THE EARLY HISTORY OF CAST IRON PIPE.

AT one of the meetings of the New England Water Works Association, Mr. Jesse Garrett, of Philadelphia, dealt with the history of the manufacture of cast iron pipe, from which the Bulletin has culled the following:

Cast iron was known to Holland in the thirteenth century, and stoves were cast at Elass in 1400. But tradition has it, which an ancient Roman writer records, that the temple of the "Great Mother," at Sparta, is said to have been built by Theodorus, who first discovered the art of casting and making statues in iron. All this is necessarily vague, a condition which suggests a quotation from Dr. Greene, of the Boston Historical Society, in reference to the present disturbance of King's Chapel burying ground for the subway human conduit. "It is so full of bones and remains that I do not believe you could dig down to the depth of much more than an inch without turning up the dust of ancient worthies." The application is this, that in the dust of these "ancient worthies" it is impossible to verify the individual instance. As with the metal itself, so its discovery in the form of cast iron was an accident which occurred at one of the early iron works in the Rhine provinces, where a part of the "running" one day was found to be of different texture, and it was a problem for some time what to do with the strange stuff.

The first blast furnaces appeared in the Thuringian Mountains, which were almost identical in principle with the present furnaces, with the exception that hand or treadmill bellows were used for the blast, from which the present mechanical blowers are an evolution. In 1377 the first cast iron gun was cast in Erfurt, and the famous Krupp was casting guns in 1818, so that it appears iron was mostly used for destructive and not Samaritan purposes through many centuries of its history. In 1685 the first cast iron pipes were used for the water service of Versailles, followed by screwed and flanged pipes. In 1708 the Quaker, Darby, patented the system of box casting, and in the following year started the famous Coalbrookdale foundry, which, in 1780, turned out the first cast iron bridge. The first casting in the United States is said to have been made at Lynn, Mass., a cast iron pot, which was exhibited at the World's Fair at Chicago.

In the region of Alba Longa, buried by the volcanic eruption which drove the Albans to the present site of Rome, no trace of iron is found, and its absence is still notable in the archaic tombs of Rome. The metal for their implements, of whatever kind, was of bronze, and the early Roman religious sentiment shows such an abhorrence of iron as to make it a profane innovation to use it in almost any form, especially in and around their sacred temples. This superstition continued after the Christian era, even down to the fall of the empire. In their religious rites, if iron had in any way approached a temple or shrine, sacrifices were instituted to expatiate the profanation, so that we can hardly wonder that their attention was not turned to it as a substitute for lead pipe. When iron tools came to be used for engraving, and were so employed on certain altar inscriptions, penitential sacrifices were afterward offered by slaying a cow or a sheep on the altar. Bronze plows were used long after the introduction of iron plows. The high priests of Rome would not shave or have the hair cut with iron instruments.

The first mention of iron pipes I find was in an elaborate system built at Marli, near Paris, and set to work in 1682, costing $1,500,000. The account says: "They drew the water by short suction pipes from the River Seine, and forced it through iron pipes up the hill. They climbed to a height of 533 feet by a series of reservoirs and pumps, but this system came to be known as a 'monument of ignorance,'" probably after cast iron established confidence as a pressure pipe. Agricola makes no mention of cast iron pipes, although he shows three-legged pots of cast iron. Ranselli, about the same period, describes a hand mill of a portable character, whose casing, he says, is made of iron, and its form and ornamentation are such that there is little doubt it was made of cast iron.

Peter Maurice, a German engineer, in 1582 erected, under the arches of London Bridge, 16 pumps, 7 inches in diameter and 30 inches stroke, driven by a water wheel, and these were of cast iron, flanged at their lower end, bolted to a valve chest.

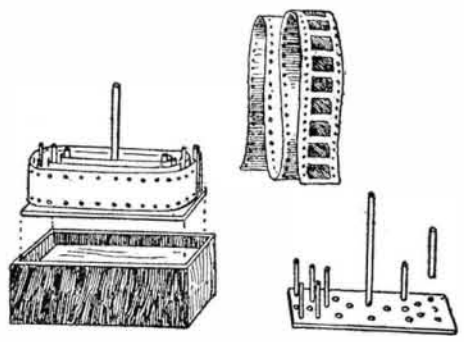
In 1835 it was estimated that over 1,000 miles of iron pipe were in use in the various systems of London water works, the first iron pipes having been laid 1746. Later on we find that cast iron pipes, 9 feet in length and 15 inches in diameter, with ball and socket flexible joints, were laid by James Watt across the Clyde for the conveyance of water to Glasgow, and another of the same size in 1818, and a little later on another of similar construction of 36 inches diameter.

