Owing to the inferior coal which they use in these centers of manufactures it is not to be denied that their air must be more contaminated with sulphurous acid, than it is the case on the banks of the Thames. This acid gas, however, will as all gases, be diffused very quickly in the atmosphere, particularly while at a high degree of temperature; its influence can therefore by no means be injurious in comparison to that produced by the deposition of soot.

Correspondence.

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

For the Scientific American.

NEW APPLICATION OF THE SPECTROSCOPE TO DETERMINE THE MOTION OF THE STARS.

In order to explain this recent and most ingenious application of one of the most important pieces of modern apparatus, we must first understand what is the cause of the dark lines exhibited in the solar spectrum by the spectroscope, or rather, what they in general indicate

We follow in this explanation, of course, the undulatory theory, it being the only one which gives a rational explanation of all the phenomena. We will therefore not speak of the Newtonian doctrine of emission, which ought to have been abandoned long ago, and not be mentioned any more, as it is utterly untenable in the present state of our knowledge of the properties of light—a knowledge far in advance of any other branch of physical science.

Light is propagated like sound, by vibrations of some transmitting medium, but its vibrations are millions of times more rapid; so in sound the lowest perceptible tone is produced by about 16 vibrations per second, the highest by 9,000 or 10,000—a range of about 8 or 9 octaves. The lowest visible luminous vibration is produced by 450 billions vibrations in a second, the highest by 850 billions. (We call the square or second degree of a million a billion, the cube or third degree of a million a trillion, etc.) The lower vibrations produce the impression of red, the highest of violet, and the intermediate vibrations the different intermediate colors of the rainbow or spectrum, which in fact (as was already remaked by Newton) may be compared with the musical scale, of one octave, 450 to 500 billions vibrations per second produce red; 500 to 550 billions, orange; 550 to 600 billions, yellow; 600 to 650 billions, green; 650 to 700 billions, blue; 750 to 800 billions, indigo; and 800 to 850 billions, violet. We use here only the round numbers, as approximately near enough for our purpose. The numbers given represent the velocity of the vibrations where one color is shaded off into the next; the pure red, yellow, blue, etc, of course correspond with the intermediate velocity of vibrations.

Vibrations of a lower velocity than 450 billions per second manifest themselves simply as heat, without light; those of a greater velocity than 850 billions, as a chemical power; and consistent with this is the fact that the red and orange rays produced by the lower vibrations have also, with the dark space beyond the spectrum, a heating power, and the blue and violet rays, produced by the vibrations of higher velocity, possess, with the dark space beyond, no heating, but chemical power (the photographic rays).

In the solar spectrum as exhibited by the spectroscope, the velocity of the vibrations increases regularly from the red end of the spectrum to the violet; and if all possible intermediate velocities did exist, the spectrum would be continuous; but the fact that it is not continuous, and possesses a multitude of dark spaces, proves that certain definite velocities are wanting; so, for instance, at the place corresponding with a velocity of 560 billions, there is a dark line in the solar spectrum, indicating that vibrations of this definite velocity are wanting, we may have those of 550 and 570 or thereabout, but between these limits the dark space proves the nonexistence of rays of that definite velocity.

Now, in sound, the apparent velocity of the vibrations is increased or diminished, in proportion as we approach or leave the sounding body, with a velocity rapid enough to be compared with that of sound itself. The result is a change of pitch; and the whistle of an approaching locomotive will appear sharper, and of a retreating one flatter, than its real pitch—a fact well established by theory and experience.

This peculiarity rests on the same principle as that the waves, encountered by a steamer, appear larger when both are going in the same direction; and shorter, when the steamer moves against the direction in which the waves are transmitted. (See page 117.)

