

and *A. Flore*. Of *Odontaster hispidus* over 100 were taken. One of the most conspicuous star fishes was the remarkable *Pteraster multipes*, Sars, one specimen of which was over six inches in diameter, and very thick and heavy. Its color when living is rich purple above, with the lower side orange streaked with brown, and with large dark purple suckers. A large and handsome orange-colored species of *Luidia* (apparently *L. elegans*), often ten to fifteen inches broad, was very common, but nearly all the specimens dismembered themselves before they reached the surface. Large specimens of two Floridian sea urchins were also taken.

What Machinery has done for Agriculture.

The various agricultural shows held last autumn in different parts of the country cannot fail to impress all who visited them with the extraordinary developments made in recent years in mechanical appliances for agriculture. It is well, therefore, to notice the benefits which this industry has derived from the genius and the labors of the mechanician. We may go back in thought to the time when the spade, the hoe, the sickle, and the flail comprised the farmer's store of machinery, and when the plow was the rudest contrivance hardly worthy to be called a tool. Then every man tilled the soil or engaged in pastoral pursuits because it was all one man could do to provide himself and his dependents with food. Then each man was forced to clothe himself and be his own mechanic for this simple reason. He labored long and with infinite pains, and the ancient sentence that man should earn his bread by the sweat of his brow came home to him with unmitigated force. In course of time improved and effective tools so lightened the labors of the agriculturist, and so increased his products, that the opportunity to make a division of labor arrived, because there was food to spare for the mechanic. This condition of things became more and more firmly established, until it changed the whole social and political aspect of human affairs. And now what do we see? The true "landlord" is not the owner of an English estate, proclaims a writer in *Capital and Labor*, but the farmer who commands an army of farmers, with brigades of plows, reapers, and other machinery upon the plains of Western America. He makes laws for countries thousands of miles away, and his products rule the world's markets. The genius of agriculture to-day is the mechanic; the soul of agriculture is the inventor. One farmer can now, with the help of machinery, feed a hundred men with greater ease than at one time he could feed himself alone. The farmer supports the railroads, for stocks rise and fall with the good and indifferent reports of what the harvest shall be. He supports lines of steamers with his wonderful freights of breadstuffs, provisions, meats, cattle, and sheep. He maintains the millions of artisans who clothe and shelter him, and who provide for every one of his wants outside of the field.

The mechanical power of the age is like a series of concentric and eccentric circles, of which the farmer stands out in the principal center. These all revolve with and about agriculture, and the same force sets all in motion. It is the farmer's duty now to make the most of his opportunities. He should be the foremost man of the age. His influence should be felt everywhere. It is felt everywhere, for the wealthiest merchants and capitalists and the most active politicians all ask themselves how far the farmers can be depended upon before they make a movement in their special pursuits. But the farmer should feel this himself. It is one thing to have power, and another thing to be cognizant of the possession. Let the farmers consider now their position, and, as they take a view of it, let them consider what they owe to the power and influence of machinery. One most conspicuous example of the results pointed out may be noted. A few years ago Minnesota spring wheat was graded very low in the grain markets and brought a low price. Unfortunately for the Western farmers this grade of spring wheat was the only one they could produce. A new process in milling was introduced. Elaborate machinery was invented to perfect the process. The best wheat by this process was the grade known as "Minnesota spring," theretofore despised and rejected—literally "rejected," in fact, in the markets. Afterward this grade became sought by millers, and the value advanced to a point equal to, and sometimes more than that of the previously much-sought winter wheats. If Minnesota farmers produce forty million bushels of wheat annually, this advanced value, due to the new process, puts several millions of dollars yearly into their pockets; and what a vast amount of comfort and happiness may be secured by the right use of so much money! This is but one instance of the vast concatenation of circumstances which points the moral here alluded to.

Supposed Preventive for Carpet Beetles.

A writer in the Germantown *Telegraph* suggests that, as the larvæ of the bacon beetle (*Dermestes tardarius*), an insect closely allied to the carpet beetle, will shun their food when tallow is placed near them, their repugnance to that substance being so great that the insects will devour each other rather than approach it, the same peculiarity may be quite possibly met with in the larvæ of the carpet beetle; and if so the coating of floors and filling the cracks with tallow (the cracks being their place of concealment) would possibly prove an effective destroyer of these troublesome pests. The experiment could be easily tried. If good mutton tallow be employed there could be no hurtful absorption of the grease, especially when the carpets have linen backs.

