

It is a gratifying fact, shown by the official statistics, that while our older communities have greatly extended their manufactures, the younger and more purely agricultural States, and even the newest Territories, have also made rapid progress. Nor has this department of American industry been cultivated at the expense of any other. There is much reason to believe that it affords the safest guarantee of the permanency and success of every other branch. Evidence bearing upon this point is found in the manufacture of agricultural machines and implements, which is one of the branches that shows the largest increase in the period under review. There is little doubt that the province of manufactures and invention in this case has been rather to create than to follow the demand. The promptness of Americans to adopt labor-saving appliances, and the vast areas devoted to grain and other staples in the United States, have developed the mechanics of agriculture to an extent and perfection elsewhere unequalled. The adoption of machinery to the extent now common in farm and plantation labor furnishes the best assurance that the development of agriculture or manufactures to their utmost, can never again justify the old charge of antagonism between them in regard to labor, or injuriously affect either by materially modifying its cost or supply.

The total value of AGRICULTURAL IMPLEMENTS made in 1860 (Table No. 8) was \$17,802,514, being an increase of 160.1 per cent. upon the total value of the same branch in 1850, when it amounted to the sum of \$6,842,611. This manufacture amounted in New England to over two and three-quarter millions of dollars—an increase of 65.8 per cent. In the middle States the value was nearly five and a half millions, having increased at the rate of 122.2 per centum. In the western States, where the increase was most extraordinary, the value of implements produced was augmented from \$1,923,927 to \$7,955,545. The increment alone in those States was, therefore, only a fraction less than the product of the whole northern section of the Union in 1850, and was greater by 313 per cent. than their own manufacture in that year. In each of the States of Ohio and Illinois, which are the largest manufacturers in the west, the value of the product exceeded two and a half millions dollars, being an increase in the former of 382, and in the latter of 235 per cent. in ten years. Michigan, Indiana, and Wisconsin increased their production of agricultural implements 1,250, 386 and 201 per cent., respectively. While in some of the southern States there has been a decrease, in Virginia, Alabama, and Louisiana the increase in this branch has been large, and in Texas, which reported none in 1850, agricultural implements of the value of \$140,000 were manufactured in 1860. The whole value produced in the southern States in the latter year (including cotton gins) was \$1,582,483, exhibiting an increase of over 101 per cent. in the last decade.

The quantity of PIG IRON returned by the census of 1860 (Table No. 9) was 884,474 tons, valued at \$19,487,790, an increase of 44.4 per cent upon the value returned in 1850. Bar and other ROLLED IRON (Table No. 10) amounted to 406,298 tons, of the value of \$22,248,796, an increase of 39.5 per cent. over the united products of the rolling mills and forges, which in 1850 were of the value of \$15,938,786. This large production of over one and a quarter million of tons of iron, equivalent to 92 pounds for each inhabitant, speaks volumes for the progress of the nation in all its industrial and material interests. The manufacture holds relations of the most beneficial character to a wide circle of important interests intimately affecting the entire population; the proprietors and miners of ore, coal, and limestone lands; the owners and improvers of woodlands, of railroads, canals, steamboats, ships, and of every other form of transportation; the producers of food, clothing, and other supplies, in addition to thousands of workmen, merchants, and capitalists and their families, who have directly participated in the benefits resulting from this great industry. It has supplied the material for an immense number of founderies, and for thousands

of blacksmiths, machinists, millwrights, and manufacturers of nails, hardware, cutlery, edged tools, and other workers in metals, whose products are of immense aggregate value and of the first necessity. The production of so large a quantity of iron, and particularly of bar iron, and the demand for additional quantities from abroad, tell of the progress of the country in civil and naval architecture and all the engineering arts; of the construction of railroads and telegraphs, which have spread like a net over the whole country; of steam-engines and locomotives; of spinning, weaving, wood, and metal working, milling, mining, and other machinery; and of all the multiform instruments of science, agriculture, and the arts, both of peace and of war; of the manufacture of every conceivable article of convenience or luxury of the household, the field, or the factory. The aggregate statistics of iron exhibit the extent to which the general condition of the people has been improved by this great agent of civilization during the ten years embraced in this retrospect.

The materials for the manufacture of iron—ore, coal and other fuel, water power, &c.—are so diffused, abundant, and cheap that entire independence of foreign supplies appears to be alike desirable and attainable at no distant period.

Probably no class of statistics possesses more general interest, as illustrating the recent progress of the country in all the operative branches, and in mechanical engineering, than those relating to MACHINERY, (Table No. 11.) Nearly every section of the country, particularly the Atlantic slope, possesses a great affluence of water power, which has been extensively appropriated for various manufacturing purposes. The construction of hydraulic machinery, of stationary and locomotive steam-engines, and all the machinery used in mines, mills, furnaces, forges, and factories; in the building of roads, bridges, canals, railways, &c.; and for all other purposes of the engineer and manufacturer, has become a pursuit of great magnitude. The annual product of the general machinists' and millwrights' establishments, as returned in the census of 1850, was valued at \$27,998,344. The value of the same branch, exclusive of sewing-machines, amounted in 1860 to \$47,118,550, an increase of over eighteen millions in ten years. The middle States were the largest producers, having made over 48 per cent. of the whole, but the southern and western States exhibit the largest relative increase. The ratio of increase in the several sections was as follows: New England, 16.4 per cent.; middle States, 55.2; southern, 38.7; and western, 12.7 per cent. The Pacific States produced machinery of the value of \$1,686,510, of which California made \$1,600,510. In Rhode Island the business was slightly diminished, but in Connecticut it had increased 165 per centum. The great facilities possessed by New York and Pennsylvania in iron, coal, and transportation, made them the largest manufacturers of machinery, which in the former was made to the value of \$10,484,863, and in the latter, \$7,243,453—an increase of 24.4 and 75 per cent., respectively. New Jersey raised her product to \$3,215,673, an increase of 261 per cent., while Delaware and Maryland and the District of Columbia exhibited an increase of 82, 41, and 667 per cent., respectively. In all the southern States the value of the manufacture, though small, was largely increased; the ratio in Virginia, the largest producer, being 236 per cent., while in Mississippi, Alabama, and South Carolina, the next in amount of production, it was 1,626, 270, and 525 per centum, respectively. This was exclusive of cotton-gins, which were included with agricultural machinery. Ohio was the largest producer in the west, and the fourth in the Union, having made to the value of \$4,855,005, an increase of 125 per cent. on the product of 1850. Kentucky ranked next among the western States, having produced over one million dollars' worth, and increased her product 213 per cent. The ratio of increase in the other western States was, in Indiana, 98; in Illinois, 24; Wisconsin, 208; Missouri, 214; and Iowa, 2,910 per cent, respectively; but in Michigan there was a small decrease in the amount manufactured.

Besides a large amount of machinery and other castings included in the re-

turns of machine shops, the value of the production of IRON FOUNDERIES, returned by the census of 1860, (Table No. 12,) reached the sum of \$27,970,193, an increase of 42 per cent. on the value of that branch in 1850, which was \$20,111,517. New York, whose extensive stove founderies swell the amount of production in that State, made to the value of \$8,216,124, and Pennsylvania, \$4,977,793, an increase of 39 and 60.9 per cent., respectively.

With the subject of iron and its various manufactures that of FOSSIL FUEL (Table No. 13) naturally associates itself. The unequalled wealth and rapid development of the coal fields of the United States as a dynamic element in our industrial progress affords one of the most striking evidences of our recent advance. The product of all the coal mines of the United States, in 1850, was valued at \$7,173,750. The annual value of the anthracite and bituminous coal, according to the Eighth Census, was *over nineteen millions* of dollars. The increase was over twelve millions of dollars, and was at the rate of 169.9 per cent. on the product of 1850. It was chiefly produced in Pennsylvania, Ohio, and Virginia. The coal mined in Pennsylvania, in 1850, was valued at \$5,268,351. In the year ending June 1, 1860, the State produced 9,397,332 tons of anthracite, worth \$11,869,574, and of bituminous coal, 66,994,295 bushels, valued at \$2,833,859, making a total value of \$14,703,433, or an excess of \$7,529,683 over the total product of the Union in 1850. Of bituminous coal, Ohio raised 28,339,900 bushels, the value of which was \$1,539,713; and Virginia, 9,542,627 bushels, worth \$690,188. The increase in Ohio was \$819,587, and in Virginia, \$222,780, in the value of mineral fuel, being at the rate of 113 per cent. in the former, and 47.6 per cent. in the latter. The increase in Pennsylvania was 179 per centum on the yield of 1850.

The development of our several valuable mines of coal, iron, lead, copper, zinc, gold, silver, quicksilver, chrome, &c., (Table No. 14,) is a subject of the highest satisfaction, constituting, as they do, the repository and fountainhead of crude materials for an immense and varied industry in the metallurgic and chemical arts. Mining in its several branches employs a very large amount of capital and great numbers of our laborious population, and shows a steady increase in the last ten years. The product of the gold mines in the Atlantic States has, however, fallen off since the discoveries of gold in California.

The increase of PRINTING PRESSES in the book and newspaper manufacture (Table No. 15) has been great beyond all precedent, and has exerted the most beneficent influence by cheapening and multiplying the vehicles of instruction. Its effects are everywhere apparent. Never did an army before possess so much of cultivated intellect, or demand such contributions for its mental food as that now marshalled in its country's defence. Many of these reading soldiers ripened their intellectual tastes during the last ten years. In fact, many divisions of our army carry the printing press and type, and the soldiers issue publications and print the forms for official papers. The press is, indeed, the great prompter of enterprise. It constantly travels with the emigrant to diffuse light and intelligence from our remotest frontiers, where it speedily calls into existence the paper-mill and all the accessories which it supports in older communities.

In New England, the Middle, and Western States the value of book, job, and newspaper printing is returned as \$39,428,043, of which eleven millions' worth consisted of books, the value of the latter being nearly equal to the whole product of the same branch in 1850, which was returned at \$11,586,549. The manufacture of PAPER, especially of printing paper, has increased in an equal ratio, the State of Massachusetts alone producing paper of the value of \$5,968,469, being over 58 per cent. of the product of the Union in 1850. New York returned paper of the value of \$3,516,276; Connecticut, \$2,528,758; and Pennsylvania, \$1,785,900.

The SEWING MACHINE (table No. 16) has also been improved and introduced, in the last ten years, to an extent which has made it altogether a revolutionary

instrument. It has opened avenues to profitable and healthful industry for thousands of industrious females to whom the labors of the needle had become wholly unremunerative and injurious in their effects. Like all automatic powers, it has enhanced the comforts of every class by cheapening the process of manufacture of numerous articles of prime necessity, without permanently subtracting from the average means of support of any portion of the community. It has added a positive increment to the permanent wealth of the country by creating larger and more varied applications of capital and skill in the several branches to which it is auxiliary. The manufacture of the machines has itself become one of considerable magnitude, and has received a remarkable impulse since 1850. The returns show an aggregate of 116,330 machines made in nine States in 1860, the value of which was \$5,605,345. A single establishment in Connecticut manufactured machines to the value of over \$2,700,000, or nearly one-half of the whole production in that year. During the year 1861 sewing-machines to the value of over \$61,000 were exported to foreign countries. It is already employed in a great variety of operations and upon different materials, and is rapidly becoming an indispensable and general appendage to the household.

Among the branches of industry which have been signally promoted by the introduction of the sewing-machine is the manufacture of men's and women's CLOTHING (Table No. 17) for sale, which has heretofore ranked with the cotton manufactures in the number of hands—two-thirds of them females—and the cost of labor employed. The increase of this manufacture has been general throughout the Union, and in the four cities of New York, Philadelphia, Cincinnati, and Boston, amounted in value to nearly forty and one-quarter millions of dollars, or over 83 per cent. of the product of the whole Union in 1856. The manufacture of shirts and collars, of ladies' cloaks and mantillas—a new branch which has received its principal impulse within the last ten years—and of ladies' and gentlemen's furnishing goods generally, form very large items in the general aggregate of this branch. They severally employ extensive and numerous establishments, many of them in our large cities with heavy capital. In Troy, New York, the value of shirt collars alone annually manufactured is nearly \$800,000, approximating in value to the product of the numerous and extensive iron founderies which have been a source of wealth to that city.

The influence of improved machinery is also conspicuously exhibited in the manufacture of SAWED and PLANED LUMBER, (Table No. 18,) in which the United States stands altogether unrivalled, as well for the extent and perfection of the mechanism employed as the amount of the product. This reached, in 1850, the value of \$58,521,976, and, in 1860, \$95,912,286, an increase of 64 per cent. in the last decade. The western States alone, in the latter year, produced lumber to the value of \$33,274,793, an increase of \$18,697,543, or 128 per cent. over their manufacture in 1850. The Pacific States and Territories produced to the value of \$6,171,431, and the southern \$17,941,162, a respective increase of \$3,841,826 and \$9,094,686 in those sections, being a ratio of 162.7 and 102.3 per centum.

Several branches of manufacture have an intimate relation to agriculture and the landed interests, and by their extension powerfully promote those interests as well as that of commerce. Surpassing all others of this or any other class in the value of products and of the raw material consumed, is the manufacture of flour and meal. The product of FLOUR and GRIST MILLS in 1850 (Table No. 19) reached a value of nearly one hundred and thirty-six millions of dollars, while in 1860 the returns exhibit a value of \$223,144,369—an increase of

\$87,246,563, or 64.2 per cent. in the last ten years. The production and increase of the several sections were as follows:

	Value of flour and meal.	Increase.	Per cent. increase.
New England States	\$11,155,445	\$4,834,959	76.5
Middle States	79,086,411	10,653,232	15.5
Western States	96,038,794	53,364,802	125.0
Southern States	30,767,457	14,185,640	85.5
Pacific States	6,096,262	4,207,930	222.8

The largest mill is in Oswego, New York, which in 1860 produced 300,000 barrels of flour; the next two, in Richmond, Virginia, made 190,000 and 160,000, respectively; and the fourth, in New York city, returned 146,000 barrels. The value of annual production of each ranged from one million and a half to one million dollars.

The manufacture of SPIRITUOUS LIQUORS in the United States (Table No. 20) employed 1,138 distilleries, independent of a large number of rectifying establishments, the product of the former being over eighty-eight millions of gallons, of the value of \$24,253,176. The middle and western States were the largest producers, the latter yielding nearly forty-five and the former thirty-seven millions of gallons of whisky, high wines, and alcohol, the aggregate value in each section being almost eleven millions of dollars. It is satisfactory to observe, that more than ninety-five per cent. of all the spirits made, was from materials of domestic production, a little over four million gallons of New England rum having been the product of imported molasses.

The manufacture of MALT LIQUORS, (Table No. 21,) though of less magnitude, and far less pernicious in its effects, shows a still larger increase. It derives its material wholly from agriculture, and its extension promises more substantial benefits to the country than the last.

The northern States returned 969 breweries, or more than double the number in the Union in 1850. The quantity of all kinds of malt liquors made, including 855,803 barrels of lager beer, was 3,235,545 barrels—an increase of 175 per cent. upon the total product of 1850, while its value was returned at \$17,977,135, being more than three times the amount produced by breweries in that year. Nearly one-half of the whole quantity was made in New York and Pennsylvania. The former had 175 establishments—45 of them in the city of New York—and the latter State 172, of which Philadelphia contained 68. The manufacture of lager beer was much increased in all the middle and western States, about 41 per cent. of the whole being the product of the two States last named. Among the eastern States, Massachusetts, and among the western States, Ohio, Illinois, and Missouri, were the largest producers of malt liquors. There were 71 breweries in California and 8 in Oregon, producing together about 7 per cent. of the total value of the manufacture.

Among the great branches of pure manufacture in the United States, that of COTTON GOODS holds the first rank in respect to the value of the product and the amount of capital employed. Aided by the possession of the raw material as a product of our own soil, and by the enterprise and ingenuity of our people, this valuable industry has grown with a rapidity almost unrivalled.

The total value of cotton goods (Table No. 22) manufactured in New England was \$80,301,535, and in the middle States \$26,272,111—an increase of 83.4 per cent. in the former, and 77.7 in the latter. The remaining States produced to the value of \$8,564,280, making the whole production during that year

\$115,137,926, against \$65,501,687, the value of this branch in 1850, or an increase in the general business of nearly 76 per centum in ten years. In the States of Maine and New Jersey the manufacture increased in the same time 152 per cent.; in Pennsylvania, over 102 per cent.; in New Hampshire and Connecticut, over 87 per cent.; in Massachusetts nearly 69 per cent., and in Rhode Island 88.7 per cent. The total production in this branch was at the rate *per capita* of \$3 69 for every individual in the Union, equivalent to $46\frac{1}{2}$ yards of cloth for each, at the medium price of 8 cents per yard. The average product per head in 1850 was $32\frac{1}{4}$ yards. The increase alone has, therefore, been at the rate of 11 yards for each person, or nearly equal to the average annual consumption *per capita* in 1830, when it was estimated to amount to twelve yards. The number of hands employed in the manufacture in 1860 was 45,315 males, and 73,605 females, an increase in the male operatives of 10,020, and in the female of 10,944 since 1850. The average product of the labor of each operative was \$969. The number of spindles was returned at 5,035,798, being an increase of 1,402,105, or 38.5 per cent. over the aggregate in 1850, which was estimated at 3,633,693. The New England States possess 3,959,297, or 78.6 per cent. of the whole, while Massachusetts alone employs 1,739,700, or 29.3 per cent. of the number returned in the Union. The increase of spindles in the last decade was, in New England, 1,208,219, or 30 per cent. In the State of Maine, 186,100, or 163.3 per cent.; in the State of New Hampshire, 229,484, or 52.1 per cent.; in the State of Massachusetts, 451,609, or 35 per cent.; in the State of Rhode Island, 141,862, or 22.7 per cent.; in the State of Connecticut, 211,188, or 83.1 per cent.; while in Vermont it exhibited a decrease.

The product per spindle varies in the different States, partly accounted for by the fact that many manufacturers purchase yarns which have been spun in other States.

The product of cotton goods per spindle is as follows: In Maine, \$22 12; Massachusetts, \$21 12; New Hampshire, \$24 87; Vermont, \$18 13; Rhode Island, \$16; Connecticut, \$16 46. The average in the New England States is \$20 30; in the middle States, \$30 48, and in the whole Union, \$22 86.

The quantity of cotton used in the fabrication of the above goods was 364,036,123 pounds, or 910,090 bales of 400 pounds each. Of this amount the New England States consumed 611,738 bales, and Massachusetts alone 316,665. The consumption per spindle in that year in the various States and sections was as follows:

	No. of spindles.	Pounds of cotton.	Pounds per spindle.
Maine.....	300,000	23,438,723	78
New Hampshire	669,885	39,212,644	58.5
Vermont	19,712	1,057,250	53
Massachusetts	1,739,700	125,665,080	72.2
Rhode Island	766,000	33,521,608	50 2
Connecticut	464,000	15,799,140	34
In New England.....	3,959,297	237,844,854	61 8
In the Middle States	881,661	76,055,666	88.26
In the United States	5,035,798	364,036,123	72 2

When we consider the large number of hands, and especially of women and children, who find employment in this business, the quantity of raw material, of machinery and of fuel, exclusively of American production, employed in this branch, and the amount of comfortable clothing and household stuffs supplied

at cheap rates, or the amount it contributes to the internal and foreign commerce of the Union—its progressive increase is a subject of the highest satisfaction, and its growth both here and abroad is one of the marvels of the nineteenth century.

The returns of WOOLLEN MANUFACTURES (Table No. 23) show an increase of over fifty-one per cent. in ten years. The value of woollen and mixed goods made in 1850 was \$45,281,764. In 1860 it amounted to \$68,865,963. The establishments numbered 1,909, of which 453 were in New England, 748 in the middle, 479 in the western, 2 in the Pacific, and 227 in the southern States. The aggregate capital invested in the business was \$35,520,527, and it employed 28,780 male and 20,120 female hands, 639,700 spindles, and 16,075 looms, which worked up more than eighty million pounds of wool, the value of which, with other raw materials, was \$40,360,300. The foregoing figures include satinets, Kentucky jeans, and other fabrics of which the warp is cotton, though usually classed with woollens. In the manufacture of these mixed goods the amount of cotton consumed is 16,008,625 pounds, which, with 364,036,123 pounds used in making cotton goods, as previously stated, amounts to 380,044,748 pounds, or 950,112 bales, exclusive of a considerable quantity used, annually, in household manufactures, and for various other purposes.

The largest amount of woollens was made in New England, where the capital was nearly twenty millions of dollars, and the value of the product \$38,509,080, but little less than the total value in 1850. More than half the capital, and nearly one-half of the product of New England belonged to Massachusetts, which had 131 factories of large size. Rhode Island ranked next, and had increased its manufacture 163 per cent. in ten years, that of Massachusetts being 48 per cent. The value of woollens produced in the middle States was \$24,100,488, in the western \$3,718,092, and in the Pacific and southern \$2,538,303. The sectional increase was, in New England 52.1, in the middle States 54, and in the south 107—the last showing the greatest relative increase. Pennsylvania, next to Massachusetts, was the largest producer, having 447 factories, which made \$12,744,373 worth of woollen and mixed fabrics, an increase of 120 per cent. A value of \$8,919,019 was the product of 222 establishments in the city of Philadelphia.

The State of New York holds the third rank in relation to this industry, its manufactures amounting to more than nine millions of dollars. The woollen manufactures of Maryland exhibit an increase of 86 per cent. In Ohio, which produced in 1850 a greater value of woollens than all the other western States, there was a decrease on the product of 1850, owing, probably, to the shipments of wool to Europe, which, in 1857, was found to be the most profitable disposition of the rapidly increasing wool crops of that State. In Kentucky, now the largest manufacturer of wool in the west, the product was \$1,128,882, and the increase in ten years 40.4 per cent.; while in Indiana, which ranks next, it was 31 per cent., and in Missouri 18.8, on the product of 1850.

The extension of this important manufacture is a subject of great interest to the country, inasmuch as our climate renders woollen clothing necessary throughout a large part of the Union during much of the year; and because it would supply the best market to the wool-grower.

The quantity of wool returned for the whole Union in 1850 was upwards of fifty-two and a half millions of pounds. Sheep raising has been greatly extended and improved since that date in Ohio, Texas, California, and other States, and the clip in 1860 amounted to 60,511,343 pounds, an increase of 15.2 per cent. in ten years. The yield still falls far short of the consumption, and large quantities continue to be imported, notwithstanding the amount of territory adapted to sheep husbandry.

The manufacture of LINEN GOODS has made but little progress in this country. A few mills, chiefly in Massachusetts, make crash and other coarse fabrics;

the largest two in that State produced six million yards in 1860. Others are extensively engaged in making twines, shoe and other threads. It is to be regretted that the manufacture of flax has not attained greater magnitude in a country where the raw material is so easily and cheaply grown. Farmers throughout the west have raised the crop simply for the seed, and thrown out the fibre as valueless.

