NOTES ON FOREIGN INVENTIONS.

Soap.—A patent has been recently secured by Messrs. R. Clegg, F. Angerstein and J. W. Page, of London, for making soap, as follows: Take 112 lbs. of the silicate of alumina, 56 lbs. carbonate of soda, in crystals, and boil them together in as small a quantity of water as possible, and until, on dropping a small quantity on a cool slab, it appears quite hard. This is called "composition A." Now take 112 lbs. each of silicate of alumina and carbonate of soda, and boil them for half an hour in 10 gallons of water, 112 lbs. of brown resin are now added to this, and the boiling continued until the whole becomes a homogeneous mass, when 56 lbs. of composition A are added, and the boiling continued for about half an hour longer, when it forms aluminous resin soap, and is called "composition B." To improve its quality, 14 lbs. of tallow and an equal weight of caustic soda are boiled together (adding fresh alkali occasionally) until saponification is effected, when it is then called "composition C," and is mixed with B, poured into molds, and cut into bars. Composition B may be poured into molds and cut into bars of itself, as it makes a resinous cheap soap without the grease, and may be very useful to employ in the preparation of cotton cloths for the bleaching process in calico print-works.

New Cement.—H. D. Scott, of Chatham, has taken out a patent for a new plastering cement, which is an improvement on a former patent. This inventor's cement is well-known in the London market, and consists of lime highly burned in a kiln in the presence of a small quantity of sulphur; after which it is ground, and used for plastering. The improvement consists in adding an equal amount of dry chalk to the lime treated in the manner described, grinding them both together, and mixing them up with water like common plaster.

Sugar for Brewing, Distilling and Making Vinegars.—There is quite a difference between the character of the spirits and vinegar obtained from cane sugar, and from malt sugar. To assimilate the properties of cane sugar to those of malt and fruits, C. Garton, of Bristol, has secured a patent, the process which he employs being rather peculiar in its character. He first dissolves sugar in boiling water, and places the solution in a trough lined with lead. Above this trough is a shaft with arms attached, for stirring the liquid in the trough at all points. The sugar solution is now agitated for six hours, and its temperature raised to about 160° Fah., so as to bring the liquor to the gravity of 40° Beaume. To each 112 lbs. of raw cane sugar thus treated, 8 ounces of sulphuric acid, of 184° gravity, are now added, after being previously diluted with 24 ounces of water, when the solution is agitated for three hours, then allowed to rest six hours; then it is agitated three hours and six alternately, three successive times, occupying altogether 36 hours; the temperature being maintained at 150° Fah. About 1 pound of chalk is now mixed with a gallon of boiling water, and added to the solution to neutralize the free acid; after which it is stirred well, and the heat maintained for one hour, when it is allowed to rest for twelve. A precipitate of the sulphate of lime now falls to the bottom, and the clear liquor is filtered and ready for use, to undergo vinous or acetous fermentation to produce superior spirits and vinegar.

Photoglyphic Engraving.—This is the name given to the invention of Fox Talbot, for engraving photographs on steel plates by sunlight. The publisher of the *Photographic News* (London) has prepared some plates of rare and beautiful pictures by this process, and has had them printed. The invention was described on page 113, Vol. XIV., of the SCIENTIFIC AMERICAN, but it does not seem to have met with that attention which it deserves from our artists. There is no other process known whereby a metal plate can be engraved entirely by chemical action; nor any other means whereby copies can be taken with such certainty. As we consider this a very valuable invention, we will again describe the process, as given very clearly and briefly by the *Photographic News*:

"A plate (either steel, copper or zinc), having been well cleaned, is to be rubbed with a linen cloth dipped in a mixture of caustic soda and whiting, and afterwards rubbed dry with another clean cloth; this process should be repeated twice. Coat the plate with a solution composed of 1 part of gelantine to 30 parts of water, and about 8 parts of a saturated aqueous solution of bi-chromate of potash. Pour the solution on the plate in the dark room as if it were collodion, drain off the superfluous liquid, and dry over a spirit lamp; the plate is then ready for exposure. Lay the object to be copied upon the plate, and expose in the copying-frame in the usual way—from one to several minutes in the sunshine, and for a much longer period if the sun is depressed; the operator must use his judgment in this matter. When the exposure has been sufficiently prolonged, the frame must be taken again into the dark room, and the plate withdrawn. On removal from the frame, it will be seen that a faint image is imprinted on the plate, the light having changed the yellow color of the gelantine to a brown wherever it has acted. Sprinkle over its surface some very finely-powdered gum copal, and distribute it evenly, care being taken to leave on the plate only a very thin layer. Lay the plate, face upwards, over the flame of a lamp until the copal is melted. This will require a considerable heat, and its accomplishment will be easily perceived by the change of color. When this takes place, leave the plate to cool gradually. This process may be termed laying the aquatint ground.