When now we move towards a luminous body, with a velocity great enough in relation to that of light to make the waves appear to be sensibly shorter, we must perceive a change in the tint of color, as in sound we perceive a rise of pitch. This change will be toward the more rapidly vibrating or violet end of the spectrum—that is, from red to orange, from orange to yellow, from green to blue, etc. When we recede from the luminous body, of course the reverse will take place. Now this slight change of color, even if possible to observe its existence distinctly, is not adapted to be measured like the pitch of a tone. This is impossible, from the nature of color; but the definitely located dark lines in the spectrum, as exhibited by the spectroscope, may be correctly measured as regards their exact locality; and all that is necessary is to compare the spectrum of a luminous body, which remains at the same distance, with the lines of the spectrum of a body to which we are approaching, or from which we are receding.

The last class of observations have quite recently been made by Mr. Huggins, of the Royal Society of London. Among others, he has compared the spectrum of the star Sirius with that of a flame producing some of the same lines, and found that (notwithstanding the enormous velocity of light, as well in its transmission through the universe, as in the velocity of its waves) not only was the incomparably slower motion of this star rapid enough to exert an appreciable change in the position of the dark lines, but he succeeded in measuring its amount. He found, for instance, that a certain dark line, corresponding with a bright line in a flame of hydrogen, was shifted toward the red end of the spectrum, which indicated that we are receding from that star; and from the amount of displacement, it was calculated that the motion was not less than 144,000 miles per hour. This was reduced to 90,000 miles, by taking into account the direct velocity of the earth, in its annual orbit round the sun, at the time of the observation.

When we consider that the only means thus far possessed of estimating the motions of the stars in relation to us, or of the earth in relation to the stars, was the apparent displacement of the stars among themselves, and that this apparent displacement is found to be very irregular, by reason of different motions and consequent changes in relative positions of the stars among themselves, we must conclude that this new method of measuring stellar motion is a very promising one; and when extended to most other stars, will open an entirely new, unexpected, and unexplored field of research in astronomical science.

P. H. VAN DER WEYDE, M.D.

Water-Seeking---The Divining Rod.

MESSRS. EDITORS:—At times we meet with reference, especially in fictitious writings, to those who can find, with a hazel twig, the places of water courses beneath the ground. Many will unhesitatingly declare that this cannot be done, and that it is merely a whim of the credulous. Hence, it may well become those who are interested in scientific truth, to consider whether there is any reliance to be placed in the claimed power of successful water-seeking.

An elderly gentleman, of most reliable character, states that when he was a youth, and lived at his home, some miles north of Philadelphia, water was obtained for domestic purposes from a natural spring situated a little below the house. A neighbor, who lived upon higher ground, and made use of the same spring, at considerable inconvenience, had made repeated and unsuccessful attempts to secure a well.

At length, hearing of a man in another place, more than twenty miles distant, who could decide, by the use of a branched stick, upon good localities for wells, he sent for him. On arriving, the man passed about the grounds with a suitable stick in his hands, and pointed out a favorable spot at some distance from the house where the surface of the earth was nearly twenty feet higher than places one would ordinarily select.

He also, though an entire stranger in the region, followed the curving line of the hidden stream across a road, and through fields, to the spring mentioned above. A well was dug on the line proposed, with entire success; and, subsequently, a second one. Each was a little over twenty feet in depth, though the latter was at a point some sixty feet lower on the surface.

A gentleman at Andover, Mass., a few years since, purchased a fine residence, that was poorly supplied with water. Repeated attempts had been made to sink a well, but in consequence of rock, or firm clay, no water was reached. The owner secured the services of a member of the Theological Seminary in the place, who was said to have the water seeking ability. He took in his hand the stock of a whip, and held it by the portion toward the small end, so that the heavy part would be erect. On his passing across a certain portion of the grounds, the end that had been upward would bend down sufficiently to make less than a right angle with the portion in and below the hand, and would swing round as he went forward. After successive observations he pointed out a line, beneath which he claimed there was a stream of water in the earth; but at what depth he did not attempt to decide.

If any other of those present held the rod, it did not move: but if he placed his hand on that person's shoulder, it would give the same indications as in his own. If he placed a silk handkerchief between his hand and the rod it failed.

