

Fabulous Astronomy.

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THE EARTH, SKY, AND STARS.

The first observers of the heavens had no suspicion of the true nature of the stars, nor of the great distances that separate us from them. They believed them, if not within reach of the hand, at least (and almost in a literal sense) to be within reach of the voice. Homer says that the loftiest pines of Mount Ida extended beyond the limit of the atmosphere and penetrated the ethereal region, through which the noise made by the arms of his heroes reached the sky. The latter was a solid hemisphere—a bell that rested upon the earth. According to Euripides, it was a cover put upon the works of the sublime workman. The Hebrew psalmist of the eleventh century before our era said to the Lord, "Thou spreadest the heavens like a tent." It is in this hemispherical vault that the stars of Anaximenes are fixed like nails. Empedocles supposed them to be attached to a crystal vault.* The celestial bell covered a flat earth surrounded on every side by water. Every nation supposed itself to be in the center, and China is still to-day the "central empire" [and its Chinese name, Chon-Koo, means "center of the world"]. The Incas of Peru showed the center of the earth in the sanctuary of Cuzco, the name of which signifies "navel," just as the Greeks saw it in the temple of the sun at Delphi, called also the navel (*ομφαλός*) of the habitable world, and celebrated under that title by Pindar. The Chinese locate the navel of the earth in the city of Khotan. The conception of an earth flat like a cake prevailed in European civilization up to the crusades, and the lazzaroni of Naples still have it.

The Hawaiians, Maoris, and Eskimos believe the entire sky to be supported by a column, just as classical antiquity supposed it to be upheld by Atlas. The Iroquois Indians suppose the sky to be fluid. In order to explain the circular motion of the sun, the Polynesians suppose that the great god Mani holds it by means of a cord, and this also was the idea of the Peruvians.

To the pastor of the Saptasindhu, the stars were fires lighted by Agni (elementary fire) or by Varuna (the celestial vault). A hymn that he addressed to the gods mentions the moon with icy rays only to proclaim the powerlessness of it before the divine fires of heaven.

THE MILKY WAY.

The grouping of the stars in constellations is very ancient. The Great Bear, the Little Bear, the V of Taurus, the Pleiades and Orion have been known for a very long time. The milky way, which is the "winter lane" of the Scandinavians, is the "soul's road" among the Iroquois and several other nations of America [and the *tchibekana*, or "road of the dead," of the Odjibways]. The souls enter the world through the door at the intersection of the zodiac and milky way in the constellation Gemini, and make their exit, to return to the gods, through the door of Sagittarius. French peasants still call the milky way "St. James's Road," and mythology attributes it to a drop of milk that fell from Juno's breast while she was nursing Hercules. It is the "celestial river" of the Chinese, an arm of the sea inhabited by sharks to the Tahitians, the field in which the manes of the ancestors of the Puelches hunt ostriches, and the "star dust" of the Peruvians.

THE PLEIADES.

The Pleiades are a group of stars quite close together, visible in winter in that part of the constellation which lies near Aries and Perseus. Several ancient peoples imagined that they saw male and female dancers in the group.

[Iroquois tradition originates the Pleiades in seven little Indian boys, who met for a dance. Their heads and hearts grew light as they flew around the mound about which they were dancing, until suddenly the whole party whirled off into the air. Higher and higher they rose, whirling around their singer, until, transformed into bright stars, they took their place in the firmament, where they are dancing still, the brightness of the singer, however, being dimmed on account of his desire to return to earth.]

In India, Italy, England, and France, it is rather a hen and her chickens that are seen in the group. French peasants call the group the *poussiniere* (from *poussin*, "chicken"). According to *Ciel et Terre*, observations of the Pleiades are of the highest importance to the Blackfoot Indians, whose feasts are regulated by the advent or disappearance of this group of stars. When the latter disappear from the starry vault, in autumn, the agricultural labors are begun by sowing seed. It is the *inissiman*, or feast of the men. When they reappear, the *montoka*, or women's feast, is celebrated. The first merrymaking has for signification the burial or burning of seed, and the second the return of the absent. The day before the Pleiades make their appearance (and a knowledge of this event implies an advanced state of astronomy), the women make merry by dancing around a pole. It is the *marristam*, in which the vestals of the sun take part. *Ocan* is the

* According to Lucian, this vault is externally of brass.

autumn feast, during which the dead are honored by a dance called *stapuscun*, or "dance of the dead." The women swear by the Pleiades, and the men by the sun. They are called "the seven," implying the idea of perfection and signifying the seven perfections. In every religious feast the calumet is always presented to them, and prayers are offered up to them that a happy life may be granted. To these Indians the Pleiades were formerly seven young people who guarded the sacred seed at night, and who executed a sacred dance while doing so. Epizors, the morning star, charmed with their gracefulness, took them to heaven, where the sight of their gambols delights the stars.

