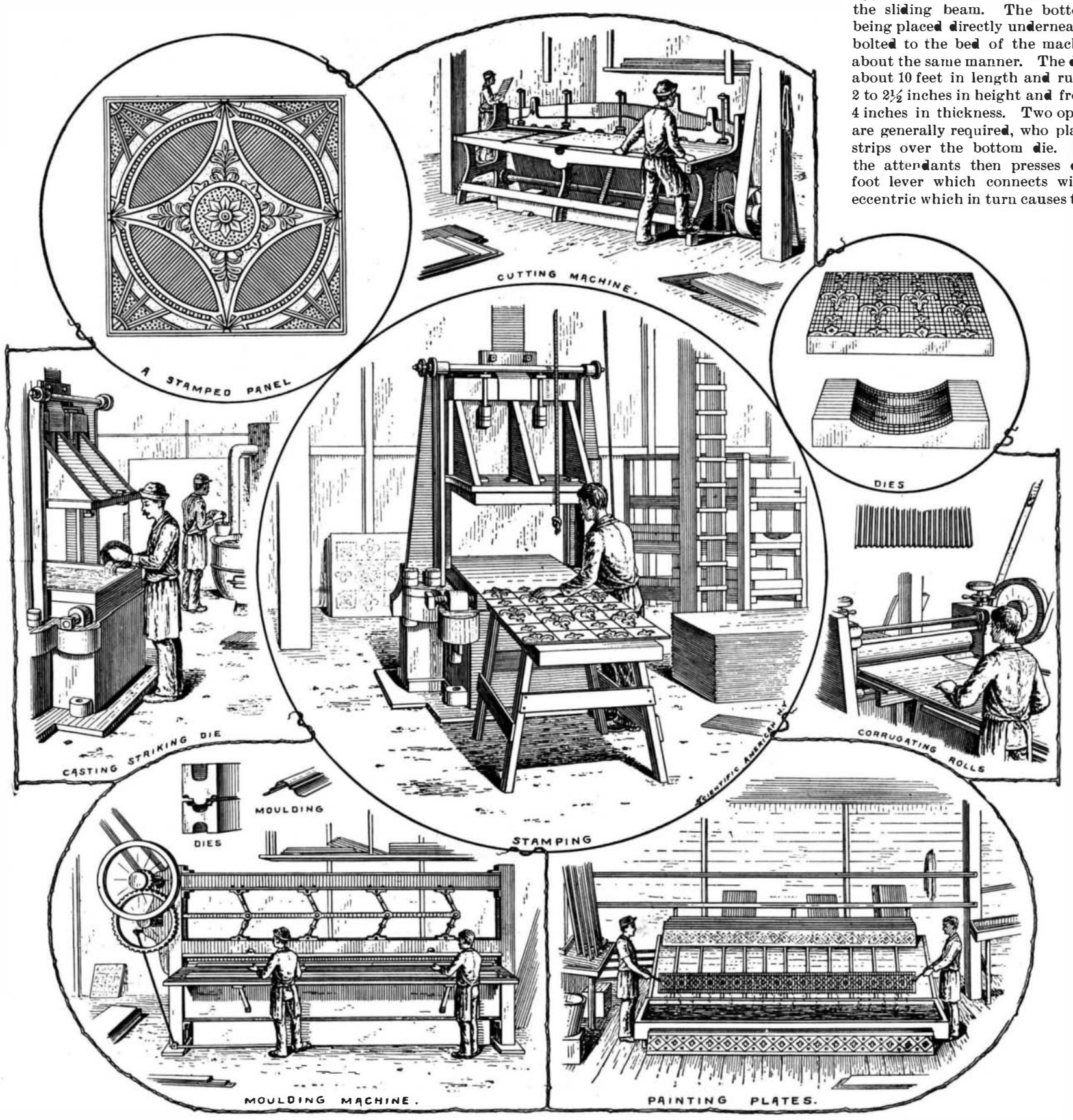
THE METAL CEILING INDUSTRY.

