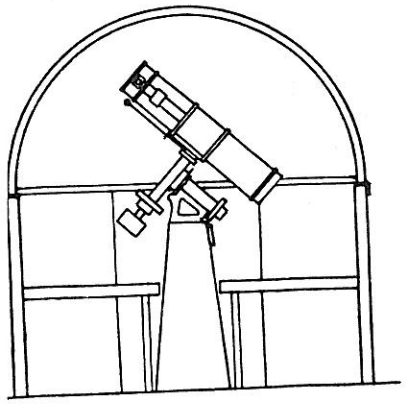

THE SPECTRUM

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

JANUARY 1970

H A P P Y

N E W Y E A R

JANUARY MEETING: For our first meeting of the year 1970 (January 9, 8:00 PM, EST) we are happy to welcome Dr. Seville Chapman, whose topic will be "Orbital Mechanics." Dr. Chapman certainly needs no introduction - as Chief Scientist of Cornell Aeronautical Laboratory he has been instrumental in locating our Newstead Observatory on the grounds of Cornell Lab. As a professional physicist, Dr. Chapman possess that rare quality of lucidly explaining even the most difficult subjects; members will remember his excellent talk on ellipses and the laws of Kepler, a few years ago. It is with great pleasure that we welcome back DR. CHAPMAN!

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ASTROPHOTOGRAPHY EXHIBIT: The long-awaited exhibit of astronomical photographs was officially opened at our December 1969 meeting in the Print Room of the Museum of Science. The exhibit will continue to the end of January, and will be open after our January meeting for viewing by our members. Approximately 90 photographs are on display, by the following members: David Blake, Robert Burdick, Dr. Seville Chapman, Orrin Christy, Dale Hankin, Larry Hazel, John Riggs, Walter Semerau, Ian Slepian, Walter Whyman. In addition, there are photographs from the Museum's Kellogg Observatory by Ernst Both, Craig Ransom, Clifford Stoll and the Museum's photographer J. Carl Burke. Mrs. Edith Geiger made the overall sign for the exhibit. To all who have so splendidly cooperated in making this our first exhibit of photographs my personal, heartfelt thanks! We hope that this will encourage members to take more pictures during the coming year and that this will become an annual event. eeb.

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A WORD ABOUT REFRESHMENTS: Mrs. Lillian Von Gerichten has done a truly outstanding job in preparing and serving the refreshments after our meetings. Unfortunately she has had very little help in the past. The need has always been for volunteers to come early (to help set up the refreshments) and stay late to "bring the house in order." Unfortunately too, despite several appeals for help, such help has not materialized in a consistent fashion. It is with deep regret, therefore, that our president has decided to discontinue refreshments until such time that adequate help becomes available.

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* SATURN'S SATELLITE SYSTEM * By Dr. Frederick R. West (concluded)

Are there more undiscovered satellites? Another satellite was suspected by W. H. Pickering, discoverer of Phoebe, just beyond Hyperion; in fact, he assigned it the name Themis. No confirming observations were obtained, so this satellite seems non-existent. Careful searches by G. P. Kuiper and C. Tombaugh failed to show any satellites brighter than 17th magnitude, which would correspond to a diameter of about 50 miles at Saturn's distance from the Sun. So it seems that apart from satellites within the inner group that are hidden by the glare from Saturn and its rings, any additional satellites must be very small.

What can the amateur astronomer see of the satellites? Titan is easily visible through even a small telescope; three satellites, Titan, Rhea, and Iapetus, and possibly Dione, should be visible through telescopes of 4 to 8-inch aperture. Of course, they are best seen near elongation (greatest apparent separation) from the planet. Ephemerides of satellite positions in their orbits are shown in the American Ephemeris and Nautical Almanac in the "Satellites of Saturn" section. The author saw five and possibly six satellites through a 30-inch telescope in July 1968. Also we should not forget that Cassini's Division in Saturn's ring system is caused by the gravity pulls of the nearby satellites Enceladus and Mimas (and possibly Janus) on any ring particles revolving at that mean distance from Saturn. Such a particle would have an orbit period 1/3 that of Enceladus, 1/2 that of Mimas, and 3/5 of Janus, and the systematic pulls of these satellites would remove it from an orbit inside Cassini's Division to an orbit closer to or further from Saturn. A similar effect due to the planet Jupiter produces Kirkwood's gaps among asteroid orbits. So Cassini's Division is an observable effect of two or three small, close satellites of Saturn that are difficult or impossible to observe except with a large telescope.

