POSITION OF THE PLANETS FOR APRIL.

MARS

is morning star until the 11th, when he becomes evening star. He will be a beautiful object throughout the nights of April on account of his ruddy light, brilliancy, and the warlike aspect to which his name is due. His approach to Spica, his bright companion, will be plainly perceptible. On the 13th he will meet and pass Spica about 4° north. After that time he will recede from the star. The opposition of Mars, which occurs on the 11th, gives the reason for his present importance among the planetary brotherhood. He is then at his least distance from us, the earth is between him and the sun, and he rises at sunset and is visible the entire night. Mars rises on the 1st at 7 h. 15 m. P. M. On the 30th he sets at 3 h. 59 m. A. M. His diameter on the 1st is 16″, and he is in the constellation Virgo.

URANUS

is morning star until the 4th, and then evening star. He is in opposition with the sun on the 4th, and will be at his best for observation with the naked eye—for those who are blessed with special visual power. If the unaided eye fail to find him, a telescope will bring him out northwest of Spica, and not very far from Mars. He must be looked for in the southeast soon after sunset. Uranus rises on the 1st at 6 h. 28 m. P. M. He sets on the 30th at 3 h. 53 m. A. M. His diameter on the 1st is 3″.8, and he is in the constellation Virgo.

SATURN

is evening star. He is in quadrature with the sun on the 19th, and is near the meridian at sunset. He is stationary about the 1st of the month, and then moves eastward, retracing his path in the heavens. He is easy to find east of Pollux and Procyon, though his brilliancy is lessening as his distance from the earth increases. Saturn sets on the 1st at 2 h. 39 m. A. M. On the 30th he sets at 0 h. 48 m. A. M. His diamater on the 1st is 17″.8, and he is in the constellation Cancer.

JUPITER

is morning star. There is no need of pointing him out to observers of the southeastern sky, at 11 o'clock on the 1st and at 9 o'clock on the last of the month. He is then seen rising slowly above the horizon and treading his starry path with stately step, the most brilliant star in the whole heavens. Even ruddy Mars pales in his presence. Jupiter rises on the 1st at 10 h. 46 m. P. M. On the 30th he rises at 8 h. 42 m. P. M. His diameter on the 1st is 39″.8, and he is in the constellation Scorpio.

VENUS

is morning star. She is still brilliant in the eastern sky in the morning, but her luster grows dim as she approaches the sun. She rises about half an hour before him at the close of the month. Venus rises on the 1st at 4 h. 50 m. A. M. On the 30th she rises at 4 h. 16 m. A. M. Her diameter on the 1st is 11″.6, and she is in the constellation Aquarius.

MERCURY

is morning star. He is in conjunction with Venus on the 13th, at midnight, being 1° 10′ south. Mercury rises on the 1st at 4 h. 48 m. A. M. On the 30th he rises at 4 h. 35 m. A. M. His diameter on the 1st is 7″.2, and he is in the constellation Aquarius.

NEPTUNE

is evening star. He sets on the 1st at 10 h. 6 m. P. M. On the 30th he sets at 8 h. 18 m. P. M. His diameter on the 1st is 2″.4, and he is in the constellation Taurus.

Mercury, Venus, and Jupiter are morning stars at the close of the month. Neptune, Saturn, Uranus, and Mars are evening stars.

The Great Storm.

The recent storm of wind and snow proved fully as widespread and disastrous as the first reports indicated, and some roads were a full week or more in recovering from it. Northern New England did not suffer exceptionally, and trains within 15 miles of Boston were kept running, but otherwise the blockade was as complete as indicated before. The newspapers have printed hundreds of columns of particulars, and have made mention of a great many derailments which will never get into our record, because the accounts are too vague. The New York Central had six or eight trains stalled between New York and Yonkers. Most or all of them were heated from the engine, and the heating systems acquitted themselves creditably, though the snow actually embedded the cars from the windows down. The two inner tracks in the Fourth Avenue tunnel and on the viaduct north of it were badly blocked, and an express train stood near 110th Street from Monday morning till Thursday night, though the passengers got out on Tuesday.

