THE INTERNATIONAL COMET QUARTERLY

OCTOBER 1980 VOL. 2, NO. 4

EPHEMERIS FOR COMET MEIER 1980q

Date ET	R. A. (1950)	Decl.	Delta	r	Elong.	Mag.
1980 11 07	18^{h}05^m.48	+41°36'.5	1.550	1.587	73°.6	9.5
1980 11 12	18 01.45	+38 39.3				
1980 11 17	17 58.63	+36 03.0	1.678	1.554	65.5	9.5
1980 11 22	17 56.68	+33 45.5				
1980 11 27	17 55.36	+31 44.7	1.796	1.532	58.5	9.6
1980 12 02	17 54.50	+29 58.8				
1980 12 07	17 53.97	+28 26.0	1.895	1.522	53.0	9.7
1980 12 12	17 53.66	+27 04.9				
1980 12 17	17 53.47	+25 54.4	1.970	1.526	49.4	9.8
1980 12 22	17 53.33	+24 53.3				
1980 12 27	17 53.18	+24 00.8	2.018	1.541	47.9	9.9
1981 01 01	17 52.96	+23 16.1				
1981 01 06	17 52.61	+22 38.7	2.035	1.569	48.6	10.0
1981 01 11	17 52.06	+22 08.1				
1981 01 16	17 51.23	+21 44.0	2.023	1.609	51.6	10.1
1981 01 21	17 50.06	+21 25.8				
1981 01 26	17 48.48	+21 13.4	1.982	1.658	56.6	10.2
1981 01 31	17 46.39	+21 06.5				

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INSIDE THIS ISSUE

THE INTERNATIONAL COMET QUARTERLY is a non-profit journal devoted to news and observation of comets. Issues are published four times per year (January, April, July, and October). The ICQ is published usually by the Physics Department of Appalachian State University and is mailed from Boone, North Carolina; occasional issues are published at the Smithsonian Astrophysical Observatory and mailed from Cambridge, Massachusetts. Subscription rates are $8.00 per year worldwide; subscribers who do not wish to be billed, and who will keep record of their own expiration dates, may subscribe at the rate of $5.00 per year. Make checks payable in U.S. funds to THE INTERNATIONAL COMET QUARTERLY and send to the Editor at P-329, S.A.O.; 60 Garden St.; Cambridge, MA 02138, U.S.A. Group rates available upon request. Manuscripts will be reviewed for publication; they should be typewritten and double-spaced, and should be sent to the Editor. All cometary observations should be sent to C. S. Morris; Prospect Hill Rd.; Harvard, MA 01451, U.S.A. Back issues are available from Dr. T. L. Rokoske, Physics Dept.; A.S.U.; Boone, NC 28608, U.S.A.

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This issue is No. 36 of the publication originally called THE COMET, founded in March 1973, and is Vol. 2, No. 4, of the ICQ.

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FROM THE EDITOR

On September 25, 1980, a wonderful woman passed from this life, a victim of cancer at the age of 60 in St. Catharines, Ontario, Canada. Violet Eleanor Handahl Green, my Mother, was extremely important to this publication, for without her tremendous support as a reference librarian at Appalachian State University from 1973-76, this publication may well not exist right now. In March 1973, I started THE COMET, which became THE COMET QUARTERLY, and later THE INTERNATIONAL COMET QUARTERLY. My Mother helped me to start this publication when I was a high school student, by having it published for no or little cost at the library where she worked for one full year. This was only one of the many cases in which she gave me much support in everything that I did.

A year ago, I identified the minor planet 1979 MJ with 1936 QB, 1929 TR, 1943 MD, and 1972 RL, permitting a fairly determinate orbit which, in turn, allowed this object to be numbered (2166) [see Minor Planet Circular 4831]. My Mother was tickled when I named this minor planet "Handahl" in her honor, after her maiden name [MPC 5285]. It was, indeed, the least that I could do for one who has done so much for me.

