

subject of Her Majesty, and resident in this Province, having discovered or invented any new and useful art, machine, manufacture, or composition of matter, the same not being known or used in this province by others, may petition and obtain a patent." Another section provides that a patent shall be held to be void "on the ground that the patentee, in his specification of claims, has embraced more than that of which he was the first inventor or discoverer." This puts a complete extinguisher upon the proposition made by Anderson in his circular, and we consider it our duty to "American inventors," to warn them that a patent obtained through fraud so transparent as this, would not be worth the parchment. The Canadian patent system is a mockery of justice, and we advise "Mr. Alexander Anderson, Inventor and Patent Agent, Dominion of Canada," to stop sending out such circulars, and to turn his brilliant talents toward securing an amendment to the law of patents, such as will protect the rights of all inventors alike.

THE GAMGEE PROCESS.

Professor Gamgee's process for preserving meat, accounts of which we have heretofore published, has lately been put in operation in this city; and we recently had the pleasure of inspecting the apparatus at the establishment of the Holske Machine Co., 528 Water street. Here we found a large airtight chamber, in which a dozen or more carcasses of sheep were placed for treatment. The process consists, substantially, in submitting the meat to the action of carbonic oxide and sulphurous acid, under pressure which is maintained for several hours.

The carbonic oxide combines with the coloring matter of the blood, forming a more stable compound than when that substance is combined with oxygen—thus preserving the fresh color of the meat and assisting in preventing decomposition. But the real antiseptic agent is the sulphurous acid, which may act in two ways: First, by entering into combination with the bases of the meat to form sulphites; and, secondly, by destroying the living germs, which, according to Pasteur's theory, are the active cause of decomposition in animal and vegetable matter.

Nothing can be more complete or successful than this method of preserving meat. We tried, at home, some joints of mutton which had been treated as above, and the meat after hanging ten days or more in the air appeared to be as fresh as ever; when cooked no difference could be observed between it and the ordinary fresh meat of market. We regard it as a very important and valuable discovery.

GAS MONOPOLIES.

The Legislative Committee at Albany, continue the taking of testimony in regard to alleged abuses on the part of the gas companies. Probably a government does not exist on the face of the earth so ready to grant franchises without guarantees as that of the Empire State.

Mr. Valentine T. Hall, Secretary of the Brooklyn Gas Light Company, testified before the committee that the company is acting under special charter, dated 1826, which has been several times amended. "It contains no regulations as to price of gas, or quality we must furnish, we may charge anything we please."

Having thus obtained the privilege to lay their mains, and having got thoroughly under weigh; having at the outset a capital of \$250,000, which has increased so that it could not in the opinion of Mr. Hall, be replaced for less than \$4,000,000, with market price of stock 240 per cent when "last any was offered for sale," this unrestricted monopoly has everything in its own hands. What chance would a new company have in the attempt to compete with it? The franchise possessed by the Brooklyn Gas Light Company is so valuable that they could well afford to give away gas for two years to swamp an opposing corporation.

"Verily to him that hath, shall be given, and from him that hath not shall be taken away that which he hath;" and when this impoverished company asks for further grants from the generous New York Legislature, it will doubtless get what it wants. We have little faith that the present investigation will result in the revocation or limitation of the charter of any gas company. Such an expectation is not justified by any precedent.

BEEF ROOT SUGAR.

No. I.

In No. 4, current volume of the SCIENTIFIC AMERICAN, we expressed our belief that at some future day the United States would manufacture the whole amount of the sugar needed for home consumption, and we further stated that this sugar would, in all probability, be made from the beet.

We now think the time has come for the country to free itself, at as early a date as possible, from dangerous dependence on the foreign production of this staple, so as to avoid sudden variations in prices, and inconveniences arising therefrom, such as have actually occurred in consequence of the recent revolt in the island of Cuba.

We consider the subject of beet root sugar production in the United States to be of such vital importance to the interests of the whole community, that we have determined on publishing a series of articles, illustrated with the necessary engravings, concisely elucidating the whole question, statistically, economically, agriculturally, and technologically. This is the more necessary, as no really reliable and complete treatise on beet root sugar has ever been, to our knowledge, published in the English language.

We sincerely hope by so doing to be the means of stimulating the monied men and the agriculturists of the country into active measures, which we are fully convinced must result

advantageously, both to the public in general and to themselves in particular. Should we succeed in this object, we shall consider ourselves fully rewarded for our efforts toward its attainment.

