locomotive to be practical. Of course it will require a considerable volume of water to move a car of ten tons. This can be obtained near the head of Butte Creek if it should prove desirable to have a flume to the timber of that region, and any volume of water necessary for and down Feather River could be had at the lower end of the Big Meadows. Of course the flume would have to be constructed with a view of having the track for the car on the top of its sides, and braced from the outside, so that no ties or cross-pieces would be required on the top of the flume, as that must be left open for the paddle-wheels to work in. If it should cost as much to build a flume of this kind as it does to lay a railroad-track, the advantages would still be in favor of the flume, for the economy of motive power is much greater. Indeed, it is nothing at all after the track and flume have been constructed. It would also have the advantage of being narrow gauge, which is an important consideration through a mountain country.—*Butte Record*.

ON THE USE OF TIN AND GOLD COMBINED.

By J. PAETSCH, M.D., D.D.S., Berlin, Prussia.

I HAVE frequently seen good operators make gold fillings for very delicate patients, who were compelled to suffer for hours. I am sure that the same could have been made in much less time, and the teeth have been preserved quite as well—perhaps better—by using tin and gold. I say “perhaps better,” because such a tooth requires, for a gold filling, so much time and so much pressure, that besides the other disadvantages, inflammation may follow. It is not the first requisite that we should make as fine a piece of workmanship as the goldsmith. Our first task is to preserve the tooth, at the expense of a little pain and discomfort to the patient as possible. If, besides this, we can superadd fine workmanship (as we, fortunately, can do in most cases), so much the better.

In operating with tin and gold (and I beg you to note, gentlemen, that during the six years I have used these materials combined not one of my patients has ever experienced the slightest pain or trouble from galvanic action), I have found them a much poorer conductor of heat than gold alone. In the winter season, when my patients have complained of an uneasy feeling in those teeth that had been filled with gold, they have not complained of those in which the combined metals had been used, although the latter were more involved in decay. It was the observation of this fact that led me to put a stratum of tin and gold in the bottom of very deep cavities, where the caries has approached very near the pulp-cavity; then build the gold on this as a base. An excellent filling is the result, and the patient does not complain of pain attendant upon changes of temperature in the mouth. In addition, there is this great advantage: such a filling can be made in half the time that the gold alone would require.

A NEW METHOD OF IMPARTING ARTISTIC FINISH TO PHOTOGRAPHS.

By E. DUNMORE.

THE materials are few and their application easy; they consist of sandpaper, of various degrees of fineness, cardboard, and glue—that is all. Use them after this fashion: Cut a piece of cardboard somewhat larger than the mounted proof, upon which glue sandpaper, face up; and when dry, cut out an aperture corresponding exactly in shape and size with the picture to be operated upon; make the edges of the aperture smooth and even. This constitutes the mask or die. Suppose it is a medallion portrait of the usual *carte* size you wish to finish: fit the sandpaper mask, face down, on the enamelled side of the portrait, adjusting it so that the oval picture corresponds with the aperture of the mask. Place a piece of smooth paper outside for the purpose of printing, scratch on the polished parts, and pass the whole through an ordinary rolling-press, face down. On removal, it will be found roughened on those parts that have been in contact with the sandpaper, and the polish and relief of the smooth portions greatly enhanced by the contact. Various degrees of fineness may be obtained by slightly shifting the position of the mask, and putting through the press after each alteration. This is the novelty. Other substances besides sandpaper can be used. Probably an engraved metal plate would be better; in fact, almost any textile fabric, such as net, gauze, lace, etc., is applicable. For my own part, I prefer the effect of sandpaper to a more ornamental design, a flat mat surface being as good as any thing, if not better, for giving value to the polished part.

CONDENSED BEER.

