

TALES OF THE COMET.

A Large Number of Interesting Facts Regarding a Very Interesting Subject. The Big Comets of History. Their Age, Size, Etc. Etc.

Speaking about comets, there are some facts regarding these wanderers through space known to school children, who have reached the elements of astronomy, which may be of interest to the general reader, who has long since forgotten the teachings of his school boy days.

Comets are observed only in those parts of their orbits which are nearest the sun. They are not confined like the larger planets to the zodiac, but appear in every quarter of the heavens, and move in every possible direction.

They usually continue visible a few weeks or months, and very rarely so long as a year. Their appearance is nebulous with few exceptions, or cloud-like, whence it is inferred that they consist of masses of vapor, though in a highly attenuated state, since very small stars are seen through them.

The more conspicuous comets are accompanied by a tail, or train of light which sometimes stretches over an arc of the heavens of fifty degrees or upward, but more frequently is of much less extent.

The same comet may assume very different appearances during its visibility according to its position to the earth and sun.

When first perceptible, a comet resembles a little spot of faint light upon the dark ground of the sky; as it approaches the sun its brightness increases and the tail begins to show itself.

Generally the comet is brightest when it arrives at its perihelion, and gradually fades away as it recedes from the sun, until it cannot be seen with the best telescopes we possess.

Some few have become so intensely brilliant as to be seen in full daylight. A remarkable instance of this kind occurred in 1843, when a comet was discovered within a few degrees of the sun himself; and there are one or two similar cases on record.

The brighter or more condensed part of the comet, or the part from which the tail proceeds, and the nebulous matter which surrounds the nucleus, is termed the coma. Frequently the nucleus and coma are included under the general term head. Some comets have no nuclei, their light being nearly uniform.

The tail of a comet is merely the prolongation of the nebulous envelope surrounding the nucleus and it almost always extends in a direction opposite to that of the sun at the time. In some cases it is long and straight, in others it is curved at the extremity or divided into two or more branches. A few comets have exhibited two distinct tails.

The length of the tails has sometimes exceeded 100,000,000 or 150,000,000 miles; that of the great comet of 1843 is said to have been 200,000,000 miles long.

Comparatively few of the many comets that visit our system, are visible to the naked eye; most of them are faint, filmy masses, without tails, which can be seen only with the telescope.

Dr. Halley was the first astronomer to ascertain with precision the periods which certain comets require to perform their revolutions around the sun. Many astronomers since his time, however, have been able to predict the times of their reappearance and to mark their paths around the stars.

Dr. Halley discovered the comet of 1682 to be the same that appeared in 1456, 1531, 1607, and hence concluded that its revolution through space is accomplished in about seventy-five years. He foretold its reappearance in 1759, which actually took place after a retardation of between one and two years.

The same body appeared again in 1835, and may be looked for again in 1911. The comet is traced in history as far as 11 B. C.

A comet called Encke's has a period of three and one-half years; another, Biela's, of six and three-quarters years; and several others perform their revolutions in from five to eight years.

There are a few comets, beside the ones above mentioned, which complete their journey around the sun in from sixty to eighty years; but it is certain that by far the greater number require hundreds and even thousands of years. When this is the case it becomes almost impossible to assign their exact periods.

Remarkable comets appeared in 1680, both of which approached so near the sun as almost to graze its surface. The comet of 1811 has acquired great celebrity. It remained visible to the naked eye several months, shining with the lustre of the brighter stars and attended by a beautiful, fan-shaped tail. This body is supposed to require upwards of 3,000 years to complete its excursion through space.

The splendid comet of 1858, generally known as Donati's, will long be remembered for the remarkable physical appearances it presented in the telescope, as well as its imposing aspect to the naked eye. It is presumed to have a revolution of 2,100 years. Hardly less famous will be the grand comet which appeared in 1861. This comet had a tail 100 degrees in length. Its period of revolution would appear to be much shorter than that of Donati's, probably not exceeding 450 years.

It is probable that there are many thousands of comets belonging to the solar system, of which a large proportion never come sufficiently near the sun to be seen from the earth.

ment existence, but this is not the case with meteors and comets. Up to 1818 only two comets were known the calculation of whose period had been verified by their return, the comets of Halley and of Olbers. Their orbits are far apart and wholly unlike each other, but both have nearly the same period, seventy-five years.

