THE GEYSERS OF CALIFORNIA.

The Geysers of California are situated in lateral ravines of Pluton River, a tributary of Russian River. In gaining a clear idea of the California Geysers, it will be necessary to forget the geysers of Iceland, with their columns of water and capitals of cloud. Upon approaching those upon Pluton River, your first impression is that there has been a great conflagration, and that the fire engines are blowing off steam preparatory to going home. The gorge is lined with masses of smouldering ashes, from which hot steam is being drifted, by the wind, and, in some places, you can imagine that the embers are ready to relight. In the bottom of the cañon, turbid and blackened water, from which vapor slowly lifts, is running among the discolored rocks. Here and there, escaping steam hisses, and, in some places, roars like the "exhaust" of an engine.

In other smaller cañons and depressions on an irregular table land, there are like appearances of chemical activity. The rocks in the vicinity are mainly sandstones and silicious slates, which are highly metamorphic. The intermediate varieties are innumerable, all belonging to the Cretaceous Series, which is largely represented in the northern Coast Range of the State. Two belts of eruptive rock have been observed in this part of the State, one lying thirty miles south, and the other found between the Geysers and Borax Lake, twenty or more miles away. Both are on the line of former volcanic activity, and near both we find many thermal springs.

Beside hot springs, incrustations of sublimed sulphur, pumice, and the light lavas are regarded as traces of volcanic action. These are found in many places in California, and in Nevada. The writer has observed these indications near the summit of the extinct volcano, Shasta. In all cases they point to former igneous activity. Therefore, the steam springs and the Solfataras may be considered, for all practical purposes, as the poor relations of volcanoes in reduced circumstances. Such are the Geysers.

Upon the 28th of May, 1866, there had been a slight fall of rain. The morning of the 30th was quite cloudy, the thermometer ranging at eight o'clock from 60° to 62° Fah. The temperature of the water in Pluton River, immediately above the confluence of the stream from the Devil's Cañon varied from 65° to 70°. At the mouth of the cañon the temperature of the water was 90°, and upon walking up the bank of the stream the different temperatures of 95°, 97°, and 100°, were noticed. A light vapor was rising from the surface of the water.

The first spring where ebullition was observed had a temperature of 135°. There was a free escape of sulphydric acid from the cloudy water, and here the hot, stifling moisture began to make the walk one of discomfort. Upon the right hand several small springs of 190°, all giving off sulphydric acid, were boiling violently, and at the edge of a queer miniature cave on the same side, there was a furious little cauldron seething at 200°. Several of the springs had low forms of cryptogamic vegetation growing upon the walls of the basins, and, in some instances, confervæ were observed thriving in water of a temperature of 145° Fah. Seventy or eighty rods from the mouth of the canon, there is a jet of escaping steam, and a little further on there is an escape pipe, nearly ten inches in diameter, through which steam is forced out several feet. Part of the steam condenses at five feet from the orifice, the rest ascends as light vapor, and is borne away by the wind. The greatest degree of temperature observed was 206° Fah., where there was, of course, as in the other cases mentioned, apparent ebullition from escape of gases. In no instance was the temperature of 500° noticed, which Mr. Bowles speaks of in his entertaining "Across the Continent." Obviously, this is a slip of a flying quill.

Upon the east and west sides of the cañon, at this point, the ground is made up of decomposing rocks of clayey consistence, and of various colors dependent upon metallic oxides; each little locality seeming to be a laboratory for the decomposition of silicates. Wherever the light soil was dry, there was no vegetation whatever; wherever there was a good degree of humidity, confervoid growths were scattered. Near springs, a few rods further east, a species of grass, Panicum, was seen growing; and, in one instance, at the water's edge where the panicle was bathed in slowly-rising vapor. This species is abundant near fumaroles, which are little natural blast chimneys, lined with crystalline needles of sublimed sulphur.

This leads next to the the subject of incrustations, which for our purpose we may divide into three groups, namely: silicic acid, sulphates, and sulphur. The first comprises the crystals of quartz, which are found upon slates embedded in the soil. They are minute, but very perfect.

