The Destruction of Derelicts.

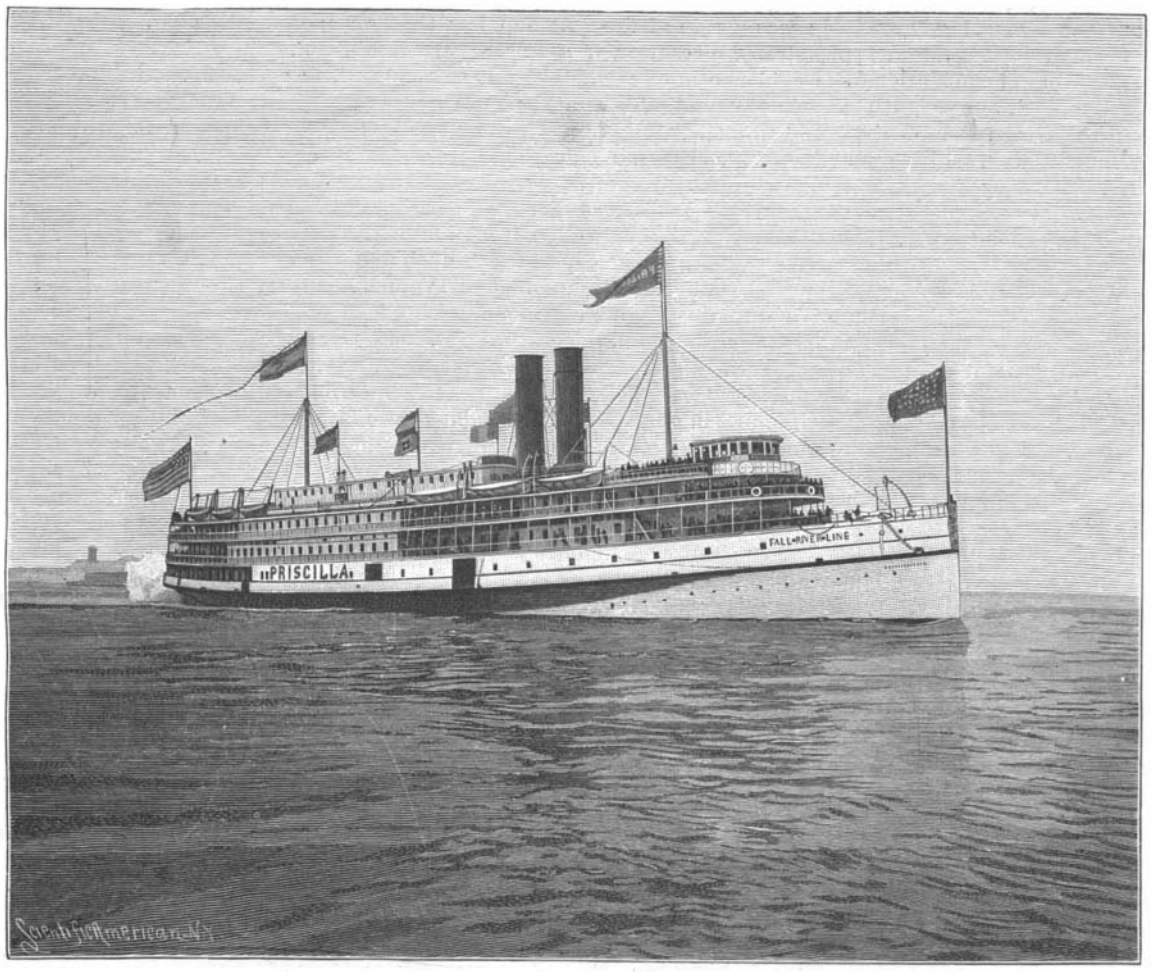
In a recent issue of the monthly Atlantic Pilot Chart, published by the Hydrographic Department, United States navy, it is stated that during the past seven years, 1887 to 1893, the Hydrographic Office received 5,024 reports concerning a total number of 1.628 derelicts, of which number 482 were identified and 1,146 unidentified. The average number of derelicts constantly afloat is estimated to be 232 annually, or about 19 per month. Statistics compiled from the reports received show that the average period a derelict is afloat, after having been abandoned, is about 30 days. The dangerous character of these derelicts is illustrated by the fact that in this period of seven years there have been 45 collisions with them, which caused the total loss of nine vessels and considerably damaged seventeen others. Seventy derelicts have been destroyed, one by torpedoes and the ram of the U. S. S. San Francisco and 69 by fire. Seven other attempts to destroy derelicts by fire are considered to have been unsuccessful, as the derelicts remained afloat for some time after having been set on fire. Five of these seven had cargoes of lumber that had become so waterlogged as not to be inflammable; the other two were in ballast. The efficacy of destroying derelicts by fire is thus illustrated. In the cases of the 59 attempts regarded as successful, the fact that these derelicts were never seen subsequent to the time they were set on fire is regarded as sufficient proof of their destruction.