MR. LOCKWOOD describes, in the *Journal of the Society of Arts*, his patent solid or condensed beer. Beer is taken at its best condition, its alcohol is separated and saved by a method of gentle distillation *in vacuo*, and the residue is condensed in a vacuum-pan, like milk. When finished, it is inclosed in hermetically-sealed packages, the alcohol first being added to it again, and acting as a preservative. The fermentation which was present in the beer when it was taken is suspended by the heating, and the condensed beer remains sound in this condition, apparently for any length of time, as some exists that has now been kept for nearly two years. When re-made by adding water, it is not wort, but real beer, having all its flavor and alcoholic strength, and lacking only effervescence, which can be quickly imparted by reviving the suspended fermentation for a short time in order to develop sufficient carbonic acid gas to give it the required briskness; or it is fit to drink immediately, if charged with carbonic acid gas, like aerated water.

AMERICAN CHAPEL, ROME.

THE new American chapel, dedicated to St. Paul, is in course of erection in Rome, from the designs of Mr. G. E. Street. The church consists of nave and aisles, of five bays and a semi-circular apse. The walls are constructed of brick and stone in alternate courses, stone from Arles being employed for the interior, and travertine for the exterior work. The nave arcade is carried on columns of red granite with gray marble shafts. The building, which is now roofed in, is covered with tiles, and the aisles are groined in brick with stone ribs, and the apse has a semi-dome in brick. The tower, which will be crowned with a low spire, will measure forty-three metres from the ground to the top of the cross on the summit. The building is lighted by two light windows in the aisles, and single lights in the clerestory, and a large rose window at the west end.—*The Architect*.

USE OF PAPER.

OF the 1,300,000,000 of human beings inhabiting the globe, 370,000,000 have no paper nor writing material of any kind; 500,000,000 of the Mongolian race use a paper made from the stalks and leaves of plants; 10,000,000 use for graphic purposes tablets of wood; 130,000,000—the Persians, Hindoos, Armenians, and Syrians—have paper made from cotton, while the remaining 30,000,000 use the ordinary staple. The annual consumption by this latter number is estimated at 1,800,000,000 pounds, an average of six pounds to the person, which has increased from two and a half pounds during the last fifty years. To produce this amount of paper, 200,000,000 pounds of woollen rags, 800,000,000 pounds of cotton rags, besides great quantities of linen rags, straw, wood, and other materials, are yearly consumed. The paper is manufactured in 3900 mills, employing 90,000 male and 180,000 female laborers. The proportionate amounts manufactured of the different kinds of paper are stated to be—of writing paper, 300,000,000 pounds; of printing paper, 900,000,000 pounds; of wall paper, 400,000,000 pounds; and 200,000,000 pounds of cartoons, blotting paper, etc.

[Baltimore American, January 10.]

WRECK OF THE BALTIMORE AIR-SHIP.

THE Schroeder air-ship, which has been lying in a nearly completed state just beyond Boundary avenue, on the north-western suburbs, was almost totally destroyed last Thursday night by the heavy gale which prevailed. The board fencing surrounding it had been removed to one of the neighboring yards, and preparations were in progress for stowing away the ship until next spring, when the company who owns it expected to raise sufficient means to arrange for a trial of the invention. On Thursday night the ship was left exposed upon the broad common, and when the wind came it twisted the big machine into a shapeless mass of irregular wicker-work and broken boards. The force of the gale must have been great, for the strong iron frame is contorted and strained, and where the ship was secured in the ground the earth has been torn up for several feet around. The machine is so seriously damaged and strained that it is not likely that its use will be either possible or safe. The wreck was yesterday viewed by many persons who were attracted to the place by the odd-looking thing as seen from a distance.

[Medical and Surgical Reporter.]

THE QUESTIONABLE VALUE OF HYPODERMIC SOLUTIONS.

DR. LAFITTE, of Paris, attacks hypodermic medication, so far as the alkaloids are concerned. He says, not the alkaloid, but simply the water, distilled or not, has the merit of allaying pain. Startling cases are mentioned (*L'Union Méd.*, Nos. 113 and 114, 1875), and from these we find that severe lumbago, obstinate neuralgia, etc., are instantly relieved by the injection of about thirty drops of water. Failures are but few, and the author consoles himself respecting these by the consciousness of not having done any harm, if he did no good.

