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Experiments with Metals.

In our last number we published some very useful information in relation to castings of cast-iron, derived from the reports of the U. S. Officers of Ordinance, and we will now present some remarks on castings of brass or bronze, derived from experiments in casting bronze cannon at the famous Ames Works at Chicopee, Mass.

Brass founders have often noticed a remarkable difference in the color and quality of castings made from the same molten mass of brass, and have been puzzled to account for this. It is believed by many persons that in forming alloys the metals unite in definite proportions at different temperatures, and that in the cooling of brass castings the particles arrange themselves in a manner not yet well understood, either by scientific or practical men. The experiments made with bronze guns at Chicopee are interesting in relation to this question. A number of small bronze guns were cast, and bars was cut from different parts of them and tested. The material was the same in all cases, 8 parts of copper and 1 of tin; they were all treated alike, and cast from the same molten mass. The samples of bars tested gave an extraordinary variety of results. A bar cut from one part of a gun exhibited a tenacity of 100, while a bar cut from another part of it exhibited a tenacity of 236; and the difference in the density of different parts of the same casting was also remarkable, being equal to 34 lbs. in a cubic foot, thus showing, we conceive, that the metals of alloys do unite in different proportions at different degrees of temperature. Three howitzers were cast from the same molten mass, poured at different temperatures into separate molds. The first was poured at a very high heat into its mold; the metal of the second was kept 15 minutes in the ladle before it was poured in, and the third kept 15 minutes longer still. All the attending circumstances, excepting the temperature of the alloy when poured into the mold, were equal. The liquid metal of the first and greatest heat sank gradually down into the mold for a few minutes after casting, and receded about an inch and a half below its original hight; soon after this it boiled at the surface as if gas were escaping, and fluid portions of the alloy arose and overflowed the top of the mold. The exuded metal congealed like lava, was of a dirty white appearance, and contained more tin than the mass of the casting. When cold the casting was found to be an inch longer than the mold, and it was filled with minute vesicular cavities. The bars cut from it and tested were very low in density and inferior in tenacity. The second howitzer cast fifteen minutes later at a lower temperature was shorter, when cold, than the mold, by nearly two inches. The third, cast at a still lower temperature, was, when cold, three inches shorter than the mold. The density of the bars cut from these three howitzers was greatest in the one cast at the lowest temperature, and as the tenacity follows the same law, it appears that casting brass at a high temperature is injurious to the quality of the casting—the difference in the tenacity of the three castings being as 3 to 1. In reference to this point the report of Major Wade says: "The division of copper and tin into two or more separate alloys probably occurs at some definite temperatures; one division may occur in the liquid mass, and another after the temperature falls below the melting of copper, and the latter probably occurs in all large castings, for on a close examination of any gun casting, some traces of this whitish alloy will be found in some parts of it.

That such a division may occur in the liquid mass, appears evident from the fact, that a portion of the liquid bronze will pass through a porous vessel as through a sieve, while another portion will remain within the vessel. The former is the more fusible alloy, the latter the less fusible, and forms the mass of gun castings. It thus appears that we may sift the more fusible alloy, while both are liquid."

The sifting of the more from the less fusible alloy in the liquid state, and the pouring of the molten alloy into the mold at a reduced temperature, to improve the character of brass castings, is very important information for brass founders. It was also discovered in the course of these experiments with alloys, that small bars of bronze cast of the same metal as the cannon, were vastly stronger than the cannon. This is attributed to the rapidity with which they were cooled, thus preventing the particles changing position in the act of cooling. Although a great deal of information has been published in our columns from time to time, relating to alloys and brass castings, much has yet to be done by men of science and mechanics in investigating their nature, for we are still in the dark respecting the laws which govern their combination. There is still a wide field open here for experiment, which we hope will soon be explored by many industrious and acute experimenters.

Congressional, or Public Books.

MESSRS. EDITORS—I saw a notice in the SCIENTIFIC AMERICAN of books published by the United States Government. What becomes of them, and who gets them? Are they attainable by the common people? When will the Patent Office Report for 1855 be published? C. B. H.

Oriskany Falls, N. Y., April 18, 1855.

[Our correspondent asks a very reasonable question. If our information is correct, a very large proportion of all the best books, printed by Congress, fall into the hands of speculators, and are not attainable by the common people. The object of printing books at the public expense, is to disseminate widely the information they contain. But this result is seldom reached. Each Member of Congress is entitled to a certain number of copies, and he is in duty bound to distribute the same, gratis, among his constituents, in such a manner as shall best insure the spread of knowledge. But the adopted practice, in such matters, is otherwise. Instead of distributing works, for the common good, Members are in the habit of selling them to book speculators, at Washington, and pocketing the proceeds. Each new Member realizes, in this manner, from $800 to $1000 cash—so we are told.