A Whistling Snake.

The discovery by the Horn expedition to the McDonnell Ranges, in Australia, of a remarkable specimen of natural history called a "whistling spider," whose peculiarity consists in producing a whistling noise by the simple operation of drawing its foreleg across its jaw, seems at the moment to be outdone. Sir William Macgregor, the Administrator of British New Guinea, is now in the field with another extraordinary discovery —a whistling snake. In his latest report Sir William says that a large number of deaths occurred early this year in the Rigo district of New Guinea from snake bite. The administrator points out that the island is infested by a small species of black snake, which is very fierce. The natives declare that whenever a man goes near one it rushes at him, uttering sounds which they describe as resembling a whistle. "Shortly before I was at the government station," writes Sir William Macgregor, "one of these reptiles attacked the government agent, but was killed before it did any harm. A little while before a boy of fourteen years was in the bush near the station when one of these snakes made a rush at him with the usual peculiar whistling sound. The boy thought the noise emanated from some cockatoos in a tree, and began to look for them. He did not discover his mistake until he received a bite from the reptile, from which he died.

Bookmaking Exposition.

The International Exposition of the book, paper, and printing trades was opened at the Palais de l'Industrie in Paris on July 23, and will remain open until some time in December. Many of the French societies for the advancement of art, science and trade make important exhibits. Several foreign nations, including the United States, also participate. Probably the most interesting exhibit is that devoted to the production of books for the blind. This display is largely retrospective. Bookbinding is also well represented. France is a country where collecting has been reduced to a fine art, so that some of the exhibits loaned by amateurs are very fine.



THE STEAMER PRISCILLA, OF THE FALL RIVER LINE.

THE GRAND SALOON AND ELECTRIC LIGHTING OF THE STEAMER PRISCILLA, OF THE FALL RIVER LINE.

We illustrate in the present issue the interior of the grand saloon of the steamer Priscilla, of the Fall River line, a vessel which we have already described, and which is one of the most magnificent specimens of naval architecture in existence. The stairway in the grand saloon, of which two views are given, is accepted as one of the most difficult portions for treatment, and the cuts show a most successful design, in whose carrying out the skill of the iron master and of the art modeler were utilized. The columns and paneling, which are seen to be of the most elaborate design, are all made of papier mache, by the firm of H. Sinclair's Sons, of 327 Seventh Avenue, New York, a firm representing the third generation occupied in and conducting the same business —something very unusual in this country. All the paneling, ceilings, and similar work on the boat were the work of this firm. In executing it twelve tons of material were employed, representing eleven months' work of a gang of about sixty men on the boat and twenty-five in the shop. In the grand saloon the decorations are of the purest Italian Renaissance, while in the dining room an equally pure example of East Indian design has been followed. In the painting, gold leaf has been used sparingly, only the high lights receiving it. In lightness and ornateness and in adaptation to every conceivable requirement the papier mache leaves nothing to be desired. It is also fireproof, a matter of great moment in such a vessel as the Priscilla.

