PART II.

A

COLLECTION

OF

Additional facts, tending to shew the practical foundations, progress, condition and establishment of the American arts and manufactures, and their actual connexi n with the wealth and strength of the United States; stated in the continuation of the communication to Mr. Gallatin.

In the tables, which form the third and fourth parts of this statement, is contained the result of this first attempt of an extensive and populous country, or perhaps of any country, to ascertain, in detail, the facts, which constitute and display the actual condition of its manufactures. The duty of collecting the information by the marshals and secretaries was additional and secondary to the periodical enumeration of the people, and required a longer time than was allowed for such an enumeration, enjoined as a basis for the distribution of constitutional power. The period of the two measures was not sufficient for the correspondence between the superior and subordinate officers, which would have produced more perfect details and greater uniformity and perspicuity. It may however be affirmed, that the tables contain a great number and variety of clear indications of the state of the manufacturing branch of the national industry, and a mass of positive evidence upon the subject, in relation to the eastern, northern, middle, southern, atlantic and western *sections or grand divisions* of the country, with respect to the forms or modes of the manufactures, which have grown up, the raw materials, upon which they operate, a very considerable portion of the value to which they have arisen, very useful data for the comparative values of *internal commerce or manufactures and external commerce or navigation, and foreign trade*, and much elucidation of the operations of manufacturing industry upon the commercial and the landed interests, and upon the public safety.

From the official papers, on which the tables are founded, and from many other sources, some additional information, not reducible into regular columns, has been collected. This information it is now proposed to submit in the form of statements, concerning several branches and denominations of manufactures and the connected machinery. To shew the portion of goods consumed or demanded, which our manufacturers did not or do not supply, by the actual importation of manufactures in a season of embarrassment and economy, the substance of the return, for the first year under the present constitution will be added. The national population was then nearly four millions of persons, and the value of foreign manufactures about 15,000,000 dollars, after adding ten per centum to their European cost. Some of the non-enumerated or unspecified goods were certainly not manufactures, but their value is not considerable and may be fully allowed for, by the deduction of $ 295,688$\frac{89}{100}$, which has been made from the amount of the return. Distilled spirits were not included among those imported manufactures. If our population be taken at seven millions and a quarter, in 1810, our demand for foreign manufactures might be cotemporaneously estimated at 27,187,500. But on the one hand, importation has been increased in consequence of a freer con-

sumption, and the business produced by increased wealth and other circumstances. On the other hand the consumption of foreign manufactures has been diminished by the great increase of those of the United States. The exportation of American manufactures, in the year 1807, is afterwards given, so far as they appear on the face of the general custom-house returns; but it is considered as a certain fact, that a greater value is exported, than appears from that document.

A very great number and variety of literary productions, foreign and American, diffuse the knowledge of labor-saving machinery, processes and devices, and quicken the progress of manufacturing industry and skill. *Those which favor family and household manufactures are peculiarly interesting.* It is respectfully suggested that it would promptly repay the expence and reward the pains, if measures were taken, under known public authority, to ascertain and exhibit, by plain descriptions, or specifications and engravings, the best set of implements, instruments, utensils, tools and machinery, existing in the United States, to render household manufactures more easy, expeditious, convenient, economical and profitable. *The fly shuttle* is considered as a very valuable invention, but though it has been known, in this country, many years, more than ninety-nine hundredths of our shuttles are not of that description The same observation occurs as to the spinning mills, mules, jennies, &c. The stocking loom, though so much more rapaid in its work than the knitting needle, has not been yet by any means sufficiently extended. It is more convenient in a private family than the smallest cloth loom, or the great spinning wheel,

It is necessary to observe, that several facts, in the first part of this statement, will be found in this second part. They were given in the former on the ground *of the general economy and policy of manufactures*, merely to shew their influence in favor of agriculture, commerce, the fisheries and defence. In the following statements, they are adduced, *in a strict technical or practical view*, to manifest the states of *the respective branches of manufactures* and of the specific means of their execution.

COTTON.

This raw material, being the *only redundant one* adapted to the manufacture of cloths for apparel and furniture, produced in the Unites States, and being the most susceptible of labor-saving operations, the cotton branch will probably, nay certainly, become, *very soon* the most considerable of our manufactures. It is adapted to all seasons in its various forms, and to a greater variety of uses, than any other cloth or stuff. While sheep's wool continues to be much more wanted than cotton wool, the latter will be proportionally used as a substitute for sheep's wool, in blankets, corduroys, velvets, and the chain or warp of goods with woollen woof or filling. Cotton cloths can be printed; an operation seldom performed on woollens or silks, very seldom or never on hempen goods. They are substiutes for *worsteds*, or *stuffs of combed wool* and for silks, which are made of raw materials not yet considerable in the United States. The cotton raising states appear, by the reports of the marshals to be the most numerous employers of family looms. Improvements in the household carding machinery, spinning machinery, loom and shuttle, and in family bleaching and dying are producing new and great facilities, savings and profits in the manufacture of cotton goods by the farmers and planters. The cotton cloths, for various uses, manufactured in the United States, exceeded *in measurement*, in the year 1810, all the other cloths: that is all the cloths of flax, hemp, wool, and silk, and the progress of the cotton branch is greater than that of any other, and indeed greater than that of all the others. *Capitalists can most easily extend themselves in the cotton manufacture, because the raw material is abundant and capable of being conveniently and promptly increased.* The United States have some palpable and great advantages over their foreign rivals in the cotton branch. Those of Europe depend upon foreign agriculture for the raw material, for the indigo dye, and in a considerable degree for their bread stuff. Those in the East Indies will not be allowed or be able to use labor-saving machinery. Improvements in the loom, and in other things, are opposed by force in Europe. The expences, costs and charges of transporting cotton, from the farms and plantations, even near the coasts of the United States, to the manufactories of Manchester, Glasgow and Rouen, and the same charges upon manufactured goods from Manchester, Glasgow and Rouen, to the houses of the planters and farmers in America are equal to fifty per cent upon the European costs of the finer, and seventy per cent on the coarse, heavy and bulky goods of those

great manufacturing towns. Every person capable of working in the manufactories of woollen, linen, hempen and silken cloths, can become, in less than a week, a useful cotton manufacturer. The cotton branch, in the United States is the great resort of all the unemployed cloth manufacturers, and there is here no impediment to a person changing his trade or employment, or place of business. Every man and woman in the United States, uncharged with crime, is free of every city, town, borough, village, hamlet, township, hundred and county, and enjoys the freedom of every occupation, trade and calling. The cheap American bark and other dyes, and particularly the costless dye, called *the iron liquor*, made by covering useless fragments of that metal with vinegar, or the pyroligneous-acid, are convenient colorings for cotton yarn and cloths. A great *desideratum* in the manufacture of cotton is the method of giving it a true *scarlet* dye, which no art has hitherto been able to fix in goods made of this raw material. It has been for many years the subject of an offer of a very considerable premium in Europe. The Americans make good red cotton for the weaver, superior to Turkey yarn.

In consequence of numerous and particular enquiries and communications, in and from all parts of the United States, it satisfactorily appears, that the skill, the means and the scale of the year 1810, in the cotton manufacture, have been very greatly improved and extended, and that the capital machinery and establishments have been very much enlarged and multiplied The cotton blanket, which is a luxury on the continent of Europe, is a matter of great economy in the United States. It is an excellent covering. The double twilled cotton cloth for apparel and furniture, begins to rival the immense invoices of foreign ticklenburgs, and other stout linens. Similar facts occur in a variety of other instances. *Heavy cotton goods cannot be imported without a loss.* Fancy goods offer the greatest profits, and in many instances are easy of imitation. In household manufactures, as soon as it happens that the stock of flax and wool is exhausted, the industry of very great numbers of families of the middle, northern and eastern states, is applied to our redundant southern cotton, which is every where for sale and pays no import duty or excise. Every additional working hour, in a day, thus employed, is an addition of one twelfth part to the domestic manufactures of the country. *It is highly beneficial to possess an unlimited raw material, which at once invites and impels to sober, steady industry, and facilitates its operations* One natural effect is to render every industrious female *an artizan*, whenever her household duties do not require her time. The general practice of manufacturing cotton in families, not resident in the cotton raising districts, prepares those families, by their habits of industry and their skill, for that extension of the woollen manufacture, which our great landed capital and the rapid multiplication of sheep must very soon occasion.

A large quantity of cotton is used as chain or warp with woollen woof or filling, and it is used as woof or filling for goods with flaxen or hempen chains or warps. It has nearly superceded the use of flax in the manufactory of hosiery, and is sometimes mixed with wool in making stockings. Cotton is well adapted to use in stockings in our southern winters. It is believed, that it would be favorable to health, if the colored laborers were supplied with a cap of thick homemade undyed cotton swanskin, similar in form to the highland woollen cap of north Britain. Fevers and morbid strokes of the sun would be prevented by the protection of the head.

WOOL.

The manufacture, which is next in rapid improvement and extent, to cotton, is that of wool. It is very considerably aided by the new carding and spinning machinery, by the introducton of the Barbary, Merino and long woolled sheep, by improvements in the breeding and tending of the general flocks of the country, by superior care of the growing fleece, by the increase of the value of the carcase or mutton, by the sorting of wool, by improvements in the stocking and cloth looms, by the acquisition of *the fly shuttle*, and of machinery to dress and finish cloths, by increased skill in the workmen and by improvements in the arts and business of fulling and dying, to acquire which great exertion and expence are applied.

The present growth and production of English wool, from the system of production, management and application of which we derive the most useful lights, are supposed to be most accurately esti-

mated by Mr. Luccock of Leeds, in his late publication. It is believed to decline. The soil of Great Britain is insufficient for the population. Mr Luccock estimates the British wool at 97,000,000 lbs. per annum. If the whole present annual production of the united kingdom be taken at one hundred and twenty millions of pounds weight, and if two third parts be used by the British and Irish people, it would give 80,000,000 lbs. for 16,000,000 of people, or five pounds per head, whether infant or adult. This is exclusively of foreign wool and the increased cotton substitutes. In the same proportion, the United States, if they contain at this time,* eight millions of persons, would require, were our climate as cold as that of Britain, forty millions of pounds. If it be considered, that one half of our population lies to the southward of Pennsylvania, and that their cotton is a very convenient substitute for wool, it will appear, that forty millions of pounds weight of sheep's wool is a good supply. It is believed, from the facts stated and considerations suggested on the subject of wool, that the supply of 1812 does not fall short of twenty to twenty two-millions of pounds. Not only have sheep been greatly multiplied, but their fleeces have been increased in weight and much better preserved. A very few years must increase our wool to 40, 50, or 60, millions of pounds, when the exportation of woollens must take place. For it is not doubted, that our housewives, other manufacturers, and machinery will continue (as they have for a long series of years) to make up all the wool our sheep will yield. The stock of fine woolled sheep, in Spain and Portugal, are unhappily diminished, neglected and injured, as well in the fleeces as in the bodies of those animals. Our principal source of European supply of fine wool is then reduced in quantity and quality, while the prices are advanced. Our own stock of fine wool is therefore the more convenient and beneficial, and the manufactory of it is the more highly encouraged and greatly assisted. The most strenuous and judicious efforts *to increase the quantity and improve the quality* of our wool, have occurred within the two or three last years, while our adventitious gains of sheep and wool have been far greater than in any past time; yet the manufacturers (with their machinery) have so increased and extended, as to advance the prices of wool, and even to produce continued importations. Considerations, of *revenue at least*, have occasioned *an actual encouragement* by increased duties, in the last year. The simplicity of the prevailing colors in the woollen branch for some time, has been favorable to the United States and continues so in the present stage of their woollen manufacture. Scarlet, purple, garnet, crimson, claret, and pea green are more difficult to dye, fix and finish than drabs, bottle greens, grave mixtures, marons and browns. Several recent extensions of the woollen manufacture, produced by the interruptions of the importations from Europe, and by the increase of wool, are particularly convenient to this country, because they do not require the aid of fulling mills, and may therefore be executed in families, and by manufacturers within their own working places. Flannels, common woollen stockings and hats are among the goods contemplated. These are commodities of very great consumption and as necessary as any other woollen goods for the general population, and for the supply of the army and navy.