Great energy is exhibited in flooding the country at the public expense, with long-winded, inflammatory, and, too often, worthless speeches. But when documents of value are placed in the hands of Members, their zeal in the diffusion of knowledge experiences a sudden check.

Of the excellent Report of the Commissioner of Patents, for 1854, illustrated with several thousand diagrams of new inventions, *twenty-seven thousand* extra copies, for public distribution, were ordered to be printed. What has become of them? The inventors who furnished the materials for the work, have had scarcely any. Indeed, unless they have influential friends at the seat of government, their chances for obtaining copies of such reports are always slim. This is wrong. The law should expressly provide that every applicant for a patent should receive a copy of the Patent Report.

Some time since a meeting of librarians from various parts of the country, was held in this city. Among other movements, they resolved to memorialize Congress, and ask for the passage of a law to supply every public library with one copy of each public work printed. This ought to be done, for it would greatly facilitate the access of the people to such documents.

Another rule should be, (now we speak for ourselves,) to send copies of all government books to every editor in the country. The works would then pass under review, their contents, and the information they contain, would be made known and disseminated much more widely than could be done in any other manner.

Our correspondent inquires when the Commissioner's Report for 1855 is to be published? Echo answers, When? In the course of the year, perhaps,—when it has become old and stale.

The steamboat *Cuba* exploded her boilers on the Alabama river on the 20th ult., by which accident several persons were killed.

Amending the Patent Laws.

Two propositions for amendments in the Patent Laws have just been presented to the Senate. One of them relates to fines for deceiving the public by stamping articles "patented," when in fact no patent exists. The bill proposes to fix the penalty at not less than $5, nor more than $100 for each article so stamped. The Jury to assess the amount of the penalty, but no fine exceeding $2,000 in the aggregate, for making such false representation on any articles of the same kind in any one year, shall ever be recovered against any person All actions to be brought within two years.

The *Evening Post*, of this city, says that the above amendment is "adapted to remove some of the serious annoyances and obstructions now so much complained of by the mechanical inventors in the country."

We should most heartily join in any effort to procure greater security against bogus patentees, but it strikes us that the foregoing project is a step backwards. The existing law fixes a penalty of not less than $100 for each offence, as above, does not leave the fine to a jury, nor qualify the aggregate amount, or time of action. In short it punishes the offender fully, for each offence, whenever it can catch him. The jury have nothing to do with the penalty, but only to say "guilty," or "not guilty." The *improvement* which is proposed, reduces the fine to $5, gives the offender the choice of clearing his skirts for the sum of $2,000 cash, no matter how many times he has violated the law, or lets him off scot-free if he can manage to keep the subject hushed up for 24 months.

The other amendment to which we have alluded, is a proposition to permit the people of Canada and the other neighboring British Provinces, to obtain United States Patents on the same terms with our own citizens. This is a good move, and we should like to see it adopted. Were it not for the light of the Golden Rule, we should be inclined to exclude the Canadians and Nova Scotians altogether. They have done so towards Americans, for some few years past, and still adhere to their exclusiveness. They have always enjoyed the privilege of coming here to secure patents for their new inventions on the same terms as other Englishmen; but they utterly refuse to grant patents to American citizens under any consideration whatever.

The Province of New Brunswick, however, is a noble exception. Americans are at liberty to take out patents there whenever they choose, and the expense is quite small. New Brunswick has always been noted for the liberality and intelligence of its inhabitants. It is a thriving and populous colony.

Notes on Ancient and Curious Inventions.—No. 5.

Cordials—In days past and gone, cordials were *cordials*, because they were patent cordials. In 1802, Simon Lazarus, of Virginia, obtained a patent for an anti-bilious cordial, and in 1804 Samuel Chamberlain, of Massachusetts, obtained one for a "bilious cordial." Five years afterwards, Antonio Bouchere, of Philadelphia, obtained one for a cordial gin, which we have no doubt was as good, and perhaps better, in its day, than the much vaunted and puffed "Scheidam Schnapps," of the present.