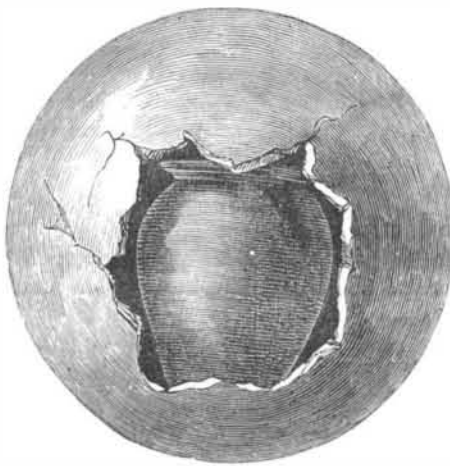
The Year.

The Egyptians, it is said, were the first who fixed the length of the year. The Roman year was introduced by Romulus, 738 B.C., and it was corrected by Numa, 713 B.C., and again by Julius Cæsar, 45 B.C., who fixed the solar year as being 365 days and 6 hours. This was denominated the Julian Style, and prevailed generally throughout the Christian world till the time of Pope Gregory XIII. The calendar of Julius Cæsar was defective in this particular, that the solar year consisted of 365 days 5 hours and 49 minutes, and not of 365 days 6 hours. This difference at the time of Gregory XIII. had amounted to 10 entire days. To obviate this error Gregory ordained in 1582 that that year should consist of 365 days only; and in 1751 it was ordered to be so used in England; and the next year 11 days were left out, the 3d of September, 1752, being reckoned as the 14th, so as to make it agree with the Gregory Calendar. The Russians still adhere to the Julian Calendar (called now *Old Style*), which is 12 days behind the reckoning of the Gregorian.

The year 1881 will be a mathematical curiosity. From right to left and left to right it reads the same. Eighteen divided by 2 gives 9 as a quotient; 81 divided by 9 gives 9; if divided by 9 the quotient contains a 9; if multiplied by 9 the product contains two 9s; 1 and 8 are 9; 8 and 1 are 9. If the 18 be placed under the 81 and added the sum is 99. If the figures be added thus, 1, 8, 8, 1, it will give 18. Reading from left to right it is 18, and 18 is two-ninths of 81. By adding, dividing, and multiplying 19s are produced, being one 9 for each year required to complete the century.

A CURIOUS GRAVE.

The practice of burning the dead was common among the ancients, and was in vogue during the first two centuries of the Christian era. In Italy, the ashes of the dead were generally buried in the ground or deposited in vaults, while among the Celtic people inhabiting Gaul and Brittany the urn was frequently inclosed in terra cotta globes and then



interred. One of these spherical graves is shown in the engraving; it was discovered near Lincoln, England, by the Rev. John Carters. The globe is roughly made of terra cotta. It has a diameter of several feet, and contains an urn, the shape of which indicates its Roman origin. As at that period Roman legions occupied England, the ashes are probably those of a soldier from the Gallic provinces. The urn is made from white clay.

Treatment of Whooping Cough in Gas Works.

According to the *Lancet*, a series of recommendations on the treatment of whooping cough in gas works has been made to the French *Académie de Médecine*. Some time ago a committee of three was appointed to investigate the subject, and of these M. Roger, the President of the Académie, is the sole survivor. He has lately presented a report which is of considerable interest. Before considering the communication, he described the arrangement of the chambers for purifying the gas, and the chemical products which patients would breathe therein. The purifying chamber is a large room with doors and windows freely open. Each contains twenty-four vessels, holding five cubic meters of depurating substance—lime and sulphate of iron, mixed with sawdust—through which the gas has to pass. When the workmen are emptying and refilling these vessels the children with whooping cough are placed around it, and inhale the vapors which escape. They are in an atmosphere containing ammonium sulphide, carbolic acid, and tarry products. As to the efficacy of the treatment, M. Commenge records 120 cases in which the treatment was persevered with. In 20 the treatment failed completely, in 48 improvement followed, and 101 were cured. M. Bertholle merely states that of 341 cases 122 were improved and 219 were cured. Failures or deaths are not mentioned. Besides the 490 cases improved there were, it appears, 671 cases not included, because the treatment was not persevered in, and these perhaps include a large number of failures. The remote situation of most gas works, and the exposure involved in the treatment in winter, must necessarily limit the application of the method. M. Roger thinks that it acts only upon one element of whooping cough—the catarrh—and that it is contra-indicated in febrile attacks of the disease, and would be dangerous in complicated cases. The method, however, is easy of use in some localities in summer, and seems worthy of further trial in suitable cases.