The sulphates, such as crystals of ferric and magnetic sulphate, and the alums were not seen in their best estate. The rain of May 28th had dissolved the largest ones, and while we regretted this loss, we consoled ourselves with the thought that the rain, which had robbed us of our jewels, had added intensity to the chemical action going on around and below. It is stated upon good authority that the action is more intense during, or at the close of the rainy season, which is the winter of California.

The sublimed sulphur presents the two prevailing forms; namely, that which has crystallized with free access of air, and resembles the obtuse oblique rhombic prisms of sulphur familiar to chemists; and that which is produced under pressure, and has a slight inclination of the vertical axis.

In some limited localities there are effloresced salts, and pale, faded carbonates. At one spot, a light green cupric carbonate was partially covered with a darker green confervoid growth, and each shaded into the other like colors on a palette

But the salts just referred to are those which have been left by the heavily-charged water. Imagine, therefore, the variety of dissolved salts which must have been formed, by the over-heated steam and sulphur acids, from the rocks which are being so rapidly leached under pressure. The solutions are, almost in every case, acidulated by a high sulphur acid; free sulphur floats in the water, and sulphydric acid escapes with violent ebullition. It must be supposed that in these acidulated solutions, the iron exists as a ferrous salt, since sulphydric acid has this reducing power.

In one spring, which is very nearly neutral, the iron has been incompletely precipitated and is suspended, in the agitated water, with other insoluble sulphides. Another spring is strongly acidulated, and contains only the merest trace of the sulphydric acid, which everywhere fills the atmosphere. The rationale of the reactions observed at the Geysers is not obscure, but so far as the writer is aware, no careful analysis of the waters and sinter have been made upon the spot.—*American Naturalist.*

Correspondence.

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

About Gravitation.

MESSRS. EDITORS:—In your "Gleanings from the Polytechnic Association," of the meeting of the 11th of April last, published in the SCIENTIFIC AMERICAN, you give a synopsis of Mr. Malling's paper on "Molecular Motion," in which you say, "Gravitation is considered to be the resultant of equal infinite and opposite forces intercepted by matter, thereby causing a diminution of the two opposing forces between the atoms, and a preponderence of the external force, thereby impelling the atoms towards each other."

This mechanical explanation of gravity, which Newton considered as simply a property of matter impressed upon it by the Divine Creator, if I rightly understand it, I find first advanced by Prof. Bassnett, thirteen years ago, in his "Mechanical Theory of Storms," True, he advances his theory of gravity as only incidental to his main subject. yet he clearly announces the proposition that gravity is a physical effect produced by one body of matter upon another, through a physical medium, which he supposes to be the ether of the Plenists, which he assumes to possess inertia and elasticity; but if it fills all space, must be without ponderosity, in which waves are created by atomic motion, producing a propelling effect, a portion of which being neutralized by opposing waves from an opposite body of matter, the two bodies of matter are forced towards each other. On page 23 he says: "We will next endeavor to prove that the gravity of planetary matter could not exist without this ethereal medium, by showing that it is the effect produced by the interference of *opposing waves*, whereby a body is prevented from radiating into space its own atomic motion from the side opposite which another body is placed, as much as on the opposite side, and consequently it is propelled by its own motion towards the other body; and this effect, following the simple law of inertia and radiation, is direct as the mass and inverse as the squares of the distances."

Again, on page 155, he says: "If action be equal to reaction and all nature be virbrating with motion, these motions must necessarily interfere and some effect should be produced. A body radiating its motion on every side into a physical medium, produces waves. These waves are a mechanical effect, and a body parts with some of its motion in producing them; but should another body be placed in juxtaposition, having the same motion, the opposing waves neutralize each other and the bodies lose no motion from their contiguous sides, and therefore the reaction from the opposite sides acts as a propelling power and the bodies approach or tend to approach each other." Am I correct in understanding Mr. Walling as reproducing Bassnett's mechanical theory of gravity? Is this theory original with Prof. Bassnett, or by whom was it previously advanced? J. D. CATON.

Ottawa, Ill.

The Comets Again.

MESSRS. EDITORS:—I notice in your paper of the 7th inst., a communication advancing the theory that the tails of comets are composed of *refracted light*.

