

Correspondence.

Bergmann's Blackboard Covering.

To the Editor of the Scientific American:

Being a teacher, I give you my experience in making a blackboard with velvety surface. It is as near perfection as can be. I have used it for years. Take equal parts by weight of Prussian blue powdered and of chrome green powdered; mix well. For liquid, use gilder's sizing (solution of shellac in alcohol), thinned with one-half of alcohol; mix with part of combined dry powder to the thickness of cream. Use large and stiff brush; cover quickly. In an hour's time give second coat. In a day or two smooth the surface with hair cloth.

P. S.—This covering will never look gray, as that with lamp black will.

C. H. BERGMANN.

Principal of the German School, Charleston, S. C.

Illicit Opening of Letters.

To the Editor of the Scientific American:

Not a hundred miles from New York there is a little country village where the wife of the postmaster is generally credited with opening private letters temporarily abstracted from the mails. It is said that she steams the flap over a tea kettle, opens and reads the letter and seals it again with a lick. Her illicit knowledge of the contents of certain epistles gives color to the supposition. I would like to have some of your numerous inventors suggest some means by which when a letter has been opened in this way it will reveal the fact. Ink powder, when dusted on the lid, would leave, perhaps, when licked, a smear of black, and thus betray the process; or the flap of the letter might be wet with some salt of silver, which would stain the paper and the tongue that licked it.

X.

[Your proper course is to address the Post Office Department at Washington, D. C. It will at once investigate the matter, and your connection with it need never be known. Various inventions have been made for the purpose you suggest, such as insoluble glues, etc.—ED.]

A Needed Invention.

To the Editor of the Scientific American:

Something simple and easier of application than the ordinary indicator for determining the mean pressure against a piston would, we think, find ready sale. This is suggested by the fact that many persons using steam engines would be glad to know how many horse powers they are getting from a given amount of fuel, or what it requires to drive one or a number of machines. The cost of an indicator, the trouble and expense of attaching it, or the inability to use it, puts it beyond the reach of those not expert in its use. You are often asked, "How is the horse power of an engine estimated?" The answer is simple, but the query comes back, "How am I to get the mean effective pressure?"

For the purpose that we propose the operator does not care to know the point of cut-off, or the initial and terminal pressures; all he wants is the average of these, and we think a simple instrument might be devised that would give this data alone. It should be easily attached, perhaps at one or the other of the cylinder cocks, and so constructed as to give the desired reading of pressure without a calculation being necessary.

QUIRK.

Tree Culture as a Profitable Investment.

To the Editor of the Scientific American:

I have just read the article headed "Metal as a Substitute for Wood in Railroad Ties," in SCIENTIFIC AMERICAN of April 25. The destruction of timber in America long ago arrested my attention. Timber suitable for posts and railroad ties is rapidly disappearing from our forests. Forty years ago I was an officer on the leading railroad in Georgia. The common price of best ties then, delivered on line of road, was fifteen cents. I do not know what the price is now on the same road, but some time ago it was about double.

Mr. Walter Katte, engineer on the Hudson River road, in the article referred to, says: "In am led to believe that upon the basis of 55 cents for a wooden tie and \$3 for a steel tie, and under the conditions of traffic and maintenance expenses existing on this line, the relative economy is from 8 to 12 per cent in favor of the metal system." How any railroad can be made to pay with such an enormous expense as these prices imply I cannot understand.

I have frequently advised young men who farm to plant a few acres of their best land in such trees as would make the most lasting posts. If I was a young man, I would plant a few acres in cedars and keep them closely trimmed, leaving only the top buds to grow, thus making the whole force of the roots go into the straight body. No timber makes a better post or cross tie than cedar. Then there are other trees which are nearly as good. Among these I would mention mulberry, yellow locust, and chestnut. If these trees were planted in good ground, alluvial soil for instance, and the land cultivated in field peas and vines left on the

ground to rot, the trees would grow rapidly, and the peas gathered or allowed to be consumed by hogs, the cost of cultivation would be found in the value of the pea crop, to say nothing of the growth of trees. There are oak trees now growing in this town on what was considered poor land, which are now 18 inches in diameter, planted by myself about the beginning of the civil war.

