Correspondence.

Expansion of Rails in Hot Weather.

To the Editor of the SCIENTIFIC AMERICAN:

Before the art of laying railroad iron was brought to its present state of perfection, the main line of the Chicago, Burlington & Quincy Railroad west of Burlington, Iowa, was the scene of a most peculiar accident, due entirely to natural causes.

In 1868, that portion of the road described had never been ballasted, the wooden ties having been merely laid upon the loose dirt of the prairie, and not much trouble had been taken to tamp them. The rails had been laid upon these ties with their ends brought close up together.

James Roberts, a trusted engineer on the above road, left Burlington at eleven o'clock on a hot day in August, 1868, a little late. The train was scheduled fast for those days, but he made up the time before he reached Fairfield, Iowa. As the train was speeding west, three miles from Fairfield, Engineer Roberts was amazed to see the track about a mile ahead of him suddenly rise from the roadbed, writhe and bend like a wounded snake, and then slowly settle down into a perfect curve at the side of the roadbed upon the level prairie. He reversed his engine and whistled for brakes and brought the train to a standstill. Crew and passengers went forward and inspected the phenomenon. Not one tie had broken loose from the rails, and the new position of the track at the side of the roadbed seemed secure and safe. At least a mile of track had changed its position, and, after examining the track for the entire distance, it was decided to go on, and the train, moving slowly, passed safely over. The circumstance was reported, and the engineers visited the scene without delay. They reported the occurrence to be due to expansion of the rails, which, having been placed with their ends touching each other, allowed no room for expansion. The weather being so hot, the expansion became a force greater than the weight or gravity of the rails and ties, and lifted them bodily until the longitudinal pressure was removed, when the whole structure settled to one side in the form of a curve. The greater length of the curve was identical with the length of the expansion.

This is the only instance of the kind ever reported, but they would be of frequent occurrence were not the matter of the expansion of the rails taken into account when rails are laid, and a suitable space left between the ends of the rails to accommodate their increased length in very hot weather. C. M. GINTHER.

Hagerstown, Ind.

[In stating that the above remarkable case is the only instance of the kind ever reported, we presume that our correspondent refers to the fact that the track lifted bodily from the roadbed before settling into a curve, and that the actual change of position occurred before a reliable eye witness. "Kinks" in a roadbed are not an uncommon occurrence on the unballasted roads of the western prairies, though the translation from a tangent to a curve usually occurs by the ties and rails being pushed bodily sideways over the ground. The remarkable feature in the occurrence above mentioned was the sudden rise of the track, when one would have expected it to be gradual. In all probability there was a slight vertical curve in the track at this point. The initial expansion would be accommodated by the elasticity of the rails; but as soon as the vertical component of the thrust of the rails exceeded the combined weight of ties and rail, the latter would commence to rise with an accelerated movement due to the enormous elastic thrust of the metal.—ED.]

The Heavens for July.

BY WILLIAM R. BROOKS, M.A., F.R.A.S.

THE SUN.

The sun's right ascension on July 1 is 6 h. 43 m. 43 s.; and its declination north 23 deg. 4 m. 24 s.

On July 31, the sun's right ascension is 8 h. 44 m. 27 s.; and its declination north, 18 deg. 6 m. 6 s.

On July 1, at 9 h., the sun is at its greatest distance from the earth.

On July 29 will occur an annular eclipse of the sun, visible throughout the United States as a partial eclipse, beginning, for Washington, at 8 h. 42 m., and ending at 11 h. 2 m. A. M. At Washington the greatest obscuration will be 7 digits. To all places north it will be less, and to places south the obscuration will be greater. The path of annulus, about 25 miles in width, extends from a point in the Pacific Ocean 20 deg. west of the west coast of Mexico, passes across Mexico, the northern edge of Cuba, just touches the northeastern point of South America, and ends in the mid-Atlantic Ocean, in 21 deg. south latitude.

MERCURY.

Mercury is morning star the first half of the month. It comes into superior conjunction with the sun on July 15, when it changes to evening star.

On July 4, at 12 h., Mercury is at its ascending node, on July 9 at perihelion, and on the 19th at its greatest heliocentric latitude north.

Mercury is in conjunction with the moon on July 30, at 7 h. 38 m., when the planet will be 3 deg. 18 m. north of the moon.

The right ascension of Mercury on the first of the month is 5 h. 42 m. 59 s.; and its declination north, 22 deg. 53 m. 38 s.

