Correspondence.

Plumbago as a Lubricant for Steam Cylinders.

To the Editor of the Scientific American:

The engine on which the experiments were carried on was a compound duplex, high pressure cylinders 14 × 12 and low pressure cylinders 20 × 12, with a piston speed of 200 feet per minute.

To obtain the best results, the common oil cup was exchanged for a goblet-shaped tallow cup, with a lid; after which, the piston follower and springs were taken out and cleaned before starting the engine. One-third ounce of finely pulverized plumbago was placed in the cup. When fairly under way the valve of cup was opened half way, and a little later was opened to its full extent.

The piston rod became coated with plumbago soon after starting, and by noon the whole had passed from the cup into the cylinders.

On starting up, in the afternoon, one-third of an ounce more was placed in cup, and the engine run till five o'clock with like result. There was no noise in cylinders, either in starting, running, or stopping the engine, and after two months' use, with the above amount twice a day, no noise has been heard in cylinders. Soon after beginning its use, a small amount of plumbago was left in cup. To obviate this, one ounce of water was poured in cup after the plumbago was put in, and a decided improvement was observed, in that it could be fed into the cylinders as readily as oil.

After three weeks' use, the cylinder heads were taken off and the working parts were found coated with plumbago, so it could not be easily rubbed off with the finger.

EARL GAINER.

El Reno, O. T.

Cooling Air by Means of Underground Pipe.

To the Editor of the Scientific American:

Can you give us any information as to the construction of a cold storage apartment, which is built by means of sewer pipe being laid a certain depth below the ground, and for a certain length through which the warm air passes, and by the time it reaches the apartment is sufficiently cooled, so as to dispense with the use of ice? The cool air is then carried away through a high chimney. We are informed that cold storage apartments are being built on this principle, and any information you may be able to give us as to their construction and practicability will be highly appreciated.

THE ZOAR SOCIETY.

Zoar, O., July 29, 1893.

[The cooling of air, as indicated by our correspondent, has been proposed; but we do not call to mind any practical example now in operation. The principle seems correct, but the power of a natural circulation appears weak. The air, when it becomes cool in the subterranean pipes, is disposed to stay there, like the air in wells and cellars, and unless some positive means are employed to produce a fixed condition of circulation, the apparatus would be of little value. The natural draught of a chimney, without heat, is as liable to be downward as otherwise. Again, if artificial draught is produced, it should not be in excess, as a strong draught through the subterranean pipes would soon warm the passages and ground and destroy its cooling properties. Under any circumstances, the amount of cooling effect must be small, as the temperature of the ground in summer, at a depth of four feet, is seldom cooler than 55° Fah. In order to obtain a temperature of 60° in hot weather, the subterranean exposure should be very large; we should judge not less than one square foot for every cubic foot of space in the cool room, with a moist ground for the unglazed tile pipe. Then, if four inch tile pipe is used, it will require 1,000 feet for a cool room of 10 feet × 10 feet × 10 feet, which may be divided into two or more sections leading in different directions. In very dry ground, we should judge that fifty per cent more pipe should be used. For artificial draught, a small fan driven by electricity, a wheel train and weight, which may be wound up by a small windmill, will be the most available power; otherwise an up-draught ventilator may be made available when there is any wind. The use of fire for creating draught in the chimney will be troublesome and expensive, unless the cold room chimney could be warmed by a flue used for other purposes. The more porous the tile pipe can be made, the better results will ensue, as it must absorb the water of condensation from the cooling air and also be a partial feeder of air from the ground.—ED. S. A.]

Lemon Sirup.

Take 1 pint and a quart of juice, 2 pounds of sugar. Let the juice stand in a cool place to settle. When a thin film is formed on the top filter the juice, add the sugar, and finish in the bain-marie. If the flavor of the peel is desired with it, grate off the yellow rind of the lemons and mix with the juice to infuse, or rub it off on part of the sugar and add it to the remainder when you finish it. Orange sirup is made in precisely the same manner as lemon sirup.—*Western Druggist.*

THE BORDAME COMET.

The accompanying diagram will give the unscientific reader some idea of the relation between the paths of the comet and earth. Suppose the circle representing the earth's orbit to lie in the plane of the paper, then the comet's path lies in a plane inclined 20° to that of the paper and intersecting the latter in the line NN', which is called the line of nodes.