References: 1. Alexander, A. F. O'D, THE PLANET SATURN, 1962, New York: MacMillan, chapters 22, 23, 29, 32, 37, 38; 2. Kuiper, G. P. and B. M. Middlehurst, PLANETS AND SATELLITES, vol. 3 of "The Solar System," 1961, Chicago: Univ. of Chicago Press; 3. Dollfuss, A., Sky and Telescope 34: 136-137, 1967.

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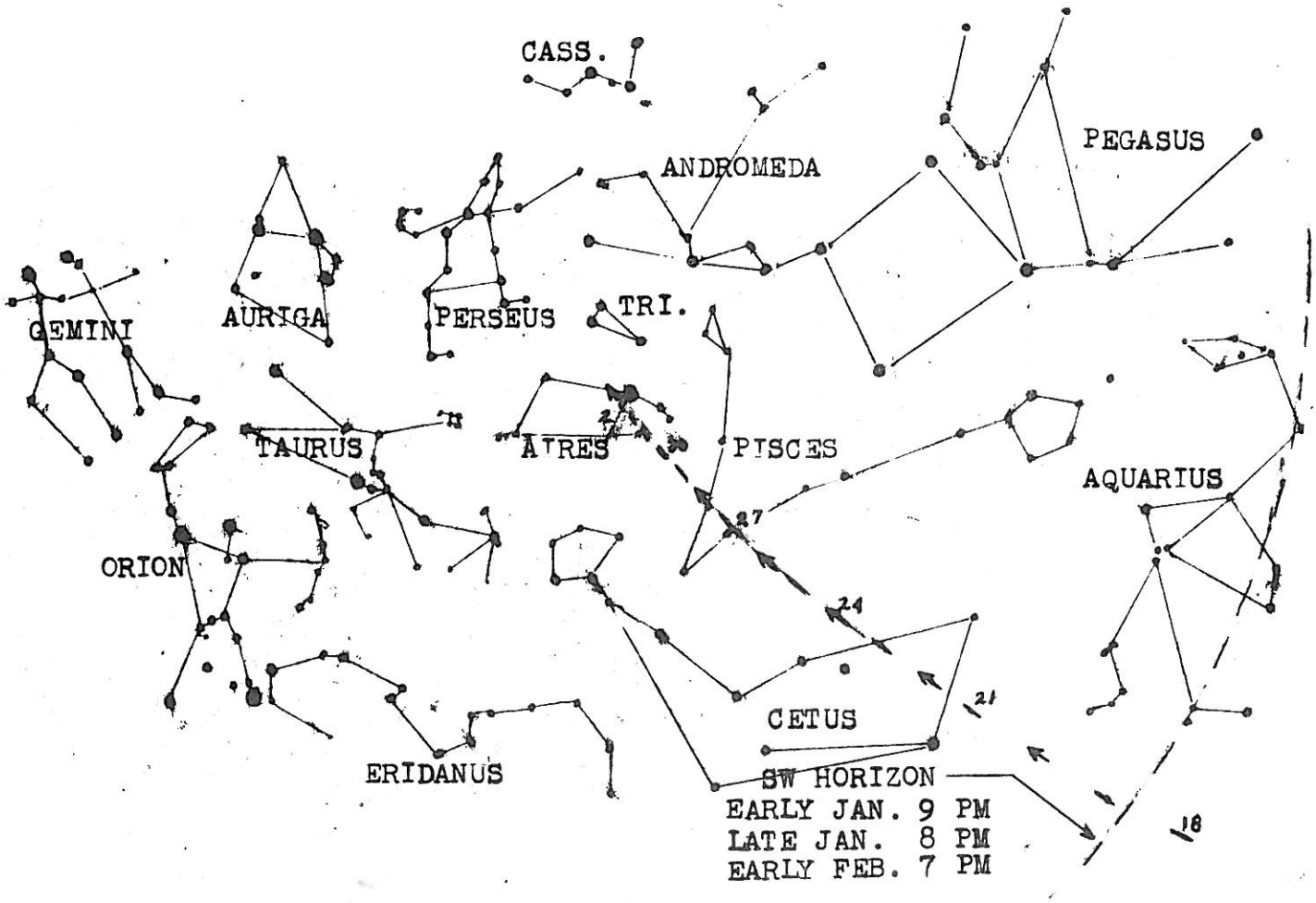
* COMET TAGO-SAKO-KOSAKA * By Walter Whyman