Every farmer who is living within five miles of a railroad would find it a profitable investment for himself, or his children, to plant out a reasonable amount of land in such trees as would make good ties, paying such attention to the trees as would throw the sap into the body instead of limbs. Hoping that these suggestions may do some good, I have ventured to communicate the thought to your paper. Having passed three score and ten years, I shall not live to see the result of my suggestion, if adopted, yet I believe great good will accrue to future generations.

WILLIAMS RUTHERFORD.

Athens, Ga.

Copying Book Illustrations and Other Similar Subjects by Means of Artificial Light.

Although, undoubtedly, the most important part in the operation of photographing such subjects as china, silver plate, glass vessels, coins, etc., is the employment of a proper method of lighting the objects—for owing to the great dissimilarity in the shapes of such articles, hardly any two objects being alike, or fail to be treated in precisely the same manner—still of almost equal importance is the preparation or preliminary treatment of many such articles preparatory to their being copied; and here we have a very wide field for the operator to exercise his ingenuity in.

In the case of such articles as glass jugs, tumblers, or decanters, where the main object is not only to show off the beauty of shape, but likewise to depict in many instances the exquisite designs cut upon their surfaces, it stands to reason that were any one to proceed and merely photograph the same straight away, without having recourse to some method of preventing the designs on the further planes of the glass articles from interfering with that on the immediate side next the lens, nothing but a confusion of the various designs would ensue by the one overlapping or interfering with the other. Hence one of the first steps to be taken is to so arrange the vessel as to prevent this. And in cases where the shape of the article is such as to permit of its being filled with a liquid, perhaps there is no better plan than that of filling it up with some semi-opaque liquid, which acts virtually as a backing or background to sides of the vessel. In the selection of such liquids a proper discrimination should be shown in the choice only of such liquids as are in keeping with the nature and shape of the various articles being photographed. It will require but little thought for an intelligent worker to understand that what would be quite suitable in the case of such an article as a cream jug would be quite out of place in the case of a wine decanter. Hence the necessity of selecting only such liquids as are in keeping with the articles being copied. There are, however, numerous fluids to choose from. Skim milk, in some cases, comes in very handy, so also does claret, port, and sherry wine in others, and an intelligent worker will, doubtless, be able to think of many more quite as suitable, such as beer and stout.

When following out this plan, it will be found that more natural results are secured when the vessels are not filled right up to the top.

So much for glass vessels. Now let me refer to the copying of silver cups and plate. In this class of work the main thing to overcome is the bright reflections of the burnished portions of the objects. Some writers advocate the use of ice when such is practicable, others recommend that the burnished parts receive an application of putty to deaden the surface and prevent the objectionable flare spots. I have used both these expedients with success, but latterly have discarded the use of them for a much simpler method. Simpler because it does not necessitate any tampering with the objects being copied, and, in cases where such are of a very delicate order, this becomes an important item, for with putty there is always a fear of damaging the surfaces.

The plan I adopt is merely to keep breathing on the object. This requires to be renewed after every few seconds during or at intervals in the exposure, but the cap of the lens can be easily put on and off to permit of the breathing being applied.

With some commercial firms, when any important object is being manufactured, and it is desired to have the same photographed, it is generally arranged for such being accomplished previously to the burnishing of the parts. This is a great advantage, but, of course, is not feasible in the great majority of cases.

When developing silver objects, the amount of pyro used should be very small, and the exposure given a very full one, and I have always got the best results on a dark background.

Medals and coins require some consideration in the selection of suitable backgrounds also, and the mode of their being held *in situ*. My best results with bronze

medals and coins are got by using as a background a sheet of opal glass, and by placing the medals right on the surface with the aid of a very thick solution of powdered gum, almost to a jelly. Silver medals are best fixed up in the same way against a sheet of ordinary plain glass, while at some distance behind is placed a black velvet background. Gold medals and coins are best on opal, because they get more relief. China plates, and such like, are best relieved by black velvet placed at a distance.