Now it seems to me that your correspondent must be somewhat in the dark, both as to the nature of light, and the observed phenomena of comets.

According to his theory, there could be but one tail to a comet, which must necessarily be of a conical form, extending in a perfectly straight line in a direction diametrically opposite to the sun, in *every instance*. Now let us see how this corresponds with observed phenomena.

Very few comets of large size have been attended by straight tails: that of 1744, which appeared on the 7th or 8th of March, had *six* tails, from 30° to 44° in length, curved nearly in a quadrant; in the appearance of Halley's comet in 1835, the tail had a strong curvature; and the magnificent comet of Donati, in the autumn of 1858, is probably within the memory of most of the readers of the SCIENTIFIC AMERICAN; it is this comet which furnishes my principal refutation of Mr. Wilhelm's theory.

I have open before me a monogram upon this comet, by Prof. George P. Bond, of Cambridge, published by A. Williams & Co., of Boston, in 1858; on the 25th page is a cut, which, as I can attest, is a faithful representation of the comet, on the evening of October 10th, of that year; the tail springs up from the nucleus in a sharp and regular curve, for nearly half its length; the rest drifts away to the northward in nearly a straight line, upon looking at which, it is impossible, to me at least, to resist the conviction that it is composed of nebulous matter, as evidently left behind by the motion of its head, as the smoke of a locomotive by the progress of the train.

It is unnecessary to mention further instances, though I could bring up a number, all tending to the same end—that is, to prove that the commonly received theory concerning these appearances is as yet the nearest approximation to the the truth. P. S. YENDELL.

Dorchester, Mass., Sept. 1867.

Coal Oil for Fuel.

MESSRS. EDITORS:—It appears to me that Col. Foot, Spencer, and other inventors, in their experiments with petroleum as a steam fuel, have overlooked or are not well posted in one of the best and cheapest oils for that purpose, namely, coal or rather shale oil. In number nine, present volume, of the SCIENTIFIC AMERICAN, you state that petroleum heat costs six times more than coal heat at present prices. We have no assurance that petroleum will long remain at its present low price. Now what I wish to say is, that coal or shale oil, free from all impurities, and from eighteen to twenty degrees Baumé, can be produced here in any quantity for fifteen cents or less per gallon in bulk. This I will prove by the following: Three years ago, I put up a number of the improved revolving retorts in Beaver county, Pennsylvania, for the purpose of manufacturing lamp oil, and completed them in time to find petroleum, too low in price and too light in gravity for this heavy oil to compete with for lamp purposes.

In working these retorts, we charged each one with seventy-five bushels or three tuns of coal six times in twenty-four hours, receiving from twenty-five to twenty-seven barrels from each retort, or about sixty gallons of oil from a tun of coal. The expenses, mining the coal, eighty cents per tun, or say, for fuel, breaking the coal, etc., $7; eighteen tuns per retort, $18; average labor for each retort, $4,50. Now we have running expenses for each retort, $22,50 per day, for which we receive twenty-five barrels of oil, less than $1 per barrel. The freight to Philadelphia or this city is from sixty to sixty-four cents per hundred, or about $2 a barrel, which will bring the oil here about 7½ cents per gallon. Of course this is without barrel, or there will be five cents added for packing.

This shale oil, in my opinion, is the only rival coal has for our Atlantic steamers. The difference of gravity between shale oil and petroleum is so great—one at twenty, and the other forty-five—shows you at once the superiority of shale over petroleum for fuel purposes. My experience has taught me that shale oil has nearly double the intensity of heat that petroleum has at forty-five gravity. C. G. W.

New York.

An Iron Worker on Tweers.

MESSRS. EDITORS:—Our works are supplied with water taken directly from a spring flowing from magnesian limestone beds. The water is very hard, in other words thoroughly saturated with carbonate of lime in solution with, no doubt, a slight percentage of sulphate of lime. The tweers we have always used until about 18 months ago, were made either of coiled gas pipe in cast iron, or of cast iron alone, but hollow, each intended to admit a constant stream of water through it to preserve the metal of the tweer from burning. When in place in the furnace their longest duration was from 4 to 6 weeks, not unfrequently burning out in as many days.