MISCELLANEOUS INVENTIONS.

Mr. Abraham Witmer, of Safe Harbor, Pa., has patented an improved car starter. Coiled springs are engaged by clutches operated by the wheels when the car is stopped, and the springs thus being wound up, the momentum of the car is stored up as a force to assist the subsequent starting. Means for placing this arrangement under the control of the driver or conductor of the car are provided.

Mr. Wallace H. Phelps, of Alliance, Ohio, has invented an improved drill for coal. It is a large auger provided with a peculiar screw feed and means for holding it in adjustment, and the bits or cutters are formed of S-shaped cutting knives formed with cutting edges at both ends. The shape of these knives renders them effective and durable.

A curious combination of water races with gates at different heights, water wheels, tanks, and pumps, has been patented under the title of "water power," by Mr. Robert Thamm, of Oshkosh, Wis., by which means the water can be made to act upon a single motor, or a series of motors, the water acting successively upon the motors in the order of their elevation.

A patent for a spark arrester has been granted to Messrs. Geo. Gunther, of Bath, N. Y., and William Kowalski, of Brooklyn, N. Y. The lower part of the smokestack has a jacket, and the upper part of the stack is attached to the lower part by brackets. In the upper part of the stack is placed a deflecting cone with its apex downward over the opening in the lower part. The blast is turned outwardly and downward, and a portion of it emerges through the opening between the two parts of the stack, while the sparks are retained in a space between the upper and lower parts, the lower part projecting upward into the upper part.

Mr. Jonathan Cornell, of Sandy Hill, N. Y., has patented an improvement in paper pulp washers, which washes the pulp faster than strainers constructed in the ordinary manner, and enables the operator to see into the washers to watch the progress of the work, and to clean the strainers when necessary by water discharged through a hole against the inner surface of the strainers.

Mr. Oley C. Hanson, of Eureka, Cal., has patented an improved shingle machine, in which, by a peculiarly constructed carriage for conveying the block to the saw, a novel sliding crank feed mechanism and a device for changing the lead of the saw, he secures simplicity of construction, speed, and regularity in the operation of the machine.

A rectilinear motion of sulky plows is secured in an invention patented by Mr. Samuel H. Taylor, of Kansas City, Mo. Bars with lateral slots form the connection of the plow to the sulky shaft, which permits the draught pole of the sulky to oscillate laterally without affecting the direction of the plow, which can be raised or lowered at will by the operator.

Messrs. George Biehn and Rudolph Weidauer, of Racine, Wis., have patented an improved band cutter for thrashing machines so constructed as to cut the bands rapidly and surely and deliver the grain in good condition to the feeder. The feeder is protected from being accidentally cut by the knife of the band cutter.

An improved heel for boots and shoes, patented by Jean Leycuras, of Paris, France, provides improved means for mounting the heels upon the shoe, secures increased solidity and greater rapidity in manufacture, and completely masks nails, screws, and threads. The heel is provided with a circumferential groove, and the upper leather is secured at its edge in the groove by nails driven from the outside. An overlapping edge, or strip of leather, is arranged to turn up over and mask the nail heads.

Fires in Coal Mines.

A vein near Coal Castle, Schuylkill County, has been burning for forty-five years. A huge fire was kept in a grate at the mouth of this mine to prevent the water in the gutters from freezing. One night, in 1835, the timbers of the drift caught fire, and when discovered the flames were beyond control, and the mine was abandoned. Many efforts have been made since to work the mine, as the coal was of remarkably good quality; but although it has been flooded many times, the fire continues to rage, and the intense heat makes it impossible for miners to labor even in slopes which were opened some distance from the burning vein. No vegetation grows on the surface above this pit of fire, and it is dangerous to walk across it, as many places have caved in, and there seems to be but a thin shell of earth over it. Near Mauch Chunk there is Summit Hill Mine, which has been burning for about twenty-five years, and vast sums of money have been expended in fruitless efforts to extinguish the flames.

Quillala Toothwash.

BY ALEXANDER E. BENNETT, PH.G.

An excellent toothwash containing glycerin is made as follows: R. Soap bark, ground, 4 ounces; glycerin, 3 ounces; diluted alcohol, sufficient for 2 pints; oil of gaultheria, oil of peppermint, aa 20 drops.