Contemporary with the history of cast iron pipes in America is Peter Adams, a moulder and core maker, born in Millville, N. J., in the year 1833. His grandfather, James Adams, was a soldier in the revolutionary war. His father, Mark Adams, was born in 1789, and was a moulder and core maker at Weymouth, N. J., where he was engaged on the first cast iron pipes made for the city of Philadelphia, from designs and under the instruction and inspection of Frederic Graff, first, who was the then engineer of the Philadelphia water works, and father of the later Graff, who succeeded him in office. The first pipes made for Philadelphia were for the pumping main, of 16 inches diameter, delivering into the reservoir, the distribution still continuing throughout the city through wooden pipes. These pipes were cast direct from the melting of native bog ore, and the process was about as follows: In the beds where pigs were usually run were moulds for pipe, which tapped the flow from the furnace until one pipe was complete, then on to another mould, and so continuing for as many pipes as were planned for that pouring, using the surplus from the pipes for pigs as usual. The proprietor of these furnaces at Weymouth was a Mr. Richards, a native of the city of Philadelphia and its mayor at that time. After this, Mr. Adams thinks that the first pipe made at Millville, N. J., was about the year 1830, the inspector for which, under Mr. Graff, he remembers as one Louis Ort, who "was a good fellow enough, but inclined to be very particular unless he got one or two glasses of whisky before beginning his daily inspection, in which case it was very seldom that he would reject a good pipe."

The first pipes made at Millville, as at Weymouth, were from the product of the bog ore furnaces, and at that time, of course, cast upon their sides, a series of gates, six or eight in number, used for running the iron from the furnace into the pipe moulds, which, at the proper time, were cut off and the flow of iron continued to another series, or to the pigs, as the case might be. As time went on, and the demand for cast iron pipes increased, and sentiment ripened against using the melt direct from the ore, the proprietor of the Millville Works, David Wood, designed and constructed special foundries for their manufacture. The original proprietor of the Millville Iron Works, as before stated, was David Wood, a brother of R. D. Wood, who succeeded him and who afterward added to his pipe works from time to time until their production became the largest in the country.

DEVELOPER FOR FILMS.

ONE of the inconveniences of strips of films is that connected with development. It is either necessary to cut them in order to allow them to enter the tray, or else it requires great experience to cause them to pass through the bath properly. The small developer which we figure herewith solves the difficulty. It suffices to fix the strips around pegs, the emulsioned side outward,



DEVELOPING DEVICE FOR FILMS.

and to immerse the whole in the gutta percha trough containing the bath.—Le Monde Illustré.

PHOTOGRAPHIC WASTE MATERIAL AND WHAT TO DO WITH IT.*

IT would take but a sorry detective to discover the presence of an amateur photographer in any household his calling might lead him to be interested in. Every possessor of a camera is also the owner of vast treasure, in the way of glass, and his dwelling may be likened to a cross between a marine store and a crockery warehouse after it has been invaded by the proverbial member of the bovine species.

His friend looks in on Sunday evening and finds him piously engaged with a biblical treatise, a state of things which is sadly belied by scraps of P. O. P. scattered on the floor, and other telltale indications.

Undoubtedly spoiled negatives form the greatest part of the unsalable matter which litters his abode. I shall, therefore, consider these first. The uses to which a ruined negative may be put are manifold. Cut down to 3¼ inches square and the films cleaned off, they make excellent cover glasses for lantern slides. Another use for them in the same popular branch of photography is the following: If, during development, you see that your negative is spoiled through uneven density, excessive overexposure, or what not, expose it to the light and allow it to blacken all over. Now sealing-wax a needle to a penholder, and by means of this little tool you can easily manufacture diagram slides from your darkened film (white lines on black ground).

Take a spoiled negative, dissolve out all the silver with a solution of potassium ferridcyanide and hypo. Rinse, dry, rub with sandpaper, and you will have a splendid substitute for ground glass.

Remove the silver in a similar manner from another negative, but this time wash thoroughly. Squeegee down on this a print, and an opaline will be your reward. From such an opaline, by cementing on a few more glasses, a tasteful letterweight may soon be made. Another way in which very thin negatives may be utilized appeared in these columns some months ago. It is this: Bleach them in bichloride of mercury, back them with black paper, and positives will result. Old negatives also make good trimming boards, the film preventing a rapid blunting of the knife, and they may be successfully used as mounting tables. Clean off the films, polish with French chalk, and squeegee your prints thereto. When dry they may be removed and will have a fine enameled, if hardly artistic, appearance. Many other uses for them may also be found if the amateur is at all ingenious.

Users of pyro, instead of throwing the old developer away, should keep some of it and allow it to oxidize. A thin negative, if immersed in this for a few minutes, will be stained a deep yellow all over, and its printing quality will be much improved.

Old hypo baths should be saved, and, when a sufficient quantity of silver is thought to be in solution, reduced to recover the metal.

Printing paper of any sort is another great source of waste, especially to the inexperienced photographer. Prints are too dark or not dark enough to successfully undergo the subsequent operations. Spoiled material of this kind, however, is not without its uses in photography. Those who swear by that unreliable combination, yclept the "combined bath," will find that scraps of P. O. P., or any silver paper, are necessary to start the toning action.