Metal ceilings are manufactured from thin sheets of iron and steel. The sheets are cut into different shapes and sizes and stamped by means of dies into panels, coves, diapers, borders, etc. The material is made up into single squares or plates of almost any size up to 30 inches and also into sheets 10 feet in length. The plates are stamped in such a manner that when the edges are lapped one over the other on the ceiling the joints cannot be seen. In putting up a metal ceiling a number of furred wooden strips or sheathing boards are first nailed to the joists. The patterns or designs, which are of different styles, such as the Greek, Moorish, Louis XVI, etc., are then tacked to these strips by means of wire nails. The strips for these ceilings are made of pine or spruce about 1 inch in thickness and about 2 to 3 inches in width and planed on one side. The strips are nailed to the joists in such a manner the joints of the plates come directly over them. Where using very small plates, the entire surface is generally boarded over. The first operation is the cutting up of the sheets of metal into shapes and sizes. The sheets of iron run in size from 24×120 inches to 30×120 inches. The steel sheets from 20×120 inches to 32½×120 inches in size. In thickness the iron sheets are gauged No. 28 and the steel No. 27. The knife or blade of the cutter is about 10 feet in length and made in two pieces. They are about 4 inches in width and made of ⅝ inch steel. Connected to the machine in front of the blade is a grip, which by means of a spring grips or holds the metal down firmly to the table until after the operator makes the stroke. The sheets weigh about 9 pounds each. About 30 sheets an hour can be cut by a good hand. The plates are then taken from the cutter to the stamping press. The bottom stamping dies are made of steel, ranging in size from 14 inches to 32 inches square and about 3 inches in thickness. They are fastened down securely to the bed of the press by means of four heavy screw bolts at each end. The upper or striking die is made of spelter. This die is formed by placing a wooden frame around the top of the lower or sunken die, which is plastered down on the outside to keep it from shifting. The molten spelter is then poured on the die to the depth of about 3 inches, the metal coming up to the top of the frame. Connected to the hammer of the press are a number of bolts which project down from the bottom at each end about 2 inches, each bolt having a nut screwed on at the lower end. The hammer is then lowered down into the spelter, and left to cool. After cooling about 20 minutes the hammer is raised with the spelter die securely bolted to the bottom. The machine is then ready for stamping. A flat piece of metal is then placed evenly over the sunken design of the bottom die. By drawing back a dog on which the hammer rests, which is worked by the foot of the operator, the hammer falls and the impression is stamped on the sheet of metal.

If a number of impressions are to be made on the same sheet, it is drawn forward, the end of the stamped portion being placed into the impression in the front end of the die. The hammer is then dropped again, the operation being repeated until the whole sheet is stamped. The hammer and spelter die weigh about 2,800 pounds, and have a drop of about 2 feet. The hammer is run by friction and is raised after every stroke by hand. About 500 to 1,000 panels can be stamped per day. After the spelter die is worn out it is removed from the hammer and remelted to be formed into another. After stamping, the plates are taken and dipped into a paint trough.

This trough or tub is made of wood, 10 feet in length, 3 feet in width, and about 8 inches in depth. The tub holds about 70 gallons of cream colored enamel paint made of China clay, oil, etc., into which the plates, borders, etc., are dipped. After dipping they are allowed to drain from five to ten minutes and then taken away and placed in rows on the floor so as not to touch each other until dry. Moulding is formed by means of steel dies, the strip of metal being pressed into shape by a sliding horizontal beam or bed which is drawn up and down by means of four movable knees which are jointed and connected at the center by a horizontal bar or shaft which connects itself to an eccentric. The upper die is bolted to the bottom of the sliding beam. The bottom die being placed directly underneath and bolted to the bed of the machine in about the same manner. The dies are about 10 feet in length and run from 2 to 2½ inches in height and from 1 to 4 inches in thickness. Two operators are generally required, who place the strips over the bottom die. One of the attendants then presses down a foot lever which connects with the eccentric which in turn causes the bar or shaft to draw the knees forward, which forces the beam containing the die downward, causing the sheet of metal to form itself into a strip of moulding. The beam drops about 2 inches. The moulding, if it is to be embossed, then goes to the stamping press to have whatever design wanted stamped into it. The moulding ranges in width from about 1 inch to 7½ inches. The pressure on the moulding is about 200 pounds to the square inch. Coves are also shaped out with steel and spelter dies on the stamping presses in the same manner as the panels. The cove dies are circular in shape and deeper than the others. Corrugated metal plates are formed by running the sheets between two fluted steel rollers 8 inches in diameter and 4 feet in length, which run at the rate of 9 revolutions per minute. The panels, coves, friezes, diapers, etc., are sold by the square foot. Moulding by the running foot. The plates average



THE METAL CEILING INDUSTRY.

about three-fourths of a pound to the square foot. The plates are given one coat of paint when sold. Two coats of paint are necessary to finish them. The sketches were taken from the plant of the New York Metal Ceiling Company, Ltd., 614 West 21st Street, New York City.

