a straight track. There is no doubt but wheels of this form will caused a greater oscillation than cylinder-shaped ones. But in passing around curves, give me the cone shape.

To substantiate my theory, let me ask Mr. C. F., if his assertion is correct about the running of a car around a curve, why is it that the inner side of the shorter rail is always rusty and not worn off like the opposite one? What experience I have had with cars, is that it would be far more dangerous upon curves to use cylinder wheels, and I think that the friction and wear would be double what it now is. I make the assertion that the cone shape does lessen the danger upon curves. The cone-shaped wheel is not altogether the cause of the oscillation on a straight line. I have measured one thousand new wheels with a metal tape-measure and hardly found any two of them the same size, although many of them were cast in the same chill. You will perhaps say, "Why is this difference?" I reply that the iron when it flows from the cupola into the different ladles, is rarely of the same quality in each, and when poured into the molds the temperatures vary widely. The hottest iron will shrink the most, and if the mold is not set to a dead level, the wheel will become oblong in cooling. I have frequently found them one eighth of an inch out of round. Furthermore, the men who have charge of pressing on these wheels, are usually common laborers, who make no pretensions to mechanical skill. They are supplied with an old, rusty, rickety pair of callipers (which a true mechanic would not use a moment), and with this tool they begin to operate, first applying one leg near the flange and passing the other down the opposite side. The rickety old machine will hit about the same anywhere from the tread next the flange out to the edge, and the conclusion is, "She is all right, lets shove her on." Now this I know to be the case in three prominent railroad shops, and at one of these same shops I measured two new wheels upon the same axle, and one was three eighths of an inch smaller in circumference than the other.

No wonder oscillations occur under such circumstances. If, as *The Times'* correspondent says, a cone shape does no good in passing around curves, why are street cars raised on to the flange to round corners? Cone-shaped wheels have been experimented with, and the proportion of one in twenty, I believe, has been taken as the standard. What is wanted is a remedy for the evils I have specified. If cylinder wheels are used, a train of cars will certainly haul harder around a curve because there will be more back slip to the inside train of wheels.

On March 28, 1865, through the unrivaled office of the SCIENTIFIC AMERICAN, I had a patent issued on a car axle which obviates all difficulties herein mentioned. Upon this plan, the old callipers may be thrown aside, the common laborers eye is good for determining the size of wheel. No matter what the size of wheels no oscillation can possibly occur.

J. W. HARD.

Decorah, Iowa.

How to Remove the Sulphur Compounds of Petroleum.

MESSRS. EDITORS:—Having some two years ago discovered a process for removing the sulphur compounds of petroleums—such as are found in Canada, Kentucky, and Tennessee—and as my process has been disclosed to some of the refiners of oil in Canada, by a workman I then had employed, I desire through your columns to give it to all who choose to use it. I am aware that certain persons have discovered the use of plumbite of soda independent of me, but I believe none can claim priority, as my discovery was made as early as June, 1867; evidence of which fact I have on record. The details of my process are as follows:

The crude oil should be distilled in the usual manner, making the proper specific gravity for burning oil. The distillate should be allowed to remain in open tanks for one or two days, to allow the free sulphureted hydrogen to escape, and thereby saving chemicals in its removal. The oil should then be pumped into an agitator and the treatment begun, first, with a solution of plumbite of soda—made by saturating a boiling solution of caustic soda of 20° strength, with litharge. About one quart of this solution to the barrel is quite sufficient. The oil, in a few minutes after the solution is added, and brisk agitation made with air, becomes brown and then black. The agitation should be continued for about fifteen minutes, and the oil allowed to settle. The formation of a heavy brown deposit of sulphide of lead is the phenomenon to be then looked for. Sometimes it occurs by the time agitation is finished, at other times several hours afterward, and again not until a further treatment is given it. The oil is allowed to remain in the agitator 12 hours, in case the precipitate does not fall sooner, and at the expiration of that time; if no precipitate has formed and the oil becomes clear, then the following treatment:

A solution of penta-sulphide of soda is made by boiling 2 lbs. of sublimed sulphur in 10 galls. of a solution of caustic soda 20° strength, until it is all taken up, and the liquid becomes of a clear deep brown. About one quart of this solution to every bbl. of oil, is added to the oil in the agitator, after the settled plumbite of soda has been withdrawn, and agitation with air continued for half an hour. If the precipitate does not form in that time, the solution of soda is allowed to settle, drawn out, again boiled with half its original sulphur, returned to the agitator, and agitation made for half an hour. This seldom ever fails to cause the precipitate.