Having heard that copper tweers had been used formerly in Europe, although now generally abandoned in favor of iron tweers, I undertook to test their efficacy. The result of the trial surpassed my most sanguine expectations. Two of them were in active use 10 or 12 months, supplied with the same hard spring water, before either of them showed any evidence of leaking from the effects of burning, and during that time no attempt was made to wash out or otherwise remove the scale. When removed, the scale proved to be about the thickness of an egg shell, compact, yellowish, and amorphous, with smooth fracture, and with little or no free sediment and no light, porous, calcareous incrustation or lumps as found in our heater and boilers.

I have sent this communication in the hope that the facts stated may prove to be of some value to furnacemen who alone can appreciate, as the result of costly experience, the loss of time and material and the damage to hearths arising from the sudden admission of water in the crucible.

E. H.

Irondale, Mo.

Pumping Hot Water.

MESSRS. EDITORS:—I have charge of a factory wherein are 1,200 feet of pipe used for heating the building in the winter. The condensed water from this piping is considerable and all flows through a steam trap into a tank set in the ground; this condensed water is nearly boiling hot. We pump this water back into the boiler again. With due deference to your opinion I must say that any ordinary pump will not do it. The effect is a pounding sound in the valve chamber, chattering of the valves as though they were very unwilling to leave their seats, trembling of the pump rod, etc. (This establishment is new). After the steam fitters had got through with their work and steam put on for the first time the result was as I have stated. I thought the trouble was in the pump, but soon satisfied myself it was not; the pump would not supply the boiler; I could not keep the water cool, and could use no other. "Necessity is the mother of invention."

I picked up a book the other day with an article in it headed "Getting Under Way," and one of many reasons given why the pump would not work was this: "The check valve may get stuck and not drop on its seat, letting the hot water flow back to the pump and hot vapor form in the valve chamber, thus preventing the valves from working." I can pump it now boiling hot without any trouble.

I think, Messrs. Editors, if you invite the attention of your correspondents to this subject you will find I am right. Some may have had experience like mine; if so I can sympathise with them, for to have a whole establishment depending on you, and a tubular boiler driven to its utmost, and then be bothered for water is not a very desirable situation.

Hingham, Mass. JOHN C. GARDNER.

[Our correspondent states that he can pump hot water with the ordinary force pump, but he fails to state how he does it. From our experience we feel assured that to pump hot water the pump should be—in some way—different from one intended to pump cold water.

In starting a new engine and boiler nothing is more important than an inspection of the feeding pump. Some manufacturers are reprehensibly careless in building their pumps. The writer once started a new establishment in Nova Scotia, and after firing up, attempted to feed the boiler, but the pump refused to work. After an hour of great anxiety and labor we found one of the composition valve seats had not been put fairly into place. It stood about one-sixteenth of an inch above the hole for its reception in the casting. The consequence was that the water, backing from the boiler, went under the flange of the valve and held it up from its seat. Except for this the pump was well constructed, and after the seat was driven home no more trouble was experienced.—EDS.

Artificial Stone--Its Local Value.

MESSRS. EDITORS:—I see on page 1 No. 4 Vol. XVII., dated July, an article on artificial stone, invented by a Mr. Ransome, of England. We would like to have all the information you can give us. We have concrete machines, but they do not give satisfaction. The chemical combination is too slow, and not sufficiently adhesive. We want something better, something that will not crumble down by rain and frost. If what you say about Ransome's blocks being so hard and solid is true it is the very thing we need out on the prairies for houses, barns, walls, and fences. Can you inform us what the expense per inch or foot of this material will be for manufacturing it? We have sand, gravel, lime, gypsum, salt, and soda. Now if we only knew how to mix them chemically it would be a favor of untold magnitude. We prize the SCIENTIFIC AMERICAN and expect it to assist us in overcoming the difficulties we meet with in the scarcity of timber. We have the most beautiful, most fertile, and healthful country in the world; but the consumption of the immense coating of grasses has almost eradicated our timber. We being a fast people cannot wait till it is planted and grown. We have the material here for the stone. Now we want you to find out, and tell us all about the manufacture, definite proportions, and machinery necessary to manufacture the stone. L. McCurdy.