The Life of Our Present Literature.

As far back as May, 1892, says the American Journal of Photography, we called attention to the worthless character of the paper stock, so far as permanency is concerned, that is now used for both photographic as well as printing purposes.

In February, 1893, we supplemented above article by another on "The Adulteration of Paper Stock." In the latter paper we set forth how even the wood pulp was loaded and adulterated with talc and other mineral substances.

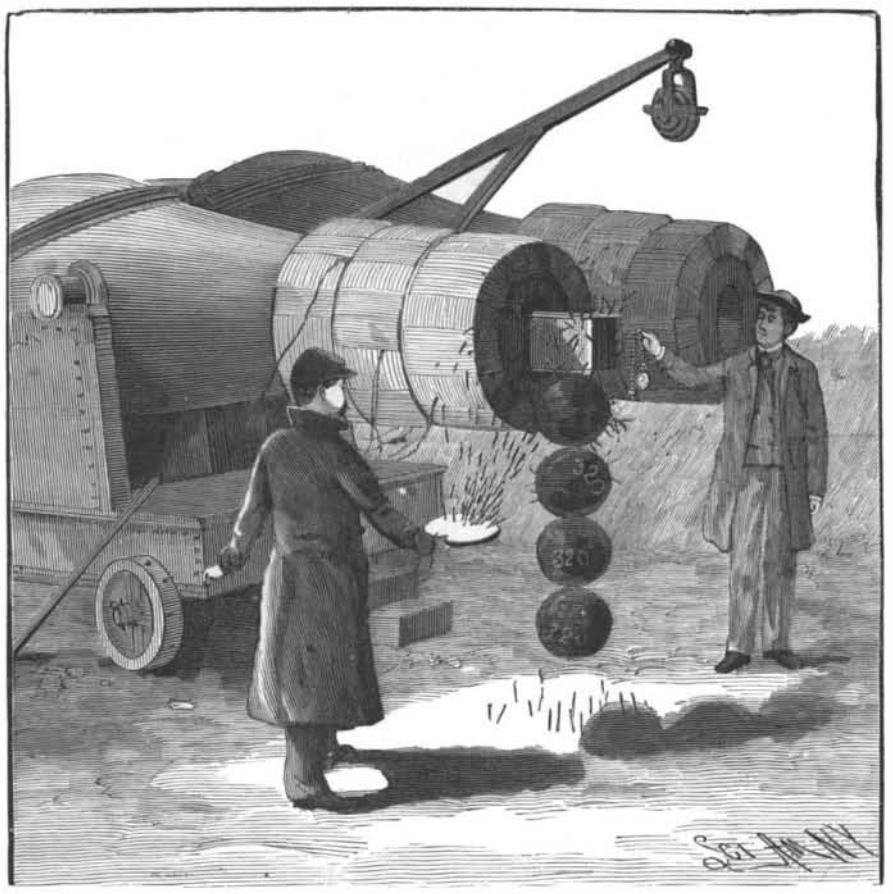
This subject has of late been taken up by noted bibliophiles in Europe as well as in America. The last noted celebrity to write upon the subject is M. Delisle, librarian of the Bibliotheque Nationale of France, who calls attention to the fact that paper is now made of such inferior materials that it will soon rot, and very few of the books now published have chance of a long life. The books of the present day will all have fallen to pieces before the middle of next century. The genuine linen rag paper was really calculated to last, and even the oldest books printed on it, if kept with due care, show very little of the effect of time; but the wood pulp paper now largely used, in the making of which powerful acids have been employed, is so flimsy that the very ink corrodes it, and time alone, with the most careful handling, will bring on rapid decay.

Perhaps from one point of view this is not altogether an unalloyed misfortune. Only remnants of present day literature will survive for the information of future generations, and great national collections, such as that in the British Museum library, formed at great expense, and intended to be complete and permanent, will offer to the literary historian of, say, the twenty-first century, but a heterogeneous mass of rubbish, physical laws thus consigning to oblivion a literature of which but a tithe is intellectually worthy to survive.