The beautiful iron railing, which represents true art work in metal, and which is all hand made, was produced at the works of John Williams, 544–556 West 27th Street, this city. It is not saying too much to assert that the public have been educated to an appreciation of fine art in metal largely by the productions of this firm. In New York and other cities, in the finest hotels, office buildings, and private residences, may be found samples of gates and grilles all hand made, in the most elaborate forging, by this firm.

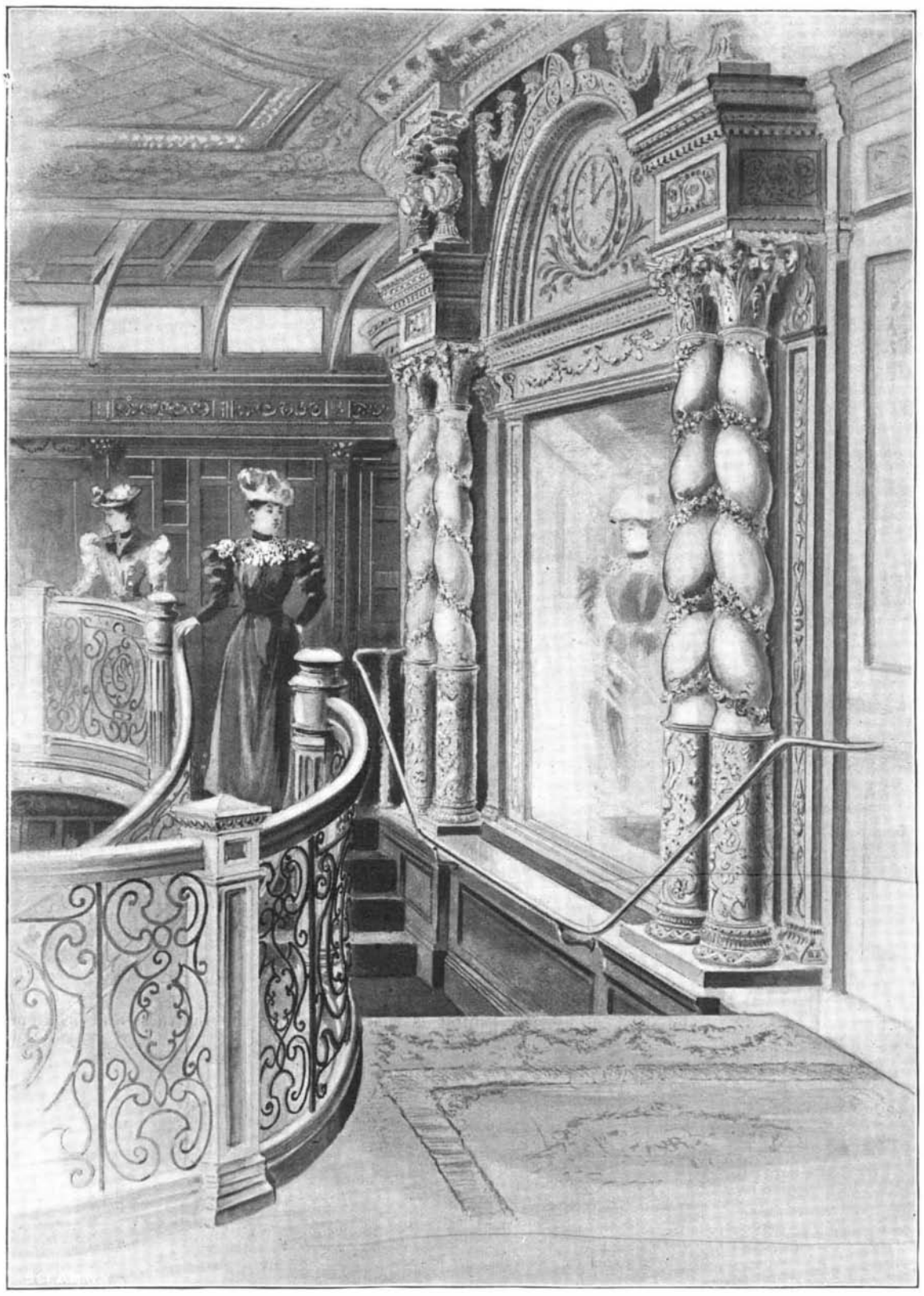
Their workshop and forge is a most interesting place to visit. It reminds one of the doctrines of Ruskin to see great gates and heavy railings all forged by hand from the bar and plate. A single little leaf in a railing may represent some hours' work of a man. The different members of the design are welded or brazed or otherwise fastened together, even soldering riveting and bolting being required by some of the most intricate designs. The beautiful railing on the Priscilla shows the smaller class of work produced by this firm. In our last issue it will be remembered that we showed the gates and grilles of the Metropolitan Club's palatial home.

