PRATT'S PATENT VENT STOPPER.

Within the past six or eight years, the great improvements made in the use of tin plate in the manufacture of cans, and every variety of articles for domestic use, have excited the wonder of all who have not made themselves familiar with this subject. The enormous consumption of cans for different purposes, has led to many patented improvements tending to reduce their cost, or to add to their utility and convenience.

The constantly increasing price of oak timber for staves, and the difficulty of obtaining such as are suitable for the secure transportation of oils and other penetrating fluids, render the substitution of cans almost a necessity. Nature has given us an unfailing supply of iron, the basis of tin plate, and the cost of the latter, notwithstanding the large duty upon it, has become so low, that with the advantages of improved machinery, and the economy of a well organized business, packages for the transportation of oils, can be furnished at almost the same price in proportion to capacity as well-seasoned barrels. For these reasons, together with freedom from leakage, and the avoidance of danger and loss by spilling, or changing of goods from barrels or casks by the dealer or retailer, it has now become a universally acknowledged fact that it is cheaper to buy oil, spirits of turpentine, etc., in such cans, than in barrels.

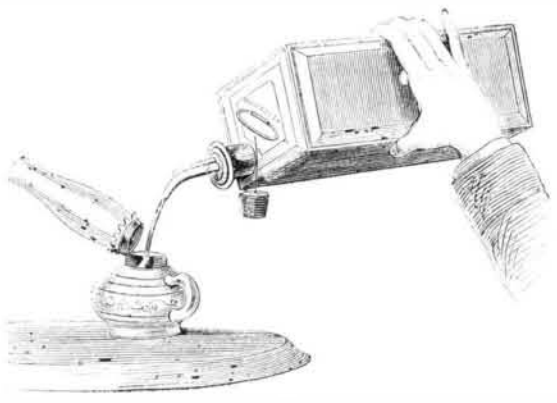
Among the many candidates for public favor in this line, "Pratt's Guaranty Patent Can," of which we give herewith an engraving, has gained an enviable reputation, and is probably as perfect a device for the purpose designed as has ever been invented.

From the extended use of these cans a necessity has arisen for some simple and cheap means for overcoming the difficulty, which has been experienced in emptying cans and small vessels without spilling some of the contents, resulting principally from the fact that there was no vent or conduit for admission of the air to the can, while the liquid was being poured out. To remedy this difficulty, vent-nozzles or other like devices have hitherto been used with cans or vessels; but such appliances have always been costly, and their use has been attended with inconvenience, while they require cans of special construction, and indeed, are permanently united with and form parts of the cans.

A device of this kind, however, has been recently invented and patented by Charles Pratt, 108 Fulton street, New York city, which is worthy of attention. It is simple in construction, can be easily and cheaply made, may be readily removed from or applied to the can, and used with any can of ordinary or suitable construction, and may be manufactured and sold as a distinct article, not necessarily accompanying the can.

The invention consists of a stopper, also shown in the engravings, for oil cans, or other liquid-holding vessels (for whatever use), provided with an opening or spout for the outflow of the liquid, in combination with a vent for the ingress of the air.

The manner in which this device can be constructed and used will be readily understood by reference to the drawings.



The body of the stopper, which is here represented as composed of cork (but which may be made of any other suitable material), carries a tube or spout for the outflow of the liquid, and another and smaller tube to act as a vent. The two tubes pass down through the body of the stopper and open into the interior of the vessel, the smaller, or vent-tube, being arranged upon one side of, and so as to follow the curve of the larger tube, so that when the vessel is tipped to pour the liquid, the larger tube will be beneath, by which arrangement the oil or fluid will flow only through its proper channel, the larger tube, or spout, leaving the smaller tube or vent free for the passage of the air.

The tubes are fastened to the cork by means of metal disks, which are soldered to the tubes at such a distance apart as to compress the body of the cork between them, the turned-up edges of the disks entering the cork and holding it tight. As already stated the device may be formed of cork or of any other suitable material capable of closing the orifice in the can, it may also be of metal and can be screwed into or upon the neck of the can.

In any event, however, a detachable stopper will be obtained, in which the spout or opening for outflow is combined with a vent; and this device can be applied to any can, vessel, or receptacle for liquids, whatever its shape or size, provided that such receptacle be provided with a neck or mouth, into which the stopper can be fitted.