In 1818 Encke's comet was discovered, and since then many of these bodies have become known, whose period ran from three to six years. They agree in other respects also; their orbits are inside that of Jupiter, they move like the planets from west to east and the inclination of their orbits to the plane of the ecliptic is not greater than those of the minor planets. On account of these points of resemblance they have been classed together as the "inner group" of comets.

Encke's comet, after a few returns, exhibited a regular shortening of its period, and the same was found to be true of Faye's comet.

Encke also observed in 1823 that the light of his comet was becoming fainter. Prof. D'Arrest has recently called attention to Encke's remark: "Soon nothing will be left of the comet." It is a fact that from that time to the present its brightness has steadily decreased.

The history of Biela's comet, another of the same group, has been even more remarkable. In 1846 it divided itself into two parts, almost under the eye of the observers, and each pursued its course separately. Upon the comet's return in 1852 the distance of its two parts had become ten times greater than in 1846; they were now completely independent of each other, as if they had never been united.

At its return in 1859 the comet was in so unfavorable a position as to render its observation extremely difficult. The computations for a most favorable position, but the comet was not to be found. There can be no doubt, therefore, that Biela's comet has totally disappeared.

We thus see that two of the comets of the "inner group" are subject to certain contingencies which threaten their very existence, and we have reason to believe that the others will share the same fate. It is true that the latter have not yet betrayed any great changes, but a fact has recently come to light that is strongly against the permanent existence of these celestial bodies.

Most of these comets pass through orbits that render a conjunction of two comets at one and the same point of the heavenly space probable, and even a collision of a comet with a planet at some time or other absolutely certain. The orbit of Encke's comet crosses the orbit of Biela's comet. This is of little consequence so long as the comets do not meet at that point; but they are certain at some time or other to do this, and then their union or their division and destruction is probably inevitable.

Apart from this, however, there are other circumstances menacing the existence of each of these two comets, or, at least, the immutability of their orbits. Encke's comet approaches the orbit of the planet Mercury, and Biela's that of the earth so closely that conjunction with these planets must take place at a calculable future period. Indeed, there would have been a fair prospect of the conjunction of Biela's comet with the earth towards the latter part of December, 1838, had it escaped its mysterious destruction.

The comets of Brorsen and Faye pass through the orbit of Jupiter, and a conjunction with this planet, or even a close approach to it, will certainly affect their existence or their course. De Vico's comet has a similar relation to the planet Mars.

If we add to all this the fact that astronomers have by very recent computations, demonstrated the possibility of a conjunction of three or even five comets at once, it is easy to comprehend that their existence is exceedingly unstable.

IOWA AND THE WEST.

As Seen by a Vermont Journalist. Correspondence of The Springfield (Mass.) Republican. LEADERSHIP, In., June, 1881.

To leave Boston Monday afternoon and be in the heart of Iowa Wednesday evening, with a couple of hours to spare in Chicago, gives one an idea of the "progress of civilization" of which we hear so much. There is beauty and glory and history in the hills of Berkshire and the Connecticut valley, but there is wealth and population and empire on the prairie. One whose only ideas of agriculture are obtained among the rocky fastnesses of New England can have no adequate conception of the boundless resources of this great west. Some one asked Professor Knapp, of the Iowa agricultural college, how many crops of corn they could raise on the soil here. He replied that chemical analysis revealed one thousand drops. I asked a farmer how deep the soil was and he replied with characteristic frankness, "18 inches and downward." I might have doubted his statement had I not first heard Prof. Knapp's. Gov. Gar says Iowa will yet be the seat of empire on this North American continent, and really it looks as though he had some ground for his statement. I wish the farmers of New England could have an excursion out into this great West, so as to study methods of agriculture. You tell your average farmer that he ought to do his work easier, ride his sulky-plow and horse-hoe and harrow, as he does his mowing-machine, and he will be incredulous, if nothing more. Now a little trip out here where he would see that going on every day would be a suggestive lesson. I know that your farmers have stony fields, but stone can be picked up, or blown up and hauled off, for I have done it. The skin was worn from my finger ends. My point is, with the uneven stony soil of the east, great improvements in agricultural methods are not only possible, but eminently desirable. Theology may or may not be an improvable science, I leave that to the divines, but agriculture is most assuredly.

