Astronomy

Halley's Comet.

(AFTER H. C. WILSON IN *Popular Astronomy.*)

In ancient times the appearance of comets filled the people with terror and "with fear of change perplexed monarchs." In England the most noted and the most terrifying of the whole series that disquieted the nation, during fourteen centuries was the Comet of April, 1066. None, on the other hand, seemed to the popular mind so amply justified as a prophet of evil. Having at the beginning of the year perplexed the brave Saxon King Harold with fear of change, and flown away out of sight, the end of the year brought justification with the decisive battle of the Norman conquest. This true prophet of old time has since been identified as Halley's comet. It was seen in the fifth and eighth centuries of the Christian era, but not honoured by the usual calculations. But its third appearance and its sequel, the Battle of Hastings, prevented men from forgetting its existence. Since then it has been proved to have a period of between 74½ and 79 years, having returned to the neighbourhood of the Sun ten times during the seven centuries. "The question now arises," writes Professor Wilson in *Popular Astronomy*, "will the next return be in favourable or unfavourable circumstances? Shall we expect to see a great magnificent comet, as in 1066 or 1456, or an insignificant object as in 1607? In order to aid in answering this question, I have gathered together the elements of the comet's orbit at the different apparitions which have been observed, and have drawn the consequential diagram," which we produce on this page of the present issue.

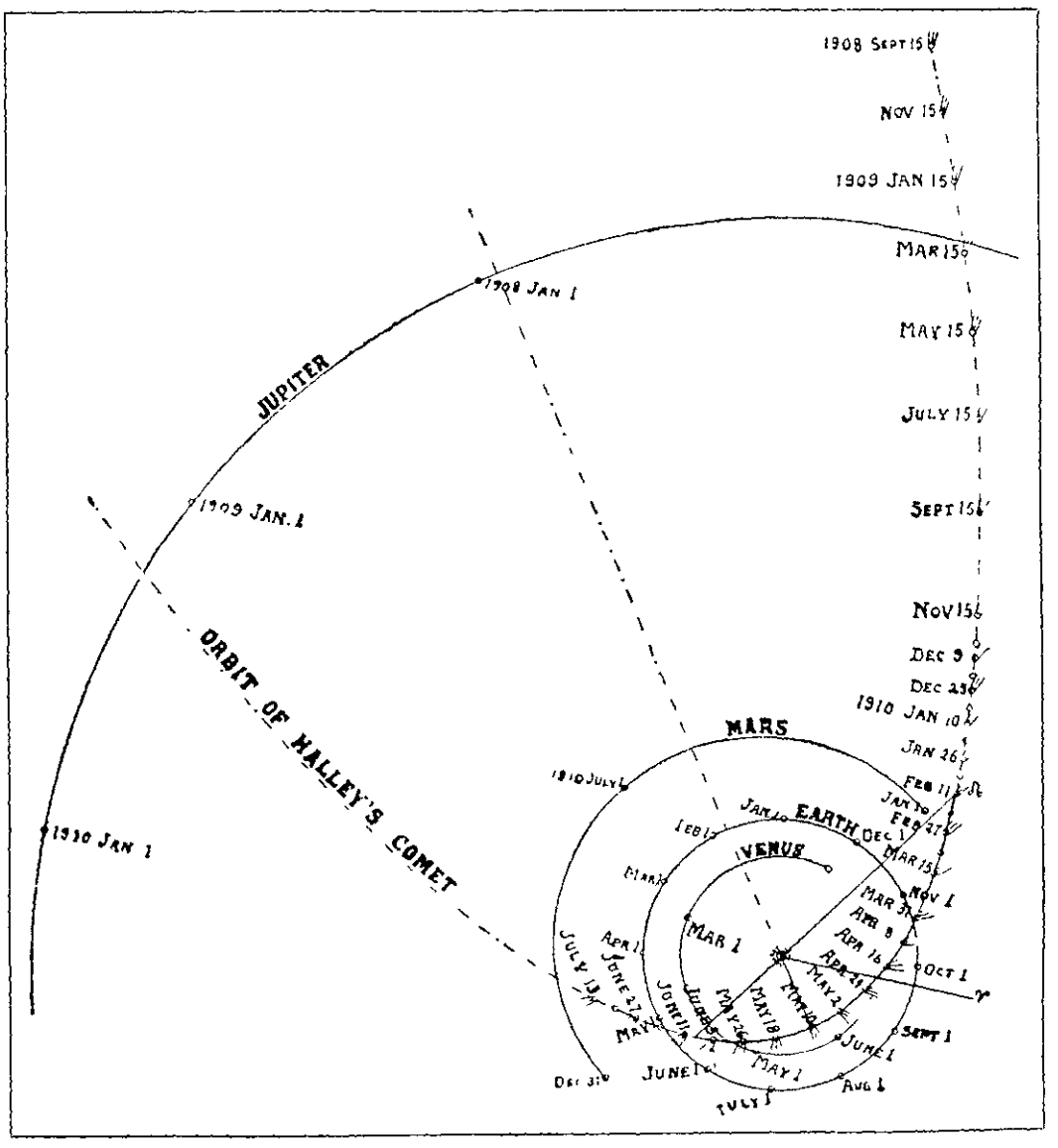
APPROXIMATE ELEMENTS OF HALLEY'S COMET REDUCED TO THE EQUINOX OF 1910.