In the last cut we show the great dome electrolier, built by the General Fixture Company, of this city. The dome is 7 feet in dia-

VIEW IN THE GRAND SALOON OF THE STEAMER PRISCILLA.

meter, and is built on an aluminum frame, saving about 200 pounds weight, while it is as strong as if made of steel. Behind its twelve panels of opalescent glass are forty-eight lamps, each one of 32 candle power. An idea of the size of the fixture is given by the fact that in putting it up three men at a time worked inside of it, while riveting on the outside framework. Four smaller opalescent domes, each containing six lights, form a square on the main fixture. The decks are lighted by the same style of fixtures used on the United States government cruisers. Reflectors are arranged so that the light cannot be seen from the bows of the ship, although the decks are perfectly lighted. This enables the ship signal lights to be seen by other vessels. The stateroom brackets are put up on round porcelain pieces, which serve both as backs and carry the cut-out. The brackets are removed by unscrewing and are interchangeable, so that the electrician can readily test the wire. In the dining room all the incandescent lamps are concealed in inverted globes of art glass, or are behind art glass panels on the side. On the mast of the boat is a fixture containing 36 lights. The number of lamps on the boat aggregate 1,987, the entire system forming a unique example of the most advanced type of electric light.

In the SCIENTIFIC AMERICAN of June 30, 1894, will be found a full description of the Priscilla. The vessel is 440 feet 6 inches long over all, 423 feet 6 inches on the water line, 93 feet wide over the guards, with a hull 52 feet 6 inches wide. The registered tonnage is 5,398 tons. The engines are of 8,500 horse power, compound, with four cylinders of inclined type. The cost of the vessel is put at $1,500,000.



UPPER LANDING OF THE MAIN STAIRCASE OF THE STEAMER PRISCILLA.

Work of the Pension Office.