The manufacture of fabrics from **FLAX COTTON** has been commenced, and success in a new branch of industry is confidently expected. The inventive genius of our countrymen has perfected machinery for the preparation of flax for spinning, which can be furnished, it is alleged, at as low a rate as the product of southern cotton fields.

The manufacture of **SEWING SILKS** is extensively carried on in this country. Including tram, organzine, &c., the production exceeded five million dollars in the States of Connecticut, New Jersey, Massachusetts, Pennsylvania, and New York—their relative values being in the order mentioned. Ribbons are made to a small extent, but the chief manufactures of silk consist of ladies dress trimmings, coach lace, &c., of which the cities of Philadelphia and New York produce to the value of \$1,260,725 and \$796,682, respectively.

The production of **LEATHER** (Table No. 24) is also a leading industry of much importance to the agriculturist and stock raiser, as well as to the commercial interest, inasmuch as it consumes all the material supplied by the former, and feeds an active branch of our foreign import trade. The tanning and currying establishments of the United States produced in 1850 leather, exclusive of Morocco and patent leather, to the value of \$37,702,333. The product of the same branch in 1860 reached \$63,090,751, an increase of nearly 67 per centum. In the New England States it was \$16,333,871, in the Middle States, \$36,344,548, and in the Western States, \$5,986,457; being an increase 66.6 per cent., 90.7 and 13.3 in those sections, respectively. The Pacific States and Territories, (including Utah,) which returned no leather in 1850, produced in 1860 to the value of \$351,469. The largest producers of leather are New York, \$20,758,017; Pennsylvania, \$12,491,631; and Massachusetts, \$10,354,056; an increase in those States of 111.7, 98.4, and 82.3 per cent., respectively. Including Morocco and patent leather the aggregate value produced in the Union in 1860 exceeded sixty-seven millions of dollars.

If we add to the sum total of this manufacture the aggregate value of all the allied branches into which it enters as a raw material, or take an account of the capital, the number of hands, and the cost of labor and material employed in the creation and distribution of its ultimate products, it is doubtful if any other department of industry is entitled to precedence over that of leather.

The manufacture of **BOOTS and SHOES** (Table No. 25) employs a larger number of operatives than any other single branch of American industry. The census of 1850 showed that there were 11,305 establishments, with a capital of nearly thirteen millions of dollars, engaged in making boots and shoes to the value of \$53,967,408, and employing 72,305 male and 32,948 female hands. The returns of 1860 show that 2,554 establishments in the New England States employed a capital only \$2,516 less than that of the whole Union at the former date; and with 56,039 male and 24,978 female employes produced boots and shoes of the value of \$54,767,077 or eight hundred thousand dollars more than the entire value of the business in 1850, and 82.8 per centum in excess of their own production in that year. Massachusetts increased 92.6 per cent., having made boots and shoes of the value of \$46,440,209, equal to 86.6 per cent. of the general business in 1850. The State of New York returned 2,276 factories, with an aggregate production of \$10,878,797; and New England, New York, Pennsylvania, and New Jersey together produced \$75,674,946 worth of these articles, being 40.4 per cent. more than the product of all the States in 1850, and 67.9 per cent. more than their own manufacture in that year. The three

counties of Essex, Worcester, and Plymouth, in Massachusetts, produced boots and shoes to the value severally of about $14\frac{1}{2}$, $9\frac{1}{2}$, and $9\frac{1}{4}$ millions of dollars. The largest production of any one town was that of Philadelphia, in which it amounted to \$5,329,887; the next that of Lynn, Massachusetts, was \$4,867,399; the third, Haverhill, \$4,130,500; the fourth, New York city, \$3,869,068. The largest production of a single establishment was of one in North Brookfield, Massachusetts, and amounted to over \$750,000. This establishment was the largest of five the same proprietors had in operation that year, the total production whereof was over one million pairs of boots and shoes, valued at more than thirteen hundred thousand dollars! Machinery propelled by steam power is now used in many large manufactories with highly satisfactory results.

INDIA RUBBER GOODS were made chiefly in Connecticut, New York, New Jersey, and Massachusetts to the value of \$5,729,900, an increase of 90 per cent. in the last decade.

The value of CABINET FURNITURE (Table No. 26) made in 1860 in the New England, Middle and Western States reached the sum of \$22,701,304, an increase of 39.8 per cent. over the product of those States in 1850, and exceeding the production of the whole Union in 1850. New York returned in 1860 furniture of the value of \$7,175,060, (or 40.6 per cent. of the whole amount made in 1850.) Massachusetts, \$3,365,415, and Pennsylvania, \$2,938,503. The growth of this branch keeps pace with the increase of population and wealth, and serves to swell the amount of our exports. It gives employment at remunerative prices to skilled labor, which it attracts from the crowded labor-markets of Europe.

Our advance in wealth and refinement is attested by the rapid increase in the manufacture of piano fortes and other MUSICAL INSTRUMENTS, (Table No. 27.) New England, New York, and Pennsylvania produced musical instruments to the value of \$5,791,807; an increase of 150 per cent. over their own production in 1850, and 124 over the whole value of that branch in the Union in the same year. New York alone made \$3,392,577 worth, being \$811,862 more than the whole amount returned in 1850. In this branch, our manufacturers have achieved marked success. Without claiming for them superiority over their brethren in France and Germany, it is admitted that church organs and other instruments made in this country are better suited to the climate, and in other respects fully equal to those which come from the most celebrated establishments in Europe.

The increased amount of the precious metals and the greater ability of all classes to indulge the promptings of taste or luxury, have added greatly to the manufacture of JEWELRY, (Table No. 28,) and of all kinds of gold, silver, and plated wares. In the New England and Middle States, the production of jewelry and watches reaches over eleven millions in value; of silver, silver-plated wares, &c., over six and one-half millions; making nearly eighteen millions of dollars, exclusive of gold leaf and foil, and the assaying and refining the precious metals, exceeding the product of the whole Union, in 1850, by \$7,016,908 in value; an increase of over sixty-four per cent., and of seventy per cent. on the production of those States in that year. The production of cheap jewelry has been greatly augmented by recent improvements in electro-metallurgy.

The manufacture of American WATCHES, commenced within the last ten years in Boston as an experiment, has proved eminently successful. Unable, heretofore to compete with the low-priced labor of European workmen, our ingenious countrymen have perfected machinery, by the aid of which watch movements are fabricated equal, if not superior, to the hand-made. The continued growth of this branch will diminish the importation of foreign watches, and may, at no distant period, earn for our country a reputation in this manufacture equal to that she enjoys in the kindred branch of clock-making. Gold and silver watch cases are now produced to a very large extent, chiefly in the cities of Philadelphia, New York, and Newark.

Improvements in technical CHEMISTRY have added largely to the value of its products. The manufacture of articles strictly classed exclusive of white lead, ochres, paints, varnish, glue, perfumes, cement, pearl ashes, &c., amounted, in 1850, to the value of nearly five millions of dollars. The production, in 1860, exhibited a considerable increase. This branch is susceptible of almost unlimited extension and application to the manufacture of commercial and useful articles from the refuse of every other industry and the diversified products, vegetable, animal, and mineral, of our lands. Many of the chemical branches, apart from the money value of their manufactures, are of the highest economical importance to our country as auxiliaries to almost every other industry of the people. Chemistry has revealed but a tithe of the vast wealth of its resources.

The manufacture and consumption of GAS, (Table No. 29,) for domestic and other purposes, which is one of the remarkable fruits of chemistry, has been greatly increased, not only in our northern cities, but in our towns and villages throughout the Union. The quantity returned in 1860 was nearly a thousand million feet of the value of eleven million dollars, but the quantity made exceeded 5,000,000,000 cubic feet, the value of which was thirteen millions of dollars.

The making and refining of SALT (Table No. 30) in the United States in 1850 employed 340 establishments, and the value of their products was \$2,177,945. The four States of New York, Virginia, Ohio, and Pennsylvania, which, in the order named, are the principal salt-producing States, returned in 1860, according to the Eighth Census, nearly twelve million bushels, the cost of which was \$2,200,000, an average of about 18½ cents per bushel. Texas, Massachusetts, and California are also salt-producing States. About 60 per cent. of the whole was made in New York, at an average cost of 15 cents per bushel.

In the aggregate product of the FISHERIES (Table No. 31) there was an increase of 28.5 per cent. over their value in 1850. The total value of the lake, river, shore, and deep-sea fisheries, including oysters to the amount of \$382,170, and \$7,521,588 as the product of the whaling business, increased in 1860 to \$12,924,092. Of this amount \$6,526,238 in the whale and in the cod, mackerel, halibut, and other shore fisheries, belonged to the whaling and fishing industry of Massachusetts, and constituted nearly seventy-two per cent. of the whole. This favorite occupation of her enterprising sons has been which has been over two and a quarter centuries engaged in the principal distributing fish market of the Union, and has raised the State to the third rank among New England seaports in the amount of her foreign commerce. The latter has become the largest seat of the whaling industry in the United States, if not in the world, and distributes the product to the large cities of the Union and to foreign countries.

The State of Maine holds the second place in respect to the value of her fisheries, and returned \$1,050,755 as the value of the cod, mackerel, and other fisheries taken by its fishermen. North Carolina had the largest shad fishery in value to \$99,768. New Jersey, New York, and Virginia took the largest amount of oysters, and Michigan returned the largest value in 1860 amounting to \$250,467.

A slight decline in the value of the whale fishery arose from the scarcity of the whale in its former haunts. The consequent deficiency of teeth, and oil, as raw materials, proved embarrassing to some branches of the fishery, particularly those employing whalebone. The scarcity of whale fish oils in the arts has been supplied by an increased production of fish oils, especially by that beneficent law of compensation which pervades the operations of nature, and when one provision fails her children, opens to them the exhaustless storehouse of her material resources, or leads out

energies upon new paths of discovery for the supply of their own wants. Thus, when mankind was about to emerge from the simplicity of the primitive and pastoral ages, the more soft and fusible metals no longer sufficed for the artificer, and veins of iron ore revealed their wealth and use in the supply of his more artificial wants, and became potent agents of his future progress. When the elaboration of the metals and other igneous arts were fast sweeping the forests from the earth, the exhaustless treasures of fossil fuel, stored for his future use, were disclosed to man, and when the artificial sources of oil seemed about to fail, a substitute was discovered flowing in almost perennial fountains from the depths of these same carboniferous strata. A decline of the cod and whale fisheries is, nevertheless, to be regretted, as they have been from the earliest period of our history the nurseries of seamen and of our naval and commercial marine, and therefore contributing to the national defence, to foreign commerce, ship-building, agriculture, and other important interests.

PETROLEUM.—An important development of the natural resources of the country, and a valuable addition to its exports, have been made by the discovery, within two or three years, that certain indications, known to the aboriginal and early European inhabitants of the western country, of natural reservoirs of inflammable oil existing upon the headwaters of the Alleghany river in New York and Pennsylvania, were but the clue to apparently inexhaustible supplies of native oil, accessible at no great depth throughout an extended belt of country, embracing the bituminous coal measures of several States.

Petroleum, rock, or mineral oil, a natural product of the decomposition of organic matter, emitted from the soil in various formations, particularly those of rock salt, was known and employed to some extent by the ancients, having been mentioned by the father of history twenty-three hundred years ago, and by Greek and Roman writers of later date. In its more fluid form, as found on the shores of the Caspian Sea, near the Irawaddy of Burmah, in Italy, and some parts of our country, it has borne the name of naptla, while the more solid elements of the same substance predominated in the articles known as asphaltum and bitumen, found abundantly in the Great Pitch Lake of the Island of Trinidad, near the Dead Sea in Judea, and elsewhere. Petroleum is nearly identical in properties with the artificial oils, which have been long derived from the destructive distillation of different minerals, as cannel coal and brown coal, or lignite, bituminous shales, sands, clays, peat, &c., which have been the subject of numerous patents in Europe and America, and within the last eight years have been manufactured to a considerable extent in the United States and the neighboring provinces, until the native petroleum springs opened a source of cheaper supply.

As a product of our own country this remarkable substance was brought to the notice of the white population, as early as the middle of the last century, by the Seneca Indians, who found it upon Oil creek, a branch of the Alleghany, in Venango county, Pennsylvania, and near the head of the Genesee river, in New York, whence it received the name of "Seneca oil" and "Genesee oil." It was used by the natives in their religious ceremonies, and as medicament for wounds, &c. For the last-named purpose it has been long collected and sold in small quantities at a high price. A perennial flow of oil has been known to exist on Oil creek, above referred to, for a century. For the last forty years the spring has been enclosed in a vat or structure of wood and stones, which was daily skimmed by the proprietor and made the source of considerable revenue. We have seen extensive diggings in this region made by the French more than a century since, while that nation held the valley of the Mississippi, which were evidently made with a view to ascertain the basis or source of what, no doubt, impressed the French officers as a most interesting and curious development of the bounty of nature. Petroleum, doubtless, formed an article of considerable traffic between the Indians and traders of that region; as we have

seen, in some old account books of the last century, "gallons" and "kegs" of Seneca oil credited to Indians.

Its existence in any vast amount appears to have been unknown until 1845, when a spring was "struck," while boring for salt, near Tarentum, thirty-five miles above Pittsburg, on the Alleghany. Experiments having proved its constituents to be nearly the same as those of the artificial carbon oil, a company was organized in New York to attempt its purification by the same process applied to the latter. But little was effected, however, and in 1857 Messrs. Bowditch and Drake, of New Haven, commenced operations at Titusville, on Oil creek, where traces of early explorations were found, and in August, 1859, a fountain was reached by boring, at the depth of seventy-one feet, which yielded 400 gallons daily. Before the close of the year 1860, the number of wells and borings was estimated to be about two thousand, of which seventy-four of the larger ones were producing daily, by the aid of pumps, an aggregate of eleven hundred and sixty-five barrels of crude oil, worth, at twenty cents a gallon, about ten thousand dollars. Wells were soon after sunk to the depth of five or six hundred feet, and the flow of petroleum became so profuse that no less than 3,000 barrels were obtained in a day from a single well, the less productive ones yielding from fifteen to twenty barrels per diem. In several instances extraordinary means were found necessary to check and control the flow, which is now regulated in such wells according to the state of the market, by strong tubing and stop-cocks. The quantity sent to market by the Sunbury and Erie railroad from the Pennsylvania oil region, which has thus far been the principal source, increased from 325 barrels in 1859 to 134,927 barrels in 1861. The whole quantity shipped in the last-mentioned year was nearly 500,000 barrels. Since August, 1861, the product has rapidly increased. The present capacity of the wells is estimated at 250,000 to 300,000 barrels per week. So important, however, have the operations in this article become that a railroad, we understand, has been chartered in Pennsylvania exclusively for the transportation of the oil to market. From a recent number of the "Register," a newspaper published at Oil City, Pennsylvania, we copy the following statement respecting the product of petroleum in that vicinity: "We learn that the number of wells now flowing is seventy-five, the number of wells that formerly flowed and pumped is sixty-two; the number of wells sunk and commenced is three hundred and fifty-eight; total, four hundred and ninety-five. The amount of oil shipped is set down at 1,000,000 barrels; amount on hand to date, 92,450 barrels; present amount of daily flow, 5,717 barrels. The average value of the oil, at \$1 per barrel, is \$1,092,000; average cost of wells, at \$1,000 each, is \$495,000; machinery, building, &c., from \$500 to \$700 each, \$500,000. The total number of refiners is twenty-five. The detailed report of the condition of the wells shows that production is on the increase. Holders are firm at fifty cents per barrel at the wells, and don't seem to care about selling any great amount at that price." With increased facilities for getting it to the seaboard at a cheap rate for transportation, the operations will doubtless become much more extended than at present.

The exportation of crude and refined petroleum from the principal Atlantic cities to Europe, South America, and the West Indies, has already become considerable, the larger proportion being shipped to England. Much of it is sent to Europe in this crude state, in which form it is said to be preferred for the sake of the collateral products obtained in the process of refining. It is probable, however, that the highly inflammable character of the unrefined article, owing to the presence of certain gaseous or exceedingly volatile compounds may prove an objection to its shipment in that state.

The quantity exported from the cities of Philadelphia, New York, Boston, Baltimore, and San Francisco, from the 1st of January to the 1st of April, 1862, amounted to 2,342,042 gallons, valued at \$633,949. The receipts at Cincinnati,

during the same period, of carbon and petroleum oils, were 519,960 gallons, or 13,000 barrels, nearly one-half of which was petroleum oil. The exports from the three cities first mentioned, from the first of January to the 16th of May of the present year, were 3,651,130 gallons, worth \$889,886, and the shipments in the last week of that period from the same places, were 255,600 gallons, valued at \$42,160.

A large reduction has taken place in the price since the commencement of the trade, and particularly during the last few months. The price of crude petroleum in Philadelphia on the 4th January, 1862, was from 22½ to 23 cents a gallon, and of refined oil 37½ to 45 cents. On the 29th March the prices had declined at the same place to 10 and 12 cents for crude, and 25 to 32 cents for refined oil, while the most recent price current lists place it at 9 and 19 cents. Although the capacity of the existing wells already exceeds a profitable demand, there appears to be no assignable limit to the flow, or to the localities which may be found to yield it, whenever an augmented demand shall warrant farther search or increased production. The bituminous coal areas of the United States are estimated to cover upward of 62,000 square miles in eight of the middle, southern, and western States. Springs and reservoirs of petroleum have been discovered throughout nearly their whole extent. They have also been noticed by Captain Stansbury on a branch of the Yellow creek, 83 miles from Salt Lake City, in Utah, on the route to Fort Leavenworth. They exist also in some of the neighboring British provinces. It is probable that the saliferous strata of our western country may be generally found to yield this interesting mineral product.

The importance of this article is not limited to its value as an item in the export trade of our cities. Attention appears to have been first directed to it on account of the demand for a safe and cheap material for illumination, in place of the dangerous compounds of turpentine and other explosive hydro-carbons, as well as for lubricating purposes in which it has proved to be a valuable substitute for animal oils. There is no doubt that the various other uses of crude petroleum, or its constituents, will render it a valuable acquisition to the arts. The business of refining the raw product, in order to remove from it all corrosive and volatile elements, already employs a number of establishments, and will become one of some magnitude. Practical chemistry is daily adding to the number and variety of uses which the substances eliminated in the process of rectification may be made to subserve in the arts.

Although the extraction of oil, pitch, and tar from bituminous shale was the subject of a patent in England as early as 1695, and the manufacture and purification of oil, gas, and other hydro-carbons from coal received several improvements by the Earl of Dundonald and others at a later period, the patent of Mr. Young, of Manchester, secured in England in 1850, and in the United States in 1852, "for the obtaining of paraffine oil, or an oil containing paraffine, and paraffine from bituminous coal," appears to have given the first great impulse to the manufacturing of these oils as a source of artificial light. The patent, which covered a very successful process, has given rise to suits at law, one of which was recently brought, without success, to restrain the sale in England of petroleum oils, by the name of American paraffine oil, as damaging to the sale of his "paraffine oil," on account of the highly inflammable character of the former.

Illuminating oil from coal appears to have been made as early as 1846 by Dr. Gesner, of Nova Scotia, and in 1854 the Kerosene Oil Company, on Long Island, commenced the first manufacture of carbo-hydrogen oil under patents secured by Dr. Gesner, using cannel coal from England, New York, and other parts of the United States. The Breckenridge coal-oil works on the Ohio, at Cloverport, Kentucky, were commenced in 1856, and were soon followed by others, to the number of twenty-five in operation in 1860 in Ohio alone, with a working capacity of three hundred gallons of light oil each, per diem. There were then about fifty-six factories in the United States, exclusive of some fifteen

engaged altogether on petroleum, and several small private coal-oil works. The capital expended in coal-oil works and cannel coal mines was estimated at nearly four million dollars. The manufacture of coal-oil lamps, resulting from the use of the oil, formed the principal business of sixteen companies, who employed 2,150 men and 400 women and boys, and work for 125 looms in making the lamp-wick.

The cannel coal employed by them, as well as wood, peat, and other substances of vegetable origin, when subjected to destructive distillation in close vessels, at a heat below that at which they yield gas in abundance, affords a large quantity of a light supernatant oil, amounting to about one-fifth of the product, which, having been purified and re-distilled, yields a very volatile and naphthalous fluid, of light specific gravity, containing some paraffine oil, and highly inflammable, owing to the presence of benzoïn or benzole. There is also obtained a heavier oil, which is a safe and valuable burning oil, a denser lubricating oil, and solid paraffine, a peculiar white crystalline substance, beautifully adapted for candles, and now manufactured to some extent for that and other practical uses. The petroleum of our country has been found to be a more economical source for these several compounds of carbon and hydrogen, and enables the manufacturer to dispense with the first stage of the process referred to. The cheapness of crude petroleum, and the simple and comparatively unexpensive process by which a safe and economical illuminating oil may be obtained, give an unusual interest to this subject, as affording the means of preventing the great loss of life shown by the recent census to result from the dangerous compounds so extensively used for that purpose. Although the petroleum oils, when imperfectly rectified, so that all the benzole has not been expelled, are exceedingly explosive, owing to the heat generated by the combustion of the solid paraffine readily vaporizing and igniting the more ethereal portion, it may with great facility be freed from all volatile substances, and a very simple and practical test enables the purchaser to ascertain its fitness for use. The precautions required in the treatment of petroleum, as well as the expense of thoroughly purifying it, being somewhat greater than with coal oils, many are tempted to neglect it or even to add a portion of the lighter and cheaper oil to make the heavy oil burn more readily.

All these oils possess an advantage over other kinds in the fact, that when once properly deodorized, they do not become rancid or ferment by keeping, but rather lose by age any odor they may have retained.

Of eight several products obtained from petroleum by chemical analysis, two or three only were solidified by cold of fifteen degrees below zero, the first three or four remaining perfectly fluid, and none possessed corrosive qualities, showing their fitness as lubricators. Experiments have shown that crude petroleum is admirably adapted to the manufacture of gas, and have led to the expectation that its use will greatly reduce the cost of its manufacture, if it does not entirely supersede the use of coal for that purpose. The "carburation of gas," by attaching to the gas-burner a reservoir of oil, through which the gas is made to pass before combustion, has been found greatly to increase the economy and illuminating power of coal-gas.

The various collateral and residuary products of the distillation, which have been generally wasted heretofore, will all doubtless be utilized as the progress in analytical and technical chemistry throws more light upon their nature and relations. Several of them are already employed in Europe, if not in this country, in the manufacture of some of the new and beautiful dyes which practical science has recently introduced in the arts. Benzine, which it is the object of the rectifier to eliminate, is used, to some extent, as a flavoring material, though some recent facts make it doubtful if it is wholly innocuous to the health.

The acids, caustic alkalies, and other materials used in the purification of the crude qualities of petroleum may all be restored to use or employed as fertilizers, and the dense, pitchy liquids obtained in the manufacture are available in

the composition of water-proof cements, roofing, varnish, and fuel. The absence of fatty acids may possibly prevent the saponification of these oils with alkalis for the manufacture of soap, but the more extended use of petroleum for the purposes we have named, which will be effected by time and improved manipulations of the article, will suffice to render it a most valuable acquisition to the raw materials and manufactures of the country.