"The etching-liquid is prepared as follows: Take hydrochloric acid, and add to it as much peroxyd of iron as it will dissolve by the aid of heat. When saturated, filter, and afterwards evaporate it until, as it cools, it solidified into a brown semi-crystalline mass. This substance is per-chloride of iron. It is very greedy of moisture, and absorbs it from the atmosphere, if exposed to it.

"Water dissolves a very large quantity of per-chloride of iron with the evolution of heat. Saturate a small quantity of water with the per-chloride, and pour it into a bottle, with label No. 1. Fill a second bottle with a mixture of five or six parts of this saturated solution, and label it No. 2; and a third bottle with a mixture of equal parts of this solution and water, and label it No. 3.

"When the plate is quite cool, pour on it a small quantity of solution from bottle No. 2, and spread it quickly over the plate by means of a camel-hair brush which has been used for no other purpose. The liquid will speedily begin to act on those parts of the plate on which the light has not acted, it being unable to penetrate through those parts of the gelatinous solution upon which the light has acted. The etching proceeds with considerable rapidity, and should be suffered to continue for some minutes. If the rapidity is too great, it may be checked by adding to No. 2 solution a little of No. 1, doing this with care, as the addition of too large a quantity would render its action too sluggish, and it would require to be stimulated by some of No. 3. When the exact strength required has been thus arrived at, the operator may proceed with confidence in his manipulations. The liquid must be moved about the plate during the whole operation with a camel-hair brush; and when the etching has proceeded far enough, the liquid must be wiped off the plate with a piece of cotton wool, and a stream of cold water poured over it, so as to cleanse it as rapidly as possible; then wipe the plate with a clean linen cloth. When faint portions of the picture fail to appear, Mr. Talbot dips a camel-hair pencil in No. 3 solution, and touches these parts, which causes the details to appear with great rapidity; and it is evident that, in the event of its being desirable to check the action of the liquid on any part of the plate, this could be accomplished by dipping a pencil in No. 1, and applying it in a similar manner."

STRAIGHTENING A CHIMNEY STALK.—Quite an interesting operation was successfully completed in Port Dundas, Scotland, for the restoration of a chimney which had settled out the perpendicular. This was accomplished by sawing several of the mortar beds between the courses on the side from which the chimney leaned, thereby allowing it to come back with its own weight without the application of any external force. Only one draught was cut at a time, to guard against any shock which might have endangered the state of the building, and by keeping the saws wet, a bed of mortar was prepared for the superincumbent weight to settle down upon. Twelve cuts were made in this manner on different parts of the structure, which generally set before the saws had passed through half of the circumference, particularly in those made nearest the ground, where the weight was greatest. The principal dimensions of the chimney are—Total hight, 468 feet; from surface to top of cope, 454 feet; outside diameter at foundation, 50 feet; at surface, 34 feet; at cope, 14 feet.

BARKS FOR TANNING.

The following is the substance of a very useful and interesting article on this subject, in a recent number of the *Shoe and Leather Reporter:*—

There are four species of oak barks chiefly used in tanning. The first is the Spanish oak, which thrives in Maryland, Delaware and Virginia, and in all the States south of 41° N. In the Atlantic States, this species is most abundant, and in Georgia and the Carolinas it is known by the name of "red oak." Its bark, which is thick, black, and deeply furrowed, is preferred for coarse leather, which it makes more pliable and of a better color. Hemlock bark is often with advantage mixed with it. In the southern States, the Spanish oak grows to the hight of 80 feet, having a trunk four or five feet in diameter; while in some of the northern States it does not exceed 30 feet in hight, with a diameter of five or six inches.

The common red oak grows abundantly in Canada and in the northern States, especially in the southern half of New York, in New Jersey, in northern Pennsylvania, and along the ridge of the Alleghanies. Its bark is very generally employed, though inferior in several respects to some other kinds. This tree grows to the hight of 70 or 80 teet, and has a diameter of three or four feet.