The island of Cuba has been making about half a million of tons of sugar annually upon 1,365 estates; this quantity approximates to one-third nearly of the consumption of the world. Our refiners have been in the habit of drawing their principal supplies of raw sugar from this source, but they will soon have to look to some other, as nobody can doubt that the day of the emancipation of the Cuban slaves is fast dawning, and that a repetition here of what took place in the island of Jamaica, under similar circumstances, is to be expected, namely, a sudden falling off in the production of over eighty per cent.

Let us not be unprepared for such an emergency, which would inevitably force us into purchasing European beet root sugars at much more onerous prices than would make their home production a profitable industry.

Below we give a table exhibiting the total consumption of sugar in the United States along with the amount of foreign imports for the last eight years. This conveys to the mind a better idea of the magnitude of the sugar trade than any lengthy dissertation of ours could do. These statements are compiled from the Reports of the Chamber of Commerce of the city of New York.

Years.	Imports of foreign sugar.		Total annual consumption of both foreign and native sugars in the U. S.
	Tons.	Tons.	
1860.	341,532	296,950	415,281
1861.	242,908	241,420	363,819
1862.	247,015	241,411	432,411
1863.	243,137	231,308	284,308
1864.	214,099	192,660	220,660
1865.	362,243	345,809	350,809
1866.	403,497	383,178	391,678
1867.	355,801	378,068	400,568

From the above figures we compute that, we, as a people, are paying for sugar to foreigners, with whom we have comparatively no exchanges, a sum, which for the year 1867 alone, and at ten cents per lb., amounted to no less than \$84,687,232; a sum which, if paid yearly for ten years, with interest compounded, would be considerably more than the equivalent of one-half of our present national debt.

By manufacturing our own sugar the whole of this large amount of capital would remain in the country.

If the population of the United States, including negroes, in 1867 be estimated at 35,000,000, we find that the consumption per capita (including both races) was 28.97 lbs. per annum, an increase of 25 per cent over the preceding year.

The consumption of the Pacific States in 1867 was 18,000 tons. During this period 22,000 tons of maple sugar were also manufactured.

The whole production of the Southern States did not, in 1867, amount to over 5 6-10ths of the whole consumption of the country.

The average yield of Louisiana before and since the war, is interesting:

From 1822 to 1825 it averaged	30,000 hogsheads
" 1842 to 1843 "	140,316 "
" 1844 to 1845 "	204,913 "
" 1845 to 1850 "	211,825 "
" 1850 to 1856 "	276,640 "
" 1856 to 1859 "	287,944 "

In 1865, Louisiana made 5,000 tons of sugar; in 1866, 8,500 tons; in 1867-68, 22,500 tons, or only 20,000 hogsheads more than she had produced forty years before.

The average price of Southern sugar, from 1845 to 1850 was \$52.50 per hogshead of 1,000 lbs.; in 1853 it fell as low as \$35, and rose in 1855 to \$110.

If our average imports of cane sugar should continue to be about one billion of pounds, as at present, we have calculated that this amount could be made from the beets grown on less than 555,555 acres of good land, a quantity which we could readily spare from other crops without interfering materially with the prices of ordinary farm produce.

In order to show the extent of the beet root sugar interest in Europe, we indicate the production for the year 1867-68; it is as follows:

	Tons.
France.	220,000
The Zollverein.	165,000
Russia.	97,500
Belgium.	32,500
Poland and Sweden.	15,000
Holland.	7,500
Austria.	92,500
	630,000

The gradual increase in production has been remarkably illustrated in France, which, in 1827, had 39 factories making 1,218,000 kilogrammes of sugar, and in 1860 had 336 making 126,180,000 kilogrammes.

The German Zollverein averaged from 1840 to 1846 about 129 factories, which made 241,487 cwt. of beet root sugar; in 1865 the production had reached 3,300,000 cwt.

Russia, in 1866-67, in the departments of Kiev, Podolia, and Volhynia manufactured 1,153,880 cwt., where, fifteen years before, not one pound had been grown.

The gradual increase in the consumption of sugar by the working classes of Europe is singularly indicative of the effects of abundance and low prices. In 1822, the consumption of sugar for every inhabitant in Germany amounted to only 1 1/2 lb. per annum; from 1830 to 1840 it rose to 4 2-5ths; in 1848, it had reached 5 1/2; in 1857, it was 6 1/2, and to-day it is a little over 10 lbs.