Perihelion passage	Angle from ascending node to perihelion	Longitude of ascending node	Inclination of orbit to ecliptic	Perihelion distance	Period years
	Degrees	Degrees	Degrees		
451 July 3 ...	108 5	53 3	16	0.62	...
760 June 11 ...	107.5	52.5	17	0 60	...
1066 Apr 1 ...	...	...	. .	.	...
1145 Apr. 29 ...	...	...		. .	79.1
1222 Sept. 15 ...	105 6	51 6	16 5	0.07	77.4
1301 Oct. 22 ...	...	...	...	...	79.1
1378 Nov. 8 ...	107.77	54 67	17 9	0.584	77.0
1456 June 8 ...	104 82	50 08	17 62	0 581	77.7
1531 Aug. 25 ...	104.30	50 77	17 00	0 579	75 2
1607 Oct. 27 ...	107.25	52.66	17 14	0 585	76 2
1682 Sept. 14 ...	109.26	54 35	17 76	0 583	74 9
1759 Mar. 12 ...	110.65	55.92	17 62	0 585	76 5
1835 Nov. 16 ...	110.64	56 19	17 76	0 586	76 7
1910 May 10 ...	111 54	57.18	17 78	0 59	74 5

Motion retrograde.

The diagram was prepared by the aid of ephemerides of the comet computed by Mr. F. E. Seagrave, of Providence, R. I., and the elements differ slightly from those given in the last line of the table, but not enough to affect the shape of the diagram appreciably. Mr. Seagrave adopts May 10th for the date when the comet will be at perihelion. The computations of Messrs Cowell and Crommelin point to an earlier date, probably about April 8 for perihelion passage. Comparing this with the dates in the table we see that this coincides very closely with that for the apparition in 1066 when the comet was a famous object.

Now as to the 1910 apparition. The comet is now out between the orbits of Jupiter and Saturn. It will be within the distance of Jupiter's orbit after March 1st, 1909. It is possible that some one with the aid of a great telescope or a photographic camera may catch sight of the expected visitor during the winter of 1908-9. We may begin to search for it as early as September, 1908, provided that good ephemerides are at hand. Almost certainly it may be found by September or October, 1909. It will then be only a round nebula, whatever tail it has being almost directly behind it as seen from the earth. If the date of perihelion should be May 10, the comet will be lost behind the sun in the early part of April, reappearing in the morning sky about the first day of May. It should reach its greatest brilliancy in the last days of May but the morning dawn will prevent its having the most striking effect. It will pass between the earth and the sun about June 1, and there is a possibility then of the tail extending so far out over the earth that it may be very conspicuous in spite of the deep twilight in which the head of the comet must be observed. After June first the comet should be visible in the evening in the western sky, a more or less splendid object according as the effect of the lessening twilight or the increasing distance of the comet be the more important factor in changing its brilliancy.



HALLEY'S COMET The Orbit computed, showing probable dates of first appearance and Perihelion

Halley's Connection with this Comet.

As soon as Halley had completed his researches, the comet of 1682 appeared. He at once observed and exhaustively studied the new arrival, displaying extraordinary power of methematical analysis. He found the planet moving in a plane but little inclined to the ecliptic—we quote from Professor Mitchell's "Planetary and Stellar Orbs"—and in an eclipse of very great elongation, and receding at its aphelion period to the enormous distance from the sun of 3,400,000,000 miles; and he computed its period at seventy-five years. Looking over his researches by the light of these data, he found, as it were, a string of beads: comets appearing in line at seventy-five years distance approximately. The earlier portion of the string was probable, the later appeared certain. The first of the former category was the great comet of the year of the birth of Mithridates, 130 years before Christ. It was, according to all records, the most magnificent comet that has ever been seen by human eyes, and incomparably, therefore, the most famous in the list. In the years 248, 324, and 399 of the Christian era there are records of comets of remarkable appearance, all true to the Halley period. The rest are in the table above given by Professor Wilson, and it will be seen that they are all of the seventy-five year period, with aberrations accounted for now by the superior knowledge of astronomers who can make allowance for the perturbations due to the influence of planets since discovered.

This is the comet which may now be seen at any moment, according to Professor Wilson, though theoretically due in 1910, which undoubtedly will be the period of its greatest splendour for the current period, for the observation of which the position of this planet will be favourable. It will be for us the last luminous point of a long history, of which the first probably was seen just before the Roman conquest of Asia Minor. It is probable that the brightness of the last appearance of this flying visitor may equal that of the first, which was so famous throughout the world.