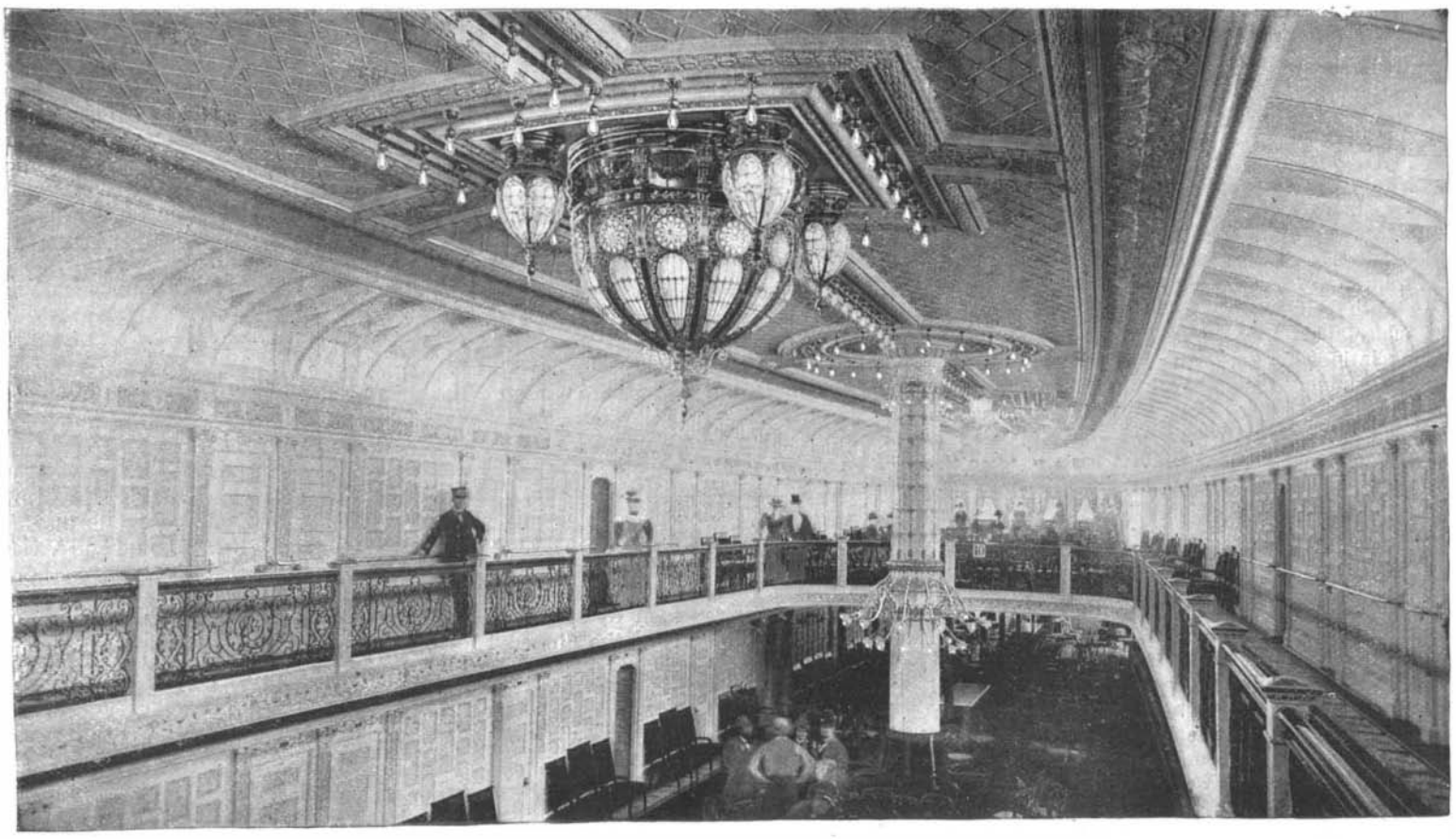
The report of the Commissioner of Pensions for the fiscal year ended June 30, 1894, states that the number of pensioners on the rolls June 30, 1893, was 966,012; that during the year 30,085 new pensioners were added to the rolls and 2,308 previously dropped were restored, while 37,051 have been dropped for death and other causes, and on June 30, 1894, the number of pensioners upon the rolls was 960,544. The number of pension certificates issued during the year was 80,213 and 132,873 claims of all classes were rejected.

There were undisposed of and in different stages of preparation and advancement, on July 1, 1894, claims for pension and for increase to the amount of 619,027, of which 287,209 claims—originals, widows, and dependents—are on behalf of persons not already on the rolls. These claims, save some recently filed, have been examined more than once and found lacking in essential evidence.

New claims of all kinds have fallen off from 363,799 in 1891 to 40,148 in 1894, the fact being that original claims for pensions under existing laws are substantially all in, and the bulk of new claims are for increase or for widows and dependents.

The amount paid for pensions during the year was $139,804,461.05, leaving a balance in the Treasury of $25,205,712.65 of the appropriation.

There were 194 convictions in the United States courts within the year for pension frauds, perjuries, and forgeries.



THE DOME ELECTROLIER IN THE GRAND SALOON OF THE STEAMER PRISCILLA.

Preservation of Our Battle Ships.