Having partially reviewed the progressive industry of our country during the last decade, and seen the advancement in all that relates to the peaceful arts, the numerous improvements made in the implements and enginery of warfare, which are patent and undeniable, deserve consideration. Our improved fire-arms, especially rifles and pistols, have obtained a reputation not alone in Europe, but in Africa, Asia, and the islands of the sea, the traveller finds that his revolvers of American invention and manufacture exert a salutary influence on the Bedouin and the robber.

The machinery for making the various parts of rifles and other fire-arms, which, in its automatic exercise, seems almost endowed with reasoning faculties, owes its origin to the inventive genius of New England. The Enfield rifle was transplanted to England by a son of Vermont, under whose superintendence the arms were made. And even the Armstrong gun, which obtained for its reputed inventor the honor of knighthood, was invented in this country, for a model was submitted and the principle demonstrated to scientific gentlemen at Harvard College anterior to its appearance in Great Britain. (See notes.)

In the year preceding June 1, 1860, a year devoted to peaceful pursuits, the manufacture of fire-arms was limited, and yet two establishments in a single city of Connecticut produced to the value of over one million of dollars. Had the national inventory been taken two years later, the magnitude of this and kindred branches of manufacture, stimulated by the necessities of the country, would have excited astonishment. (See note on fire-arms, p. 118.)

Without any special stimulus to growth—depressed, indeed, during the years 1857 and 1858, in common with other public interests, by the general financial embarrassments of those years,—and with a powerful competition in the amazing growth of manufactures in Great Britain and nearly every other nation of Europe, the manufactories of the United States had nevertheless been augmented, diversified, and perfected in nearly every branch, and almost uniformly throughout the Union. Domestic materials, whether animal, vegetable, or mineral, found ready sales at remunerative prices, and were increased in amount with the demand, while commerce and internal trade were invigorated by the distribution of both raw and manufactured products. Invention was stimulated and rewarded. Labor and capital found ample and profitable employment, and new and unexpected fields were opened for each. Agriculture furnished food and materials at moderate cost, and the skill of our artizans cheapened and multiplied all artificial instruments of comfort and happiness for the people. Even the more purely agricultural States of the south were rapidly creating manufactories for the improvement of their great staples and their abundant natural resources. The nation seemed speedily approaching a period of complete independence in respect to the products of skilled labor, and national security and happiness seemed about to be insured by the harmonious development of all the great interests of the people. Peace reigned within our borders and waited upon our name abroad. But in an evil hour the tide of prosperity has been stayed, whether to be rolled back or not, the ninth census will reveal.

BANKS AND INSURANCE.

(APPENDIX—TABLE NO. 34.)

* Among the evidences of prosperity and general accumulation of wealth in the United States, the multiplication of banks with increased aggregate capital is

one of the most significant. When, as in this country has been generally the case, individual promises representing produce and merchandize, and made available through the instrumentality of banks, are almost the sole means by which commodities pass from the producers to the consumers, the increased action of the banks becomes the index of larger production and more active trade. Where crops and the products of manufacturing industry are more abundant, the aggregate amount of paper created by their interchange is larger, and the negotiations of this paper require greater banking facilities. This want usually manifests itself in a more lucrative banking business, which draws more capital into that employment. Such a state of affairs presented itself during the decade which closed with 1860. The bank movement in the United States during that period underwent great expansion without becoming less sound. In that respect it presented a strong contrast to the expansion that occurred in the decade which ended with 1840. In that period a season of speculation in bank stocks and wild lands manifested itself, and the paper created for bank negotiation represented imaginary or speculative values rather than commodities produced. Those values were never realized, and the whole paper system based on them collapsed. If we compare the aggregate features of the banks at each decade with the population and the sum of the imports and exports for corresponding dates, the results are as follows:

Years.	No. of banks.	Capital.	Loans.	Specie.	Circulation.	Import & export.	Population.
1830..	330	\$145,192,268	\$20,461,214	\$22,114,917	\$61,323,898	\$144,726,428	12,866,020
1840....	901	353,442,692	462,896,523	33,105,153	106,968,572	239,227,465	17,069,453
1843....	691	228,661,948	254,544,937	33,505,866	58,563,608	149,090,279	.....
1850....	672	227,463,074	412,607,653	48,677,138	155,012,911	330,037,038	23,191,876
1860....	1,562	421,620,095	691,945,560	83,594,537	207,102,477	762,288,550	31,445,920

The year 1843 was that of the lowest depression after the extensive liquidation that followed the expansions of 1837-'39. In that year the bank credits were, however, large, as measured by the foreign trade or the sum of the imports and exports, but an internal trade had been developed through the settlements of the western country which required more credits. The operation of the general bankrupt law aided in clearing away the wreck of over two hundred banks that had failed, and which failures involved that of several sovereign States that had loaned their credits for bank capital.

The elements of prosperity were now again active, and banking facilities were required to a greater extent. The severe losses the public had suffered made some more comprehensive guarantee necessary to a full restoration of confidence in bank paper. In New York, in 1838, a new principle had been adopted—that of requiring the banks to deposit security for their circulating notes and holding stockholders liable to an amount equal to the value of their shares. On this basis the banking of New York was thenceforth to operate; and the principle, as its value became recognized, was gradually adopted in other States.

The failure of the Irish harvests of 1846-'47, followed by those of England in 1848-'49 by creating a great demand for American breadstuffs, stimulated business and gave a new impulse to banking. The year 1850 showed an amount of foreign trade more than double that of 1843. With the increase of business the banks were very prosperous, as is manifest in the fact, that although the capital of the banks was no more in that year than in 1843, their discounts were one hundred and fifty millions, or 60 per cent. greater. Thus the decade opened with a very lucrative banking business, and amid the greatest excitement in relation to the gold discoveries of California. The spirit of enterprise abroad was very strong, and the impression that prices were to rise by reason of the

depreciation of gold was prevalent; hence the general desire to operate, in order to avail of the anticipated profits. Industry of all descriptions was very active and productive, and there never was a period when the national capital accumulated so fast, a remarkable evidence of which was afforded in the vast amount expended in the construction of railroads; while, of the large capital accumulated, a considerable portion was employed in banking. The incorporated bank capital increased nearly two hundred millions, and the private bank capital half as much. The report of the Treasury Department gave the latter amount at \$118,036,080. The distribution of the incorporated banks among the several States is given in the Appendix, (Table No. 33.)

The increase of bank capital was large in the Atlantic cities, particularly in Boston and New York, of which the number and capital were respectively as follows:

	1850.		1860.		Increase.	
	No.	Capital.	No.	Capital.	No.	Capital
Boston.....	30	\$31,760,000	43	\$36,581,700	12	\$14,821,700
New York.....	31	33,600,602	55	69,758,777	24	36,158,175
Total of two cities.....	61	55,360,602	97	106,340,477	36	50,979,875

This increase of banks, following the general expansion of business, brought with it the necessity of some improved means of adjusting the daily mutual balances. The fifty-five banks in New York city, for example, were each compelled to settle as many accounts daily. To obviate that great labor the clearing system was devised. Each bank sends every morning to the clearing-house all the checks and demands it may have received the day previous, in the course of business, upon all others. These in a short time are interchanged, and a balance struck and paid. This system was established in 1853, and the amount of the exchanges and balances annually were as follows:

Year.	Amount exchanged.	Balances.
1854.....	\$5,750,455,927 06	\$297,411,493
1855.....	5,352,913,098 33	229,694,137
1856.....	6,936,213,328 47	334,714,489
1857.....	8,333,226,718 66	365,313,901
1858.....	4,756,664,386 09	314,238,910
1859.....	6,448,005,956 01	363,984,682
1860.....	7,231,143,056 69	308,683,438
1861.....	5,915,742,758 05	353,383,944
Total for eight years.....	50,704,365,288 81	2,627,494,997

With the development of business the transactions grew immensely up to 1858, when they fell off nearly one-half under the panic of that year. They recovered gradually up to the breaking out of the rebellion. The banks of Boston and Philadelphia adopted the same system with similar results. The figures indicate to what an extent the credits of individuals, created in the operations of business, are cancelled through the intervention of the banks of the cities where the commerce of the whole country centralizes.

In the States of Illinois, Mississippi, Arkansas and Florida, after the collapse of 1837, no banks were again created up to 1850, and the three last named are

still without them, with the exception of two small ones in Florida. Texas has a small bank at Galveston, and Utah, Oregon, and New Mexico have none. In the District of Columbia four old banks expired by limitation of charter in the hands of trustees, and Congress refused to recharter them; but they continue to transact business.

It is probable that a large portion of the increase in banking, particularly at the west, has been due to the introduction of the security system of New York, the idea of which seemed to popularize that which had previously been in bad odor. The following table shows the States which have adopted the free banking principle in whole or in part:

States.	Year adopted.	1860.	
		Stocks held.	Circulation.
New York.....	1838	\$26,807,874	\$29,959,506
Michigan.....	1849	102,831	222,197
New Jersey.....	1850	962,911	4,811,632
Virginia.....	1851	3,584,078	9,812,197
Illinois.....	1851	9,826,691	8,981,723
Ohio.....	1851	2,153,552	7,983,889
Indiana.....	1852	1,349,466	5,390,246
Wisconsin.....	1854	5,031,504	4,429,655
Missouri.....	1856	725,670	7,884,825
Tennessee.....	1852	1,233,432	5,538,378
Louisiana.....	1853	5,842,096	11,578,313
Iowa.....	1858	101,840	568,806
Minnesota.....	1858	50,000	50,000
Massachusetts.....	1859	.....	.....
Total.....	.....	57,951,954	97,212,827

The principle cannot be said to have worked well except in New York, where it required constant alterations for many years to bring it to perfection. In Illinois it was an entire failure, and the new constitutional convention adopted a clause looking to the prohibition of any more banks and to the suppression of the existing circulation.

INSURANCE.

The progress of insurance in the United States has been rapidly following the development of commerce and trade, of which it is the necessary accompaniment, since the system of buying and selling goods on credit necessitates the resort to every possible means of making those credits safe. None is more obvious than that of requiring all goods to be insured. It follows that as commodities increase in quantity and value, the amount to be covered by insurance must expand in the same proportion. Unfortunately, however, there have been no regular statistics collated from year to year, as in the case of banks, by which that interesting index to the growth of the national wealth might be compared. The State of Massachusetts has paid most attention to this matter, and the annual reports are very valuable. The number of companies and amounts at risk have been as follows in that State:

Year.	Number of companies.	Capital stock.	Fire risks.	Marine risks.
1840.....	41	\$7,475,000	\$51,898,596	\$50,631,877
1850.....	30	6,106,875	63,943,273	76,082,529
1860.....	117	6,353,100	348,923,289	101,972,974

The total property at risk has increased in the ten years \$310,870,461. Under the present laws of New York the insurance returns are well organized. Taking the figures in connexion with those of the leading ones of other States, the results are as follows :

	Number of companies.	Capital and assets.	At risk.
New York	135	\$53,287,547	\$916,474,956
Massachusetts	117	6,353,100	450,696,263
Connecticut	12	5,364,688	279,522,184
Rhode Island	6	2,419,688	32,187,104
Philadelphia	10	6,519,601	139,239,374
New Orleans	9	6,738,031	221,100,000
Charleston	2	.....	47,291,000
Augusta, Georgia	1	952,858	7,000,000
Jersey City	1	179,713	5,231,061
Peoria, Illinois	1	363,995	6,606,377
Total			2,105,538,319

The amount at risk by all the companies in the Union may approach three thousand millions, and the losses were reported as follows for 1860 :

Vessels and freights	\$13,525,000
Cargoes	15,050,700
Total marine	28,575,700
By fire	22,020,000
Total losses	50,595,700

The number of United States life insurance companies is about 47; number of lives insured, 60,000; total amount insured, \$180,000,000; annual premiums, \$7,000,000.

VALUE OF REAL AND PERSONAL ESTATE.

(APPENDIX—TABLE No. 35.)

The marshals of the United States were directed to obtain from the records of the States and Territories respectively, an account of the value of real and personal estate as assessed for taxation. Instructions were given these officers to add the proper amount to the assessment, so that the return should represent as well the true or intrinsic value as the inadequate sum generally attached to property for taxable purposes. The result of this return by all the census takers will be found in table No. 34, whereby it will appear that the value of individual property in the States and territories exceeds the sum of sixteen thousand millions of dollars, representing an increase of one hundred and twenty-six and a half per centum in ten years in value in the aggregate, and an increase of sixty-eight per cent. per capita of the free population. The rate of increase has been immense in the western States, while the absolute gain in the older States has been no less remarkable. For example, the rate of increase in Iowa has been more than nine hundred per cent., while the absolute increase of wealth has been two hundred and forty-seven millions of dollars; while Pennsylvania has increased at the rate of ninety-six per cent., with an absolute gain in wealth of near seven thousand millions of dollars. The wealth per capita for Iowa in 1850 was \$123, while in 1860 it amounted to \$366, a rate of increase

of one hundred and ninety-seven and a half per cent. The wealth of Pennsylvania in 1850 per capita was \$312; in 1860 per capita was \$487; the rate of increase fifty-six per cent.

It must be borne in mind that the value of all taxable property was returned, including that of foreigners as well as natives, while all was omitted belonging to the States or United States. In considering the relation of population to wealth, the fact must be borne in mind that a much larger proportion of the property of the western than eastern States is held by non-residents, and that this circumstance is not without its influence in exaggerating the wealth of individuals in States where large investments have been made by persons resident elsewhere.

The effect of internal improvements upon the prosperity and wealth of the country can not be better illustrated than by the rapid enhancement in value of all property brought within their influence.

To trace the causes of our great progress in wealth, and to pursue the investigation in detail, would be profitable and interesting, but the want of time makes it incumbent to postpone further review of this table to another time.

AGRICULTURE.

(APPENDIX—TABLE NO. 36.)

View of the condition and progress of agriculture in the United States.

It appears from the returns of the last census, that the ratio of increase of the principal agricultural products of the United States has more than kept pace with the increase of population. Indeed, there appears no reason to doubt the continuance of an abundant supply of all the great staple articles, equal to the necessities of any possible increase of population or national contingency for ages to come. It is also gratifying to note the evidences of improvement in some of the most important agricultural operations, proving that our farmers are fully in sympathy with the progressive spirit of the age, and not behind their fellow-citizens engaged in other industrial occupations. The products of the great west are giving a tone to the markets of Great Britain and the continent. Chicago has become one of the first grain markets in the world, and as the boundless region still further west is being developed, every channel of communication with the Atlantic coast will teem with the products of the soil. Illinois alone sends now to the great market at New York an average of two thousand head of cattle weekly, and other States, comprising regions almost unknown at the former census, and still more distant from the seaboard, are adding and increasing their contributions.

New plants and animals have been introduced in the past decade. From the products of the sugar cane—*sorghum saccharatum*—transplanted from the Chinese empire, the west is furnished with a new article of domestic luxury and utility, and rendered comparatively independent of the sugar cane of more southern States.

The great dairy interest in our country during this period has increased the production of cheese and butter, and already American cheese is as well known in English markets as the best English dairy cheese.

Indian corn is now an indispensable article for Great Britain, and each succeeding year is increasing the demand for this important product of our country, which is raised in every State and Territory of our Union.

While it is admitted that very much remains to be accomplished by the agricultural interest of our country, it cannot be doubted that the past ten years has shown to the world that the United States has within its own territory the resources which will enable us to compete with the older nations of the world in every department of domestic industry.

The London exhibition in 1851 made known that the United States had the

means of supplying the implements and machinery needed in every country in Europe. Since that time our reapers and mowers, ploughs, steam-engines, and railroad cars have found their way to the Old World, and an American in taking the tour of the continent will, in the great empire of Russia, find himself on board of an American railroad car drawn by an American locomotive on a railroad built by an American engineer. We point to these advances as evidence that the enterprise of our countrymen, with so wide a scope for its development at home, manifests itself wherever a profitable field opens for its exercise abroad.

At a period like the present, when, for the preservation of the national life and character, the resources of the country are subjected to a greater strain than they have ever yet borne, when a large portion of its effective labor is diverted to the same sacred duty, and all the productive forces of the Union are controlled to an unprecedented extent by causes more pervading and subversive in their effects than any which could possibly arise from extraneous sources, it is a subject of the highest gratification that we are blessed with the amplest returns from the labors of the husbandman. The crops of hay and grain, as the result of a favorable season and a broader cultivation of land, are believed especially to have afforded abundant and timely harvests. Regarded either as a source of cheap and ample supply for a vast commissariat with the least possible drain upon the public chest, of cheap and plenary subsistence to the numerous unemployed and dependent classes, or as a source of exports and employment for the commercial and shipping interests, the bounty of our land is at the present time a subject of national congratulation and thankfulness.

The increasing annual products of agriculture in our highly-favored country, and the hay and grain crops in particular, furnish striking illustrations of the close interdependence and connexion of all branches of the national industry. The dependence of agriculture upon the results of mechanical skill, as well as the astonishing progress of the latter within the last half century, is strongly exemplified in the application of labor-saving appliances, which become still more valuable, in emergencies like the present, in all the operations of the farm. The saving effected by new and improved implements in Great Britain within a dozen years preceding 1851 was stated by a competent authority to be not less than one-half on all the main branches of farm labor. Our own progress in this respect is believed to have been more rapid than that of any other agricultural people, and to be in advance of our application of the fruits of purely scientific research in the improvement of agriculture. In nearly every department of rural industry mechanical power has wrought a revolution. The inventive genius of the country has not only contrived to make it prepare the crop for market and to sew or knit the family apparel of the farmer, but to rock and "tend" the infant as well as to rend from the embrace of earth the century-rooted oak which our fathers were forced to leave to the slow eradication of time. Whether the superior agricultural advantages and the demand for improved implements and machinery in the United States have stimulated the facile ingenuity of our mechanics, or have only been seconded by its ready contributions to industry, we shall not stop to inquire. The greatest triumphs of mechanical skill in its application to agriculture are witnessed in the instruments adapted to the tillage, harvesting, and subsequent handling of the immense grain crops of the country, and particularly upon the western prairies. Without the improvements in ploughs and other implements of tillage which have been multiplied to an incredible extent, and are now apparently about to culminate in the steam plough, the vast wheat and corn crops of those fertile plains could not probably be raised. But were it possible to produce wheat upon the scale that it is now raised, much of the profit and not a little of the product would be lost were the farmer compelled to wait upon the slow process of the sickle, the cradle, and the hand-rake for securing it when ripe. The reaping-

machine, the harvester, and machines for threshing, winnowing, and cleaning his wheat for the market have become quite indispensable to every large grain grower. The commercial importance of the wheat crop and its various relations to the subject of domestic and foreign supply, to markets, the means of transportation, storage, &c., make it highly important that the producer shall have the means of putting his crop in the market at the earliest or most favorable time and with the greatest precision.

Wheat.—The quantity of wheat grown in all the States and Territories in the year 1849 was 100,485,944 bushels. The quantity grown in 1869 was 171,183,381 bushels, an increase of nearly seventy per centum, or about double the increase of population in the same period. Some of the older wheat-growing States—Pennsylvania, Virginia, New York, and Ohio—do not show a proportionate increase, owing to the destructive agency of the wheat midge, and the consequent unwillingness of farmers to subject themselves to repeated losses from this cause. Fortunately, the midge is diminishing where it was formerly most destructive, and wheat-growing will soon be resumed in many localities in these States where for a time it was almost abandoned. To the introduction and greatly extended cultivation of spring wheat in the northwestern States, is the country mainly indebted for the increase in the amount of wheat produced. In Illinois this crop has increased in ten years, from 9,414,577 bushels to 24,159,500 bushels; in Wisconsin, from 4,286,181 to 15,812,625 bushels in the same period. In many cases in these States the quantity grown has exceeded the means of ready transportation, or the demands of the market, and has therefore been too great to be profitable.

There appears among the contributions of the New York State Agricultural Society a statement of Dr. Asa Fitch, entomologist for that useful association, relating to depredatory insects, of so much general interest as to claim insertion in this report. It is a matter of no small import that this association have introduced into this country from abroad certain parasites which Providence has created to counteract the destructive powers of some of these depredators, by limiting their efficiency and destroying their numbers. We have heretofore been suffering from the destructive agency of some of these enemies to the grain crop, which have been introduced from abroad, without enjoying the influence of their natural enemies which remained at home. It is gratifying to realize that the New York State Agricultural Society has manifested a spirit so philanthropic in conception, with the prospect of results so important.

Dr. Fitch remarks:

“The grain aphid made its advent in a most remarkable manner. That an insect never seen before and not known to be present in our country should suddenly be found everywhere in New England, and most of the State of New York, in profuse numbers in every grain field of this wide extent of territory, and literally swarming upon and smothering the crop in many fields, was a phenomenon which probably has no parallel in the annals of science. How it was possible for this insect so suddenly to become thus astonishingly numerous was a mystery which seemed to most persons to be inexplicable. It is the most prolific of any insect which has ever been observed. I find it commences bearing when it is but three days old, and produces four young daily. Thus the descendants of a single aphid will in twenty days amount to upwards of two millions, each day increasing their number to almost double what they were the day before. This serves to account for the surprising numbers which we had of this insect.

“The aphid was everywhere supposed to be a new insect, and one writer went so far as to name and describe it scientifically, in full confidence that the world had never before known anything like it. My examinations, however, fully assured me that it was identical with a species which has long been known in the grain fields of Europe. And on my announcing this, the erroneous views which one and another were adopting were speedily abandoned.

“Our best European accounts of this insect are very imperfect. They only speak of it as occurring in June and July, whereas I find it is present on the grain the whole year round. And when the grain is but a few inches high, if half a dozen of these insects happen to locate themselves on the same plant they suck out its juice to such an extent that the plant withers and dies.

"As yet I have never been able to find a male of this species. They are all females. This is proved by placing any one supposed to be a male in a vial; next morning two or three young lice are always found in the vial with it. The general habits of insects of this kind are well known. The aphids on the apple tree and other fruit trees, when cold weather arrives, give birth to males. The sexes then pair, and the female thereupon deposits eggs, which remain through the winter to start these insects again the following year. I had supposed it would be the same with this aphid on the grain. I thought, when autumn arrived, I should meet with males and find eggs dropped on the blades of the grain. But there were none. The females and their young continued to appear on the grain till the end of the season. They are everywhere on the grain now, buried under the snow, ready to warm into life and activity again when the spring opens. And on grain growing in flower pots, on which I am keeping these insects in full activity through the winter to notice what I can of their habits, no males have yet appeared. When, and under what circumstances this sex will be produced, is a most curious subject, still remaining to be ascertained. It at present looks as though the female and their descendants were prolific permanently, without any intercourse of the sexes.