M. Lafitte now asks himself how the simple water acts, and he throws out the theory that the ultimate nerve filaments are compressed by the water, and, being thus paralyzed, can no longer convey the sensation of pain. M. Lafitte goes the length of maintaining that all the hypodermic injections hitherto performed acted through the agency of the water, and he is very particular in stating that his operations were never followed by abscesses or any unpleasant symptoms.

[New-Bedford Evening Standard.]

IRON LIGHTHOUSE.

MR. EDMUND GRINNELL, of this city, is now finishing at his foundry, on South Water street, an iron lighthouse, to be erected by the government on a coral reef at Sand Key, near Key West, Florida. The structure, for the building of which Mr. Grinnell has the entire contract, requires the use of 35 tons of wrought-iron, and 40 tons of cast-iron. It consists of a keeper's dwelling, surmounted by a tower. The dwelling is 38 ft. square, and 12 ft. 6 in. high. It contains 7 rooms, each 12 by 12 ft., besides an oil-room. The tower, which rises from the centre of the building, is 96 ft. high and 8 ft. in diameter. The dwelling is constructed of cast-iron plates, and the tower of wrought-iron, securely bolted together. As the reef on which the lighthouse is to be placed is entirely under water, wrought-iron piles will be driven into the coral, from which columns will rise to secure the tower.

SUNSHINE.

AT a recent meeting of the Meteorological Society, London, Dr. J. Mann, President, in the chair, a paper was read “On the Registration of Sunshine,” by R. H. Scott, F.R.S. This paper is on the continuous record of sunshine and rainfall obtained at Kew for September, 1875; the latter by Beckley's rain-gauge, the former by a method originally proposed by Mr. J. F. Campbell, of Islay, F.G.S. This consists in the use of a sphere of glass to concentrate the sun's rays, and a strip of cardboard is placed on a frame concentric with the sphere, and distant from it by its own focal length. The sun when it shines burns a hole in the cardboard, the length of the trace being regulated by the duration of the weather.

ON THE CHEMISTRY OF THE URINE.

GALILEI (*Pharm. Zeitschrift f. Russland*, XIII. 683) uses the following method for the determination of albumen, which is applicable in the presence of the phosphates or the urates. A test-tube is one third filled with a deep yellow solution of picric acid, and one or more drops of the to-be-tested urine added. If albumen is present, there immediately appears a sharply-marked white cloud; upon heating the liquid, the albumen collects in a lump and floats. The reaction leaves nothing to be desired for delicacy.

E. Reichardt, in the same journal, XIV. 45, demonstrates the presence of a body similar to dextrine in albuminous urine.

David writes (*Bull. de la Soc. de Chem. de Paris*, XXIII. 235) of a peculiar urine which decolorizes Fehling's solution, but did not affect the beam of polarized light. A substance possessing the same properties was separated from the urine. The death of the patient so limited the supply of the material that further investigations were prevented. Z. B. E.

THE WOOD OF NOAH'S ARK.

IN the ancient Egyptian temples stones have been found tied together by a kind of dowel of wood on their upper surfaces, and these wooden ties of dove-tail form were inserted about an inch deep. Some of these have been found quite sound in temples known to be at least four thousand years old, thus proving the wood to be of the most durable kind. The ties are said to be the tamarisk or shittim wood of which the ark was constructed, and which was a sacred tree in ancient Egypt, though now very rarely found. The thought occurs why, instead of metal dowels, wooden ones could not sometimes now be used. Though metal ones would last longer they not unfrequently split the stone.

CORNISH PUMPING ENGINES.

THE *Mining Journal* gives reports of sixteen pumping-engines. They consumed 1703 tons of coal, and lifted 12,400,000 tons of water 10 fathoms high. The average duty of the whole is, therefore, 49,200,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal, being a little over seven tenths of a pound of coal per horse-power.

COAL-MINES IN RUSSIA DEVELOPED BY AMERICAN LOCOMOTIVES.