Pills—There was a time when pills were really pills; and they have left forcible demonstrations of their effects upon the rolls of the Patent Office; no less than eighteen different patent pills having left their marks upon those records. The first patent pill was that of S. Lee, Jr., of Connecticut, in 1796. Connecticut appears to have carried off the palm in pill making—one half of the pill patents having been taken out by citizens of that State. Lee's Connecticut pills were famous in their day, for we find that Samuel Lee obtained two patents, and Samuel H. P. Lee two,—all of the bilious order. Two kinds of anti-dyspeptic pills were patented, and three of rheumatic pills; the rest bore the names of "family pills," "tonic pills," &c., and were no doubt powerful instruments for good or evil, according as they were used.

The last patent that we find granted for an American pill, was that of John J. Oellig, of Waynesborough, Pa., on the 28th October, 1837. It was termed a "tonic aperient pill," and, as being the last of its race, its composition is worthy of being known. It consisted of crab apple root bark, 1 1-2 drams, rhubarb, 2 drams; extract of horehound, 28 grains; sal soda, 2 scruples, and castile soap sufficient to make the mass into 150 pills. The latest patented pill that we have any knowledge of, is that of A. H. Hardy and J. H. Fordoff, in England; the patent was granted, on the 25th of August last. Its composition consists of jalap, one ounce; aloes, extract, one ounce; buckthorne, one ounce; oil of almonds, one grain; calomel, one grain—all well mixed with a little sugar, and made into very minute pills. The same patent embraced an ointment, to be used with the pills, for curing scrofulous disorders. It consisted of white precipitate, red precipitate, oil of origamme, and turmeric, beat up with lard, in equal parts.

Medicines generally.—Townsend's Sarsaparilla has obtained rather an extensive reputation, but the Sarsaparilla Mead of Jonas C. Brigham, of Methuen, Mass., patented July 25, 1833, was no doubt as good. Some queer patents relating to medicines have been granted, and some of these are worthy of being extensively known. We find that Joseph Baker, of Jefferson, Ohio, obtained a patent on May 5th, 1831, for a medicine to cure fevers, rheumatism, dropsy, dysentery, consumption, pleurisy, boldhives, &c. &c. Seneca snake root, one ounce; liverwort tops, three-fourths of an ounce; plaintain roots and tops, one-quarter of an ounce. These were dried, pounded, and mixed well together, and formed part of the medicine. Sasafras root bark, half an ounce; the inside bark of wild cherry, half an ounce, and sulphur half an ounce. These, in a dry state, were ground and mixed together, and formed part second of the medicine. The third part consisted of dried lobelia tops, two ounces. This medicine was to be administered *all together*, or in parts, as the nature of the cases required. A dose of either of these powders, for an ordinary constitution, was stated in the specification, to consist of a teaspoonful, consisting of each of the parts equally mixed together, and washed down with half a pint of cold lye made from hickory shell bark. If this dose did not operate in fifteen minutes, a second was given, and if that did not operate, a third dose was given. The object of the medicine was to produce a free perspiration. How many patients this medicine cured or killed is not stated.

On August 25th, 1832, Horatio Howard, of Columbus, Franklin Co., Ohio, obtained no less than five patents for as many divers medicines. The first was for a diaphoric sweating powder, composed of butterfly root (Asclepias Tubarosa,) 1 pound; bark of bayberry root, (Myrica Cerifera,) 1 lb., ginger, one pound; bark of sasafras root, 4 ounces; colic root (Liatris Dubia,) 4 ounces; cloves and cayenne, 2 ounces each. These were to be finely pulverized and mixed. A dose for an adult was a teaspoonful mixed with sugar in hot water. These powders were given in cases of slight indisposition to induce perspiration, such as in chills. The drugs named are used by physicians for the purposes stated. We will describe other patented medicines in our next.

Recent American Patents.

Improvement in Telegraph Receiving Magnets—By Andrew Coleman, of Perth Amboy, N. J.—This invention has for its object the compensation of the varying forces of the electric currents, thereby avoiding the necessity of any manual adjustment of the spring or its equivalent, by which the armature is suspended. It consists in constructing the armature in the form of a lever, having its fulcrum variable under the influence of the variable magnetic force, in such a manner that the spring, or its equivalent, is made to act with a power proportionate to the strength of the magnetic current. We learn that this improvement is used with the highest advantage in connection with Morse's Telegraph.

Improved Subsoil Plow—By Pells Manny, of Waddam's Grove, Ill.—Consists in the employment of a circular rotating coulter, or knife, in front, which cuts the sod; behind the coulter is a share, which turns the furrow; be-

hind the share, and lower down, is a mold-board, which enters deeply and disturbs the sub-soil, the whole being combined with a single plow beam, and drawn in the common manner.