A well was dug in accordance with his suggestions, which, passing down along the vertical face of a buried ledge, at the depth of seventeen feet, afforded a fine supply of water. He selected places for a number of wells in the town, and always with success.

His explanation of the phenomenon was, that the flowing stream was charged with resinous electricity, and, that when a stick, fitted for the purpose, was carried in the hand of a person vitreously charged, and brought over that water, it would be attracted.

That there are streams in the earth we have many reasons for believing. Some years since there were two manufacturing establishments in England, a considerable distance apart, which made use of large quantities of water. It was found that when the pumps of one were used actively, the wells of the other were drained, and it became necessary for them to secure their water on alternate days. This proves a communication between those wells.

In the boring of artesian wells, also, proof of the existence of subterranean streams has been afforded. Hitchcock says, that "at St. Ouen, in France, at the depth of one hundred and fifty feet, the borer suddenly fell a foot, and a stream of water rushed up." A paper has stated, that, in Chicago, twelve hundred feet below the surface, a vein eight feet in depth was reached, with a current so strong that a long lead, upon a fine wire, lowered into it, was snatched from its position very much as an insect upon a hook is taken by a fish.

It is not difficult to conceive of these streams being in an excited electric condition; and this view is favored by the assertion of some philosophers, that lightning more frequently strikes upon their course.

And, again, we know that persons are not unfrequently in a highly electric state, as manifested when one, especially if partially insulated by wearing rubbers, has taken a vigorous walk on a clear and windy evening, in a dry atmosphere; for then, upon folding together the edges of an outer garment, on removing it a line of sparks, attended with sound, often appears along the meeting edges. It is also shown, by some persons being able, after moving the feet along a carpet, to light gas with the finger.

Arago refers to the surprising pleasure which it afforded him to see, not only a few metals, but wood, and various other substances, affected by the poles of a magnet, being either attracted or repelled. Remembering that magnetism and electricity have many common features, and are even considered by some of our best natural philosophers as different manifestations of the same agency, is it absurd to conceive it possible that a rod, in the hands of a person in a certain electrical condition, may be attracted by a hidden stream of water in an opposite state?

We should not be deterred from thoughtfully considering the subject, simply because some may be incredulous. An aged philosopher was regarded deranged, by casual observers, when he was experimenting with films of viscid water upon the properties of light, though his researches were to result in brilliant conclusions for science. And, always, efforts employed in searching out the more subtile and recondite laws of matter have a rare value, and hence are not to be regarded as trivial.

Massillon, O. J. K.

Returning Condensed Steam to the Boiler.

MESSRS. EDITORS:—As a constant reader of your paper, I take the liberty to ask you the following questions: I have a tubular boiler in the basement of my mill, and wish to heat three floors above with steam; the top of the boiler, which is horizontal, is three feet below the lowest floor, which I wish to heat. Can I not, with perfect safety, take steam from the top of my boiler, and allow it to return (or the water that condenses from it) by the pipe that feeds the boiler, provided I put in suitable cocks to shut off either the pump or the return condensed water, as it becomes necessary to use the pump, and would it not be perfectly safe to shut off the condensed water at such times as I should find it necessary to pump? I am told by parties who make piping mills their business, that my plan is not safe, and I must return my condensed water to a tank, and then pump it in. I cannot understand why this should be so, and would like your opinion on the subject in the SCIENTIFIC AMERICAN, together with such information as you may be willing to give.

Suppose I allow all my pipes to slant one thirty-second part of an inch to the foot, toward the upright supply pipe, and have that one and a half inch diameter, will not all condensed water run back to the boiler, and will not everything be safe, say at eighty pounds steam, or less?

Stoughton, Mass. C. S.

[Your proposed plan is one very generally in use. You would, however, not be able to return the drip or condensed steam from the first floor, three feet, as the weight of the column would not be sufficient. Your method of slanting your pipes toward the upright supply pipe, and having that of good diameter, is correct. There is nothing dangerous nor difficult in the arrangement, if properly put up and properly attended to.—EDS.

How to Catch Rats.