On the last of the month its right ascension is 9 h. 49 m. 57 s.; and its declination north, 14 deg. 35 m. 49 s.

VENUS.

Venus is morning star, and a most beautiful object it is, as it heralds the approaching dawn. Venus reaches its greatest elongation west of the sun, 45 deg. 44 m., on July 7, at 11 h.

On July 17, at 4 h., Venus is at its greatest heliocentric latitude south.

On the 25th, at 2 h. 24 m., Venus will be in conjunction with the moon, when the planet will be 6 deg. 44 m. south of the moon.

On July 28, at 4 h., Venus will be in conjunction with Neptune, when Venus will be 1 deg. 21 m. south of Neptune.

On July 1, Venus rises at 1 h. 57 m. A. M., and crosses the meridian at 8 h. 52 m. A. M. On the last day of the month Venus rises at 1 h. 40 m., and crosses the meridian at 8 h. 59 m. A. M.

On July 15, the right ascension of Venus is 4 h. 30 m. 31 s., and its declination north 18 deg. 38 m. 51 s.

MARS.

Mars is evening star. In its rapid orbital motion among the stars it will be seen to overtake Regulus on July 5, when it will be within one degree of that well known star. Compare the ruddy light of the planet with the light of the star.

On July 25, at 10 h. A. M., Mars will be in conjunction with Jupiter, when Mars will be only seven minutes of arc south of Jupiter. This close approach may not be seen, but the planets will be found very near to each other on the evenings preceding and following the time of conjunction, forming an interesting celestial picture.

On July 3, at 8 h. 31 m., Mars is in conjunction with the moon, when the planet will be 3 deg. 21 m. north of the moon.

On July 1, Mars crosses the meridian at 3 h. 14 m., and sets at 10 h. 3 m. P. M. On July 31 Mars crosses the meridian at 2 h. 25 m. and sets at 8 h. 50 m. P. M. The right ascension of Mars on July 15 is 10 h. 25 m. 49 s.; and its declination north 10 deg. 56 m. 54 s.

JUPITER.

Jupiter is evening star, and is a very beautiful object in the western heavens soon after sunset. Telescopic work should be made at an early hour, while the planet is at a fair altitude.

Some of the phenomena of the satellites which occur at a sufficiently early hour for observation are here given.

On July 5, at 9 h. 22 m., the ingress of satellite I in transit will occur. On July 12, at 8 h. 14 m., satellite II will disappear by occultation. At 8 h. 57 m. satellite III will reappear from an eclipse.

On July 13, at 8 h. 35 m., satellite I will disappear by occultation. On July 14, at 8 h. 10 m., satellite I will egress from transit; and at 9 h. 4 m. the shadow of satellite I will pass off the disk of Jupiter.

On July 21, at 8 h. 28 m., satellite II will pass off the disk, and at 8 h. 41 m. the shadow of satellite I will enter in transit. On July 4, at 2 h. 24 m., there will be a conjunction of Jupiter and the moon, when the planet will be 4 deg. 10 m. north of the moon.

On the first of the month Jupiter crosses the meridian at 3 h. 53 m. and sets at 10 h. 28 m. P. M. On the last of the month Jupiter crosses the meridian at 2 h. 15 m., and sets at 8 h. 43 m. P. M.

The right ascension of Jupiter on the fifteenth of the month is 10 h. 42 m. 6 s.; and its declination north 9 deg. 23 m. 9 s.

SATURN.

Saturn is also evening star, and a very beautiful object in the southern heavens. Its wonderful ring system is quite widely opened out. The separation of the two bright rings may be well observed now with telescopes of very moderate aperture, under good atmospheric conditions.

On July 10, at 4 h. 10 m. A. M., Saturn is in conjunction with the moon, when the planet will be 7 deg. 18 m. north of the moon.

On July 28 Saturn is apparently stationary.

On the first of the month Saturn crosses the meridian at 8 h. 50 m. P. M., and sets at 1 h. 54 m. after midnight.

On the last of the month Saturn crosses the meridian at 6 h. 50 m. P. M. and sets at 11 h. 50 m. P. M.

The right ascension of Saturn on the fifteenth of the month is 15 h. 29 m. 39 s.; and its declination south 16 deg. 47 m. 12 s.

URANUS AND NEPTUNE.

Uranus is also in the southern evening heavens, about two degrees south of Saturn; its right ascension for the middle of the month being 15 h. 31 m. 18 s.; and its declination south 18 deg. 50 m. 46 s.