The sand dance of Malay warriors gives an idea of this celestial dance. The bath of purification prescribed to the Indian doctors contains a triangular aperture, in which are placed seven hot stones that are afterward covered with cold water. After the medicine men have made their invocations, they invoke the aid of the Pleiades in curing the sick in body. As a talisman, they have seven bones, balls, or buttons.

To the ancients, the Pleiades (from *πλεην*, "to navigate") were the constellation of navigators, because they were visible from May to November—the period of navigation in the Mediterranean—and served, instead of the pole star, for directing sailors at night. According to a fable, the Pleiades, or Atlantides, were the seven daughters of Atlas and Pleione, who were carried off by Busiris, king of Egypt, and rescued by Hercules. Being afterward persecuted by Orion, they were changed into stars. The most brilliant of them, Alcyone, γ Tauri, is of the third magnitude; Electra and Atlas are of the fourth; Merope, Maia, and Taygetes are of the fifth; and Cæleno, Pleione, and Asterope are of the sixth and eighth. The last two are invisible to the naked eye, and Cæleno can be seen only by sharp eyes. It has probably diminished in brilliancy since the time of the Trojan war, since an ancient version states that it disappeared on account of the carnage of these battles.

It is a remarkable thing that our sun and its system are drawn along to a point in space situated between μ and π Herculis, and much nearer the latter, under the influence of a central star, which is perhaps Alcyone.

THE GREAT BEAR.

In the Great Bear, the inhabitants of northern regions see a rude figure of the common bear, or that of the reindeer or dog. A chariot is likewise seen in it—the "chariot of David" of country folk.

The Iroquois have long known of the approximate immobility of the pole star, and call it *tiyunsoudagoerr*, "star that never moves." [The Cree Indians name it *atak ekawikatch ka attutet*, "star that never changes place."]

THE AZTEC FEAST OF THE CYCLE.

The period of fifty-two years appeared to the Aztecs so complete a cycle that they asked themselves whether, at the expiration of this period, the great clock of heaven (having accomplished its revolution) would not stop forever. The Aztec cycle threatened a largenum-ber of men once, sometimes twice, in their life. The fatal night on which the fifty-second year was to expire was therefore a solemn moment. On this evening the sacred fires in the temples were extinguished, as were also the fires in private houses. All vessels that had contained food were broken. The evening was passed in darkness, the population being divided between inquietude and hope. It was in the month of November. The sky, usually clear at this season, sparkled with myriads of stars. The people then betook themselves to the mountain of Huixachtecatl, near Mexico. The Pleiades were to culminate at midnight; it was the denarkation of the cycle. When they were at the highest point of the heavens, the chosen victim was brought forward, and the priests opened his breast and tore out his heart. Then laying the sticks whence the new fire was to issue upon the victim's quivering breast, they rubbed them in order to produce the flame that was to light the funeral pile. Men provided with torches at once surrounded the new flame in order to light the resinous wood that they carried in their hands. These were the couriers who were to distribute the sacred fire throughout all the provinces of the empire. At this moment, cries of joy made the mountain echo; the world had not come to an end, and man could hope for at least one more cycle before the destruction of the universe.

Those who were unable to be present at the public ceremony kneeled upon the house tops, asking themselves whether they would see a new era. At the approach of daybreak, with eyes turned toward the east, they watched for the first glimmer of the dawn, like the bird that Dante speaks of, which fixedly gazes eastward in order to see the day appear. At the first sign of light, cries of joy arose from everywhere. New fires were everywhere lighted, a magnificent feast was celebrated, and thanks were rendered to God for having prolonged his light and accorded a new cycle.

The secular feast of the Aztecs has been suppressed by the Spaniards, their conquerors. The last human victim was sacrificed upon the pyramid of Tlaloc in 1507. This solemn celebration was analogous to the

secular games of the Romans, and still more closely resembled those of the feast of Isis, in Egypt.—*L. Burre, in Revue Scientifique.**

Aluminum Bronze.