MESSRS. EDITORS:—In reading your excellent paper, I have frequently noticed devices for the extermination of rats, mice, and other vermin. Different contrivances have, from time to time, been presented to the public, and each claiming to possess some superiority which others have not attained. I do not doubt concerning their efficiency; but as a general thing, the cost of patent machines places them beyond our poorer population, while many of the wealthy are incredulous, and prefer to employ the old style of trap. Now if a drop of oil of rhodium be poured upon some bait, in a common or wire spring trap, and the said trap be set in an infested locality, only a short time will elapse ere the cage will be found occupied by vermin. Rats and mice possess a great liking for the oil, and, when scented, will risk anything to obtain it. I have cleared my cellar of the pests by the above method, and others have tried it with similar success. The oil of rhodium costs about one cent per drop, but a drop will last several days.

New York. J. C.

[Rhodium oil is an extract of a Chinese rose-tree—*Convolvulus Scoparius*—and the perfume is similar to that of roses. This oil, as well as that of anise and asafœtida, is often used to attract fish, insects, and other animals.—EDS.

The Shifting of the Center of Gravity of a Revolving Wheel Tested by an Astronomical Fact.

MESSRS EDITORS:—Our earth is, in relation to the sun, a wheel, or rather ball, of which the plane of rotation is vertical; its axis being in March and September horizontal, and inclining gradually, until in July and December it reaches an inclination of 23°, of course all considered in relation to the great luminary, of which the attraction of gravitation surpasses that of the earth more than three hundred thousand times.

If now the theory that the center of gravity shifts toward the descending portion of a wheel or ball be true, the center of gravity of our earth must continually be shifted toward that side which, in its daily rotation, is moving or falling toward the sun, that is, toward that meridian where it is 6 A. M.; and this shifting of the center of gravity would necessarily be perceptible in the tides. A high tide wave would

take place at the equator at 6 A. M., or a few hours after, of course modified by the tide wave due to the moon's attraction.

What is the case, however? The solar tide wave takes place under the equator two or three hours after midday, proving that it is due solely to the solar attraction, which shifts the center of gravity of our earth directly toward the sun, as the lunar attraction shifts it constantly toward the moon; and the combination of these two attractions, in the different relative positions of the sun and moon, produce the difference in hight of the tides, spring tides, etc. Observations continued for centuries over almost the whole earth in the interest of navigation, have settled the subject of these tides in such a rigorous manner, that we know positively the non-existence of a tide wave, due to the shifting of the earth's center of gravity, toward that half which in its daily rotation is falling toward the sun.

In the same manner as the attraction of the sun brings the center of gravitation of our earth toward that luminary, so the attraction of our earth tends to bring, in all terrestrial bodies, rotating or at rest, the centers of their own gravitation or mutual attraction nearer to the earth; only this mutual attraction of terrestrial bodies is so infinitely small, when compared with the earth's attraction, that it cannot be perceived except with very delicate contrivances, like the torsion balance of Coulomb, who already, seventy years ago, demonstrated this mutual attraction of all bodies on the surface of our earth.

It appears to me that the chief cause of error in those who defend the notion that the center of gravity of a vertical revolving wheel shifts toward the descending portion, or toward the ascending portion (there are some persons who also defend the last idea) is, that they overlook the fact that gravitation acts on all the particles of bodies either in rest or in motion, ascending or descending, with the most perfectly equal force, and that a body is not lighter when ascending nor heavier when descending, or that the attraction of gravitation will not diminish as soon as the body obeys this attraction by falling, nor that the attraction will increase when the body moves against gravitation. The adherents to the last notion maintain, of course, that the center of gravity of the wheel shifts toward the ascending portion. Every one of these notions is erroneous, and beside they would not explain the gyroscope, even if true.

Another cause of error is that the centrifugal force is confounded with the tangential force. They are not the same. The first is the amount of pull to the string when whirling a stone around, and is simply due to the tendency of all bodies to move in a straight line; the last, the tangential motion, is obtained when occasion is given to the body to move in that straight line, and the velocity of this tangential motion will be exactly equal to the motion of the body in the curve in which it moved previously, only continued in a straight line.

