## VALUABLE RECEIPTS.

FENCE POSTS.—Taking the vast extent of our country into consideration, an incalculable expense is incurred every spring in the putting-up of new fences and the repairing of old ones. It has been found that one cause of this great trouble and expense is the rapid decay of those parts of timber fence posts that are inserted in the ground. Fences would last three times longer than they usually do, could those parts that are covered in the earth be so treated as to render them as durable as those parts that are exposed above ground. A great saving would therefore be effected by any simple method of treatment to prevent rot in fence posts. This may be effected in two ways. One by boiling the feet of fence posts in coal tar; the other by charring them. As few farmers can obtain coal-tar, the latter mode is the most convenient for them to practice. About eighteen inches in length of the foot of each post should be charred to the depth of one-third of an inch. It is well known that charcoal is a very fixed substance. It will scarcely change its condition by exposure to the natural elements, and it therefore forms an almost indestructible coating to the interior timber of posts.

GLUE CEMENT.—A correspondent sends the following described mode of making a cement of glue and shellac. Dissolve half a pound of good common glue in water, in the usual way and saturate clean white paper in it until the glue solution is absorbed. The saturated paper is then dried and cut into strips, and these are put into a clean glue-pot containing about half a pound of alcohol, then boiled gently over a fire for about an hour. A light cover is kept upon the glue-pot during ebullition. The paper is now removed from the glue-pot, and is found freed from the glue, which has been taken up by the alcohol. The object of thus soaking the paper in glue is simply to obtain an extensive surface for the alcohol to act upon the glue. At this stage of the operation half a pound of pulverized gum shellac is gradually added, and the boiling of the alcohol continued with occasional stirring until the gum is dissolved. This forms a very adhesive cement for leather belts and several other purposes.

WELDING CAST STEEL.—To make the composition used in welding cast steel, take of borax ten parts, sal-ammoniac one part; grind or pound roughly together; then fuse in a metal pot over a clear fire, continuing the heat until all spume has disappeared from the surface. When the liquid appears clear, the composition is ready to be poured out to cool and concrete. To prepare it for use it is ground to a fine powder. The steel to be welded is raised to a bright yellow heat, and then dipped into this welding powder; it is then placed in the fire again; and when it attains the same heat as before, it is ready to be placed under the hammer.

TO MAKE AUSTRIAN GUN COTTON.—Take cotton yarn and twist it into strands of suitable size to answer the same purpose as grains in gunpowder. [The size of these strands can only be ascertained by experiments.] It is then steeped for a few minutes in nitric acid contained in a stone-ware vessel, squeezed, and thoroughly washed by water which is permitted to fall upon it from a pipe set at a hight of several feet. After this it is squeezed, and dried in a room heated to 130° Fah., when it is ready to be treated with a mixture of monohydrated nitric acid of 1.52 specific gravity, and monohydrated sulphuric acid of 1.14 specific gravity. These acids in equal quantities are mixed together in a glass or stone ware vessel, and allowed to stand for twenty-four hours, then the prepared yarn is immersed in it for forty-eight hours, with occasional stirring; the vessels being covered; then it is squeezed, washed for several hours in running water, and dried again. After this it is soaked for a short period in dilute silicate of potash, squeezed, washed again, dried and is fit for use. This gun cotton is manufactured by M. Reny of Vienna. It emits but little smoke and is not subject, like common gun cotton, to explode by percussion.

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A GENTLEMAN, recently arrived from Canada, states that a fee of $1,500 was paid to him the other day in Quebec, wholly in American silver. He didn't want the stuff, but was compelled to take it. Poor fellow!

## COFFEE AND ITS SUBSTITUTES.

The use of coffee as a beverage seems to have originated among the Turks in Arabia, from whence it was carried to Europe in 1669. It has gradually become a national beverage to Europeans and Americans, as well as the Moslems, and it has been called "one of the chief necessaries of life among the people." The coffee bean is the seed of the *Coffea Arabica*, a shrub which grows to about the hight of 30 feet, but it is usually cut down to about six feet, to increase the yield of the bean. Its cultivation was confined until within the past century to Egypt and Arabia, but it is now cultivated in the West India and East India Islands; also in Brazil upon a most extensive scale. A single tree sometimes yields about 20 pounds of beans, and about 1,100 pounds are obtained as the crop of an acre of land. There are a number of varieties of coffee, but Mocha or Arabian is still the most famous. Its beans are small and of a dark yellow color; Java is a larger bean, and the color is a paler yellow; West India and Brazilian coffee is of a blueish grey color. Physiologists have endeavored to account for the extended use of coffee, by ascribing to it a peculiar quality for preventing the waste of animal tissue in the living being. This principle is called caffeine, and is composed of carbon 8, nitrogen 2, hydrogen 10, and oxygen 3 parts. Roasted coffee contains about 12.50 parts of caffeine. In roasting coffee, great care should be exercised not to overheat it, because the caffeine in it is so liable to volatilize. The best temperature to roast coffee is 392° Fah., and the operation should be peformed in a close revolving vessel. When the beans have assumed a bright brown color, they should be cooled, if possible, in the vessel in which they have been roasted, so as to retain all the aroma that has been developed by the roasting operation. Burnt coffee beans are just as suitable for making an infusion as charred wood. Upon no account therefore should coffee beans be so heated in roasting as to char them. Coffee should never be boiled, because the boiling action volatilizes the aromatic resin in it, and this constitutes nearly three per cent of the beans. It should be ground as finely as possible, and scalded with water heated to the boiling point. It can be clarified with the white of eggs, or isinglass. This information relates to pure coffee.

