Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Dangerous Oils vs. Dangerous Lamps.

MESSRS. EDITORS:—I notice on page 148 of present volume, that Mr. Chas. B. Mann aims a blow at glass as a material for kerosene lamps. He has hit the nail on the head. So long as the low value of the light petroleum fluids offers large inducements to cheat, all legislation will fail to protect us from the horrors of kerosene burning. Of all substances, glass is the most unfit for kerosene lamps. A large portion of the accidents which result in death, are caused, not by explosions, but by the accidental breaking of glass lamps, which may occur in a thousand different ways.

Another large class of accidents, though but little understood, are those resulting from unequal expansion of the glass by heat. Being a very poor conductor of heat, the large amount generated by the burner is concentrated around the collar and top of the lamp, while the lower portion remains cool, causing the heated portion to expand, producing fracture. The lamp falls in pieces, and the overheated oil ignites.

Experiment also proves, that in a glass lamp, the heat, which cannot escape, is conducted by the oil in the wick down into the body of the oil, raising the temperature many degrees above that of the outside of the lamp, or the surrounding atmosphere; while in a metal lamp this heat is spread over the whole surface, and is rapidly dispelled by the air, leaving the oil cool. In order to test this matter, I placed, side by side, a glass and a metal lamp, containing the same kind of oil, and using the same kind of burner; the other conditions being as nearly as possible alike. After burning two hours in a room, at 71° Fah., I introduced, through the feeder, the bulb of a thermometer into the oil. In the glass lamp, the mercury indicated 104°, while in the metal lamp it only indicated 79½°. The collar and a small portion of the glass fount were very warm, while the main portion of the glass was cool; showing that the temperature of the glass is no indication of that of the oil within.

Many of the burners now in use conduct downwards but little heat, while others conduct an amount sufficient to bring almost any oil up to the flashing point. No glass lamp is safe from accident. I have known a shuttle to fly from a loom, breaking a glass lamp, and setting fire to the mill, which was saved only by the flames being smothered with a large amount of valuable cloth which happened to be handy.

For household purposes, I believe the rule I have adopted, at my house, to be safe. I have one or more lamps in each room, on stationary brackets, out of the reach of children, and only use one lamp to carry about the house. These lamps are all metal, and cost but $3 per dozen, and are more ornamental than my old glass lamps, costing three times that amount. I believe them to be absolutely safe. My cans are so constructed that the oil, in filling the lamp, is filtered through sand, so that no fire can possibly communicate with the interior. Give us safe, cheap, metal lamps and safe cans, and, in spite of legislative failures, we shall be comparatively safe. J. B. FULLER.

Norwich, Conn.

Petroleum Dangers.

MESSRS. EDITORS:—I am glad to see that petroleum dangers are at last exciting the attention they deserve; and it is to be hoped that we shall soon have the proper remedies. I had intended to write an article on the subject, but your last correspondent, Mr. Mann, of Baltimore, has nearly saved me the trouble, by expressing my views exactly: namely, that all petroleum oils are likely to generate an explosive vapor, when long confined with a vacuum above them, and subjected to a moderate heat; and that although thousands of gallons of positively dangerous oils are daily sold by ignorant and villanous dealers, yet the lamps in common use are as much at fault as the oils, as disasters have occurred with the best of oils. Now this state of things, I think, can be easily remedied, and I would offer the public a few suggestions:

First. Let us have lamps so constructed as to be as far as possible proof against accidents, and on such principles that any oil may be burned in them with perfect safety by careful and intelligent persons. Second. Let us have legal enactments, forbidding, under severe penalties, the sale of all light and volatile oils, for domestic purposes, and requiring all retailers to have their stock inspected, and proved to be unignitable at 110° Fah. Third. Let benzine and all the volatile products of our oil wells be used in specially constructed lamps for street lights, light-houses, etc., superintended by careful and competent hands, and in situations where, if an accident did occur, it could do no great damage.

I have frequently used pure benzine, with great success and economy, for light and for cooking meals, taking great care to have my lamp so full as to leave but little vacuum, and having the wick so tight that the flame could not pass down it; and never letting the bowl get above 80° Fah. But, though I could do this with perfect impunity, I should consider myself a murderer if I introduced such a practice to the public, as the world always will be full of people too stupid or careless to be trusted with even tallow candles.

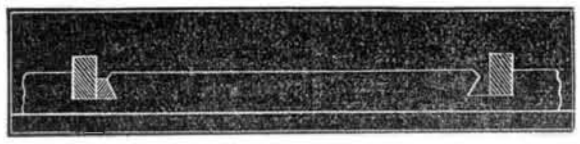
Now, I would point out some of the defects of our common lamps. Fragile glass bowls, mounted on high stalks often slightly fastened to narrow bases, itching to be knocked over and broken; short wicks passing loosely through short tubes, the flame only an inch above the bowl, in the top of which explosive vapor more or less always accumulates, as the oil heats and exhausts, the looseness of the wick giving free passage from the flame to the vapor: these things seem to be a combination peculiarly designed to invite disaster. I also object to the nicked wheel in the tube; though very convenient for turning the wick up or down, it will not work when the wick is tight enough to prevent the flame from being conducted downwards by the ascending vapor. A simpler and safer plan is to have the top of the burner, with the chimney, to swing over on a hinge, when the wick can be regulated with a pin or an awl.