A CONSULAR report from Russia says: “The first ten locomotives were imported to St. Petersburg in 1872 from the Baldwin Locomotive Works of Philadelphia, followed by twenty more from the same firm, and last summer fifty more were contracted for at the Grant Factory, in New-Jersey. The great moment of this incipient trade will be apparent from the fact that there is an immense field here open for their import for many generations to come, the railroad lines to Russia having just begun to develop on a greater scale, those in operation hardly reaching to 18,000 English miles up to this day. The small locomotives heretofore built in Russia, at the rate of 100 to 120 only a year, also those imported from Germany, France, and Belgium, were all built for consumption of wood for fuel till the agent of the Philadelphia firm had brought the attention of the consuming department to the fact that anthracite coal of best quality can be found around the town of Worenesk, in Southern Russia, extending over 180 miles, and that whole regions were abounding with it in the southern half of the empire, sufficient to feed the locomotives of the whole continent. The American locomotives finally accepted and introduced here, being expressly built for coal consumption only, have led Russian capital to the development of the now quite numerous coal-mines in the district named. On account of the faultless finish of the American locomotives and their superior power, guaranteed to haul on a level 1075 tons, in lieu of those heretofore in use, hauling but 650 to 700 tons, they are much preferred, as the higher price paid for them—namely, 25,000 silver roubles apiece, instead of 18,000 to 20,000 silver roubles paid for those brought in from Germany and Austria, would indicate.”

CHALCOPHANTITE: A NEW MINERAL SPECIES.

MR. GIDEON E. MOORE, Ph.D., describes in the *American Chemist* a new mineral found at Stirling Hill, Ogdensburg, N. J.

The mineral occurs in druses of handsome and lustrous but minute crystals, and in foliated aggregates lining the walls of the cavities in the matrix, or grouped to stalactitic and plumose forms. The lamellar structure is perpendicular, or nearly so, to the surface upon which the crystals are implanted, or, in the stalactitic forms, to the direction of the latter.

The following figure represents a type of frequent occurrence among the more perfect crystals:

The face O possesses a brilliant lustre, and gives perfect reflections: the rhombohedral faces are far less brilliant, and are often deeply striated parallel to the basal plane.

The crystals are often flattened out to the thinnest scales, and these are in some cases grouped together parallel to O, forming aggregates which often bear a strong resemblance to combinations between a hexagonal prism and the basal plane. The prismatic faces, however, reveal their composite character by the absence of lustre and the frequent striæ parallel to the basal plane.

Cleavage: Basal; perfect. Structure: foliated; micaceous. Thin laminae, very slightly flexible.

Hardness = 2.5. Cuts with a smooth surface like graphite. Specific gravity = 3.907. Lustre: metallic; splendid on the basal plane, usually dull on the other faces, except in the more perfect crystals. Color, bluish-black, in the larger and more perfect crystals, verging on iron-black. Streak, chocolate-brown, dull. Opaque even in the thinnest lamellae.

Before the blow-pipe turns of a color varying from pale yellowish bronze to copper-red, exfoliates slightly, and on continued heating darkens in color, and shows traces of fusion on the edges of thin laminae. In the closed tube gives off water and oxygen, exfoliates slightly, and changes to a mass of loosely coherent laminae of a golden-bronze color, and metallic lustre, greatly resembling in appearance certain varieties of the mineral enstatite (var. bronzite). With borax, a strong manganese reaction, the button becoming cloudy in the reducing flame. On charcoal, with soda and borax, a coating of oxide of zinc. Soluble in muriatic acid, with evolution of chlorine on warming.

The species is of recent origin, being evidently a product of the decomposition of franklinite and other manganiferous and zinciferous minerals.

THE developments of the Comstock lode in the State of Nevada form a special subject to the Director of the Mint in his report lately submitted to the Secretary of the Treasury. A careful examination of the consolidated Virginia and California mines was made by the Director and Prof. R. E. Rogers in July and August last. The annual product of the Comstock mines is estimated at \$50,000,000, about 45 per cent of which will be gold; a product equally large from domestic sources may be anticipated during 1876. Professor Rogers expresses the opinion that the ore in the two mines above mentioned will give an ultimate yield of three hundred millions of dollars.