

Comet in the History of Man

By KAREL HUJER

(Dr. Hujer is professor of astronomy, general science and physics at the University of Chattanooga.)

The recent sudden appearance of the major comet, Ikeya-Seki, which has aroused a wider public interest, invites a second look at the general story of comets. Out of the variety of celestial phenomena, none through the ages has attracted more attention, greater concern, foreboding, and apprehension than comets. Even the present comet has brought more inquiries indicating an astrological rather than astronomical curiosity. Comets thus reveal the enduring strength of the ancient tradition that these objects in the mind of men were "ominous of the wrath of Heaven and harbingers of war and famines, of the dethronement of monarchs and the dissolution of empires."

Of earliest reports related to the appearance of a comet is Salpurnia's warning to Julius Caesar against going to the senate as she pointed to the strange "hairy star" on the heavens in 43 B.C. In fact, numerous historical incidents appear to coincide with an apparition of a comet such as the historical Halley's comet. Its appearance in 1066 A.D. not only stirred European humanity but it was viewed in England with special alarm and the success of the Norman invasion and the death of Harold was attributed to the comet's baneful influence.

The return of Halley's comet in 1456 was blamed for the fall of Constantinople and the desecration of the Santa Sophia basilica at the hands of the Mohammedan Turks, that shook European Christendom. As a supposed effect of a comet, European Christianity was in deadly danger and Pope Calixtus III ordered the ringing of the Angelus bell, a custom preserved until our time. Milton's two allusions to comets in his *Paradise Lost* are well known and H. H. Turner, astronomer at Oxford University, is almost certain that Milton refers

to the comet of 1618 which was held responsible for the great "Thirty Year's War."

Napoleon, quite an addict of astrology, considered the appearance of the very spectacular comet of 1811 a good omen for his invasion of Russia. A respectable French astronomer, Messier, must have solicited favors of the powerful monarch when, in 1808, he published a book describing the great comet of 1769 which appeared at the time of the birth of "Napoleon le Grand." Indeed, Claudius' statement in the fifth century seems to resound through the ages that "a comet was never seen in the heavens without implying disaster."

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If, since the dawn of civilization, comets were considered as supernatural messengers of sinister events, it was truly an unparalleled victory of the human intellect over superstition when Halley first made the mathematical prediction of the comet's return the latter part of 1758 or early 1759. The entire civilized world then anxiously awaited the comet's reappearance. When an amateur astronomer, Palitzsch, a farmer who lived near Dresden in Saxony, discovered the comet on Christmas day, 1758, the world was swept off its feet. It was a glorious victory of rational thought over ages of fear. Naturally, it was named Halley's comet and returns every 75 years. Halley's comet last appeared in the vicinity of our sun in 1910.

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The present comet, Ikeya-Seki, which we now see in our morning eastern sky, was discovered last September 18. It is equivalent to Halley's comet in size and the

length of its tail. Relatively only a small number of comets like Halley's return periodically. The Ikeya-Seki comet is a visitor from a truly outer space that outside our solar system. Its orbit may be several hundred or even several thousand years long. It may pay even a single visit to the neighborhood of our sun. In inter-stellar space there are millions of roaming objects, scattered diffused matter. Occasionally they may be drawn toward the sun and thus begins the dramatic career of a comet. If trapped in the solar system like Halley's comet and some 900 known comets, it has relatively a short lifetime of about 10 million years. At a greater distance from the sun the comet is entirely invisible. Its dramatic entrance begins only as it approaches the sun. There it increases its speed to counteract the growing gravitational pull and thus produces sufficient centrifugal force to keep itself in orbit. Then, also, the comet's tail lengthens impressively reaching some enormous value like that of Ikeya-Seki's, which exceeds 50 million miles. Yet, Sir James Jeans used to describe a comet as actually a "big nothing." Gravitational strain affects the small mass of comets as they reach the close vicinity of the sun in such a mysterious way that they attain enormous size, with the tail always pointing away from the sun, indicating the existence of the solar pressure of radiation.

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All in all, the unusual peculiarity of comets continues to preserve its fascination on the mind of man in our age of rationalism just as it did in the age of mythology. Since cometary matter is exposed to conditions utterly unavailable in our physical laboratories, these celestial harbingers of cosmic mysteries are now extremely important from the point of view of atomic physics.