HALLEY'S COMET

By Frederic Campbell, Sc. D. President of the Department of Astronomy, Brooklyn Institute.

This series of six illustrated articles on Halley's Comet will be notable as chronicling the arrival in this hemisphere (on September 11th last) of that monster, which in 1456 drove all Europe into a frenzy of fear, and which at each of its visitations before and since, has produced a profound impression on all mankind.

Absent for seventy-five years, its return has already been detected by the camera and large telescopes, and in December we shall begin to see it with the naked eye. Nightly it will brighten and increase in bulk and length, until at its most brilliant development the Comet will possibly stretch across one-third of the sky, reaching as far as a line of sixty full moons. Not before late summer will it vanish from view, to be seen no more by mortals for another three-quarters of a century.

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In the little village of Marthon, N. Y., lives a retired astronomer, Dr. Lewis Swift. Before he had reached his twenty-first birthday he had the distinction of being the director of two astronomical observatories, and had obtained undying fame as the discoverer of comets. He was born on February 29, 1820, and is thus 89 years of age. When he was but a lad he discovered Halley's comet on its return to our sky. No one has seen this monster of the heavens for sevnty-five years, but had his sight not nearly failed, Dr. Swift would soon see it again.

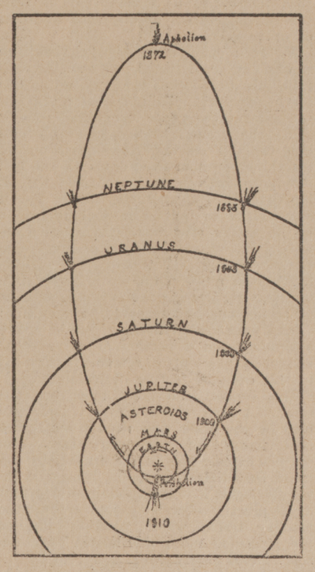


Halley's comet in 1835, showing nucleus, head and streaming tail of slight curvature and a length of millions of miles. (Drawn by the author).

Very few are now living who recall seeing Halley's comet in 1835. The writer has talked with only three such—Professor Swift, Daniel B. Hasbrouck of Brooklyn, 90 years of age, and Mrs. Bush of Lowville, N. Y., who was born 91 years ago. What these saw in their youth and are now about to see again, the rest of us will gaze upon for the first time. Halley's comet, that celestial prodigy which in 1456, drove Europe wild with fear, was again sighted on September 11 last, just where it was predicted that it would be found at this time, and it is now rushing toward earth and sun with ever-increasing speed, so that in the month of December, and for months thereafter every eye will see its gleaming sword held aloft over the earth, and every human being will stand mute with awe.

The heads of comets differ much in brightness and in actual size. That of the great comet of 1811 measured 1,200,000 miles in diameter. Holmes' comet in 1892 displayed a diameter of 700,000 miles. It will aid to the comprehension of such figures to recall that the diameter of the earth is only 8,000 miles and that of the sun 860,000 miles. There are comets then whose heads even surpass the sun in size. The average naked-eye comet is to be thought of as having a diameter of 100,000 miles, and to this class Halley's comet is to be assigned; while telescopic comets possibly average 70,000 miles. It will be seen then that a comet's head is no inconsiderable object, one, in fact, to be avoided; its tail is usually a much more conspicuous though much less substantial affair.

In the year B. C. 43 a marvelous comet appeared, whose brilliancy was so great that it was seen even in the daytime. This was one year after Caesar's death, and the popular belief was that it was his metamorphosed body. The same comet has been seen three times since, its period being 575 years. In A. D. 1456 when Halley's comet was paying one of its periodical visits, eyewitnesses describe it as having a tail which nightly swept across one-third of the heavens. This would mean a length of 60 degress, equal to a line of 120 full moons. No wonder if in that ignorant, superstitious and troubled age, the spectacle nearly deprived Europe of its reason. Every time the church bells are heard at noon we are reminded of that occasion, for it was then that they first rang to call to prayer against the dread visitant. It is that comet which in a few weeks, our unaided eyes will begin to detect, first as a faint and slowly moving haze, then as an object gradually increasing in brilliancy and size, until it may reach or even exceed the marvelous attainments of 1456.

