FAIENCE.

We present herewith an engraving of a group of faience jars and tazza in porcelain and enamel work, designed from Chinese and Japanese originals, by E. Collenot, of Paris.

China Ware in New Jersey.

Last year, at the suggestion of Governor McClellan, of New Jersey, a commissioner was sent to Paris to study the exhibition of ceramics there and purchase a library of works relating to that industry. Mr. W. C. Prime is reported as pronouncing the library thus selected the best of its kind in this country. A slight controversy, which has arisen among the Trenton potters, owing to a fear that the returning commissioner may bring to the company he is connected with more than their share of the knowledge gained by him abroad, has called out the following facts, which are printed in the *Sun:*

There are sixteen great pottery establishments in Trenton. In them are invested between a million and a half and two millions of dollars, and their annual sales amount to nearly the same figures. Their buildings cover large tracts of ground, and give employment to about 3,000 persons. Their grimy, stained buildings seem to be as old as Trenton, but the industry is, in reality, a new one. It is only about twenty-five years ago that the first pottery was established. It is there yet. It made only yellow or Rockingham ware. Other potteries started out to make only yellow ware, but the grades of goods made in Trenton improve every year, and there is now only one yellow ware pottery there. East Liverpool, Ohio, is the great center of yellow ware manufacture. It is nearly as great a pottery center as Trenton. Trenton owes its good fortune, in this respect, to its situation. It has no clay, except some black dirt that is used for the manufacture of the boxes that the crockery is laid in to be "fired." The clay used in Trenton comes from Pennsylvania, New Jersey, and Delaware. The clay near the Amboys, in New Jersey, is the best in the market. A poor man, in South Amboy, borrowed a little money, a few years ago, purchased a lot of ground, and began selling the clay that lies under its surface. He has dug great shafts and tunnels, and is said to have earned a fortune of $300,000. Trenton's handiness to New York and Philadelphia, and its railroads, canal, and river, are its attractions to the potters. Among the workmen in the potteries are many Englishmen and Irishmen, but Americans are learning to do good work. There are designers and decorators from Minton's great English tile works, and from Tiffany's in New York, employed to decorate the better grades of toilet and table ware.

A little while ago nothing better than cream-colored stone china, and blue stone, and stone porcelain ware was made in Trenton. Now there are establishments that make real china, and others that manufacture a grade of stone china that they claim looks as well and wears better than French china, and is the same in everything except that it is not translucent. This translucent quality is obtained by an intense "firing," and those who do not make "real" china say that this "firing" spoils a large proportion of the goods. Those who do deal in this fine work claim that by "firing" the china just as earthenware is fired—that is, by putting many pieces together where the French put only one piece—there is a tremendous profit at lower prices than the French obtain. The trouble is, however, that the French goods, in standing alone in the firing boxes, receive no blemish, while the American ware, which is stacked up on pegs, in the boxes, bears the marks of the pegs.

Mr. Fisk, of the American Crockery Company, estimates that the growth of the Trenton trade has reduced the importation of foreign ware from 35 to 40 percent during the past three years. It is said that in one year a great stride has been taken. A market has grown up for fancy goods. People were educated a great deal by the Centennial Exhibition, and, more than all, Americans had ceased to copy from the English, and are relying upon their own originality. Other potters are less cheerful. One young man spent much time and money on a pair of plaques. The principal ornamentation was a wreath containing every garden flower of especial beauty. The copying from nature was almost mirror-like. The potter estimated the cost of the plaques at $125. He took them to Tiffany and to some one else in New York and asked what they were worth. At one place he was offered $50; at another $35. He says that if they had been imported he would have been offered at least $250 for them. He gave them to a bride, and found her a more appreciative connoisseur than the New Yorkers.

FAIENCE JARS AND TAZZA IN PORCELAIN AND ENAMEL.

White Africans.

Major Pinto, the Portuguese explorer, who has just crossed Africa, from Benguella southwestward to Natal, describes a race of white men found by him near the headquarters of the Zambezi. He says:

"I one day noticed that one of the carriers was a white man. He belonged to a race entirely unknown up to the present day. A great white people exist in South Africa. Their name is Cassequer; they are whiter than the Caucasians, and in place of hair have their heads covered with small tufts of very short wool. Their cheek bones are prominent, their eyes like those of the Chinese. The men are extremely robust. When they discharge an arrow at an elephant the shaft is completely buried in the animal's body. They live on roots and the chase, and it is only when these supplies fail them that they hold any relations with the neighboring race, the Ambuelas, from whom they obtain food in exchange for ivory. The Cassequères are an entirely nomadic race, and never sleep two nights in the same encampment. They are the only people in Africa that do not cook their food in pots. They wander about, in groups of from four to six families, over all the territory lying between the Cuchi and the Cubango. It would seem that from a crossing of the Cassequeres with the negroes of other races sprang those mulattoes of the south, whom the English call Bushmen. The latter are, however, better off than the Cassequeres, and use pots in cooking their food, while their dispositions are good, though quite opposed to civilization."

Unfortunately Major Pinto does not say whether he saw more than one of the white Africans he describes, or whether the account he gives of them is based on observation or on hearsay. His promised book may clear up the matter.

Imitation Gold and Silver.

There have been a great number of alloys resembling gold and silver patented. The last which has come to our knowledge is a patent recently granted in England to one Thomas Meiffrer, of Marseilles, France, for the following ingredients:

Gold Alloy.—800 parts of copper, 28 of platinum, and 20 of tungstic acid are melted in a crucible under a flux, and the melted mass poured out into alkaline water, so as to granulate it. It is then melted together with 170 parts of gold.

Silver Alloy.—65 parts of iron and 4 parts of tungsten are melted together and granulated; also 23 parts nickel, 5 of aluminum, and 5 of copper, in a separate crucible, to which is added a piece of sodium, in order to prevent oxidation. The two granulated alloys are then melted together. Both alloys resist the action of sulphureted hydrogen.

EXPANSION OF WROUGHT IRON AND CAST STEEL.—It is important in workshop manipulation to remember that if a piece of cast steel be made red hot and quenched in cold water it will become longer, but if the same operation be performed upon a piece of wrought iron it will become shorter.

Cire Perdue—Bronze Casting in Wax.