With better lamps and good oil, the world may use petroleum, and suffer no more from it than it did in past times from tallow. LINDON PARK.

Brady, Pa.

Wooden Railroads.

MESSRS. EDITORS:—In your valuable paper of February 4th, in the "Correspondence" column, I notice that you would like to hear more in detail about the wooden railroad. We built, in 1865, a wooden railroad, $3\frac{32}{100}$ miles in length, to transport coal, by mule power, to the Ohio River, near Rockport, Ind. The cross ties were mostly split out of white oak, from 7 to 7½ feet in length; and the notches were sawn with hand saws, as shown in engraving. They were cut straight down on the outside, and bevel and taper inside, to keep the keys in their places, if they should get loose by shrinkage.



We placed the ties from 2 to 2½ feet from center to center. We used the best white-oak rails 3 × 6 inches, and keyed them in with oak, so that the bevel space was filled.

The cars used on this road had 24-inch wheels, 4-inch tread. 1½ inch depth of flange, and 2¼ inch axles, run in cast boxes lined with Babbitt metal. The weight of car was about 1,500 pounds, to carry 60 bushels coal=4,200 pounds (the Indiana bushel is 70 pounds); in all about 3 tuns per car. The cars ran smoothly and easily for six months, when the rails began to get soft, and to splinter for a quarter of an inch of depth. They were much the worst where the sun shone on them, during the summer months. About two miles of this road was through timbered land, and the rails in the shade lasted much better than those exposed to the sun.

The next trouble we encountered was in frosty weather; the splinters or mashed wood would stick to the wheel, and wind around it like rope, until it would run out with the grain of the timber, or break off at a knot.

In less than twelve months the road was rough, and we turned the rails, and replaced some with new ones. Some of the rails were worn down more than an inch, leaving the knots nearly full up to the first measure. This made a rough road; and we concluded to try flat bar iron. We sent for ten tuns 1½ × ⅜ inches, countersunk and punched for ¼-inch spikes. This worked so well that we put iron on the full length of road.

By using iron on the rails, we gained as follows: 1st. On the wooden road we had to keep two or three men to keep it in order; as soon as the iron was on, one hand did the work, and had half his time for other work. 2nd. One mule would do as much work as three would do on the wooden road, and the rails would last about four years, or until they would rot and not bear the weight of the cars.

The vein of coal at this place being about worked out, we opened a vein near Yankeetown, Warrick county, Ind. This vein is about 20 feet above the Ohio River at high-water mark, and 8,530 feet from its bank. We built a road to the river last summer and fall. About 6,000 feet of this road is trestle work, on river bottoms, from 3 feet to 16 feet high, 10 feet span, 20 feet string timber (6 × 11 in white oak.) The old flat bar iron and cars are used here. We used a piece of flat bar iron, about 18 inches in length, alongside of the flat bar at every joint, so that the ends of the iron are not mashed down into the timber to make it rough. This road is properly graded, the steepest grade with the loaded cars being 9 inches to the 100 feet. Three mules bring five cars up this grade, which is on trestle work, 10 feet high, planked with 2-inch lumber. We are not in full operation yet, but expect that one team of three mules will haul from 2,000 to 2,500 bushels per day to the river. We shall put on a small engine, as soon as we are able and find one to suit us. A six tun engine would do our work, we believe.

The flat bar iron cost us near $1,100 per mile; tires, about 12 cents apiece—we used our own timber. (Cutting ties cost 5 cents; sawing notches and trimming out, 5 cents hauling out of woods, 2 cents.) We had to purchase some oak lumber, not having enough on our land. Price paid was $16 per thousand, delivered along the road. We used near 325 thousand feet of lumber, on the road and a few miners' shanties. Our vein of coal is from 4 feet to 4 feet 2 inches thick (what miners call "blasting coal.")

All that we can say to those building wooden railroads is, they will not be long in using flat bar iron on their roads; by so doing, they will save many a dollar in the way of repairing rails, etc.

Narrow gages and light T iron will take the place of the wooden roads in a short time, if cheap railroads are wanted. The T iron is a little more expensive at first, but in two year's time it will pay for the difference in keeping the road in order. J. M. SPEER, SR., & SONS.

Warrick county, Ind.

Payne's Electro-motor.