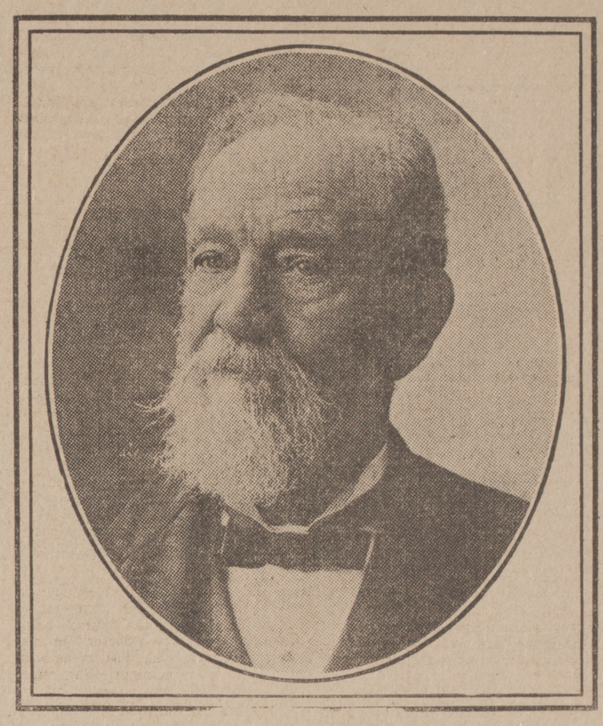


Orbits and directions of Halley's comet and the planets, with the sun at focus of each. Orbits of Venus and Mercury within that of the earth. (Drawn by the author.)

As this comet has been absent from our part of the universe for nearly seventy-five years, and is about to pass the earth twice on its way to and from the sun, it is important to know something of its distance. The comet travels an ellipse of great eccentricity; its two foci are near its opposite extremes, and in one of these the sun is located. At "perihelion" it is only about 60,000,000 miles from the sun, nearer than the planet Venus; but at "aphelion" it is thirty-five times the earth's 93,000,000 miles from the sun, and 500,000,000 miles farther than Neptune, the most distant known planet of our system. But so immense is the universe that Halley's comet makes no approach to the regions of the fixed stars; if it did, its period would be lengthened from seventy-five years to 20,000,000. Still, at its farthest from the sun, the cold would possibly even liquefy air; while at its nearest the sun's heat must be sufficient to destroy all terrestrial forms of life. It is only incidentally that, in making its dash for the sun, the comet comes within not less than 13,000,000 miles of the earth, and its nearest possible approach would be at a point 6,000,000 miles distant, more than twenty-five times the distance of the moon.

Large comets are as bright as Venus, the brightest star, and their nebulous heads sometimes appear as large as the moon. Their steady approach to the sun, which attracts them within our sky, usually develops a tail, which streams back into space, following the head when approaching the sun, preceding it when retiring.

The most celebrated comet of the nineteenth century was Donati's, which attained its greatest brilliancy in October, 1858. At night men looked from the front of their dwellings and saw the comet's head near the horizon; then they looked from the rear, and behold, its splendid tail stretched into the opposite part of the sky. Donati's comet returns once in about two millenniums, and may be looked for again about the year 3858. Halley's comet seems a frequent visitor when compared with such long absent members of the solar family. For it must be remembered that all periodical comets, returning at regular intervals, just as they belong to the solar systems as Jupiter, Venus, the moon or the earth. For it is the sun's attraction which dominates them all, no matter how far they may wander and how long they may disappear. All the planets, too, are traveling ellipses, and each of them is at one time much nearer the sun and traveling much more swiftly than at another. The paths of periodical comets, however, do not so closely approach perfect circles, but are very greatly compressed and consequently immensely elongated. Hence, with the sun near one end of their orbits, and the earth near the sun, they periodically visit both sun and earth.



DR. LEWIS SWIFT

Former director of Lowe Observatory, California, discoverer of 15 comets and 1000 nebulae.