The series of special loan exhibitions of fine art works, which have been held from time to time under the auspices of the Burlington Fine Arts Club, London, is this year enriched by one of considerable artistic interest—namely, an exhibition of bronze and ivory works of European origin. About 370 bronze works and 166 ivories have been brought together. Among the bronzes are some of the earliest specimens made by Greek, Etruscan, and Roman artists, lent by the Rev. Montagu Taylor. Among them is a mask of a marine deity with ruby eyes, and of a fine quality of finish. For excellence of pose as well as graceful modeling, a winged youth, holding a small dolphin in his left hand, is a striking Roman bronze.

The question of the *modus operandi* in producing these works seems to suggest itself. But on this point the catalogue yields us no information. From time to time the notes to the descriptive entries direct attention to the comparisons which it may be interesting to draw between various versions of similar subjects, as, for instance, between Nos. 180, 148, 138, 133, and 131, all of which are slightly varying editions of a Venus of John of Bologna. Again, No. 172, a fine saltcellar, composed of a kneeling nude male figure supporting a shell on his shoulder, is an artist's model from which others were cast; No. 182 is one of these casts. The difference in quality of texture between these two works should be noted. No. 172 is what would be termed a "*cire perdue*" model. Now, a little explanation of what "*cire perdue*" means would add much interest in the casual examination of the collection, and would help to clear up the difficulties which naturally crop up of understanding how it comes to pass that men chiefly known for their paintings or architectural designs appear in this exhibition as the makers of bronze medals, plaques, or statuettes. A short note placed as a label to one or two of the principal works, such, for instance, as the handsome candlestick designed by Pollajuolo, would help to clear away little misunderstandings on such points. This candlestick, No. 169, is ornamented with delicately worked garlands of flowers and leaves, sharply cut, and as crisp as though they had been produced yesterday. Much of this is due to good preservation. On the other hand, much more is due to the manner in which Pollajuolo's original models in wax were incased in plaster, so that the plaster faultlessly adhered to the wax. As soon as the plaster casing had set, the molten bronze was poured into it, and, melting out the wax model, filled up the impressions made in the plaster. Thus the wax or *cire* was *perdue,* and after the plaster had been broken away, the bronze alone remained as the tangible result of Pollajuolo's model in wax. From this reference to the process of producing certain bronzes it will be readily seen that a clever-fingered artist, without any extraordinary display of skill, might use wax as a vehicle for giving material shape to his designs, and, having made his model in wax, convert it into bronze by the process alluded to, and so appear on the scene as a bronze work. But the process *cire perdue* does not include all the methods of making a bronze object. Surface work has often to be resorted to, and handicraft other than that of modeling is thereby called into play.—*Iron.*

Incombustible Wood.

The following chemical compound is said to produce the result claimed by M. M. P. Folbarri for rendering wood incombustible, petrifying it, as it were, without producing any change in appearance. Intense heat chars the surface, slowly and without flame, but does not penetrate to any extent, and leaves the fiber intact:

Sulphate of zinc, 55 lb.; American potash, 22 lb.; American alum, 44 lb.; oxide of manganese, 22 lb.; sulphuric acid of 60°, 22 lb.; water, 55 lb.; all of the solids are to be poured into an iron boiler containing the water at a temperature of 45° C., or 113° Fah. As soon as the substances are dissolved the sulphuric acid to be poured in little by little, until all the substances are completely saturated. For the preparation of the wood it should be placed in a suitable apparatus, and arranged in various sizes (according to the purposes for which it is intended) on iron gratings, care being taken that there is a space of about half an inch between every two pieces of wood. The chemical compound is then pumped into the apparatus, and as soon as the vacant spaces are filled up it is boiled for three hours. The wood is then taken out and laid on a wooden grating in the open air, to be rendered solid, after which it is fit for uses of all kinds.

House Drainage.

On this subject Mr. George E. Waring, Jr., in a paper in the *Atlantic Monthly*, says:

Were I called upon to-day to specify the essential features of perfect house-drainage, I should include the following items:

The establishment of a complete circulation in the main line of the soil-pipe and drain, allowing a free movement of atmospheric air through the whole system from end to end, together with as complete a circulation through minor pipes as could conveniently be secured.

The complete separation of the over-flow of every tank or cistern delivering water for the general supply of the house from any soil-pipe or drain containing a foul atmosphere.

The supplementing of every water-trap with a suitable mechanical valve, to prevent the water of the trap from coming in contact with the air of the drain.

The reduction of the size of all waste-pipes, and especially of all traps, to the smallest diameter adequate to their work.

The abolition of all brick or earthen-ware drains within the walls of the house, using in their stead the best quality of iron pipe, with securely calked lead joints.

The substitution, so far as practicable, of wrought-iron pipes for lead pipes, in the case of all minor wastes.

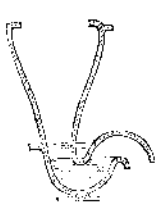
The coating of all iron pipes, both cast and wrought, inside and out, with "American" enamel, a glossy black coating which withstands in the most complete manner the chemical action and changes of temperature to which it is subjected in such use.

The iron pipes should be extended so far beyond the foundation of the house as to obviate the opening of joints by settlement, so common where earthen-ware drains are subjected to a slight movement of the foundation, or of the new filling about it.

The object to be sought is the provision of a permanent drainage channel for the removal of all wastes, offering little asperity for the adhesion of foul matter, swept from end to end by fresh air, absolutely separated by mechanical obstructions from the interior atmosphere of the house, and literally a section of out-of-doors brought for convenience within the walls of the house, open to receive the contents of the various waste-pipes leading to it, but securely closed against the return of its air. I believe that the next step in advance will be the establishment of means by which the whole length of this drainage channel may be thoroughly flushed with clean water at least once in twenty-four hours.