The Boston & Albany had a train, from which the engine had been detached, stalled within eight miles of Springfield for about 46 hours. It contained 160 passengers, whose necessities were relieved by a volunteer party of 40 men, who carried coal and provisions on their backs from the nearest village, two miles or more away. The conductor strove six hours to reach the nearest telegraph office, a third of a mile away, occupying 45 minutes going the last 70 feet. Many other trainmen in various places proved themselves heroes. Near Worcester, on the Boston & Albany, the engine of a steam-heated train, which left it and went for help, was unable to return, and the newspapers say that blankets for the passengers had to be carried from the city by horse power. A Shore Line express train was detained near Saybrook, Conn., 53 hours.

The New York, New Haven & Hartford had about the hardest fight of all, the New York & New Haven division being blocked near Bridgeport until March 16. Many telegraph poles were blown down, lodging on the track, and one interlocking signal tower was demolished by the wind, killing a man. The Harlem division of the New York Central was nearly as badly off, and a snow plow, pushed by five engines, was derailed in a huge drift near Amenia on March 16, killing five trainmen. A similar derailment occurred on the Lehigh Valley Railroad, by which three men were killed; and fatalities occurred in several other places. Twelve engines were reported derailed or disabled at one time in the yard at New Haven and fourteen at New Brunswick, N. J. Live stock froze to death in large numbers on the Boston & Albany and elsewhere. At St. Johnsville, N. Y., 26 cars of hogs were unloaded and driven into the engine house. Reports about freight trains being covered *out of sight* at Indian Orchard, Mass., on the New York division of the Pennsylvania, and at other places seem to be literally true. Many branch lines had to be neglected, and 75 miles of the Long Island road were reported still blocked on Monday, March 19. Among the trains derailed in the snow was the New York and Philadelphia "two hour train" on the Central of New Jersey, which runs 70 miles an hour for a good portion of its trip.

The stoppage of trains on the elevated roads in New York was primarily due to the density of the traffic; that is, the frequency of the trains and their heaviness as compared with the power of the engines. Although the snow—with some rain to make it sticky—accumulated very fast, the main track could have been kept clear simply by the passage of trains, if storms of this sort were at all common and had been expected. The shortening of the trains, or the addition of pushing engines, would have kept the road open. But with trains following each other so closely, a blockade of a half hour, or even less, at a single point sufficed to stop a score or two of other trains, and then their fate was settled, for several hours at least. At the terminal stations, where there are several parallel tracks and the platforms make the conditions somewhat similar to those in a large yard of a surface road, there was a large accumulation of snow, so that switches became clogged and nothing but an extra force of shovelers and sweepers could cope with the situation.

As a good many railroad men have had new experiences in the line of "snow bucking," and as some of those who are older have had very unfortunate experiences in this storm, we print below the rules of the Northern Pacific for the guidance of its trainmen. It will be seen that running snow plows is not regarded out there as boys' play by any means. It will be understood that these rules are for use with common plows, not the rotary shovel.

INSTRUCTIONS TO BE OBSERVED IN CLEARING THE TRACK OF SNOW AND ICE.

When two or more engines are coupled together, the forward engine will (except in case of danger, when any engine will signal) be considered the signal engine, and the direction the forward engine is going will govern all others in the gang.

When starting for or backing out of a snow drift, the forward engineer *will first place his lever in proper position*, and then signal the other engines. The second engineer will answer the signal first given only when *entirely* ready to give his engine steam. The third engineer will answer the signal of the second engineer only when *entirely ready* to give *his* engine steam, etc. The last signal given will govern *all engineers* in giving steam to their engines, which must be done on the instant.

In case a following or assisting engine is employed, it will keep at least one-half mile in the rear of snow gang, and be prepared to move forward the instant required. Five blasts of the whistles is a signal for following engine to move forward to assist snow gang, and the signal should be *answered* by the same signal.

In case engines become fast in snow bank, it is best to shovel out one of them at a time, and clear the track of snow. The released engine then becomes a helper for the others.

In running for snow banks, engineers must, in absence of express orders as regards speed, use their best judgment, considering the condition of track and bank. When snow is badly packed and frozen, the edge of drift should be broken to allow plow to follow under with safety. In absence of an experienced conductor, head engineer will frequently examine snow banks before running, and especially when snow is deep or badly drifted upon one side of track.

It is useless to run into snow banks with low steam, and engineers will therefore pay particular attention to having full boiler pressure before making a run.