"Last summer such multitudes of parasites, ladybugs, and other destroyers of this aphid, had become gathered in the grain fields at harvest time that it seemed as though it would be exterminated by them. But at the end of the season this insect appeared as common on the young rye as I had noticed it at the opening of spring. The present indications, therefore, are that this aphid will be as numerous on the grain the coming summer as it was the past, if the season proves favorable to its increase.

"As to the *army worm*, it may be remarked that for almost a century it had been known that in this country was a kind of worm whose habit it was to suddenly appear in particular spots in such immense numbers as to wholly consume the herbage over an extent frequently of several miles, and then abruptly vanish, nothing being seen of it afterwards. Thus it was one of the most singular and also one of the most formidable and alarming creatures of this class that was known to be in our world. Yet, what kind of worm this was, and what insect produced it, remained wholly unknown down to the present day. Appearing here and there all over the country the past season, this army worm became an object of the deepest interest; and from Illinois on the one hand, and Massachusetts on the other, specimens of the moths bred from these worms were sent to me for information as to what the name of this insect really was.

"With regard to the *wheat midge*, I would observe that in this country injurious insects are much more numerous than in Europe, occasioning us far greater losses than are there experienced. A year ago I received from France a vial filled with insects as they were promiscuously gathered by the net in the wheat fields of a district where the midge was doing much injury. It then occurred to me that by gathering the insects of our wheat fields here in the same manner, it would furnish materials for a very accurate comparison of the wheat insects of this country with those of Europe. As the result of a comparison thus made, I find that in our wheat fields here the midge formed 59 per cent. of all the insects on this grain the past summer; whilst in France, the preceding summer, only seven per cent. of the insects on wheat were of this species. In France, the parasitic destroyers of the midge amounted to 85 per cent.; while, in this country, our parasites form only 10 per cent. And after the full investigation of the subject which I have now made, I can state this fact with confidence—*we have no parasites in this country that destroy the wheat midge*. The insect so common on wheat, and which resembles the European parasites of the midge so closely that, in the New York Natural History, it is described as being one of that species, and in the Ohio Agricultural Reports it is confidently set down as another of them, I find has nothing to do with the wheat midge, but is the parasite of an ash gray bug which is common on grain and grass, laying its eggs in the eggs of this bug, and thus destroying them.

"I stated to the society, a year since, that the wheat midge had wholly vanished the previous summer; not one of its larvæ could I find, on a careful search over an extensive district around me. But the past season this insect appeared in the wheat again, as numerous as usual. This has led us into important changes in our views of the habits of this insect. How was it possible for it to utterly disappear from the wheat one year and be back in it in swarms the next year? Obviously it must have other places of breeding than in the wheat. And, therefore, if no wheat was grown in this country for a few years, as has so often been proposed, it would not starve and kill out this insect. The insect would resort to other situations, and would sustain itself there, returning into the wheat again as numerous as before, when its cultivation was recommenced. And what could it be that banished this insect from the wheat in 1860, and brought it back again in 1861? The remarkable difference in the weather of these two years furnishes an answer to this question. When the midge fly came out to deposit its eggs in June, 1860, the weather was excessively dry; in 1861 it was very wet and showery. And thus we learn the fact that these flies cannot

breathe a dry, warm atmosphere; they are forced to retreat to places where the air is damp and moist. When the uplands, the ploughed fields, are parched with drought, the midge cannot abide in them; it must go to the lowlands along the margins of streams, where it must remain so long as the drought continues. Here it must lay its eggs and rear its young, depositing them, probably, in the grass growing in these situations. And hence we also learn that if the last half of June is unusually dry, our wheat that year will escape injury from the midge; but if the last half of June is very wet and showery, this crop will be severely devastated."

Indian corn.—This crop in 1849 was 592,071,104 bushels; in 1859 it was 830,451,707 bushels, which is an increase of more than forty per cent. In a majority of the States this is undoubtedly the most popular crop; it is less liable to failure than any other, and is applied to so great a variety of useful purposes. No important changes have been made either in the varieties cultivated or in the modes of cultivation, except in the gradual substitution of animal for human labor.

Cotton.—The rapidity with which the cultivation of cotton has increased in the United States is truly wonderful. In the beginning of the present century the annual exportation was less than 5,000 bales; in 1849 the quantity grown had reached 2,445,793 bales of ginned cotton of 400 pounds each; in 1859 it had further increased to 5,196,944 bales, or more than 110 per cent. in ten years. The whole crop is the product of thirteen States, but is chiefly obtained from eight of them. Immense as is the quantity of cotton produced, the demand is equal to the supply. Prior to the production of cotton in such vast quantities in the more southern States, it was extensively cultivated for domestic purposes in North Carolina, Virginia, Maryland, Delaware, and southern Illinois, and it is not improbable that its cultivation may be re-established in some of these States with profit to the producer and advantage to the consumer.

Dairy products.—The quantity of butter produced in the census year 1859-'60 is set down at 460,509,854 pounds, which is an increase of 46 per cent. on the product of 1849-'50. The amount of cheese returned is 105,875,135 pounds, or 339,242 pounds more than the product of 1849-'50. Cheese is especially rich in flesh-forming constituents, and is therefore regarded as a highly nutritious article of diet, well adapted to the use of the laboring man, and capable of doing more to repair the waste of muscular exertion than many times its weight of butter or of fat meat. Still it appears that cheese does not enter largely into the daily food of the working classes of this country, as it does in Germany and Great Britain. Were it produced more abundantly, and sold at a lower price, it is probable that an article of food so convenient and economical would be more fully used. The cheese exported from the United States to other countries is about 15,000,000 pounds annually. In fact, were cheese-making as well understood in our country generally as it is in Europe, the demand would be greatly increased. It is believed that our people suffer immensely by not thoroughly understanding the most approved processes of cheese-making. Comparatively little of the prodigious quantity produced can be termed a first rate article. While many of our most enterprising dairymen supply an article creditable to the country, in Europe what is termed American cheese is not purchased with that confidence with which we receive theirs, and for the reason that the processes have not reached that perfection which alone contributes to uniformity of excellence and distinctiveness of character.

When this point is attained a taste is cultivated, and increasing demand follows, and profits enlarge. An article so nutritious and easy of transportation should form some portion of our army rations.

Domestic animals.—The tables of agriculture will show a satisfactory increase in the live stock of the country. In addition to returns of animals employed in agriculture and possessed by farmers, we have prepared a table from the returns

of the census-takers which represent an *estimate* of the different varieties of live stock which, being owned by persons not engaged in agricultural pursuits, were not included in the agricultural schedule. These returns we believe entitled to confidence, and they swell considerably the numbers contained in the official statements. As all live stock thus circumstanced was omitted in the previous census, we have, in all our comparisons and calculations, ignored it, because, being omitted in previous censuses, its introduction into the figures at this time would interfere with the apparent rate of increase.

The horses included in the table referred to comprise carriage, team, and other horses which were previously, and in this census, omitted, but which will be seen to make a vast increase to the number returned in the agricultural schedule. The addition to all varieties of live stock thus made to appear, and which exists, is a matter of no inconsiderable importance.

Value of animals slaughtered.—The value of slaughtered animals for 1849 was \$111,703,142, in 1859 it had reached \$212,871,653, the largest part of the increase being in the western States. The manufacturers of soap, candles, leather, glue, bone-black and others depending on this source for their material have received a proportionate development.

Sheep and wool.—The number of sheep returned by the census of 1850 was 21,723,220, and the amount of wool 52,516,959 pounds. In 1860 the number of sheep returned was 23,317,756, and the amount of wool 60,511,343 pounds.

In addition to the number of sheep above mentioned as returned by the census, the assistant marshals reported 1,505,810 as their estimate of the number of sheep not included because owned by others than farmers, so that the entire number of sheep in the United States on the 1st day of June may safely be placed at 62,017,153, and a proportionate amount may be added with propriety to the clip of wool for the same period.

While the sheep of the United States increased but 1,594,536 between 1850 and 1860, the imports of wool and woollens during that period were as follows:

Year.	Value of imports of unmanufactured wool.	Value of imports of manufactured wool.	Year.	Value of imports of unmanufactured wool.	Value of imports of manufactured wool.
1850.....	\$1,631,691	\$17,151,509	1856.....	\$1,665,064	\$31,961,793
1851.....	3,433,157	19,507,309	1857.....	2,125,744	31,265,118
1852.....	1,930,711	17,573,964	1858.....	4,022,635	26,466,091
1853.....	2,609,718	27,621,911	1859.....	4,444,954	33,521,956
1854.....	2,822,185	32,362,594	1860.....	4,842,152	37,927,190
1855.....	2,072,139	24,404,149			

The aggregate exports of domestic wool during the whole of the same period only reached the value of \$1,562,502; and there were no exports of domestic manufactures of wool.

The average price of fine wool in one of our principal wool markets, (Boston,) for the last thirty-five years has been $50\frac{3}{10}$ cents per pound; of medium, $42\frac{3}{10}$ cents; of coarse, $35\frac{1}{2}$ cents. The consumption of mutton has rapidly increased. The supply now as rarely exceeds the demand as with any other meat, and the best qualities out-sell beef in our markets.

No country is better adapted by natural, and on the whole, by artificial conditions to the production of wool than the United States. It appears to be conceded that Australia and South America, contain the only very extensive regions of the earth now capable of competing with equal areas of our country

in this production. That narrow rim of vegetation which encloses the vast inland deserts of Australia presents not a circumstance of superiority, for this object, over the immense natural pastures of our western and southwestern States and Territories, and it is manifestly inferior to them in important conditions. Portions of it are destitute of running streams for hundreds of miles, and it is subject to the periodical recurrence of droughts, which in some cases have extended through years, drying up all minor vegetation, and proving most destructive to flocks and herds. The government price of lands is higher than in the United States. Its distance from its wool market equals nearly half the circumference of the globe. Yet its exports of wool rose between 1810 and 1850 from 167 pounds to 40,000,000 pounds! South America is also becoming an extensive producer and exporter of this staple. Here, too, no natural conditions of superiority over those of the United States present themselves, while there are political and moral ones which undeniably are hostile to the security and permanence of so exposed a branch of industry.

Apart from the mere question of the cheap production of wool, the experience of the most advanced agricultural nations, like England, Germany, and France, goes to show that sheep are a necessity of a good general system of husbandry on even the highest priced lands and amidst the densest population. They afford as much food to man, in proportion to their own consumption, as any other domestic animals. They are believed to return more fertilizing matter to the soil. In addition to these things, they alone furnish wool. England proper has about five hundred and ninety sheep to the square mile. The United States proper (exclusive of Territories) have about forty-eight to the square mile.

Our people have not lacked the necessary breeds to embark vigorously and advantageously in every department of sheep husbandry. In fine-wool varieties we have selections from the best flocks of Germany. In varieties ranging from fine to medium we have the American merino, yielding fifty per centum more wool than his Spanish ancestor, without a deterioration in its quality. In coarse varieties, we have the choicest mutton-breeds of England, and also hardy and productive sub-varieties between these and what are termed our native sheep. No country has ever been so liberal in importing the most highly-esteemed foreign breeds of sheep, and none has been more successful in acclimating them. Some have been greatly improved among us, and none, it is believed, have degenerated where the systems adapted to their culture have been found profitable.

In view of all the preceding facts, it would seem most anomalous that a people so intelligent and enterprising as our own should have advanced so slowly in one of the most important departments of industry, should have consented so long and so largely to import a prime necessary of life which they could actually produce and market at a less cost than the exporter.

American wool-growers attribute this state of things mainly to two causes: tariff regulations, which give protection to the woollen manufacturer and not to the producer, and to the unsteadiness which has marked our tariff policies. Though the monetary state of the country and other incidental causes have undoubtedly contributed their influences, it is not to be denied that a comparison of wool prices under the different tariffs gives color to the first conclusion, because, contrary to all the earlier anticipations of the growers, they show that there has been no coincidence whatever between high and low wool prices and what are termed high and low tariffs, but quite as often precisely the reverse. If the above position of the producer is well taken—if he is not equally protected with the manufacturer—it is not a sufficient answer to his complaint to say that he needs no protection because he can already produce the staple as cheaply as his foreign competitor. The ordinary wool-growers of the United States can no more live as he now lives, on the same profits which content the wealthy Anglo-Australian or South American grower, than can our ordinary

manufacturers live as they now live on the profits which content the manufacturers of Europe. Much the greater number of our producers are comparatively small land-holders and capitalists, yet they have the duties of intelligent freemen to discharge and the expenses of liberal members of society to incur. Their expenditures in directions which tend to comfort and self-respect, and which promote civilization and the public interests, are ten times greater than those of persons of the same wealth in the foreign countries from which the competition comes. Is not our government as much bound, both by justice and expediency, to assist this class of men to preserve their respectable status as to render like assistance to any other class? Is the production of a great staple of less consequence to our country than its manufacture?

It is complained that the rapid and almost radical changes which have taken place in our tariff legislation, now stimulating both the producer and manufacturer of wool beyond the boundaries of prudence, and now suddenly withdrawing much of the protection on which their anticipations and arrangements for the future were founded, have necessarily led to ruinous disappointments, and finally impaired the confidence of the community in the safety of investments in a husbandry subject to such interferences.

The present would seem an auspicious period to establish permanent policies in these particulars. One of the principal causes which has rendered it difficult to estimate the public receipts in advance—the fluctuations between large and small sales of the public lands—is now probably removed. These sales, always advancing at the same time with imports and duties, that is, in periods of pecuniary inflation, were sometimes sufficient at such periods, with the aid of only a moderate tariff, to lead to the accumulation of large surpluses of revenue. These produced clamorous and successful calls for a reduction of duties. But in periods of pecuniary depression the sales of the public lands fell off; the reduced tariff was found insufficient to raise the necessary revenue, and another change in the opposite direction became necessary.

While it is not probable that surplus revenues will accrue, from any cause, for many years to come, the most intelligent and experienced wool-growers of our country ask for no extreme or disproportioned legislation in their behalf. They only ask that in establishing a system of revenue adequate to the public wants, the interest they represent receive a share of protection fairly proportioned to its importance and requirements. If this is accorded, and the policy established is allowed to acquire a permanent character, it is not doubted by our agriculturists that this important branch of industry will rapidly attain a development which will no longer leave us tributary to foreign nations for one of the most important necessaries of life.

In view of the limited number of American publications devoted to sheep husbandry which have appeared, we feel it a duty to refer to a valuable repository of useful information, being a treatise on fine-wool sheep husbandry, by Henry S. Randall, LL.D., of New York, read before the New York State Agricultural Society, February 12, 1862. 127 pages, 8vo.

Sugar and molasses.—Notwithstanding the large quantities of sugar and molasses produced in the United States, a large amount is obtained from abroad. The sum paid for imported sugars, in 1859, exceeded \$31,000,000, and in the same season 30,000,000 of gallons of molasses were imported.

The rapidly increasing culture of the Chinese sugar-cane is supplying a great want. The introduction of such a crop to the notice of the American farmer is a prominent feature of the past decade. While, in the present state of knowledge, much difficulty and uncertainty seems to attend the manufacture of sugar from this plant, it has proved its value as very productive in sirup or molasses. The plants introduced into this country are from Asia and Africa, and vary considerably in character. They are liable to hybridization with each other, and with the broom corn, and much care is required to preserve the varieties

distinct. So far as we have information, Mr. J. H. Smith, of Quincy, Illinois, has been the most successful cultivator of the imphee, and his efforts have been attended with much success. While, with our knowledge of the disappointments which have been experienced in Europe and this country as to results, we would not recommend a heedless expenditure of time and means in the culture of the imphee, we are sufficiently confident in its value, under many circumstances, as to hope that farmers generally of the north and west will devote some attention to the culture of the plant, and fairly test its utility for the production of sugar.

The product of cane sugar, as returned by the Seventh Census, was 237,133 hogsheds of 1,000 pounds each; in 1859 it was 302,205 hogsheds. The product of molasses for the former year was 12,700,991 gallons; for the latter 16,337,080 gallons. From the sorghum and imphee, 7,235,025 gallons of molasses were made in 1859.

The amount of maple sugar made in 1850 was 34,253,436 pounds; in 1860 the product was 38,863,884 pounds. This increase is not large, but sufficient to afford gratifying evidence that our beautiful maple groves and forests are not becoming extinct, while many are preserved with commendable care. We wish it could, with truth, be added that the cultivation of this noble tree was extending in a ratio equal that wherein the old trees in the forest are diminishing under bad treatment and the demands for new land for tillage. The landholder who appropriates a few rods of land to the preservation or cultivation of the sugar tree not only increases the value of his estate but confers a benefit upon future generations.

Tobacco.—The tobacco crop, in 1849, amounted to 199,752,655 pounds, being a decrease of more than 19,000,000 pounds according to the previous census; in 1859 it reached 429,390,771 pounds.

To the production of this amount every State and Territory contributed, although Virginia and Kentucky furnished much more than any other. It would seem surprising that a crop which is said to impoverish the soil more than any other, and to injure to some extent every one who uses it, should be found so desirable as to increase 106 per cent. in ten years; but such is the effect of a ready market with remunerative prices. Several of the northern States present a very large increase in the production of this article. Among these, Ohio, New York, Connecticut, Massachusetts, and Pennsylvania exhibit both the largest product and the greatest increase. Ohio raised, in 1859, over 25½ million pounds, and New York increased her production from 83,189 pounds to 5,764,582 pounds; Massachusetts from 138,246 to 3,233,198, and Connecticut from 1,267,624 to 6,000,133 pounds. Virginia, North Carolina, Maryland, Kentucky, and other of the more southern States show a greatly augmented growth of the staple.

There has been a commensurate increase in the manufacture of snuff, cigars, and other ultimate products of the tobacco crop, while the consumption of the article in various forms doubtless keeps pace with the production.

Wine.—The returns upon the subject of wine-making show a very large increase in an article which promises to become one of great commercial value. The wine culture has increased in a considerable number of States, but more particularly in Ohio, California, and Kentucky. The quantity of domestic wines was increased from 221,249 gallons in all the States and Territories in 1850, to 1,860,008 gallons in twenty-two States in 1860, or at the rate of 740 per cent. Of this quantity the three States above named made nearly one million gallons, and Ohio alone more than half a million gallons. The return was probably far short of the real amount.

The culture of the grape and the manufacture of wine are rapidly increasing. So soon as cultivators become assured that they possess varieties of the grape

of sufficiently good quality, thoroughly hardy and adapted to our climate, the development of this form of industry is likely to be still more rapid. More than \$4,000,000 was paid by citizens of the United States in 1859 for imported wines; the amount paid by consumers for a factitious home-made article it is perhaps impossible to ascertain. A good native wine may and should at once take the place of the spurious article, and in a few years of a large part of the imported. This is the more desirable, inasmuch as the disease which so seriously affects the vineyards of Europe greatly diminishes the quantity and increases the price of good wine, and at the same time tempts producers there to practice extensive adulterations. Nothing will effect a substantial temperance reform so certainly and speedily as the production of good wines in such quantity as to place them within the means of the poor as well as the rich; and every man who plants a vine will be a useful co-operator in the beneficent work of relieving the country from the evils of intemperance by the substitution of a healthy beverage for the various forms of poisons which take the name of spirits and concentrate and diffuse misery over the land.

Hay and clover.—The hay crop of 1849 was 13,838,642 tons; in 1859 the quantity reported is 19,129,128 tons. This increase is not proportionate to the increase of live stock in the country, but it appears that, with better farming, more roots and cut straw and other rough fodder are used, and therefore less hay is required. Without adding to the present extent of meadow lands, the hay crop might probably be greatly increased by the careful introduction of the best varieties of grass.

The quantity of clover-seed grown in 1849 was 468,978 bushels; in 1859 the amount was 929,010 bushels. This increase is important not only in a commercial point of view, but still more so as indicative of improvement in our agricultural system.

Orchard products.—These consist principally of apples and peaches, dried and undried. Their value in 1849 was \$7,723,186; in 1859 it had reached \$19,759,361. This large increase is principally due to the fact that for several years great attention has been paid to the introduction and cultivation of improved varieties of fruit, and to processes for the preservation of fruits by artificial means, which now occupy a great amount of capital. The pear, which for several years was almost left out of general cultivation on account of what was termed the "blight," has of late been less affected by this injury than formerly, and is now extending rapidly in public estimation, being justly regarded as one of the most delicious and profitable of fruits.

Silk.—The production of raw silk in the United States still remains inconsiderable in comparison with what was at one time expected. It has, however, been demonstrated that many parts of the country are well adapted to the growth of the mulberry, and that the production of silk is profitable. Were silk-raising pursued steadily wherever the climate is suitable, very profitable employment would be afforded to thousands of persons, especially females, who are now almost without such employment during a considerable portion of their time. The best way to make silk-growing profitable to individuals and the country, is to encourage its production in small quantities by many families, rather than for a few persons to undertake its production on a large scale; at least, such is the lesson taught by all silk-producing countries. By such means the cost would prove trifling, but the aggregate product would be immense. The value of silks of all kinds imported in the year ending June, 1860, exceeded \$33,000,000.

Improvements.—No better evidence of the progressive improvement of American agriculture need be adduced than the great amount of animal forces employed to assist the labor of man. The number of horses, mules, and oxen engaged in agricultural labor is probably greater than the number of men, a proportion that

has no parallel in any other country. All of this animal force is, of course, made available through some form of machinery. Since the preceding census the use of the reaper and mower has become not merely general but almost universal. Some of the most important crops are now seeded, cultivated, gathered, and prepared for use or market with little or no labor from man except where he is aided by mechanical appliances and animal force. The employment of steam in agricultural operations is much less common in the United States than in Great Britain, but is gradually increasing.

Draining.—This important improvement has made great progress in the estimation and practice of our farmers. Tile factories have been established extensively in many parts of the country, and consequently the material for making permanent drains is much cheapened.

Should the next ten years witness an equal advance in this direction, underdraining will be regarded as among the most indispensable operations of the farm, and its benefits will soon be fully realized.

Underground draining involves an amount of wealth not yet appreciated, though rapidly becoming realized by the American farmer. It is an undoubted fact that the most productive portions of our farms, and which are fertile in fivers, lie neglected and worse than useless for the want of knowledge or the absence of enterprise. An assistant marshal in the State of New York made report of one farmer near Geneva, who has laid on a moderate-sized farm some fifty miles of tiles, and acquired wealth as the result. A single year's crop from land before useless, has sometimes paid all the expense of the improvement, and the drains made twenty years since are as efficient as when first constructed. For health and wealth nothing contributes more where circumstances admit of it—and where do they not, to a greater or less extent?—than underground drainage. An implement of great value has recently been patented, which opens and covers a furrow of considerable depth, and lays at the same time pipe for introducing or carrying off water.

Irrigation.—This is already found to be necessary or highly beneficial in Utah, New Mexico, and California, and is there extensively practiced. To systematic irrigation we may look for covering with luxuriant vegetation millions of acres now commonly regarded as unfit for cultivation. It will doubtless be found to prove remunerative in many of the older States where it has not yet been adopted.