As a prominent detail of house-drainage work, the long-accepted water-closet is being made the object of important modifications. The stereotyped article, the "pan" closet, has little to recommend it beyond the fact of its general adoption. It is faulty in principle, in arrangement, and in construction. While it is cleanly to look at, and lends itself readily to ornamental joinery, it has defects which should drive it out of existence. Deep down in its dark and hidden recesses, where only the ken of the plumber ever reaches, a large and sluggish trap—they call it a "cess-pool" in Scotland—is generally holding the filthiest filth in a state of offensive putrefaction. The iron chamber above this is lined with the foulest smear and slime, constantly producing fetid and dangerous gases. The earthen-ware bowl which surmounts this is set in putty, which yields to corrosion and to the jar of frequent use, until it leaks foul air, often in perceptible quantity. The panful of sealing water soon becomes saturated with foul gases, which exhale thence into the house. The whole apparatus is incoffined in tight-fitting carpentry, which shuts in the leakings and the spatterings and their vapors from the free access of air, boxing up in the interior of the house, and generally in free communication with the spaces between the walls and under the floors, an atmosphere heavy with the products of organic decomposition, and faintly suggestive to the unwonted nostril of the *mus decumanus defunctus*.

In the absence of anything better, I am disposed to go back to the simple "hopper" closet, such as is used in the cheapest work, and to depend on frequent and copious flushing to keep it clean. This closet has the great advantage that its only trap is in sight at the bottom of its pot. There is no inner "chamber of horrors" concealed by a cleanly exterior. I have recently used a number of these closets supplied with various sorts of apparatus for periodical flushing, and I find that wherever a half-gallon flush can be given every ten or fifteen minutes they are kept perfectly clean. I have no doubt that flushing every twenty minutes, or perhaps at longer intervals, would keep them free from all sanitary objection. This would require a supply of about fifty gallons *per diem*.



The Hopper Closet.

Recent invention has been turned in the direction of the provision of mechanical appliances for separating the trapping water from the air of the soil-pipe or drain. There are several devices which accomplish this purpose—one of them my own, and more than one of them constituting a very great improvement upon, and indeed an absolute step in advance of anything in use five years ago.

Another most important matter of recent development is the through-and-through ventilation of soil-pipes. Formerly the soil-pipe invariably stopped at the highest closet of the house. When the danger of *pressure* came to be understood, it was considered imperative in all work of the best class to carry a vent-pipe out through the top of the house. As this pipe, from the smallness of its size and from the irregularities of its course, had but limited capacity of discharge, the necessity was quite generally recognized for carrying up the soil-pipe itself, full-bore, through and above the roof. This was the point reached at the time of my earlier writing. It soon became evident that even this large extension of the pipe afforded no real ventilation. A deep mine shaft cannot be ventilated by simply uncovering its top. No complete frequent change of air can be effected in a soil-pipe by merely opening its upper end. Air must be introduced at the bottom to take the place of that which is discharged at the top. It is now considered imperative in all good work to open the soil-pipe at both ends, or at least to furnish the lower part of the pipe with a sufficient fresh air inlet to effect a thorough ventilation of the whole channel.

American Cotton Thread.

Some time since, in a letter to the English trade journal, *Cotton*, Mr. B. F. Nourse, of Boston, Mass., said in reply to a question as to the fineness of American cotton cloths.

"American manufacturers do not produce the finest qualities of cotton cloths, such as muslins, fine cambrics, etc., not because they cannot (finer thread having been spun here than any ever produced by machinery in England), but because the available markets for such cloths would not sustain a manufacture of sufficient magnitude to be profitable."

To the words in parenthesis *Cotton* took exception and demanded proof. Mr. Nourse's authority for the statement was Mr. Edward Atkinson (an acknowledged authority in textile affairs), who has since written to Mr. Nourse as follows:

"The three-cord No. 550 thread produced by the Willimantic Company, suitable to be used on a sewing machine, was my warrant for this assertion. At the time I made it I also supposed that the same company, in spinning No. 1,100 single yarn on a mule in the open air of their factory, had accomplished finer yarn spinning than had been reached in Great Britain; but I have since learned that this was an error, a much finer number having been spun there. But it was made on a small mule, specially constructed and operated under a glass case. Such excessively fine numbers have, of course, no commercial value. More important is the success of the Willimantic Company in spinning No. 120 for regular commercial uses on a ring spinning frame. This success and our recent progress in fine work in several other mills promised good results, as the work done on the ring frame is cheaper and stronger than that of the mule."

Meantime Mr. Nourse had written for a statement of facts to Mr. William E. Barrows, the treasurer and examiner of the Willimantic Company. From that gentleman's letter of reply Mr. Nourse has condensed the following statement, which he embodies in a long letter to *Cotton*, dated June 6:

"1. Our fine numbers of thread are made for use on sewing machines. They are three and six ply, made from yarn Nos. 300, 400, 500, and 550. The finest numbers are used for pillow lace making, and, judging from the demand, give good satisfaction.

2. The finest number of thread regularly sent to foreign markets by this company is No. 100 six-cord, made from 200 yarn.

3. The finest yarn we have spun on the American ring spinning frame (built by the Lowell Machine Shop, Lowell, Mass.), with the Sawyer spindle, is No. 320. This was experimental, the yarn not used for regular thread. We regularly spin on ring frames No. 120 yarn for No. 60 six-cord sewing cotton.

4. We have no climatic or atmospheric difficulties.

5. We do prefer American machinery. The self-acting mules, built by the Lowell Machine Shop, give less trouble than foreign built mules in the same numbers, 100's to 140's.

6. All our overseers and more than one-third of our work people are Americans—a sufficient guarantee of their intelligence.

7. The most profitable numbers for us to spin are 120's to 140's.

8. See the accompanying certificates of the comparative merit of our sewing cottons from the Expositions at Paris and Philadelphia, and from American and Maryland institutes, and the reports (1876) of M. Louis Chatel.

9. We do not import any machinery for better work or cheaper production. Combers and hand-mules are not yet made in this country, and we are obliged to import these machines.

10. I believe our extra fine numbers—400's, 500's and 550's—are finer threads than ever produced by machinery in England. All of these fine numbers have been tested on power-sewing machines at a speed of eleven hundred stitches per minute, giving satisfaction. Experimentally we have spun No. 1,100 on a handmule of 640 spindles, 60 "stretch, 1¼" gauge. Our usual fine work is 140's to 200's on mules, and 80's to 120's on ring frames."

American Tariffs.