At the close of our civil war Admiral Farragut reported that the monitor fleet, created by John Ericsson, was in perfect working condition. The Navy Department at that time (March, 1866) applied to Ericsson to know how it could be kept in good condition. Ericsson wrote in reply, showing how these vessels might be floated into an inclosed basin at League Island, where the water could be pumped out until it was needed to float them again. "A fleet laid up as I propose is," he said, "good for half a century; all, excepting some repairs about the armor backing, engines, hulls, boilers, etc., may be kept in perfect order, and in twenty-four hours fifty ironclads may be transferred from their dry resting place on the surface of League Island to the Delaware, with stores and ammunition on board." For some reason no attention was paid to this suggestion, and some time after Ericsson informed a friend, who proposed to visit the monitor fleet floating in the waters of the Delaware, that he would find them "a fleet of ironclads subjected to the most rapid decay. All that rotting and corrosion can do to destroy the vessels of which a nation expects so much in case of need, you will find," he said, "in active progress."

It is now twenty-eight years since Ericsson gave this advice concerning the preservation of the monitors, and we have had an opportunity to test its value in the light of experience with different methods. We observe that the Navy Department has finally come to his conclusion, so far as laying armor-clads up in ordinary is concerned. This new plan of disposing of armored vessels includes battle ships and coast vessels for use only in case of emergency. It is the intention of the department to transfer to fresh water the battle ships now under construction, just as soon as they have been thoroughly broken in. The place where the ships will be laid up will be League Island, it being the opinion of the Secretary that this is the most desirable fresh water rendezvous on the Atlantic coast. The probabilities are that in his forthcoming annual report, the Secretary will urge Congress to make an appropriation for increasing the facilities of this yard. This being the plan, we would suggest to the Secretary that he consider Ericsson's proposition of a generation ago in the light of unprejudiced judgment.—Army and Navy Jour.

Cellulose and Some of its More Recent Applications.

BY CHARLES A. SILBERRAD, B.A., B.SC.

Though cellulose is an invariable constituent of plants, of whose cell walls it forms the supporting framework, it is rarely found pure, as, except in cellular tissue of the youngest shoots, it always contains more or less ash. Still, cotton wool and Swedish filter paper consist of the approximately pure substance, especially the latter after treatment with hydrofluoric acid, whereby all mineral matter is extracted.

However, the preparation of pure cellulose from any material containing it—e. g., cotton wool—is not a matter of great difficulty, it being only necessary to digest it alternately with bromine water and a dilute alkaline solution until the bromine water is no longer decolorized. The fiber is then boiled in dilute alkali and washed in turn in dilute acid, alcohol and ether, and finally dried.

Thus prepared, it contains a certain amount of hygroscopic moisture, amounting to from seven to nine per cent of its weight; when this is removed, the simplest composition deducible from analysis is $C_6H_{10}O_5$, but it seems clear from its properties that its molecular weight must be many times that represented by the foregoing formula.

Solvents of Cellulose.—Cellulose is insoluble in all ordinary solvents, but is dissolved by certain reagents, of which the two following are the most important: (a) Schweitzer's reagent, which consists of an ammoniacal solution of cupric hydrate. From solution in this liquid the cellulose may be reprecipitated on addition of acids, alcohol, salt, or various other substances, in a gelatinous state, drying to a material closely resembling gum arabic in appearance. (b) A solution of zinc chloride in twice its weight of hydrochloric acid. This solvent behaves very similarly to the first mentioned, except that the cellulose is reprecipitated on dilution. Such solution and reprecipitation afford a ready means of purification.

The solvent power of the first named of the above liquids is the basis of the manufacture of the so-called paper boards. For this purpose sheets of unglazed paper are left in contact with the ammonio-cupric solution for a short time—just long enough for the fibers to be superficially attacked. The requisite number of these sheets are then placed one on top of the other, passed between rollers and dried; by this process they become united into a board-like material, impervious to water, which property is retained at 100° Cent.

Action of Nitric Acid.—If cellulose, e. g., blotting paper, be simply immersed in ordinary strong nitric acid (specific gravity 1·42) it undergoes a curious transformation. Its composition is unchanged, but the strength of the paper is increased tenfold, while at the same time its linear dimensions are diminished ten per cent.

