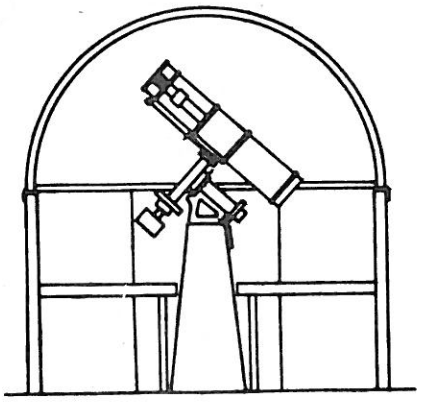
BUFFALO ASTRONOMICAL ASSOCIATION INC.
BUFFALO MUSEUM OF SCIENCE
HUMBOLDT PARKWAY
BUFFALO NEW YORK 14211



The Spectrum

MAY 1970

MAY MEETING: For our meeting on May 8, 1970 (8:30 Eastern Daylight Time !!) we are very happy to welcome back to our group Dr. Martin Green of the Westinghouse Electronic Tube Division, Elmira, N.Y. Dr. Green will present a lecture entitled "Television Astronomy" (see his article, "Observations with an Ultrasensitive TV Camera," pp. 140-145, March 1968 SKY AND TELESCOPE). This promises to be a very informative talk. Welcome, DR. GREEN! * * * If you have any photographs of comet Bennett, please bring them to the meeting. Refreshments will be served. - * - *

* * *

* TRANSITS OF MERCURY * By Dr. Frederick R. West (conclusion)

Precise observations of transits of Mercury are valuable for at least two reasons. First, accurate times of first and last contact with the Sun's disk help improve our knowledge of Mercury's orbital elements and their changes. Mercury moves almost entirely under the gravitational pull of the Sun, with small pulls (= perturbations) due to the eight other major planets. All the small changes in the orbital elements of Mercury can be accounted for by the perturbations of the other eight planets except for an advance of the celestial longitude of perihelion of 43" per century. Einstein's General Theory of Relativity published in 1916 accounted for this previously unexplained change in Mercury's orbit as an effect of the warping of the space-time continuum in which Mercury's orbit is situated by the Sun's gravitational field. Unlike his Special Theory of Relativity, Einstein's General Theory of Relativity cannot be considered to be definitely confirmed by observation, and somewhat different, competing theories have been put forward. One such theory, the Brans-Dicke tensor theory of General Relativity, predicts a relativistic advance of Mercury's perihelion of only 39" per century. The 3.4" per century difference between the predicted and observed perihelion advance could be caused by the perturbations a slight equatorial bulge of the rotating Sun produces on the orbit of Mercury. Professor Dicke and his colleague Dr. Mark Goldenberg, both of Princeton, claim to have measured by use of modern photometric equipment a solar equatorial bulge of 5×10^{-5} the Sun's diameter (see SKY AND TELESCOPE, 33: 283, May 1967). Such an equatorial bulge would produce other slight changes in the orbit of Mercury, such as a slight regression (westward motion) of the nodes of its orbit on the ecliptic that would be detectable by precise transit observations carried out over as many transits as possible. Thus observations of transits of Mercury may help determine what form of the General Theory of Relativity is correct for our universe.

Second, it is possible to measure the apparent size of Mercury's disk during a transit. During May transits, Mercury is only about 51,850,000 miles from the Earth and its apparent disk size will be about 12", while at November transits, Mercury is farther away, about 62,400,000 miles and the apparent disk size will be about 10". The diameter of Mercury is still poorly known, with derived values ranging between 2800 and 3200 miles, and measurement of the apparent disk size during transits gives an excellent opportunity to obtain more accurate diameter determinations. Such measurements can be made at least two ways; by direct filar micrometer measurement and by photography of Mercury's disk in front of the Sun and later measurement of the image diameter. The photographic method has several known sources of possible systematic error. More accurate diameter determinations are especially important now, since perturbations of the orbit of the asteroid Icarus in April 1968, when Icarus passed within 10,000,000 miles of Mercury, have enabled the most accurate mass of Mercury to date to be computed (0.056 Earth masses; see ASTRONOMICAL JOURNAL, 74: 297, March 1969). Space probes to Mercury's vicinity that may be launched within the next five years will, if successfull, allow much more accurate mass determinations to be made. Accurate masses must be combined with an accurate diameter to derive a reliable mean density for Mercury. Because of the uncertainties in the mass and diameter of Mercury, it is still not sure whether Mercury or the Earth has the highest mean density of any major planet. The high mean density of a planet as small as Mercury (5 to 6 gm/cm^3) which is much larger than those of the Moon and Mars, has important implications for its composition and structure. *