It was not anticipated by the most ardent disciple of Cobden that the principles of free trade, which had proved so difficult of comprehension in the British Parliament, would be very quickly followed in other countries, though it was understood that its full benefit could only be realized by international acceptance. It was not, however, thought that in 1879 those principles would be so little understood that they would be rejected by our Transatlantic kinsmen at that then distant time. The belief that this could not have been the case would have been strengthened if they had had the evidence of the necessity for its adoption which Americans now have with respect to the iron and steel industries. All these years have, however, passed away, and American statesmen are still compelling their countrymen to pay very high bonuses to certain classes of manufacturers. That the high tariffs now imposed on iron manufacturers are simply bonuses to manufacturers will be seen from some of the following figures, and from the fact that the articles so highly taxed do not yield any revenue to the American Exchequer. It appears from the returns of foreign import duties, published by the British Government last month, that the percentage of tax paid by American consumers on the principal sorts of manufactured iron and steel is on an average no less than 71 per cent. On English and Scotch pig iron it is 70 and 60 per cent respectively, and on bar iron, plates, and rails, it ranges from 57½ to 85 per cent. On iron wire it is 85 per cent, on hoops upwards of 100 per cent; on tin and galvanized plates 42½ and 57½ per cent, and on steel and steel rails respectively 65 and 100 per cent. As these enormous taxes do not yet appear to have raised any very strong opposition on the part of the American people, we cannot but admit that there is some reason for the feeling now becoming somewhat prevalent in this country, that the better way to open the eyes of the American people to the necessity for either free trade or reciprocity will be to impose retaliatory duties upon certain American imports. Upon the cheapness of iron and steel many of the American manufactures mainly depend, and yet the Americans allow themselves to be handicapped to the enormous extent shown by the above figures. We cannot do better than conclude this short reference to an important question by quoting one instance as illustration of the tax paid by the American consumer in order to support by bonuses a set of manufacturers who are enabled to enforce the sale of their goods, at prices which have a most injurious effect on other industries. Wood screws, of which even larger quantities are used in America than in this country, are sold in the States at a trade discount of 60 per cent or 8s. in the pound net. The same screws are exported to this country at a discount in Liverpool of 75 per cent or 5s. in the pound net. A tax of 60 per cent on screws is thus paid by the American consumer above their market value. If a duty of upwards of 130 per cent did not prohibit it, our manufacturers would deliver superior screws into American ports at a discount of 75 per cent. Other instances might be cited in support of what has been said, and if a knowledge of these facts does not effect an alteration in American feeling on this subject they will certainly help to strengthen that which is growing in strength in this country.—*The Engineer*.

New Process of Phototypie.

Phototypie is a sort of lithography in which the stone is replaced by a hygroscopic layer of gelatine impressed with an image by the action of light passing through a photographic negative. Now, if we could cut down a lithographic stone, both in its surface dimensions and its height, to make it like a wood block, we should be able to insert it in the text, and take an impression from it simultaneously with that from the type. The difficulties in the way of doing this would be, first, the necessity of wetting the stone previous to each impression; and, secondly, the expense of cutting down lithographic stones, which would entirely lose their value in the process. But what we are on this account prevented from effecting with natural lithographic stones can be managed with an artificial one, provided that the latter possesses a hygroscopic surface from which, after being saturated with water, numerous impressions can be taken without its being necessary to wet it afresh. It became, therefore, necessary to make photo-printing blocks of the requisite size and height to be set up in the form with ordinary type, and possessing so great a hygroscopic quality that the moistening requisite to produce an impression should only be an accidental operation, and not one that is indispensable before each pull.

Now the ordinary process of phototypie was scarcely adapted for this purpose without modification. The plates in this process are made of metal or glass, or even lithographic stone, always larger than the image of which it is required to obtain an impression, and it would be impossible in every case to cut these plates to the size of the printing block. M. Vidal adopted another method for arriving at the same result as that produced by ordinary phototypie. He prepares the artificial lithographic stone and the hygroscopic support separately, and then attaches the one firmly to the other. The image is obtained as in the ordinary carbon process; an impression on carbon tissue is developed on a roughened glass plate coated with some fatty substance. When, by means of hot water, the picture is divested of all the gelatine not acted on by light, it ought to appear with all its half-tones like a good carbon print which is ready to be transferred to its definite support. This is then inclosed in a frame of thick cardboard, beveled outward on the inside, and coated entirely with paraffin or wax; the frame is then filled with the following composition, which is poured into it and over the picture:

Gelatine	20 grammes.
Gum-arabic	20 "
Glycerine	40 "
Water	100 cub. centim.
Ammonia	5 " "
Alum	0·5 gramme.
Salicylic acid	2 grammes.
Barium sulphate	10 "

The salicylic acid is added as an antiseptic, and the sulphate of barium gives to the layer of gelatme an opalescent ap pearance. The whole layer should be so deep as to have, after drying in the chloride of calcium box, a thickness of about five millimeters. When the desiccation is complete, the layer above the glass plate is turned out, and will be found to have the image transferred to it. We have now, therefore, a plate of gelatine bearing on it the picture of the exact dimensions required, and beveled downward from the edges, which latter will therefore not take any ink. This plate must then be mounted on a sheet of copper or zinc, which is raised on a wooden support until the height of the image is the same as that of the type with which it is to be printed. The gelatine plate is next saturated with moisture by immersion for a quarter of an hour in a bath composed of,

Glycerine	50 grammes.
Water	50 cub. centim.
Alum	2 grammes.

and the image will appear on its surface in considerable relief, so as to render it particularly well adapted for printing from. The separation of the black parts of the picture from the white parts of the hygroscopic gelatine is very perfect, so that no smudging, such as so often occurs with printing blocks on which the shadows are modeled by fine lines close together, need be feared. The mixture of which the formula is above given is of so hygroscopic a character that repeated wetting is rarely necessary. It must be effected with a sponge dipped in a mixture of half water and half glycerine, after having removed from the plate all trace of ink; but the latter should never be severely washed.

In this way, then, we obtain a carbon print, but with a light colored pigment, so that the degree of inking can be readily determined. Light colored earths in the form of impalpable powders, with a gelatine chosen for its resistant properties, make a very good tissue. The print should not be treated with alum before pouring on the layer of hygroscopic gelatine, otherwise it will not transfer easily. On the contrary, it is better to wash it with water containing a little ammonia, which will facilitate the penetration; the mixture already contains some ammonia, and the transfer of the image to the plate of glycerine and gelatine is thus rendered completely effectual. The alum contained in the first liquid used for moistening increases the hardness of the image, and prevents it from swelling too much.

