

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 Tyrringham, 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-

cations 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. Meechi, 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	2,148,285
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:

	Tons.
Existing June 30, 1851.....	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 feebler 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.*



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... 39.26	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	.....	.....	.....	.....