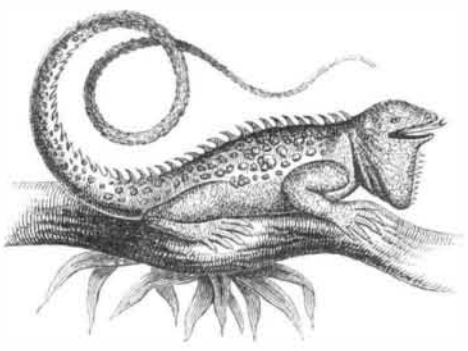
For the Scientific American.

IGUANAS.

Iguanas, or guanas, are a genus of lizards, one species of which is known to zoologists as the *Iguana tuberculata*. They are of a bright, green color when young, that hue changing to a dusky brown as the reptile advances in age. According to Webster, the term, Iguana, is derived from the Spanish name given to the animal by the natives of Haiti, in which island the iguana abounds. They are found also in the other West India islands and in some parts of South America. The size of these creatures varies from that of the common lizard, or nuto, to over four feet in length from the nose to the end of the tail. The head is similar in shape to that of an ordinary lizard, and is covered with a scaly armor of a pink color, tinged occasionally with blue and brown. The eyes resemble those of a fowl, and though small are very bright. The back is provided with a serrated comb, which extends from the nape of the neck to within a few inches of the end of the tail. The animal can elevate this or depress it at will, and with its tail can deal a lusty whack, inflicting sometimes a severe gash with this saw-like comb, some anecdotes of which peculiarity will be given further on. In old age, the skin assumes the appearance of old leather, being wrinkled in many parts, and it is so tough that with difficulty can it be penetrated by a shot.

Iguanas inhabit, generally, thickly wooded spots, where they perch on high trees, and, as they are of a green color, they can easily conceal themselves among the branches and leaves while they await their prey. Unlike chameleons, they are very lively in their movements, and will even pounce from a tree to the ground in order to seize what they want.

The food of guanas consists of herbage, insects, and poultry and their eggs, the latter of which they devour with great avidity and are very cunning in perceiving them. I once saw one of these reptiles attack a hen with her brood of chickens. Darting from a tree, it made a rush at the chickens, on which the mother flew at it and pecked it; but Mr. Guana was not to be outdone, so, though evidently smarting



with pain, it turned round and dealt the hen a lusty blow with its tail, thereby stunning her, and seizing its desired food it made for its haunt there to devour the poor chicken at ease. When it had finished this, it returned with full intent to pursue the same course, to which, however, I put a stop by discharging one barrel of my fowling piece at the rapacious monster. As soon as the smoke caused by the discharge had cleared away, I was much surprised to see the guana spring into a neighboring tree. But I was not thus to be foiled; so raising my gun, I discharged the second barrel at it, which took effect killing it instantly. The spot from which the guana sprung when ascending the tree was marked with blood, therefore I felt assured that the first shot hit it, the more so as there were perforations in the skin of the reptile that had assumed a whitish tinge, which is the case after the charge has been in the body some time.

How true it is, I do not know, but it is asserted that the guana is provided with a pouch under its throat, in which it conceals eggs very often. It happened on one occasion that I was out hunting, accompanied by my dog; and, returning, I thought I would pass through my poultry-yard to ascertain if I could shoot any more of these destructive creatures. I had not long entered the gate when my attention was attracted by a cackling among the fowls, and soon found it to be occasioned by the presence of a huge guana, which was disputing the right of a hen to some eggs upon which she was sitting. Wishful of seeing the procedure of the reptile, I watched it narrowly; it deliberately raised its whip-like appendage and brought it down on the back of the poor fowl; of course, she could not stand that, so she dashed upon it with all her force; the guana taking advantage of the opportunity was going to seize an egg to make away with it when I started my dog at it. Ready for defense, the agile lizard raised its tail, and laid it two or three times over the dog, sending her away howling, while it made for the bush hard by.

Although applied with considerable force, the blow given by means of the tail of the guana cannot make an incision through the hair of an animal, or feathers of a bird; but it inflicts a most unsightly wound in the flesh of a man, if the guana be large and if it apply the serrated portion of the whip to the object of its rage.

The flesh of this disgusting creature is esteemed by some persons as a great delicacy, and it is said that it bears a resemblance to chicken when stewed. The eggs, I believe are eaten by some epicures, but I think the former has too strong a likeness to that of frog's flesh, and the latter to the eggs of serpents to be relished by persons not accustomed to such diet.