A writer in the *Journal* of the United States Cavalry Association points out that this alloy might with advantage be used in the construction of breast plates. There is no doubt that the days of defensive armor are by no means past. The advantage of the cuirass was shown in the cavalry combats of the Franco-German war, and the far range of the modern rifle may render it every day more desirable that some attempt should be made to counteract its deadliness. Gun shields also will sooner or later become necessary, and it may be that in this alloy will be found the solution of the question how to protect light artillery and cavalry, without sacrificing mobility. Captain W. Hall, the writer above referred to, gives an interesting comparison, which was made by his government, between the average of 130 specimens of accepted gun steel and an alloy of 90 parts copper and 10 aluminum. This comparison is as follows:

	Aluminum alloy. Lb. per sq. in.	Gun steel. Lb. per sq. in.
Tensile strength.....	111,400	96,150
Probable elastic limit.....	84,000	51,811

It is considered that modern methods of working aluminum, especially by aid of the electric furnace, will so reduce the price that it will come into general use for many purposes.

THE PEARL MUCILAGE BOTTLE.

The accompanying cuts show a novel and useful mucilage bottle recently placed on the market by the Nassau Manufacturing Co., of 140 Nassau Street, New York.

Fig. 1 shows the flexible rubber tip, which is of peculiar construction, answering the purposes of a brush, with none of the inconveniences. This tip may be readily converted into a self-feeding brush by simply sticking a narrow knife blade through it at the index notches, as shown in Fig. 2.

Owing to the peculiar construction of the tip, the slits will always open when it is bent by pressure applied in using, but if mucilage hardens around them, a pinch or tap on the end of the tip will readily loosen it. The bottle may be left on its side, or, in fact, in any position, without the slightest chance of

spilling any of its contents, as the mucilage will only flow through the apertures when pressure is applied, as in use.

There is no waste from spilling or evaporation. It is much more economical than the old fashioned bottle, and may be refilled as often as desired by slipping off the tip.

Though on the market but a few weeks, it is having a deservedly large sale.

Friction of Collar Bearings.

The third report of the friction committee of the Institution of Mechanical Engineers is on experiments on the friction of a collar bearing. The general conclusions of the committee are that this kind of bearing is inferior to a cylindrical journal in weight-carrying power. The coefficient of friction is also much higher than for a cylindrical bearing, and the friction follows the law of the friction of solids more nearly than that of liquids, due doubtless to the less perfect lubrication applicable to this form of bearing compared with a cylindrical one. The coefficient of friction appears to be independent of the speed, but to diminish somewhat as the load is increased, and may be stated approximately at one-twentieth at 15 pounds per square inch, diminishing to one-thirtieth at 75 pounds per square inch.

QUANTITIES of bears' bones and seven very well preserved skulls were recently discovered in a cave at Rubeland, in the Hartz. A set of stag antlers, fragments of skeletons of hyenas, and some slender bones, which are assigned to the ptarmigan and the lemming, were also discovered. The cave is to be lighted by electricity for the benefit of scientific visitors.

* With additions by the translator.

Own Your Homes.

Every man, says the *Building News*, whether he is a workman in the common acceptance of the word or not, feels a deep interest in the management of the affairs of the city, county, and State in which he lives wherever he owns a home. He is more patriotic, and in many ways is a better citizen, than the man who simply rents, and who has but little, if any, assurance of how long it will be before he can be ordered to move, to which may be added in many cases the saving of more money.

Of course it requires some economy to lay up a sufficient amount of money to purchase and pay for a home, but this very fact, if properly carried out after the home is acquired, may be the instrument of furnishing the means to commence and prosecute a business upon one's own responsibility. True, in some cases it will require more economy, perhaps, than is now practiced. But the question with every man, and especially if he is the head of a family, is, can he afford it? That is, can he afford to live up his wages as fast as he earns them, without laying up anything for the future?

If he is the head of a family, he is obliged to pay rent, and it does not require very many years of rent

the currant bush treated with a solution of alum produces a brown. Yellow is obtained from the bark of the apple tree, the box, the ash, the buckthorn, poplar, elm, etc., when boiled in water and treated with alum. A lively green is furnished by the broom corn.

RESTORATION OF ROMAN RUIN AT REIMS, FRANCE.