The action of stronger nitric acid and of mixtures of nitric and sulphuric acids in the production of guncotton and the various pyroxylines, as well as the preparation of collodion by dissolving the last named in a mixture of alcohol and ether, are too well known to need any further account here; but the peculiar properties of a mixture of camphor and pyroxyline may be worth noting, as it is of these two substances that celluloid consists.

Celluloid was first prepared by Hyatt, of Newark, U. S. A. It may be obtained either by direct addition of pyroxyline to melted camphor, or by strongly compressing the two together, or lastly by dissolving the two in some common solvent, as ether alcohol.

The method usually adopted on the manufacturing scale is a combination of the second and third above mentioned. The pyroxyline is prepared by treating unsized paper with moderately strong nitric and sulphuric acids, whereby a product is obtained consisting of a mixture of the tetra and penta nitrates of cellulose.

The camphor is dissolved in the minimum quantity of alcohol, and this solution sprinkled upon the dry sheets of pyroxyline in such quantity that there is one part of camphor to two of pyroxyline. On the sheet so treated another is placed, and the same process repeated, and so on till a sufficient thickness is obtained.

There is thus produced a translucent mass which is worked between rollers, first in the cold and then at a higher temperature; it is next subjected to hydraulic pressure at a temperature of about 60° Cent., for twenty-four hours, and finally cut into sheets of the desired thickness and dried for several days at a moderate heat. The substance so obtained appears quite homogeneous, and may be cut and turned in the cold or moulded under pressure at a higher temperature.

It is very readily colored by pigments or dyes, which may be either mechanically mixed in a state of powder or dissolved with the camphor in the alcohol.

Artificial tortoiseshell is produced on the same principle as damascene steel, i. e., by welding together alternate plates of differently tinted celluloids.

As might be anticipated from its composition, it is extremely inflammable, but has been shown to be non-explosive under all conditions.

Action of Sulphuric Acid—Vegetable Parchment or Parchment Paper.—If cellulose, e. g., blotting paper, be rapidly passed through moderately strong sulphuric acid (specific gravity 1·5—1·6), and then well washed in water, it acquires properties very similar to those of parchment. The resulting preparation is now extensively used under the names of vegetable parchment or parchment paper.

This change is due to the conversion of the cellulose on the surfaces of the paper into a peculiar modification known as amyloid, which may be precipitated pure in a gelatinous form by diluting a solution of cellulose in concentrated sulphuric acid.

If cellulose be left in contact with acid of specific gravity 1·5 for some time, it becomes friable, forming a substance called hydro-cellulose, which is soluble in alkalies. By means of this reaction the cotton may be separated from the wool in a mixed fabric, as the latter is unacted upon.

Action of Alkalies—Mercerization.—If cotton cellulose be treated with a concentrated solution of soda or potash and then washed, it is found to have undergone a remarkable change in properties. From the name of its discoverer (Mercer) this change is termed mercerization.

The way in which Mercer was led to his discoveries is interesting as showing how one result may lead to another wholly unconnected with it. He was making a series of experiments to determine whether any alteration occurred in the composition of a solution on filtering it, and in the course of these he passed a strong solution of caustic soda through several layers of cotton cloth. He certainly found a considerable change in the composition of the solution on filtering, but was able to fully account for it by what turned out to be the far more important change produced in that of the cotton cloth, for this proved to be approximately expressed by the formula $C_6H_{10}O_5NaOH$; and though, on washing, all the soda was removed, the properties of the fiber were found to have undergone a marked change. Their length was contracted to the extent of twenty per cent, while at the same time there was an increase of thirty to thirty-five per cent in strength. A still more important alteration was the increased affinity for such dyestuffs as will dye cotton without a mordant, e. g., the diphenyl derivatives—Congo red and the benzidine dyes.

Cellulose Thiocarbonate.—Certain theoretical views led Messrs. Cross and Bevan to an examination of the action of carbon bisulphide on the mercerized cotton, with results which will probably have most important practical applications in the near future, and which have already formed the subject of at least one patent.

