Correspondence.

Difficulties of Inventors.

To the Editor of the Scientific American:

I have been a reader of your valuable paper for the past four years, and I have watched very closely and with a great deal of interest the different inventions you have illustrated, and more particular, railroad improvements. I saw an article in your issue of September 2, 1882, a list of "railway improvements needed." I feel very much on this subject as a writer of your paper some time ago expressed himself on the article of "car couplings"—no railroad company will adopt any good one until compelled to by law; and it is about the same with any other railroad appliance, or, at least, my experience with railroad companies the past three years proves to me.

In your article of September 2, 1882, you claim among other improvements needed is a machine for clearing the "flangeways" of ice and snow. I have a machine for this purpose, patented 1879. I have shown to six railroad master mechanics the model, and they all agree that the machine will do all I claim for it; besides, I have a full sized one which I have run on the railroad until I am satisfied I can do all I claim, and all railroad men who have seen it work will say the same. To give you some idea of the machine and the work it will do, I will state that I can clear the flanges of any railroad track filled *level full* of solid ice and snow, and will cut down on the inside of the rails one and three fourths inches deep by ten inches wide, and throw the same on the outside of the track, the same as a man would do with a pick and shovel, and I can do it as fast as any engine can run an ordinary train, and can clear more track of ice and snow in one day than one thousand men can do with picks and shovels. I will back my statement by putting the machine on any railroad, and if I fail to do all I claim I will pay all cost of attaching. I ask no railroad company to buy until I show them what I can do. My experience teaches me that no inventor in ordinary circumstances can reach the proper man to buy or adopt for trial his invention (and most railroad inventions need to be tried to be perfected). You may go to a railroad superintendent in summer and talk to him about an ice cutter for his railroad, and he will answer you about the same as the man who had the leaky roof—when the sun shone he did not need it shingled; and go to one in the winter, when the track is full of ice, and he is busy and has no time to notice you. Besides, he says, our track is filled so travel is stopped, and our men are all idle and nothing to do but use the pick and shovel and clear the track. What show or encouragement has an inventor got to study up any of the "railroad improvements needed" when he cannot get any notice from the railroad companies? If you or some correspondent will state in your paper some way inventors can get good improvements for railroads adopted, then it will be a pleasure to furnish them with the improvements needed; but not so long as the inventor with his machine has to hang around on the *outside* of a railroad superintendent's door like a beggar at a rich man's gate. INVENTOR.

[It appears from our correspondent's statements that he knows how to invent; but he has not yet acquired the noble art of doing business with railway officials.]

Test for Pepsin.

To the Editor of the Scientific American:

The several American dispensatories differ considerably as regards a good test for pepsin *pure*. The following is a good test, and is much used:

℞ Pure pepsin..... 0·05 gramme.
Coagulated albumen.. .....10 grammes.
Muriatic acid..... 0·5 c. c.

Place in a flask and digest on a water bath for six hours at a temperature of 38° to 40° C. (102° F.), shaking vigorously every half hour. At the end of six hours the albumen should be entirely dissolved. GEO. S. WOODS.

New York, September 15, 1882.

On the Essential Oils.

BY DR. AUGUST BELOHOUBEK.

Freshly distilled oil of turpentine contains no oxidized products, and hence no resinous matters, for, owing to their slight volatility, they remain behind in the retort; while an oil that has been kept in open vessels absorbs oxygen from the air and hence contains rosin.

Various observations have forced us to the view that substances composed of carbon, hydrogen, and oxygen mix with other liquids—that is, mutually dissolve each other more easily the more similar they are chemically. The exceptions to this rule are very few.

If we apply this rule of the mutual solvent power of allied substances to the oil of turpentine recently distilled, we can predict that, being a hydrocarbon, it will dissolve easily in other hydrocarbons; and the more readily the more nearly the hydrocarbon series to which they belong are related to each other, and the less they differ in the number of carbon atoms in the molecule.

But how will it be with the old, oxidized, and hence resinous oils which contain but a few per cent of resin. Such resin differs from the oil, $C_{10}H_{16}$, in containing one or two atoms more of oxygen, and one or two molecules of water, so that it is tolerably similar to the pure oil and soluble in it; but it differs considerably from other hydrocarbons, especially if they contain but little carbon and comparatively more hydrogen in the molecule, and therefore do not readily mix with it. This supposition was confirmed by experiment. I selected as a cheap reagent the petroleum ether which boils at about 104° Fah (40° C.), and is a mixture of pentanes, C_5H_{12}, etc. Fresh oil of turpentine mixes in all proportions with this naphtha, and the mixture remains clear, while lumps of rosin separate from the old and oxidized oil.