* * * *

* NOTES ON COMET BENNETT (1969i) * By Ernst E. Both

From the standpoint of easy naked-eye visibility, early morning splendor, and length of duration in the eastern sky, comet Bennett must rank as one of the best within recent years. Even our notorious weather co-operated about 50% of the time to provide a memorable experience. A number of good pictures taken by our members (Robert Burdick, Larry Hazel, Orrin Christy) were shown at the last meeting and hopefully we shall see more at the May meeting. Apparently Richard Janas was the first to see it after it moved into the northern sky (at least I have no other reports, but considering our taciturn membership, this need not surprise anyone). Richard saw it on March 28, 1970, between 9:50 and 10:00 UT (from Buffalo, no less) with 10 X 50 binoculars, showing an estimated tail length of about 3°. Two days later in the dark skies of Langford, N.Y., I estimated the tail at nearly 13° or more even though there was some hazyness in the atmosphere. A photograph taken by Robert Burdick on April 16, 1970 (30 minutes exposure on Plus X with a 3-inch, f/7 Cooke triplet) shows a clearly split gas tail superimposed on a fainter dust tail.

While the comet has faded considerably and the waning Moon becomes a nuisance object, it will pass through Cassiopeia during early May at which time it will be visible all night. Positions and magnitudes for May are:

May	4:	RA 0h 46m	Decl. +61°09'	Mag. 6.2	Although the Moon will be gone
	9	1 09	62 59		from the sky, the rapidly decreasing
	14	1 30	64 26	7.1	magnitude will not make it an easy
	19	1 50	65 36		object. All we can say is - thank
	24	2 09	66 35	7.9	you, 1969 i, and bon voyage! May you,
	29	2 27	67 25		silent wanderer in an endless night

find the Earth in better shape upon your return thousands of years hence!

* * * *

* SOME THOUGHTS ON HALLEY'S COMET * By Kurt Erland

The appearance of Bennett's comet reminded me of my teens when I, a green novice in astronomy, had the pleasure of following assiduously that grandfather of all comets, Halley's! In a recent conversation with Ernst Both he remarked how an elderly lady had called him to prophesy the imminent doom of our world as indicated by 1969 i - and I remembered a little booklet telling of the bloody history of the many appearances of Halley's comet, Edwin Emerson's "Comet Lore - All About Halley's Comet" (London 1910). For those of our members who are too young to know Halley's Comet I present from this booklet some interesting details:

B.C. 11 - the appearance of the comet in this year was taken as a bad omen; shortly after it disappeared from the sky, Agrippa, ruling the Roman Empire during the absence of Augustus, died. (One fails to see a distinct connection).

A.D. 65/66 - the comet signifies the fall of Jerusalem, in the words of Josephus: "the comet, of a kind called Xiphias, because their tails appear to represent the blade of a sword, was seen above the doomed city ..."

141 - the plague ravages China and the Far East, and 400,000 people died of the disease in Italy.

218 - China is ravaged by civil wars following the death of emperor Ween-te, and in Rome emperor Macrinus is murdered by his soldiers.

373 - the beginning of the tremendous migration of peoples, starting in Mangolia.

451 - Halley's comet (or a comet) appeared just before the battle on the Catalaunian Fields when Attila was defeated by Aetius, last of the Romans, and Theoderic the Great.

684 - Black Plague in the Far East, reaching England.

760 - the appearance of the comet was followed by a disastrous frost the next winter, lasting for 150 days.

912 - following the appearance of the comet, everybody (Danes, Slavs, Magyars) decides to invade Germany.