If the above mentioned compound of cellulose and soda be exposed to the action of the vapor of carbon bisulphide, it is gradually converted into a yellowish mass which, when placed in water, swells up, and finally dissolves to form a solution of cellulose thiocarbonate.

This same solution may be more readily produced by bringing together two parts of cellulose, one of caustic soda, two of carbon bisulphide, and eight of water.

From this solution the thiocarbonate may be precipitated in a pure state by addition of alcohol or strong brine, after which it may be redissolved in pure water to form a colorless solution of great viscosity. Thus, a four per cent solution is as thick as treacle, while a bottle filled with one containing eleven per cent of the thiocarbonate may be inverted for a considerable time without any risk of loss. But its most important property is its power of coagulation, which occurs spontaneously on standing for a considerable period, or immediately on heating above 60°, or by addition of an acid. This coagulation is due to the cellulose separating out in the pure state, forming a gelatinous mass which gradually shrinks, but in such a manner as to form an exact miniature of the interior shape of the containing vessel; all the sulphur and alkali are found in the liquid which separates from the shrunken mass. The cellulose thus reproduced varies in consistency according to the concentration of the original solution, but is always perfectly homogeneous; thus, it may be obtained in a form closely resembling the softer varieties of India rubber, or in one practically indistinguishable from horn, and it is not merely in appearance that this latter resembles horn but also in its consistency, for it is hard and tough and perfectly adapted for turning. Finally, it is found to possess the same increased affinity for dyestuffs that is exhibited by the original "mercerized" cotton.

The importance of the discovery is manifest, especially in view of the inevitably failing supplies of ivory, which have already resulted in the success of the ebonite and celluloid manufactures, over which it is clear that this preparation possesses many and great advantages; for none of the materials required in its production are expensive, and it is free both from the brittleness of ebonite and the inflammability of celluloid, while the readiness with which it can be obtained in any desired shape gives it a still more marked superiority over either of these products.—Knowledge.

Improved Car Doors Wanted.

Let any practical mechanic, or any practical railroad superintendent, go through any large yard where cars of all railroads are stored, and examine the doors on freight cars, and he will find that with a monkey wrench in his hand he can enter nine-tenths of the cars inside of five minutes, without breaking a seal. This because the fastenings are put on with lag screws, or ordinary bolts with the nuts on the outside of the car. There is no one road that is more subject to criticism in this respect than another, except that a few have apparently realized that this is all wrong, and made a few feeble and unmechanical attempts to better it, with very little real success.

The car manufacturing companies come in for a share of the blame for this state of affairs. They are fully aware that box cars are built for the purpose of carrying the most valuable articles of commerce; that such valuable traffic is frequently carried from the Atlantic to the Pacific coast, and is delayed and set out in large city yards, or at desert stations, unprotected, where it is subject to pilferage by being opened by thieves, who are pleased to find so easy a task as is presented by the present general construction. Knowing these facts, the car manufacturer should give intelligent consideration to the same in building a car in such a manner that the interests of his customer will be the best subserved. It will hardly be taken as a sufficient answer that manufacturers build to specifications made by the purchaser. This is not true in each mechanical detail.—J. J. Frey, Railway Review.

The Proposed Ship Canal Between Chesapeake Bay and the Delaware River.

The board to select the route of the Chesapeake and Delaware Ship Canal has been appointed by the President as follows: Thomas L. Casey, chief of engineers of the army; Captain George Dewey, United States navy; Colonel W. P. Craighill, in charge of river and harbor works in Maryland and Virginia; member of the Lighthouse Board; Mr. Mendes Cohen, of Baltimore, late president of the American Society of Civil Engineers, and J. Alexander Porter, of Savannah, Ga.

The board is instructed to examine and determine from the surveys heretofore made under the War Department the most feasible route for the construction of the waterway to connect Chesapeake Bay and Delaware River, which, in its judgment, shall give the greatest facility to commerce and will be best adapted for national defense. An appropriation of $5,000 has been made to pay the necessary expenses of the investigation. The report of the board must be completed in the next four months, as it is to be submitted to Congress at its next session.