The spinning wheel, the loom and the fulling mill are real aids to manual labor. The two first have been long invented. The last is a far more recent discovery. It has been little improved, since its invention. *Nice skill, in using the fulling machinery, is of the greatest importance to the success of the woollen branch. This skill is wanting in many places. It is very desirable* to awaken *the most particular* attention of the manufacturers to the fulling operations and mill. The fulling of hosiery is practised in Pennsylvania, in making that description, which is called *the Germantown stockings*. It particularly adapts them *to the comfort and trying service of the army.* The fulling of hats is yet a manual labor. Wool and other animal substances are capable of being fulled. Vegetable substances are not deemed capable of that operation. The improved carding, and spinning and shearing machines, the household cloth-loom and stocking cloth-loom are also capable of saving labor. Dying prevents the domestic labor and expense of washing, while it obviates all that injury to the pleasantness and beauty of woollen cloths, which frequent washing occasions.

No branch of manufactures receives so great an accession of foreign workmen as the woollen branch; because the raw material and manufacture are universal in Europe.

No branch of the manufactures of the United States receives so great a propulsion from *our*

* December 1812.

immense landed capital, as the woollen branch; because sheep are produced in every section of our country, and land is redundant in most of the states. *Cotton has a natural climaterial district*, and requires a very limited portion of it. *Wheat has a practical district.* Hemp and flax are limited in their cultivation by the state of population and employment. All these require the steady labor of many hands. *But the field of sheep walks is as extensive as our territory, and sheep farming is as general as our settlements. With their progress it must become as extensive as our country.* Sheep do themselves, much towards the care they require. The quantity of land, which would maintain the greatest stock belonging to any country, is but a minor fraction of our soil. Wool then must become abundant, and household manufacturers, machines and artizans insure the conversion of it, as fast as it shall be increased, into materials for apparel and furniture, and into merchandize for domestic and foreign trade and consumption.

Of all the raw materials, none is capable of conversion into manufactures so favorable to health as wool. It is extensively and indispensably necessary to the enjoyment of that blessing. A great number of persons of both sexes and of all ages and conditions, require woollens for their comfort and their safety. *There is no other good and safe material for carpets:* no other *capable* material *for common hats and winter stockings:* no other which preserves, in the human body, that constant and equable insensible perspiration, the want of which brings early pain, disease and death. No material, for cloths, for furniture and for apparel, is so safe as wool in respect to fire. No abundant one for those purposes is capable of so economical and elegant colorings and dyes. Wool receives, and, better than any other copious and strong material retains, every tint, every shade of color. The goods of this manufacture are of very great variety and compass, beginning with three shillings sterling per gross of yards, in the shape of worsted bindings, and rising to fifteen dollars per yard, in the form of superfine broad cloths of the best Peruvian or Vicunia wool.

IRON.

The red appearance produced by iron in our burnt clay, in every state and county, proves that general character or quality of our soil. The ore is very abundant and widely diffused. The extraction of the metal, in the best condition, the conversion of it into steel and the manufacture of it into all the necessaries and conveniences belonging to this extensive and useful branch, are facilitated by the omnipresence of wood and consequently of charcoal, and by rich and numerous veins of fossil coal appearing in many places on the surface of the earth. These are present magazines, and uncommonly strong symptoms of immense latent treasures of that fuel. *The manufacturers of iron wares urgently call on the owners of mines of that metal to open more of them; and to work the whole upon a far greater scale.* Machinery to work up pig-iron and bars, has been wonderfully invented, extended, diversified and multiplied in this country since the impediments of the year 1750, from external legislation, ceased to exist. Every year enlarges and diversifies the iron and steel manufactures. They are much too numerous for a detailed statement. Castings have been made in very increased quantities. These, for the use of manufacturing machinery alone, have been computed at 1000 tons per annum. The common blacksmiths' work, though of necessity very imperfectly given in the tables, is a branch of manufacture of great amount and utility, and is performed in every section of the United States, however agricultural, and however peopled. *The improvement of the system and tools of these workmen and particularly the introduction of the labor-saving machinery into their shops, would be a very substantial benefit to them and to the country.* The blacksmiths' shops are in effect *primary schools of the arts.* The cut-nail machinery has been very beneficially introduced into some of these shops, near to the iron furnaces, insuring the profitable employment of all the time, not otherwise occupied. It is, like the two spinning wheels and the loom, among the women in private families. Pennsylvania ,the greatest nail making state, produces at the rate of nine pounds of nails for each person in the state, which is at the rate of 65,000,000 of pounds for the whole white population of the United States, were equal attention paid to this gainful economy of time and labor. There are many blacksmiths' and nailmakers among the people of African birth and descent in the southern states.

There being in effect, no limit to our fund of charcoal, the extraction of pig metal from iron ore, the refining of iron by the second process, as also by the forge-hammer and other modes of compression, and the formation of it into manufactures by all the operations, which require it to be heated to the malleable degree, are therefore performed without any of the injuries to the metal, arising from fossil coal, and with all the benefits resulting from carlbonic fuel. As the extent of our territory insures a very great duration to our stock of charcoal, by mere natural reproduction, and generally without the labor and expence of plantations, our iron manufactures must be very good, permanent and highly beneficial. There are great quantities of iron, adjacent to forests, which continue to impede the cultivation of the richest soils. Practice, the sciences and imported aid and skill add yearly to the degree of ability, we possess in the iron branch. The rolling and slitting mills, the various nail mills, the tilt-hammer, the grinding and polishing mill, the wire mill, and all the great variety of iron works, except the common furnace and forge, were assumed to be prohibited by the act of the British parliament of the year 1750, restraining our manufacture of iron beyond the pig and the bar. The iron and steel manufactures of Great Britain were raised in 1785, to the value of 50,000,000 dollars. The United States formerly exported much iron, but they now import a far greater quantity, in bars and some rolled and slit. The returns of the quantity of iron manufactured are very imperfect, yet much is exhibited on the face of those documents. The iron branch has been very fruitful in inventions and labor-saving devices, both at home and abroad. In the moments, when we feared difficulty and injury, from the want of certain necessary things, the manufacture has suddenly been attained and established. This is remarkably the case, as to *common steel, iron wire and edge tools*, the manufactures of all which have been greatly advanced since 1810. The variety of iron goods, returned by some of the states and counties, proves to all who are acquainted with this country, that great quantities and values of the same kinds of goods are omitted in the returns, from other states and counties. The improvement and extension of the cast iron manufactures, including cannon cast solidly with a spruce head and bored out, have been very great. The saving of the labor of the manual hammer, (which is the chief benefit of small castings) and of the tilt and trip-hammers, have given extraordinary activity to this branch of the iron manufactory.

The course of things is very strikingly altered with respect to both the commerce and manufacture of iron. The iron branch is more extensive and perfect in Great Britain, than in any other country. It is worthy of note therefore, that considerable quantities of iron and steel are imported even from that country into the United States, proving that we manufacture iron goods beyond what all our own iron permits. The duty alone prevents much more considerable importations of British and other iron. The English iron manufactures were very extensive in 1783. But in each of the five years preceding 1800, they imported, on an average, 41,000 tons of bar iron. Many British workmen of their furnaces and forges have migrated to the states on the Baltic and to other parts of the world, induced by the temptations of countries full of iron and wood. The scale, upon which iron works have been lately conducted in Britain, the use of the steam power and the charring of pit coal have produced great benefits to the owners of iron works. Every thing that saves or which is equivalent to the saving of labor in the business of the furnaces, is of peculiar importance to countries possessing abundance of iron ore. The extension of our manufactures is not impeded by any want of the means to work it, *when procured in the first simple state of pig metal.* The extraction of metal from the ore involves much expensive labor. Much business is done, in labor-saving manufactories; much in the common manual shops. Since we can make such contrasted goods, as the wire and working cards and cannon; small nails and anchors, spinning wheel irons and mill works; screws and plough shares; and as we have raised the price of bar iron from sixty to one hundred and ten dollars, since our revolution, our capacity in the iron branch cannot be doubted. But the most weighty fact respecting the state of our iron manufactures is, that we cannot procure enough of pig metal and bars to satisfy the great and increasing demands of labor-saving mills and machines, and our numerous handicraft workmen A principal improvement in the iron manufacture would be to make more valuable descriptions of goods, such as cutlery, fine tools, needles, watch springs, and other nice wares. These will probably appear in interior

situations, when iron becomes cheap there, as in British Warwickshire. Fuel, provisions, forage and building materials are abundant, in our interior country.

HEMP.

The growers of this raw material are said to suffer very considerably from the sacrifice of the quantity and value of their crops, by imperfections in rotting and preparing it, for the manufacturers. An injurious conversion of a great number of strong and good fibres *into tow*, by the want of care and skill in the preparation of it for the spinner, too often occurs. This stout and harsh raw material requiring strong hands, is also rather unsuitable to the numerous class of female spinners and weavers. The serious labor of the culture, preparation and manufacture of hemp, occasions it to be nearly excluded from the operations of the household manufacturers, in which respect it is on a less convenient footing than flax. *Its great importance to defence obviously recommends it to the most particular attention and consideration.* Its region, its soil, its mode of gathering, rotting, freeing from the stalk, dressing, keeping, spinning, weaving, finishing and uses, merit thorough investigation, very intelligible specification and record, and extensive diffusion, so as to ascertain, preserve and make known all those things, with the best instruments of its culture, preparation and manufacture, and the selection of its seed, for propagation, oil making and all other uses.

In the spinning of hempen yarn, water and steam mills have been introduced. In making twine and even in making cables, horse machinery is used. The improvements in weaving are more likely to be successful in the manufacture of hemp, than in any other raw material, *from the great strength of the yarn*

No manufacture appears to demand, in a greater degree, the aid of *joint stock, or associations of capitalists and manufacturers.* It is possible, that such companies might very favorably affect the cultivation of hemp, by purchasing it of the planter in the state, in which it is first separated from the root or ground, in the manner in which some of the Louisiana cane growers sell to a sugar manufacturer *the stalks of the cane*, as soon as it has been cut. Such *devisions of labor* have many favorable effects, and some particularly desirable in this country. When the manufacturer buys *sugar canes* to make sugar, or hemp in the stalk to rot and otherwise prepare, he, in effect, carries his manufacturing laborers into the present system of cultivation, by making them perform certain labors, which the farmers' people have hitherto performed. The manufacturer also brings his money earlier into the hands of the farmer or planter, and he saves him all the capital requisite for works, tools, implements and wages. The operations of the manufacturer also save labor, either by machinery or by the superior skill and dexterity of those, *who follow one art or branch of industry.* There is an useful reaction of all the adjacent arts and trades, upon the neighbouring cultivators, leading to care in all the parts of agriculture, necessary to the production of excellent goods, in the best condition. Our numerous flour millers are ever checking the farmers, who offer them bad kinds of wheat, or unclean, or mixed with rye or garlic.

