DISCOVERIES AND INVENTIONS ABROAD.

Preserving Timber.—A patent for a composition for preserving timber has been taken out by G. H. Birbeck, of London. It consists of sulphur and the oxides of iron, copper or zinc, mixed and boiled with the residue of the fat used in the manufacture of candles, and the product thus obtained is dissolved in American petroleum in a close vessel highly heated. The timber is prepared with this solution by boiling it in a covered iron tank or by forcing the solution into the pores of the timber with a pump—the timber being placed in a cylinder during the operation.

Improved Cement.—Common lime mortar becomes hard from long exposure to the atmosphere, by absorbing carbonic acid slowly, and thus returning to its original condition—limestone being a carbonate of lime. A patent has been taken out by C. W. Westmacott, of London, for a new cement to be used as mortar for building and plastering and also casting in molds. The nature of the improvement consists of a mixture of carbonate of lime with common burned lime. The cement is composed of 1 bushel of burned lime to 2 bushels of dry ground chalk or ground limestone or marble. The lime as it comes from the kiln is first slacked with water, then mixed with the ground chalk or limestone in water; sand is then added in the same way that common mortar is made, and the mass allowed to stand for two or three days before the cement is used. This cement may also be made by mixing the burned lime, dry, with the chalk (which is dried in an oven) in powder, and kept for use, to be mixed with water. It may also be worked into a paste and molded like clay. It soon becomes quite hard and fixed.

Welded Iron Cupolas and Forts.—The common method of constructing iron cupolas for revolving batteries is with iron plates bent by machinery, planed at the edges and afterwards fastened together with bolts. W. L. Tizard, of London, proposes to construct such cupolas—and has taken out a patent for the purpose—of welded plates, thus making them solid masses of iron. He proposes to bend the plates, and fit their edges together, then apply the intense heat derived from a stream of ignited oxygen and coal-gas, and having heated them to a welding temperature they are to be hammered by machinery. The gas for heating the metal is to be conveyed in flexible tubes and may be directed on any point so as to produce a perfect weld. Such mechanism and apparatus for welding iron plates would undoubtedly be expensive, but not impracticable, and solid iron cupolas may thus be constructed.

Steel for Army Rifle Barrels.—Captain Caron, of the French army, has addressed a paper to the Academy of Sciences, Paris, describing a peculiar soft steel which has been experimented with by artillery officers in the manufacture of army rifles. It has been drawn cold and made into rifle barrels as thin as those of fowling-pieces and has exhibited a strength that has surprised all those who witnessed the experiments. A rifle was fired with 40 grammes of Esquerdes powder—the strongest in France—and gave no signs of bursting; then it was charged with 5 ounces of gunpowder and five balls, well rammed down, and discharged without producing a rupture. The only injury to the barrel was a slight swelling around the place where the balls had been placed.

Combined Iron and Wooden Ships.—In the last-preceding issue of the Scientific American we presented a brief description of a vessel under construction at Sunderland, England, by G. S. More, having an iron framing designed to be planked with wood. Mr. More has applied for an English patent, from the specification of which the following is condensed:—Ships have heretofore, in some cases, been constructed with an iron frame having a wooden planking fixed thereto, but difficulty has been experienced in employing copper fastenings when constructing ships in this manner, as the iron frame is found to be eaten away by the bilge-water all around the copper fastenings. Now, according to this invention, the inventor prevents the copper fastening from coming in contact either with the angle iron or with the bilge-water, by surrounding its upper end with another metal which has not the same prejudicial action on the iron. This he does by forming the hole in the angle iron (which is to receive the fastening) of that larger diameter than the fastening, and inserting into it a tube of the projecting metal, which also extends a short distance into the wooden planking. This tube has a flange at one end, which lies against the angle iron; the fastening is passed through the projecting metal tube and the wooden planking, and is secured beyond by placing a ferrule or washer on it and clenching it. The head of the fastening within the vessel is then covered with a cap of the protecting metal, the edges of which are soldered all around to the edges of the flange of the tube before-mentioned. The preservative metal employed should be one which will not itself act injuriously on the iron, and which solders readily. Zinc or lead, or a mixture of these, either alone or combined with other metal, will be found most suitable in practice. According to this invention, also, he makes the ends of the two planks, where they meet, to lap the one over the other for a distance somewhat exceeding the space between the ribs, and he scarfs the ends, that is, he reduces the width of the planks where they overlap one-half. He arranges the joints so that they shall each fall correctly over two of the ribs, and he fastens the ends of each plank to each of the ribs by preference with fastenings such as hereinbefore described. In order to make the whole more secure he drives a bolt down vertically through the joint and intermediate of the ribs into the plank below.

Railroad Signaling by Electricity.—A patent has been taken out by J. Imray, of London, for actuating the distance-signals of railways by electro-magnetic apparatus. A column-stand is placed near the track, on which is a disk of the usual signal form or a colored light for a night signal. When this disk is turned in one direction it indicates that the line is clear; when it is turned in another direction it indicates danger. In the column is a train of clock work connected with an electro-magnet. This clock-work is held by a detent operated by the magnet which is connected by wires with the battery in the station. By touching a key in the station the electro-magnet sets the clock-work in motion and the signal is turned. A bell is also placed in the signal column, which is operated at the same instant, and the two signals are operated by the simple touch of the key. It also contains devices for reversing the signal.