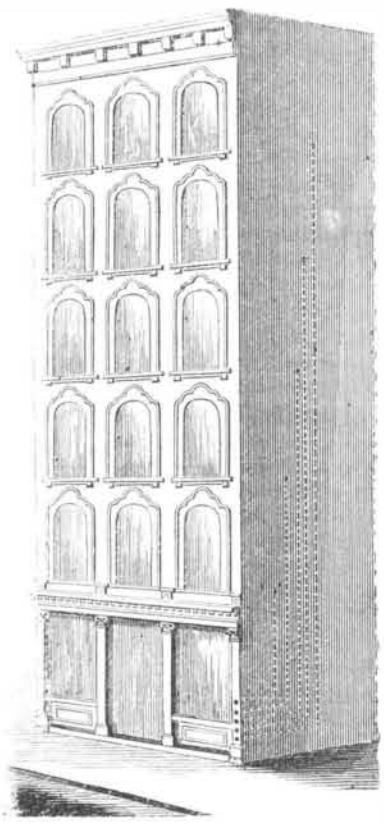
I have noticed several specimens of the guana exhibited in some of the druggists' windows in this country, some of which, I presume, have been brought from the island St. Thomas, D. W. I., to which place the foregoing narrative has reference. J. R. G.

Correspondence.

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

Extinguishing Fires in Buildings.

MESSRS. EDITORS:—I send you a plan of apparatus for extinguishing fires, which is original with me and may be new to others, and although not perfect in itself may lead to some thing better. It is this: In constructing the walls of a building, carry up within the wall, cast-iron or other metal pipes, one for each story, each pipe of the capacity of at least one steam fire engine; the lower ends opening near the ground to



which a hose can be attached, the upper ends opening in upon the several floors above. If there is no dead wall in the front or rear, the pipes can be constructed within the partition walls (see drawing), the dotted lines showing the position of pipes within the partition wall. The openings in the street need not be exposed, but may be placed in the sidewalk, inclosed, numbered, etc.

Now the successful application of this plan is upon the theory that if the floor of a building is flooded with water, its destruction (by fire alone) is prevented, and all above may be consumed whilst the submerged floor and all below are safe, and that all of the upper floors are made water-tight as near as possible, the openings, stairways, partitions, etc., constructed to insure the complete flooding of the floor—one or two inches is sufficient; and no matter if the floor is well stored with combustibles, water will find its way before fire. It has always been a mystery to me why more attention has not been paid to the construction of water-tight floors, when we so often witness the destruction of large and costly stocks of goods by water alone, when fire occurs in upper stories, which are often occupied for hazardous occupations. These fires always prove most destructive because inaccessible.

A building being constructed as before stated, on the breaking out of fire above, the fireman attaches his hose to the pipe leading to the floor on which it originates, and although it is not entirely extinguished, is greatly retarded when other ordinary means can be used.

This idea was suggested to me by the burning of the Lindell Hotel in this city nearly three years ago. In this case the fire commenced in the seventh story, and continued for nearly one hour before any serious apprehensions were felt for the safety of the building.

The following is an extract from the Chicago *Tribune*, in reference to a fire nearly two years ago, and I have noticed recent destructive fires in other cities in which this plan would have been applicable and saved a large amount of property:

"The great conflagration of Tuesday evening, which has shocked the entire community, and which will be remembered hereafter as an epoch in the city's history, will be worth all it has cost if it shall compel us to mend our system of constructing buildings. It is time that our penny-wise and pound-foolish economy in building was abolished, and that stores and warehouses were constructed under a system of public inspection, and with heavy penalties to insure them at least against external fires, and to keep the destruction within the walls where it begins. Burch's Block, though consisting of nine stores, four fronting on Wabush avenue and five on Lake street, burned as freely and scientifically as if the the entire building had consisted of one room. One reason

for this—and the same reason will apply to nearly all the commercial blocks of this city—is that the buildings are all too high, rendering it impossible to employ the fire apparatus effectively, or to raise the water to the required elevation. This was painfully evident at the fire on Lake street."

The plan I propose is practicable and cheap (the latter may be its most prominent feature); however, as before stated, it might be perfected, and I would suggest that although the floor is saved the walls may become so hot as to endanger the ends of the joists or timbers, metal baseboards perforated over each timber would retard its destruction by keeping the wood saturated with water. ARCHIBALD DOUGLASS.

St. Louis, Mo.

Thermometric Experiments.