Progress of invention in threshing instruments.—As next in point of importance to the production of grain consists the facility for its early and economical preparation for market, the value of implements and machinery tending to this end cannot be overestimated; and as the progress whereby perfection is attained in any improvement so valuable as that which has, through a long process of years, attended the construction of threshing implements, is interesting to the political economist as well as the farmer and statesman, we have endeavored to group together all the essential facts connected with their history. The plough, hay and grain cutters, and some other implements of husbandry, have attained to such perfection within a short period, and their history is so generally known to the present generation, that special allusion to them may with propriety be deferred to a future period.

It appears that the number of patents granted in the United States for threshing-machines, exclusive of a considerable number for threshing clover, and those combining threshing apparatus with cider or grist mills, straw-cutters, &c., was three hundred and fifty-four—a larger number than had been given for any other instrument or process, except the plough and the water-wheel.

Some kind of mechanical means for separating grain from the ear appears to have been early contrived. A complete history of the successive changes in the means and instruments for effecting this would be a curious and interesting

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chapter in the record of the world's progress. Such a retrospect, could it be made, would show a remarkable uniformity in the methods adopted throughout the world in ancient and modern times. It would show that, until within a recent period, mankind has been altogether unsuccessful in originating or transmitting any essential improvement upon the most ancient plan of which we have any record.

The primitive mode of "treading out the corn" upon a smooth circular "threshing floor" in the open air, beneath the feet of the unmuzzled ox, or other animals, has prevailed among eastern nations from remote antiquity. This tritulating process, however, appears from very early times to have been facilitated by certain instruments. Thus, "threshing instruments of iron" are mentioned by the prophet Amos; and "a new sharp threshing instrument having teeth," at a later period, by Isaiah. Smaller grains, having a less adhesive envelope, appear to have been separated by implements analogous to the flail, as elsewhere mentioned by the same prophet: "For the fitches are not threshed with a threshing instrument, neither is a cart-wheel turned about upon the cummin; but the fitches are beaten out with a staff, and the cummin with a rod." Cummin is threshed by the same mode in Malta at the present day, and in Syria may still be seen in common use the representative of the new, sharp threshing instrument with teeth. It is described as a thick plank or sledge drawn by oxen, and having inserted upon its under surface pieces of stone, flint, or iron, projecting from three-quarters to half an inch, by which the ears of corn are torn asunder. Its more ancient form among the Hebrews was frequently that of a square frame with rollers, encircled by three rings or wheels serrated in the manner of a saw. It sometimes resembled in form a cart, by which name it is called in the passage quoted. The threshing floor of level, hard-rolled earth was sometimes covered so as to afford shelter to the laborers during harvest; as that of the wealthy Boaz, which has furnished so interesting an illustration of the simplicity of ancient manners and customs. It was usually constructed upon an elevation exposed to currents of wind, to carry off the chaff; as that of Ornan, the Jebusite, occupied the rocky eminence of Mount Moriah, and, with the threshing instruments and oxen, was purchased by David to be forever honored as the site of the holy temple. Hesiod, who soon after wedded the muse to agriculture, directs the threshing floor to be so placed:

"Smooth be the level floor on gusty ground,
Where winnowing gales may sweep in eddies round."

That the threshing instruments employed had great mechanical effect upon the sheaves over which they were drawn may be inferred from their frequent use in the imagery of the prophets as descriptive of violence and ruin. The *tribula*, as the same implement was called by the Romans, has furnished our language with a synonym for the worst forms of affliction.

It is uncertain at what time the flail was first introduced. But it was in common use among the Romans, and throughout the greater part of the empire, as well as among most nations of modern Europe, for several centuries superseded nearly every other implement. This highly efficient but tedious and laborious instrument still holds its place upon small farms, and for certain kinds of crops upon large ones, in Great Britain and America. There are few, whose privilege it is to have been born in the country, who are not familiar with an article pleasantly associated with the rural literature and experience of ancient and modern times.

The earliest attempt on record to produce an implement of the character of the modern threshing-machine was made toward the middle of the last century.

The genius of mechanics appears about that time to have suddenly invaded the domain of rural economy. The horse-hoe, the drill-plough, and many other valuable contributions were made by it to the labor of the farm and the fireside.

In place of the spinning-wheel and the distaff, it supplied the spinning mill and the jenny. The threshing floor of clay, the trampling of oxen, and the flail of the thresher—

"Sweating over his bread
Before he eats it; the primal curse;
But softened into mercy, made the pledge
Of cheerful days and nights without a groan,"

it sought to replace by the threshing-machine. For the dash of the water-wheel and the moil of men and brutes it substituted the Briarean arms and tireless energy of the steam-engine. These and a thousand other substitutions in agricultural and general mechanics, if less picturesque than the objects they have supplanted, have made ample amends by their pre-eminent service to mankind; and if mowing, reaping, and threshing machines shall ever have their protean forms arrested and fixed in a definite and recognizable shape, they may in time gather about them as many agreeable associations as their earlier and simple representatives—the scythe, the sickle, and the flail.

It is an interesting fact that as the first specific mention of the production of artificial light from coal gas was made nearly two hundred years ago in an historical account of Virginia, given to the Royal Society of England, by the Rev. John Clayton, of Yorkshire, so the earliest proposition on record, probably, to apply machinery, and perhaps water-power to the threshing of grain, occurs in a work upon that colony of still earlier date. It is found in a tract published in London, in 1650, by Ed. Williams. He urges a vigorous prosecution of the plan of colonization in that quarter, and states, among other reasons, that it would stimulate the invention of labor-saving engines, which were necessary to half-peopled plantations, but were regarded as oppressive monopolizers of labor in over-populous countries. He gives an "explication of the saw-mill, an engine wherewith, by force of a wheel in the water, to cut timber with great speed." This mechanism he proposed to introduce into Virginia, and finishes his description of it by saying that the artificer might "easily convert the same to an instrument of threshing wheat, breaking of hemp or flax, and other as profitable uses." It does not appear that the machine was at that early period ever applied to any of those "profitable uses." A number of the first attempts, however, to construct threshing mills in this country were made in the Old Dominion.

We propose to glance at some of the early attempts to introduce this class of machinery upon American farms and at some of the results of later invention to show that our people have not been slow to appreciate the advantages of such mechanism nor unsuccessful in supplying it. It is proper, however, before speaking of American machines to look a little at what has been done in Great Britain, where they were first invented. Our own progress may thus be better understood.

The first person who ever projected a threshing-machine is said to have been the celebrated Jethro Tull, of Shelborne, in Berkshire, the inventor of the drill-plough, and the father of the horse-hoeing husbandry and of systematic agriculture in England, who died in 1740. In constructing an effective threshing-machine he was far from successful. His attempt was immediately followed by that of Michael Menzies, a Scotchman, belonging to the fertile grain district of East Lothian. His more successful machine, patented in 1732, is considered the initial instrument of its class. It consisted of a system of flails attached to a revolving cylinder, driven by a water-wheel, and was pronounced by a committee of the Society of Improvers, in Scotland, "of great use to farmers both in threshing the grain clean from the straw and in saving a great deal of labor, for one man would be sufficient to manage a machine which would do the work of six." The next attempt appears to have been made about twenty years after by Michael Sterling, who made a machine on a very different principle,

that of the flax-hulling machine, in common use. It was found to break off the heads, and to be only well adapted for threshing oats. In 1766 a machine, which could be moved either by horse or water power, and was said to thresh great quantities of corn in a short time, was presented to the London Society of Arts, by Mr. Evers, of Swillington, in Yorkshire, the inventor of a winnowing-machine deposited with the society.

Messrs. Alderton and Stewart, of Northumberland, in 1772, devised a machine, with an indented drum six feet in diameter and a number of fluted rollers, between which the grain was rubbed from the ear. "A mill for separating grain from straw," patented in 1785 by William Winlan, of Marylebone, was constructed upon the principle of the coffee-mill, and performed more than it promised by grinding as well as threshing the grain. The price of this machine was about £15, as appears from a letter of General Washington, dated November 1, 1787, to Arthur Young, in the sixth volume of whose *Annals of Agriculture* he had seen a cut and description of it. He requested Mr. Young to procure one, if he was able to recommend it and thought it sufficiently simple to be kept in order by common laborers. In a subsequent letter the general says he is convinced that a Scotch machine, described by his correspondent, was superior to Winlan's, and he concluded to wait a little before he procured one. Some other machines, constructed upon the rubbing principle, were found to damage the grain—an objection thought by some to lie against all machines when used for seed-wheat, and were laid aside.

In 1792 Mr. Willoughby, of Bedford, in Notts, returned to the system of flails introduced by Menzies, and constructed a machine with loose beaters attached to a horizontal axis or cylinder, turned rapidly by means of a horse-wheel and made to act upon a grated flooring. A Mr. Jubb, of Lewes, in 1795, also made a threshing-machine in which the straw was carried by feeding rollers between two rapidly revolving beaters, whence the corn fell into a winnowing-machine.

During the next year the model of a threshing-machine was presented to the Society of Arts of which we have no description. About the same time the description of a curious machine, worked by one horse, walking in a circle of forty feet and moving a cylinder upon which were placed thirty-two flails, making twenty revolutions to one of the horse-wheel was given to the same society. It did not prove to be an efficient agency.

In October of that year John Steedman, of Trentham, patented a machine having a number of flails fixed upon a rotary cylinder, while a circular table, revolving horizontally, brought the straw beneath their strokes. All the foregoing machines and a machine with flails, invented by J. Wardrop, of Virginia, introduced the same year in England, have long been regarded as nearly impracticable in principle.

The machine which was more properly the basis of those now in use in Scotland and elsewhere, was brought out in 1785, by Andrew Meikle, of Tynningham, in East Lothian, through a gentleman named Stein, who had long seen the defect of the rubbing process and agreed with the son of Mr. Meikle to build him a perfect instrument. The machine was completed in 1786.

It introduced the corn between two rollers and threshed it by four beaters fixed upon a revolving drum. Previous to obtaining a patent, an improvement was made upon the original form of the beaters by substituting for a flat surface a comparatively sharp edge, thus "scutching out the grain," as he termed it, by acting in the direction of the ear, a modification not easily explained without a cut. The inventor, according to Sir John Sinclair, received substantial evidence of the gratitude of his countrymen, whose "voluntary donations" made a comfortable provision for his old age and for his family after him. Professor Low remarks, that "to Andrew Meikle, beyond a question, belongs the honor of having perfected the threshing-machine," although many changes have since

been made in many parts. It was probably the instrument referred to in the letter of General Washington.

In 1789 the first machine with a rake and fan attached, to perfect the cleaning of the grain, was invented, it is believed, by J. Bailey, of Chillingham. In 1795 Mr. Wigfall, of Lynn, patented some improvements, in which he attempted to combine the stroke of the flail with revolving beaters. The latter were loosely attached by short bits of chain instead of being fixed, as in Meikle's scutchers. The grain was carried to the fan by a shaking screen and rolling cloth on an endless arch.

About the year 1800 or 1801 the Society of Arts first offered a premium of thirty guineas or a gold medal for a threshing-machine. The medal was accordingly adjudged by the society, in 1810, to H. P. Lee, esq., of Maidenhead Thicket, who, finding the machines then in use so complicated, inefficient, and liable to get out of order, had one constructed under his own directions, which was highly commended for its simplicity and effectiveness. In it rollers were first dispensed with for feeding the straw to be threshed. It was three feet in diameter and two and a half feet in length, and, with two horses, would thresh about twelve bushels in an hour. It consisted of four vanes or beaters, fixed to an axis revolving within a drum or cylinder, formed of iron plates grooved or ribbed parallel to the axis, and connected by wooden curbs so as to admit of being placed nearer or further from the beaters, according to the kind of grain to be threshed. It was made at a cost, including the horse-wheel by which it was carried, of £40. It was subsequently improved by Mr. William Lester, of Paddington. Another invention called the bolting-machine, afterward much improved by R. Garrett & Son, of Leicester, was highly spoken of at a later period. A patent was taken out in England over twenty years ago by Joseph Atkinson, of Braham Hall, Yorkshire, for a machine said to have been previously patented in this country by S. Turner, of New York.

Many other threshing-machines of various degrees of merit were introduced in Great Britain during the first half of this century. Hand threshing-machines were quite common, and received several improvements by Ransom and other large manufacturers. The machines in use in Scotland twenty years ago were generally on the principle of Meikle's, and combined all the later improvements. Those in use in the eastern part of England were generally portable threshers, without rakes or fanners attached.

There was much difference in the performance of different machines. A machine erected for J. Hanning, esq., of Dorset, about 1801, would thresh, clean, and sack, it was said, in twelve hours, with the assistance of five men, four hundred bushels of grain. A report on the Scotch machines in 1796 states that those carried by water, or four horses, would generally thresh from one hundred and fifty to one hundred and eighty bushels per diem. Arthur Young states in a report of Norfolk, in 1804, that machines built by Wigfall cost from £120 to £210, and worked by six or seven men and four to six horses, would thresh in a day, of wheat, from eighty to one hundred and sixty bushels; of barley, one hundred and twenty to two hundred and fifty-six; and of oats or peas, from one hundred and sixty to three hundred and twenty bushels. The only threshing mill in use in Kent, in 1805, R. Boy's, had by many improvements and alterations been brought to work extremely well. Operated by four horses and twelve men it would thresh, of wheat one hundred and ninety-two bushels, of barley two hundred and fifty-six, and of oats three hundred and twenty bushels daily. A machine of R. Ker's, described by Sir John Sinclair in 1812 would, with six horses, four men, and four women, thresh about three hundred bushels of wheat in a day, at a saving of one-half the expense of the ordinary mode of threshing. Steam was applied to the business of threshing upon the example farm of Lord Ducie, at Whitfield, where a machine with some valuable modifi-

ations was constructed under the directions of his manager, John Morton, and was driven by an engine of six-horse power.

Thus it is apparent that considerable skill and enterprise had been expended upon this class of machines at an early period in the present century. Although tolerably successful, the inventors do not appear to have as yet produced instruments devoid of considerable complication and expense, both in the construction and working of them, which would preclude their general use on farms of moderate size. The early attempt to introduce from abroad into the United States did not, on these accounts, meet with much success. Their high cost, complexity, and liability to get out of order, as well as the amount of horse power and manual assistance required, were objections which led many to doubt the utility of such machines upon American farms.

The flail, therefore, and the primitive system of treading out grain by cattle, continued in use as the favorite modes during many years of the present century. The former prevailed in most of the northern States, while in parts of Pennsylvania, in Delaware, the eastern shores of Maryland and Virginia, and, we believe, in Rhode Island, grain was generally trodden out by oxen or horses as the more expeditious method. Horses were preferred for this work. A crop of 3,000 bushels could thus be threshed and secured from "the best laid schemes of mice and men" in ten days, which would employ five threshers with the flail for one hundred days. The treading floors were from forty to one hundred and thirty feet, more commonly sixty to one hundred feet in diameter, with a path twelve to fourteen feet wide near the periphery upon which the grain was laid. The horses were led round at a slow trot, in platoons equidistant from each other, so that four ranks could preserve the distance of one-fourth of a circle and represent the four cardinal points. The floors were sometimes removed from field to field, but permanent floors made hard and smooth, and kept so by careful use, were preferred. They were commonly fenced round, sometimes with an outer and inner fence.

Toward the end of the last century Mr. Benjamin Sylvester, of Caroline county, Maryland, introduced the use of a roller to be attached to the horses upon the treading floor. It consisted of a good piece of white oak six and one-half feet long by twelve to fifteen inches square, which was reduced to an octagon or eight square, and encircled at each end with an iron ring, and had an iron axis in each end. Each of the eight planes were bored with about a dozen two-inch holes, in which were inserted stout pegs of oak, alternating with those in the next row, and made shorter at one end of the roller than the other to fit them for running in a circle. This appendage to the threshing floor cost about twelve dollars, and drawn by three horses, with four men to turn the straw, would thresh a floor of thirty bushels in favorable weather in two hours, or from sixty to eighty bushels in a day. It was introduced into Kent county, Delaware, by Judge John Clayton, who, after an experience of over twenty years in preparing for market an annual crop of five hundred to eight hundred bushels of wheat, and as many of oats, considered it superior to any other known mode of threshing. George Cummins, esq., a senator from that county and a large farmer, continued its use for the same length of time, and with Mr. Nicholas Ridgely, of Dover, whose account of it was published in the memoirs of the Philadelphia Society for Promoting Agriculture in 1816, and other experienced farmers, concurred in the opinion of Mr. Clayton. Although a Scottish threshing-machine was about that time introduced into some parts of the State, the wheat from Kent county was all threshed in the manner above described, and was said to be more sought after and to bring a better price at Wilmington than any other.

A good threshing machine of moderate cost was a desideratum, however, with the mass of farmers, and as the Scotch machines were expensive, the attention of American farmers and mechanics had been long turned to the construction of

an instrument adapted to the circumstances of the country. An effort in this direction appears to have been made before the revolution. In the *Pennsylvania Magazine or American Monthly Museum*, vol. 1, for 1775, is a plate and description of a threshing-machine constructed with some improvements after a model shown by Mr. Ferguson in his lectures in London. In the account of it the maker is said to have heard of machines for threshing grain erected in America, but had never seen or heard a description of them. We have met with no other reference to such inventions in this country during the colonial period. We find our mechanics, however, immediately upon the organization of the Patent Office, prepared to put on record their inventions in this line, and it is probable some of them may have been made much earlier.

The first patent issued by the Secretary of State for a threshing-machine, was dated March 11, 1791, being the seventh on the records of the office. It was to Samuel Mulliken, of Philadelphia, who on the same day received letters patent for machines for breaking and swingling hemp, for cutting and polishing marble, and for raising a nap on cloth, &c., all of which could scarcely have fallen ready armed and equipped for use from his fertile brain. On the second of August of the same year another patent was recorded for a threshing-machine by William Thompson, of Virginia. In the following year Colonel Alexander Anderson, of Philadelphia, an extensive distiller who made some important improvements in the application of steam to his own branch of manufacture, endeavored to supply the desideratum of a threshing-machine. His machine, a model of which was deposited with the American Philosophical Society, was not patented. But one erected upon its plan in Maryland was found to answer well. After a time the wheel warped so as to impede its action, and from want of confidence or energy in the owner, and the absence of the inventor, it was laid aside.

In 1794 two patents for threshing-machines were taken out by Virginians—one dated April 28, by William Hodgson, and the other November 5, by James Wardrop, of Amptill, in that State. Wardrop's machine, as already mentioned, was introduced in England in 1796. It was made with flails or elastic rods twelve feet in length, of which twelve were attached in a series having each a spring requiring a power of twenty pounds to raise it three feet high at the point. A wallower shaft with catches or teeth, in its revolution successively lifted each flail in alternate movements, so that three of the flails were operated upon by the whole power, viz, twenty pounds. The whole weight to be overcome was one hundred and twenty pounds, and the machine was worked by two men. The flails beat upon a grating, to which the corn to be threshed was fed by hand. We cannot say what success it met with in England.

Patents were taken out in March, 1797, by William Booker, also of Virginia, and in November by Richard B. Elliott, of Massachusetts, who were followed in June, 1798, by Thomas C. Montin, who patented a threshing-machine, making nine inventions of that kind in eight years. The next machine brought before the public was that of Christopher Hoxie, of Hudson, New York, patented August 20, 1801. It was considered more promising than any of its predecessors, but did not come into general use.

During the year 1802 a Mr. Prentiss, from Edinburg, erected in Pennsylvania, New Jersey, and Delaware, six or seven machines upon the Scotch principle, which were found to answer well. But on account of the extreme care required in feeding them and the inability of common workmen to keep them in repair, the builder being engaged in another business at a distance, prevented their general adoption. The increased demand for American breadstuffs in Europe during the continental wars, and the impulse given to American agriculture about this time, produced frequent attempts to project a threshing-machine adapted to general use. In July of this year two patents were issued for threshing and cleaning grain—one to Ezekiel Miller, of New York, and one to Joseph Pope, of Boston, afterwards of Hallowell, Maine, a very ingenious

mechanic and the inventor of an orrery which was purchased by Harvard College. Twenty years after, and four years before his death, Pope received another patent for a machine for the same purpose. In October, 1803, J. F. Turner, of Delaware, followed with a threshing-machine, and during the following year patents were issued to Thomas Barnatt, of Philadelphia, for threshing and cleaning grain; to Samuel Houston, of Virginia, for the Columbian threshing, break, and cleaning fan; and to James Dencale, of Dumfries, in the same State, for an improvement in threshing-machines. B. B. Bernard, of Virginia, and Simon Willard, jr., of Hudson, New York, took patents in 1807, the former for a simple thresher, and the latter for threshing and cleaning. But one patent was given in 1808, four in 1809, and six in 1810, for threshing and cleaning grain, including one by Isaiah Jennings, of Brookfield, New York, the inventor of the patent burning fluid so extensively used in late years.

The number of threshing-machines patented during the next twenty-five years, including those which combined other operations and horse power, was over 240, or nearly ten annually upon an average.

In 1815 the trustees of the Massachusetts Society for Promoting Agriculture offered, among others, a premium of one hundred dollars for the most approved machine for threshing and separating grain, adapted to a farm of medium size, to be claimed before the first of June, 1816. In the summer of the last-mentioned year a Mr. Dumbleton, from England, introduced in the middle States a threshing-machine which was thought at the time to supply all that was desirable. He erected one at Port Penn, Delaware, which gave complete satisfaction. It was speedy, clean in its threshing, easy of management, and portable. We have not seen a full description of it.

A machine patented by Seth Ballou, of Livermore, in Maine, in 1821, was the subject of patented improvements by Messrs. Boyd and Ketchum, of Pennsylvania, in 1825, by the inventor in 1826, and by George Jessup, of Troy, New York, in 1830. During the latter year the large number of thirty-four patented inventions connected with the threshing of grain were recorded, and in the following year thirty-eight—the largest number in any year of the period before mentioned. Many of our most ingenious mechanics exercised their skill upon these machines, including Moses Pennock, of Kennett square, Pennsylvania, the inventor of the revolving horse-rake; Jacob Perkins, the inventor of the machine for cut-nails, and numerous others. Pennock patented a vibrating thresher in May, 1827. A machine patented in January, 1831, by Samuel Turner, of Aurelius, New York, was, a few years after, patented in England by a Mr. Atkinson, of Yorkshire. It appears to have been upon the principle of those now in use, having a drum surrounded by a series of pegs so arranged as to pass a similar row of pegs placed on a concave, surrounding nearly one-half the circumference of the drum.

In the year 1831 two patents were issued for horse power for threshing-machines to N. P. Stanton, of Syracuse, New York, and to John Lammon, of Macedonia, in that State. These, which now form an important branch of the business of the manufactures of agricultural machinery, have been the subject of 147 patents up to 1857.