The rock-chestnut oak is seldom found in the southern States, but abounds in elevated districts having a broken, rocky surface. On some of the Alleghany mountains it constitutes nine-tenths of the forest growth. Hence the name "rock oak," by which it is known on the banks of the Hudson and on the shores of Lake Champlain. It has received in Pennsylvania, Maryland and Virginia the name of "chestnut oak. Its bark is thick, hard, and deeply furrowed, and differs from other barks in that the epidermis or outer layer contains a large proportion of tannin, which is usually in other kinds confined chiefly to the under layers. In Pennsylvania and New York it abounds, but only the bark of the small branches and young trees is used in tanning.

The quercitron or black oak grows throughout the States, below the latitude of 43° N., and in the more elevated sections of Georgia and the Carolinas. Its bark is not very thick, but is bitter, deeply furrowed, and of a deep brown or black color. It also imparts a yellow color to the ooze; and leather tanned with it is apt to give a yellow tinge to the stockings. This inconvenience, however, may be obviated by an inexpensive chemical process. Quercitron bark is much used, as it is abundant, cheap, and rich in tannin. This tree often attains a hight of 90 feet, and a diameter of four or five feet.

Besides these four kinds are others less known. The white oak chiefly grows in Florida, and to the south of 46° N. Its bark is preferred for leather for saddles, and similar purposes. The scarlet oak is found as far north as lat. 43° N.; its bark is very thick. The gray oak in Maine, New Hampshire, and Vermont; and the live oak is never found more than twenty miles inland; its bark being black, hard, thick, and replete with tannin. Other kinds of oak bark are occasionally used, but not to any great extent in the United States.

Most of the sole leather in our country is tanned with the bark of the hemlock tree, which is unknown in the Old World. The common British oak grows in almost every country in Europe, and is the chief agent used in tanning. It sometimes reaches a hight of one hundred feet, and the trunk grows occasionally to fifteen feet or more in circumference. This majestic tree will stand hundreds of years, and when at a distance from other trees, it spreads its gnarled branches so that its head is often broader than its hight. The foliage resembles that of the white oak of this country. In northern Russia, and in some parts of France, the bark of a shrub called the Kermes oak is used in tanning. This shrub grows to the hight of three to five feet, and bears some resemblance to a small holly tree. The bark of the root is rich in tannin, and is said to produce a very superior quality of thick, durable, impervious sole leather.

In early spring, the opening leaves indicate that the sap is circulating the most actively, and it is found that the bark then contains nearly one-third more tannin than in autumn, consequently in this country, the proper time for barking trees will vary, according to latitude and other circumstances, from the end of April to the beginning of July. Wet seasons and damp localities are prejudicial to the bark and lessen its tanning power. The bark of southern oaks and of such as grow in high ele-

vated positions is more rich in tannin than that of low and badly drained, damp, and shady locations. In hemlock bark the inner layer contains about 8 per cent of tannin, the middle part about 5 per cent, and the outer part about $3\frac{1}{2}$ per cent.

BOSTON HORSE-RAILROADS.

The recent report of the Boston Board of Aldermen respecting horse-railroads has attracted considerable attention from its liberal policy towards these corporations. The report presents some facts about the passengers transported, which we think are not fully realized by the public. It says:—The number of passengers carried upon our horse-railroads for the last year was nearly 8,000,000, and it must soon exceed 10,000,000 per year. This is over 27,000 passengers per day, Sundays included. The transportation of this number through the streets by omnibuses, or any other kind of carriages, would operate as a thorough blockade.

The number of passengers carried on the Metropolitan road alone, for the present year, is estimated at 5,000,000, or 15,000 per day. To transport this number in omnibuses would require one to start about every 30 seconds, for 15 hours each day. But as the rush of passengers is at morning and evening, the transport of this number by omnibuses would be next to an impossibility, and yet the Metropolitan road carried, on the 4th of July, over 50,000 passengers.

For safety, this mode of conveyance is, we think, in advance of all others, and stands 36 to 1 against steam roads, the fatal accidents on the latter in 1858 being at the rate of $4\frac{1}{2}$ in 1,000,000 passengers, and on horse roads 1 in 8,000,000.—*Boston Courier.*

[These statistics are interesting and valuable regarding the capacity of city railroads for conveying passengers in comparison with stages. There is one expression in the latter paragraph of the *Courier* which requires explanation. It states that the accidents on the horse railroads have been only as 1 in 36 in comparison with steam railroads, which conveys the idea that the steam-power causes the excess of the accidents, independently of the greater velocity with which locomotives are run. The fact is that steam-engines are just as safe for running carriages as horses according to their speed; there can be no difference in this respect, because they are as easily governed.—Eds.

LAKE SUPERIOR IRON ORE.