Positions in the best hemp districts of the United States, where the strong nature of the soil tempts or impels to the cultivation of hemp, and where fossil coal abounds, appear to be fit places to bring forward the manufacture of hempen cloths, yarns, twines and other goods, which are convenient to handle, to store and to transport, and which are not, like cables and ships' cordage, liable to be injured by the tar used in their munufacture. By manufacturing hemp at the place of its growth, in such situations in Kentucky, the great and useless charges of transporting the offal, the tow and the good hemp, in an unmanufactured state would be avoided. The best parts of the materials, increased in value, by the costs and profits of the manufacturing, would better sustain the charges of sending them to the other states or to the seaports, for the foreign trade. This raw material affords the strongest evidence of the absolute necessity of manufactures, and of *adjacent* manufactures, especially by labor-saving machinery, to *the prosperity of agriculture, and to the certainty of public supplies.* Had we not cultivated and manufactured hemp, and in various places, *in the time of peace, we must have suffered for want of the manufactures of it, in time of war.* Measures even to force *such* manufactures, as are *really necessary to the public safety*, are not uncommon in the

United States. A printed investigation into the cultivation, manufacture, and uses of hemp, with engravings, from the seed to the completion in cordage, cloths and other supplies of war by sea and land, would be of great public advantage. One foreign nation adopted such a measure and displayed, before the people, in the most perspicaous manner, all the operations of *forty arts and trades*, most important to agriculture, war, domestic service and foreign trade.* No country would be more promptly moved by such measures than the United States. The minds of the people are open to useful imformation, and those, who receive conviction from such information, are under no restrictions of local or professional privileges. *The freedom of trades, and the freedom of towns*, as they exist in some countries, are deductions from the general freedom of the national industry.

FLAX.

Habit, convenience and necessity, especially without the bounds of the cotton district of the United States, occasion an extensive cultivation, preparation and manufacture of the raw material. The foreign countries, which are most distinguished in this branch, have not yet made any considerable use of labor-saving machinery and have few regular factories, in which flax is prepared, spun, twisted or wove. They have until lately, depended entirely on *household industry*, for the preparation and spinning. In the United States, the branch has risen to its present considerable height, chiefly by the same means. Within a few years, machinery, saving labor in a greater degree than the common spinning wheel, has been introduced into regular establishments, and even into private families; also machinery to double, treble and twist. There appears no reason to doubt that the flax manufacture will maintain a respectable ground in the United States, by the industry of common spinners and weavers, by *little and great labour-saving machines*, by the fly shuttle, the value of which should be made known, and by some of the improvements of the loom. Such a thorough investigation and display of all the operations and instruments of the culture and manufacture of flax, as have been suggested in regard to hemp, would be equally useful with a view to profit, though not so important to the defence of the country. The spinners and weavers demand of our merchants *their constant aid in the importation of flax*, for our cultivators do not keep pace with the wants and progress of our manufacturers; and in proportion as labor-saving machinery and capital shall be introduced into this branch, still greater exertions of the landed interest, will become necessary. The household manufacture of flax is the most general and the most familiar of all the family operations relating to threads and cloths for apparel and furniture in the United States. In consequence of habits so prevailing, *all we can raise is manufactured and all we can import*. This branch also affords conclusive evidence, that even *handicraft* operations will succeed in the household way, though the regular work-shops be full of labor-saving machinery.

GOLD, SILVER, AND THE FINER MIXED METALS.

The increase of general capital, with the consequent freedom of consumption and extension of manufactures and commerce, has occasioned goods made of these materials to be greatly multiplied, diversified and improved. Gold and silver wares are made in all the considerable towns, and have reached a very high degree of convenience, excellence and beauty in some places. They are not only sufficient for the supply of every possible demand of the country, but our present workmen could make a stock of gold and silver wares for foreign sale, equal to the quantity exported by any nation of Europe. With common care the standard quality is good and uniform, the branch being in the hands of an intelligent and respectable class of citizens, and if it were chosen to raise the standard of quality, in such inconsiderable degree as to make the silver plate a little superioar to the purest foreign standard, and to establish an assay, the operation would probably be quite as pleasing to the conductors of this branch of our manufactures, as it would be practicable and easy.

* The French exposition of the arts and trades, called "*Dictionnaire des arts et metiers*".

The use of rollers and of other contrivances to save labor in some degree, has been gradually introduced into the gold and silver manufactory; and being numerous, they have, though small, at length reached to a considerable aggregate importance. They would indeed be, at this time, highly convenient and valuable, did not *taste and fashion*, to the dominion of which this branch is peculiarly subject, render it unsafe to make too large a stock of goods, though exhibiting in their forms, every line of beauty and of grace.

The gold-beaters' trade, or that of the manufacturer of gold leaf, has been recently introduced into the United States. The metal is prepared by labor-saving rollers, which reduce it to the thickness of a hard, tough and very thin letter paper. Silver is similarly manufactured into leaf. *The city of New York* has attracted the most conspicuous and greatest number of these artists. It is understood, that they are well establised and prosperous. The workmen of Europe, in all branches such as this, are much incommoded by the fluctuations and distresses of that quarter of the world, and they now find encouragement here. This is the case with all that description of artists, who are employed in making the more valuable metal ornaments, trinkets, set work of glass, valuable stones and paste, in gold and silver and jewellery.

Plated work, and the fine and common mixed metal buttons and buckles, are made in very considerable quantities by foreign and native workmen. Casting and machinery afford them great assistance.

Button making has become a lucrative and regular employment in the United States. And is far more considerable, than appears by the returns. The rollers for small and fine work are not sufficiently numerous and dispersed, or all necessary supplies might be manufactured with ease. The rolling and stamping apparatus greatly saves labor in button making. The American cast button is so cheap, that the foreign cast button can rarely be imported. Water mills and steam engines, to roll and stamp in the manner of Europe, will quickly possess the United States of the entire manufactory of buttons, and other small metal goods for seven millions and a half of people, with opportunities of ordinary exportation.

HIDES AND SKINS OF DOMESTIC AND WILD ANIMALS.

Every description or variety of leather is made here. So entirely and easily are the raw materials worked up by the tanners, leather dressers and other manufacturers, that even *the deer skin*, which was formerly prepared *in the buff mode only*, is now much more frequently tanned and dressed as russet or colored leather. That species of skin alone has been latterly exported in the manufactured state.* Fine and delicate skins, which were not formerly seen here as raw materials, are now imported and handsomely dressed, finished and made up into ladies' shoes, pocket books and other goods. The demand for skins, in this extensive and successful branch, has occasioned a curious and effective invention *to split skins*, producing a double quantity of covers for books and other purposes. *The hog skin is tanned in some places, but it is too often neglected and lost in the shape of mere offal of fresh, pickled and smoked meat. Being particularly fit to make strong and handsome saddlery, the farmers will profit by attention to the best management of their hog's skins in all the states, as they now do in some.* The proper oil of fish is not so abundant as it formely was, nor obtainable in interior situations without a great expence, and it is possible that the congenial fat of the skin of this animal, may occasion it to be better and more easily preserved than the skins of horses and oxen A judicious course in manufactures is to consider the true fitness of the various materials, and to put each kind to its proper use.

The facility and utility of the manufactory of leather is every where such, that the utmost ingenuity has been exercised upon the subject of the sources of the raw materials, and the economy of them, when manufactured A considerable premium has been offered by the French government for the invention of the best and cheapest *substitute* for leather *for the covers of books*

* The exportation declines. 1810 to 1814.

It would favor the Indian trade, which has a great tendency to conciliate the aborigines, if the manufacture and a greater consumption of the dear skins could be effected in our frontier towns. It would give activity to the Indian commerce. The transportation of dressed skins from thence would not be subject to so heavy a rate of expence in proportion to the increased value; nor would they suffer in their substance, as they now do, from the worm, and from fermentation and decay.

The present and constant manufacture of all our hides and skins, affords the manufacturers an opportunity to devise such things, as, by increasing the beauty and goodness of their commodities, will enhance the aggregate value of the leather branch. Much utility and profit may be derived from superior tanning, coloring, dressing, workmanship, fancy, taste and economy, *in the whole range of the operations of the leather manufacture.* The elegance of our improved book binding is an example. The abundance of farm lands and the distance of many of them from the seaports, render it certain, that the United States will always be one of the greatest cattle raising and meat eating countries. *Of course there will be, in our markets, a great quantity of domestic hides and skins.* Bark, lime and water-sites, are in many places rather incidents in country tanners' possessions and general situations, than things required to be specially sought, purchased or hired. Most of the goods properly made of leather, are of a very useful and durable nature. There are no commodities, the surplus of which will more certainly command a good and sure foreign market, than the manufactures of this raw material. As the nature of the country, and of its productions and many things in it, give a great fund of fixed and necessary capital in this branch, so it is true, that there is a very large monied capital constantly employed in the leather manufacture. The southern farmers have, in many instances, made tanning a household or plantation business, which they may generally do, with a little attention to the practice, and the addition of the pleasure of some relative chemical reading. *Were chemistry, in particular, and the general science, relative to the fine and useful arts and manufactures, made a branch of domestic and ordinary academical instruction, it would greatly and permanently redound to the dignity of the American mind and the solid internal profits of the business of the country.* Such a course of instruction may be commenced at an early age, for exhibitions of the nature, internal composition, mixtures, attractions, fermentations and decompositions of material objects are as amusing as instructive, and all these are pleasingly and intelligibly displayed *in experimental philosophy.*

It is believed, that the present annual value of the leather manufactures of the United States, exceeds that of any other nation, in proportion to its population; though prices in America are lower, and the goods are nearly all of the useful and necessary, not the fine and shewy character; and as they are chiefly by mere *manual* industry, and are not much aided in the domestic and household way, they establish our capacity for general manufactures, in the ordinary modes.

MAPLE-SUGAR.

This useful and valuable commodity has been heretofore generally estimated, as one, which this country was rather able than likely ever to manufacture in a considerable quantity. Yet incomplete, as manifestly are the general tables in which eight only of the twenty-six districts, return the maple-sugar manufactured; and defective as are the subordinate returns from nearly all the states, which have noticed the commodity, 9,665,108 pounds of maple-sugar are proved to have been made in the year 1810. It is believed, that seventeen millions and a half of foreign sugar, with perhaps three millions and one half more of maple-sugar, supplied our consumption in 1790, when the population was about four millions of persons. Four millions of pounds might be added for the weight of molasses, *used in substance.* Our present population would therefore probably enjoy a comfortable but moderate supply of foreign and domestic sugar, in fifty millions of pounds of the crude or muscovado, allowing, for obvious reasons, a freer consumption now, than heretofore. It is not rare for careful and attentive families to make, 3 or 400 pounds weight in a season. If 250,000 families (of the 1,250,000 families, which compose this nation) were to make only 200 pounds each, or 500,000 of those families were to make no more than 100 pounds

each, we should have the requisite supply of 50,000,000 of pounds. The state of Ohio with a population, equal to about one thirty-third part of that of the United States, returns 3,023,806 pounds of maple-sugar. If the whole union were to manufacture at that rate, it would produce above one hundred millions of pounds. Thus are the actual calculations of the year 1790 fully realized, though deemed by many then sanguine and fanciful.

