RUSTING OF GUN BARRELS.

The Boston *Journal of Commerce* says: One of the great difficulties which the sportsman has to contend against is the rusting of his barrels, even when protected by the best browning. The alkaline matter existing in snow and in rain, under certain conditions of the atmosphere, works through the best coatings, and reaches the iron. Varnish, as ordinarily laid on, is objectionable, as it gives a gun a "Brummagem" look. The best plan is the following: Heat the barrels to the temperature of boiling water (not any hotter, or you may injure them), and rub them with the best copal varnish, giving them a plentiful coating. Let them remain hot for half an hour, and then wipe them clean with a soft rag. In this way you can get enough of the varnish into the pores of the metal to act as a preservative, and, at the same time, no one would suspect that the barrels had ever been touched with varnish. We have applied boiled oil, beeswax, paraffine, and some other substances, in the same way, and obtained good results; but on the whole, we find nothing better than good copal varnish.

The same journal, in speaking of the rust and corrosion of iron in general, says: Iron is easily corroded by even the weak acids. Sulphuric acid, nitric acid and hydrochloric acid all act on it quickly and powerfully. Air and moisture also quickly corrode it. It is a curious fact that carbonate of soda protects iron very perfectly from rust. We have seen a piece of iron that had been kept in a solution of soda for 20 years, and yet was quite bright.

There are several methods of protecting iron from rust. Painting, varnishing, tinning, zincing, etc., have all been tried with good effect. Painting and varnishing need no remarks. Where bright work is to be temporarily protected, however, a paint of white lead and tallow may be used. This will not dry, and may be easily and quickly removed with a little turpentine.

Bleaching by the Electric Light.—M. Leon Manet has devised a process for bleaching blood albumen by means of the electric light. The albumen is taken after separation, and either before or after drying. It is then exposed to the light. The inventor arranged electric lights fitted with lenses or reflectors, so as to cast their light upon the albumen which is to be bleached. If it is still liquid the light is thrown upon the plates or trays which contain it in the drying stove. These plates may be made of glass, so as to let the rays pass through them. If the albumen is dry the light can be thrown upon layers of the article arranged upon the stage. In either case the process varies in duration, according as the albumen has been more or less completely separated from the clot. Under ordinary circumstances 24 hours will suffice to bring about a perfect decoloration. For more efficacy the electric light may be brought into action at the beginning of the process, when the clot and the albumen are being separated.

The Population Center of the United States.—Ten years ago the center of the population of the United States was about 48 miles east of Cincinnati, Ohio. The Superintendent of the late census announces that the growth of the great West during the past decade carried the center of population about 50 miles west, while the large increase in the Southern States carried it a little southward. The result places the center of population within the limits of Cincinnati.

Luminous Printing Ink.—A new invention is reported from Turin. It consists in the application of light-giving materials to printing ink, by which print becomes luminous in the dark, so that in future it will be possible to read at night, in bed or during a journey, without the assistance of candle or lamp. A new daily paper in which this luminous material will be used is, it is said, about to be published at Turin.

THE NATIONAL BALANCE SHEET.

The following is an official statement showing the financial and economic transactions of the United States of America for the four years ended March 1, 1881:

		For year ended March 1, 1878.	For year ended March 1, 1879.	For year ended March 1, 1880.	For year ended March 1, 1881.	Total.
Total receipts		$265,843,831 56	$262,058,517 04	$306,762,742 93	$364,386,715 41	$1,102,651,307 94
Total expenditures		218,589,531 [illegible]	253,084,943 91	260,047,024 [illegible]	267,351,[illegible]	998,794,796 93
Total debt, less cash in the Treasury		2,042,037,139 06	2,075,257,241 [illegible]	1,990,112,971 [illegible]	1,879,956,412 77	
Decrease of debt		46,744,013 [illegible]	13,470,097 [illegible]	31,080,726 [illegible]	113,135,[illegible]	208,824,730 27
Annual interest charge		92,507,592 [illegible]	101,817,019 [illegible]	82,111,111 [illegible]	76,845,[illegible]	
Available cash in the Treasury, including resumption fund		72,920,913 [illegible]	144,025,042 [illegible]	150,730,706 [illegible]	190,692,[illegible]	
Gold coin and bullion held by the Treasurer		121,728,804 [illegible]	133,033,339 [illegible]	146,762,471 [illegible]	173,093,[illegible]	
Silver coin and bullion held by the Treasurer		9,453,[illegible]	35,021,080 [illegible]	31,495,[illegible]	44,108,[illegible]	
Exports of live stock		4,306,[illegible]	10,923,241 [illegible]	12,069,459 [illegible]	20,061,[illegible]	47,306,[illegible]
Exports of other food		200,734,800 [illegible]	301,593,273 [illegible]	374,664,113 [illegible]	415,346,[illegible]	1,437,317,292 00
Total exports—merchandise		630,453,[illegible]	715,050,729 [illegible]	727,423,[illegible]	913,271,[illegible]	3,046,485,[illegible]
" " specie		47,109,[illegible]	25,321,[illegible]	16,075,[illegible]	16,079,[illegible]	113,[illegible]
Total imports—merchandise		475,838,319 [illegible]	432,050,[illegible]	535,695,[illegible]	703,139,[illegible]	2,[illegible]
" " specie		23,[illegible]	23,[illegible]	92,714,[illegible]	99,270,[illegible]	343,492,[illegible]
Production of cotton	No. bales	4,485,423	4,811,265	5,073,531	5,761,252	20,131,471
Production of wool	No. pounds	207,000,000	211,000,000	232,500,000	264,000,000	914,500,000
Production of wheat	No. bushels	364,194,146	420,122,400	448,756,630	480,849,723	1,713,922,899
Production of corn	No. bushels	1,342,558,000	1,388,218,750	1,547,901,790	1,637,595,900	5,916,274,440
Production of pig iron	No. tons	2,066,594	2,301,215	2,741,853	3,300,000	10,409,662
Production of coal	No. tons	54,393,[illegible]	52,130,394	60,904,[illegible]	69,500,000	241,446,[illegible]