It is easy to imagine what advantages can be derived from a process of this kind, which enables us to produce, at a moderate cost, plates capable of being inserted among type for the printing press. A number of different blocks obtained by this method can be mounted in the same form with the type of the text, and can be pulled all together in the press. They can be used in cylinder presses also, without any difficulty. Until the contrary is demonstrated, M. Vidal believes that this is the only process by which photographic printing blocks capable of being printed simultaneously with type can be produced.—*Photographic News.*

Freezing Fish for Winter Use.

To equalize the supply of fine fish, several varieties of which are apt to be overabundant in this market in summer and scarce in winter, the fish dealers of New York have erected three large refrigerating houses wherein many tons of frozen fish are stored. The largest of the freezing houses, is located on Front street, and belongs to the members of the Fish Market Association. When there is a greater supply of fish in the market than is likely to be sold during the day the wholesale fish dealers select the best and remove them before daylight from the vessels to the freezing houses, where each fish is cleaned and prepared for the refrigerator. The whole of the Front street house is devoted to the work; the first story from front to rear and the entire width of the building from floor to ceiling being one gigantic refrigerator divided into three sections, each capable of being subdivided into six apartments or boxes. The walls are coated with zinc, a second or inner wall of the same metal separating each apartment—a space of several inches being left between the wall of one subdivision and that of its neighbor, with oblong slits permitting the air from these spaces to pass into the apartments. These spaces are filled with ground ice and rock salt, a mill being used for grinding the mixture together, and at this season of the year it requires over 3,000 lb. of ice and about 14 bushels of salt daily to keep the freezing houses in proper order. The selected fish having been cleaned, are placed in freezing pans covered with ground ice and salt, thus excluding the air while the process of freezing is going on. This work is done on the upper floors of the same building. When frozen stiff the fish are taken to the apartment of the special owner and there laid away in the cold until wanted.

The season for freezing fish, says the reporter of the *Commercial Advertiser*, who furnishes this account, is not yet at its height, as the consumption now nearly equals the supply, and the bluefish have not been caught in such quantities as would pay for preserving. Before September, however, the work will be at its height, and according to the usual statistics of the probable catches, there will then be over 250,000 lb. of frozen fish in the storehouses in this city. The rarest fish will thus be obtainable for the rich man's table in the depth of winter, and sheepshead, salmon, bluefish, Spanish mackerel, and many other kinds, only known to ordinary consumers in the summer season, can then be supplied at rates which will be deemed cheap when the labor and expense of preserving the fish are taken into consideration.

A Congressman's Argument for Repealing the Patent Laws.

A member of Congress arguing in favor of the repeal of the patent laws, and complaining of the universality of in ventions and patents, declared that the children of this coun try are swathed in patent baby clothes; rocked to sleep in patent cradles, danced in patent baby jumpers; take their airings in patent perambulators, amuse themselves with patent "playthings," wear patent bibs, spin patent tops; ride patent hobby horses, and, coming down to business, they prepare their land for crops with patent plows and harrows, sow their seed with patent grain drills, plant their corn with patent corn-planters, cultivate it with patent cultivators; cut their grain with patent harvesters, thrash it with patent separators, have it made into patent flour, by a patent middlings purifier, and finally baked in a patent oven. And thus they go through life, followed by patents, and at death are buried in patent burial-cases. Thus, literally from the cradle to the grave we are harassed and robbed by in ventors and patentees. Now, he wanted the patent laws all repealed, that the people might be relieved of this intolerable oppression. That congressman ought at once to remove to China or some of the South Sea Islands not yet visited by the ubiquitous Yankee inventor, where he could live and die and be buried, as his great-grandfather did before him, un vexed by the thousand-and-one changes and improvements offered by the hand of restless invention. Seriously, adds the *Western Manufacturer*, he should remember that none of these patent improvements are ever forced upon him or any body else. Those who choose may wrap their offspring in the traditional "rabbit-skin," and rock them in the half of a hollow log, and "jounce" them upon their knees. Patented improvements are only adopted because they are better, cheaper, and more convenient than the old styles, with which people are already familiar. The fact is, nobody complains of the inventor or his improvements until it is found that a patent stands in the way of their indiscriminate appropriation. Then it is that Congress is appealed to to repeal the patent laws—in other words, to "kill the goose that lays the golden egg." This is a terribly practical age, and the American people are the most practical portion of the human race. They pursue the business of invention as they do any other business, as a means of gaining a liveli hood or making money. And that is the secret of the practical nature of their inventions. Take away the stimulus of protection in the property-right and ownership in their inventions, and all that kind of work would be laid aside at once. We would soon find as great a dearth of inventions and improvements as the most conservative could wish.

A Home Made Daniell.

The following method of constructing a voltaic couple, or a home made Daniell cell, may be of interest to the student: Select a small round earthenware jar, such as is used for keeping preserves, and having lined the bottom with gutta-percha, or some suitable cement, to the depth of ¼ inch, fix upright in this a rod of zinc, of equal height with the jar, to which a length of copper wire has been attached by passing it through a hole drilled in the upper part of the zinc rod, or by soldering. Make a cylinder of pipe clay, or other porous clay, larger than the zinc rod, and having dried it, make it hot in the fire by degrees, till it attains a red heat. Let this cylinder cool gently, and when cold place it in the jar round the center rod encircling it at a little distance. By moderately heating the end of the cylinder it will, when placed on the gutta percha, make a groove which will fix the tube, and prevent infiltration of the fluids. Line the inside of the jar with a plate of thin copper bent into cylindrical form and having a few holes punched in it, through which may be threaded the extremity of another length of copper wire. On the top of this cylinder place a flat ring of copper pierced with holes, and nearly, but not quite, touching the porous cylinder. This forms the battery. To charge it, the *Electrician* gives a saturated solution of sulphate of copper poured between the copper and the clay tube, and some crystals of the same salt are placed upon the perforated ring so as just to be in contact with the solution. The zinc compartment is then to be filled with a solution of sulphate of zinc, sal ammoniac, or common salt.