Carrolton, Iowa.

[Those who are practically acquainted with the manufacture of artificial stone, are advised to turn their attention Westward. Here at the East we have an abundance of natural building material with which artificial stone is not likely to compete.—EDS.

The Crystallization of Honey.

MESSRS EDITORS.—I have several times seen it stated in the SCIENTIFIC AMERICAN and elsewhere, that the crystallization of honey is caused by the action of light. In opposition to this theory, allow me to present two facts. We frequently take up honey late in the season (in Nov. and Dec.) place it in tin pans and set them on shelves in the cellar. Some of the honey, of course, leaks out of the cells and in a few weeks will be found crystallized in the bottom of the pans. Yet no light enters the cellar from the time we bank the house in October until some time in March.

Again, our strained honey we put in earthern jars, and after replacing the covers, set them in a dark closet where no light enters. In the spring the honey that remains unsold or unused, will be found completely "candied." In my opinion exposure to the air, and cold have more to do with the crystallization of honey than light. J. L. W.

That Big Saw.

MESSRS. EDITORS:—In a recent article on the Emerson saw you state that the saw was capable of sawing 50,000 ft. of inch lumber in 10 hours with 50 horse power or in other words it only requires one horse power to saw 1,000 ft. of lumber in 10 hours.

This assertion of Emerson's that with his saw, "it only requires to saw 1,000 ft. of lumber (inch) in 10 hours, one horse power" has done me a good deal of damage because with my experience I find it to be impossible.

Another assertion of Emerson's is "that it only requires 15 horse power to drive a 52 inch circular saw of his make as strong as it could be driven, and that it would at least cut 10,000 feet of inch lumber in 10 hours."

Now I would feel obliged if you would give me your opinion as to the feasibility of the foregoing and also how much power it requires to cut 10,000 feet of lumber per day with a 52 inch circular saw, as I would like to know whether the result of all my experience has left me in the wrong.

LAMAR FOOS.

New Haven, Conn., Sept. 6, 1867.

[Before we comment on the above perhaps Mr. Emerson and the correspondents will express their views on the subject.—EDS.

Rapid Disintegration of Granite.

MESSRS. EDITORS:—A few weeks since, as I was going from Bucksport to Ellsworth, Me. some five or six miles beyond Bucksport I noticed large boulders crumbling to pieces. These boulders looked like coarse granite and varied in size from a cubic yard to fifty in dimension; they are in all stages of disintegration, some just commenced, some nearly, and others wholly disintegrated and changed to coarse gravel, which is used in some places to macadamize the roads. So far as my observation extended this disintegration was confined to a space of about two miles. I found that it was a fact well known for twenty miles around. I have been in many different countries but have never seen anything like it and it has interested me much. JAMES EMERSON.

Lowell, Mass.

Translated for the Scientific American.

Shooting Trial of the Army Target School at Spandau, Prussia.

On the morning of the 6th of July a trial of skill in musketry was witnessed by the Crown Princes of Prussia and Italy, at the target grounds of the Army-Target-practice School, and was arranged in the following manner: At the commencement five men fired five shots each at a moving target (figure of a man) at a distance of 130 paces with the following result: 25 shots, 18 hits; average hits, 72 per cent.