This issue of the ICQ is dedicated to the memory of Violet Green.

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The sudden death of my Mother put this October issue of the ICQ off the printing schedule by two months, and consequently, in order to have this issue in our readers' hands as soon as possible, we are publishing this at the Smithsonian Astrophysical Observatory print shop rather than at A.S.U.

The January 1981 issue of the ICQ is scheduled to go to press just before Christmas.

The index to Volume 2 will be published in the January issue; all indices will be henceforth published in the first issue of the following volume.

---Daniel W. E. Green
1980 Nov. 13, Cambridge, MA

ROLF MEIER'S THIRD COMET

Rolf Meier, an amateur astronomer from Ottawa, Ontario, discovered his third comet in 2 years on the evening of November 6 with his 40-cm (16-inch) f/5 reflector. This object has been designated comet Meier 1980q by the IAU Central Bureau for Astronomical Telegrams. When Meier first found his comet, low in the sky around 9:40 p.m. EST, he noted it as diffuse with condensation and as of total magnitude 10.5. The following evening, observing from Prospect Hill Observatory in Harvard, MA, Charles Morris found the comet at total magnitude 9.8, while Gunther "Skip" Schwartz, Dan Green, and C.-Y. "Jerome" Shao photographed the object with the 16-inch Metcalf astrograph and the 61-inch Newtonian reflector at Harvard College Observatory's Agassiz Station; an estimate by Green of the total magnitude on the Metcalf plate yielded 10.5. Further observations are reported in the Tabulation of Comet Observations elsewhere in this issue.

The ephemeris on the front page of this issue was computed from the following parabolic orbital elements by Brian Marsden here at the Smithsonian (from 13 observations):

T = 1980 Dec. 9.458 ET
ω = 87°.866 q = 1.52192 AU
Ω = 24.800 i = 101°.028
(above angles for equinox 1950.0).

It appears that comet 1980q will move out to a substantial elongation from the sun by April (about 150 degrees), and it may remain above total visual magnitude 12 until May. More in the Jan. issue.

---D.W.E.G. (1980 Nov. 13)

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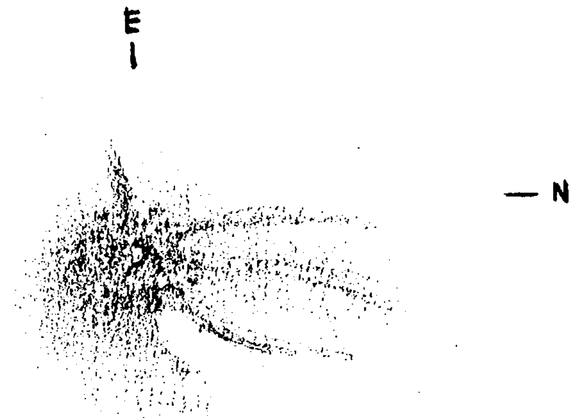
NEWS OF THE THREE CURRENTLY-BRIGHT PERIODIC COMETS

This issue of the ICQ originally was to have included an ephemeris and article on Periodic Comet Encke, but as of this writing, the elusive object is heading into the glare of the sun, while concurrently speeding southward in the celestial sphere. We will present a discussion of this extremely favorable apparition of Encke's comet in the January 1981 issue. Below is a drawing of this comet made by Steve O'Meara from a visual observation on October 30 at 9 hours UT with the 23-cm Clark refractor at Harvard College Observatory in Cambridge, MA. Note the apparent sunward fan.



O'Meara notes that the comet had an outer coma diameter of 13', and that the object was very diffuse. He noted many faint spike tail features within broad fans, and remarked about the mottled inner nuclear region. He observed much of the same of this comet on Nov. 3. Charles Morris and Dan Green noted a fairly long tail in 20x80 binoculars on Nov. 9, and other observations of tails are presented in the Tabulation elsewhere in this issue.

