tons, the bombardment experienced by the earth when struck by a comet would be a very serious matter; but if, as seems more probable, they are very small, the result of a collision with a comet would be merely a beautiful display of meteors, or shooting stars.

It appears that in the year 1861 the earth actually passed through the tail of a comet, without any disastrous consequences to any one On a Sunday evening in the midsummer of that year a clergyman was reading his sermon in the church without any artificial light, when suddenly the sky became so overcast with a peculiar glow, that the sexton had to bring a pair of candles to enable the clergyman to get through his sermon. The glow, it appears, was caused by the tail of a comet which happened to come into collision with the earth just at that time; and there is no record of any other disaster resulting from the collision than the expense of a pair of candles.

As a rule comets visit us, like the present one, unannounced and unexpected They come to us apparently from the depths of interstellar space, approach the sun with ever-increasing speed, whirl around it in a path which has generally the form of a parabola, and disappear into the depths of space, never to return. There are a few comets, however, which move in elliptical orbits and return to the sun periodically. One of the most remarkable of these periodic comets is Halley's comet, which was the first whose return was predicted. This comet is especially interesting at the present time, as it is expected to return again in 1910. When the English astronomer Halley observed this comet in 1682, he found that its orbit corresponded with that of a comet which appeared in 1607, that is, 75 years earlier, and also with that of another comet which appeared 76 years earlier still, *viz.*, 1531. On examining the record of still older comets he found that other great comets had appeared previously at intervals of about 75 or 76 years, one going back to 1066, the year of the Norman Conquest. Halley came to the conclusion that these were not all different comets, but only different appearances of one and the same comet; and he ventured to predict that the comet of 1682 would return again in 76 years, that is, at the end of 1758, or in the beginning of 1759, as he calculated that the comet would be retarded by the action of Jupiter and Saturn. As 1759 drew near an astronomer called Clairvaut calculated how much the comet would be retarded in its course by the action of these planets. As the result of a most laborious investigation, he predicted that the comet would be in perihelion, that is, in its nearest position to the sun, about April 13th 1759, or perhaps a month earlier on account of disturbances from other planets. Great was the admiration of the astronomical world when the comet actually came to perihelion on March 13th of that year. At its next return, in 1835, it appeared within two days of the predicted time. And now astronomers are busy calculating the exact date of the comet's next perihelion passage. After allowing for the action of Jupiter, Saturn, Venus Neptune and of the earth itself on the comet, they have come to the conclusion that the next perihelion passage of Halley's comet will be about the 6th or 23rd May, 1910 It will probably be visible, though very faint, in November 1909, appearing in the constellation of the Bull, not far from Hyades where the present comet first appeared. It will attain its greatest brilliancy about June 12th 1910, when it will be near the bright star Capella, in the constellation of Auriga. As very faint nebulosities can now be photographed which would be utterly invisible in the most powerful telescope, there is a chance that Halley's comet may be photographed in 1908, or, as some think, perhaps even in October or November of the present year.

Fig. 1 of the accompanying photographs was taken on the morning of August 4th from 4-45 to 5-5 a.m. The light of the moon interfered with the photograph to a great extent The cluster of stars to the left of the tail near the top is the group called the Hyades in the constellation of the Bull. The brightest star near the central part of the tail is Aldebaran. Being a reddish star it does not come out so brightly in the photograph as it appears to the eye

Fig. 2 was taken with a 3½in portrait lens on August 15th from 4-45 to 5-30 a.m. with an interruption of about 20 minutes on account of clouds In the interval the star images trailed while the telescope was following the comet. Clouds and twilight interfered with this photograph. The tail appears to be divided into three branches, with two short streamers near the head.

Fig. 3 is a photograph of the comet's head taken at the same time as No. 2, with the 9in. object glass. The white streaks are star trails with a break caused by clouds. The star near the comet's head is Gamma Geminorum.

Fig. 4 shows the comet taken at the Meanee Observatory on the 15th of August last, with a 3½-in. portrait lens at 45 minutes' exposure. The original negative showed six branches to the tail, but owing to the extreme faintness of two of them, our illustration only depicts four. The length of the tail in this picture is over 17,000,000 miles. The star with the black dot near the end of the tail is Gamma Geminorum.

FIG. 4

The Orbit of the Sun and the Solar System.

Our sun through the centuries travels a long ellipse, dragging the world, of course, with it, and just within one end of this ellipse blaze the rays of another sun, known to astronomers as the star Arcturus. At the other end of our sun's ellipse are cold voids, vast spaces of absolute zero.

Astronomical records are complete enough to show that somewhere more than twenty centuries ago Arcturus was visible only as a luminous speck Now it blares in the evening sky, bright as the planet Jupiter, a beacon among the glittering points of fire that stud the firmament this side the Milky Way. Manifestly, our own solar system is approaching the sun Arcturus.

The rate of travel of our sun through space, carrying with it its little group of satellites, including the world, has been determined with fair accuracy. We are racing southward through the heavens at the rate of about 5 000 000 miles a year, along an arc whose segment shows undeviating progress in the one direction of Arcturus. Eventually, we will be carried clear around this star and be subjected to its fierce rays; then we will come back on the other side of the ellipse, and will be carried along a wide and awful sweep towards the star Polaris, now in our rear and to the extreme curve that must be passed before the journey back again begins. How many times our solar system has swung that almost illimitable course, none can ever know or guess. But in this great course there are just two extremes of season, except that instead of their being six months, they are about 75,000 years apart. The summer season of this vast cycle is unutterable heat—the melting point; the winter season, frigidity. That we are now a little more than half way down the journey to the summer turning point, and entering upon a spring-like opening to a young summer of celestial weather, is made clear by those who study the sky, and to whom the stars present but partial mystery.

The astronomer Leroy Tobey has shown that the course we are travelling is regulated by the influence of Arcturus, and that it will carry us around that torrid star in something more than 25,000 years. The turn will bring us so near to it, and into a zone of heat so high, that physical life in its present form will be impossible; for Arcturus is an incandescent sun, known to be vastly larger than our own. The belief that the world shall die in fire enwrapped a truth—as all beliefs do when they are understood.

On the other hand, at the Polaris end of the great ellipse are 'thrilling regions of thick-ribbed ice." Flung to the extreme limit of its course before it turns again in answer to the magnet of its orbit, our sun and the worlds that circle it, being farthest from their source of heat, will dim and fall into a sleep of cold so deep that life will be suspended, to again awaken and again begin a new development, as the southward turn is made and warmth flows in once more."

ELMER E. TOWLE.