Note.—The debt, less cash in the Treasury March 1, 1877, was $2,088,781,143 04, and the annual interest charge, $94,403,645.50; showing a decrease in the debt during the four years, as above, of $208,824,730 27, and of the annual interest charge, $17,557,708.

John Sherman, Sec'y.

Treasury Department, March 1, 1881.

A Leg Amputated by Electricity.—A very interesting operation was performed in the Toronto General Hospital a few weeks ago. It consisted of amputation, by means of electricity, of the left leg at the hip. The patient, a young man, being reduced very much by the sloughing of an open wound on the outside of the leg, it was desirable that he should lose as little blood as possible. Having placed the patient under the influence of ether, the customary flaps were made, and then a platinum wire, attached to the two poles of a galvanic battery, was encircled round the leg under the flaps. In a moment this wire was brought to a white heat, and began to cut its way through the limb. By the great heat the ends of the arteries were contracted, and only the larger ones required to be tied. Many of the leading surgeons of the city and a large number of the students from both schools were present.

Nicotine Poisoning.—A rather unusual case of poisoning by nicotine has occurred lately in a Paris suburb. The victim, a man in the prime of life, had been cleaning his pipe with a clasp knife; with this he accidentally cut one of his fingers subsequently, but as the wound was of a trivial nature he paid no heed to it. Five or six hours later, however, the cut finger grew painful and became much swollen; the inflammation rapidly spread to the arm and shoulder, the patient suffering such intense pain that he was obliged to betake himself to bed. Medical assistance was called, and the ordinary remedies proved ineffectual. The sick man, questioned as to the manner in which he cut himself, explained the use to which his pocket knife had been applied, adding that he had omitted to wipe it after cleaning the pipe. The case was now understood, and the patient's state becoming alarming he was conveyed to the hospital. There the doctors decided amputation of the arm to be the only hope of saving the patient's life, and this was immediately done.

Securing Glass in Skylights and Roofs.—A recent English patent shows what seems to us a very convenient and reliable way of fastening sheets of glass in skylight frames of either wood or iron. In the case of a wooden rafter a piece of sheet lead is cut three and one-half times the width of the rafter, laid across the rafter, projecting equally on either side, and nailed at intervals. The lead is then doubled back over the heads of the nails to the center of the rafter on either side and turned up at a right angle. The glass is then laid and the lead turned down over the face of the glass so that when finished the lead covers the glass the same width of the rafter. If T iron is used for a rafter the lead is doubled under the edge of the T instead of nailed, as in the case of wood, and in all other respects handled just the same as with wood.

Testing Drain Pipes.—A writer in the *Ironmonger*, from long practical experience in testing drain pipes, confidently recommends for that purpose what he terms a "smoke test;" and which gives evidence as to leaks both to the sight and smell. The materials that he employs are soiled cotton waste and sulphur, the smoke from which, after ignition, is blown into the drain or pipes. If leakage exist in the latter inside of the house the smoke and smell both issue forth and show that something is wrong, and generally tells just where the fault or faults are. Sulphur, as is well known, is one of the best of disinfectants, and a dose of the fumes from this to the drains, after disease has been in the house, would effect much good.

Phosphorescent Flowers.—French manufacturers have a very simple method of preparing the phosphorescent flowers, which are commencing to attract so much attention abroad. They are rendered luminous by coating the petals with transparent size, and then dusting them with a phosphorescent substance, such as Canton phosphorous (sulphide of calcium) or Bologna phosphorous (sulphide of borium), the first named being considered the best, and yielding a soft yellow light. According to M. Becquerel, a good quality can be made by mixing 48 parts of flowers of sulphur with 53 parts of calcined oyster shells, and raising them to a temperature of between 800° and 900° C. Exposed to sunlight during the day, the flowers become brightly luminous at night.

A High Bridge.—A bridge has recently been built over the Volga, in Russia, at a point where it is a mile in width. So great are the spring floods at that point, that the bridge has been built 100 ft. above the lowest level of the water; the depth of the river is more than 50 ft. The bridge rests on 14 piers. The girders are 364 ft. long and 20 wide, and were riveted together on the bank of the river.

Cracks in Boilers.—A new method of repairing cracks in boilers, invented in Germany, consists in the use of a sort of wedge link—a pair of tapered pins connected with each other in one solid body by a flat wedge.