In Germany and England the poorer classes, who cannot afford to buy coffee, use mixtures of it, and in many cases, other substances as entire substitutes. In Germany dried yellow turnips and chicory root mixed together are employed as a substitute; chicory is also very generally mixed with common coffee in England. Lately several mixtures and substitutes for coffee have become more common among our own laboring people on account of the great rise in the price of coffee. In some of our country villages German families roast acorns and use these as substitutes for coffee. Roasted rye is an old and well known substitute, and so is "Cobbett's coffee," which consists of roasted corn. Many persons roast white beans and peas, and mix them with coffee, others roast carrots and beets, and make a mixture of them with coffee. In some parts of France a mixture of equal parts of roasted chestnuts and coffee is used. It makes a very superior beverage to chicory, turnips, and all the other articles mentioned. The substitutes for coffee are innumerable, and so far as taste is concerned, this is a mere matter of cultivation. If any of these substitutes for coffee contained caffeine or a similar principle, they would answer the same purpose, and their use should be inculcated; but in all the analysis that we have examined of chicory, turnips, carrots, beets, peas, beans, corn and rye, no such substance as caffeine is mentioned, therefore they are not true substitutes for it in a chemical and physiological sense. We have been unable to obtain a satisfactory analysis of chestnuts and acorns, but it is well known that these contain tannic acid, and it is certain that caffeic acid is very nearly allied to it; hence they may have a close resemblance to coffee in taste, and perhaps in effect lso.

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THE Commissioners of the International Exhibition in London have decided that there will be no public ceremony connected with the delivery of the prizes.

### Desulphuration of Iron in the Puddling Process.

The following very useful information to our iron manufacturers is from *Silliman's Journal*, translated from a German work:—

"The inferior quality of bar-iron obtained from the puddling of pig-iron reduced from iron ores rich in sulphur, or even from good ores when reduced with coal containing much pyrites, is well known to iron-masters, and many methods have been devised for the desulphuration of this iron in the puddling process. Among the best of these is the addition of binoxyd of manganese; still this is liable to objection as it is infusible, and thus prevents its becoming thoroughly incorporated with the iron; moreover, commercial oxide of manganese often contains impurities which possibly may be taken up by the iron in the puddling-process, and influence unfavorably the quantity of bar-iron produced. This subject has recently been studied by Prof. Richter of Leoben (Austria). Richter calls to mind the powerfully oxidizing effect of litharge (oxide of lead), and its use to promote oxidation in many metallurgical processes. On experiment he finds that litharge will not only remove sulphur in the puddling procees, but, what is equally important, it also oxidizes the phosphorus contained in the iron, thus affording a most simple means of correcting two sources of great annoyance to the iron-master.

"The experiments were made at the forges of Count Donnersmark at Frantschach near Wolfsberg in Carinthia, with pig-iron which contained so much sulphur that it was impossible to make it into puddled-bar. The process of puddling was undertaken in two double puddling-furnaces arranged for burning wood. Each furnace was charged with 7 cwt. of this iron. To one of the furnaces there was added 3 lbs. of sulphid of iron and ½ lb. of phosphid of iron, in order to still further deteriorate the quality of the product. After complete fusion, 3 lbs. of litharge was added to the furnace in which the sulphid and phosphid of iron had been placed, and on thoroughly mixing this with the charge, the iron commenced to boil finely—the litharge being deoxidized by the carbon. The reduced lead was immediately re-oxidized by the atmosphere, and by subsequent reduction and re-oxidation it again and again exercised its oxidizing influence on the harmful impurities contained in the iron. There was soon formed an easily fusible slag containing oxide of lead, which also exercised an oxidizing influence upon the impurities contained in the iron, while at the same time the oxides thus formed united with the slag. After an hour and a half from the time of charging, the iron was made into balls, these were shingled, and without difficulty rolled into puddled-bar. In the other furnace, in which the iron was puddled in the usual manner, it was two and a half hours before the puddled balls could be taken out of the furnace, and, notwithstanding the greatest care was exercised, these crumbled to pieces when struck with the hammer, and rolling into bar was not to be thought of. Besides this, the loss in weight when the litharge was employed was but 11 per cent, while in puddling this iron by the ordinary process the loss was 18 per cent. The puddled-bar obtained from puddling with litharge proved neither hot nor cold short, and was of sufficiently good quality to be forged into iron for scythes. A repetition of the experiments gave a confirmation of these results. Richter adds, that, in some instances, the use of metallic lead may perhaps be preferable to litharge."

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STALE.—An exchange relates a "good anecdote" of a chap who is on board of a man-of-war. When the iron-clad was just going into action, the soldier was on his knees. An officer sneeringly asked him if he was afraid. "No, I was praying," was the response. "Well, what were you praying for?" continued the officer. "Praying that the enemy's bullets may be distributed the same way as the prize money—principally among the officers," was the quick and ready retort. This "good anecdote" is as old as the hills, and was uttered by a British sailor in Nelson's fleet, and therefore was clearly a plagiarism on the part of our "iron-clad" friend.

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GRANDEAU, the French chemist, has discovered the metal rubidium in the ashes of the beet, tobacco, coffee, tea and raw tartar.