Improved Fish Hook.—By J. T. Buel, of Whitehall, N. Y.—The nature of this invention consists, first, in having the upper part of the shank of the hook, which is made solid or in two parts, terminate in a small barb, whereby a "minnie" can be secured upon the hook more permanently, and in a position to insure the capture of the fish so surely as he bites. Also in having the hook thus constructed, made in two parts, so as to allow of the lower barb being turned out of line with the upper one, and so constructing the upper barb that an elastic eye shall be formed by it and the shank, whereby an artificial minnie may be conveniently placed on or removed from the shank, and a natural minnie substituted for it and twisted spirally, and thus caused to spin similar to an artificial bait when in the water. Also combining with the lower barb of the improved hook, one or more minnie barbs, in a manner to form a "minnie gang," and having one of the minnie barbs turn free of the lower barb of the improved hook, so that when desirable, a spiral twist may be given to the natural minnie.

We have just received from the inventor some very substantial evidences of the practical value of his invention, in the shape of a lot of fish, caught on Lake Champlain. Among them is a specimen of the "Maskalounge," which weighs ten pounds and a quarter. He states that it is one of the finest kinds of fish known, and that in some instances they weigh as high as 45 lbs. We can fully endorse to the latter part of his statement, for a more delicious fish never tickled our palate.

Improved Seed Sower—By George I. Bitler, of Lancaster, Ohio.—In this machine there is an ingenious arrangement for regulating the escape apertures of the seed, so that a larger or smaller quantity can be planted, per acre, as desired. The devices for adjusting the parts are very convenient. Altogether this is a good invention and merits an extensive introduction. Its use will save much time and labor to farmers.

Combined Weather Strip and Lock for Windows—By Alfred Speer, Passaic, N. J.—Consists in providing a longitudinal groove in the bottom and top of the sashes, sill, and head piece of the frame, and arranging between said grooves a thin horizontal strip, and causing the same to enter the grooves when the windows are shut, so as to close up all cracks and render the sashes water-proof and also lock them securely. An engraving of this invention may be found in No. 12, present volume of our paper.

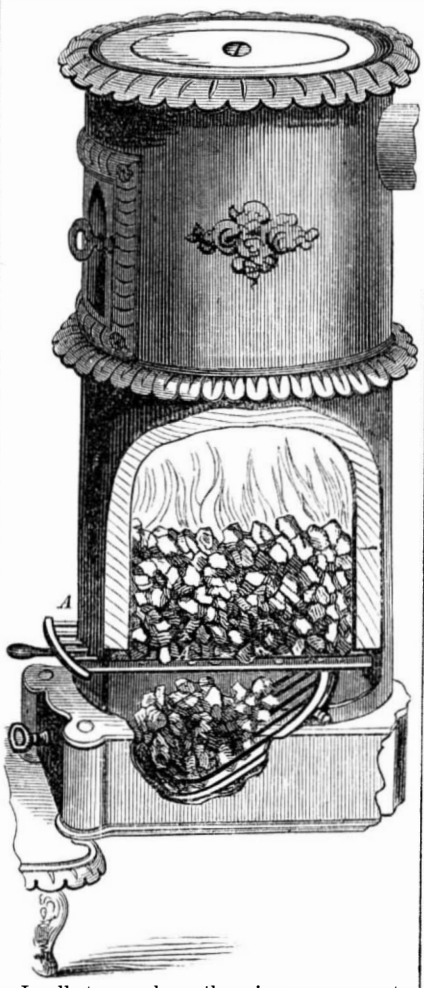
Cotton Gin.—By J. H. Kenyon & J. Hollingsworth, of Chicago, Ill.—This invention is intended chiefly for ginning Sea Island and other long staple cotton. It consists in the employment of toothed rollers, husk fans, and a clapper provided with a slotted bottom, and also in the employment and use of inclined passages and rollers arranged and operating so as to gin the cotton in the most perfect manner without breaking or injuring its fiber.

Machine for Making Tin Ware—By Shepard and Stow, Plantsville, Conn.—The object of this invention is to insert the binding wire and turn the edges of tin vessels. It consists in the employment of an adjustable rotating guide, which is placed on one of the rollers of the machine; also in the peculiar arrangement of a forming roller, whereby the box, kettle, or other article to be operated upon will be fed through the machine by the rollers without the aid of the operator. This improvement effects an important saving in labor.