MESSRS. EDITORS:—From the interest I feel in the production of an "electro-magnetic motive power," I am induced to say a word in relation to the article which appeared in the *Telegraph Journal*; and I was very properly placed in doubt by your article of the 11th inst. In the description given by the writer who was privileged to see the wonder that is to turn the world upside down, he distinctly states that there were five magnet cores equidistant in the fixed ring, and six in the revolving set, thereby avoiding any dead center. Now any person giving such an arrangement a little attention, will readily come to the conclusion that there must be a dead center in any and every possible position; therefore the engine's moving at all can only be accounted for by supposing that it was, in some way, coupled to the source of power which drove it, which would, at the same time, solve the problem of the brake. It would not be very difficult to ship and unship a coupling by means of the electro-magnet.

Montreal, C. E. POLAR.

A Circular Saw Eighty Years Old.

MESSRS. EDITORS:—Mr. John Coop came into our factory to-day with an old rusty circular saw, about 16 inches in diameter, 18 gage, with four cross-cutting teeth to the inch, and a one inch and a quarter square hole in the center Mr. Coop says that he made the saw; that is, he sent to Birmingham for the steel, and cut out the saw, and filed the teeth in it, in a dockyard in England, eighty years ago; he says he used it for sawing, running it in a lathe, and calling it at that time a "fly saw." Mr. Coop is now nearly 95 years of age, and made this saw when a boy of about 14 years old.

The old gentleman claims that this is the first circular saw that was ever made in England. I tried to purchase it from him, but he would not dispose of it. He wanted it cleaned up, as he said, to carry to Florida with him, saying that when he dies he means to have that saw with him. Mr. Coop is certainly a rare specimen of longevity and perfect health; he has always lived temperately; eats no meat, never was married, and never has seen a sick day.

Pittsburgh, Pa. J. E. EMERSON.

How to Select Right or Left Hinges Instantly.

MESSRS. EDITORS:—The following simple method of selecting right from left-handed loose jointed butts or hinges, may be useful to many of your readers, as it has often saved me considerable trouble and annoyance in sending inexperienced persons to the stores for such articles: Take up the closed hinge from the counter, and open it from you, holding it in both hands; if you wish for right handed ones, hold fast with the right hand, letting go the left. If the hinge remain intact it is right handed, but if it fall to pieces, or apart, it is left handed. Holding fast with the left hand and letting go with the right, will prove which are which, by a similar test.

I have seen many a score of people puzzled to tell one hinge from another, until I showed them the above simple plan, when it was a mystery no longer.

Eastport, Me. W. A. MACKENZIE.

[For the Scientific American.]

WHAT BECOMES OF ALL THE STEEL PENS?—THEIR MANUFACTURE.

When at the works of Messrs. Thomas Jessop & Sons, in Sheffield, Eng., I was informed that *six hundred and thirty-one tuns* of sheet steel was manufactured and sold in 1868, to be manufactured into steel pens. I was about writing home, and dared not give the quantity, fearing that I was misinformed. Next day I returned to the office, and the clerk turned to the books and showed me the exact figure, which was something over 631 tuns. This is from one establishment, others making steel for pens also. Each tun of steel averages about 1,000,000 pens, making a total of 631,000,000.

What becomes of all the steel pens? Is it not reasonable to presume that the most of them are thrown away? How common it is to pick up a steel pen, the nibs of which are stuck together, to pull it out of the holder and throw it into the stove, and put in a new one! Then this is too soft, or too stiff, too fine, or too coarse, or does not make a fine hair line. For the least trifling fault, it shares a similar fate; and a trifling vexation often empties a whole box into the waste basket. Nobody considers the cost of a steel pen. Well, that's where the most of them go.

Now, this enormous and almost incredible quantity of steel for pens excited my curiosity, and I was curious to see how they were made in England. I took a letter of introduction to Mr. Gillott, and, calling on that gentleman, at his manufactory in Birmingham, was cordially received by him in person; and I was conducted through every department of his immense establishment, employing 600 operatives, mostly women, turning out about 20,000 gross of steel pens daily, comprising, at that time, thirty-three different varieties. First, the sheet steel, as it comes from the steel works, is cut into strips, generally wide enough for two pens in length; the scale is removed by acid, and the steel cold-rolled into strips. One of these strips is now seen feeding into a machine, which first stamps the name on it; at the next move it is under the die, and cut out into flat blanks. These are then formed into proper shape, by dies in a drop press, one by one. They are then taken to the tempering room, placed in small sheet-steel boxes, holding about a pint, and heated in a furnace to a cherry red; then poured into a hardening bath of an oil mixture, falling into a perforated dish. The bath is raised, the oil drained out from among them, and they are wiped clean. Then they are put into a regular coffee roaster (as I called it), holding about half a bushel, and turned slowly, by a hand crank, over a slow charcoal fire, until they are of a proper spring temper. They are then placed in tin cans, holding say half a bushel, and these cans are put into frames, and run by belts, like a tumbling barrel, until the pens are polished, and all the sharp corners worn off. They are then