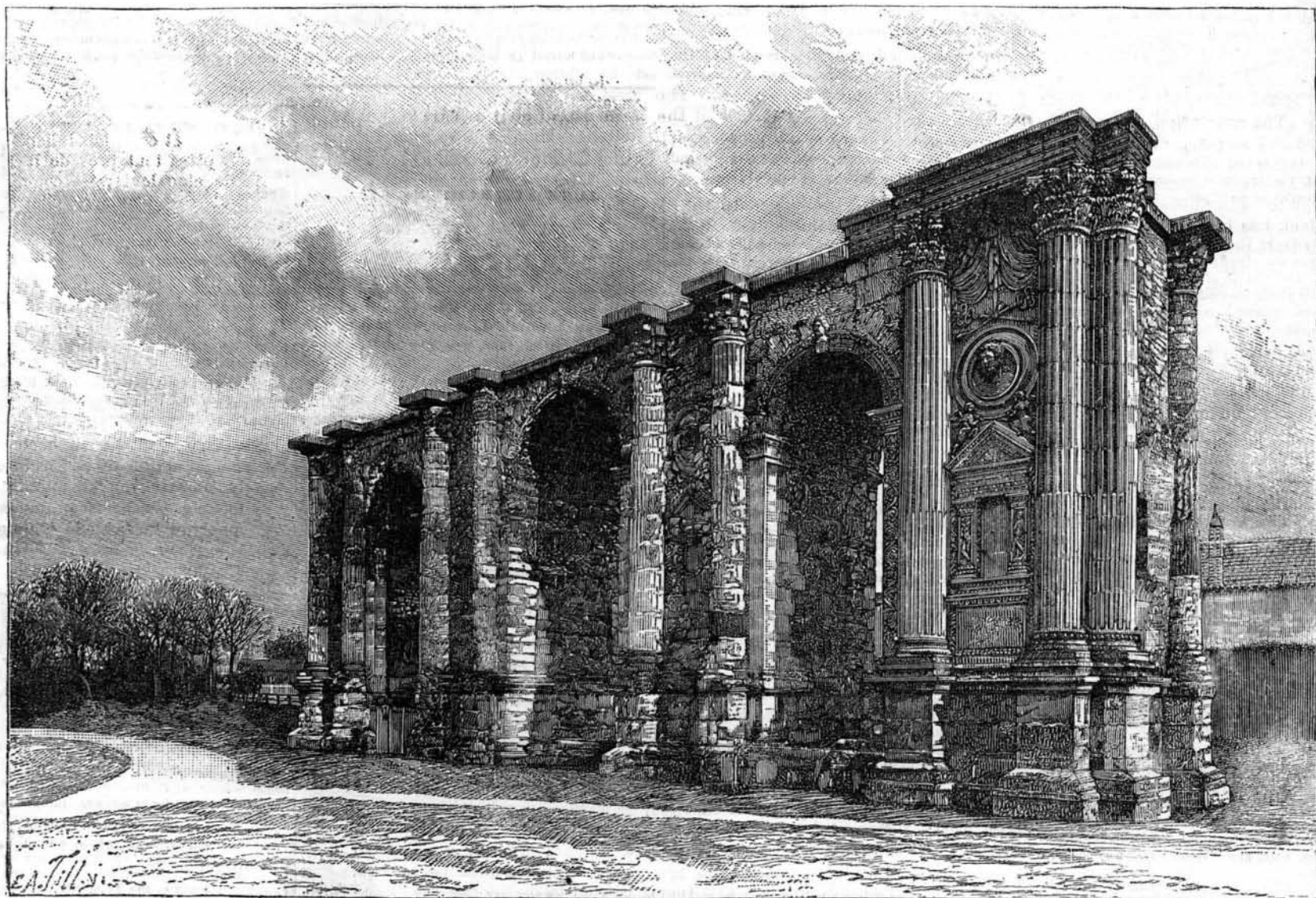
The gate known as the Porte de Mars at Reims, in France, one arch of which has been recently restored, a first step toward the restoration of the whole monument, is the only one remaining of four similar gates or triumphal arches which were used in the city of Reims while under the dominion of Rome. It consists of three arches and eight columns of the Corinthian order, measuring 42½ feet in height. The middle arch, which is the largest, measures 49 feet in width and 38 feet in height. It is called the Arch of the Seasons, and the sculptor had represented the twelve months of the year. Unfortunately, five of these bass-reliefs are almost entirely destroyed, and the seven others are very much damaged. The left hand arch is called the Arch of Remus, and represents Romulus and Remus under the wolf, and at the right and left of the children are standing figures of Faustulus and Acca Laurentia. The arch at the right is called that of Leda, and represents

World, that this subject will meet with the attention it merits, and that light will be shed upon a still obscure subject.