1066 - the battle of Hastings (see the comet on the Bayeux tapestry)

1145 - start of the Crusades

1222 - Ghenghis Khan begins to move toward China, Persia, India.

1378 - the Black Plague ravages all of Europe

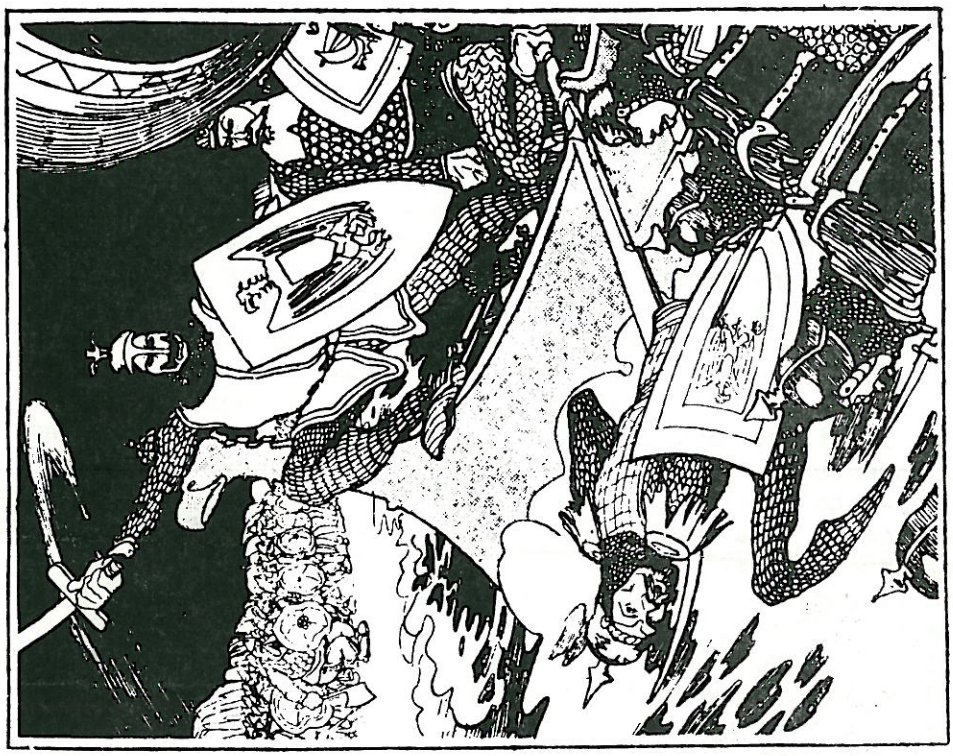
1456 - the scimitar-shaped comet, with a tail nearly 60° long, is taken by Mahomet II as a good omen. Unfortunately for him, Mahomet II had not counted on the great Magyar leader, Hunyadi, who defeated him before Belgrade.

1531 - not having learned their lesson, the Turks, this time under Soleyman are repulsed near Vienna; black plague in Europe; diasastrous floods in Holland; and the reign of terror of Cortez, Alvarado, and Pizzaro (of course, the coincidence with Halley's comet is not perfect; but this was its worst appearance).

I shall not continue this into more recent apparitions. Suffice it to say that all that this proves is man's inhumanity to man, and that people's ideas concerning the evil influences of comets proves their own stupidity. *

On the next page we produce a prophetic cartoon which appeared in 1910 in the magazine "Kladderadatsch", the German equivalent of the English "Punch". Its caption reads:"WILLIAM THE CONQUEROR, An English Dream. Halley's Comet appeared in 1066 - when William the Conqueror took England. Halley's Comet is here today!" Four years later World War I began! One shudders to think what might happen when Halley's comet returns in 1986! * (our thanks to Kurt Erland for the cartoon which we hope comes through the press in good shape. Notice the evil look of Kaiser Wilhelm and the totally un-astronomical appearance of the comet. eeb).

* * *



Buffalo Astronomical Association, Inc.
c/o Buffalo Museum of Science
Buffalo, N.Y. 14211

Mr. Edward Lindberg
113 Maple Drive
Bowmansville, N. Y.
14026

F I R S T C L A S S