AUTHOR'S VIEW ON WAR

Maurice Hewlett, the English author, is a warm advocate of peace. He set forth his views in a letter read at the annual meeting of the International Peace Association not long ago. "I am, as you suppose, a peace at any price man," he wrote. "The use of murder and homicide as a means of deciding international difficulties seems to be inconceivable. I do not, however, believe that we shall make any real advance until war is commonly spoken of in the terms we now apply to drunkenness or gluttony as degrading and disgusting."

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"The captain gets but $40.41, and $59.01 is divided among the six officers. The chief officer gets $14.55, the first $12.13, the second $9.70, the third and extra third $8.08 each, and the fourth officer $6.47. Most of the officers in the Cunard service get less pay than the Lusitania's officers.

"The minimum fare that the Cunard line accepts from a saloon passenger on the Lusitania, which is $127.50, not only pays the wages of the entire executive staff, viz., the captain and his six officers, for the voyage, but what is left pays the wages of two quarter-masters, two firemen, and two stewards, with a couple of bellboys or a stewardess thrown in.

"I know more than one captain of a freighter who is paid twice as much for bringing his 3,000 to 5,000-ton craft across the Atlantic as the Cunard line pays to the skipper of the 32,000-ton, $7,500,000 Lusitania for like services.

"The captain of the wrecked Slavonia received but $60.61 for commanding and navigating that ship for the voyage from New York to Naples, a distance of some 4,000 miles.

"What incentive is there for a young man to take up maritime life as a profession or to continue in it if he is luckless enough to be a qualified navigator?"

The above statement, made by a former officer on one of the Cunard liners, who has quit the sea for a land-lubber's job, explains the ultimatum which the captains and officers of the big British transatlantic steamships entering this and other American ports are about to present to the directors of their lines.

This ultimatum will demand that they receive pay and treatment commensurate with their skill and labor and the risk they run in the service.

The captains and officers on these liners number nearly 300 men, all of them highly educated navigators of the first rank, and many of them also members of the Royal Naval Reserve. The number given includes the officers serving on the Cunard, White Star, Atlantic Transport, Wilson, and Anchor lines.

It is not expected that these captains and officers will actually go on strike, but they have in mind in their proposed presentment to the English board of directors the strike of the 500 captains and officers of the British India service, which was nearly crippled before the owners came to terms.

Unlike the latter officers, however, the transatlantic men declare they expect to sign articles which will guarantee them their positions for at least two years under higher pay.

Officers on the big liners, such as the Cunard and the White Star, as a World reporter learned yesterday, are signed for the voyage only. They have not the slightest guarantee that they will be signed on the next voyage. But reckoned monthly their incomes may be gathered from the following table:

	First Month.	Second Month.	Third Month.
Chief officer	$80	$85	$90
First officer	65	70	75
Second officer	55	60	60
Third officer	45	50	50
Fourth officer	35	40	40

Chief officers' pay increases to a final maximum of $110 a month, where it remains until they are ranked as captain.

All below the rank of first officer get no advance after the second month unless they are promoted in rank.

It was learned that the officers on these liners were leaving their positions for places ashore as fast as they could secure them.

A former first officer on the Cunarder Campania is now superintendent of a New York dock company. The former first officer of the Mauretania took a position with MacArthur Brothers, contractors, working on the Ashokan Dam. The third officer of the Mauretania is now manager of a cotton mill in Fall River, Mass., while the first officer of the Cunarder Pannonia left her at the end of the last voyage to take a situation in Philadelphia. The former fourth officer of the Caronia is now teaching the boys' school at Tarrytown founded by Helen Gould.

The Panama Canal will be ready for use by January, 1915.

THE LATE PETER F. COLLIER
Founder and head of Collier's Weekly, and the great publishing house which bears his name, was a firm believer in Life Insurance.
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was shown by his voluntary and unsolicited selection of this company.
The following letter from his son and executor, Mr. Robert J. Collier, shows the wisdom of his choice:

New York, May 4, 1909.
Office of Collier's Weekly,

Hon. John F. Dryden, President,
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Newark, N. J.

My Dear Sir:
Permit me to thank you, and through you The Prudential Insurance Company of America, for the very prompt receipt of checks for $50,000, in full cash settlement of claim on the life of my father, Peter Fenelon Collier, who demonstrated his belief in Life Insurance in The Prudential by carrying policies in your Company for several years.
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