Macerate the soap bark in the mixture of glycerin and diluted alcohol for three or four days, and filter through a little magnesia previously triturated with the volatile oils.

Thus made, a much better preparation is obtained than by macerating the bark in the dilute alcohol, and adding the glycerin afterward.—*American Journal of Pharmacy*.

[New York Tribune.]

Interesting Tests Made by the Government Chemist.

Dr. Edward G. Love, the present Analytical Chemist for the Government of the United States has recently made some interesting experiments as to the comparative value of baking powders. Dr. Love's tests were made to determine what brands are the most economical to use. And as their capacity lies in their leavening power, tests were directed solely to ascertain the available gas of each powder. Dr. Love's report gives the following:

"The prices at which baking powders are sold to consumers I find to be usually 50 cents per pound. I have therefore calculated their relative commercial values according to the volume of gas yielded on a basis of 50 cents cost per pound."

NAME OF THE BAKING POWDERS.	AVAILABLE GAS. CUBIC INCHES PER EACH OUNCE POWDER.	COMPARATIVE WORTH PER POUND.
"Royal" (cream tartar powder).....	127.4	50 cts.
"Patapsco" (alum powder)	125.2	49 "
"Rumford's" (phosphate) fresh.....	122.5	48 "
" " " " old.....	32.7	13 "
"Hanford's None Such".....	121.6	47 1/2 "
"Redhead's".....	117.0	46 "
"Charm" (alum powder).....	116.9	46 "
"Amazon" (alum powder).....	111.9	44 "
"Cleveland's" (short weight 1/2 oz.).....	110.8	43 "
"Czar".....	106.8	42 "
"Price's Cream".....	102.6	40 "
"Lewis's" condensed.....	98.2	38 1/2 "
"Andrews' Pearl".....	93.2	36 1/2 "
"Hecker's Perfect".....	92.5	36 "
Bulk Powder.....	80.5	30 "
Bulk Aerated Powder.....	75.0	29 "

NOTE.—"I regard all alum powders as very unwholesome. Phosphate and tartaric acid powders liberate their gas too freely in process of baking, or under varying climatic changes suffer deterioration."

[New York Tribune.]

Alum Baking Powders in Court.—Interesting Testimony of Scientific Men.

Within the past two years a bitter controversy has been waged between manufacturers, on account of the use of alum as a cheap substitute for cream of tartar, by many manufacturers of baking powders. The handsome profits yielded by using the substitute have induced dealers as well as manufacturers to push them into the hands of consumers, sometimes under definite brands, frequently by weighing out in bulk without any distinguishing name.

Are such powders wholesome? The Royal Baking Powder Co., who make a cream of tartar baking powder, declared that they are injurious to the public health, while others who make alum powders claim that they are not. The whole matter as to the effects of these alum powders has finally been brought into the courts, and the case was tried in the Superior Court of New York city before Chief Justice Sedgwick, reported substantially as follows in the New York Sun:

CONCLUSION OF A LITTLE TROUBLE BETWEEN A CHEMIST AND AN EDITOR.

The suit of Dr. Henry A. Mott against Jabez Burns, has brought to light the fact that this country produces at least forty-two different kinds of baking powders. Neither Burns nor Mott has been found guilty of making the baking powders, but Burns, who is the editor of a periodical called the *Spice Mill*, has been severely mulcted for libel in his efforts to make his paper spicy. Dr. Mott, it appears, is a chemist, and at one time was employed by the United States Government to analyze different specimens of baking powder which had been recommended for adoption to the Indian Bureau. Dr. Mott reported in favor of the cream of tartar baking powders for the Indians, and against the alum baking powders. The chemist analyzed forty-two kinds of baking powders.

The jury were out about half an hour. Then they came in with a verdict awarding Dr. Mott \$8,000, to which the Court made an additional allowance of \$150.

As the public have a large interest in the wholesomeness of whatever it is called upon to use as food, the following extracts are introduced from the testimony of some of the prominent men as to the injurious effects of alum powders:

DR. MOTT:

Q. Were you employed by the U. S. Government?

A. I was, sir; was employed as chemist, to analyze all the articles of food; to express an opinion as to the analysis of their healthfulness and purity.

Q. Please tell the jury the baking powders that you examined while in the employ of the government.

A. It would be difficult to remember them all; I could refer to my books; I examined twenty-eight powders; was given sixteen at first.