On the next page is a plot of the predicted positions of comet Tago-Sako-Kosaka, from Circular 2189 issued by the International Astronomical Union, covering the 16-day period from its first appearance in western New York skies, January 19 - February 3, 1970. Despite newspaper announcements to the contrary, this comet will not be visible prior to January 19, at the earliest. Before this date, it will be below the horizon in the evening, and not bright enough to be seen in the daytime. When near perihelion, it will be beyond the Sun in the daytime sky, at magnitude +2.7, during the final week of 1969. Thereafter, it will slowly fade, as it recedes from the Sun, and will be about magnitude +3.1 when it comes above our horizon on January 19th. As it moves northeastward, it will continue to fade to magnitude +5.2 on February 3rd, the final date of the ephemeris from which these positions were plotted. After that date, it should still be possible to follow it from night to night with telescopic aid.

Although the magnitudes mentioned above are usually considered to be within naked eye visibility, as applied to stars, they are misleading when applied to comets, and you are unlikely to see this comet without optical aid, unless you are

well away from city lights and have a clear sky, free from haze and bright moonlight. For several days after January 19th, the approaching full moon may make it difficult to find this comet. Binoculars will be helpful; much better is a mounted low power wide field telescope. The star plots are adapted from Sky and Telescope; constellation figures are from H. A. Rey.