On regular snow-bucking expeditions the pilots of pushing engines must be removed, and engines thoroughly equipped with substantial drawheads, firmly bolted. Also an extra supply of links and pins, and the coal in the tender well covered with tarpaulin.

Snow plows running ahead and on time of passenger trains will pull beyond the station building and await the arrival of the train before proceeding.

Everybody interested must understand that plow engines cannot use headlights, and that the shoe of the plow is liable to crowd torpedoes off the rail without exploding, and the frequent use of the injector in low temperature blinds the engineer by steam, thus requiring the greatest possible care in flagging plow engines.

In blizzards, when it is necessary to follow the plow closely, engineers of following trains will allow as much time as possible between the plow and the following train. All engineers should mark the bad cuts, and in severe storms every precaution should be taken to ascertain if the plow engine is through the cut or has had time to get a flag back. Particular attention is called to this rule.

No man is worth anything in snow plow gang who has not perfect confidence in himself, engine, and plow. Any one who does not feel this is requested to inform his superior.—*Railroad Gazette.*

They Should.

The following unsolicited notice of our several publications we came accidentally across the other day, in looking through the pages of our lively Western contemporary, the *Dubuque Trade Journal.*

Not that editorial encomiums on our different publications are an unusual thing, for seldom a day passes without several publications reaching this office, containing very complimentary sayings, but our Iowa contemporary expresses so much in so few words, and says it so well, we claim the indulgence of our readers for occupying their space in reproducing our contemporary's statement.

"Everybody knows the SCIENTIFIC AMERICAN. It abounds in attractive illustrations and is always filled with entertaining and instructive matter in science and art, especially in the departments of mechanics, invention, engineering, and general industrial progress. The experience and improvement of over forty years of growth have placed it in the forefront of excellence in its line. To thousands of readers it brings a weekly budget of all that is new and interesting in the realm of evolving thought, contrivance, and utility. The SUPPLEMENT also published is an outgrowth of the enterprise demanded by necessary incursions in fields profound, erudite and expanding, where truths sojourn more reconditely and are to be found only by the aid of a higher analysis and the potent grasp of a more complicated deductive logic.

"As said above, everybody knows the SCIENTIFIC AMERICAN, yet everybody does not take it. Nevertheless, they should. The three publications issued by Messrs. Munn & Co., New York, are the SCIENTIFIC AMERICAN, the SCIENTIFIC AMERICAN SUPPLEMENT, and the SCIENTIFIC AMERICAN ARCHITECTS AND BUILDERS EDITION, prices a year, respectively, $3.00, $5.00, and $2.50. They also conduct a large and reliable patent office business and furnish a handbook for inventors."

Engineer Slingerland's Reports on the Assembly Chamber Ceiling, Albany, N. Y.

In our description of the work on the defective ceiling in the State Capitol at Albany, N. Y., in the SCIENTIFIC AMERICAN of March 10, we inadvertently omitted mention of the fact that Mr. W. H. Slingerland, C.E., had made three several examinations and reports on the work. As long ago as 1882 Mr. Slingerland warned the Legislature of the dangerous condition of the Assembly chamber ceiling, and in his third report on the subject, last year, he recommended its removal and that it be replaced by a wooden ceiling. All the examinations since made have fully confirmed the correctness of the original observations and reports of Mr. Slingerland.

Professor Baird's Generosity.

A commendable characteristic of the late Spencer F. Baird, Secretary of the Smithsonian Institution, was his generosity shown toward the young men under him in the Institution. He was carefully scrupulous that his assistants should receive their full share of the honor due them as co-workers with him. In this particular, he was not in the least like Sir Humphry Davy, who was so jealous of his assistant Faraday that the fact became part of the latter's biography.

Major Powell, in a recent issue of *Science*, bears witness to Professor Baird's generosity toward his young assistants, and adds that, when on the track of valuable information, with the end to be gained almost in sight, he was known to turn over the examination to some young assistant, that he might have the credit of completing the work.

Reduce the Postage.