The preservation and general propagation, of the sugar maple-tree therefore, very strongly press upon the public consideration. This substantial and energetic nation can effect, with ease, what the youngest member in 1810, struggling with the forest and the savage, performed *in mere ordinary course.* The thorough investigation and display of this subject, from the natural history of the tree, through the course of exposure, seasons, treatment, management and manufacture, till its formation into refined loaf-sugar, and to the death and new plantation of the tree, with its qualities and various uses as wood, and with due attention to the implements, utensils, process in a manufacturing and chemical view, and all the possible details, appears to be earnestly demanded of the governments. This effort would induce its early and ample reward, in almost every township, by the benefits, which would result from the mere excitement of a general attention to the manufacture of so pleasant, so profitable, and so nutritious a production. To be fully and universally aware of an attainable advantage is, in such a case, to insure the attention necessary to obtain and preserve it. The season of making maple-sugar is from the middle of February to the end of March, when the farmer and his family have little business to employ them. Five pounds have been stated, as the produce of a tree, but if four or even three pounds be taken from each tree on an average, seventeen millions of trees would produce 51,000,000 of pounds of sugar. There are frequently 40 trees upon an acre of land, but if there be only 34, then five hundred thousand acres (a quantity of land inferior to very many single counties in the United States,) will yield the whole necessary supply. The reserved woodland of our farms is, on a medium, more than a fourth part, even in our old counties. Wherefore a tract of two millions of acres (of which three fourths might be cleared for the plough) would fully suffice. The quantity may be considered as about one thirteenth or fourteenth part of a state, as large as the land of New-York or Pennsylvania, uncovered by streams and lakes. Our rough and mountain land will produce this tree. It has been credibly certified, that a single township, in the state of New-York produced one hundred and fifty thousand pounds weight of maple-sugar, in the infancy, or seventh year of its settlement. It will be observed that the manufacture is proved, by the annexed tables in parts III and IV to take place, in the northern state of Vermont, and in the southern state of Tennessee, and in many parts of the intermediate country, *establishing the region of the sugar maple-tree and manufacture, to be several hundreds of millions of acres.* The tree is abundant in more southern districts. As it is, at present, considered necessary to impart to the wine of *the Corinth or currant fruit*, a greater degree of the saccharine character, than it has from nature, the general presence of the maple-tree, and the universal capacity of our country to produce the red, white and black currants are facts apparently worthy of the public attention. Maple-sugar, within my personal knowledge, has been so well refined as to have been served to the largest circles of foreign and American evening visitors at the house of the late president Washington. The quality was of that real excellence, whichth e double refined white loaf-sugar (from the cane) of the late *Mr Edward Pennington*, of Philadelphia, was generally known to have possessed. Information, as to the proper quantity and use of quicklime and some directions to avoid waste and injury, in the operation of boiling, are the principal instructions wanted by our farmers and planters, to make good muscovado sugar from the proper kind of the American maple-tree. While the governments of Europe labor incessantly to discover a vegetable production, which will yield them sugar, we enjoy from the gift of providence a great favor in the sugar maple-trees, which overspreads our country. If we have but a limited quantity of cane land, it is happy, that we possess very many more than the requisite number of sugar maple-trees.

The substitution of this sugar for molasses, or the use of it when it reaches the substance and condition of molasses, is a further object to our country, which imports many millions of gallons of that commodity from foreign countries. With a view to the economy of drink, this is a most interesting consideration.

But sugar and molasses are so auxiliary to household preparations of various kinds, and to several great and small manufactures and they are so acceptable to the great mass of our increasing population, that there is no reason to doubt, that there might be a good market for all the sugar we can procure, not only from our canes and maple-trees, but by the most active commerce. Consumption at home, and free exportation will ever support the price. Sugars, of every quality, have so greatly increased in value throughout the world, within a few years, as materially to benefit those who make them.

THE SUGAR OF THE CANE.

This interesting commodity is, in the United States in the crude form, little more than an agricultural production, and in its best refined condition, an elegant and grateful manufacture. After the acquisition of a cane district by the purchase of Louisiana* it was apprehended that the constitutional impediments, to the importation of slaves would have, at once, deprived us of much cane sugar, which our newly acquired country could produce, and in some degree, affect the prosperity of the Delta of the Mississippi. But the reported production of 9,671,500 pounds of the sugar of the cane in Lower Louisiana in the year 1810, with 179,000 gallons of molasses†, is considered as far short of what that country will be quickly made to produce, by the general adoption of *the new and curious operations, in the culture of the cane and manufacture of sugar*, which are found to be practicable. This new mode of managing sugar lands appears to be worthy of particular attention, and statement.

Instead of the employment of slaves, requiring a very burdensome advance of capital, and an expensive subsistance, the occasional labor of neighbouring, transient, hired white persons is often used to prepare the grounds with the plough and harrow, to plant the new canes, to dress the old ones, and to clear the growing plants from weeds. The same or other white laborers are afterwards employed by the planters to cut and stack under cover, the ripened canes, so as to prepare them for the grinding mill and boiler. The operation of planting occurs after the sickly autumnal season and before the vernal, and the operation of cutting also occurs in the healthy season, at the end of the following autumn. The service is therefore not unhealthy.

It is considered to be expedient, that the planters, who own, and they who cultivate the soil, should not expend great sums in the establishment of mills and sets of works, on all the sugar estates, after the manner of the West Indian colonies of the European states. But it is found much more convenient and profitable, to leave the business of grinding and boiling to *one manufacturer of muscovado sugar*, for a number of planters. These persons, like the owners of grain mills, and saw-gin mills, can be employed for a toll in hind, or part of the produce, or for a compensation in money. By this method a tract of three miles square or three hundred and twenty perches square, which *would* contain twenty-five plantations of above one hundred and two acres each, may be accommodated by *one central manufactory* of muscovado sugar from the cane stalks: for none of these plantations will be more distant from the boiler than a single mile; a mere city porterage or cartage. Refineries for making white sugar and distilleries may be added, and the economy and accommodation to the planters will be more complete.

The effect of this division of labor and ownership will be, rapidly to bring into the most complete and productive cultivation, all the cane lands in the United States; and to advance the various manufactures of this valuable and wholesome agricultural production. The easy and cheap maintenance of cattle, the abundant supplies of provisions, and building materials for man and beast and the redundance of fuel and cask lumber with the benefits to our planters from being more frequently and comfortably their own stewards, and overseers, will greatly redound to their convenience and profit. Their exemption from duty on their muscovado sugar, their refined white sugar, and their molasses is a very great advantage to the manufacturers of and from the brown sugar and molasses of the United States.

*It is found since 1810, that sugar is produced on the whole coast of Georgia.
†There were made also 239,130 gallons of distilled spirits out of 239,130 gallons of molasses, in Lower Louisiana, in the year 1810.

WINES OF THE GRAPE.

The proper wines of the grape, of the best qualities, are produced in various climates, which are found in the United States, if reliance can be placed upon the indications of temperature, which have been suggested. To the kinds of that liquor, which have been mentioned, the celebrated wine, called *Tokay* may be added. It is produced near a place of the same name, situated in *Hungary*, in 49 degrees north, in a temperature approaching to that of *Champagne*, one of the best wine districts of France. This situation may be considered, as nearly corresponding with that around the common point of contract of Virginia, Maryland, and Pennsylvania. The exquisite wines of the Cape of Good Hope, particularly the red and white *Constantia*, which are produced in 34 degrees south, a position deemed colder than the same latitude north, may be also added. The Madeira grape produces there an excellent wine.

It has been understood, within a short time, that some enterprizing and well informed emigrants from Germany after careful experiments, have considered the temperature of the south western angle of Pesnsylvania as suitable for the production *of the Rhenish and Moselle qualities* of wine. This fact contributes to support the opinion, that it will be safe to count the degrees and minutes of common temperature in Europe and North America respectively, from Lisbon and St. Augustine or New-Orleans.

It appears, by the returns, that about ninety-six quarter casks, (a quantity of good red wine worthy of notice) have been made by a few Swiss settlers, from the Madeira and Cape of Good Hope grapes, on the river Ohio, in about 39 degrees north latitude, in the territory of Indiana. It is also understood, that a good wine, really fit for table use, has been made in the vicinity of Columbia in South Carolina. Other experiments have been made with various success.

The grape-vine, of several distinctly different species, is indigenous in the United States, and is found in every degree of latitude, from the river St. Croix to the Gulf of Mexico. It is doubtless from such original stocks, in corresponding temperatures of Europe,* that its several, present, excellent wine grapes have been obtained by selection, choice of position and of soil, and cultivation. The skill of the wine makers, resulting from practice, and improved by the relative arts, has curiously perfected the manufacture of wine. This commodity rewards, by profit and pleasure, the skill and exertion of its improvers. A striking difference, very interesting to the United States, occurs in certain great classes of foreign wines, extensively used in this country, a statement and an attempt to explain, which may contribute to improve the future operations of the wine manufacturers of the United States.

It has been constantly observed, that although the superior red and white wines of France (the Burgundy, the finer clarets, the Champagne, and the Sauterne) are proved, by the hydrometer, to be as strong as some, and stronger than others of the wines of Spain, Portugal and their islands (the Sherry, the Paxarete, the Lisbon, the Carcavella, the Madeira, the Teneriffe, the Fayal and the St. Michaels; yet the French wines can only be kept, *in bottles well corked and sealed*, while the latter are constantly kept *upon tap*, in *half emptied* casks. It is also observed, that within a few hours after the uncorking of a bottle of French wine, especially of any of the superior qualities, it becomes sensibly injured; while those white wines of Spain, Portugal and their islands, continue good, and some of them even improve in decanters, which by accident have remained long unstopped. This difference is considered to be occasioned by the fact, that the spirit of the French wine is its own natural and proper *fermented* spirit, while the Portuguese and Spanish wines have, (in addition to their *fermented*,) infusions of *distilled* spirits, or brandy. The French wines, soon after their exposure to the air by the drawing of the cork, are believed to recommence fermentation and are quickly injured, having been before sufficiently and most perfectly fermented; while the *distilled* spirit in these wines of Spain and Portugal, prevents a similar recommencement of fermentation and its consequent injuries. Distilled spirits have no sensible fermentation.

*It is remarkable, that continental Asia and Africa, have no wines of high reputation, but those of the little European plantations, at the Cape of Good Hope.

Believing in this cause of the difference of those two great classes of wines, and deeply impressed with the importance of that difference in several views, I submitted the facts, in a guarded and informal conference with the president and vice-presidents, and several other members of *the American Philosophical Society*, at one of our meetings in a manner, which occasioned various suggestions of the moment, from the gentlemen respectively, in order to attain a knowledge of the cause; and, after hearing the whole, that which I have stated, was also submitted to their consideration, and was received with as much assent, as the nature of a learned body, and of the subject rendered proper and necessary, on a new and informal communication. This matter is introduced here, as the foundation of a suggestion, that in the wine making business of the United States, in internal situations, where bottles may be costly or unattainable, a cautious infusion of the barely necessary portion of *homo-geneous* distilled spirits (the purest and best brandy of the grape) will probably enable our citizens to keep their wines, as they keep those of Lisbon, Xeres, Madeira, Fayal and Teneriffe, in half filled casks and common decanters. Thus not only a great and universal economy, in respect to bottles, may be made, but the practicability of keeping wines, in a condition fit for use, may be extended to all situations and to every storekeeper and family. Hitherto the manufacture of fermented liquors has been impeded by the expence of bottles, and often by the total want of them.*

As the grape, its wines, its brandies and essential salt (known under the name of cremor-tartar) are of very considerable importance to our interior country, where foreign wines and brandies must be received at costs and charges, which a great majority of the people cannot sustain, and as wine has a high value, as the means of drawing many from the consumption of distilled spirits, and as a medicine, besides the value of the fresh and dried grape, it is a matter of real consequence among the objects of this statement, that the success of the wine manufacture appears to be rendered certainby the variety and universality of native grapes, by a number of successful experiments, and by the correspondence of temperature, between parts of our country and the districts of the Tokay, the Champagne, the Moselle, the Rhenish and the Hock, the Burgundy, the various clarets or Bordeaux, the Sauterne and the Grave, the Oporto, the Lisbon and other superior or estimable wines of the European continent, and those also of the Cape of Good Hope. *Extreme heat does not appear necessary or even favorable to the happiest concoction of the juices of the grape, the orange and fruits in general.* For France, not less distinguised for its various and exquisite wines and fruits, than any other country, has no point more southern than 42 degrees 26 minutes of north latitude. In considering the character of Madeiria and its wines, it will be remembered, that it is *a small and elevated island*, and similar considerations as to temperature, arise in regard to the *constantia* vineyards at the southern point of Africa, *the Cape of Good Hope*, which must greatly partake of insular characteristics.