By the Court:

Give your best recollection.

Q. And one of the powders included was "Dooley's Baking Powder?"

A. Yes, sir.

Q. And the "Charm?"

A. Yes, sir; the "Charm" and "Patapsco."

Q. Please state in which powders you found alum.

A. I found alum in Dooley's "Patapsco," "Charm," "Queen," "Vienna," "Orient," "Amazon," "Lake Side," "Twin Sisters," "Superlative," "King," "White Lily," "Monarch," "One Spoon," "Regal," "Imperial," "Honest," "Economical," "Excelsior," "Chartres," "Grant's," "Giant."

Q. Recurring to the question that has been asked you upon this suit—the result of these examinations which you have made—is it your opinion that alum in these various compounds, in baking powders such as you have examined, is injurious?

A. It is my opinion, based upon actual experiments on living animals.

CHARLES F. CHANDLER, called on behalf of the plaintiff, being duly sworn, testified as follows:

Q. Dr. Chandler, you reside in the City of New York?

A. I do.

Q. Your business is that of a chemist?

A. It is.

Q. You are and have been Professor of Chemistry in several colleges?

A. I have.

Q. Please state how long that employment of yourself has been, and with what colleges you are now connected.

A. I am at present Professor of Chemistry in the Academic Department of Columbia College; the School of Mines, Columbia College; the New York College of Physicians and Surgeons, and the New York College of Pharmacy.

Q. You are President, also, of the Board of Health, are you not?

A. I am.

Q. In your various employments, have you had frequent occasion to examine the question of the wholesomeness of food, and the beneficial or injurious effects of its ingredients?

A. I have.

Q. I will ask you in regard to the use of alum with soda, in a baking powder, whether or not it is neutralized—is there any injurious constituent of alum left?

A. There is an injurious constituent left after the mixture of alum and bicarbonate of soda.

Q. Without using any nicety of chemical terms, what is your opinion about the use of alum in a baking powder, in combination with bicarbonate soda and other ingredients, for raising bread—whether injurious or not?

A. I think it is dangerous to the digestive organs, and liable to produce serious disturbance of the liver of the individual making use of such powders.

HENRY MORTON, President of "Stevens Institute," called in behalf of the plaintiff being duly sworn, testified as follows:

Q. You are President of Stevens Institute?

A. I am.

Q. And have for many years been a chemist?

A. I have.

Q. Have you had occasion to examine the substances which are used in the composition of baking powders?

A. I have.

Q. Did you, some time ago, examine a sample of Dooley's Baking Powder?

A. I did.

Q. Is that it, sir? [handing can].

A. Yes, sir; that is it.

Q. Well, what kind of alum did it contain?

A. It contained potash alum.

Q. Did you make any extract of that alum, to show the kind?

A. I did; I extracted a large quantity of it as potash alum, and it is in that bottle which I have now here [showing bottle]; that is potash alum which came out of the alum baking powder that was in that can.

Plaintiff's Counsel offers said can of Dooley's Baking Powder in evidence.

Q. Now, sir, have you made any experiment in the bread made from baking powder, to see whether there was any soluble alumina in the bread itself?

A. I have; I took a portion of this powder and mixed it with flour in the directed proportions, and baked a small loaf with it; then I soaked this loaf—the interior part of it—in cold water, and made an extract, in which I readily detected, by the usual tests, alum—that is, alumina in a soluble condition.

Q. Does any baking powder in which any alumina salts enter, contain alumina, in your opinion, which can be absorbed in the process of digestion—are not such objectionable?

A. Very decidedly objectionable, in my opinion.

Q. Why do you say—from what system of reasoning do you make it out—that because alum is injurious, alumina is injurious?

A. Because the injurious effects of alumina, when it gets into the stomach and reacts on the organs, are the same; this hydrate of alumina meets in the stomach the gastric juices, and reacts with them the same as alum would; it forms, in fact, a kind of alum in the stomach with those acids, and whatever alum would do, it would do.

Dr. SAMUEL W. JOHNSON, Professor of Chemistry in the Scientific School, Yale College, being duly sworn, testified as follows:

Q. You have had much to do in the examination of substances that enter into food, and the adulteration of food?

A. More or less; yes, sir.

Q. After the use of alum with soda, in a baking powder, in your opinion, is there any injurious substance left?

A. In my opinion, there is an injurious substance left.

Q. What, sir, two years ago, was the prevailing opinion among scientific men, as to the effect of the use of alum in baking powders?