The New York *Journal of Commerce* and a great many other influential newspapers, we are glad to see, are advocating the proposed measure for reducing letter postage to one cent. They justly take the ground that, with the large surplus in our treasury, the post office business of the country need not be made self-supporting. There are other branches of the government in which the people at large are not directly benefited, which do not earn anything for their support. They live on the money collected through the treasury and interior departments, of which the inventors of the country pay an unjust proportion. A great deal might be said in favor of free postage, as an educational factor, but what the public will be satisfied with for the present is a reduction of letter postage to one cent, which measure Congress should not stop to discuss, but put in train for early passage.

Trade Marks Prosecutions.

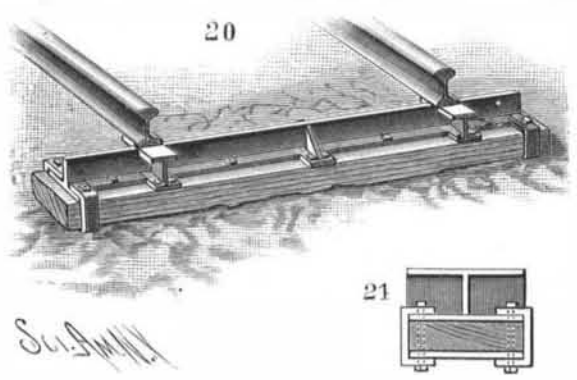
A very interesting trade mark case has just been considered judicially at Sheffield, England. A local firm of cutlery manufacturers were summoned by another firm for using "A 1," which they contended was their trademark. For the defense it was urged that "A 1" was merely a description of quality, and ought not to be registered as a trade mark any more than "First rate," "High class," or "Superior." The fact remained, however, that "A 1" had been registered. The firm who were summoned pleaded that when they struck "A 1," they never for a moment imagined it was a trade mark, until one day they read of it in a trade organ. They then immediately ceased striking it, ground the mark out of their blades, and destroyed the tool. A single specimen found on their premises must, they say, have been overlooked, for the police in their search failed to find any others, or to elicit any information which would indicate that they intended to strike the forbidden "A 1." The Sheffield stipendiary, exercising his common sense, accepted the explanation and dismissed the summons. It certainly would be intolerable, remarks our informant, if the merchandise marks act, which was passed to prevent fraud, were to be used as an engine of oppression against honorable firms who were in ignorance of the existence of the trade mark they were charged with using.

Prizes Offered for Hospital Furnishing.

The present ex-Empress of Germany last year placed at the disposition of the Red Cross Society the sum of $1,500, and three gold and nine silver medals, to be awarded for the most meritorious efforts in bringing forward something beneficial in the care of the sick and wounded. The society has determined to award these gifts in the form of prizes for the best interior furnishing for a movable hospital, indicating the articles most appropriate, and the best way of obtaining and putting them into use for the fitting up of a portable hospital barrack designed for a given number of sick and wounded patients. The articles designed for competitive prizes must be sent before August 15 to the executive committee of the General International Exhibition, Brussels, Belgium. Requests for further information may be addressed to J. B. Hubbell, Washington, D. C., or Judge Joseph Sheldon, New Haven, Conn.

The Secretion from Roots.

Recent investigations on this subject undertaken by Dr. Hans Molisch have shown that the acid secretion from the roots of plants attacks organic even more powerfully than inorganic substances, not merely dissolving them, but causing in them important chemical changes. It exercises both a reducing and an oxidizing

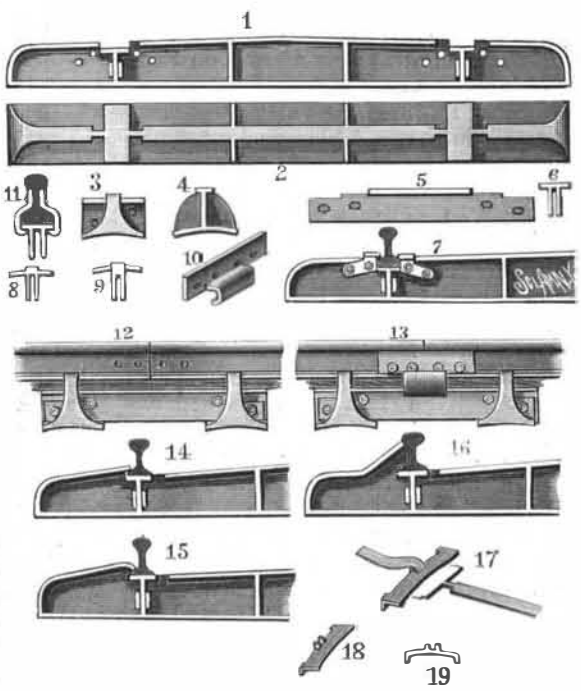


HAWLEY'S RAILROAD TIE, PART WOOD.