The great exhibition in London, in 1851, gave an immense impulse to the use and construction of agricultural machines in England and America. Europe was on that occasion first made acquainted with the extent and excellence of American inventions in this department, in which our greatest triumphs were achieved. A great variety of threshing-machines were there exhibited, adapted to steam and horse power. All the English horse-power machines required from four to eight horses to work them. Only one, which was exhibited by the Messrs. Allen, of New York, was operated by a single horse.

New York manufacturers have shown much enterprise in the department of rural mechanics. In July, 1852, under the direction of the executive committee of the New York State Agricultural Society, an extended and thorough trial of agricultural implements, lasting eight days, was made at Geneva before a select committee. Trials were, on that occasion, made of simple threshers entered by Messrs. Emory & Co., of Albany; George Westinghouse, of Central Bridge; Eddy & Co., Union Village; Ezra W. Badger, of Fly Creek, and George F. Jerome, of Hempstead. The Messrs. J. A. Pitts, of Buffalo; Harris Scovill, of Tompkins county; Daniel Woodbury, of Palmyra; J. Rapalje & Co., of Rochester, and Hall & Thompson, of Rochester, exhibited threshers and separators combined. Nearly all of this large number from a single State were found to be highly efficient machines. One of the largest of them was found to be capable of threshing and cleaning, with eight horses and seven men, 250 bushels of grain in a day, at a cost of four cents and seven mills per bushel. A less efficient machine, requiring double the time to perform the same work, would thresh, without cleaning, 135 bushels, with the aid of five men and two horses, at a cost of four cents and four mills per bushel. The balance of economy generally was found to be in favor of the large machines. The price of the larger machine was \$150, and of the smaller but \$35. Of nine competing machines the price of three was \$150; of one, \$145; of two, \$40; and of three, \$35 each.

The horse power exhibited by the same manufacturers was also subjected to careful tests. They were both upon the chain or railroad principle and upon that of the sweep or lever, and cost about \$100 each.

We thus perceive what an immense gain had been effected in the economy of threshing over the most approved methods and instruments in use in England and America only forty or fifty years before.

The World's Fair in New York, in 1853, brought together also splendid illustrations of the progress of the United States in the application of mechanics to the business of the farm. There was a good representation of threshing-machines, of which the following were the principal, which may be supposed to exhibit the highest perfection which the instrument had then attained:

The "Farmer's Labor-saving Machine," for threshing, separating, cleaning, and bagging grain, ready measured for the market at one operation, was designed for two horses, and was said to be capable of threshing and cleaning 100 bushels per day. It was patented in June, 1848, by E. S. Snyder, of Charlestown, Virginia, who also exhibited the model of another thresher with an upright cylinder.

The rotary seed and grain thresher, with revolving flails, invented by R. W. Palmer, of North Carolina, possessed some new features; and a machine on the old spiked cylinder plan, exhibited by the same manufacturer, contained several improvements. Mr. Palmer took out a patent in England in 1853, and in the United States the next year.

Hathaway's combined threshing, hulling, and cleaning machine for all kinds of grain and seeds patented in 1848 by Bradford G. H. Hathaway, of Yates county, New York, was said by the inventor to be capable of threshing and cleaning 600 to 800 bushels of wheat in a day.

Gilbert's excelsior thresher and cleaner, patented by Joseph C. Gilbert, of New York, possessed some peculiarities in the construction of the cylinder, for which superiority to all others was claimed; A No. 3 machine of this patent, costing \$110, would thresh and clean, it was said, with two horses, 10 to 1,200 bushels of wheat in a day.

The improved threshing and separating machine, patented by J. R. Moffit, of Piqua, Ohio, differed in many respects from any other. It was a powerful machine with much complicated but ingenious mechanism.

Moffit's machine was introduced in England soon after the New York exhibition. It was put in operation upon the farm of Mr. Mechi, at Tiptree Hall, in Essex,

and driven by a steam power of four horses, and threshed 256 bushels of wheat in four hours, cleaning it in perfect readiness for the market. Of barley it afterwards threshed 56 quarters or 448 bushels in six hours, turning out the grain clean and ready for malting or sale; it turned out 10 quarters in 73 minutes, and outstripped all the exertions of the feeders. Its weight was 12½ hundred-weight without wheels and driving gear, and cost in America \$115.

During the Paris exhibition, a trial of mowing, reaping, and threshing machines was made about thirty miles from Paris, which attracted a great concourse from the capital. A correspondent of the New York Tribune says: "Six men were set to threshing with flails at the same moment that the different machines commenced operations, and the following were the results of half an hour's work:

" Six threshers with flails	60	litres of wheat.
Pitt's American thresher.....	740	" "
Clayton's English thresher.....	410	" "
Dunoir's French thresher.....	250	" "
Pinet's Belgium thrasher.....	150	" "

In regard to Pitt's machine the "Moniteur" says: "Pitt's machine has, therefore, gained the honors of the day; this machine literally devours the sheaves of wheat; the eye cannot follow the work which is effected between the entrance of the sheaves and the end of the operation.

"It is one of the greatest results which it is possible to obtain.

"The impression which this spectacle produced upon the Arab chiefs was profound."

The "Moniteur" might have added that the effect was no less wonderful to the Prince Napoleon, who returned twice to the machine and declared that it was "frightful to look at!" as it must have been to all those who never before saw a genuine, fast American thresher.

The machine of Dunoir is used almost exclusively in France, but already the demand for the Buffalo machine is so great that without doubt it will supersede all others.

A machine by G. F. S. Zimmerman, of Virginia, the patentee combined operations for threshing, separating, cleaning twice, screening and bagging all kinds of small grain at one and the same time. For this machine it was claimed that with six or eight horses it would prepare for the mill 300 to 500 bushels of wheat, and with twelve horses and as many men 800 to 1,000 bushels in a day.

Mr. R. L. Allen, of New York, and perhaps other manufacturers also, exhibited threshing-machines, and the Messrs. Von Brocklin, Winter & Co., of Brantford, Canada East, sent a machine of their invention and manufacture, having some resemblance to Moffit's, and which had the appearance of being simple, strong, and efficient.

The portable steam-engines for farm purposes began, about twenty years ago, to be advocated by the Royal Agricultural Society of England, and are now in very general use. They travel, with or without threshers attached, from farm to farm to do the threshing and other work. They are from three to eight, or ten horse power, and consume about one hundred weight of coals per diem for each horse power. One of the smallest size named will thresh 20 quarters or more daily.

Most of the large farms in England and Scotland have also fixed steam-engines of four to ten horse power for threshing and other uses. Their average cost in 1844 was about \$600 each, but is now much reduced.

By the use of steam and improved threshing-machines the crop is now threshed in the field in about the same time it would take to remove it to the barn.

Steam-engines and steam-threshers have within a few years been introduced in Ohio and other parts of the west.

A machine of about ten-horse power was several years ago built at Chillicothe, Ohio, and was employed in threshing grain in the fields of the farmers. With

three men accompanying it, and some assistance from the farm hands, it did the work of seventy fails, threshing about 100 bushels an hour, or 700 bushels in a day.

It was estimated that the counties of Ross and Pickaway, in Ohio, would require thirty steam-threshers to prepare for market an average wheat crop, the united savings of which would be equal to the labor of forty thousand men.

The immense importance of the threshing-machine with steam as a motive power, as well to the grain-grower as to the manufacturer, when they shall have been more generally introduced throughout our extended country, may be readily inferred. To the farmer, in enabling him to take advantage of any sudden rise in the price of grain, and to secure it from mischances by fire, weather, or otherwise, its value is very apparent.

Messrs. Hoard & Brodferd, of Watertown, New York, were among the first in this country to manufacture steam-engines for farm use. The specimens exhibited by them at the World's Fair in London were, perhaps, not inferior in merit to the best of a large collection.

New domestic animals.—Camels and Cashmere goats have been successfully introduced, and strong hopes are entertained of their perfect acclimation and permanent utility. Italian bees have also been brought into the country, and are believed to possess many advantages over the common black variety.

Associations and exhibitions.—Among the means and incentives to improvement enjoyed by the farming community we cannot overlook the influence of associations and annual exhibitions. These are not new, but they prove none the less useful, are now established in most of the States, and in almost every county of some of them. A somewhat new and important application of the association principle has been made in many towns and neighborhoods by the organization of local societies or *farmers' clubs*. The great advantage of these township associations consists in their adaptation to bring agricultural improvement home to all the people.

Agricultural schools and colleges.—But few agricultural schools are in successful operation, although several have been established. New York, Pennsylvania, Maryland, Michigan, and Iowa, have each one, and one or more are about to be established in other States. It does not argue well for the agricultural taste of our people, that while we are in advance of most European countries in the number of our common schools and colleges, we are greatly behind some of them in institutions designed to teach the innumerable applications of science to agriculture, and to elevate and throw a charm around this noble employment.

Periodicals.—The number and excellence of agricultural and horticultural periodicals leave little to be desired except that some of them were in the hands of every farmer. Forty papers and magazines, devoted almost exclusively to topics pertinent to farming and gardening, are published in the country.

Diseases of animals.—Among the embarrassments which still interfere seriously with farming operations are the diseases of domestic animals. Two forms of disease have more especially attracted attention—the pleuro-pneumonia of neat cattle in Massachusetts, and what is known as hog-cholera in the western States. In reference to the former, the people of the whole Union have incurred a heavy debt of gratitude to the State in which it first appeared, for the prompt and energetic measures adopted to prevent its diffusion. The disease which prevailed among swine caused great destruction, and unfortunately but small success attended any efforts devised to arrest its progress.

These visitations, with others of more common occurrence, cannot fail to sug-

gest the necessity of a class of well-educated veterinary surgeons. In this particular most European countries are greatly in advance of the United States. It is believed there is nothing about the rural economy of the Old World from which we may so profitably learn a lesson as in securing skilful, medical, and surgical treatment for domestic animals. This necessity has been made still more apparent by recent losses of army horses. We are of the opinion that the country, in the purchase and loss of horses during the insurrection, has incurred expenses already which, under other circumstances, could have been avoided, to an amount greater than would have been required to maintain a national veterinary school or college on an extended scale for half a century. In truth, we are not sure that the interest on the amount lost would not permanently support such an institution. The multiplication and cost of insurances on live stock furnishes proof of the little reliance placed on the skill of the professed cattle and horse doctor.

Destructive insects.—In many instances whole armies of destructive insects have rendered the labors of the husbandman unprofitable or fruitless. The wheat midge, the chinch bug, and the army worm, besides those that have for years preyed on the products of the orchard and garden, occasion the loss of millions of dollars annually. By the labors of entomologists we have been taught to know these enemies more fully, and led to cherish the hope that we shall yet learn how to protect our crops from their ravages.

Meteorological observations.—The want of meteorological knowledge, and consequent want of adaptation of our industry to the laws of climate, both general and local, is a frequent source of loss to the farmer.

Through the system of meteorology inaugurated by the Surgeon General of the United States army, and that now efficiently carried on by the Smithsonian Institution, the climate of the United States will soon be as well understood as its geology or geography. When the knowledge thus obtained is thoroughly popularized we may expect to see it beneficially applied.

For information respecting agricultural products, not referred to in the foregoing notes, the reader is referred to the tables of agriculture appended to the report. The great labor required in the preparation of tables involving such vast interests and varied details has precluded their completion prior to the moment when it becomes necessary to submit them to the printer, a circumstance which is sufficiently explanatory of what some may be disposed to consider a meagre commentary upon a matter of so great importance.

It is not improbable that some inconsiderable errors may be detected in the foregoing notes, attributable to the tables having, in some cases, been slightly varied after their adoption as the text for comment. It is confidently believed, however, that no material error or discrepancy will be found to exist in any part of the report.

THE PUBLIC PRESS.

(APPENDIX, TABLE No. 37.)

Among the elements which determine the characteristics of a people no branch of social statistics occupies a more important place than that which exhibits the number, variety, and diffusion of newspapers and other periodicals. Composing, as they do, a part of the reading of all, they furnish nearly the whole of the reading which the greater number, whether from inclination or necessity, permit

themselves to enjoy, and it was in virtue of this fact that the most philosophical of British statesmen signalized "newspaper circulations" as a more important instrument of the popular intelligence than was generally imagined in his day. The writers of these papers, he added, "are indeed, for the greater part, either unknown or in contempt, but they are like a battery in which the stroke of any one ball produces no effect, but the amount of continued repetition is decisive. Let us only suffer any person to tell us his story, morning and evening, but for a twelvemonth, and he will become our master."

And if such was the idea of Burke respecting the influence of the public press, it is equally true that the quality and the dissemination of its fugitive sheets may be said to stand as an exponent at once of the intelligence and the domestic economy of any people.

It was in this view that Lord John Russell, in his great speech on Parliamentary reform, delivered in the year 1822, cited the multiplication and improvement in newspapers as gratifying evidences of the augmented wealth and expanding culture of the middle classes in Great Britain. And it was in this view, also, that a great Greek scholar was accustomed to say that a single newspaper published in the age of Pericles (had that age produced any such phenomenon) would, if handed down to us, be a better index of Athenian life and manners than can now be found in any existing memorials of the Grecian civilization.

The newspaper and periodical press, now covering so wide a field of activity in every department of thought, has won its way to the commanding position it occupies from very small beginnings. Taking its origin in Italy, and under a form bearing some resemblance to that of modern times, capable of being traced to the sixteenth century, the newspaper has in our day enlarged equally the area of its diffusion and the character of its contents, while the celerity with which it is disseminated equalizes throughout large tracts of country the conditions of that popular intelligence which make up an enlightened public opinion. The earliest English newspaper, entitled the "Mercurie," was little more than the present "Court Circular" in respect of its matter, while its periodical visits from London to York were, in the time of Cromwell, accomplished "in the brief space of a fortnight or three weeks."

At the present day the newspaper and the periodical have become "popular educators."

Instead of mere chronicles of formal proceedings or passing events they are vast depositories of discussion and information on all topics which engage the thoughts or enlist the activity of men in the figure of society. A free press has thus become the representative and, for the masses, the organ of that free speech which is found indispensable to the development of truth, either in the religious, the political, the literary, or the scientific world. In each and all of these domains the newspaper and the periodical have accordingly become most efficient agents.

And in no country has their influence been more sensibly witnessed, or more widely extended, than in the United States. The universal diffusion of education, combining with the moderate prices at which the daily visits of the public press may be secured, has given to the newspaper a very great currency among us. And where so large a share of the popular activity is, from the very nature of our civil institutions, engrossed in social and political discussions, it is easy to predict that the public press must here ever exert a power which renders it mighty for good or for evil, according to the intelligence and the virtue of those who preside over its conduct.

The tabular statement appended to this report, relating to this subject, strikingly illustrates the fact that the people of the United States are peculiarly "a newspaper-reading nation," and serves to show how large a portion of their reading is political. Of 4,051 papers and periodicals published in the United

States, at the date of the census of 1860, three thousand two hundred and forty-two, or 80.02 per cent., were political in their character. Two hundred and ninety-eight, or 7.38 per cent., are devoted to literature. Religion and theology compose the province of two hundred and seventy-seven, or 6.83 per cent., while two hundred and thirty-four, or 5.77 per cent., are classed as miscellaneous.

The last decade in our civil history has been one of extraordinary political agitation. Accordingly we find that there has been a very large increase in the number of political papers and periodicals, as compared with corresponding publications at the date of the preceding census. In 1850 their number was 1,630. In 1860 it was 3,242, being an increase of nearly 100 per cent. In 1850 the number of religious papers and periodicals was 191. In 1860 it was stated at 277, being an increase of 45 per cent. In 1850 the number of papers and periodicals of every class in the United States was 2,526. In 1860 the aggregate under this head reaches, as before stated, 4,051, showing a rate of increase of 60.37. The total circulation of all kinds amounted in 1850 to 426,409,978 copies. In 1860 the annual circulation is stated at 927,951,548 copies, showing a ratio of increase of 117.61.

The total white population of the United States was stated at the date of the census of 1850 to be 19,553,114. In 1860 the census returns report it at 27,008,081, the ratio of increase being 38.12. These figures show how largely the increment of the newspaper and periodical circulation has exceeded the increase of population during the last ten years.

In 1850 the annual circulation of all kinds afforded 21.81 copies to each white person in the Union. In 1860 the total circulation was at the rate of 34.36 per person.

New Hampshire and South Carolina are the only States which, as compared with the data of 1850, show any considerable decline in the number of copies of papers and periodicals published within their limits. In the States of Maryland and Vermont, and in the District of Columbia, the emissions of the public press at the two dates are nearly uniform. The largest increase, as might have been expected, occurs in the State of California. Of the total circulation in the country, three States, New York, Pennsylvania, and Massachusetts, furnish 539,026,124 copies, or considerably more than half of the aggregate amount.

PROGRESS OF RAILROADS IN THE UNITED STATES FOR THE DECADE OF 1850-'60.

(APPENDIX, TABLE NO. 38.)

The decade which terminated in 1860 was particularly distinguished by the progress of railroads in the United States. At its commencement the total extent in operation was 8,588.79 miles, costing \$296,260,128; at its close, 30,598.77 miles, costing \$1,134,452,909; the increase in mileage having been 22,004.08 miles, and in cost of construction \$838,192,781.

While the increase in mileage was nearly 300 per cent., and the amount invested still greater, the consequences that have resulted from these works have been augmented in vastly greater ratio. Up to the commencement of the decade our railroads sustained only an unimportant relation to the internal commerce of the country. Nearly all the lines then in operation were local or isolated works, and neither in extent nor design had begun to be formed into that vast and connected system which, like a web, now covers every portion of our wide domain, enabling each work to contribute to the traffic and value of all, and supplying means of locomotion and a market, almost at his own door, for nearly every citizen of the United States.

Previous to the commencement of the last decade only one line of railroad had been completed between tide-water and the great interior basins of the country, the products of which now perform so important a part in our internal

and foreign commerce. Even this line, formed by the several links that now compose the New York Central road, was restricted in the carriage of freight except on the payment of canal tolls, in addition to other charges for transportation, which restriction amounted to a virtual prohibition. The commerce resulting from our railroads consequently has been, with comparatively slight exceptions, a creation of the last decade.

The line next opened, and connecting the western system of lakes and rivers with tide-water, was that extending from Boston to Ogdensburg, composed of distinct links, the last of which was completed during 1850. The third was the New York and Erie, which was opened on the 22d of April, 1851. The fourth, in geographical order, was the Pennsylvania, which was completed in 1852, although its mountain division was not opened till 1854. Previous to this time its summit was overcome by a series of inclined planes, with stationary engines, constructed by the State. The fifth great line, the Baltimore and Ohio, was opened, in 1853, still further south. The Tennessee river, a tributary of the Mississippi, was reached, in 1850, by the Western and Atlantic railroad of Georgia, and the Mississippi itself, by the Memphis and Charleston railroad, in 1859. In the extreme north the Atlantic and St. Lawrence, now known as the Grand Trunk, was completed early in 1853. In 1858, the Virginia system was extended to a connexion with the Memphis and Charleston and with the Nashville and Chattanooga railroads.

The eight great works named, connecting the interior with the seaboard, are the trunks or base lines upon which is erected the vast system that now over-spreads the whole country. They serve as outlets to the interior for its products, which would have little or no commercial value without improved highways, the cost of transportation over which does not equal one-tenth that over ordinary roads. The works named, assisted by the Erie canal, now afford ample means for the expeditious and cheap transportation of produce seeking eastern markets, and could, without being overtaxed, transport the entire surplus products of the interior.

Previous to 1850 by far the greater portion of railroads constructed were in the States bordering the Atlantic, and, as before remarked, were for the most part isolated lines, whose limited traffics were altogether local. Up to the date named, the internal commerce of the country was conducted almost entirely through *water* lines, natural and artificial, and over ordinary highways. The period of the settlement of California marks really the commencement of the new era in the physical progress of the United States. The vast quantities of gold it produced imparted new life and activity to every portion of the Union, particularly the western States, the people of which, at the commencement of 1850, were thoroughly aroused as to the value and importance of railroads. Each presented great facilities for the construction of such works, which promised to be almost equally productive. Enterprises were undertaken and speedily executed which have literally converted them into a net-work of lines, and secured their advantages to almost every farmer and producer.

The progress of these works in the aggregate, year by year, will be seen by the tabular statements at the close of the report. The only important line opened in the west, previous to 1850, was the one from Sandusky to Cincinnati, formed by the Mad River and Little Miami roads. But these pioneer works were rude, unsubstantial structures compared with the finished works of the present day, and were employed almost wholly in the transportation of passengers. Within the decade, in place of this one line, railroads have been constructed radiating from lakes Erie and Michigan, striking the Mississippi at *ten* and the Ohio at *eight* different points, and serve as trunk lines between the two great hydrographic systems of the west. These trunk lines are cut every few miles by cross lines, which, in the States east of the Mississippi, are sufficiently

numerous to meet every public and private want, and to afford every needful encouragement to the development of the resources of this country.

The southern States have been behind the northern in their public enterprises, though, at the date of the census, they were prosecuting them with great energy and vigor. The progress inland of the great trunk lines of the south has been already noted. The opening of the Mobile & Ohio, and of the Mississippi Central, which will soon take place, will give completeness to the system of the southwestern States, and leave little to be done to make it all that is wanted for that section of the country.

West of the Mississippi less has been done, for the reason that the settlements there are of a more recent date, and the people less able to provide the means for their construction than those of the older States. But even upon our western frontier extensive systems have been undertaken and very considerable progress made in their execution.

A more interesting subject than the progress of our public works would be their results, as shown in the increased commerce and wealth of the country. But such inquiries do not come within the scope of this report. It is well ascertained, however, that our railroads transport in the aggregate at least 850 tons of merchandise per annum to the mile of road in operation. Such a rate would give 26,000,000 tons as the total annual tonnage of railroads for the whole country. If we estimate the value of this tonnage at \$150 per ton, the aggregate value of the whole would be \$3,900,000,000. Vast as this commerce is, more than three-quarters of it has been created since 1850.

To illustrate the correctness of the estimate made, the following statement is added of the tonnage transported by the railroads of the State of New York for 1860, with the estimated value of the same. The classifications are made by the companies:

Kinds of freight.	Tons carried.	Value per ton.	Total value.
Products of the forest.....	373,424	\$20 00	\$7,468,480
Products of animals.....	895,519	200 00	179,103,800
Vegetable food.....	1,103,640	50 00	55,182,000
Other agricultural products.....	143,219	15 00	2,148,055
Manufactures.....	511,916	250 00	127,979,000
Merchandise.....	783,811	500 00	391,905,500
Other articles.....	930,244	10 00	9,302,440
Totals.....	4,741,773	163 00	773,029,375

If we make a deduction of one-quarter for duplications—a portion of the tonnage passing over more than one road—the aggregate would be 3,556,330 tons, having a value of \$579,681,790.