A. As far as my acquaintance with scientific men is concerned, my personal opinion is derived from my investigation and from reading; I should think the opinion was that alum, or any compound of alumina, would be decidedly injurious.

Q. Do I understand you to say that any baking powder in which there are aluminous salts, or any resultant from alum which could be absorbed in digestion, is objectionable and injurious?

A. Extremely so.

Prof. JOSEPH H. RAYMOND called, sworn and testified as follows:

Q. Would you be good enough to state your profession?

A. I am a physician, sir, and a professor of physiology.

Q. You also were, and have been for some time, Sanitary Superintendent in Brooklyn—is not that so?

A. I have, sir.

Q. Now, sir, I will ask you your opinion, from this experience, whether the use of alum with soda, in a baking powder, is injurious or not, in its physiological effects?

A. I consider it to be dangerous.

Q. You examined this question for the Board of Health in Brooklyn, some years ago, did you not?

A. Two years ago, sir, in December.

By the Court:

Q. What was the result of your investigation as to the use of alum in baking powder?

A. The result of my investigation at that time was this: that the changes which took place between the time that alum baking powder was put in the bread, and the time the bread was eaten, the chemical changes were so little understood by chemists, that as a physician and physiologist, I considered it a dangerous experiment.

Dr. Mott, the Government chemist, in his review on the subject in the SCIENTIFIC AMERICAN, makes special mention of having analyzed the Royal Baking Powder, and found it composed of pure and wholesome materials. He also advises the public to avoid purchasing baking powders as sold loose or in bulk, as he found by analyses of many samples that the worst adulterations are practiced in this form. The label and trade mark of a well known and responsible manufacturer, he adds, is the best protection the public can have.

DECISIONS RELATING TO PATENTS.

United States Circuit Court.—Northern District of New York.

UNITED STATES STAMPING COMPANY vs. JEWETT et al.

Blatchford, J.:

1. Patent to E. A. Heath, No. 119,705, granted October 10, 1871, not anticipated by invention of Weber, the proofs failing to show beyond a reasonable doubt that Weber was prior to Heath.

2. Where the decree in a former suit against one licensee of a patentee was for a simple dismissal of the bill a claim that the plaintiff is estopped from suing another licensee will not be entertained.

3. Where a patent has been allowed and ordered to issue, and an assignment has then been made authorizing the Commissioner to issue patent to assignee, and patent issue to inventor, the assignment not having been recorded until after the issue of the patent, Held that the legal right to the patent became vested in the assignee on the recording of the assignment.

Our Trade with China.

Recent official reports show an encouraging increase in American trade with China, whose vast and undeveloped markets offer enormous opportunities for our manufacturers and farmers.

A few years ago wheaten bread was all but unknown in China. The multitudes of returning Chinamen carry home with them not only a knowledge of wheat but a preference for it. One steamship from San Francisco carried to China, last year, 1,400 tons of flour; and the entire shipment for 1879 was 235,789 barrels. The vast wheat fields of the Pacific coast are likely soon to find an ample market for their products among the millions of the Celestial Empire.

During the same year California found in China a market for half her quicksilver product, or 36,696 flasks. Of other products the total shipment from the country was not large, but the variety indicates great possibilities of future development. The exports to China for the year, the last for which official reports have been published, included clocks, to the value of \$50,397; cottons, colored, \$270,600; cottons, uncolored, \$1,302,000; drugs and chemicals, \$13,700; glassware, \$14,000; silver bullion, \$1,831,000; machinery, \$9,000; other iron manufactures, \$9,000; firearms, \$17,000; lamps, \$22,000; kerosene, \$690,000; ordnance stores, \$9,000; provisions, such as bacon and other meats, butter and cheese, etc., \$42,000; refined sugar, \$7,000; tobacco, \$52,000; clothing, \$10,000.

TO RENDER IVORY FLEXIBLE.—Ivory is readily rendered quite flexible by immersion in a solution of pure phosphoric acid (specific gravity 1.13) until it loses, or partially loses, its opacity, when it is washed in clean cold water and dried. In this state it is as flexible as leather, but gradually hardens by exposure to dry air. Immersion in hot water, however, restores its softness and pliancy. The following method may also be employed: Put the ivory to soak in three ounces nitric acid mixed with fifteen ounces water. In three or four days the ivory will be soft.