OTHER FERMENTED LIQUORS.

The moralizing tendency and salubrious nature of these manufactures, compared with distilled spirits, appear to recommend them to a serious consideration, *and particularly in our country* Distinct views of those of the wines of the grape, customarily speaking, and of the currant or corinth fruit, have been submitted. Beer, ale, porter, cider and perry, manufactures of great aggregate importance to the farmers, remain for notice. The difficulty and expence of procuring a supply of strong bottles, and a peculiar taste for lively or foaming beer, which our summers do not favor, have been principal causes of the inconsiderable progress of malt liquors, compared with distilled spirits. The absence or infrequncy of malting, as a separate trade, has also operated against brewing in the small way and in families. The great facility of making and preserving distilled spirits has occasioned them exceedingly to interfere with the brewery. The liquor of peaches, hitherto deemed incapable of use without distillation, greatly prevents the use of beer in a very extensive region of

*This application of a sedative, in the shape of a distilled spirit, may perhaps be usefully made in the preservation of other fermented liquors.

our country, where the each-tree grows with the utmost freedom, and where its fruit is of the best quality. Cider, which is abundantly produced in another very extensive region, rivals fermented malt liquors as a common drink, and as a material for *a customary concoction*, (the cider royal) and for distillation.

A method to preserve beer and other fermented liquors on tap in half full vessels, by peculiar constructions of the cask and of the cocks, has been invented.* The manufactory of glass bottles is likely to increase. The cork-tree might be established in all our climates south of the Chesapeak. The manufactory of wire, for securing the corks, is commenced with abundant capital, in several places.† The sealing materials for bottled liquors are cheap in America. The manufactures of the brewery are diversified in the shapes of porter, pale ale, brown ale, strong beer and small beer, and even spruce and molasses beer, to suit all tastes, and to accomodate all climates and consumers. The head or top of foam (or cream, as it is popularly called here) is now known not to be observable in the tap beers of Europe, and it is presumable, that this object of fancy or taste may not therefore, in some future time, be deemed indispensable, in the American tap houses, and families. We have been used to consider the want of this foam as an evidence of badness in the liquor. The brewery must be expected to improve in the United States, as it manifestly has since the introduction of *the pale ale and porter* manufactures in 1774. The exportation of malt liquors, and their coasting transportation and sale, have very much increased.

So great diversions from the cultivation and production of *grain*, arise from the cultivation and growth of raw materials, including cane sugar, and from the very increased attention to sheep, and horse and cattle farming, that the farmers' manufactory of cider, already very extensive, must increase and improve. The high price of flour also diminishes attention to grain liquors. The first qualities of cider are more valuable than inferior wines are to the cultivators of France, the Azores, the Balearic islands, the Greek islands, the Canaries and other wine countries. Cider is particularly convenient to those states, whose settlements are completed, as it requires the use of but little land and not the exclusive use; for orchards admit the cultivation of the ground. The distillery, in those fully populated states, is chiefly from apples to the north of the Delaware. The preservation of cider, without the expense of bottling, is more practicable and more general than that of fermented malt liquors.

The exquisite vinous flavor of the north American peach, in the most favorable situations, and the ease with which it is propagated in such places, give rise to great solicitude, that *nice and careful experiments should be made of the quality of the clear fermented liquor it would yield.* Whether the attempt would succeed best, if the peach were treated like the grape, the apple and the pear, in making wine, cider and perry, or whether it would best succeed, if the fruit were treated in the manner of the currant, experience would determine. In the former cases, proper grape wines, cider and perry are made of the juices of the grape, the apple and the pear, without water and often without brandy in the wine; always without brandy, in the farmers' cider and in perry. In the case of the currant wine, brandy is sometimes added and sometimes omitted. Sugar is always added on account of the acidity of that fruit. The peach would not require that addition. There seems to be reason to fear, it may prove too saccharine. It ought however to be remembered, that the wine of France, called *Frontignac*, is of an extreme sweetness, with less pungency than the juice of the peach. It is possible too, that the peach juice fined, and with or without an infusion of brandy, might be preserved as a sweet to mix with other things. It would probably require the bottle. The ease with which the peach is raised throughout the United States, and its application hitherto, to the table, only in its fresh and dried states, and to the distillery, invite to endeavors to extend its utility. So copious an addition to our substitutes for cane sugar, in the form of a sweetening treacle, and of so exquisite a flavor, would be very valuable, if it could be rendered conveniently attainable. The ancient fermented liquors, called *metheglin and mead*, made of honey are not mentioned in any of the returns, though they have been long made in the United States, the

* By the present Mr. Robert Hare, a native of Philadelphia.
† The wire manufactory is well established. A. D. 1814.

former in considerable quantities. They would fairly contribute to swell the value of our household manufactures.*

DISTILLED SPIRITS.

Numerous and valuable improvements, in this manufacture, have been effected, by making spirits of sixth proof (Jamaica rum and French brandy being only fourth proof) the transportation of American distilled spirits from distant interior places, is effected upon more favorable terms, according to the value, or a lower rate per centum. The empyreumatic oil is frequently and easily extracted by a patented operation, and the bad flavor of ill tasted spirits is taken off. The quantity of distilled spirits reported, is 25,804,792 gallons, equal to 234,589 puncheons, of about 110 gallons each; very far exceeding all the West Indian and South American rum or spirits and molasses, of every foreign power. Our manufacture of spirits is partly of foreign and American molasses, oats, Indian corn, buckwheat, wheat and potatoes; but principally from rye, apples and peaches.

The comparative importance of the distillery will be more clearly understood, when it is known, that the amount of all the rum and spirits imported from the British colonies into England in 1785, was only 18,184 casks of 110 gallons each. It is true, that there was a considerable exportation from the British West Indies to the United States, some to the northern British colonies and a little in other directions. But the American distillery, at present, very far exceeds the whole. It will certainly continue to receive considerable support from foreign consumption.

The unobserved rapidity of the growth of the grain distillery combining with the extension of the brewery, and with the increased consumption of the various meals by the manufacturers, and the modern cultivations of cotton and sugar, have greatly contributed to maintain the high prices of wheat and Indian corn. For the rye and barley, which have been raised for the distillery and brewery, have employed a proportional part of the cleared land and labor of the country. But as our objects of cultivation have increased in number, and continue to increase, and as grain will be raised in a less proportion according to our population, and our manufacturers, cotton growers, sugar planters and cattle farmers will require large supplies, the original necessity for the grain distillery will decrease. Cider and wines of the grape and currant will, at the same time, increase and will materially interfere with the grain distillery by their rivalship and by their employment of a portion of our industry. The distillery of the potatoe is said to be very profitable, and increasing; and the flavor may be improved by the extraction of the empyreumatic oil, in the patented manner. As very profitable, and as moralizing rivals of distilled spirits, all the other drinks, suh as fermented malt liquors, cider, currant wine, perry and grape wine are respectfully conceived to merit a sanctioned investigation and perspicuous display, for the use of the community.

CHEMICAL PREPARATIONS.

This branch of manufactures has been a great source of profit in Holland, Germany, Great Britain and France. Our rapid and very great attainments in it, are evidences of the enterprize of our citizens in trade and business, and of their progress in science and useful knowledge. The sugar refinery, distillery and brewery may be considered as ancient and important parts of this branch; but the operations, to which reference is most particularly intended, are those of the proper chemist's laboratories for drugs, medicines, tinctures, extracts, dyes and pigments. These have been extended with great skill and profit. The works, the capital and the talents, which are constantly added to this business insure its permanency and success.

Soon after the acquisition of the southern lead mines, establishments to make pigments of that material were erected in one season, sufficient, with the new shot factories, to employ that portion of the addition, which was likely to reach the Atlantic ports. Red and white lead and patent yellow are now made in very considerable quantities, and operating with the other manufac-

*The immense value of our liquors, little less than half the value of all our exported unmanufactured productions, has occasioned them to be presented, in a variety of views for the manufacturer and the economist.

tories of the same raw material or metal, occasion a demand upon the miners and the merchants, for much more than they supply. Besides these, a great number and variety of other preparations of paints, drugs, tinctures, extracts, &c. are constantly made, so as to interfere with the importations, in some instances and to prevent them in others. The practitioners of physic, and various artists and builders derive great assistance, in their respective operations, from these manufactures, and by a selection of faithful makers, have it in their power to avoid those fraudulent and pernicious deceptions, which few importers can detect and none can entirely prevent. It would be favorable to morals, to the public health and interest, and to the internal and external trades, if these and other manufactures, liable to adulteration were required to be sold, with evidence of the makers' names.

BRICKS AND BRICK CLAY.

There are very great quanties of brick clay or common potters' clay in the United States, and in numberless situations, adjacent to abundant reserved woods and forests and frequently to fossil coal. These clays are very generally impregnated with iron, and therefore the bricks, tiles and much of the potters' wares, become red when burned. The implements, utensils and instruments employed in the manufacture of bricks, have been considerably improved, so as to make very good and handsome work, with great despatch, saving labor. The pottery being effected by preparatory horse mills and turning machines, the time and work of the operations are saved and regularity is given to the forms of their wares. Twenty-two labor-saving projects have been offered in brick making alone. This beneficial principle, thus frequently occurs in a branch, which does not, at first view, appear susceptible of the advantage of labor-saving machinery. A horse mill might be made to turn a number of potters' forming-wheels. Red hearth tiles, of a very nice quality, are made. The clay might be freed from extraneous matter and prepared in moulds, plain, fluted or figured; so as to be formed into tablets, facias, columns, pilasters, and other ornamented matters of the same color as the general brick work. The marble, now used for such things, would be left for other, more convenient or necessary purposes. The official returns of manufactures of bricks are, every where, very defective, and in most places these simple manufactures are entirely omitted. There is some exportation and much coasting trade, in bricks, and various tiles, for mansonary. The use of unburned bricks and of walls composed of large regular pieces of earth alone, and of earth and sand worked into an adhesive state, with, and without lime, has been adopted in some places, but not extensively. Bricks cannot be imported without a loss. The few that are imported, are brought as ballast, and do not injure the American manufactory.

THE POTTERY.

The manufactory of ordinary ware of common potters' clay is very much extended in the United States. It is of great use in dairies, kitchens, larders, store-rooms, sale-stores and manufactories. Crucibles are made in several places. *Black* lead is redundant. Some manufactures of potters' ware, of qualities fit to substitute for queensware, or British Staffordshire ware, have been established. The manufacture of the common potters' ware, of clay, which becomes red in the kiln, is capable of improvement by judgment in the choice of the clay, and skill in preparing it, also in the formation, glazing and ornaments. Within a few years, more numerous and better veins of potters' clay have been discovered, *in consequence of the attention to manufactures*, than had been observed, during the seventeenth and eighteenth centuries, the whole time. that has elapsed since the settlement of North America. The spirit of improvement, in every branch of internal industry occasions the establishment of manufactures as rapidly, as the ascertaining and making known the suitable qualities of materials, in convenient situations, take place. Every kind of fuel is abundant; the clays are not deficient; and some native workmen appear, and others from various countries, arrive among us. The freight, cost of packages, and breaking, and other charges and losses on the potters' wares, are very great.