Treating Jute and Flax.—Cheap vegetable fiber, such as those of Indian jute, may be treated so as to render it capable of being spun on cotton machinery by a process for which a patent has been taken out by John Thomson, of Dundee, Scotland. The jute is first divided into parcels weighing about 300 pounds each, and then sprinkled with a solution composed of 2 quarts of oil mixed in $3\frac{1}{2}$ gallons of water in which 1 pound of soda has been dissolved. The jute is allowed to remain thus saturated for two days, then it is run between rollers and crushed, when it becomes very soft. After this it is steeped for one hour in a solution of cold caustic soda of a strength equal to 40° by Twaddle's hydrometer. Twenty-four gallons is about the quantity required for a bale of 300 pounds. It is next lifted and drained in a centrifugal drying-machine, then washed in water. After this it is steeped for about half an hour in very dilute sulphuric acid. This prepares it for the bleaching operation, which consists in steeping it for half an hour in a liquor of chloride of lime of 2° strength, after which it is drained, washed again, then steeped a second time, for another half hour, in very dilute sulphuric acid, once more washed, and the process is completed. A white fiber is thus obtained which is soft and easily carded and spun. The process is also applicable to manilla and other kinds of hemp and vegetable fiber.

Leather Cloth.

On several occasions we have directed the attention of inventors to the need of a cheap substitute for leather, but hitherto such a material has not been produced. It is true that American enameled oilcloth has superseded leather for many purposes, such as coverings for stuffed chairs, lounges, settees, carriage-seats and covers, but it is unfit for the uppers of shoes, although its surface can be made to resemble morocco. The enamel of this cloth cracks and scales off when applied to shoes, but efforts should not be relaxed to improve it and obtain an article that will be free from this defect. At the present moment calf-skin and morocco leather are higher in price than at any period within our recollection, and the inducements presented for inventing a good cheap substitute never were so inviting. We learn from our European cotemporaries that such an article has recently been invented and introduced in England, by a Mr. Szerelmey, and that it is manufactured at Clapham. They mention that it is quite different in quality to enameled cloth, although it is made by a similar process. The London *Engineer* and the *Ironmonger* both give the following description of it:—

"The fabric used in the manufacture is entirely according to the kind of imitation leather wished to be turned out. Thus 'moll,' a very thick, soft kind of cotton fabric made at Manchester, is preferred for calf-skin; fine calico or linen for water-proof material for macintoshes, siphonias, &c., as perfectly water-proof as india-rubber itself; and alpaca, silk, cloth, or common cotton for boots and shoes, bookbindings, harness, carriage furniture and all the thousand purposes to which real leather is applied. What the composition of the pigment is, which in a few hours changes common cotton into a substance like enameled leather and only to be distinguished from the real article by its non-liability to crack and its greatly additional strength, is of course a strict trade secret. The mode of manufacture, however, is simple. The fabric to be converted into leather—silk, alpaca or whatever it may be, of any length or width—is merely wound on rollers beneath a broad knife-blade, which by its weight presses in and equally distributes the pigment previously placed upon it. A hundred yards may thus be done in a single minute, and in this most simple application the whole manufacture begins and ends, except that three coats of the pigment are necessary to perfect the leather, and an interval of twenty-four hours must elapse between the application of each. During this period the sheets are carried to a drying-house heated to a temperature of 94°, and where they are hung like oil-cloth, according to the order in which they arrive, the last comers displacing those which have completed their time and are ready for their second coat. Thus the manufacture never stops, and three days suffice to complete 'hides' of any length or breadth to which fabrics can be woven. For imitations of morocco or other marked leathers the long sheets are simply passed, when finished, through iron rollers, which indent them in any pattern required. For enameled leather the enamel is applied after the third coat, by hand-labor, which, though slower, of course, than that of machinery, is nevertheless rapid enough to cover the sheet in a very short time. The enamel, when dry, is infinitely superior to any description of patent leather. It is, perhaps, scarcely necessary to state that the pigment which transforms the cotton into leather is capable of being tinted to any shade that may be wanted; no admixture of india-rubber or gutta-percha forms part of it, inasmuch as the leather cloth when complete, even when left folded and exposed to considerable heat, is entirely free from the tendency to stickiness."

Attention, Inventors!

The *Country Gentleman*, one of the ablest and oldest agricultural journals in the country, has the following paragraph in reference to the demand for agricultural implements:—

"There never was a season when farm machinery was in more general demand over the country, and perhaps never one in which manufacturers and inventors seemed less inclined to advertise their latest and best productions to the public. Are they already receiving orders to the full extent of their capacity to supply them, or is there a lack of capital or enterprise somewhere? Sales are made this year for cash more readily than ever before. It might be a good lesson for our implement and machine makers to take one or two foreign agricultural journals—the London *Mark Lane Express*, for instance—and note the example set them by their brethren in trade abroad, whose full and largely illustrated advertisements weekly crowd the columns of the farmers' papers."

The Scientific American has been for years the channel of communication between the farmers and inventors, and the members of the latter profession will do well to note the demand existing, and govern themselves accordingly. We may be allowed to add, that many farmers who do not take the Scientific American would be benefited by doing so.