The papermaker thus unwittingly assumes the function of the great literary censor of the age. His criticism is mainly destructive, and it is too severe. Without the power of selective appreciation, he condemns to destruction good and bad alike.

CANNON MAGNETS.

We reprint from the SCIENTIFIC AMERICAN an illustration of Col. King's great magnet, made several years ago at Willetts Point fortification. The magnet core consisted of two old Rodman 15 inch guns, weighing 50,000 pounds each. It was turned into a club-footed magnet by the addition of many tons of heavy iron plates. The coil consisted of old torpedo cables 14 miles long, carrying 20 to 25 amperes. The armature consisted of 6 platform plates bolted together. A calculated force of 44,800 pounds was insufficient to tear off the armature, the chain used being broken by the strain. Five cannon balls, of 325 pounds each, were suspended like a chain from the muzzle of the gun. An iron spike placed against the breast of a man standing three or four feet off, with his back to the gun, stood out straight. It required the efforts of two men with a sudden jerk to pull away a 25 pound bar from the gun. The entire mass of iron, including guns, carriages, armature, etc., weighs over 130,000 pounds. At a distance of 71 feet the magnetism of the gun equaled that of the earth, a compass needle being deflected 45 degrees; at a distance of 300 feet it was deflected 3 degrees.



CANNON MAGNETS.

Two Centenarians.

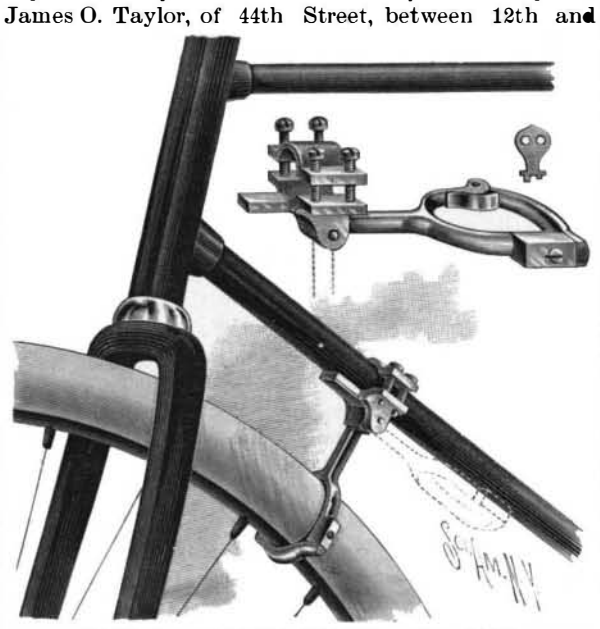
Joseph Shorett, a half-breed, who was born two years before the United States Constitution was adopted, died at Fond du Lac January 16. Shorett was born 110 years ago.

Henry McCaulley, the oldest man in Michigan, died at Battle Creek, Mich., January 17. He was 102 years old and was remarkably active up to the time of his death.

A NEW mode of lighting has been introduced by Mr. Lester Betts, the manager of the Calcutta branch of the Oriental Telephone and Electrical Company, Limited, in the case of the Empress of India Cotton Mills, at Budge-Budge, which are entirely lighted from the outside, special zinc fittings with 50 c. p. lamps being fitted to each window. This system, which has proved a complete success, saves the extra premium for fire insurance.

A BICYCLE HOLDER AND LOCK.

This simple holder and lock is designed to hold the front wheel in position to prevent it from swinging sidewise, and to consequently lock the wheel to the frame. The principal figure in the illustration represents the device in locked position on a bicycle, the dotted lines showing the locking arm thrown up against the frame in unlocked position, and the smaller figure showing the device detached and its key. The improvement has been patented by Mr. James O. Taylor, of 44th Street, between 12th and 14th Avenues, Brooklyn, N. Y. The clamp is readily attached to the bar of the bicycle frame by means of screws, and the locking arm, pivoted in lugs of the clamp, has at its outer end a fork adapted to partially encircle the rim of the wheel, the free ends of the fork being connected with each other by a pivoted spring lockbar, which, when locked in closed position, can only be opened by a key. Adjacent to the pivotal point of the locking arm is a spring which holds the arm in unlocked position up against the under side of the frame, as shown in the dotted lines. The device is small and light enough to be conveniently carried in the pocket if desired, and affords a most effective means of preventing the use of a wheel by unauthorized persons.