About June 26 the comet passed the point, N, its ascending node, and since that time its path has been north of the ecliptic. On July 7, it reached its nearest point to the sun, and at almost the same time its nearest point to the earth. It was discovered therefore at the time of its greatest brightness, when it was almost directly between the earth and the sun, but at some distance above the line joining the two. The tail of the comet was directed toward a point almost directly over the earth.

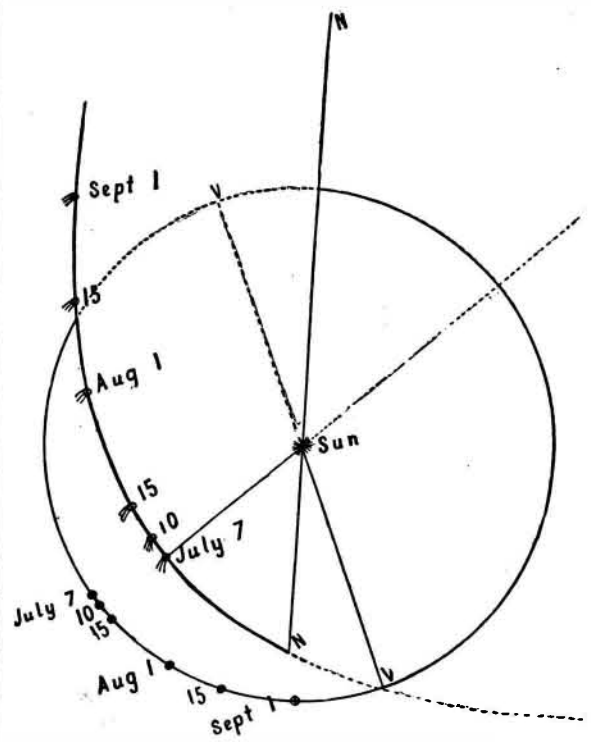


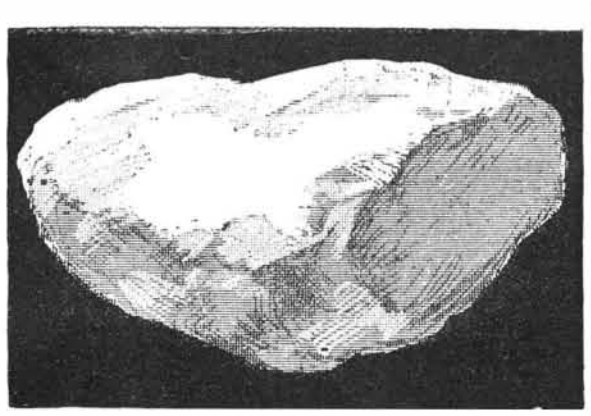
DIAGRAM SHOWING RELATIVE POSITIONS OF COMET *b* 1893 AND THE EARTH.

The apparent motion of the comet among the stars was very rapid, because of its nearness to the earth. This has been rapidly decreasing, as might be expected from the fact that the earth and comet are moving in opposite directions. Its course has been southeastward, passing by the feet of the Great Bear and between Leo and Coma Berenices. During August it moved very slowly southeast from a point 5° east of the star β Leonis toward the double star γ Virginis. —*A. and Astro. Physics.*

A MONSTER DIAMOND.

We have received from Birmingham the plaster of Paris model of the great South African diamond, recently found in the Orange Free State, and which is claimed to be the largest ever discovered. The model was sent to the editor of the Birmingham *Daily Post* by Mr. Walter Lowe, a Birmingham man, now resident in South Africa. In a letter which he sent with the model, dated Jagersfontein, July 2, he says:

"You may have noticed by cable that the largest diamond the world has ever seen has been found here. This place is all excitement about it, and it may make a stir in the financial world. I am sending by this post a perfect plaster of Paris model of the diamond, which was found on June 30, 1893. This model was taken by me personally this morning, and is the only one which has been taken except one which I have sent this afternoon to the President of the Orange Free State, by special request. The diamond was found in the New Jagersfontein Company's mine. It is the most perfect large stone ever seen, its weight is 971 carats, its color is blue-white, and almost perfect. It has one black spot in it, which, however, the owners stated to me will cut out. Its value, of course, cannot now be stated; but I think if £50,000 were offered for it now, or even double that amount, it would not be accepted. Some even declare that it will be worth half a million. It was found by a Kaffir, who was working in the mine, shortly after blasting. The Kaffir, in this case, was talking to his overseer, when he saw something shine, and he put his foot over it until his 'boss' had gone away, when he picked up the immense diamond and put it in his pocket. Afterward, in the compound, he handed it over to the manager, for which he has been given £150, a horse, saddle, and bridle, and has gone home in, no doubt, perfect happiness. An extraordinary circumstance is that one gentleman, or some gentlemen, I don't know which, were under contract to buy all stones, good, bad, or indifferent, at so much per carat. This contract terminated on the 30th of June, and this stone was almost, if not quite, the last stone found on that day."



"The Largest Diamond in the World:" The "Jagersfontein Excelsior," recently discovered in the Orange Free State. (Exact Size.)

The model shows that the stone is in the form of a sloping cone flattened on two sides, and standing on an oval base, so flush as almost to appear to have been cut. Its height is about three inches, and its width about two, while the flat base measures nearly two inches by one and a quarter. The diamond itself, which has been named the "Jagersfontein Excelsior," is now in London.—*London Daily Graphic.*

Seaside Painting.

A paper was recently read on this subject by Paul F. Brazo before members of the Master Painters' Association of New Jersey. The author said:

I will relate what I have observed, experienced, and practiced for the past thirteen years on the ocean front at Long Branch.

In the first place we have to contend with a great amount of dampness and fogs, which always leave a residue of salt on the surface of the work to be painted or otherwise treated. So it follows that we must be on the alert to know that the work is perfectly dry; especially new work. It was only after I had several jobs badly blistered and spoiled that I concluded to seek a remedy, and my remedy was this: To leave all piazza ceilings, floors, and clapboards under piazzas and porches until ten o'clock, or later, in the day, if possible to do so. I have followed this rule, and have had no trouble in that direction since.

As to the salt on the surface of the work—where it was practicable, and the work was not to be hurried, I had it washed thoroughly a day or so before applying the priming coat. I then primed with pure lead, used thinnings composed of one-third turpentine and two-thirds raw oil, with one-half pint of good japan to the gallon, in shade of color as near to the finishing color as possible. My object in keeping the priming the same shade as finishing is that it makes the work more solid, and as the priming coat has to stand at least three days or more before applying the finishing coat, and as it generally makes its own color, or, in other words, the priming darkens, it follows where we put on finishing there is just enough difference to be perceptible and comfortable to work over without showing brush marks, etc.

I have also observed that a combination of pure lead and French zinc is the best, using good japan and raw oil only as a binder. For finishing coats, the zinc and lead should be in the proportion of 25 per cent and 75 per cent pure lead—no pulp lead—as we have all the moisture on the surface that is necessary. At all times I use the French zinc, for the reason that it does not contain sulphur to such an extent as our American zinc, consequently does not bleach my coloring matter so quickly.

I particularly avoid using ochers or other earth paints, except in priming coats, for I have observed that all buildings where ocher was used as a stainer, no matter what grade it was, or what lead was used in combination with it on the sea coast, were in all cases attacked with the painters' worst enemy—mildew; particularly when painters were foolish enough to use boiled oil as a means of conveyance. On the contrary, I have observed that lead, zinc, chrome yellow, and their kindred pigments, with raw oil and japan as a binder are not molested by mildew, and that they wear longer, hold their luster better, and instead of bleaching in spots and mildewing, will wear uniform; in fact, grow darker in course of time, and in all cases give your customers good satisfaction.

I have noticed that all, or nearly all, of those who come here from the cities or from towns away from the coast use boiled oil, and that all of their work goes wrong in the first six months, and makes a difficult job for the painter who follows them to do good work.

A word about shellac work in our damp air may do some fellow craftsman good. Do not do any shellacking in the early morning. If you must do it in damp weather, or in the early part of the day, have your men take a piece of cheese cloth, dampened with raw oil, and rub dry, and the work will not turn white, as I see some of the cottages at present which I have been called in to remedy; that is if you cannot varnish immediately after shellacking, or if a shellac finish only is required.