The iron ore of this region is, perhaps, the best in the world, and it is now shipped in large quantities to Ohio and Pennsylvania. We think it is not too much to say that the introduction of Lake Superior ore has redeemed the business of making pig-iron throughout the bituminous coal region of eastern Ohio and western Pennsylvania, from the situation of a difficult and uncertain enterprise, and has placed it on a footing of sure prosperity. It has made its way steadily and surely, in spite of natural prejudice, and all the disadvantages of inexperience in its use; and, wherever it has gone, it has made new friends and customers. Next year, not less than 40 furnaces will use it wholly or in part, to supply which will require between 150,000 and 200,000 tuns. The iron ore companies of Lake Superior are making preparations to supply a largely-increased demand next season, to do which, it is only necessary to uncover surface and enlarge openings at the mines, so as to enable a larger number of men to be employed to advantage. If coal was abundant in the Lake Superior regions, of course the iron would be manufactured on the spot. No less than 75,000 tuns of ore have been shipped this season; and the demand was far greater than the companies at the mines could supply.

A Bake Oven for Paris.—There has been constructed at one of the machine-shops in the north-western part of this city a large automaton bake oven designed for a company in Paris. It is 20 feet high, and contains 30 cars for pans. The construction of the oven is similar to the one now in use at the mechanical bakery in this city, but the power to move it is entirely different. Steam is only used for the purpose of moving a hydraulic pump, which is so arranged that the cars are moved by this power alone. By this arrangement a large number of wheels are dispensed with and the whole operation of the oven much simplified, and but little steam-power is required to keep it in motion.—*Philadelphia Ledger.*

THE GROWTH OF THE SEWING-MACHINE BUSINESS.

In 1848, we were sitting, with several gentlemen, in an office in Broadway, in this city, when a person came in and invited us to go up the street a few doors to see a new invention which he had to exhibit there. Some of the party went with the gentleman, and in the course of half an hour they returned and made their report. They said it was all a humbug. They found the room full of tailors, and the man had a little machine for sewing cloth. It was worked by a treadle, and, at first sight, seemed to be perfect, sewing with surprising rapidity, and making a straight, handsome seam. But one of the tailors, observing that the exhibitor, before he handed the finished work to the spectators, very deftly tied a knot in the thread, took the liberty of breaking the thread, when the whole seam unraveled as readily as a knit stocking. The company separated with a laugh of derision at the mortified exhibitor. It seems a very short time since this incident occurred, and when we yesterday recalled the recollection of it, while standing in Grover & Baker's new and magnificent establishment for the sale of their sewing-machines, we were impressed, more forcibly than we ever were before, with the marvelous rapidity with which the arts, and especially new arts, are developed in this wonderful age in which we live. This establishment occupies an entire building in the most fashionable part of Broadway, with 25 feet front, and running through 200 feet to Mercer-street. The front is a single iron Gothic arch, three stories high, the two lower stories being formed of eight panes of plate glass, four in the lower story, each $14\frac{1}{2}$ by 5 feet, and four in the second story, each $11\frac{1}{2}$ by 6 feet. The basement is used for setting-up and packing the machines, the space under the Broadway sidewalk making a nice shop for repairs, and the space under the Mercer-street sidewalk being occupied for generating the steam by which the building is heated.

On the first floor is the beautiful salesroom, 25 by 150 feet, 50 feet in the rear being used for receiving, delivering and storing the machines as they come from the manufactory. In the second story, directly over the salesroom, is the receiving-room, where ladies who purchase machines are taught the art of using them. This is an elegant drawing-room, richly carpeted and furnished with the most costly rosewood chairs, lounges, tete-a-tetes, sofas, a piano, &c., and is to be supplied with a select library. The bronze chandeliers in this room were made by Haughwout & Co., in a style corresponding with the architecture of the building. Adjoining the drawing-room is the ladies' toilet room, containing a looking-glass, a marble wash-stand, pins for hanging cloaks, &c.

We were informed that this company have already sold about 30,000 of their machines; this, at an average of $100 apiece, would amount to $3,000,000. The machines are made in Boston, and more than 400 men are employed in the manufacture.

The machines manufactured by this company are too well known by the public at large to need any recommendations at our hands, and we will simply add that we have had one of them in use in our family for some time past, and it is considered the most useful article in the house, next to the cradle, and no less indispensable than that. In No. 2, of the present volume of the Scientific American, we published an illustration showing the mechanical principles of the Grover & Baker machine. By reference to that illustration, the form of the stitch will be seen, and its security from ripping, as well as its superior elasticity, will be readily understood.