The improvements in the manufacture of beet root sugar

have followed the increasing demand, and the gradual augmentation of internal revenue levied on it.

In 1845, the average product in raw sugar did not exceed 5 per cent of the weight of the beets; three years later it had reached 6 1/2, and to-day it is about 8 to 8 1/2 per cent.

The objections made by many persons to the establishment of this branch of industry on the continent are generally specious. They are comprehended in the following queries:

"Can American beet root sugar compete in price with the colonial sugars, or even with Louisiana cane sugar, and is not our labor too high to permit of any comparison being made between European manufactures and our own?"

"Are our conditions of soil and climate as suitable to the growth of the beet as they are on the other side of the Atlantic?"

"Does the beet grown in the United States contain as much sugar as it does in Europe, and can it be as readily extracted?"

In answer to the first of these questions (which we shall fully enter into with necessary figures to sustain our assertions in a future issue), we must content ourselves for the present with stating that the protective duty on foreign sugars, combined with the absence of any tax on home made beet root sugars, and the fact that good beet lands can be purchased in fee simple in America for less than one-quarter of the annual rental of such lands in Europe, are in themselves sufficient to allow us to hold our own against all outsiders.

To this may be added a peculiarity of the beet, that of leaving no waste or residue, as is the case with the cane. The beet, after all the juice has been extracted, is not merely valueless bagasse, but constitutes a most excellent material for the fattening of live stock during the winter months. Beet root molasses makes good brandy and alcohol. The residue of distillation furnishes potash. The green leaves at the time of harvesting are used as a manure, being rich in ammonia, and when dried, are largely consumed as an admixture with the lower grades of manufactured tobacco.

The production of beet sugar is well known to be one of the most remunerative investments in Europe, where the number of sugar establishments is constantly on the increase, and yet beyond what has been done by one small, but apparently prosperous German establishment in one of our Western States, not a single field of fifty acres of genuine sugar beet has ever been grown in America.

We have recently heard of a company in California who intend starting an establishment in that State within a short period of time. We wish them success, and hope that their example will be followed on the more eastern portions of the continent by some of our men of enterprise.

The beet in America, wherever it has been analyzed, and this has been done to our knowledge in the States of Illinois, Massachusetts, New Jersey, New York, and others, has never been found to contain less than 11 per cent of sugar, and has generally tested 12 per cent. Of this quantity, we extract, by our modern processes of manufacture at least, eight-tenths.

The results of numerous experiments on a scale of sufficient magnitude to be conclusive, made in the States of New Jersey, Illinois, and elsewhere, have proved that 20 tons of beets is a very ordinary crop in this country. This being the case, we may expect to make, at the rate of 8 per cent of sugar, the large quantity of 3,584 lbs. out of the 44,800 lbs. of the beet produced on one acre.

In Louisiana the average quantity of cane sugar per acre seldom reaches two hogsheads.

With the exception of the extreme North and Northwestern States, and the far South, the whole extent of the territory of the United States, wherever the soil is of the right quality, such as we shall indicate in our next article, may be made to produce the sugar beet.

Our manual labor is said to be too high; but if this be the case, may we be allowed to ask, how our producers manage to ship to European ports our flour, wheat, cotton, tobacco, and many other articles?

The secret rests with the fact that the cheapness and natural fertility of our lands, more than compensate for superior cost of labor.

We do not fear to express the opinion that Yankee beet root sugar will, at no very distant day, be offered in the markets of the world in successful competition with both colonial or European brands.

In our future articles, we shall attempt to show how this result can be attained.

Variation in our Domestic Productions.

It has been boldly maintained by some authors that the amount of variation to which our domestic productions are liable is strictly limited; but this is an assertion resting on little evidence. Whether or not the amount in any particular direction is fixed, the tendency to general variability seems unlimited. Cattle, sheep, and pigs have been domesticated and have varied from the remotest period, as shown by the researches of Rutimeyer and others, yet these animals have, within quite recent times, been improved in an unparalleled degree; and this implies continued variability of structure. Wheat, as we know from the remains found in the Swiss lake habitations, is one of the most anciently cultivated plants, yet at the present day new and better varieties occasionally arise. It may be that an ox will never be produced of larger size or finer proportions than our present animals, or a race horse fleetier than Eclipse, or a gooseberry larger than the London variety; but he would be a bold man who would assert that the extreme limit in these respects has been finally attained. With flowers and fruit it has repeatedly been asserted that perfection has been reached, but the standard has