A Canal Mowing Machine Wanted.

Canal Superintendent Fish is accredited with the statement that within two weeks after its appearance in Erie Canal this summer eel grass grew eight feet in length, actual measurement. In July the canal was so full of grass in several localities that the flow of water was seriously impeded. The Rochester *Express* asserts that there seems to be at least half a dozen kinds of eel grass, several of which were entirely unknown to the superintendent, and much more harmful in impeding the progress of canal boats (as well as the flow of water) than the old variety. One new eel grass starts from very slender roots and grows to different lengths. At the end is a dense tuft, through which it is difficult for water to flow. By reason of the different lengths of the stems these tufts form a solid padding from the bottom to the surface of the water. Mr. Fish has had at work clearing out the beds an apparatus consisting of a couple of rudder-like arrangements at the stern of a boat, with sharp sickle-like knives. These rudders are swung backward and forward by two men, and a passage is thus cut through the grass. Mr. Fish says this is the best device as yet found for removing the grass, but hopes that something better may be invented.

Study of Latin and Greek.

At the recent meeting of the American Institute of Instruction, at the White Mountains, Professor J. L. Lincoln read an able paper upon classical teaching and study. Greek and Latin, he said, as languages, must be taught by the tongue and the ear quite as much as by the eye; it must be voiced, and heard, and spoken, by all possible exercises of most practical kind, in union with the reading of the book. Such a method must be carried on from the beginning to the end of a course of instruction in school and college. Thus may our pupils come to master and appropriate the knowledge of these languages, so that the classic writers can be read with ease and satisfaction. The paper touched, also, upon the practice of reading at sight. This, however, can be used only after considerable progress has been made. It is not so much a means of learning, as a test of having learned or not, and also an incentive to further progress. The paper closed with illustrations of the crowning point of the theme—the literary knowledge and culture to be derived from a studious and generous reading of Greek and Latin writers.

In the discussion which followed, Professor Thatcher, of Yale College, thought that should no mental discipline be obtained, the knowledge secured was sufficient to pay for the trouble. If no knowledge is obtained the mental discipline would repay. The utility of studies is not in the knowledge obtained, but in the memorizing power developed.

Professor Louis Soldan, of St. Louis, said the moment Europe went back to the study of the classics a reformation commenced, and scholarship revived. The Scriptures were studied in the ancient tongues, and modern science owes its strength to the classics. The historic growth of our whole educational work is traceable to Latin and Greek. The classics are the basis of all progress in education. Language should be investigated, not only for itself, but for all other purposes.

The Consumption of Smoke.

As our manufacturing works are starting up afresh all over the country, a demand is renewed through the newspapers for some method to prevent the smoke nuisance in our manufacturing towns and cities.

It would seem not to be a difficult problem to solve, and *The Factory and Farm* pertinently inquires if some wise man will inform it why smoke may not be consumed if means are applied to that end. A smoke consumer that will burn the smoke before it leaves the fire bed or pot will reduce the consumption of fuel anywhere up to about one-half. Not alone because the combustion of smoke supplies fuel, but because the burning of the smoke prevents the lodgment of soot on the surfaces where heat is to strike; and less fire will produce greater results because a smoked or sooty surface is a non-conductor of heat, and it requires a fire at its greatest intensity to produce the required amount of heat.

Numerous devices have been studied up to fulfill the requirements, all perhaps with some merit, but none of them, as far as real tests have been made, being successful. So many have been tried and not proved of any real value, that manufacturers despair of being able to secure such a device, and are not in a mood to even try anything more, no matter how full of promise it may be; and yet actual experiment is the only thing that will demonstrate the success or failure of any plan proposed.

If the genius of this country cannot relieve the cities of the everlasting cloud of smoke and reduce the expense for fuel, it would seem there was degeneration and an early limit found to the ability of mechanical skill. The invention of a smoke consuming appliance would not only be a fortune to the inventor, but a blessing to those who dwell in large towns and cities.

A Large Smelting Contract.

The Leadville *Reveille* reports that J. B. Grant & Co., of Leadville, had contracted to smelt the entire product of the Little Pittsburg Consolidated Company, from the middle of July till the first of January next, and adds: "This is, without doubt, the largest transaction in the mineral line ever consummated in this country, and perhaps in the world, the anticipated amount of ore to be furnished being about 150 tons a day, or in the neighborhood of 25,000 tons for the period covered by the contract. In addition to this, Grant & Co. will buy ore of other grades to assist in smelting, so that the amount of ore handled daily will not be far from 200 tons a day." Large additions to the plant of Messrs. Grant & Co. will be required to do this work. The product of the works in June was $200,000; under the new arrangement it is estimated that the product will range between $300,000 and $400,000 a month.

The Children of Rum Drinkers.

Dr. Martin, of the *Salpetrière*, Paris, has made a series of interesting observations on nervous affections among the offspring of alcoholic parents. His results may be summed up as follows: In 83 families in which one or more members showed nervous excitability with a history of alcoholic origin, there were 410 children. Of these, 108—more than a quarter—had convulsions, and in the year 1874, 169 were dead; 241 were still alive, but 83, *i. e.*, more than one-third of the survivors, were epileptic.

Recent Decisions Relating to Patents, Trade Marks, Etc.

BY THE U. S. CIRCUIT COURT—SOUTHERN DISTRICT OF NEW YORK.

The Atlantic Giant Powder Company versus Jasper R. Rand et al.—1. The use of the explosive compound known as "rendrock powder," which contains in 100 parts, by weight, nitro-glycerine, 34·71; nitrate of potash, 52·68; sulphur, 5·84; and woody fiber, charcoal, and resin, in nearly equal proportions, 6 77 parts, is an infringement of reissue patent No. 5,799, granted to the Giant Powder Company, assignee, March 17, 1874, for the combination of nitro-glycerine with infusorial earth, or other equivalent absorbent substance, as a new explosive compound.