The lead colored potters' ware, often called stone ware, is also made of clay, and salt and potash. It is of the same kind, which was formerly imported from Holland, at a very great expence. This manufacture is from a clay, which does not become red, in the kiln.

As the establishment of potteries has succeeded in the atlantic counties, it cannot be doubted. that they will be more beneficial in the interior and western districts, where fuel, grounds and building materials are cheap, and where the breaking and expenses of transportation of foreign ware, over land, occasion the prices of the unbroken to be excessive. It is affirmed, *in the strongest manner*, by persons of *experience and skill*, that the requisite clays and flint for the branches of the pottery, called English China and queensware, exist in the United States, to an extent beyond any possible wants of this country, for internal consumption, or exportation. The Vermont clay is held in much estimation.

There is no manufacture, for which this country is more perfectly prepared, than those of dotters and glass wares, nor is it probable, that the progress of any other manufactures will be henceforth so rapid. The consumption is very great and increasing. In wood, pit coal, and soils, our stock exceeds any other country, and invites the attention of the skillful.

GLASS.

The manufacture of glass has made, till of late, a slow, but considerable progress. It has been however astonishing, that an article so costly in the importation, so much subjected to loss by breaking in importation and in the transportation over land, and so universal in its consumption, has not made a rapid progress, in the western and midland and even in the Atlantic sections of so well wooded a country; so full of the materials. Wood fuel and consequently alkaline salts are to be procured with a profit, because the lands from which a glass manufacturer or potter should take them, would be greatly increased in value, by the removal of the wood. The diffusion of the knowledge of this art by examination, statement, engravings and instruction would produce much gain in the United States. Our inexhaustible stock of wood actually cumbers much excellent soil, and suspends its cultivation and production. Fossil coal is abundant in several extensive districts. Large tracts of land convenient to the materials, covered with wood and accommodated with water, are purchasable upon very low terms, and often upon long credits.

Seven of the states and districts gave returns of twenty-three, or more glass manufactories in 1810, making glass of materials, lying every where on the surface of the earth, a vast proportion of which is unused. The amount of the goods made was 1,046,004 dollars. When this fact is considered and the encouragement given to manufactures, since 1810, by the new duties, and by the war, it cannot be doubted, that the necessary and convenient part of the glass manufuctory is rapidly becoming sufficient for our consumption. The whole value of the British glass manufactory in the year 1783, was considered to be 2,800,000 dollars, for 11,000,000 of people: yet they exported considerably to Ireland, their colonies and the United States. It appears that our glass works in 1810, were far more numerous and productive, than was then supposed. New works have been since erected. There are great savings and large profits to a number of the American glass manufacturers, arising from their obtaining building materials, fuel and produce, from the lands they purchase, at very low prices, for those works, and from the sure and steady increase, in the value of lands so purchased, in the United States. The constant improvement in the stile of the buildings in this country, the erection of houses in new towns and on new farms, the extension of these into interior situations, the improvement of the glass manufactory itself, and the export trade, assure to the manufacturers, in the United States, a good, steady and increasing demand.

It is manifest, that the United States have made great progress, in the manufactory of fermented liquors, and it is believed, that their lessened proportionate attention to the bread grains, in consequence of the cotton, tobacco, sugar and indigo cultivations, horse, sheep and cattle farming and mining, will occasion more future activity in the brewers, farmers and housewifes manufactures of fermented liquors, which will greatly increase the demand for glass bottles. Many old and new branches of manufacture also demand large numbers of those vessels. Our increasing population requires a constant addition. We have not yet discovered any considerable quantity of tin, which is one of the materials to make pewter, and our summers incline the people to use glass drinking cups, (which are indeed preferable from their facility to be quickly and nicely cleaned) to any other drinking vessel. The people of this country will therefore, always be great

consumers both of the useful and elegant glasswares. The importation of hollow glassware, and looking glass plates is extremely expensive, especially to the inhabitants of the interior.

SILK.

The steady and increased application to the prevalent household manufactures, has prevented any considerable attention to breeding silk worms. Our manufacture of silk from the immediate production of the worm in America, is very small. It is chiefly from foreign silk and from foreign silk thread, which last is wrought into fringe, tassels, buttons and other fancy goods of taste and fashion, and is used in making up clothing and furniture.

The most interesting manufacture of silks for the United States, is that of *boulting cloths* for our flour mills. There are no difficulties in the way of procuring enough of the raw material to manufacture this *necessary* class of silk goods. It is true, that importation may be expected certainly to furnish the quantity of those cloths, which we may want. But the peculiar value or rather the indispensable necessity for this commodity, renders it desirable to hold it up in the most striking point of view. Holland, without any particular advantage over us in this manufacture, and in some respects less prepared for it than we are, has been induced, probably by her numerous flour mills, and the profits she derived from the manufacture of *boulting cloths*, to enter into it in a greater degree, in porportion to her population, than any other country. The general silk gauze manufacture, of which this may be considered as a branch, has very much declined; so that experienced weavers might be drawn to America in any requisite number. The necessary importation of raw silk can always be made, if other objects should continue to employ private families. The infirmaries, on the southern estates, which have been already mentioned would be convenient places for breeding silk worms. The climates of our region of colored population, are those of the great silk countries, and persons strong or well enough to move with comfort, may tend the silk worm. Connecticut has done much in the production of the proper mulberry-tree and of the silk, and has progressed in the manufacture of cloths of silk, though in a climate colder than those of the worm, in Europe and Asia. The silk worm does well in dry countries. From such facts our capacity in the silk business may be considered as common to a great number of the states.

It appears that countries so successful in commerce, and manufactures, and parts of those countries so populous and extensive, prosecute, with steadiness, the production and manufacture of silk, that the subject must be worthy of a more profound and minute examination, than has been yet applied to it, in the United States. Between the southern extremeties of Italy, Greece and Spain, which being all peninsular, are probably of the warmth of our state of Louisiana, and the latitude of Presburg in Hungary, which nearly corresponds in temperature with Baltimore in Maryland, are found the innumerable silk worms of France, Spain, Hungary, Germany, Switzerland, Lombardy, Italy and Turkey. In most of those countries, the governments, the merchants, the manufacturers, and the householders pay a great and increasing attention to the production and commerce of unmanufactured and manufactured silks of every description and quality. Similar facts occur in the corresponding climates of Asia. In many of those regions of the ancient and modern manufacturing and trading nations, the production, manufacture and commerce of silk have been pursued through a long series of ages. *They are maintained at the greatest known height, at the present time,* when rival productions, manufactures and trades, constantly employ an immense mass of capital and population. It is true also, that there are, or have been in Great Britain, the whole of the Netherlands and many parts of Germany, which do not produce silk, very considerable manufactures of that raw material, which they import from Italy, Turkey and India. These facts satisfactorily prove, that the production of a surplus of silk is profitable in some countries, and that the manufacture of that surplus, is found to be advantageous to other countries, which do not produce that material. The governments and people of the United States cannot observe, without impression, our constant importation of silk goods in parcels amounting sometimes, on board of a single vessel, to six hundred packages. There does not occur to recollection any employment, so perfectly suitable for the decrepit, the valetudinarian and the aged parts of the natirnal population. It appears also, to be compatible with the pursuits of all persons, who rarely go abroad and with

those of such, as can make it convenient to remain generally at home. Silk is so easily and abundantly producable, that it is found to be an economical clothing for the poor of China. It requires no ownership nor tenancy of soil. There are some prepossessions against the production of silk in the United States, but the pursuit of it has been so long continued in many countries, and the results are so considerable, that it is much doubted, whether the subject is correctly estimated. A complete examination of it, throughout its districts of foreign production, manufacture and commerce, with the relative examinations in our own country, and the proper application of the whole, would be an useful service.

SALT.

The manufacture of salt, from springs in the interior country, is very imperfectly returned. New-York is understood to furnish about 300,000 bushels per annum, and it is represented that the quantity can be increased. *The Ouabache saline*, made in 1809, about 130,000 bushels, of which there is no return. Other salt springs have been discovered on the banks of the Kenhawa. The manufacture of salt (and that of glauber-salts, which are procured in the progress of the work) on the seacoast, is considerable and increasing, and has been very favorably affected by a recent discovery. The flowing of the sea near to Cape Henlopen in the *Delaware state*, occasions a collection of saltwater, in a great sandy pan or extensive shallow cavity. In this cavity, the evaporation of much of the water appears to take place, while the remainder is absorbed by the sand. This occasions the saltness of the absorbed part to be much increased. That briney water is subject to further evaporation, till it reaches a clayey bottom, which lies under the sand. By uncovering this clay bottom, in places, and making short trenches in it, opportunity is given for the unevaporated water to pass into them. When taken, in vessels, from these trenches, the water is found to be heavy enough to float an egg, and of course, produces a much greater proportion of salt, than the common seawater. Sometimes this water from the trenches, is converted into salt by mere evaporation. On the French Atlantic coast, such clayey bottoms occur in the salt district and are highly valued.

It is said, that such great pans or shallow cavities or receptacles of sea water are numerous along the coasts of the United States. They ought to be brought into immediate use, as in Europe.

The salt works at Cape Henlopen are stated to produce nearly 2,000 bushels per week or 100,000 per annum. Only a small part was reported in 1810, in the Delaware return. It is believed, that the increase has been so considerable as to amount to the quantity now mentioned * This new advantage in salt works may not only occasion a great extension of the manufacture, but may produce savings of labor and fuel It is possible, that situations remote from the mouths of great rivers, may be most favorable for salt works, as the seawater is perhaps less briney, where a great body of fresh water is disembogued. Islands are found best on the coast of Europe. It may not be amiss to consider the temperature of the places on that coast, where salt is manufactured. Cadiz, Lisbon and the coast of France, (no part of which is in less than 42 degrees and 26 minutes north) may be considered as the great sources of salt, on the continent of Europe. The coasts and islands of Georgia, and the shores of the gulf of Mexico appear to be much more favorable for the manufacture of salt, than the salt districts of France, and situations upon the gulph seem more likely to be suitable, than the vicinities of la Rochelle, Lisbon and St. Ubes, so far as depends on temperature. Long droughts and a climate of a general dry character, must favor the manufacture. Fuel, in abundance, can be procured in America, where the manufacture, by solar heat, is not yet found to be steadily practicable.

It is probable that the manufacture of the best pearl ashes, out of the common ashes produced by the fires of the saltmakers, might conduce to the profits of salt works. It ought to be remembered, that the ashes of the pine and all other terebinthine woods, are considered as unfit for the ordinary manufacture of potash.

*In the year 1812.

Other wholesome and agreeable antiseptics are substitutes for salt, and are sufficiently relative to a competent manufactured supply of salt, to merit suggestion. A considerable portion of brown or unrefined sugar or molasses, rubbed on meat intended to be pickled, or coarse sugar or molasses mixed with the salt and water, in certain proportions, with or without salt-petre, is known to contribute, to preserve meat and to prevent its growing hard. This is a well tried fact, highly interesting to every body, when salt is scarce and dear, and it is peculiarly so to the owners of sugar maple lands. To this method of saving salt, or lessening the demand for it, may be added the adoption of the practice in Canada, and in some parts and families of the United States, of placing meat in a situation to be frozen and to be retained in that state, while it is kept in winter for family consumption. Icehouses have the same effect upon the economy of salt, in the warmest seasons, and merit the consideration of the farmers. They are built of logs from our woods to the surface of the earth, and a very thick and close thatch, above the surface, for a very small value of labor and less of materials.