After this, five men fired five shots each, lying down, at some moving targets (men's heads); distance 200 paces; result: 25 shots, 18 hits, 72 per cent. A trial in quick-firing by various marksmen was then made with the Peabody and Martini rifle and the Prussian needle gun, during one minute, lying down; distance, 400 paces; result: Peabody 12 shots, 7 hits; Martini, 11 shots, 7 hits; needle gun, 11 shots, 9 hits. A fire at covered marks (5 targets posted at proper intervals behind an embankment 10 feet high) was then commenced. Thirty men were posted in squads of ten at the respective distances of 400, 600, and 750 paces from the embankment; ten men fired at the same time ten shots each, lying down, slow fire; result: 489 marks found in the five targets out of 300 shots. There was no sight or other guide whatever placed upon the edge of the embankment. A sort of sham fight was then executed by 96 men with 4 officers, upon the grand stand; distances not previously given. This company took position in a wood in bodies of 24 each. At the signal, "deploy as skirmishers" one squad deployed to the edge of the wood and, lying down, commenced firing at a number (32) of half-sized figure targets; distance 200 paces; result: 120 shots, 50 hits, 42 per cent. Two targets were then seen approaching, each representing the front of a section of infantry, which advanced a distance of from 300 to 200 paces towards the edge of the wood, when they were fired upon by 24 men during one minute, quick-firing; result: 188 shots, 157, hits, 84 per cent. The enemy then retreated, but suddenly another body of imaginary troops (single figure targets but only half visible, owing to the undulating ground,) appeared at a distance of about 200 paces, whereupon two of the squads (48 men) deployed as skirmishers, firing in common time and lying down; result: 275 shots, 134 hits, 49 per cent. The enemy disappeared, when, bringing up his reserves, he suddenly displayed two targets each representing the front of half a platoon, but two squads of 24 men fired each three volleys at 300 paces distance, which caused him to retreat; result: 138 shots, 103 hits, 75 per cent.

A number of the enemy's skirmishers under cover (32 single figure targets) now became visible a little further back, when one of the squads (24 men), after having deployed as skirmishers opened fire upon them, lying down, distance 170 paces; result: 117 shots, 55 hits, 47 per cent. At the same time 10 officers, 5 on each wing of the line of skirmishers, fired the same distance at a target which was moved rapidly backward and forward (representing a man on horseback riding at a brisk trot): result: 45 shots, 40 hits, 89 per cent. Cavalry suddenly appears (large cavalry target 96 feet long, 8 feet high), and is opposed by three squads (72 men) who give a volley at 300 paces; result: 70 shots, 56 hits, 80 per cent. But the cavalry continues to advance, which is demonstrated by suddenly drawing up the small cavalry target, 48 feet long, 8 feet high, at a distance of only 200 paces, when 72 men deliver two volleys upon them, which causes them to disappear, in place of which an infantry column of the enemy, 40 feet long, 6 feet high, shows itself at a distance of 300 paces. The 72 men discharge two volleys at it; result: 144 shots, 111 hits, 77 per cent. The whole company now advances upon the enemy's column in a general attack, which ends the fight. The trial was concluded by firing with ordinary cartridges at a barrel of powder, also with explosive cartridges at a wooden wall made of two sides of boards with straw packing. The powder barrel exploded at the first shot and the wall ignited after firing the second shot.

ASPHALT PAVEMENT IN PARIS.

Visitors to Paris are generally surprised at the appearance of the pavement of a great number of streets in the central parts of the town, and still more at the peculiar mode of making and repairing this asphalt pavement if they chance to see those operations carried out. The asphalt pavement was introduced in Paris in 1854, by M. Momberg, chief engineer, and M. Vaudrey, engineer of the municipal service of the town of Paris. The first street paved in this manner was the Rue Bergère. The asphalt used for this purpose is a natural composition of pure carbonate of lime and of bitumen or mineral tar. It is found in abundant quantities at Seyssel (Ain) in France, and at Val-de-Travers, in the canton Neuchâtel, in Switzerland. In the first-named locality the layers of bituminous limestone are from four to seven yards deep, and of very uniform composition, containing about sixty-six per cent of bitumen and thirty-four per cent of carbonate of lime. The natural stone is crushed into powder by machinery, and afterward heated to a temperature of about 140° Cent. It then remains in the state of a dry, fine powder, somewhat similar in its consistency to molders' sand, and in this form it is employed in the streets. The roads to be paved are first covered with a layer of concrete made of gravel and cement, and this layer is carefully dried before the application of the asphalt cover. The asphalt powder is then reheated and spread over the surface of the concrete in an even layer of about four centimetres, or 1⅗ inches, in thickness throughout. After this the powder is rammed and compressed by means of heated cast-iron rams worked by hand. This being done, a heated roller is passed over the surface. The roller weighs about four hundred weight, and is repeatedly traversed over each short length of pavement newly rammed in. Two larger rollers, one of sixteen hundred weight and one of about two tuns weight, are afterward employed for flattening down the surface of the whole. The pavement is finished and ready for use immediately after cooling, say two or three hours after the first roller has completed its work. The asphalt pavement has now had an extensive and complete trial, and its advantages are very numerous. There is neither dust nor mud produced by it, and its surface wears no more than one millimetre, or one-twenty-fifth of an inch in thickness per annum in streets having a lively traffic. At the beginning there is a compression caused by the weight of the vehicles rolling over the pavement, but the whole gets soon into a state of uniform density, and the street then remains in a perfect state for a long time, requiring very little repair. There is no noise whatever from the wheels of carriages in asphalt-paved streets, so that there is a certain danger caused by this to pedestrians from the want of warning of the approaching carriages. This, however, disappears by degrees, as the public become more and more acquainted with this kind of pavement. The tractive force required by the carriages passing over asphalted streets is very considerably reduced, and still more important is the reduction of the wear and tear of carriage wheels, springs, and axles, a reduction which is due to the absence of all concussion and vibration in the rolling of the carriage wheels over the smooth and uniform surface of the street.—*Engineering*.