Neptune is in the morning sky, but too near the sun for observation.

Smith Observatory, Geneva, N. Y., June 21, 1897.

Science Notes.

Arrangements have been perfected for the establishment of zoological gardens in San Francisco.

It is said that an establishment for the manufacture of calcium carbide will be established at the new hydraulic power plant at Rhinefelden, Switzerland.

A fulgurite has been found in Rome, N. Y., which extends to a vertical height of forty-five feet. A fulgurite is a vitrified tube caused by lightning striking sand.

The International Submarine Telegraph Memorial Committee has granted "the Sir John Pender gold medal" to the Glasgow and West of Scotland Technical College. It is given annually to the best student, who at the same time obtains the college diploma in electrical engineering.

Natural Science has completed its tenth volume and will be hereafter published by J. M. Dent & Company, of London, It is remarkably well conducted and shows conclusively that science need not be dull. American science has been given more attention than in any other foreign journal. If for no other reason, it should have a good circulation in the United States.

In a recent number of the Comptes Rendus M. De Wateville gives a method of obtaining large and transparent crystals. The small crystal is so mounted that, while in a saturated solution, it can be continuously rotated on itself with a speed of several rotations a second. Potassium and ammonium alums, copper sulphide and sodium chlorate are said to give particularly fine results.

Until lately M. Moissan had not succeeded in preparing metallic titanium by pyro-electric reduction. He always obtained as the result of his experiments a hard, reddish-brown nitride of the metal, TiN_2. But recently he found that totally different results were obtained if a stronger current, and therefore a higher temperature, was used. By this method Moissan reduced titanium oxide in a mixture with carbon to a bead of metallic titanium surrounded by a coat of oxide. The metal contained about 2 to 6 per cent of carbon.—Uhland's Wochenschrift.

The Grand Duke of Bavaria had, in 1893, detected the monogram of Albrecht Dürer and the date 1521 on a painting in the possession of Mr. F. Bürger, in Munich. Still many doubted the authenticity of the picture. The painting was lately examined by means of X rays. On the screen appeared, to the surprise of the Brothers Haller, at whose laboratory the experiment was conducted, and of all others present, a perfectly clear image of Christ in a crown of thorns, and also the monogram of Dürer and the date were clearly visible.—Electrotechnische Rundschau.

A remarkable glacier eruption occurred during the early part of the present year in the south of Iceland. A postman was crossing the sands of Sakeitara when he heard sounds proceeding from a glacier two miles in front of him and saw large masses of ice being hurled up into the air from the glacier. This was followed by a flood which began descending to the sands below. He promptly fled, and when he returned, about a week later, he saw a belt of ice waves extending from the glacier to the sea, a distance of at least twenty-five miles. The average breadth of this belt was about four miles. The height varied from seventy to ninety feet. On the other side of the ice field were newly formed torrents which sprang from the glaciers. No one was injured by the glacier eruption, which, it is thought, may have some connection with the severe earthquakes of last summer.

Edward McIlhenny has sailed from San Francisco for two years' scientific work in the northeastern part of Alaska and the basin of the Mackenzie River. He was the ornithologist on the Cook excursion, which was wrecked in Davis Straits. He has associated with him W. L. Snyder, of Beaver Dam, Wis.; Norman G. Buxton, of Johnstown, Pa. They will take supplies for two years' work in the Arctic regions, most of their food being in condensed form and adapted for transportation in sledges. Point Barrow will be made the headquarters and expeditions will be made from it to northeastern Alaska, which is comparatively unknown. The fauna and flora of the Alaska and Mackenzie regions will be carefully studied and specimens sent back to the coast, from which they will be shipped to the National Museum, at Washington, and to the museum of the University of Pennsylvania. Mr. McIlhenny hopes to make a careful exploration of the Romanzoff Mountains, in Alaska, which are said to be rich in fossil remains.

Bound Copies of Our Supplement Catalogue.

Owing to the request of librarians and many of our readers we have a issued a special edition of our new SUPPLEMENT catalogue. It is printed on heavy paper and is bound in cloth. These catalogues will be supplied by mail at the nominal price of twenty-five cents. Public libraries will be furnished with a copy free of charge. The ordinary edition of the catalogue will be sent free to any of our readers as heretofore free of charge, and all should avail themselves of the opportunity of obtaining a valuable reference catalogue.