The railroads of Massachusetts transported, for the same year, 4,094,369 tons; or, making the deductions for duplications, 3,070,027 tons, and having a value of \$500,524,201. The number of miles of railroad employed in the transportation of freight being 2,569 in the State of New York and 1,317 in the State of Massachusetts, with the deductions named, the amount of freight transported in these States average 1,700 tons per mile. We have estimated the tonnage of all the railroads of the United States to average one-half the amount

of the roads in these States. That this is not an overestimate is shown by the following statement of the tonnage of several interior lines :

Roads.	Length of miles.	Tons transported.
Cleveland, Columbus, and Cincinnati.....	141	295,835
Little Miami.....	120	343,961
Cleveland and Toledo.....	147	250,483
Michigan Central.....	282	378,570
Michigan Southern.....	525	398,679
Illinois Central.....	700	496,390
Chicago, Burlington, and Quincy.....	310	538,670
Chicago and Rock Island.....	238	301,668
Galena and Chicago.....	259	381,188
Total.....	2,712	3,386,393

Average per mile, 1,250 tons.

TONNAGE OF THE UNITED STATES.

	<i>Tons.</i>
The total tonnage of the United States in the year 1814 was.....	1,368,127
Since which period have been built (to June, 1861, inclusive).....	8,307,397
Total owned and built since 1814.....	9,675,524
The total tonnage owned at the close of the last fiscal year (June 30, 1861) was.....	5,539,812
Showing the total decrease in forty-seven years, by decay, wreck, and other loss, to have been.....	4,135,712

It would appear that the loss by wear and tear, decay, wreck, fire, and other causes, was in forty-seven years 42.75 per cent., while in the past ten years alone it has been about twenty-five per cent.

The rapid advance in the ship-building interest during the last forty-seven years, in which the northern States have largely participated, is shown in the following tabular statement of the tonnage built in each decade since 1821, and in the seven years previous :

	Tonnage built in United States.	Annual average.
	<i>Tons.</i>	<i>Tons.</i>
Seven years, 1815—1821.....	638,563	91,223
Ten years, 1822—1831.....	901,598	90,159
Ten years, 1832—1841.....	1,178,693	117,867
Ten years, 1842—1851.....	1,999,263	199,926
Ten years, 1852—1861.....	3,589,300	358,930
Total forty-seven years.....	8,307,417	176,753

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The total tonnage of the United States at the end of the fiscal year 1851 was 3,772,439 tons. If to this we add the tonnage since built and officially reported as 3,589,200 tons, it will show a total of 7,361,639 tons.

	Tonnage owned in the United States.	Year built.	Tons.	At the end of the year—	
				Presumed ton- nage.	Actual ton- nage.
June 30, 1851.....	3,772,439	1851-'52	351,493	4,123,932	4,133,440
1852.....	4,138,440	1852-'53	425,471	4,563,911	4,407,010
1853.....	4,407,010	1853-'54	535,616	4,942,626	4,802,902
1854.....	4,602,902	1854-'55	583,450	5,366,352	5,212,001
1855.....	5,212,001	1855-'56	469,393	5,681,394	4,871,652
1856.....	4,871,652	1856-'57	378,804	5,250,456	4,940,843
1857.....	4,940,843	1857-'58	242,286	5,183,129	5,049,608
1858.....	5,049,808	1858-'59	156,601	5,206,409	5,145,037
1859.....	5,145,037	1859-'60	212,892	5,357,929	5,353,868
1860.....	5,353,868	1860-'61	233,194	5,587,062	5,539,812
Tons.....			3,589,200	51,283,200	49,461,373
Presumed loss in ten years.....					1,821,827
					51,283,200

This is equivalent to a total loss in ten years, from July 1, 1851, to June 30, 1861, of 1,821,827 tons, viz:

Existing June 30, 1851.....	Tons.	3,772,439
Built since, (ten years, to June 30, 1861).....		3,589,200
Total owned and built in ten years.....		7,361,639
Actually reported June 30, 1861.....		5,539,812
Loss in ten years by decay, wreck, and other causes.....		1,821,827

According to the United States treasury report, the loss in ten years has been 1,821,827 tons, or nearly twenty-five per cent., or about $2\frac{1}{2}$ per cent. per annum. What portion of this loss is by wreck, and what portion by actual decay, are not shown. Unfortunately the statistics of wrecks and of total and partial losses are not preserved by authority of law, but, in view of their importance, it seems proper that they should be carefully ascertained by private enterprise or public authority.

The total tonnage of the United States, at the close of the fiscal year June 30, 1861, was 5,539,812 tons, of which the State of New York owned 1,740,940 tons, or nearly thirty per cent. of the whole. During the same fiscal year the tonnage built was 233,194 tons, of which New York built 46,359 tons, or nearly twenty per cent. The tonnage owned in each district of the State, and built during the two years 1859-1861, was as follows:

Tonnage owned in New York and built in 1859-'61.

	Tonnage built 1859-1860.	Tonnage built 1860-1861.	Tonnage owned June 30, 1861.
New York.....	23,484	33,122	1,539,355
Buffalo.....	3,766	8,292	108,224
Oswego.....		4,718	53,552
Greenport.....	381		7,080
Sag Harbor.....	150	166	5,621
Dunkirk.....			4,274
Oswegatchie.....			7,332
Genesee.....			2,082
Champlain.....			1,791
Cape Vincent.....		61	5,228
Gold Spring.....			1,839
Sackett's Harbor.....	3,988		888
Niagara.....	116		774
State of New York.....	31,905	46,359	1,740,940
All other States.....	180,986	186,835	3,798,872
Total tons.....	212,891	233,194	5,539,812
1859-1860.....		212,891	5,353,868
1858-1859.....		156,602	5,145,037
1857-1858.....		242,286	5,049,808
1856-1857.....		378,804	4,940,843

Maine takes the lead as a ship-building State; New York is the second. The other prominent ones are as follows for the past three years, showing a more rapid advance in New York than in other States:

States.	1860-1861.	1859-1860.	1858-1859.	Total tons, three years.
	Tons.	Tons.	Tons.	
Maine.....	57,343	57,867	40,905	156,115
New York.....	46,359	31,936	16,313	94,608
Massachusetts.....	37,206	33,461	31,270	101,937
Pennsylvania.....	24,754	21,615	14,476	60,845
All other States.....	67,532	68,013	53,638	189,183
Tons built, years 1859-1861.....	233,194	212,892	156,602	602,688

Thus New York, which in 1858-'9 built but little over ten per cent., has, in the last year, built about twenty per cent. of the whole, and is the second instead of the fourth State in this industrial work. The immense value of this large property in tonnage, owned by our people in 1861, both as a source of temporary profit to the owners, and as an active and permanent means of extending abroad and at home the commerce and manufactures of the country, can scarcely be overestimated. Assuming the average value per ton at forty dollars, the value of this tonnage may be stated at \$221,592,480, viz:

State of New York..... 1,740,940 tons = \$69,637,600, or 31.41 per cent.
 Other States..... 3,798,872 tons = 151,954,880, or 68.59 per cent.

Total, U. S., June, 1861.. 5,539,812 tons = 221,592,480

INTERNATIONAL STATISTICAL CONGRESS.

During my superintendency of the seventh census, the Secretary of the Interior, upon the recommendation of the Census Board, directed me to proceed to Europe to investigate the manner of conducting statistical operations in other countries, that we might avail ourselves of all useful information attainable as to the best plan of arranging the details of our census, and my instructions enjoined it upon me to effect, if possible, some arrangement whereby the results of periodical censuses should be ascertained as nearly uniform in time and details as practicable, and the facts classified upon like principles as far as circumstances would admit, in order to allow of the more ready comparison of their details. In my report of December, 1851, representation was made of the course pursued for accomplishing the objects of my mission, and it now gives me pleasure to state that the views of my superior officers here, being at the same time cordially advocated by Baron Quetelet, of Belgium, Doctor Farr, of London, and other distinguished men of science, an important general movement occurred throughout Europe resulting in arrangements for an international congress to elevate the science and improve the administration of statistics, to be held at Brussels the succeeding year, which, however, on account of the unsettled state of Europe, was postponed to the latter days of August, 1853, when the first statistical congress convened at that city, and closed on the 2d of September. In the opening address Baron Quetelet referred complimentarily to my efforts as those of one of the originators of this great movement, and expressed his regret that a political change had severed my connexion with the administration of the census and occasioned my absence. Encouraged by the success attending the convention at Brussels, congresses have since been held at Paris in the month of September, 1855, at Vienna, in September, 1857, and lastly in London, in July, 1860; and arrangements have been made for a fifth congress to be held in Berlin in 1863. I was present at the congress of Paris, and presented a paper which was read and is published at length in its proceedings. As at the first congress held at Brussels, so in the last convened in London, an unequivocal tribute was paid to the agency of this country in directing public attention to the importance of this movement. All these congresses have been attended by many of the most distinguished scientific men of Europe, and their proceedings, which form several quarto volumes, in three languages, contain perhaps the most valuable contributions to statistical science which have ever been published.

BUREAU OF STATISTICS.

It may not be improper in this connexion to express the opinion that the establishment of a permanent bureau of statistics would prove of inestimable advantage to the country. Such a bureau is maintained by every enlightened government of Europe, and the want of one here has been seriously felt by Congress and the people. Such a bureau has been frequently recommended by Presidents and heads of departments. Eighteen years since the subject was referred to a select committee of the House of Representatives, which made an able report, from which the following extracts are made :

“The *importance* of statistical knowledge is proved by the circumstance that scarcely any civilized government exists in the world where a *department* or *bureau* has not been established for the purpose of collecting, recording, and arranging statistical facts, and for the dissemination of correct information upon the fiscal, commercial, agricultural, and manufacturing interests of the respective countries wherein such institutions are established. England, France, Austria, Prussia, Russia, Sweden, Belgium, &c., and several of the smaller powers of Germany and Italy, have, in some shape or other, and under various desig-

inations, long possessed the advantages of correct official information upon their several national statistics."

"Correct and extensive statistical information is no less necessary to the mass of the people, in order that they may desire, appreciate, and understand correct legislation, than it is for the legislator to enable him to comprehend and to promote the best interests of his constituents. The want of such of a bureau, or rather the want of the information which it would be the means of collecting and disseminating, has long been felt and acknowledged, and by none more than by those members of the national legislature who have been anxious to legislate correctly and impartially, and thereby best advance the true interests of the nation. In many cases the information which has been necessary, owing to the want of a systematic and regular arrangement of materials, cannot be procured but after very great delay; and, in some cases, no diligence or exertion of the department upon which the call has been made can furnish the necessary replies. There are now calls on some of the departments remaining unanswered which were made *two years ago*; and such is the quantity of extra labor thrown upon the departments by these calls for information that, in one office, the number of *extra clerks* employed is greater than that of the *regular clerks* of the department."

"Such a bureau would furnish correct information respecting the commercial, the financial, the navigating and shipping, the manufacturing, and the agricultural interests of the country; a digested body of facts relative to the revenue, the custom-house, the post office, the land office, and the Indian department; correct statements respecting the population, the expenses and details of the army and navy, the progress of internal improvements, the state of banks and other institutions, and of monetary affairs and exchanges; and, in short, a regular, connected, and methodized arrangement of every subject to which facts and figures bear any relation, and which are in any way connected with the history, the progress and the condition of the nation at large, and those of the various States and Territories. And here it may be remarked, that, by a full and complete arrangement of the prices of stocks, the rates of exchanges, the quantity of unemployed capital, as exhibited by the amount of deposits in banks and other variations in the money market, the best opportunities for the execution of government financial operations would be ascertained, and the public interest materially promoted."

"The duties of the bureau would extend to the arrangement, condensation, and elucidation of the *statistics of foreign nations*, and to all the various branches of *international commercial intercourse*, materials for which are daily accumulating, especially from consuls and other public agents abroad."

The labors of a statistical bureau would most essentially contribute to the increase of sound knowledge upon all subjects connected with national and international affairs among the people. The theories, often conflicting, of political economists would give place to the practical results of experience, the sober truths of figures, and the unerring demonstrations of facts.

The true interests of the people of the country, as a people *one and indivisible*, would be perceived and understood. Knowledge of the most important kind would be given to the community; additional power, the result of knowledge, be placed in the hands of the legislature; the welfare of the country advanced by its interests being better understood; and legislation would be consistent and onwards, uniformly conducing to individual happiness and national honor and prosperity. It is hoped that nations will no longer seek to conquer by war or physical force, but by an honorable rivalry in the cultivation of the arts of peace, of commerce, of agriculture, of manufactures, and of science. Practical and useful information must be furnished to our people, to enable them to compete with other nations in their laudable career. The object of this bureau would be to furnish this information, and thus place the materials for sound thought, and the foundation for correct action, within the grasp of

every American citizen. The committee above referred to closed their report with these words:

"It is, therefore, respectfully submitted *that the establishment of a statistical bureau would be a measure highly advantageous to the public interests, one of very easy and ready practicability, and productive of not only a saving of time and labor, but an absolute diminution of the annual expenses of the general government.*"

No words of mine could add force to such representations, which are doubly applicable in the present condition of the country.

It may not inappropriately be added that the census has become so cumbersome on account of the vast area embraced within its operations, and the increasing numbers of population, and enlargement of our material interests, that its successful management demands administrative talent only to be acquired by experience, and must require most of the years of a decade for its completion. With the facilities this office possesses, it would add but little comparatively to its labors to prepare an annual report on population, agriculture, manufactures, commerce, internal improvements, &c., &c., while its permanent establishment would insure the maintenance of a valuable repository of statistical information important to the legislator and statesman. In my opinion, a permanent bureau of statistics, having charge of the census, would add but little to the expenses of the government, as its effect would be to obviate the necessity of employing the vast clerical force now requisite because of their inexperience, and for the reason that the great statistical facts of the country are collected by the census but once in ten years.

THE BRITISH CENSUS FOR 1861.

The population returns of the British census for 1861 have been courteously furnished to this office in advance of the publication of the full results. They show the number of inhabitants, the division of the sexes, the amount of emigration during the preceding ten years, and, as to Ireland, the religious profession of the people, together with a few other particulars.

The census was taken on the 8th of April, and on that day the population of England and Wales, and of the islands in the British seas, was 20,205,504. It was estimated that the portion of the army, navy, and merchant seamen out of the country belonging to England and Wales, not enumerated, was 162,021. The actual increase of population in these divisions of the kingdom was 2,169,576, which was greater than in any previous decade, though the *rate of increase* has somewhat diminished, owing, it was supposed, to emigration to the United States and elsewhere. The islands in the British seas had a population of 143,779.

In respect to the sexes, there were 9,825,246 males and 10,380,258 females, showing an excess of 555,012 females. The disparity is in part accounted for by the absence of men in the army, navy, and merchant service, and from the greater number of males than females who emigrate.

The number of inhabited houses enumerated was 3,745,463, of uninhabited 153,494, total 3,898,957; being an increase of 467,424 since 1851. This gives 5.33 inmates for each inhabited house, and would appear to afford a very comfortable amount of aggregate accommodation in regard to shelter to the inhabitants.

The progress of population in England and Wales for sixty years has been surprisingly regular. In 1801, the whole number of inhabitants was 9,156,171; in 1811, 10,454,529; in 1821, 12,172,664; in 1831, 14,051,986; in 1841, 16,035,198; in 1851, 18,054,170; in 1861, 20,223,746. The rates of increase per cent. during these several decades, beginning with the end of 1801, was 14, 16, 15, 14, 15, 12. As has been observed, the falling off in the rate per cent. of increase from 1851 to 1861 was accidental, emigration having carried out of the kingdom during the ten years no less than 2,287,205 persons.

In eleven districts there was an excess of registered births over registered deaths of 2,260,576, and in the same districts there was an ascertained increase of 2,134,116 persons.

The census of Scotland, taken on the same day, exhibits a total population of 3,061,251, of whom 1,446,982 were males and 1,614,269 females. There were 679,025 separate families, and 393,289 inhabited houses. The number of children attending school between the ages of five and fifteen was 456,699. The increase in the whole population since 1851 was 172,509, or a trifle over six per cent. The females outnumbered the males in Scotland by 167,287.

In the returns for Scotland a list of seventy-six cities and towns is given, containing 1,244,578 inhabitants. Whether this comprises the entire urban, as distinguished from the rural population, does not appear; but such is probably the fact, since a few of the places named are mere villages or hamlets of less than five hundred inhabitants. The number of inhabited houses in these cities and towns was 89,520, showing 13.90 inmates to each house. The number of separate families is stated to be 286,585, giving 4.28 individuals to each family. Edinburgh, the capital, contains 9,820 inhabited houses, and a population of 168,000; each house, therefore, contains 17.12 inhabitants. Glasgow is the principal commercial city. Its population is 394,857, and it has 13,873 houses which are inhabited, showing that each house accommodates 28.45 persons.

Ireland.—It was found that on the 8th of April, 1861, Ireland contained 5,764,543 inhabitants, of whom 2,804,961 were males and 2,959,582 females. The decrease of the whole population from 1851, as shown by this return, was 787,842, being at the rate of 12.02 per cent. during the ten years. In 1841 the population of Ireland was 8,175,124, and in 1851 6,552,385. The falling off during that decade was 1,622,739, or 19.85 per cent. The only localities in which an increase of population was shown by the last census, were Dublin and the towns of Carrickfergus and Belfast, where there is a gain of 18.88 per cent. on the returns of 1851. In explanation of the general decrease of population in Ireland, it is stated that of 2,249,255 emigrants leaving the ports of the United Kingdom from the 31st March, 1851, to the 8th April, 1861, 1,230,986 were Irish, of whom 1,174,179 persons were set down as permanent emigrants. It is remarked that the whole of the last decade was remarkably free from famine, pestilence, riots, and civil commotions, so that the condition of the country was such as ordinarily produces an increase rather than a decline of population. But the effects of the great calamities of 1846 and subsequent years extended over the first few years of the last decade, precluding the restorative energies of the country from coming into force and action.

As to religion, the Irish people are divided as follows: 4,490,583 are Roman Catholics; 678,661 belong to the established church of England, and 586,563 are Protestant Dissenters. The last-named class includes 528,992 Presbyterians and 44,532 Methodists. The Protestant population are chiefly found in the province of Ulster, where they are about equal in numbers to the Catholics. The commissioners, in their report, note it as a fact worthy of remark, that no objections were made to the inquiries directed to be put on the subject of religion, and that fifteen complaints were made to them of the inaccuracy of the results.

The total number of inhabited houses in Ireland in 1861 was 993,233; in 1851, 1,046,223; and in 1841, 1,328,839. This shows a falling off corresponding with the decrease of population. The diminution of inhabited houses from 1841 to 1851 was at the rate of 21.27 per cent., and the decrease since 1851 was 5.08 per cent. It was found that there were 1.14 families in each house.

The number of families returned was 1,129,218, showing a decrease of 75,101, or 6.24 per cent. on the returns for 1851. The decrease from 1841 to 1851 was 268,468 families, being at the rate of 18.23 per cent.; (the average number of

persons to a family in 1861 was 5.10; in 1851, 5.44; in 1841, 5.54;) results showing a gradual thinning out of the households, attributable to emigration and the other causes leading to a decline in the population. From these statements it will be perceived that the people of Great Britain and Ireland but little exceeds twenty-nine millions, and that the population of the United States has not only, for the first time, reached that of the mother country, but has run beyond her near two and a half millions of people.

DISEASES, AND CAUSES OF DEATH.

(APPENDIX, TABLE No. 6.)

[Continuation of the chapter on mortality, ending page 32.]

In the previous discussion of mortality statistics from other points of view, the conclusion was reached (p. 30) that the actual deaths in the United States occur at the rate of one in forty-five or forty-six of the whole population, and that they amounted to about 680,000 during the year 1860. It will further be admitted, in respect to the corresponding prevalence of sickness and invaliding, that twice the number of annual deaths in a large community will exhibit very nearly the number that are constantly sick. This rule is practically confirmed by numerous statistical comparisons, and though applicable more directly to manhood than to infancy and old age, yet on the whole it is found to furnish a near and convenient approximation. Accordingly, doubling the number of deaths, we readily obtain 1,360,000 for the number constantly sick during the year of the census.

The number of sick will be seen to constitute about one twenty-third part of the whole population. Besides watch-care, maintenance, and other attendant charges, so much is the efficiency of our population in respect to labor diminished, and so much is lost to industry and production. It is true that a certain prevalence of disease must be deemed, in the course of nature, "the inevitable lot," yet a large portion is needless, being clearly traceable to the neglect of temperance and the laws of health. The diminution of the current rate of sickness and mortality evidently pertains to the general prosperity and happiness, and may well constitute the leading idea in examining the statistics of disease.

What diseases are most influenced by the vicissitudes of climate, and what by the conditions of place? The former depending on the condition of the atmosphere, and attacking many persons at the same time, have long since been designated epidemic diseases; of which fever, dysentery, influenza, smallpox, and scarlatina or scarlet fever, are examples. The diseases arising from some peculiarity of the soil and surface have been similarly termed endemic; thus, ague is endemic in some marshy districts. More recently it has been proposed to include both epidemic and endemic, together with contagious diseases under the single title of *zymotic diseases*. The *zymotic*, from a Greek word signifying leaven or fermentation, are the first division in the general classification of diseases by Dr. Farr, whose researches now constitute a fundamental portion of the system of vital statistics.

Among *zymotics* are arranged four diseases which are contagious, and which can visit the same individual, as a general rule, but once in the lifetime; these are *smallpox*, *measles*, *scarlatina*, and *whooping-cough*. The last three prevail among children more especially. Other maladies under this head, such as *dysentery*, *fevers*, and *cholera*, are noted for wide fluctuations in different periods. Such peculiarities give to this category the greatest interest, and the question whether one particular year or locality is more healthy than another chiefly depends on the relative mortality from zymotic diseases. All other diseases may be regarded as isolated disorders, such as *apoplexy*, *consumption*, *dropsy*, which bear off nearly the same proportion of the living in every year.

Zymotic diseases.

	Deaths, 1860.	Deaths, 1850.	Proportions, 1860.	Proportions 1850.
Cholera	985	33,074	0.28	11.87
Cholera infantum.....	4,804	3,960	1.35	1.45
Croup.....	15,188	10,706	4.25	3.84
Diarrhœa.....	7,847	6,366	2.20	2.28
Dysentery.....	10,461	20,556	2.93	7.38
Erysipelas.....	2,756	2,786	0.77	1.00
Fever, intermittent.....	4,447	964	1.25	0.35
Fever, remittent.....	11,102	18,496	3.11	6.63
Fever, typhoid, typhus.....	19,207	13,099	5.38	4.69
Fever, yellow.....	657	785	0.18	0.28
Influenza.....	387	252	0.11	0.09
Measles.....	3,900	2,983	1.09	1.07
Scarlatina.....	26,393	9,584	7.39	3.44
Smallpox.....	1,263	2,352	0.35	0.84
Syphilis.....	231	146	0.07	0.05
Thrush.....	554	424	0.16	0.15
Whooping-cough.....	8,400	5,280	2.35	1.00
Total zymotic.....	118,582	131,813	33.22	47.28
Other specified diseases.....	218,261	134,803	61.14	48.36
Violent deaths.....	20,115	12,174	5.64	4.36
Unknown.....	36,648	44,233	.....	.....
Grand total.....	393,606	323,023	100.00	100.00

Here the wide and striking difference between the proportions of zymotic disease, 33 and 47 per cent., at once indicates the year ending June 1, 1850, to have been one of unusual mortality. The prevalence of Asiatic cholera has already been mentioned.—(Page 23.) It will be seen that *dysentery* and *remittent or common fever* also prevailed in excess during the same year with the Asiatic or epidemic cholera. But deaths from *intermittent fever* (fever and ague) and from *scarlatina* (scarlet fever) were more frequent in the year of 1860 than from the same diseases in the former year.