The oil is then carefully run off the precipitate, by tapping the side of the agitator, into the proper tankage, where it can be pumped back again. The agitator thoroughly cleaned by washing, the settled oil is returned to it for further treatment, as follows:

Sulphuric acid in the proportion of one lb. to the barrel of oil, is added, and agitation with air begun. The air before being introduced into the oil, should be passed over chloride of calcium to remove all moisture. Within an hour after air has begun to pass through it, sulphurous acid gas is given off in large quantities, and continues until every trace of sulphur is oxidized in the oil. After 18 hours' agitation the tar is allowed to settle for an hour, drawn off, and a fresh amount of acid added, and agitated again 18 hours. This treatment is continued until a sample of the oil will not be tinged, when shaken with a solution of plumbite of soda, and left to stand for six hours. Three or four treatments of this kind are generally sufficient, though it varies with the kind of oil under treatment. After the acid treatment, the usual amount of caustic soda is added, and the oil thoroughly washed. The chemical reactions which take place I have noticed very closely, and will at some other time give you my theory.

H. T. YARYAN.

Supt. Tenn. Oil Works, Nashville, Tenn.

Naphthaline.—The Cause of Serious Accidents.

MESSRS. EDITORS:—When hearing of the first explosion that occurred last spring in Jersey City in saturating wood with carbolic acid oil for the purpose of making it fit for preservation, I was not in doubt for one moment as to the true cause of this accident. A second explosion followed soon after in San Francisco, where this process was being introduced, causing, as you state, the loss of seven lives and more than $50,000 worth of property; and now a third sad accident is reported, resulting in the death of the chemist and an operative employed in the wood preserving establishment.

I do not propose to enter into any of the many hypotheses forwarded in regard to the probable cause of these explosions, but shall simply relate some facts which I have observed in distilling the same kind of oil employed in the process referred to. This process consists, so far as I am informed, in the impregnation of timber by the hot vapors of "dead oil," which, in being the source of carbolic acid, is sometimes, but improperly, termed carbolic acid. This oil is produced as a by-product in the manufacture of gas from coal, and is composed of from five to fourteen per cent of carbolic acid, a large and varying quantity of neutral oils, and from twenty five to forty per cent of naphthaline. This latter is deposited by the oils distilled from the tar in granular crystalline masses, called "salts" by the workmen. It is then thrown away, or, at best, burned for lamp-black.

In subjecting dead oil to distillation, naphthaline comes over during the entire distillation, and, according to Bowditch (*vide* his "Analysis, Technical Valuation, Purification, and Use of Coal Gas"), hardly a sample of commercial benzole can be obtained which does not contain naphthaline, although the boiling point of the latter substance is 410° Fah., and of the former but 176° Fah.

This hydrocarbon (the naphthaline) has a very great tendency to stop up the coils of the stills, especially in cold weather, and, in accumulating there very rapidly, it is easy to comprehend that explosion must occur, when the tension of the vapor inside of the still becomes greater than the resisting power of the shell. I have had tuns of naphthalized oils distilled, but being acquainted with the facts by previous experiments, and fully aware of the danger attendant upon a neglect on my part, I never failed to keep the water of the condensation tank at a temperature of about 160° Fah. At this degree of heat there is never any danger of obstruction, the oils run off fluid, but, after having left the coil they will soon assume a buttery consistency. In order that I might at any time be able to liquefy the naphthaline, should emergencies require it, I had a steam pipe attached to the upper part of the coil. This proved to be a very efficient arrangement.

Naphthaline is a constituent part of our gas, and readily stops up the gas pipes in winter. Besides for lamp-black, it is now employed to a limited extent for the preparation of dye-stuffs as a carbureting material, and quite recently has been proposed by a chemist in this city as an ingredient of an explosive in combination with chlorate of potassa. As to its efficiency as a preservative, I still entertain some doubts. It is by no means an explosive material, as little as charcoal in gunpowder, since it may be thrown into a red-hot crucible, when it volatizes and decomposes, condensing in the air in snowy spangles.

I append a table indicating the boiling points and specific weights of various constituents of the oils from coal tar:

	Boiling point.		Specific gravity.
Benzole	176°	Fah.	·85
Toluole	230°	"	·87
Cumole	284°	"	·86
Anisole	311°	"	·77
Cymole	353°	"	·85
Caproyle	395°	"	·75
Naphthaline	410°	"	1·04

ADOLPH OTT.

New York city.

Has the Pacific Railroad Changed the Climate of the Plains?

MESSRS. EDITORS:—Without presuming to fully answer the interrogatory of Mr. Whitford, on page 214, current volume of SCIENTIFIC AMERICAN, I will offer an opinion, founded on years of observation, and I think corroborated by reasonable probability.

I have for the last four or five years advocated the idea that the extending of railroad tracks through the country, was changing the climate from the destructive droughts, we formerly experienced to the salubrious climate we have been enjoying for seven or eight years. The facts in the case are that here, in Central Ohio, the farmers have quit calculating on droughts and remember them as things that were; the complaints are that there is so much rain that they don't get an opportunity to cultivate crops; and all this is happening against counter-causes, such as artificial drainage and removing forests.