Electric Printing Telegraph.—By Albert J. Partridge, of Southbridge, Mass.—In the use of this telegraph an instrument is employed at every station, which is both a composing and printing instrument, and is capable of receiving communications without printing, and also of taking a copy at the station from which the communication is sent. The several instruments of the line are connected by a circuit composed of a single conducting wire and the ground. The invention combines several very ingenious devices, which it would be impossible to describe clearly without engravings.

Improvement in Coal Stoves.—Anthracite coal is one of the best and most extensively used fuels known in this part of the country; and almost the only inconvenience connected with its employment is its tendency to form lava or clinker, which adheres to the sides of the stove, clogs up the interior, prevents proper combustion, checks the radiation of heat, &c. In ordinary stoves there is no method of extracting the clinker, except by letting the fire go out, and then removing the whole contents of the stove. Nobody wants to do this, especially on a cold winter's day or evening.

The improvement shown in our engraving consists of a supplementary grate, A, which is introduced through apertures made in the side of the stove for that purpose, above the lower grate. If the stove is full of fire, and it is desired to remove the clinkers, the grate, A, is shoved in as shown, and the upper part of the fire is supported, while the lower part where the clinkers form, may be removed by tipping the lower grate in the usual manner.



In all stoves where there is an open grate, the supplement may be thrust directly through the fire in front, and thus give the required support to the upper part while the obstructions are being removed.

The saving in time and kindling wood which this simple contrivance effects, is considerable, not to mention its great convenience. It permits a thorough removal of all clinker at any time, without putting out the fire. It is applicable to nearly all forms of coal stoves, furnaces, &c.

Mr. Benj. F. Foering, of Philadelphia, Pa. is the inventor, of whom further information may be obtained. Patented March 4, 1856.

Recent Foreign Inventions.

Gunpowder—E. Hall, of Dartford, Eng., has obtained a patent for an improved method of sprinkling the gunpowder materials while under the milling process. Under the old system of wetting with a watering-pot the distribution of the water was not uniform, and the powder was not properly damped. Mr. Hall's apparatus consists of a pump, which slowly conveys water to a cistern above each mill, and having a series of sprinkling pipes, connected with an index nicely adjusted, and a stop-cock, to take off the supply while one is being taken off and another put on.

Portable Gas Apparatus—Messrs. Bridges & Adams, of Westminster Road, London, have taken out a patent for an improvement in portable gas apparatuses to supply the gas economically when not more than ten or twelve lights are required. It consists of a stove with movable retorts, that when one is burned out it may be replaced with facility; a hydraulic main and tar cistern is contained in one vessel, and another vessel adjoining serves as a purifier. The apparatus takes up little more than six square feet of space, and is well adapted for houses in isolated situations, while other and larger sizes will be found equally efficient for large or small factories, railway stations, &c. The apparatus is designed for making gas from coal, consequently it requires more ajuncts than those apparatuses exhibited at the last Fair of the American Institute for making gas from resin, oil, and wood. The flexible gas holders connected with some of these is an excellent improvement for a portable apparutus over the old iron gas holders.

Ventilating Mines.—The London *Mining Journal* contains an account of a new method of ventilating mines patented by T. Coulson, England. It consists of a reservoir, or hydro-pneumatic box, placed on one side the adit level, supplied with water from a cistern on the surface. A metallic tube descends from the cistern to the vessel in the adit, and the supply is regulated by a self-acting valve. At the top of the metallic tube is a glass one, nicely regulated by a slide, by suspending which, at a certain point, admits no more water than is necessary. To draw in the largest possible quantity of air a vortex is formed, and a continuous stream of air and water varying in proportions according to the distance between the reservoirs and the hydro-pneumatic box, is conveyed from the former into the latter. Here the water and air are separated; the former escaping at the self-acting valve, and the latter being forced through a main tube, which branches off to any part of the mine. At one mine it is now working with a small stream of water, discharging more than one thousand gallons of pure air per hour, at a distance of nearly two hundred and fifty fathoms from the hydro-pneumatic box. This mine must have been abandoned, or a new shaft have been sunk, involving a great expense; the apparatus has completely resuscitated it.

Volute Springs to the Safety Valves of Locomotive and other Boilers.