2. The owners of reissue No. 5,799 are not deprived of the right to ask for a preliminary injunction to restrain such infringement by the fact that they have prosecuted a suit in equity against the same defendants for an infringement of reissue No. 4,818, of which they were also owners, by the use of the "rendrock powder;" have taken testimony to show an infringement of No. 4,818, but not of No. 5,799; have notified the defendants that they need not, until further notice, make proof in the latter case, and subsequently, having successfully prosecuted suits on No. 5,799 in another court, have discontinued the suit on No. 4,818 and prosecuted this on No. 5,799 alone.

3. The reissue patent No. 5,799 does not cover an invention different from that embraced in the original patent No. 78,317, granted to Julius Bandmann, assignee of Alfred Nobel, May 26, 1868. The safety of the compound and its concentration were alike objects of the reissue and of the original patent.

4. The invention claimed in reissue patent No. 5,799 is not described in the French patent taken out by Alfred Nobel, September 18, 1863, nor by the certificate of addition thereto taken out January 19, 1864.

5. Nor is this invention shown in the English patent, dated September 24, 1863, and sealed March 1, 1864, granted to Alfred V. Newton for improvements in the manufacture of gunpowder and powder for blasting purposes upon a communication from abroad by Alfred Nobel.

6. The "rendrock powder" is not described in either of these foreign patents.

7. If Nobel's English patent No. 1,345 be regarded as a patent for the invention found in No. 78,317, and as having been granted more than six months before Nobel's application for No. 78,317, still No. 78,317 was not invalid because it does not appear that the invention covered by it was introduced into public and common use in the United States prior to the application for No. 78,317.

8. Neither the invention claimed in reissue No. 5,799 nor the "rendrock powder" is described in reissue No. 4,818 (division D) of Alfred Nobel's patent No. 50,617 for substitute for gunpowder.

Injunction granted.

BY THE COMMISSIONER OF PATENTS.

Ex parte Thaddeus Davids & Co.—1. The presence in a label of an element which is registrable as a trade mark excludes the whole from registration as a label.

2. A firm name printed in common type or in script type, not being an autograph signature nor the facsimile of an autograph signature, is not registrable as a trade mark.

3. But the name of a firm printed in script type in conjunction with a vignette of the coat of arms of a State is registrable as a trade mark, and the presence of such an element in a label excludes the whole from registration as a label.

Ex parte Wilson.—1. A generic claim may cover several processes as well as several machines; but the applicant must describe at least one of the processes embraced in the generic claim, just as he must describe one of the forms covered by a generic claim for a machine patent.

2. A process claim may be restricted to one of several stages of which a complete process consists. Each of these stages is itself a process, just as each of the elements of an aggregate fact is itself a fact. It is for the applicant to determine whether he will claim the entire process or only one of its subprocesses or several connected subprocesses.

3. The use of the term "shoulder" to designate the enlarged part of the base of the neck of a spinning ring is not unreasonable nor calculated to mislead where the specification and drawings show the part to which it is applied.

Young versus Van Dusen.—1. The construction and use in public of a working machine, whether the inventor has or has not abandoned it, excludes the grant of a patent to a subsequent inventor. An abandonment in such a case inures to the benefit of the public, and not of the subsequent inventor.

2. Abandonment will not be established by mere proof of the want of such a degree of diligence as is necessary to connect a prior conception of an invention with a reduction to practice.

Englemann versus Vester.—A ground for the dissolution of an interference not embraced in the motion before the Examiner of Interferences, but first suggested on the hearing of the application by the Commissioner, will not be considered.

Appleby versus Morgan.—The law aims to secure the grant of the patent to the original and first inventor, and not to him who, although conceded, or admitted, or upon default presumed, to be the original and first inventor, is not such in fact; and this purpose of the law ought not to be unnecessarily thwarted by such an exercise of the discretion vested in the Commissioner as to substitute presumptions for proofs through the enforcement of forfeitures which can only be reconciled with the law or with justice on grounds of necessity.

The Sun Dance of the Sioux.

A letter received at the Interior Department from Dr. T. Woodbridge, agency physician for the Fort Peck Agency, gives the following graphic description of the annual "sun dance" of the Sioux Nation, which took place near Poplar River, in Montana Territory, in the latter part of May:

I have just witnessed the great Indian festival of the "sun dance," or worship of the sun. Great preparations had been made for it, and everything was on the grandest scale. The city of lodges was moved, and the Indians encamped on a beautiful plain inclosing a hollow square, large enough for the movements of thousands of horsemen. In the center the great pavilion or medicine lodge was erected, 150 feet in diameter, the outside formed of small posts of green poplar and willow, thickly interwoven with green branches. Resting on this and on a rude frame-work within, all around for about twenty feet the space was covered with buffalo skins, forming the "dress circle," with places assigned to the musicians and actors or dancers. In the center was the great medicine pole, fifty feet high. The diameter of the central space, about 100 feet, was open to the broad sunlight.

Only the men occupied the deep circle, where they were feasted during the performance of twenty-eight continuous hours, during which time about forty dogs were immolated and eaten, besides large quantities of buffalo meat, wild-turnip heads, and hot caldrons of other eatables that are nameless. The audience was composed of about 5,000 Indians, but as only the men occupied the circle within, the common people, women, and boys, had to be satisfied by viewing the performances through the wide entrance or through the interstices in the leafy barriers. All had on their holiday attire. The dresses of some of the chiefs, and those acting as directors or priests, were gorgeous.

When all was prepared, amid the waving of banners, music, and loud shouting of the assembled throng, over fifty braves entered—each an Apollo—painted and naked to the waist, except a profusion of ornaments, with headdresses of beautiful feathers, their black, glossy hair reaching down to their lower garments, which were most beautifully and artistically arranged. Each carried in his hand an ornamented whistle, made from the bone of an eagle's wing, which was blown shrilly during the dancing. Each also carried a bouquet composed mostly of the wild sage. Their appearance and reception were grand and imposing.