Spoiled matt surface P. O. P., bromide paper, or platinotype should be allowed to blacken all over. Here we have a dead black surface useful for many purposes. A leak in the bellows when out in the field; repair it temporarily by moistening a piece of matt P. O. P. and sticking it on; the gelatine will cause it to adhere. These papers may also be used to back plates, platinotypes, of course, requiring some adhesive mixture to make them stick.

In every photographer's possession there will be found a small percentage of stained prints. Instead of throwing these away, you may often turn them to good account in the following manner: Take a large piece of cardboard, some mountant and the prints. Now proceed to tastefully mount them so that the corners of some overlap, arranging in every case to hide the stain. If you have gone properly to work, you will have an artistic mosaic. Now wash round with Indian ink, or paint a border of leaves, and the whole thing will form a very nice birthday gift to a friend. Little "tit bits" trimmed from a stained print are also very useful to mount on correspondence or invitation cards.

Keep the stiff bits of cardboard between which your printing paper is packed. They are useful in many ways—from opaque cards in the dark slide to partitions between negatives in the storing boxes.

Plate boxes are useful to store negatives in. Before doing this, however, each negative should be incased in a paper envelope. Hundreds of these latter may be quickly manufactured; cut out the pattern and get a juvenile to paste them for you at so much a score.

In short, nearly every waste product has its uses, even the brown paper in which your camera was packed. This makes a good paste-down tint for mounting platinotypes upon.

There are, I know, a few amateurs with whom money is a plentiful commodity, and these can afford to be wasteful; but the great majority have to be careful with their cash, and to these economy means everything. Then there is the pleasure of knowing that you have obtained the maximum of success with the minimum of waste.

*By R. A. Hamblin, in the Photographic News.

CONVERTING SLUDGE INTO FUEL.

WORKMEN are now engaged at Rotherhithe in erecting machinery which, when in proper running order, is expected to revolutionize the methods of disposing of the more than two million tons of sludge that the main drainage committee of the County Council have to dispose of annually, says the Pall Mall Gazette. Before three months have passed, the municipal authorities of most of the large towns in the United Kingdom, together with the experts on matters connected with sanitation, are to be invited to witness the "trial trip" of the machinery, and if the results of experiments already made on a comparatively small scale are borne out in the greater experiment that is to be made, it is said that one of the greatest difficulties with which the authorities of most cities have to contend will disappear. Instead of a costly work, which it undoubtedly is at present, the doing away with the sludge will be converted into a profitable undertaking for the County Council.

Some years ago it was believed that the sludge of London possessed great value as a fertilizer, but those whose business it was to attend to its disposal found it quite impossible to get it taken up in sufficient quantities to be of any use to the County Council; and despite the enormous cost for steamers and their maintenance, it was found that to take it out and dump it into the North Sea fifty miles from shore was in the end the least expensive and most expeditious method of getting rid of the refuse.

The London County Council maintains a fleet of six sludge vessels, each capable of carrying a load of close upon one thousand tons to sea. The total number of trips made by these steamers last year was 2,176, and the cost of working the vessels came to more than £27,472. They are insured for £120,000, at an annual premium of £2,400. These expenses the new arrangement is expected to save, and at the same time the belief is that the County Council will be left in possession of an amount of fuel estimated at anything up to 700,000 tons per annum.

Leaving beaten tracks, investigators have for some time past been experimenting to convert the sludge into fuel, and the results obtained with comparatively moderate quantities, it is said, have led those interested to believe that all of the millions of tons annually dumped into the sea can be made, at virtually no cost, into good burning furnace fuel. When these experiments were completed those interested gave orders for the setting up of a large plant in Rotherhithe, and the work is now rapidly approaching completion. At the public trial of this machinery some half a hundred tons of the sludge brought from Barking is to be converted into fuel blocks by what is called the "Henry" process of sludge treatment. This process, briefly described, is as follows: The sludge, which, taken in large quantities, contains about 90 per cent. of moisture, would be treated by Hencke-Cunliffe machinery. It is pumped straight into machinery consisting first of two enormous hollow cylinders. These cylinders are heated internally by hot air, and being close-geared and revolving slowly, they are said to film the sludge on their face at about the thickness of a sheet of blotting paper. By far the greater part of the moisture is evaporated at one revolution of the big cylinders, and the nearly dried sludge is automatically scraped off, and falls into jacketed pans, which, like the cylinders, are heated by hot air and fitted with slowly revolving sweeps that stir and carry the sludge along until the whole of the acquired amount of moisture is evaporated. Then the sludge is automatically discharged upon machinery that presses it into fuel blocks ready for consumption in furnaces.

LEFTOMANIA.

ABSENT-MINDEDNESS would seem to be on the increase, says the Humanitarian. This is a disease not, indeed, to be found described in the pages of the British Medical Journal, but one, nevertheless, clearly defined under our present social conditions. To some extent kleptomania, with which we are all conversant, is its complement. The Great Eastern Railway auction is a wholesale example of the extent of the disease. Two thousand umbrellas, half that number of walking sticks, 600 hats, bicycles, perambulators, and feather beds were unintentionally abandoned by their owners during the past twelve months. Leftomania is recognized at all theaters, and due provision is made for the failing.