Cholera, meaning primarily a vomiting or purging of bile, has the three varieties of cholera morbus, Asiatic cholera, and cholera infantum. The first two have been classed under the single head of cholera, since both have similar characteristics. It is usually after long intervals that some contagion in the air gives the disease a malignant type, as above noted. Of the deaths returned in 1850 there were 1,568 from cholera morbus, although there appears no very definite line of distinction between this and epidemic cholera.

Cholera infantum, allied to diarrhœa, is one of the summer diseases of children, which proves most fatal with those from three to eighteen months old, and during the process of teething. The deaths from this disease appear to have been almost equally distributed in 1850 and 1860, and very many of them have probably occurred in the large cities.

Yellow fever appears not to have prevailed extensively in either year. Only 785 deaths from this cause were reported in 1850, and only 657 in the year 1860. At intervals of years this disease takes a malignant type and prevails a dreaded scourge in tropical climates along the sea-coast.

The whole population increased in the last ten years about 35 per cent. Therefore, by adding a little more than one-third to the deaths by each disease

in 1850 the results can then be compared with those of 1860 on an equal basis of population. By this method it will be found that *measles* and *thrush* (cancerous sore mouth) occurred with equal rates of mortality in both years; *croup* and some other diseases nearly so, as will be seen by inspection of the preceding statistics.

The inquiry, What maladies have been the most fatal in the United States? is answered by the table given in the Appendix. A slight inspection will show that the number of deaths by *consumption* is the greatest of all. Next to this is the family of *fevers*, of which the mortality has just been stated. The deaths from consumption and some other noted diseases have been as follows:

Diseases.	Deaths in 1860.	Deaths in 1850.
Consumption	48,971	33,516
Pneumonia	27,076	12,130
Pleurisy	1,262	2,167
Scrofula.....	2,683	1,860
Delirium tremens, intemperance.....	1,504	951
Dropsy	12,034	11,217
Diphtheria.....	1,663	.....

Consumption, according to medical authority, "begins with a change in the constitution, followed by the deposit of a cheese-like matter, forming tubercles in the lungs and other parts, ending in ulceration. When this tuberculous matter is deposited in the glands of the neck and in the bones and joints it constitutes *scrofula*; in the glands of the abdomen, mesenteric disease; neither of which affections differs from consumption in its essential anatomical cause." Consumption is believed to prevail more extensively in the northern States, as fevers predominate in the southern States. *Pneumonia* is characterized by inflammation of the lungs, and *pleurisy* by inflammation of the lining membrane of the lungs. The total deaths in 1860 from consumption, pneumonia, and pleurisy were 77,309.

Delirium tremens, or *mania à potu*, "a disease caused by the abuse of spirituous liquors, is characterized by tremor, sleeplessness, and delirium." Under the same head are brought the deaths returned from intemperance, making a total of 1,504, and showing the large increase of 58 per cent. during the past ten years.

Diphtheria is the most recent name of a disease characterized by a thick membranous exudation in the throat. It is allied to *croup* and to *scarlet fever*, with which it is sometimes confounded. It is asserted to be not contagious, but curable in a large majority of cases. In 1850 the name had attracted little or no attention; and in 1860 the number of deaths from this cause were but 1,663, a number much less than the notoriety of the disease would imply. It belongs to the zymotic class.

Lastly, the statistics of *Violent Deaths* will be found interesting, as the causes of demise are more intelligible or less shrouded in mystery than those of disease. It appears that only 5,669 "accidental deaths" of females were reported, against 12,399 deaths of males by accident. A still greater disparity of the same kind is shown in the subdivisions of "drowning, fall, fire-arms, freezing," and "rail-road" accidents. The deaths by "suffocation," however, are quite evenly distributed among the two sexes. But among the deaths by "burns and scalds" the predominant loss ranges decidedly to the side of females, a result of fire naturally following from domestic avocations and difference in attire. On the whole, taking the accidental deaths as the measures of risk during that year contrasted with the present, the implied inference may be expressed that the male class are fully twice as much exposed to dangers as the female class, in their usual habits of life.

Under the head of *suicides* are counted 794 deaths of males and 208 of females, or nearly as four to one. Among these desertions from life, "hanging" is the principal resort. To complete the dark picture in which has been given to the "unproportioned thought, its act," 458 deaths by justifiable and unjustifiable "homicide" are also reported, together with 526 "murders" and 61 "executions." So many distinct cases have been gathered, and a considerable number more have doubtless escaped registration.

For further details, until the full returns of the census are published, reference may be made to the table of diseases and violent deaths in the Appendix. As to arrangement, the alphabetical list of diseases extends across four successive pages for the first group of States from Alabama to Illinois, inclusive; then a second group of States from Indiana to Michigan is inserted in the same manner; and so on, making five groups in all, with a final aggregate for the whole United States.

NOTES.

THE RELATIVE POSITION OF STATES, IN AREA, POPULATION, DENSITY OF POPULATION, RATIO OF INCREASE, AND INCREASE ACCORDING TO AREA.

The diagram and table which precede the population tables in the Appendix are designed to illustrate the relative rank and position of the several States from different points of view.

The diagram exhibits the numerical position according to gross population. The light lines indicate the slaveholding States, the black lines the free States. Virginia, for example, having the largest population in 1790, maintained that position until 1810, after which she successively sunk to the second, third, fourth, and, in 1860, to the fifth place. Ohio, which was first included in the census in 1800, then standing eighteenth, stood thirteenth in 1810, five in 1820, four in 1830, three in 1840, 1850, and 1860. The upper figures, with the circles, give the decennial ratios of increase. The detached column of circles contains the *mean* ratios of increase.

The table gives the numerical position in 1860 of the several States in point of area, population, population per square mile, average ratios of increase for the time during which each State has been represented in the census, and actual numerical increase of population per square mile from 1850 to 1860, and also from 1790 to 1860 for those States which were included in the first census. Were we to continue the erroneous estimate of the area of Iowa entertained in 1850, that State would occupy an improper position in this table. The correct area is 55,045 miles, population per square mile 12.26, absolute increase per square mile, 1850 to 1860, 8.77.

POPULATION OF CITIES.
(APPENDIX, TABLE No. 40.)

The table above referred to shows the population of some of the more prominent cities of the United States, as returned by the census of 1850 and of 1860, respectively; also the increase and decrease, and rate per cent. of increase and decrease in population from 1850 to 1860.

The average increase in the population of the cities above enumerated is 78.62 per cent.; the increase of the whole population of the United States during the same period (as is shown in another table) is 35.59 per cent.

The average decrease of the ten cities in the table, whose population has diminished since the returns of the census of 1850, is 14.66 per cent.

INCREASE IN POPULATION.

Cities.	From 1840 to 1850.	From 1850 to 1860.
	<i>Per cent.</i>	<i>Per cent.</i>
New York.....	64.86	56.27
Philadelphia*.....	54.27	65.43
Boston.....	19.63	29.00
Baltimore.....	65.93	25.65
Cincinnati.....	149.11	39.51
Saint Louis.....	372.26	106.49
New Orleans.....	13.87	44.04
Chicago.....	570.31	264.65

* The bounds of Philadelphia were extended in the year 1852 so as to embrace the entire county, which accounts to some extent, for the great and unusual increase of population during the last decade.

CONCLUSION.

It has been my endeavor in the foregoing statement, to represent impartially the condition of the material interests of the country for the year ending June 1, 1860; that previous to the one in which the unhappy rebellion, at present existing against the integrity of the government, assumed shape and form. However imperfect in detail and deficient in completeness, it has been my aim to impart all the information available, in a form acceptable to the general reader.

The figures which we have given, make it appear that during the decade from 1850 to 1860 our population, in the aggregate, has increased more than thirty-five per cent. More than fifty millions of acres of land were brought into cultivation. The productions of agriculture multiplied in ratio greater than the population. The products of manufacture increased nine hundred millions of dollars, or at the rate of eighty-six per cent. The banking capital ran up from \$227,469,074 in 1850, to \$421,880,095 in 1860, while the circulating currency was augmented \$52,089,560. The amount of insurances increased about \$311,000,000. More than 22,000 miles of railroad were completed, and the capital involved increased from \$296,640,148 in 1850, to \$1,151,560,829 in 1860; while to indicate on the map of our country the lines of telegraph would be to represent the web of the spider over its entire surface. Our internal and foreign trade kept pace with our advance in production and increase of capital. Education, free to a great extent, has been made more accessible, and crime has rather diminished. We experienced no effects of wide-spread pestilence, and our country seemed the chosen abode of prosperity and peace.

Admitting that the insurrection has tended to depress commerce, to paralyze many branches of industry, and plunged the nation into a debt of surpassing magnitude, and while the ordinary internal trade, so vast in its amount, has been suspended between the North and West and the South, there may be found abundant causes for thankfulness that the mass of our population has thus far experienced but gently, the sufferings and desolation usually attendant upon a revolution of so wide-spread and serious a nature as this has proved. The na-

CHANGES OF AREA.

By such as desire to institute a very minute consideration of the progress of particular States, and the District of Columbia, for all periods, the fact should not be lost sight of, that for a period of near half a century a portion of Virginia, including the city of Alexandria, was enumerated as part of the District of Columbia, but for the last two censuses has been included in Virginia—a circumstance which affected the ratio of progress from the sixth census of Virginia and the District. In this connexion it may be mentioned for the benefit of future inquirers, that since the taking of the eighth census, two towns (Seekonk and Pawtucket) of Massachusetts have been assigned to and have become part of Rhode Island, and Fall River, of the latter State, has become a part of the city of Fall River, Massachusetts. By the eighth census the population of these places was as follows, viz: Seekonk, 2,662; Pawtucket, 4,200; Fall River, 3,377. This arrangement gives to Rhode Island 6,862 of the population of Massachusetts, and to the latter State the population of Fall River, resulting in the gain to the former State of 3,485 on the number returned by the census, and the loss of that number to the State of Massachusetts.

FIRE-ARMS.

[Continued from page 75.]

The first rifles made by machinery to use the Minie ball, or its equivalent, were made at Hartford, Connecticut, and Windsor, Vermont, for the English government. The machinery and tools for the armory at Enfield, England, were made at Windsor, Vermont; Hartford, Connecticut; and Chicopee, Massachusetts. Robbins & Lawrence did most of the work on such machinery and tools, and James T. Ames, agent of the Chicopee Works, got out the stocking machinery, and some other parts.

tion may seem to bend with its present burdens, but the American people possess a buoyancy and energy equal to the emergency. The truth is, the mass of our people feel some of the calamitous effects of the insurrection less than those of other governments experience them, and the singular and anomalous fact is apparent to all, that, while the people of the United States beyond the direct influence of the rebellion, and who constitute a large proportion of its inhabitants, are prospering in every branch of industry, and while our government securities are being eagerly absorbed, and the stocks of the Northern States are coveted at a premium, many of the powerful nations of Europe witness the prostration of their manufactures and decline of commerce with serious apprehensions lest the pressure on their people may lead to deplorable sufferings.

The manufactures of the North and the agriculture of the vast West have progressed with a vigor altogether beyond expectation, and while the influx of gold and the unexampled exports of breadstuffs, and the demand for army supplies, in provisions, forage, horses, and various fabrics of our own production, have protected the North and West from financial convulsions and pecuniary suffering, the spirit of self-dependence which the comparatively helpless condition of many of the Southern States, cut off from foreign supplies, has compelled them to encourage in the promotion of manufactures, will doubtless exercise a wholesome effect upon their future prosperity.

That, amid the immense and unexampled exportations of grain and provisions, the large withdrawal of labor from agriculture and manufacturing pursuits, the country should possess, as it does, an immense surplus of provisions, and that the means of subsistence should have scarcely appreciated in value, or the cost of labor should not have greatly risen, affords the strongest proofs of the energies of our people and the inexhaustible nature of the resources of the land; and it is hoped that the truth as presented by the census, will teach us the importance of union and harmony, and stimulate a proper pride in the country and people as one and indivisible. A people who have in twenty-five years doubled their numbers and much more than quadrupled their wealth need not apprehend with misgiving any inability to pay all the national debt which has been incurred.

That we have suffered and lost materially, and temporarily in national dignity, notwithstanding what we continue to enjoy, must be evident to all; but, as in the convulsions of nature and the physical sufferings of communities or desolations of cities, the evil is generally but transitory, often resulting in accelerated prosperity, by the sweeping off of the feeble elements and bringing new energies and resources into action, we may not unreasonably hope that a few years will obliterate most of the painful reminiscences resulting from our present unhappy condition, and that while history will point to this period as one of dire calamity in our experience as a nation, we will, before the taking of the ninth census, be restored to harmony, and, profiting by the past, realize the importance of peace and the blessings of prosperity, with a good assurance of the long continuance of both.

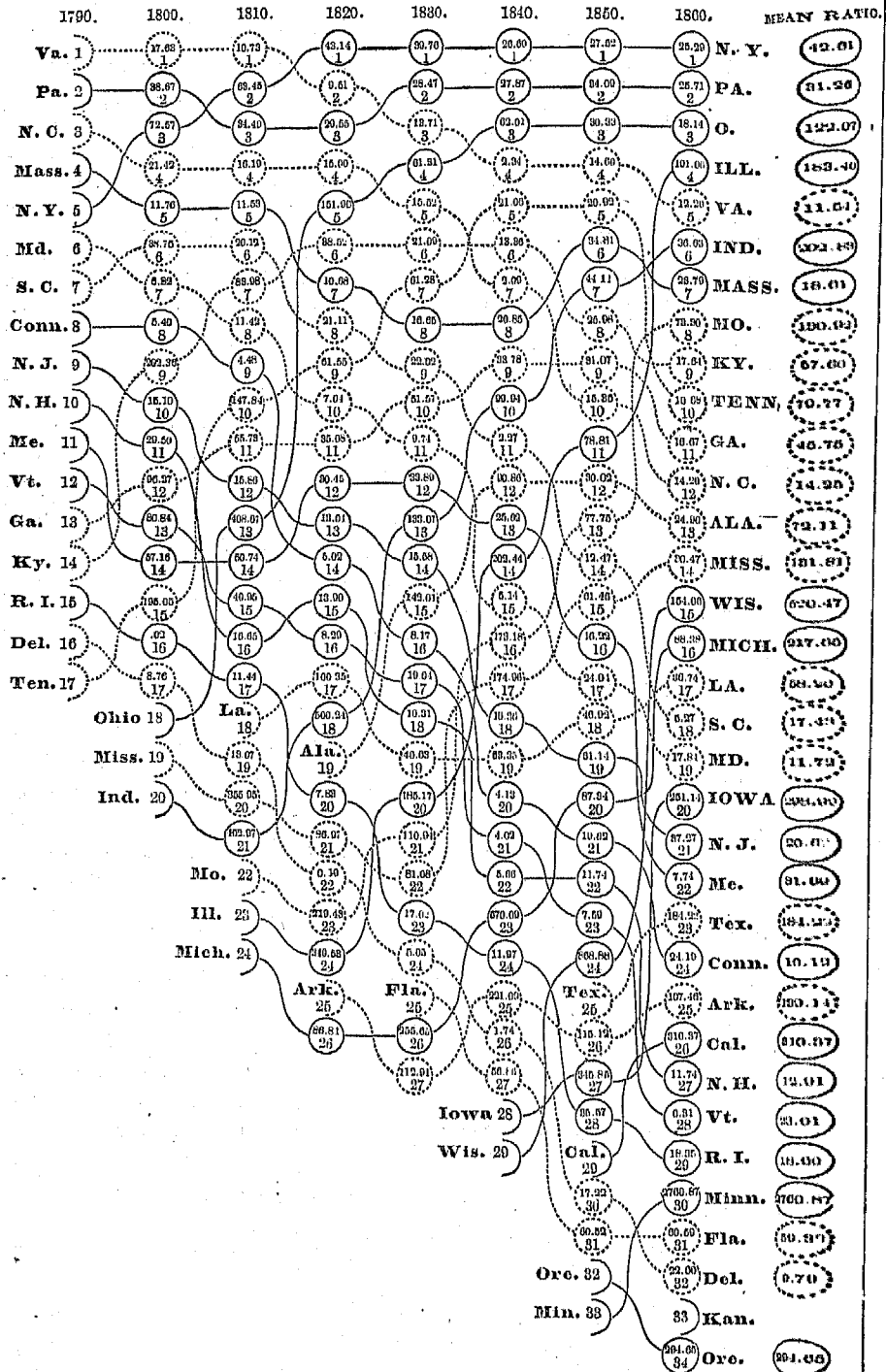
I have the honor to be your obedient servant,

JOS. C. G. KENNEDY,
Superintendent.

Hon. CALEB B. SMITH,
Secretary of the Interior.

DIAGRAM

Illustrating the relative course and position of each State, with ratio of increase, from 1790 to 1860.



PRELIMINARY REPORT ON THE EIGHTH CENSUS. 121

States in the order of their area and population.

ARRANGEMENT OF STATES ACCORDING TO—

Area in sq. miles.	Population.	Population per square mile.	Mean ratio.	Absolute increase of population per square mile.	
				1790 to 1860.	1850 to 1860.
1. Tex.. 237,321	1. N. Y.. 3,880,735	1. Mass. 157.83	1. Minn. 2,760.87	1. Mass. 109.28	1. Mass. 30.33
2. Cal.. 188,983	2. Pa... 2,906,115	2. R. I.. 133.71	2. Wis.. 520.47	2. R. I.. 80.79	2. N. J. 21.93
3. Ore.. 95,274	3. Ohio. 2,339,502	3. Conn. 98.45	3. Cal.. 310.37	3. N. Y. 76.97	3. R. I.. 20.74
4. Minn. 83,531	4. Ill... 1,711,951	4. N. Y. 84.36	4. Iowa. 298.99	4. N. J. 58.64	4. Conn. 19.12
5. Mo... 67,380	5. Va... 1,590,318	5. N. J.. 80.77	5. Ore.. 294.65	5. Pa... 53.74	5. N. Y. 17.03
6. Va... 61,352	6. Ind.. 1,350,428	6. Md... 73.43	6. Mich. 217.65	6. Conn. 47.50	6. Ill... 15.54
7. Fla... 59,268	7. Mass. 1,231,066	7. Pa... 63.18	7. Ind.. 202.83	7. Mo... 39.28	7. Pa... 12.93
8. Ga... 58,000	8. Mo.. 1,182,012	8. Ohio. 58.54	8. Tex. 184.22	8. Ky. 28.73	8. Md.. 11.06
9. Mich. 56,243	9. Ky... 1,155,684	9. Del.. 52.93	9. Ill... 183.40	9. Del.. 25.05	9. Ind.. 10.72
10. Ill... 55,405	10. Tenn. 1,109,801	10. Ind.. 39.93	10. Ark.. 139.14	10. Vt... 24.25	10. Del.. 9.76
11. Iowa. 55,045	11. Ga... 1,057,286	11. N. H. 35.14	11. Miss. 131.81	11. Tenn. 23.55	11. Ohio. 8.99
12. Wis.. 53,924	12. N. C. 992,622	12. Vt... 31.79	12. Mo... 130.92	12. N. H. 19.85	12. Wis.. 8.99
13. Ark.. 52,198	13. Ala.. 964,201	13. Ill... 80.90	13. Ohio. 122.07	13. S. C. 18.55	13. Iowa. 8.77
14. Ala.. 50,722	14. Miss. 791,305	14. Ky... 30.67	14. Tenn. 79.77	14. Me.. 17.72	14. Mo.. 7.43
15. Miss. 47,156	15. Wis.. 775,881	15. S. C. 28.72	15. Ala.. 72.11	15. Ga.. 16.81	15. Mich. 6.25
16. La... 46,431	16. Mich. 749,113	16. Va... 26.02	16. Fla.. 59.32	16. Va.. 13.83	16. La... 4.65
17. N. Y. 46,000	17. La... 708,002	17. Tenn. 24.34	17. La... 53.20	17. N. C. 13.31	17. Ky.. 4.60
18. Pa... 43,000	18. S. C. 703,708	18. N. C. 22.06	18. Ky.. 57.60	.....	18. Ark. 4.32
19. Tenn. 45,600	19. Md.. 687,049	19. Me.. 20.94	19. Ga... 45.75	.....	19. Miss. 3.93
20. N. C. 45,000	20. Iowa. 674,948	20. Ala.. 19.01	20. N. Y. 42.61	.....	20. Ala.. 3.80
21. Ohio. 39,964	21. N. J.. 672,035	21. Ga... 18.23	21. Me.. 31.69	.....	21. Va.. 2.85
22. Ky.. 37,680	22. Me... 628,279	22. Mo... 17.54	22. Pa... 81.26	.....	22. N. C. 2.76
23. Ind.. 33,809	23. Tex.. 604,215	23. Miss. 16.78	23. Vt... 23.01	.....	23. Ga... 2.61
24. Me... 30,000	24. Conn. 460,147	24. La... 15.25	24. N. J.. 20.62	.....	24. Tenn. 2.35
25. S. C. 24,500	25. Ark.. 435,450	25. Wis.. 14.39	25. Mass. 18.61	.....	25. Minn. 1.98
26. Md.. 9,356	26. Cal.. 379,994	26. Mich. 13.32	26. R. I. 18.60	.....	26. Tex.. 1.66
27. N. H. 9,280	27. N. H. 326,073	27. Iowa. 12.28	27. S. C. 17.43	.....	27. Cal.. 1.53
28. Vt... 9,056	28. Vt... 315,098	28. Ark.. 8.34	28. N. C. 14.25	.....	28. Me.. 1.50
29. N. J.. 8,320	29. R. I.. 174,620	29. Tex.. 2.55	29. N. H. 12.91	.....	29. S. C. 1.44
30. Mass. 7,800	30. Minn. 173,855	30. Fla.. 2.37	30. Md... 11.72	.....	30. Fla... .89
31. Conn. 4,674	31. Fla.. 140,425	31. Minn. 2.08	31. Va... 11.54	.....	31. N. H. .88
32. Del.. 2,120	32. Del... 112,216	32. Cal.. 2.01	32. Conn. 10.12	.....	32. Vt... .11
33. R. I.. 1,306	33. Kan.. 107,206	33. Ore.. .55	33. Del.. 9.79	.....	.....
	34. Ore.. 52,465	.....	.....	.....	.....