This experience induced us to extend the experiments to other essential oils similar to turpentine, and it was expected that oil of lemon, of orange-peel, and of juniper would act in the same way toward petroleum ether.

Experiment confirmed this expectation. Not merely the oils named, but many other fresh oils could be distinguished in this way from older oils. viz., the oils of anise, fennel, peppermint, mint, and rosemary. Beside these I also tried old *oleum caryophyllorum*, *carvi*, *macidis*, *cinnamoni*, *salviæ*, *serpylli*, and *thymi*, but could not compare the results with those of fresh oils of the same kind because I had none of the latter on hand.

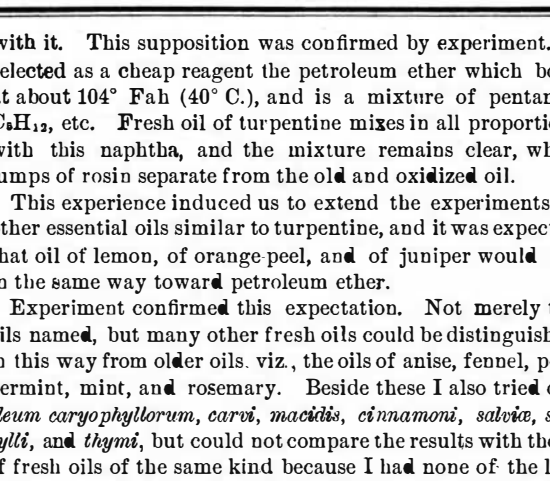
I consider such experiments very useful, and recommend any one who has an opportunity, whether apothecary or oil manufacturer, to test the action of other oils toward petroleum ether and publish his results.

The experiment is performed by dropping one drop of the oil into a dry test tube, and then a drop of naphtha, and observing whether the mixture remains clear or becomes turbid. After we add two, then three and more drops of naphtha, and can be certain whether a white precipitate or a milky turbidity, or even an opalescence results from the presence of a resin.

When old oil of anise was used it did not mix with naphtha, but the fresh oil was miscible in every proportion. Oil of orange gave a turbid mixture; oil of lemon, the resin was deposited on the side of the test tube; oil of fennel only partially dissolves when old; oil of juniper forms white lumps; oil of peppermint becomes turbid; while oil of rosemary scarcely mixes at all. Fresh oil of turpentine, after standing open a week or two, becomes turbid. If alcohol is added to the oils the reaction will not take place.—*Liqueur Fabrikant.*

CHECK REIN HOLDER.

An improvement in check reins, which largely increases the power of the driver over a horse, is shown in the accompanying engraving. A short strap, having suitable branches attached to and extending out from it, is hooked on to the water hook of the back saddle of the harness. The branches extend along each side of the neck of the horse through loops on the ends of short straps attached to and extending backward and downward from the overdraw straps of the



HARDING'S CHECK REIN HOLDER.

bridle. From these loops the branches are carried down to connect with the driving reins in a parbuckle arrangement, by which the tension of the check rein is increased and relaxed in uniformity with that on the driving rein. With this construction the permanent check is dispensed with, and the horse's head is elevated by the assistance which the parbuckle arrangement gives when the reins are drawn.

This improvement has been patented by Mr. Harry T. Harding, of Maitland, Nova Scotia.

The Nicotine in Cigar Smoke.

Kissling has made some experiments in smoking cigars with an aspirator and drawing the smoke through a cooler and five bottles, the first and third being empty, the second filled with alcohol, the fourth with dilute sulphuric acid, and the fifth with caustic soda. In four experiments 50, 42, 132, and 100 cigars were smoked respectively. The percentage of nicotine was 3·75, 3·75, 0·295, and 0·19. In the fifth experiment the tips and ends of those used in the first experiment were used; and in the sixth the cigar stubs left by a smoker were tested for nicotine and were found to contain 2·51 per cent., the cigar having had 2·24 per cent., a very slight increase of nicotine.

The general results were as follows:

The active poisonous constituents of tobacco smoke are carbonic oxide, sulphydric acid, prussic acid, the picoline bases, and nicotine. The three first named are present in tobacco smoke in too small quantities and are too volatile to deserve any consideration in judging of the effect of using tobacco on the system. The picoline bases are present in the smoke in relatively small quantities, so that the poisonous qualities may be attributed almost exclusively to the nicotine. The amount of nicotine in smoke depends chiefly on the quantity of nicotine in the tobacco, but the *relative* amount of nicotine that a cigar gives out in its smoke depends on the size of the unsmoked stump, and stands in an inverse proportion to it.