So much for the necessary arrangements as to suitable backgrounds. When the best results are to be obtained, attention must be given to this point.

In lighting, there are numerous points to be considered, and here, at the outset, the first thing to be thought of is the shape of the object being photographed. When using artificial light, I know of no better place for an amateur, or professional either for that matter, to use than his long dining room table placed under his gasolier. From such he may with convenience lead the gas to his Argand burners on their pedestals on the table by means of the rubber tubing, and when it is deemed expedient to throw in as much top light as possible, the gasolier, when fully lit, will render good help in this respect. Some objects are best lit by reflected light alone. In my practice I use my own invention, which is a plaster of Paris chamber when copying some classes of subjects, but a very good and simple makeshift can be rigged up by any one without any great cost. Say it is desired to copy a china plate so as to show off the design. Now here we have just a case in point that is best done by reflected light. This I would put into my chamber and so arrange matters that the lights are not in front of the object, but that the strong, bottled-up light brilliantly surrounded it.

A similar mode of lighting can be arranged for by merely cutting out a center in a large mounting board. This aperture should only be large enough to permit of the lens viewing the plate through. The china plate is then placed in position, and the two Argand lamps, one at each side, but not in front, so as to throw only reflected light upon the white cardboard on it. In very many cases, when photographing by artificial light, it will be found that this intervening screen, placed so as to reflect light only on the object, will give much better results than by throwing the light directly from the gas lamps in front. One great advantage is that reflections are not nearly so liable to arise, and if the brass fittings of the camera and lens are covered up with a black cloth, there should be no reflections at all to contend with.—T. N. Armstrong, *British Journal of Photography*.

Recent Discoveries of Egyptian Remains.

Writing to the New York *Nation* from Keneh, Upper Egypt, on March 17, Mr. W. H. Goodyear describes an important and most interesting discovery made by Mr. Petrie at Maydoom. Mr. Petrie has there unearthed "the oldest known Egyptian temple and the only Pyramid temple ever found." Apart from the "Temple of the Sphinx" at Ghizeh, this building is also "the only temple of the Old Empire so far known." It was buried under about forty feet of rubbish. It lies directly at the center of the eastern base of the Pyramid, on the side facing which it has two round-topped obelisks. "Obelisks and temple chambers so far entered," says Mr. Goodyear, "have the plain undecorated style of the Old Empire, as shown by the Temple of the Sphinx, but hieratic inscriptions in black paint found within fix the name of Seneferoo as builder, and confirm the supposition to this effect hitherto based on the fact that tombs near the Pyramid contain his cartouche. Seneferoo is the king connecting the third and fourth dynasties, and variously placed in either. According to computations of Mariette and Brugsch, the antiquity will be about 4000 B. C., or earlier." On Tuesday, March 10, Mr. Petrie's workmen reached a platform which appeared to be a causeway terminating with two obelisks at the base of the Pyramid. "In the forenoon of Wednesday," continues Mr. Goodyear, "a workman came to say that an opening had been found under the platform on the side next the Pyramid. This proved to be the top of a doorway choked by detritus, through which Mr. Petrie crawled into an interior of three chambers and discovered the inscriptions mentioned. I had the pleasure of following him. Mr. Petrie thought the apartments had not been previously entered for about three thousand years—that is to say, that the rubbish fallen from the Pyramid had choked the entrance about three thousand years after construction. A friend who was with me noticed on the floor some dried wisps of papyrus, a plant now extinct in Egypt. The chambers thus far found are so filled that one cannot stand erect in them, and a door at the end of the third chamber is blocked by large stones. Over all lies an enormous mass of detritus, whose removal by Arab diggers is now in progress. I had the pleasure next day of carrying the news of Mr. Petrie's find to the gentlemen of the Egypt Exploration Fund, at Beni-Hassan, and of witnessing their unaffected delight over it."