The following is the substance of a paper on the above subject recently communicated by J. Baillie, and read by Robert Stephenson before the Institution of Civil Engineers, London:—

The volute spring, stated to have been invented by Mr. Baillie, the Locomotive Superintendent of the Central Hungarian Railway, was described to consist of a single plate of steel, wound spirally in a conical shape, sustaining pressure and deflection in reference to its breadth instead of thickness, and was constructed of thicker and deeper plates according to the increased strength desired. The effect attained by this form of applying steel to resist pressure, was found to be such that equal loads were sustained by one-third the weight necessary for elliptical springs of like capabilities and power. From the peculiar mode in which the rigidity and elasticity of the material was applied in these springs, although so very light, they were not liable to break, or to be injured by any amount of force if properly fitted; and the experience of upwards of seven years had proved that they were very economical for all railway purposes. The same experience had proved the unfitness of india rubber, or other substitutes for steel, for mechanical application, where great wear and tear had to be sustained, whilst the elliptical form of spring had many disadvantages, which were obviated by the direct action, the compactness, and the elasticity of the volute; and the saving effected by their adoption was not only in the first cost, which was great, but also in repairs, owing to the simple construction and application of the volute; whilst, in addition, much of the iron-work necessary in fitting ordinary springs was saved.

It was stated that the volutes had been adapted not only to an immense number of locomotive engines, both abroad and in England, but also to tenders, wagons, tracks, and carriages for bearing, buffer, and traction springs, and in all cases with decided advantage, as to space and durability, over the ordinary elliptical springs. They were also now beginning to be employed as auxiliary springs for common road carts and wagons; and they were proved to be very valuable for many kinds of machines liable to sudden pressure, such as any unyielding substance passing between rollers, which would otherwise almost inevitably be fractured.

Concurring in the almost universal opinion of the inadquate dimension of the safty valves being the most fruitful cause of explosion, and at the same time appreciating the practical difficulties attendant upon increasing the number or the area of the ordinary valves, with the present system of weighting them, Mr. Baillie determined to try whether a safety-valve of large area could not be conveniently and steadily held down by a number of volute springs of known power; this appeared to act extremely well, and in order to test the new system, in comparison with the ordinary method, a safety-valve of 12 inches diameter, held down by seven volute springs, was adapted to a locomotive boiler on which there was also an ordinary valve of 3·6 inches diameter, weighted with the usual lever and spring balance. The boiler possessed an area of heating surface of 890 square feet; but lest the cylinder should take too much steam, the engine remained stationary during the experiments, and the fire was urged by a constant jet of steam, of 1-2 inch in diameter, into the chimney. The two valves were equally weighted to a pressure of 64 lbs. per square inch. The large valve was then fastened down, and in four minutes the pressure of the steam had increased to 105 lbs. when the small valve had risen 1-12 inch, and the experiment was stopped, as the valve could not discharge the steam so fast as it was generated.

The small valve was then screwed down, and the large valve was set free; in four minutes the pressure had only increased from 64 lbs. to 76 lbs per square inch., or 12 lbs., when the valve rose 1-24 inch.; and although the fire was powerfully urged for upwards of half an hour, the pressure of the steam could not be raised beyond 76 lbs., as the large area of the safety-valve allowed all the steam that was generated to escape freely.

These experiments were considered so satisfactory, that the system of using volute springs for the valves had been generally adopted for the boilers of the locomotives of the Hungarian and Austrian Railways, upon which Mr. Baillie was engaged.

Tanneries and Railroads.

Since the opening of the Erie and adjacent railroads, extensive tanneries have been established along the lines in localities where bark can be obtained in largest quantities and at least expense. A tannery of the largest class makes sad havoc with timber, using up, on the average, nearly a square mile of hemlock trees per annum. The amount of bark consumed every year by a first class tannery, if estimated in cords, may be set down as not less than 6,000. Each acre of woodland produces from 8 to 25 cords of hemlock bark. It was formerly found necessary to locate tanneries by the side of some stream of water of sufficient motive power, to drive the machinery for grinding the bark, rolling the leather, &c., but steam engines are now extensively used, and the spent bark which was once considered an encumbrance, furnishes them fuel. Furnaces have been and are now used for burning the wet spent bark, and some of these, it is said, operate well; but it has always appeared to us that the only way to economise the spent bark was to sun dry it, and then employ it for fuel. Solar evaporation costs nothing, whereas the water in bark absorbs a great deal of heat in the furnace to drive it off in the state of steam. There are now some large new tanneries in Oswego County. The northern shores of Oneida Lake contain much fine hemlock timber, the bark of which is excellent for tanning. But it appears to us that our tanneries should now be devoting some attention to the cultivation of some shrubs for tanning purposes, the annual crops of which would be sufficient for their business. The hemlock and oak forests are fast disappearing, and when they are gone the tanners must seek some substitute. Young blackberry bushes ground up fine are excellent for tanning fine calf skin for upper leather.