The Dynamite Gun.

At a recent meeting of the United States Military Service Institution, General H. L. Abbot, of the Corps of Engineers, criticised this weapon adversely. He did not believe in the practical value of the pneumatic gun in coast defense, because its short range restricted its fire to the area already obstructed by submarine mines, and the defenders cannot afford to make every shot that misses the enemy a countermine to destroy the mines, and thus open a route for his passage. The mines are indispensable, because steam vessels can force their way through any unobstructed channel under cover of darkness, whether the projectiles thrown at them contain gunpowder or dynamite; and it would be inadvisable to introduce a new weapon that directly antagonizes another of prime importance, which it cannot replace.

If it be suggested that the use of the "aerial torpedo" may be restricted to the period of the siege, when, the submarine mines having been destroyed by the enemy, he is ready to attempt to pass the forts, we



THE HISTORIC MONUMENTS OF FRANCE—THE ROMAN ARCH OF MARS, AT REIMS.

paying to make up an amount sufficient to purchase and pay for a comfortable home. You have to pay rent. This you say you cannot avoid and be honest. Well, you cannot be honest with your family unless you make a reasonable attempt to provide them a home of their own in case anything should happen to you.

And the obligation to do this should be as strong as the one to pay rent or provide the other necessities for the comfort of your family. When you own a home, you will feel a direct interest in public affairs that otherwise you might consider were of little interest.

Dye Colors from Plants and Shrubs.

A variety of very useful colors and dyes may be obtained from very common plants, growing in abundance almost everywhere. The well known huckleberry or blueberry, when boiled down with an addition of a little alum and a solution of copperas, will develop an excellent blue color; treated in the same manner with solution of nut galls, they produce a clear dark brown tint, while with alum, verdigris, and sal ammoniac, various shades of purple and red can be obtained. The fruit of the elder, so frequently used for coloring spirits, will also produce a blue color when treated with alum. The privet, boiled in a solution of salt, furnishes a serviceable color, and the over-ripe berries yield a serviceable red. The seeds of the common burning bush, "euonymus," when treated with sal ammoniac, produce a beautiful purple red. The bark of

Leda and the swan, with a Cupid carrying a torch above them.

Until 1544 the Porte de Mars was actually used as the gate of Reims, but at that time, owing to the growth of the city, it became necessary to carry the gates further out, and the Porte de Mars is found buried (incredible to believe) under the rubbish brought there for leveling the new routes. Discovered and unearthed in 1812, the government has recently classed it among the monuments of historical interest, and has voted, in conjunction with the municipal government, the funds necessary for the preservation and restoration of this important ruin.—*Illustration.*

Danger from Electric Wires.

The number of deaths in this and other cities caused by the electric wires in our streets seems to call for a thorough investigation on the part of our city authorities and electrical engineering associations here and elsewhere.

In a paper presented by Mr. P. B. Delany before the American Institute of Electrical Engineers, a suggestion to this end was thrown out. The causes of death by electricity, its nature and limitations, as well as the probable means for its prevention, are of sufficient practical importance to warrant earnest investigation. The investigations which have thus far been undertaken in this direction have for the most part been isolated and limited in their scope, and there is thus left for the Institute a clear field for work, the result of which will redound to its credit. We hope, with the *Electric*

must remember the high trajectory of the weapon. Vertical fire is not effective against a rapidly moving target, such as would be presented by the enemy's ships when once the channel is opened. For the dynamite gun was claimed the exclusive ability to throw detonating substances with safety; but it was stated on good authority that mortar shells charged with 110 lb. of wet guncotton were fired successfully in Germany, and improvements in the manufacture of such substances pointed to their early use even in guns.

The pneumatic gun was more useful in the navy than the army. As a counterminer to destroy submarine mines it might have a value, although without absolute proof he would be loth to believe that it could do more than moderately assist in the opening of any known and well defined channel from four to six miles long, without which no armored ship could safely pass the forts. Even then it would be a serious matter to maneuver an unarmed floating magazine, containing many tons of dynamite, under the fire of high power guns, mounted on land at a range of one or two miles.

Telegraph vs. Telephone.

A speed trial between the telegraph and telephone from New York to Boston was lately undertaken at the *Sun* newspaper office in this city. The contest lasted for ten minutes; 330 words were delivered in Boston, ready for the printer, by the telegraph, and 346 words by telephone. But many of the telephone words were incorrectly received. So the telegraph was the winner.