It is a good operation in manufactures, to make substitutes for such things as cannot be obtained in sufficient quantities. If therefore maple-sugar and maple-molasses shall be made use of, to perform a part *of the antiseptic and preservative operations of marine salt*, and are, as we know, of a less scorbutic tendency, it is a great point gained. To make salt less necessary by the use of, the maple or cane sugar or molasses, by freezing meat and by icehouses, is equal to the effect *of manufacturing salt in greater quantities.*

It may be useful to remark, that the parts of France, where the greatest quantities of salt are made *by the operation of the sun*, are the coasts of Britanny, of Saintonge and of the country of Aunis, the most northern of which is of the temperature of our Virginia coast. The French manufacture salt from seawater by fire, as far north at the mouth of the Seine.*

CANNON AND MUSKETS.

The quantity of iron cannon wanted, has not for a long time been a matter of any difficulty to procure. The price being stipulated, so as to induce to the undertaking, the commodity is obtainable with certainty. It has been already mentioned, that the most approved practice, is to cast them in the solid manner, with a spruce head, which it is supposed, occasions the more perfect formation of a compact piece of ordnance, and is considered as conducing highly to its goodness at and near the muzzle. The gun is then set in machinery, which turns it, with a pressure towards a fixed instrument. This bores a calibre, in the solid gun-form mass of iron, with great exactness and beauty.

Cannon are constantly manufactured, when demanded, to a very considerable extent, in public armouries of the union and of the states, and on contracts, and for sale to associations of citizens, and to individual purchasers, for use at home or for exportation. Of these very considerable operations, there are some specific returns for 1810, under the head of "gunmakers and boring mills," and it is presumed there are some included under that of iron founderies. The *public* armouries and their manufactures are not particularly noticed in the returns. They are mentioned, as of 1810 also, in your report in part, of that year, concerning manufactures.

The improvements in the manufactory of steel and the experience in the general manufacture of arms, with the exigencies of the times, and above all the evidences, from the coperations of individuals of the states, and of the union, under various administrations, that the xpense and trouble of a judicious and rigorous inspection are required to be surely and effectually provided for, have made, favorable changes in the condition of this important branch of our manufactures. But it appears highly worthy of consideration, whether, after a proper notice, military guns or pistols should be allowed to be sold, without the evidences of the inspection of a sworn and responsible officer. These are manufactures, which obvious considerations require to be placed under a regimen so well devised, and so strictly executed, as to prevent deception and its most evil consequences. The numerous

* It is found, that saltwater is reached by boring the earth to various depths in a number of the counties around Pittsburgh. The manufacture of salt is taking place in those counties.

facts, which have occurred fully prove, that unfaithful or unskilful or at least insufficient work in this branch, is confined to no time, no place, no persons, no nation, no cost.

THE FINE ARTS AND THE SCIENCES.

The works of human genius and cultivation, which belong to the elegant and magnificent class of the arts, have a very considerable effect upon the convenience, utility and profits of those things, which are usually called *manufactures*.

A knowledge of architecture is necessary even to the cheapness of construction. Geometry, which is the scientific basis of architecture, teaches the operator, that, as a square contains the largest area, within a certain extent of uncurved outlines, the walls of a square building are less costly, than those of any other right lined edifice. The strength of the arch is taught in like manner. An analyusis of beauty instructs us in the grounds of ornaments of curved lines.

The fine arts, particularly painting and sculpture, have beautified the manufactures of alabaster, marble, clay, plaster and metals, and of wool, linen, cotton and leather. The fine Porcelain of France and Saxony, the statues and paintings of Greece and Rome, the modern imitations of them in paintings, statues and casts, the elegant miniatures of alabaster, its various flowers and ornaments, the improvements in composition and in the pottery of *Wedgwood*, the imitations of the antique vases and figures in various gold and silver ornaments and utensils, and indeed of brass, the tapestry of the Gobelins, embroidery, brocading, dying, engraving and the printing of linen, cotton and silken cloths are among the numerous examples, that croud upon the mind. The fluctuations and disorders of the old world have occasioned innumerable transfers of the instruments, the libraries, the models, the works, the welcome agents and the lovers of the fine arts from thence to the United States. This truth is as simple, absolute and well known, as the transfer hither of the Merino flocks and the manufactures of fine wool, from their proper original countries. The effect of such transfers of much that was foreign, and all that was necessary for the interesting cultivation of the fine arts, either in their distinct and separate character and form, or as pleasing and beneficial auxiliaries to the useful arts and manufactures, are manifest to the attentive observer. A numerous body of professors and instructors in music, painting, sculpture, architecture, and all the finer branches of human skill and industry, of a character in their respective arts and sciences, very far indeed above the members of our colonial schools, and such, in numbers, in standing and in talents, as nothing but the agitated state of Europe could so early have induced or driven hither, are seen in all our principal cities. Even by the musical branch, light as it may appear to many, the useful arts have been improved. The manufacture of every instrument, from the organ to the fife, involving considerable science, exempts us from the costs and expenses of importation, and the frequent exhibitions of the *panharmonicon*, has diffused instruction, in an electric stile, through every attentive mind, gifted with mechanical talent or opened by education, in that branch of knowledge.*

The advantages of military architecture, by land and by sea, are perfectly obvious. It involves much and various art and science. Our display of skill in construction for the naval department, is not surpassed, whether it be tested by promptitude of exertion, shortness of voyages, exemption from foundering, preservation from the dangers of a lee-shore, safety in retreat from a superior foe, forcing an adversary into action, or the all important workings of our ships of war, throughout the time of actual engagement. The construction and equipment of a ship require much art and science. They involve the use and benefits of the curious mystery of the magnet, those of the discovery of the compass, the science of chemistry in regard to the generation, composition and refinement of nitre, the purification of sulphur, the preparation of carbon and the adjustment of the whole, the doctrines of matter and motion and of pneumatics and projectiles, the principles and practice of geometry and mechanics, sculpture in the formation of the head and ornaments, a beautiful, extended and peculiar symetry; and various other matters in the fine and superior arts and sciences.

* The conception and the execution of this curious and complicated piece of Austrian machinery are very strong evidences of genius and of practical mechanical talents. It is by means of the highest examples, that didactic effects are most rapidly produced.

The improved state of our manufactures, with their buildings, materials, ingredients, compositions, instruments and mechanism, involves a knowledge and a practice in extensive circles of the fine arts and of nearly all the sciences.

In the branches of sculpture, the United States exhibit some works of considerable merit and of greater promise. In the useful part of the engraving department, our progress has been great and rapid, because there is a demand for the works of the artists. It has been accompanied by a degree of invention, evincing genius. In the ornamental and elegant part of sculpture, enough has appeared to prove, that we shall exhibit the fruits of the art, if occasions shall draw it into frequent action. In wood, there are very honorable evidences of native talent in various works of taste and fancy, and there are meritorious works, of that material, in the statuary branch. In our marble we exhibit some specimens by foreign artists, far beyond the quality of the materials yet discovered in North America.† The United States may claim eminence from the works of its native and adopted citizens in the various branches of the art of painting and the superior works of civil architecture.*

INSTRUMENTS AND AGENTS OF MANUFACTURES.

Machinery and processes to effect manufactures, so as to leave manual industry for other employments, are of a degree of importance to the United States, proportioned to the smallness of the average population on a square mile. This is an interesting fact to a nation enjoying an extensive territory. As we possess innumerable contrivances, put into operation by horse powers, to turn up and break the soil and cover the seed grain, under the names of *the plough, the harrow and the roller*, to our incalculable profit, so we have water mills, wind mills and steam engines, in numerous instances and of diversified forms, to manufacture boards, bark, powder, flour, bar and sheet iron, nails, wire, carded wool and cotton, yarn and thread, metal plates of every kind, hair powder, snuff, gunpowder, paper, cannon, muskets, scythes, bolts, stocking web, various cloths and printed and other goods. These and many other machines have been obtained from abroad or derived from the actual and very considerable talents of our own citizens. The complicated silk mill, the earliest invention for yarn or thread, the fulling mill and various other mechanical constructions, were acquired by the British, the greatest manufacturing nation of this time in Europe, from their neighbours of Italy. The wisdom of the world has been, and is as fairly attainable by us, as by other industrious and qualified nations, and the inventive genius of the people of the United States has produced a very great number of curious and valuable instruments and machines.

Various important processes enable us to tan and color skins, brew, distill, rectify, refine, extract, combine and separate the raw materials or manufactures of the United States. The sciences and the fine arts, and the useful arts and manufactures, beneficially cooperate to obtain what would be otherwise unattainable, or attainable, with much labor and expense and in less perfection. In this department, foreign sources, the knowledge and indeed the learning and talents of our citizens have yielded to the country vast benefits. Chemistry has rapidly become a very general study. Leather, glass, distilled and fermented liquors, drugs and medicines, dye stuffs, pigments and all the metals and the numerous preparations of them, all the salts, all the oils, and all the extracts, tinctures, spirits and decoctions, with many other things, belong to this class.

It is in this country, as much as in any other, that the civil and religious liberty of the citizens enables them to display the value of and effectually to use, those strong and various abilities and qualifications for different employments in life, which divine providence has imparted to the human mind and body. Such faculties for certain pursuits, when not used, are available talents unwisely held in an unproductive state. To have kept *Rittenhouse* and *Franklin* in the

*The finest paintings may be considered as manufactures, and though temples and other magnificent buildings are not manufactures, they involve, like the works of naval architecture, a great number and variety of the operations and manufactures of the fine and useful arts and trades.

†It is said that a quarry of marble, finer than that of Pennsylvania, has been discovered in Massachusetts. It is seen in the walls of the new City Hall at New-York.

usual employments of agriculture would have deprived the country *of the unparalled planetarium and of the safe conductor of the electric fire.* But the history of such a man as Galileo presents the obstacles, these eminent Americans would have encountered in some countries. It would have been a mine of wealth, lost to the country, if the talent to invent the invaluable saw gin, to prepare cotton for the manufacturer's card, had not been exerted, and if the inventive and fabricating powers of our citizens minds and bodies had not been applied to steam enginery, to the machinery for nails, to rolling and slitting mills, to card wire making, to carding, spinning and weaving machinery, to fulling mills, to manufactures of grain and other ingenious occupations, the curious merits and immense value of which are lost in familiarity.