power. It stains guaiacum blue. It oxidizes tannin and humin substances, and hence greatly promotes the decomposition of humus in the soil. It transforms cane sugar into reducing sugar, and has a slight diastatic action. Plates of ivory are corroded by it. The root behaves in many respects like a fungus, especially in the fact that the fungus alters the organic constituents of the soil by definite excretions, and causes their more rapid decomposition. This root secretion does not merely impregnate the epidermis, as has been generally supposed, but is often excreted over its surface in the form of drops.

HAWLEY'S IMPROVED RAILWAY TIE.

A railway tie which can be quickly and securely placed in position, and with which the rail will be continuously supported throughout the length of the track, has been patented by Mr. Charles P. Hawley, of No. 510 West 153d Street, New York City, and is illustrated herewith. Figs. 1 and 2 show a side elevation and plan view of the tie, which has an inverted T-shaped body with horizontally flanged top, as shown in section in Fig. 4, the flange being recessed to receive the rails, and following the rounded ends of the vertical web of the tie to form a stay for its ends, as shown in Fig. 3. The ties are connected by a bridge, as shown in Figs. 12 and 13, consisting of two parallel and spaced plates having stepped ends, Figs. 5 and 6



HAWLEY'S METALLIC RAILROAD TIE.

showing side and end views of the bridge. In the recess of the tie in which the rail is supported is a transverse plate, on which rest wood beams, upon which the rails are laid and held by a spring clamp, as shown in Fig. 7, Figs. 8 and 9 being end views of the rail clamps, and Figs. 10 and 11 showing the fish plate and its method of attachment. Figs. 14, 15, and 16 are side elevations of the tie, illustrating modified forms of securing the rail, Figs. 17, 18, and 19 showing the spring plate employed in connection therewith.

As a modification or improvement of this tie, a construction is provided partly of metal and partly wood, so designed that when the wood becomes decayed the tie can be easily taken up and new wood substituted. By this invention a metallic tie is adapted to rest upon a wooden block or plank, and be bolted thereto, as shown in Fig. 20, Fig. 21 showing a form of clamping plates preferably used in connection with the ends of the tie.

In order that the tie may be easily withdrawn from under the track and replaced without disturbing the movement of the rolling stock, a supporting plate or bar, shown in Figs. 22 and 23, is adapted for use with the tie, Fig. 24 showing one of these rail-supporting plates in position, and Fig. 25 illustrating a track supported upon the improved tie, with one tie in position for withdrawal. These ties offer a perfect form for strength and lightness, and to be held securely by the ballast.

The Study of Science.

Nothing could well be more forcible than Sir James Paget's exposition of the advantages of the study of science, and his vindication of even "a little knowledge," so that it be real and true as far as it goes, and has been made the property of the mind by a process of self-verification. Sir James Paget claimed for the study of science that it included the teaching of the power of observation, the teaching of accuracy, and, lastly, the teaching of the methods by which we can pass from that which was proved to the thinking of that which is probable. The rarity of the faculty of sound and deep observation, and the difficulty of accuracy, were well stated. It is indeed one of the defects of our common systems of education that so little attention is given to the cultivation of a faculty of estimating evidence, such as is the chief and great advantage of the study and practice of law.