I close in expressing my surprise that Mr. McCarroll, the reputed discoverer of the notion, on page 243, in place of admitting that I was right in my statement (page 195) that this thing was not new, and more than ten years ago, mooted in connection with the gyroscope, "informs" me about these facts. He desires that my observations might be more intelligible. I believe that unprejudiced persons by careful reading will easily understand my short description of the apparatus which disproves totally his theory. With mere words, without figures, it could not be made more clear; and I trust that very few readers of the Scientific American, will need to be further enlightened on this subject. If so, I am willing to give figure and description.

P. H. Vander Weyde, M. D.

An Aerolite.

The Anglo-Brazilian *Times* of the 7th August contains a communication from Dr. Franklin Massena, giving an account of an aerolite which he observed at the Observatory of Itataya upon the 30th July, near daybreak. He says:

"Suddenly, toward the east, at almost 30° of the meridian, I saw an immense and beautiful aerolite crossing to the southwest. I called Messrs. Arsenio and Veija, and together we watched the disappearance of the luminous body, and its form and motion. Its form was that of a globe, having an apparent diameter of about 43′, and a tail of 9°, in an elliptical curve extending into space with an inclination of about 30°. The tail was an oval form and very divergent toward the part away from the nucleus. The motion was made by the nucleus, the tail following its track. Both the tail and the nucleus were as brilliant as electrical light, and emitted some luminous drop or tear-like particles, which threw out silvery sparkles with incredible rapidity. Six minutes after its meridian passage the body exploded toward the southwest. Such was the rapidity with which it moved that in 17 seconds it traversed a celestial area of 77° 41′, losing itself behind a hill at 5 hrs. 55′ 50″, or 17 hrs. 55′ 50″ of true solar time.

"This aerolite so disturbed the magnetic instruments that the declinometer turned its pole from the north toward the west and stuck itself in the box where it found resistance; the horizontal magnometer turned toward the west eight divisions of the scale; the vertical magnometer fell in its center of gravity, and finally, the compass oscillated 15° from north to west. I showed Sr. Arsenio the disturbed state of the declinometer. It is, therefore, demonstrated for physics that an aerolite has an intense action upon the north pole of magnets, powerfully attracting them.

"The following are some mathematical elements of the orbit of this body: Meridian passage, 5h. 55′ 33″, on July 30, 1868; declination, 65° south; vertical distance, 42° 32′; setting, 50° 15′ W. by S.

"With these data the orbit of the aerolite is found to have 17° 40′ of inclination upon the line of the earth's rotation, with its movement contrary to that of the earth.

"At 6 o'clock, at the moment of detonation, the state of the atmosphere, to be taken into account for the calculation of tance, was, Bar. 584·3; Ther. C. 8° 3; Hyg. of relative humidity 76·5. Sky clear and cold; wind N. W., weak. The motion of the aerolite was followed by a noise like that of silk dragged over the ground. The aerolite must has passed between Itajuba and Guarantingueta, and it remains now to find out where it fell in order to ascertain its size."

JOHNSON & FROGGOTT'S PATENT HORSE SHOE.

The principal wear on horses' shoes is on the calks, particularly on hard roads or paved streets. It is evident if these calks could be readily removed when worn, and replaced by others, the cost of shoeing would be materially reduced and many inconveniences avoided. Screws for attaching calks to shoes have been used, but the liability to loosen, turn, and eventually to come off, seems to be objectionable.