Causes of Acute Bronchitis.

In our climate, both forms of the disease are very common. The essential feature of the disease consists in an inflammation of the bronchial tubes, and is commonly produced by cold and moisture, applied generally or locally, as by means of damp clothing, or exposure to a cold, moist, variable atmosphere, especially, after the body has been overheated by exercise or crowded rooms, or the inhalation of metallic dust or gases. Dr. Charles T. Jackson, the distinguished chemist of Boston, nearly lost his life on one occasion by an attack of acute bronchitis, caused by the sudden inhalation of chlorine gas. Ipecac, in powder, when inhaled by some individuals, will cause bronchitis. The dust of newly cut hay, and the pollen of the rag weed, in some persons will produce the same effect, also the flowering of roses, and the inhalation of dust, exhaled from the foliage of growing plants and trees. Hooping cough is no doubt a certain form of bronchitis, induced by a specific morbid poison directly on the bronchial mucous membrane.

A very severe form of bronchitis often accompanies some of the eruptive fevers, measles, scarlatina, and small-pox, constituting a most dangerous and sometimes fatal complication. In measles, the recession of eruption is frequently followed by a great increase in the bronchial disorder, which is announced by the great increase of cough, and sudden oppressive dyspnœa. From the suddenness of the production and disappearance of the latter symptoms, which is occasionally observed in the cases, it has been suggested, that it is possible they may be rather congestive, than inflammatory, although if the congestion continue, bronchitis is the final result.

There are also many chronic diseases which may be said to favor the developement of acute bronchitis, these are Bright's disease of the kidneys, and diseases of the heart and lungs. It often occurs during the progress of pulmonary tuberculosis, and sometimes proves very fatal to the patient.—*Med. & Surg. Rep.*

DISINFECTANTS.—Mr. Crookes, says the *Medical Times*, has shown that the favorite disinfectant, chloride of lime, is about the least efficient of any of those substances reputed to possess disinfectant qualities. Chlorine itself is very little better, for if used in large enough quantities it will in time destroy the virus, but as it acts by way of oxydation, and as living virus resists this longer than dead oxydizable matter, before the gas can attack a virus everything else that it can oxydize will be oxydized first. And if when pure, chlorine is so slow of acting, when adulterated with eighty per cent of lime, its value is proportionately less. In sulphurous and carbolic acid, on the other hand, there are substances absolutely destructive of every kind of living thing of low organization, such as cattle plague virus is supposed to be. These substances, besides destroying the virus, attack it at once, and arrest all putrefying tendency.

DEATH IN THE BOTTLE.—A singular explosion case is reported by the engineers of the Manchester Boiler Association. An earthenware bottle of about a quart capacity was used, when full of hot water, as a bed warmer. After filling it on a previous occasion, the cork was tied down with a waxed end. When the bottle was next brought into requisition, instead of being emptied of its cold water and refilled with hot, it was put, all tightly corked, into the oven of a kitchen range, to be heated up entire. In a short time a violent explosion took place, the bottle was burst, and pieces of the oven door were thrown into the room with such violence as to instantly kill one person, and seriously injure two others.