The farmers of the west, especially those west of the Mississippi, are intensely alive to the question of transportation. They believe they have been oppressed by the railroads, that freight charges have been enormously high, that numerous officials might draw large salaries, and generous dividends be declared on watered

stock. Without saying how far they are correct, I can say they are in earnest. The present plan of relief is to ship grain direct from St. Louis and other river towns to New Orleans in barges which draw but little water, and there transfer it to ocean steamships for Liverpool and other foreign ports. While I write barges are loading at some points up the river, St. Paul or Minneapolis, for this route. And the significant fact about it is, as I am told, that the freight from here to Liverpool is 17 cents per hundred, less than from here to New York or Boston. The only serious obstacle in the way is the liability of the grain to heat, though expert shippers say that can be very easily guarded against. In the light of this "water-route," as these self-conscious westerners proudly term it, Eads' jetties are of equal or greater national importance than the Pacific railways. Of course this route saves largely the storage and elevator charges of Chicago and the seaboard. But even on this water-route question the west is far from united. Chicago, of course, objects to this great diversion of the foreign grain traffic, while St. Louis, not always an amicable rival, is thoroughly in its favor. Indeed, St. Louis seems to think a part of its mission is to "wipe out" Chicago and its tributaries. While St. Louis, Burlington, Keokuk and some other river towns favor chiefly the Mississippi route, Davenport, Dubuque and the upper river towns with Chicago want a canal from Davenport to Havana, in the western terminus of the old canal from Chicago. The distance is about sixty-five miles and would involve an expenditure of say \$4,000,000. This plan contemplates also enlarging and making free the Erie canal. Leading Iowa business men tell me the recent Hennepin canal convention at Davenport was the most notable gathering ever held in the west. It is the question of the west at present, you hear everywhere, political candidates shape their policy with respect to it, and they intend to have a national legislature elected on this issue. The great west and southwest are joining hands in this matter of water routes to the east and the gulf. This is the western men's method of breaking up the solid south, and I confess, it strikes me as fully equal to the republican machine method of using little Mahone to break its solidity. Then this is their method of solving the problem of railroad monopoly. "Jay Gould and Vanderbilt will come to terms and their senses when the Hennepin canal is opened for traffic," is their confident boast.

OLD WINDSOB. French Must Go. Washington Special to The Chicago Tribune. The cabinet considered the case of Mr. French, commissioner railroads, at length, and considered it very unfavorably. His letter addressed to Leland Stanford, president of the Central Pacific railroad, was read, together with extracts from the editorials of nearly every prominent newspaper in the country denouncing Mr. French for having reported to the railroad company before he reported to the government. There was a general expression of opinion that it would not do to retain Mr. French in office, but Secretary Kirkwood desired that the matter be laid over until another cabinet meeting, in view of the fact that

ATTORNEY-GENERAL MACVAGH, who has charge of the litigation against the Central Pacific is absent from the city. Secretary Kirkwood, in making this suggestion, stated, however, that he did not see what possible excuse Mr. French could give for having written the letter. It was his (Kirkwood's) opinion that Attorney-General MacVagh would agree with him in the matter. Then, in therefore, every reason to think that the removal of Mr. French will be ordered at the next cabinet meeting, which will probably be held on Thursday, as the president leaves Friday for Long Branch and New England. Secretary Kirkwood is said to be desirous to have State Auditor Sherman, of Iowa, at present candidate for governor of that state, appointed to that place, and Senator Allison is quoted as favoring such appointment; but

IS BELIEVED that, upon his dismissal from the government service, Mr. French will enter the employ of the Central Pacific and other railroads as their representative here. Mr. Guthrie, who was Mr. French's first assistant from the creation of the Bureau of railroad accounts until last year, has been the Central Pacific's Washington agent since he severed his connection with the Railroad Commissioner's office.

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Notice to Non-Resident Defendants. E. D. Lane (full name unknown) will take notice that he has been sued by Dudley M. Steele, Samuel H. Johnson and Sanford W. Spratlan, co-defendants, doing business under the firm name of Steele, Johnson & Co., in the District Court of Douglas county, Nebraska, to recover \$5,000.00, and interest from October 15, 1880, due them on a promissory note bearing date April 30, 1878. Also that an attachment has been made on certain funds in the First National bank of Omaha, Nebraska, belonging to you and which the said parties above named seek to obtain by applying in person of their said claim.

You are required to answer said petition on or before Monday, the 23d day of August, A. D. 1881. HENRY WARD BEECHER, Attorney for Plaintiff.

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