The device, herewith illustrated, is intended to provide a means of preventing these difficulties. The shoe is in the usual form, but without protuberances. The toe calk, A,—a separate piece—and the heel calks, B, also separate, are attached to the shoe by a screw secured in their upper surface,

Fig. 1

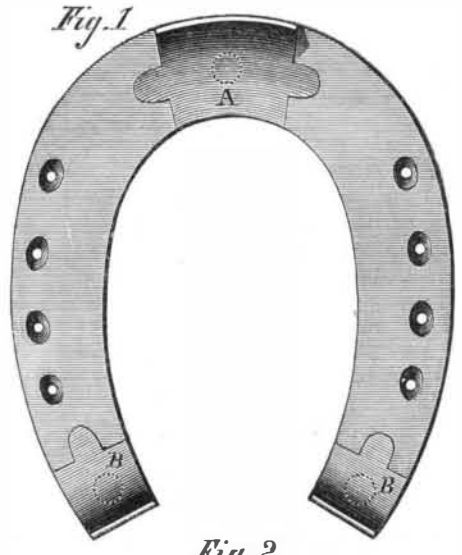
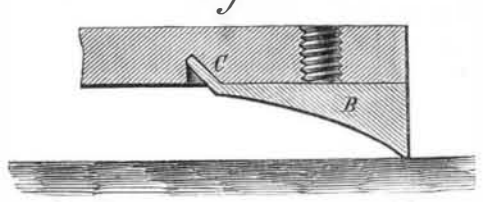


Fig. 2



which fits a correspondingly threaded hole in the shoe, shown in Fig. 2. The toe calk is provided with two projecting pointed arms and the heel calks with one each, which after the calks are screwed in place, are bent down and seated in depressions in the under side of the shoe. See C, Fig. 2. These arms prevent the calks from casually unscrewing or turning, and tend to assist in their support, and the calks may be easily detached and replaced by others.

Patented through the Scientific American Patent Agency, Sept. 29, 1868. Address, for further information, P. C. Johnson, Central City, Colorado.

The Semaphore Steering Apparatus.

A Liverpool paper gives an account of a new steering apparatus, recently invented by an officer in the English Coast Guard Service:

"The difficulty hitherto experienced of knowing and indicating exactly, when vessels meet each other on the high seas or in narrower waters, the course which each vessel intends to take, Mr. Read's invention is intended to obviate. Mr. Read's plan is to connect by a self-acting apparatus the helm of the ship with the starboard and port lights during the night, and with a flag or ball signal during the day, so that any movement which is given to the helm is at once correspondingly indicated to any approaching vessel. A rope or chain is rove through a block, or cheek, at the masthead, from thence to a block hooked on the ship's side and laid along the rail or water-ways through a tube to a block abreast of the wheel or tiller, the turns are passed under and over the barrel of the wheel and to the end of the tiller if the rope or chain is placed on the barrel of the wheel. The port and starboard lights are then placed in connection with this apparatus, and the result is that the turn of the wheel to the right tightens the line attached to the starboard light, raises it from the box in which it has been concealed, and places it fully in the veiw of any vessel approaching. A similar movement of the wheel to the left raises the port light, and starboard light descends and disappears from sight. The lights are placed in metal tubes open at the front, so as to show the light clearly to approaching veesels, and with holes at the back, so that not only may the steersman see that the light is working properly, but vessels approaching from behind may know the exact course which is being taken by the vessel in front of them. If the helm is put the wrong way, as is often the case, the officer in charge of the ship will be able to check the helmsman in an instant, or a ship approaching will detect the mistake and act accordingly. The apparatus is so simple that any cabin boy can rig and repair it when it is out of order. By the use of the apparatus all speculation as to which side a vessel will pass another is at an end, and should a collision take place between ships with the apparatus on board, the party upon whom the blame rests is at once indicated. The lamp signals are of course for use by night; for day signals, the same apparatus puts in motion a yardarm at the masthead, with green or red flags or balls which are seen to port or starboard in accordance with the motion of the helm. The invention has its useful application also in naval tactics; for when the hulls of ships are enveloped in smoke, the rudder can be indicated by the signals made at the fore, main, or mizzen royal truck; and thus, tacking in succession, ships would be able to follow each other accurately either by day or night. Captain Mends, R. N., and other officers, upon whose judgment and experience reliance can be placed, have warmly encouraged Mr. Read's plans; Captain Mends being of opinion that, whether the invention is adopted by the Board of Trade for the high seas or not, it will assuredly be of service in narrow waters."