The first afternoon's performance would have been called wonderful for display of heroism and power to endure and suffer. Many had from fifty to two hundred pieces cut out of the living flesh from their arms and back. The dance was kept up all night with unabated fervor, every performance having something new and startling. But in the morning torture reigned supreme, men dancing with two, three, and four buffalo heads suspended from holes cut in their flesh. One Indian dragged on the ground eight buffalo heads fastened to the flesh of his back, and in the stooping posture he was forced to assume they had lacerated or torn the cuts in his back to the extent of three inches. Others were held by four different cords, two in the breast and two in the back—fastened to four stakes; and still others were fastened to the center pole with ropes which were fastened to the breast and back. Some, in addition to being fastened by the flesh of their breasts, had buffalo heads suspended from the back, and they would be seized by the hanging heads and jerked until one would think their life would be forfeited; others made frantic efforts to break loose, and I often noticed the integument to be stretched three or four inches from the body. Some fell faint and exhausted, and with wild shouts, the din of music, and weird songs, made of it a perfect pandemonium.

The dancers neither took food, sleep, nor water during the festival. Their dancing, their invocations, and their prayers were fervent. They laid their faces on the buffalo heads while praying for success in hunting, and the priest wept and asked the Great Spirit to give them success in the chase and let them have food for their wives and children; also, to give them plenty of horses, to prosper them, and help them to subdue their enemies. The sod was carefully removed in a spot four feet square, and within a white cross was made. This is all they knew, and with no teacher but nature, we must judge them charitably—"Count not impossible that which seems unlike." Their liberality was unbounded. Over 200 horses were given away, besides great quantities of other articles.

The Trade in Time-Pieces.

Galignani's Messenger furnishes the following statistics with regard to the manufacture of clocks and watches. Whether the figures are trustworthy or not, we are not prepared to say. France is placed at the head of the list, and is credited with the production of chronometers, watches, time-pieces, clocks, annually to the value of 65,000,000 francs; then comes Switzerland, with watches, 60,000,000 francs; America, in watches and Dutch clocks, 32,000,000 francs; England, chronometers and watches, 16,000,000 francs; Austria, time-pieces 10,000,000 francs; Germany, in time-pieces and a few thousands of watches, 25,000,000 francs. These figures give a total considerably over 200,000,000 francs for the whole watch and clock making trade of the world. The amount assumes the greater importance when the fact is remarked that, differing from nearly all other business, the raw material enters so slightly into the prime cost, the principal expenditure being almost exclusively in labor. The approximate number of articles produced is as follows: France, about 1,000,000 pieces annually; Germany turns out more, some 2,000,000, but they are of a much inferior average price. The same may be said of the American manufacture, which provides commerce every year with 700,000 or 800,000 objects. As far as watches are concerned, Switzerland heads the list with an annual production of 1,500,000. France follows with 500,000; the United States produces from 300,000 to 350,000, and England some 200,000, but these are of very superior quality. The enormous total is that 2,500,000 watches and 4,000,000 time-pieces are annually dispersed to the four quarters of the globe.

The Great Alpine Tunnel.

A Swiss journal has recently given some particulars of the present state of the St. Gothard tunnel works. The total length of the tunnel between the two ends at Airolo and at Goeschenen is 14,920 meters, including the approaches of 145 meters. There is, however, a separate curved part of the tunnel on the Airolo side which is 125 meters in length. At the end of May last 3,489 meters of the tunnel from the Goeschenen side had been completed, and 3,633 meters from the Airolo side. This gave a total of 7,122 meters completed from both ends, and this, compared with the length which it was estimated would be completed according to the programme arranged in September, 1875, shows a deficit of 3,389 meters. There is, however, no such great difference between the estimated and achieved lengths in the headings. At the end of May the advanced top headings had reached 6,940 meters from the Goeschenen or northern side, and 6,289 meters from the Airolo or southern side, showing a total length of advanced top heading of 13,229 meters, and only 214 meters less than anticipated in 1875, and leaving 1,548 meters of heading to be made. The meeting from the two ends will not be at the center of the length of the tunnel, but owing to the more rapid advancement from the northern side, it will take place somewhere about 300 meters nearer to the southern side. The present rate of advance of the heading is, on average of both sides, about 238 meters per month. At this rate the meeting of the miners from the two ends will take place soon after the end of January next. The completion work, however, proceeds at a more rapid rate, and it is expected in Switzerland, if the work continues at the present rate, it will be completed for opening in 1894.

Industrial Distress in England.

Press reports from London state that in the middle of July, there were in Burnley 5,795 looms idle out of 33,000, and 307,870 spindles out of 900,000. In the Blackburn district 11,300 looms were idle out of 52,000; 84,000 spindles were working on short time, and 48,000 had stopped altogether. In the Chorley district 1,600 looms, owned by two firms, were working on short time. Nearly twenty other firms were running part of their machinery on short time; several had stopped theirs entirely. In the Bury district both the woolen and cotton trades were very depressed. The average time of working in the woolen manufactories was only four days out of the week, and 406,000 spindles and 3,720 looms were working on short time. In Stockport the prospect, especially in the weaving department, was said to be almost hopeless. It was computed that only 500,000 spindles and 300 looms were working, against 1,195,000 spindles and 7,900 looms five years ago. In Rochdale, it was said, only five mills were working full time; 500 houses there were tenantless. The Manchester *Guardian* gave statistics to show that the condition of trade in the Rossendale district, where the machinery of the factories is adapted for Indian cotton, was even worse. Out of 100 mills only six—and these comparatively insignificant—were working full time; thirty-five were entirely stopped, and the remainder were only running on an average three and a quarter days a week.

American Philological Association.

The eleventh annual meeting of the American Philological Association began at Newport, R. I., July 16. There was a large attendance of college professors and other philologists from all parts of the country. Most of the papers read were as usual far above the level of popular interest. That of Prof. March, of Lafayette College, however, on the "English Dictionary of the Philological Association," should interest every American scholar.

The English Philological Society proposes to publish a great historical dictionary of the English language. For this purpose it has enlisted the services of many readers in England and a few in America. The plan is to make the dictionary cover the whole range of English literature. To Americans have been left the books of the eighteenth century of American literature, and this alone is as yet unread for a dictionary. Prof. March appealed to the members of the society not to allow the great thesaurus, which will be the standard English dictionary for a generation to come, to remain incomplete in the important department of American literature. Printed slips, he said, would be given to those who were willing to undertake the reading of American literary works, with a view to making excerpts and quotations for the dictionary. The society has already made a bargain with the managers of the Clarendon Press of Oxford, and hope to bring out the work in ten years from 1880. The materials already secured amount in weight to two or three tons.