The cause of the change I have assigned as aforesaid; the reason is this: Railways, as now constructed, clamped together at the meeting of rails form complete and powerful conductors of electricity, and having contact with other railroads at crossings, etc., make a network of electrical conductors wherever they go, which, no doubt, has a tendency to promote electrical equilibrium. I believe it is now generally conceded that aerial disturbances and meteorological phenomena are dependent on electricity; and may not a more equable state of electricity in the air be productive of more equable and uniform falls of rain?

I have no doubt but the extending of the iron rails of the Pacific Railroad has produced the effect noticed by said observers. The turning up of soil and comparatively slight elevations and excavations in grading, could have no appreciable effect.

I have written the foregoing in hopes of eliciting the views of observing and practical meteorologists.

JOHN F. LUKENS.

West Mansfield, Ohio.

The Russian Fair Not a World's Fair.

CONSULATE-GENERAL OF RUSSIA TO THE U. S.,
New York, Nov. 18, 1869.

MESSRS. MUNN & CO., *Gentlemen:*—In reply to yours of yesterday, I beg leave to state that I have not received any official notification of the Fair in preparation in St. Petersburgh for 1870. But I read in Russian newspapers that it is not intended to be a *world's fair*, but merely an exhibition of *Russian* products.

I am, very respectfully yours,
R. OSTEN SACKEN, Consul-General.

Editorial Summary.

WIENER KALK.—The *Horological Journal* states that the material generally used by watchmakers on the continent for polishing hard and soft steel, as well as brass, is a white substance called wiener kalk; it polishes much quicker than crocus, and with a beautiful black gloss. It is used in the following manner: The piece to be polished is first put on a piece of cork fastened in the vice and rubbed with a piece of plate glass, on which is put a little oil and oilstone dust, till it is perfectly flat and all the file marks have disappeared. It is then cleaned with a brush and soap and water, and dipped in spirits of wine, and, after being dried with a clean cloth, put on another clean piece of cork, in the same way as before, and rubbed briskly with a flat polisher, made either of bell metal or block tin, in which is put a little wiener kalk and fine oil, mixed to the consistency of a thick paste. It is necessary to prevent any dust getting in the polishing stuff or on the piece to be polished. Wiener kalk can be had at Mr. Ehnhus' watchmakers' tools and materials warehouse, in Frith street, Soho square, London, where it is sold under the name of diamantine, and perhaps at some of the tool shops in Clerkenwell.

THE BAKER'S OVEN THERMOMETER.—This useful instrument for indicating the temperature of an oven, is the invention of Mr. J. Bailey, of Salford. Bakers have hitherto generally baked bread satisfactorily; nevertheless, housekeepers know that sometimes the bread is slack baked, while at others it is burnt; the fact being that the bakers judge the right heat of their ovens by the appearance only, and, as a consequence, they must sometimes be deceived; but by the use of a proper thermometer (heat measure) no error can well occur. This instrument is also useful to the japanner and others who use ovens and pottery furnaces.—*S. Piesse.*

WE learn from the London *Mining Journal* that England has sent more locomotives to Russia, Egypt, and Australia this year than heretofore, but in many other directions there has been a falling off. In August, steam engines were exported from the United Kingdom to the value of only £169,495, as compared with £189,639 in August, 1868, and £187,781 in August, 1867. In the eight months ending August 31, this year, were exported, however, the aggregate value of £1,128,541, as compared with £1,075,635 in the corresponding period of 1868.

THERE is a *papier-maché* church, says the *Churchman*, actually existing near Bergen, Germany, which can contain nearly 1,000 persons. It is circular within, octagonal without. The relievos outside, and statues within; the roof, the ceiling, the corinthians capitals, are all *papier-maché*, rendered water-proof by a saturation in vitriol, lime-water, whey, or the whites of eggs.

AS tallow-melters, oil-boilers, varnish-makers, and others, are very liable to accidents by fire, Dr. Piesse suggests to them the application of Sir Humphrey Davy's discovery of wire gauze, as in the miner's lamp, for the prevention of accidents, by covering the boilers and vats during operation with a drum-head or dome of wire gauze.

HEMMING SEAMLESS BAGS.—A correspondent complains that it is a common fault to hem seamless bags with a single-thread machine, and that the thread breaks, the hem speedily unravels, the bag cannot be securely tied, and its contents get wasted in handling, and asks why the lock-stich is not employed in the hemming of such bags. Will manufacturers answer why?

PETROLEUM oil, such as is used for lamps, is an effectual preventive against the destructive propensities of worms in timber. The timber is to be washed over with it.