MESSRS. EDITORS:—I would like an explanation of the results of some thermometric experiments, the object being to ascertain by Fahrenheit's thermometer the temperature of any liquid.

My apparatus is a glass jar and two thermometers, one of which is immersed, the other partially so (see annexed sketch). I fill the jar with a warm liquid, temperature 114° Fah., then I subject the apparatus to outdoor atmosphere, which indicates 34° Fah. at 7:30 o'clock A.M. Below please notice discrepancies.

	Thermometer immersed.	Partially immersed.	Temperature of atmosphere.
7:5 o'clock A.M.	112°	113°	34°
7:40 " "	108°	110°	34°
7:50 " "	103°	108°	34°
8:00 " "	98°	102°	34°
8:10 " "	92°	98°	34°
8:20 " "	89°	95°	34°
8:30 " "	86°	92°	35°

I now reverse operations somewhat by filling the jar with cold liquid—temperature 40°—and subject the same apparatus to indoor atmosphere, time 9:40 o'clock A. M.

			Temperature of room.
9:55 o'clock A.M.	41°	51°	66°
10:00 " "	43°	55°	68°
10:15 " "	45°	58°	70°
10:30 " "	49°	61°	74°
10:49 " "	51°	68°	75°

QUESTIONS.—1st. Why is it that the thermometer partially immersed indicates in both instances a higher degree of heat than the one entirely immersed?

2d. In either case which thermometer is giving most accurately the temperature of liquid. P. MILLSPAUGH.

Glen's Falls, N. Y.

[Any fluid undergoing a change in temperature has its upper strata warmer than the bottom ones. The hotter particles rise and the colder ones fall. The expansion of mercury in the bulb of a thermometer is as much greater than that in the stem, as the bulk of mercury is greater. It follows that thermometric indications depend chiefly upon the expansion of the mercury in the bulb. One of the bulbs of our correspondent's thermometers is at the top in a warm stratum of fluid, the other is at the bottom in a colder stratum. Of course the upper one must give the highest indication, and neither would give the mean temperature, which can only be determined by calculation approximately. The varying discrepancies will depend partly on the form of the vessel. The deeper it is in proportion to its diameter, the greater will be these variations as the cooling progresses. We are not prepared to say that the figures given are correct in this experiment if the drawing is a correct representation of the apparatus used. We are somewhat inclined to doubt the accuracy of the thermometers, as the discrepancies seem almost too large for so small a vessel with the bulbs in the positions indicated.—EDS.

Cotton Picking by Machinery.

MESSRS. EDITORS:—Fearing that the communication of A. D. C., of New Madrid, Mo., may dampen the ardor of inventors now engaged upon the cotton-picker, I write with a view of keeping the ball in motion. When an individual says that such and such mechanical contrivances are beyond the scope of human ingenuity, he certainly takes a great liberty with the public, and must pardon some of us if we differ from him.

Many of us at the South have heard our fathers relate that it was the custom in their young days for each member of the family to pick the seed from his or her quart of cotton before retiring for the night. We now have saw gins for the same purpose, some of them capable of doing as much work as probably 500 men in the old way. The improvements in spinning and weaving have been even greater than in the gin over the fingers, and yet we are utterly devoid of a machine for taking the cotton through the first and simplest process. The reason is obvious: Heretofore, Southerners had a very effective though troublesome machine in the African, which under the *good old plantation* system, and occasionally greased with a little *hickory ile* did the work thoroughly; and it was then very uncommon to make more than could be gathered. On the other hand, the Northern man was interested in the spinning and weaving process, and gave his attention almost entirely to the improvement of machinery for this purpose. Now, North and South are equally interested in keeping up the waning supply of raw material. The African is no longer a machine, and his place must be supplied by a cotton picker, or cotton is not a living "king," but a dead dog. All other work in the production of the plant can be done by labor-saving machines now in existence; but it yet remains for some one to crown his brow and fill his pocket by the invention of this much needed machine.

Since the publication in the SCIENTIFIC AMERICAN, of my first letter on the subject, hundreds of letters have been written to me by inventors from Canada to Texas, some of them announcing the actual discovery of the machine—one claiming to pick as much per day, as can be done by one hundred hands; others more modest in their claims; and others yet, making inquiry in reference to the plant and process of gathering, etc., etc.

This argues that there is an interest in the subject, and I am not willing that friend A. D. C. shall kill it; let it go on for a while, and if we do not have a picker soon, I will join him in his *horticultural problem*.