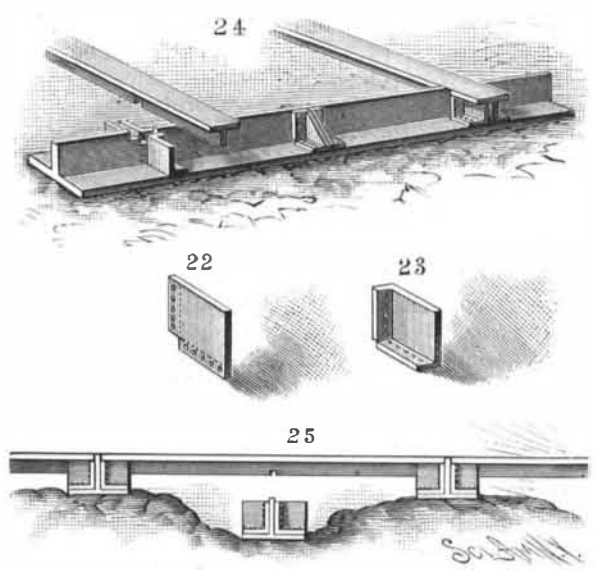
Another quality in which scientific men are apt to be deficient, according to Sir James, is that of enterprise. The love of truth is a fine thing for the sake of truth itself, but the enterprise that seizes truth for the sake of its uses, that takes hold of it at its practical point and applies it to great human and public purposes, is a great faculty, and was fitly praised at the Mansion House—that center of the enterprise of the world. Sir James evidently thinks that if the contagion of science could take effect on a few more of our City men as it has on Sir John Lubbock, great results would follow.

Scientific men want the enterprise of business men, and, according to Sir James, business men would lose nothing of their efficiency for an admixture of the scientific element. A little more push or enterprise on the part of Sir Humphry Davy and Mr. Faraday might have anticipated by a generation the discovery of anæsthetics, or on the part of Dr. Cummings, a professor of Cambridge, the discovery of the telegraph. It seems a trite occupation to go on observing and observing. But, trite as it is, it must be persevered in, and men of authority must speak it out plainly, though few can hope to catch that *felicitas verborum* which is such a gift in Sir James Paget, and of which the following sentence is an illustration: "We all of us know a considerable number of persons who would not for their lives tell a lie, but who, nevertheless, always seemed as if for their lives they could not tell the exact truth."

Loose observation of what is before us, and loose statement of what we think we observe, are the clogs of science. Better be like John Hunter, slow in articulation and embarrassed in public speech, than be superficial in observation and fluent in tongue. Our profession, perhaps, misuses the gift of speech and rhetoric less than all others. In some departments words seem to have taken the place of deeds. But in our calling, too, there is room for more care in observing and narrating facts. Let nobody begin this great discipline lightly. It cost John Hunter much. He slept less and worked more than any other man of his time. And this is the price of getting at facts. At least, this is what he had to pay who, according to Sir James, was "the master of all the science in his own profession—the greatest observer, the greatest thinker, on the whole, we have ever had." The extension of university teaching will be a blessing if it can spread the desire to imitate such men as Hunter and Darwin. It will, indeed, add to the happiness and usefulness of life.—*Lancet.*

Remarkable Discharge of Atmospheric Electricity.

A correspondent of the *Electrician* writes as follows: "A most violent discharge of electricity was observed on board the Danish steamer Constantin, coming from Newcastle and bound for Copenhagen, on Friday morning, February 10, when about 160 miles distant from the English coast. Although the thermometer was at freezing point, thunder and lightning began some way off, between 4 and 5 o'clock A. M. At about 6 a tremendous report was heard, sounding like thunder, and the captain describes the appearance of the vessel as if it were shrouded in a mass of bright red flames, which lit up the surrounding waves. The phenomena was all the more surprising as the thunder and lightning appeared to be at some considerable distance from the steamer, and it could not be compared to an ordinary thunder clap and lightning flash, being far too violent and no regular flash of lightning being seen. The shock was so great that several men in various parts of the ship were knocked down, and the first engineer was under the impression that a boiler explosion had taken place. The whole thing only lasted a moment, but it was attended by a violent wind, and St. Elmo's lights were seen on the tops of the masts and elsewhere. On arriving at Copenhagen, the captain



HAWLEY'S RAILROAD TIE—SUPPORTING RAIL FOR WITHDRAWAL OF TIE.

found his suspicions confirmed of alterations having taken place in the deviation of the ship's compasses. The alterations were greatest on S.S.E. and N.N.W. courses, where the deviation, from having been 7 degrees westerly, had become 5 degrees easterly. The vessel was, when the electrical discharge took place, steering E. to N."

THE export of breadstuffs from the United States in 1887 amounted in value, says the *Mechanical News*, to $158,301,708, against $148,123,020 in 1886.