It is a truth of the utmost importance, that there are now in the United States working examples, intelligible models, books of instruction and qualified workmen, foreign and native, by means of which persons, in almost every fine and useful art and manufactory, can obtain good instruments, machinery, information, and assistants, to make and conduct valuable establishments for every raw material. The tables prove how extensively these things were diffused so long ago as the year 1810. Since that period a very rapid progress, and a much wider diffusion in the useful arts and trades have certainly occured. Many curious and valuable inventions and improvements have taken place in the mechanical and chemical branches and in the system of labor and political economy. Every month, every week, produces additions to them. Among these are distillation by steam, the pendulum and lever mill, the machine for spliting skins, the pressed nail mill, the great increase of chemical preparations for dyers, colourmen and manufacturers, the conversion of fossil coal into a pigment, the cask for preserving fermented liquors on tap, in sound condition, weaving machinery in several new forms, the manufacture of edge tools from rolled steel, various improvements to save fuel, the variations and extensions of the application of steam, the manufacture of opium from the common poppy and from the lettuce, the increase of the pharmaceutic preparations to the number of seventy,* the division of labor in the cultivation of the cane, the extension of the manufacture of currant wine, the tanning of deer skins, activity and ingenuity in the substitutions for wool by the manufacturing thick and warm cotton goods, and by cotton warps under woollen woofs, the machine for manufacturing dipt candles, the activity extension and improvementof the sheep breeding and farming, the new employment of the children in the cities, boroughs and villages, and the active employment of the females in general in manufactures, the extension and facilitation of communication between the producers and importers, and the manufacturing citizens by the various and unprecedented improvements in the post-office department, the extension of the funds of the manufacturers by many of the banks, which are solidly founded and rigidly constituted and administered, the introduction of new exotic raw materials by means of commerce and of laborers, artizans and manufacturers and processes in every branch, from various foreign nations. Foreign masters as well as journeymen and foreign capitalists have discovered, that the United States afford extensive opportunities to employ themselves and their money in manufactures and the useful arts as has been long the case in commerce, navigation, stocks, banks and insurance companies. The manufacturing branches are as open to them here, as are agriculture and the purchase of lands and houses, in the most favorable states, or as they are to a native or a naturalized citizen. Patented monopolies, processes, machinery and tools, engrossed for a time by foreign invention in Europe, may of course be used here by all persons without restraint or injury. In this highly inventive and well instructed age, these opportunities, in such a country as the United States, often redound to the great benefit of respectable foreigners, as well as of ourselves.

It has been attempted, by means of the marshals' returns, by a resort to other authentic documents, by careful recollections, by observation and by enquiry, to present, in this digest, such a statement of pertinent facts, as appeared suitable to compose a body of convincing evidence, respecting the reality, the situation, the nature, the magnitude, the variety, the benefits, the materials, the means and the tendencies of the national manufactures. I do not hesitate to risk a long considered and confident opinion, that this internal branch of trade, has become and will continue to be productive of the most solid benefits to *the landed* and *commercial* interests of the country,

*In 1812.

and that it will give a greater support and extension to the navigation, fisheries, coasting trade, and foreign commerce of the United States.

It was believed, that the design of the recent resolution of the legislature was to procure facts on which they could rely, and in the best form admitted by the materials; and not estimates, which might be partial, erroneous and from their nature, doubtful. Estimates, in innumerable details, would diminish the force the returned facts would possess, separately presented. When it was observed, that a single county of Massachusetts reported 89,600 common sheep, that one other returned only 10,000, another 1,939, another 1,600 and that eight others, abounding in sheep, returned none, that the statement from New-Jersey was still more imperfect, and that twenty-one states, districts and territories did not return any of their flocks; that there were but six returns of blacksmiths' work, from 4,035 dollars to 1,522,627 dollars each, that though one state reported nearly two spinning wheels to a family, there were sixteen omissions by states and territories to return such wheels, with a multitude of similar facts, a present attempt to estimate, in complete detail, appeared likely to wrap up the principles, and the quantities, values and other facts, which the returns exhibit, in a volume of matter, that would obscure or diminish their proper and natural impression and give rise to inconvenient objections to the whole document. I am indeed of opinion, that the extensive local knowledge and very diversified information, necessary to a *detailed* estimate, which should extend to the various cities, towns, villages, counties and townships, defective in their returns or entirely unreturned, can not be claimed by any individual. But, since it has been the desire of the treasury department, that the best estimate, that can be made should be attempted, I have very carefully examined and compared all those things, which are of a nature to afford a sound general foundation for such an operation. The defects of the local returns, the importation or production of raw materials, food, forage, fossil coal, and wood fuel, and the possession of mill seats, manufacturing capitalists, white population, machinery, and native and foreign manufacturers have been duly observed and considered, and an estimate of the whole value of the manufactures of each state, territory and district, *for the year of the returns*, has been so accomplished, as to satisfy my own mind, in a considerable degree, as to its total amount, and to occasisn me strongly to hope, that the amounts for the states and other sections respectively are not materially erroneous.

Considering that the manufactures, actually reported by the marshals and secretaries of the territories, extremely imperfect as many of the subordinate returns really and manifestly are, in quantities, valuations, and even in notices of numerous small and great known manufactures, amount to the sum of 127,694,602 dollars, after many goods are deducted, because they are not always classed, at least by commercial men, under the head of manufactures, I have ventured to hazard an estimate of the whole manufactures of the United States, as worth in the year 1810, 172, 762,676 dollars. I feel a sincere belief that it is under the true aggregate value for that year.

The facility of retaining and steadily extending this valuable branch of the national industry is manifested by its very *early* and *spontaneous* commencement, in every county and township, and by its nearly spontaneous and costless growth, with such aids only, as have not occasioned any material expense or sacrifice to agriculture or commerce, since they were chiefly incidental to necessary revenue, or resulted from our distance from the foreign consumers of our productions and manufacturers of our supplies. The comparative importance of the manufacturing branch, in the business of the country, (a matter of deep interest to the legislature) will be illustrated by the reflections, that the greatest value in one year of *the exports* of American productions and manufactures has been 48,000,000 dollars, and the like value of *the exports* of foreign productions and manufactures, 60,000,000 dollars, under very extraordinary and transitory circumstances, which may never again occur. Foreign and domestic exports, in the greatest year, having thus amounted to 108,000,000 dollars, a net profit of ten per cent on exports and of ten per cent on equal imports, being 21,600,000 dollars, a *net* freight of vessels, worth 45,000,000 dollars, estimated at ten per cent outwards, and the same inwards, being 9,000,000 dollars, and the aggregate of these great national items of mercantile trade, being 138,600,000 dollars, a comparison of the *manufacturing* and *commercial* branches of *the national trade* may be made and considered, as it is believed, without any probability of dangerous or material errors. Some confirmation of this

view of our national operations, mercantile and manufacturing, may be drawn from the facts, that, in the years of general peace and prosperous and regular commerce, from 1785 to 1787, the average exports of England (alone) with about 8,500,000 inhabitants, amounted to 70,000,000 dollars, while their manufactures were computed at 266,000,000 dollars, of *like* money. By means of this great foreign *case*, as stated for their legislative use, and by means of the case of the United States, as it may be found to stand after the proper investigations, it is probable, that expedient and equitable measures may be occasionally and systematically devised.*

The public expences incurred, to promote, accommodate and protect commerce, however moderate, just and necessary, have been very considerable, compared with those incurred to promote manufactures. A *portion* of the navy, beacons, buoys, light-houses and public piers, with a part of of the diplomatic and consular establishments, have occasioned expenditures, which however reasonable, expedient and equitable, are *for the proper benefit of commerce*. Nothing equal to this has been done for manufactures. The mere interest of the aggregate of those commercial expenses, for a single year, would produce, it is believed, new and important guides and aids to all, who are politically, or professionally, or incidently interested in the subject of manufactures. Such being the truth as to any past expenditures, occasioned by this branch of the internal industry, it is conceived, to be a duty to state it, as a relative fact, subject to examination and consideration, while commerce shall continue to receive every proper assistance and protection.

This suggestion appears the more interesting, when it is remembered, that the persons, who at this time compose the entire body of the American manufacturers, their assistants and families, with a just addition for those engaged in househould manufactures, and upon the estates of the planters, and farmers, constitute the second class of the national population, in respect to numbers. They are native, adopted and foreign, adults and minors; rich, substantial and poor; male and female. Our federal and state constitutions, and laws secure to them the right to pursue their occupations, and to obtain comfort and prosperity, in common with the rest of the citizens and inhabitants. They are diffused through all the states, districts and territories, all the cities, towns and villages and all the counties, townships and hundreds. They are found in every vicinity, and even in most of the private families. They are a part of the constituents of every member of the territorial, state and national legislatures and administrations, and are of every church, known among us. They constitute a great portion of the militia, contribute to fill the offices and ranks of the army, are parts of its necessary organization in several of their proper arts and trades, appear in numbers on the rolls of the mercantile vessels, of the public and private armed ships, and of the workmen they carry to preserve them from injury or destruction by accident, tempest or battle. They possess and employ property, real and personal, to a very large amount, and greatly contribute to the public revenues of the states and of the union, in the form of direct taxes and ofduties on imports or consumption.

Opinions have been advanced in some countries, unfavorable to *the morals* of the manufacturers. But it does not appear that there is more vice among the description of persons, indicated in the preceding paragraph, than in some other extensive classes of our population. Perhaps the smugglers, by violence and deception, are the most immoral description of *persons of business* in every civilized community. Their misconduct is, at the same time, most injurious to the country. The system adopted at the manufactory of Humphreysville, in Connecticut, with respect to education, manners, dicipline, morals, and religion, is an interesting evidence, that the people of the United States may quicken and increase the virtues of the rising generation and reform the degenerate of later years, by a humane and politic system, in the large manufactories. It may be correctly observed, that while no commotions have dishonored the reputation of the manufacturers of this country, from this class of our citizens there have arisen to the United States Nathaniel Greene, Benjamin Franklin and David Rittenhouse, respectfully conceived to be comparable, without disadvantage to their several memories and to the manufacturing population, with any equal number of ornaments and benefactors to their country of any other single profession or occupation. The field of

*It is correct and prudent to remember, that though the exports and imports of 1806 and 1807, will never be equalled in proportion to our population, there is no doubt that our manufactures have increased, and will increase annually, in peace and in war.

manufactures, represented in other parts of the world to be fruitful in mischief and turbulence, has produced here a body of firm supporters of our constitutions and laws and the most respectable examples of the civic virtues.

When it is considered, that natural history unfolds the works of divine providence in the formation of our earth, of its productions and of its animated tenants, that chemistry displays their value, their relations and their uses, and that general philosophy and particularly geometry, annually teach men better to know the principles, the powers and the laws, involved in the stupendous system of the universal frame, and when it is remembered, that the arts and manufactures are *the practical application of this extensive and precious body of human science*, the branch of the national industry, which has engaged the attention of congress, appears to be worthy of the most profound investigation and the most perfect display.

I have taken the liberty of detaining this statement to the last day permitted by your instruction, in the hope, that by means, which I had adopted, I should obtain additional information from several of the states in the north and in the south, whose returns are manifestly and greatly defective. But none has been received. I therefore beg leave to conclude with the remark, that the form and details of the subsequent tables may facilitate the measures of the governments of the union and of the states, in causing their officers occasionally to report further information, concerning particular branches and respecting manufactures in general, with their raw materials, their means and their instruments.

Submitting, with perfect deference, the preceding statement in all its details,

I have the honor to be, sir,

your respectful servant,

TENCH COXE.

To ALBERT GALLATIN, Esquire,
Secretary of the Treasury,

In the course of the numerous and diversified operations, occasioned by the deliberate execution of this digest and statement, constant and very close attention has been applied to those facts, which have occurred throughout the union, since the autumn of the year 1810, from which a judgment of the condition of the manufactures of the United States, in the current year 1813, might be safely formed. It has resulted in a thorough conviction, that after allowing for the interruptions to the importations of certain raw materials, the several branches of manufactures and the states, territories and districts, have advanced, upon a medium, at the full rate of 20 per centum, which would give an aggregate, for this year, of 207,315,211 dollars. In this increase *the state of New-York* is considered to have most largely partaken, especially by her joint stock companies, and in consequence of the migrations thither from the eastern states. But as it is best to make ample allowances for some manifest repetitions of articles, which are inextricably involved in the subordinate returns, a a sincere and well reflected final opinion is respectfully offered, that the whole people of the United States, taken in 1813 at 8,000,000 of persons, will actually make, within this year, manufactured goods, (exclusively of *the doubtful*) to the full value of 200,000,000 of dollors, or 45,000,000 of pounds, of sterling money.

May 1, 1813.