The Liverpool correspondent of the *New York Mercantile Journal*, gives the history of the invention as follows:

Some time ago Mr. George Read, a chief officer in the Coast Guard Service, stationed in the South of England, dreamt that he could distinguish at a great distance the course a vessel was steering by seeing the movements of her rudder. At first he thought nothing of his dream, and discarded it as a meaningless phantasy. A few nights after, however, he dreamt the same thing, and the peculiarity of the occurrence caused him to ponder over the subject of his sleeping thoughts, and to consider whether the course of a vessel could not be indicated by some means different to what had been in use. Reflection led to the conclusion that there was "something in it," and the result of this wonderful dream, worked out by the skill of the dreamer, was the invention referred to in this letter, which Mr. Read has perfected and brought into practical use, viz: the "Semaphore steering apparatus."

A New Way of Estimating the Motion of the Stars.

A remarkable paper has laterly been sent to the Royal Society in England by Mr. Huggins, one of the Fellows. It announces the application of a new and most promising method of inquiry to the determination of the stars' motions. Mr. Huggins tested this method by the motions of the star Sirius. The spectrum of this star is crossed by a multitude of dark lines, and among others by one known to correspond to a bright line seen in the spectrum of burning hydrogen. The two spectra were brought side by side, and due care having been taken to magnify as much as possible any discrepancy which might exist, it was fonnd that the dark line in the spectrum of Sirius was not exactly opposite the bright line in the spectrum of hydrogen, but was slightly shifted towards the red end of the spectrum. It followed from the amount of the displacement that at the observation Sirius was receding from the earth at the rate of about forty miles per second. When due account is taken of the earth's orbital motion at the time of observation, it results that Sirius is receding from the sun at the rate of about twenty-eight miles per second, or upwards of nine hundred millions of miles per annum.

The new method of examining the stellar motions (says an English paper) is a most promising one. It will doubtless soon be extended to other stars. In fact, nothing but time and patience are required to enable astronomers to extend this method to all the visible stars, and even to many telescopic ones. For the latter purpose, however, an instrument of enormous light-gathering power will be required, and Mr. Browning, F. R. A. S., the optician, is engaged in constructing a spectroscope to be used with the great six-feet mirror of the Parsontown reflector.

Rapid Telegraphic Communication.

The *Telegrapher* says: "It may be mentioned, by way of showing the important aid rendered to modern commerce by the wonderful operation of the magnetic telegraph, that a mercantile house in this city on Tuesday received a dispatch dated Calcutta, September 21, which had been less than twenty-four hours on its way, and which conveyed the fact that their ship was ready on that date to sail for Boston. We believe this is the quickest time yet employed in communicating between these two commercial cities—so wide apart and yet so near together."

We noticed in the *Tribune* of October 2d, the following announcement:

"An attempt was made, yesterday, to assassinate the Viceroy of Egypt while he was attending a celebration in Cairo."

So much has been said and written upon the wonders of telegraphic communication, that the subject has become a trite one; yet we confess our wonder at the developments of the art of telegraphy grows rather than diminishes. Think of it. Less than one day from Egypt! Only one day from Calcutta, and the end is not yet. No further apart than Albany and New York were twenty-five years ago. Newspapers have a good time. If no catastrophe occurs in America, somebody is sure to be struck by lightning in China or somewhere, it don't matter where; it all seems to belong to us, and we are beginning to feel an intense interest in the little family matters of our next door neighbors in Japan. No dearth of news now. Our eight page dailies come literally gorged with items from everywhere, borne silently and swift as light by the wonderful electric current. Old superstitions, effete systems, heathen darkness, get up and move; your date is out.

It stated that a cement impermeable by air and steam, which is said to be superior to any in use for steam and for gas pipes, can be made as follows: Six parts of finely powdered graphite, three parts of slaked lime, and eight parts of sulphate, are mixed with seven parts of boiled oil. The mass must be well kneaded until the mixture is perfect.