TAYLOR'S BICYCLE HOLDER AND LOCK.

The Coloring of Soap and Candles.

The problem of giving soaps and candles a beautiful color, at a low extra cost, has become quite an important one at the present day, the consumer in general giving preference to the colored goods.

The solution of this task, which is now a familiar one to the manufacturers of soap, and especially of toilet soaps, is a much more difficult one to the candle maker; for while in colored soaps the requirements are limited to a beautiful color that will remain unchanged on exposure and not cause stains in washing, candles make the additional demand that the color must not interfere with the burning of the candle.

The latter point adds a material difficulty to the coloring of stearine and wax candles.

Regarding soap, the first point to be observed is to select the proper shade of the flower corresponding with the perfume used; for instance, an almond soap is left white, rose soap is colored pink or red, mignonette green, etc.

The colors from which the soapmaker may select are exceedingly numerous, for not only are most of the aniline colors adapted for his purpose, but also a very great number of mineral colors. Until a comparatively recent time the latter were probably exclusively employed, but the advance in the tar color industry in later years has brought about a not inconsiderable change in this respect. A very prominent advantage of the mineral colors is their stability, i. e., not being changed or in any way affected on the exposure to light. This advantage, however, is offset in many cases by the wonderfully beautiful effect of numerous aniline colors, and by the more difficult method of application in the case of the former. The specific gravity of mineral colors being rather high in most cases, they will naturally tend to settle toward the bottom, necessitating crutching of the soap until it is too thick to drop the color. For mottled soap, however, cinnabar (vermilion) and ultramarine are still largely employed.

For transparent soap, of course, mineral colors are not applicable, as they would detract from their transparency; for milled soap, on the other hand, they are very well adapted, as also for cold made soaps which require crutching anyway until a sufficient consistency is obtained to keep the coloring material suspended.

A notable disadvantage in the use of aniline colors, besides their sensitiveness to the action of light, is the fact that a majority of them is affected and partly destroyed by the action of alkali. A few of them are proof against a small excess of lye, and these may be used with a good effect. Certain firms have made a specialty of manufacturing colors answering the peculiar requirements of soap and being very easy of application, as they are simply dissolved in boiling water and stirring the solution into the soap. To some colors a little weak lye is added; others are mixed with a little oil before they are added to the soap.

For a soluble red color there were formerly used alkanet and cochineal; at present they have been displaced to a great extent, on account of their high cost, by "fuchsin," which is very cheap and of remarkable beauty. A very small amount of it suffices for an intense color, nor is a large proportion desirable, as the soap would then stain. Very delicate tints are also produced by the phthalein colors, of which those named rosbengal, rhodamin, and eosin are most commonly used. These colors, when dissolved, have a green fluorescence which heightens their beautiful effect.

There are also a number of the azo dyes which are suitable for soaps, and these, as well as the phthalein colors, are used principally for transparent soaps. For opaque soaps both aniline and mineral reds are used, among the latter being cinnabar, chrome red, and iron oxide. Chrome red is a basic chromate of lead which is now much used in place of vermilion, but as it becomes black on exposure to an atmosphere containing even traces only of sulphureted hydrogen, it is not especially adapted for soap. Cinnabar gives a bright color, but it is high in price. Iron oxide, known in the trade as colcothar, caput mortuum, etc., is only used for cheap soaps.

For yellow there are also a considerable number of colors. Among the natural colors these are prominent: Saffron, orlean, curcuma (turmeric), and caramel (sugar color); the first named of these is now hardly used, owing to its high cost. Of the yellow aniline colors, special mention is due to picric acid (trinitrophenol), martius yellow, napththol yellow, the yellow azo dyes, and auramin. If it is an orange that is wanted, a trace of fuchsin (red) may be added to the yellow colors named. The use of some unbleached palm oil with the stock answers a similar purpose, but the color fades on exposure. A mineral yellow is chrome yellow (chromate of lead), which has the same advantages and disadvantages as chrome red.

ACCORDING to the American Shipbuilder, the large shipbuilders, Harland & Wolff, Belfast, Ireland, who built the Majestic and Teutonic, pay riveters $7.54 per week; pattern makers, $8.27 per week; platers the same, and fitters $6.57 to $8. More than twice these sums are paid in this country to the same trades, and it is no wonder that merchant ships are built abroad instead of this country, with such a wide discrepancy in the cost for labor.