The quantity of nicotine destroyed by combustion of a cigar is relatively small.

It must be remembered that, although very little carbonic oxide is sucked into the mouth, a considerable quantity is given out at the other end and inhaled through the nostrils. As nicotine is soluble in alcohol it is probable that the use of alcoholic beverages prevents its local accumulation and hastens its removal from the body. [Rum and tobacco are well known as twins.]

Of a similar nature are the experiments of Dr. Troitzsky upon the influence of tobacco smoking on temperature and pulse. He made some six hundred observations on twenty-five persons, grouped according to constitution. The main result was that tobacco smoking has a stronger influence on the pulse than on the temperature. Taking all the classes of persons together, the mean temperature on smoking, as against non-smoking days, showed an increase of in the ratio of 1,008 to 1,000; while the ratio for the pulse was as 1,180 to 1,000.

A Picture from Pompeii.

Mr. E. N. Rolfe, writing from Naples, says: An important painting has been found at Pompeii, and placed in the Naples Museum among the Pompeian frescoes. It represents the judgment of Solomon, and is the first picture on a sacred subject, the first fragment either of Judaism or Christianity, that has been discovered in the buried cities. The picture is 5½ feet long and 19 inches in height, and is surrounded by a black line about an inch in width. The scene is laid upon a terrace in front of a house adorned with creeping plants and shaded with a white awning. On a daïs (represented as being about four feet high) sits the King, holding a scepter and robed in white. On each side of him sits a councillor, and behind them six soldiers under arms. The King is represented as leaning over the front of the dais toward a woman in a green robe, who kneels before him with disheveled hair and outstretched hands. In the center of the court is a three-legged table, like a butcher's block, upon which lies an infant, who is held in a recumbent position, in spite of his struggles, by a woman wearing a turban. A soldier in armor, and wearing a helmet with a long red plume, holds the legs of the infant, and is about to cleave it in two with his falchion. A group of spectators completes the picture, which contains in all nineteen figures. The drawing is poor, but the colors are particularly bright, and the preservation is excellent. As a work of art, it is below the average Pompeian standard, but it is full of spirit and drawn with great freedom. The bodies of the figures are dwarfed, and their heads (out of all proportion) large, which gives color to the assertion that it was intended for a caricature directed against the Jews and their religion. This may be so, but my own impression is that the artist was anxious to develop the facial expression, and to do this, exaggerated the heads. There is nothing of the caricature about it in other respects—the agony of the kneeling mother, the attention of the listening king, and the triumph of the second woman, who gloats over the division of the child—are all manifest, and to my mind there is no attempt, intentionally, to burlesque the incident; but this is a matter of opinion.

Compressed Air Locomotives.

At a recent meeting of the British Association a paper was read by Sir F. Bramwell, on "Compressed Air as Applied to Locomotion." He described an improved air tram, running from Doulon to Chautonay, at Nantes, by the side of the river Loire. A car on similar principles has been designed by Sir F. Bramwell for experimental running on the Caledonian Road, London. For the purpose of securing the necessary power to work the car on ascents on the tramway lines there are certain air reservoirs, from which a reserve of highly compressed air may be turned on at a moment's notice The compressed air is pumped into the reservoirs at the terminal stations. Each car weighs 6¼ tons unloaded, and is seated for nineteen passengers inside and fifteen outside. The air is compressed to thirty atmospheres above the ordinary atmospheric pressure. The consumption of fuel required to work a portion of the machinery on the car is about twelve pounds per mile. The system worked admirably at Nantes. The tramway line was 3⅜ miles long; the cars were always crowded, and the travelers were thoroughly satisfied with this method of locomotion. The cost per mile per hour was said to compare favorably with horse traction.

Captain Galton believed that some form of tramcar worked by compressed air would ultimately take the place of horse and steam traction because of the great convenience which it would be in a town, especially from the absence of all noise.

Mr. Crampton thought the engine described by Sir F. Bramwell was the best and most simple system he had seen for using compressed air.

Sir John Hawkshaw agreed with those who thought the time would come when compressed air would be applied extensively.

In the SCIENTIFIC AMERICAN of September 9, we gave an engraving of the Hardie compressed air locomotive lately tried in this city.