Allow me, in closing, to say that I cannot correspond with *every body* on the subject of the cotton plant and picker. I have already exhausted time and patience, and in future (without intending offense) must claim the privilege of answering only such letters as strike me.

Winnsboro, So. Ca. T. W. WOODWARD.

Care of Carpenters' Tools---Filing and Setting Saws.

MESSRS. EDITORS:—Your article on "How to File and Set a Saw" gave me much gratification. I have long wished that something upon this and cognate subjects might appear in your paper. Much has been said, from time to time, upon the use and care of machinists' tools, but the carpenter has not received so much attention. I will venture to say that the carpenters' trade contains more botches than any other in this country. Raw country boys are employed at a few dollars per month and their board, and, having worked one season perhaps building barns, come out in the fall finished carpenters and joiners in their own estimation.

But a prominent source of botches is want of knowledge how to properly sharpen and keep tools in order. This, coupled with carelessness and slovenliness, is a common fault. I find frequently the most common tools shamefully out of shape. This great evil might be, to a great extent, remedied by proper instructions in the columns of such papers as the SCIENTIFIC AMERICAN.

The article I have referred to is in the main correct as far as it goes, but a few words more about the saw may yet be of benefit.

I always file my rip saw from point to handle instead of from handle to point. I claim that in so doing the teeth can be kept at a more uniform length, which is all-important for a straight running saw. I file all from one side, and square across, or at right angles with the line of teeth, and I raise the handle of the file a trifle above the point, say at an angle of two degrees. I have found that if I held the file horizontal I would get the edges of the teeth nearest to me a trifle lower than those on the opposite side, and the result would be the that saw would run crooked. Then I file the teeth for about six or eight inches at the point at a much less angle than I do the rest of the saw, and give them about the same pitch that I do a crosscut saw; the object in this is to facilitate sawing through knots, as a rip saw catches too much in knots. A great many are in the habit of changing saws when they come to a knot and saw through it with a crosscut; but if a rip saw is filed at the point, as I have stated, it will readily work through knots, by simply raising the hand and sawing with short strokes until the knot is cleared. All new saws (back saws excepted) will be found high in the middle and I keep mine in that shape, say one-fourth inch swell in a 26-inch saw. It is almost impossible for any one to maintain a parallel stroke forward and back; the hand will naturally fall a little in pushing a saw forward, and rise in drawing it back, so a saw that is full in the center will counter-balance that rocking motion of the hand, but that motion should be avoided as much as possible.

In filing crosscut saws too much pains cannot be taken to keep the teeth of a uniform length, and this can only be done by often jointing the saws. They do not necessarily need much jointing at a time, but little and often is my plan, and the same in filing. I would rather file twice or three times, and file but little at once, than file a good deal at one time. I have often heard mechanics complain that they would invariably get the teeth the shortest on the side they filed first, and this, in fact, used to be my fault; but I found the remedy is to not file the first side quite up to the points, then turn and file the other side, then turn back and finish the first side—if necessary, turn again and finish the second side. But if a saw is not very dull, three times filing across is sufficient; if it is very dull better go over it the fourth time. After a saw is filed, round off the last tooth at the point; this will prevent this tooth catching in the kerf as the hand is drawn clear back and at the instant of starting it forward, and lessen the danger of bending or breaking. Almost any one can saw (or rather tear) a board in two, but few can handle a saw nicely.

Much might be said upon this point, but I have already made this communication too long. I will only add that a saw should always be used with great care, and with even, steady strokes, not short and quick, and all jerking either up or down should be avoided. The full length of the saw should be used as much as possible, and the saw should not be crowded, but given a chance to clear itself of sawdust.

Whoever will follow out the above directions will have as nice, smooth, and straight running saws as he will wish for.

Cleveland, Ohio. A. A. FRADENBURG.

Preservation of Brown Stone Fronts.

MESSRS. EDITORS:—I read in your paper, No. 20, current volume, page 313, an article, entitled, "What is to Become of our Brown Stone Fronts?" I also find on page 307 of the same issue an article headed "Damp Walls." May not the latter paragraph be considered as an answer to the former? Is there any reason why the discovery of Mr. Frederick Ransome, therein described, cannot be used for this purpose? If so used, would the stone retain its natural appearance or be covered with a glossy, vitreous coating?

New York city. J. H. HAMERSLEY.