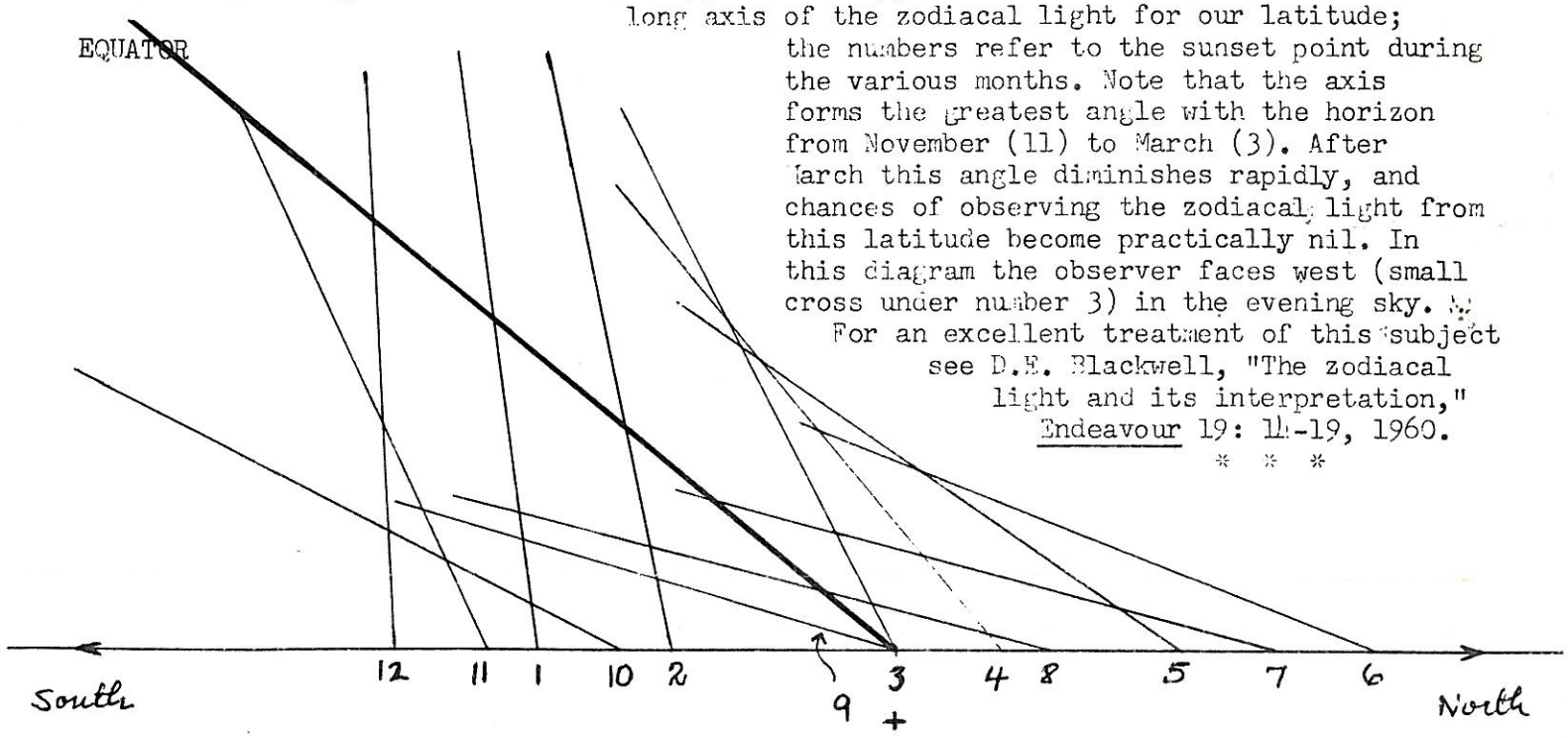


* A NOTE ON THE ZODIACAL LIGHT * By Ernst E. Both

During the opening of our astrophotography exhibit Walt Whyman and I were reminiscing about the appearance of comet Ikeya-Seki in the early morning sky of November 1965. We both vividly recalled the beautiful sight together with the added bonus of a spectacular view of the Zodiacal Light next to the comet stretching toward Leo. It is at the suggestion of Walt that I am writing these lines and in the hope that they might stimulate some of our members to seek out a dark winter sky and observe this (for our latitudes) difficult phenomenon.

The Zodiacal Light is a cone-shaped brightening on the horizon, whose base is about 25° wide and whose apex stretches some 60° upward from the sunset point. It is observable after all traces of twilight have disappeared (or before all traces appear in the morning sky, that is, somewhere around 2 hours after sunset or before sunrise; at any rate, the Sun must be around 20° below the horizon). As the diagram on the next page shows, it should be favorably placed in the evening sky until March. The brightness of the Zodiacal Light is equal to or greater than the brightest portions of the Milky Way. However, this also means that the Moon cannot be in the sky if it is to be observed. Thus the best opportunities will come during the following dates:

Until January 10; then from January 26 to February 9; February 25 to March 9; and March 26 to April 8. It is fairly certain that this light is due to sunlight reflected from tiny (meteoric) dustparticles located in a flattened disk between the Earth and the Sun, and roughly in the plane of the ecliptic. From all appearances it is an extension of the Sun's F-corona (F for Fraunhofer, since the spectrum of this part of the corona shows it to be due to diffraction scattering of sunlight) and its spectrum shows it to be reflected sunlight. Modern estimates place its density at about 8 particles per cubic mile, with the sizes of these particles between 1 and 300 microns. The diagram below shows the approximate appearance of the direction of the long axis of the zodiacal light for our latitude; the numbers refer to the sunset point during the various months. Note that the axis forms the greatest angle with the horizon from November (11) to March (3). After March this angle diminishes rapidly, and chances of observing the zodiacal light from this latitude become practically nil. In this diagram the observer faces west (small cross under number 3) in the evening sky.



For an excellent treatment of this subject see D.E. Blackwell, "The zodiacal light and its interpretation," Endeavour 19: 14-19, 1960.

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F I R S T C L A S S