Forward Children not apt to Live.— When Lord Palmerston, the present prime minister of England, was a child, he was very feeble and very precocious, so much so that his physician, on account of his health, forbade his continuing his studies. But an indulgent aunt, thinking that depriving the boy of his studies, of which he was excessively fond, would do him more harm than good, continued to instruct him in private. As his health improved rapidly under this treatment, little blame was attributed to the aunt, when she disclosed the practice; though the physician was greatly mortified to find that the recovery was not owing to his prescription. This forward, feeble boy is now, in his 76th year, administering the government of the most powerful empire which the world has ever seen, and is as ready to quarrel with all the nations of the earth as he has been at any time during his long, contentious career.

A COLUMN OF INTERESTING VARIETIES.

Compasses on board of iron ships are subject to so great variations as to render them unreliable guides in navigation. The British Association for the Advancement of Science are making extensive investigations in this matter, and it seems that the mere rolling of the ship sometimes varies the compass to the amount of 24°; but if the ship is built with her head to the south-east, the rolling effects the compasses very little if any......The motion of the sun and solar system through space toward the constellation, Hercules, is positively known, but the line and velocity of this motion have not yet been ascertained; some observations, however, indicate that the motion may be in an orbit about a point in the vicinity of the Pleiades, and that it will require 18,200,000 years to accomplish one revolution......Nearly 30 years ago an engine was run in England 32 miles an hour over a common turnpike road......The vibrations communicated to the air by the human voice are occasionally sufficient to break glass vessels......When the Croton water was cut off from a large part of this city, Oct. 21st, in consequence of the busting of a pipe, some of the newspaper-offices paid a dollar per barrel for water to run their engines......Captain Denham sounded in the South Atlantic, between Rio de Janeiro and the Cape of Good Hope, 7,706 fathoms, or nearly 7.7 geographical miles. The appearance of spots upon the sun, with which appearance terrestrial magnetism is so intimately connected, increases and decreases in regular periods of 11 years and 40 days......Persons sailing in balloons hear the echo of their voices returned from the earth, and, by the time that elapses between the call and the echo, form a rough estimate of their altitude......The first steamship which made the voyage, under steam throughout, across the Atlantic, was the *Royal William* in 1833. This vessel was of 180 horse power and 1,000 tuns burthen, and was built at a place called Three Rivers, on the St. Lawrence, in Canada. The voyage was made from Pictou, Nova Scotia, to Cowes, Isle of Wight......The heat produced in the body of a healthy man in the course of 24 hours, if it could be applied, would be sufficient to raise about 7,000 tuns to the hight of one foot......It is stated that 10,000,000 of hooped skirts are manufactured in this city per year. [illegible] more than 3,000 per day, and still cannot execute their orders. In the name of lost pins where can such a world of emptiness go? ......The presence of cotton in flannel may be detected by boiling a fragment or sample of it in a solution of potash. The flannel will be converted into soap, whereas the cotton will be but little altered, and may be collected and weighed......Eight millions of bottles are annually made at a manufactory of bottles at Folembray, France. It is the largest manufactory of the kind in the world......Mr. Tite has estimated that a work like the Great Pyramid could not now be constructed, with all the aids of modern science, for less than £30,000,000......It is calculated that in all Europe the male population would, judging from the births, surpass the female by 4,000,000, if this excess were not daily counteracted by the numerous accidents to which the males are exposed, and which materially diminish their numbers......There are in Salem, Ala., 14 artesian wells, which have an average depth of about 400 feet......Insurance on ships was first practiced in the reign of Cæsar in the year 45. It was a general custom in Europe in 1194. Insurance offices were first established in London, in 1667......Books of astronomy and geometry were destroyed, as infected with magic, in England, under the reign of Edward VI. in the year 1552......Banks were first established by Lombard Jews in Italy. The name is derived from banco (bench), benches being erected in the market places for the exchange of money &c. The first public bank was at Venice, about 1550. The bank of England was established in 1693. In 1699 its notes were at 20 per cent discount......Book-keeping was first introduced into England from Italy by Peele in 1556. It was derived from a system of algebra, published at Venice, by Burgo. ......Notaries public were first appointed by the fathers of the Christian church, to collect the acts and memoirs of the martyrs in the first century......The administration of the oath in civil cases is of high antiquity. See Exodus, xxii., 10. Swearing on the Gospels was first used in 528. The oath was first administered in judical proceedings in England by the Saxons in 600. The words, "So help me God, and all saints," concluded an oath till the year 1550.