[There is hope that Mr. Ransome's process will answer for the purpose mentioned by our correspondent, but it must be borne in mind that the trial of any process designed to effect this object must extend through a considerable period, and it would not be safe to assume that Mr. Ransome's process has yet been sufficiently tried to test its efficacy as a protection to brown standstone in our climate.—EDS.

Friction or Percussion?

MESSRS. EDITORS:—Your correspondent, "C. C. H.," in your issue of November 13, page 310, failing to agree with me in the conclusions arrived at in my former article on this subject, published on 246, current volume, and evidently wishing some further explanations, with your consent I will say a few words in reply.

First, he says that while I consider the heating of a nail on a grindstone to arise from the percussion produced by its leaping from one granule of the stone to another, I "estimate, indirectly, that in the majority of cases heat claimed to arise from friction is the result of percussion instead."

If he will again refer to the article alluded to, he will see that I merely suggested that it is impossible to show at what point, in cases similar to the "nail and grindstone," percussion ceases and friction begins, intimating that friction and percussion may often be one and the same thing; not that the result should be considered as produced by percussion "instead" of friction.

Again, to quote—"Let 'Spectrum' take in his fingers a smooth brass button and rub it briskly up and down a planed pine board, and he will soon drop it," etc., "if he does not the theory."

"C. C. H." seems to think that in this case, under these conditions, nothing like percussion could possibly occur, and I grant that apparently such would be the result; however, let him examine his "smooth brass button" under a powerful microscope, and he will see that its apparent smoothness is a delusion. It is true that in this case there would be no perceptible percussion of bodies as in the grindstone experiment; still, if the button be applied with any degree of pressure, it would not only produce waves in the wood immediately in front of it, no matter which way it be moved, and against which the particles of the button would strike or impinge, but the microscopic roughness of the button—its grooves, indentations, and prominences—would produce a like result, for the elastic wood being forced into these grooves and depressed by the minute prominences, alternately, would acquire a very rapid undulatory motion, which, by contact, would be communicated to the button, rendering it unpleasantly warm to handle.

Now, to say that there would be in reality no percussion in such cases is to affirm that if a huge boulder be rapidly dragged over a rough, stony piece of land there would in the result be no percussion between it and any other against which it might be impelled—one is but an exaggerated illustration of the other. I hold that so long as we are unable to produce a body or mass of material which shall be of perfect hardness and smoothness, and totally inclastic, there will be in rapidly rubbing any two solid bodies together more or less percussion, whether perceptible or not to our imperfect senses.

Again, if, as he suggests, the superior heat-conducting power of the large hammer, owing to its being longer in contact with the metal hammered, prevents the iron from becoming as hot as with the small one, why, after it has become too hot to touch, will it not continue to grow still hotter—red hot?

Lastly, he says, "Will 'Spectrum' inform me why it is that while iron can once be heated by percussion [?], but if suffered to cool, the heat cannot be reproduced in the same manner until after the iron has been heated by the absorption of foreign caloric?"

Now, the words last quoted show that "C. C. H." evidently makes no distinction between the heat produced by percussion and that rendered sensible by compression. Iron, in its ordinary state, contains a certain amount of heat which is insensible both to the hand and to the thermometer, called its latent heat, and by changing the condition of the iron, by condensing it, more or less of this heat is expelled according to the degree of pressure sustained.

Iron in this condensed state cannot be made to assume its former bulk by any other known force then that internal antagonism of its particles caused by the intensely rapid molecular agitation known as heat, but if "C. C. H." should take the same piece of iron which, as he thinks, has "once been heated by percussion," though in reality it is scarcely more than condensed, and submit it to the action of a series of minute hammers, the blows of which succeed each other with great rapidity—for instance, let him apply it to the grindstone, and I think he will find that it can be heated without the aid of "foreign heat," and that, too, by means of true percussion.

I have been somewhat prolix, but the subject is an interesting one; and hoping that the "percussion" or "friction" of ideas may produce sufficient light for the discernment of truth, I again sign myself SPECTRUM.

Havana, N. Y.

Oscillation of Railway Carriages.

MESSRS. EDITORS:—On page 280, current volume, SCIENTIFIC AMERICAN, I notice a piece entitled "Why do Railway Carriages Oscillate?" I agree with the writer in some part of his theory, namely, effect of cone-shaped wheels upon

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, 1835, 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 setile. 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 dyestuffs 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
Cumole	353°	"	·85
Capreyle	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.