A 9-minute exposure taken by Skip Schwartz with the 150-cm reflector at Harvard's Agassiz Station on October 8.36 UT shows a strong condensation of nuclear magnitude 16.5 enveloped in a weak fan coma. P. D. Feldman of Johns Hopkins University and others observed P/Encke with the International Ultraviolet Explorer satellite on Oct. 24, not-

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ing strong emission at the Lyman-alpha hydrogen line and at the OH (0,0) band. The estimate the water-production rate on the order of 10-to-the-28th-power moles per second. (cf. IAUC 3533)

P/Tuttle has brightened substantially during October and early November. Observations made by Green and Morris on Nov. 13 through cirrus clouds at Harvard, MA, indicated that comet 1980h had then brightened to total magnitude 7.3 or 7.4, and this object should attain magnitude 7.0 or brighter at its peak in late November and early December.

P/Stephan-Oterma 1980g has also brightened to magnitude 7.5, making 3 the total number of comets currently brighter than 8th magnitude. Add comet Meier 1980q, and there are 4 comets currently within the range of binoculars! Full reports on both P/Tuttle and P/Stephan-Oterma will follow in subsequent issues of the ICQ. Readers are urged to send their observations as soon as possible to Charles Morris (see p. 66).

The ICQ Editors have found the new AAVSO Star Atlas to be a useful aide in estimating the brightness of comets, as the charts have magnitudes plotted on the charts for many stars which can be used for comparison. More information on pp. 87-88.

--D.W.E.G. (1980 Nov. 13)

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RECENT NEWS CONCERNING COMETS

Periodic Comet Borrelly was recovered by H.-E. Schuster on exposures taken July 9 and 21 at the European Southern Observatory. Given the preliminary designation "comet 1980i", the object was then of total magnitude 18 to 18.5. P/Borrelly has a period of about 6.77 years (q = 1.319, e = 0.631), and perihelion will occur on 1981 February 20, according to elements by D. K. Yeomans of the Jet Propulsion Laboratory (cf. Minor Planet Circular Nos. 5126 and 5225). This is the tenth recorded apparition of this comet.

Kazimeras Cernis and Jovaras Petrauskas of Vilnius University Observatory in the U.S.S.R. discovered a fairly bright comet on July 31 from the Observatory's station on Maidanak Mountain in Uzbekistan. The comet was initially reported to the IAU Central Bureau for Astronomical Telegrams here in Cambridge, Massachusetts, as having been discovered by the well-known Russian observer Chernykh, and confirmation of the elusive object did not occur until some 3 weeks after discovery, when Paul Wild belatedly reported several astrometric observations made at the Zimmerwald Station of the Astronomical Institute (Berne, Switzerland). The total magnitude of this comet was reported as 9 upon discovery, but it was moving a such a fast rate that only Wild was able to follow it shortly after discovery, and its preliminary designation was made 1980k; P/Kohoutek was recovered during the confusion, and it was named comet 1980j.

Observations through September 7 revealed that comet Cernis-Petrauskas passed perihelion on June 22, 1980, at a distance of 0.523 AU (B. G. Marsden, IAU Circular No. 3516); the object was rapidly receding from the earth and sun shortly after discovery. A few amateurs did manage to observe comet 1980k visually in moderately-sized telescopes (see the Tabulation of Comet Observations elsewhere in this issue). Edgar Everhart of the University of Denver (Colorado) found a "very conspicuous, straight, narrow anti-tail" of length 14' on a photograph taken of comet 1980k on August 29. Zdenek Sekanina of the Harvard-Smithsonian Center for Astrophysics noted that the earth was then < 2 degrees from the comet's orbit plane, allowing us to glimpse this effect.

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A REVIEW OF VISUAL COMET OBSERVING TECHNIQUES -- I

by Charles S. Morris

ABSTRACT. In this three-part paper, the different physical properties of a comet which an observer can measure visually are examined. The importance of each property to the professional is discussed, and suggested observing techniques are presented. This first part considers in some depth the making of comet magnitude estimates.

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Amateur scientists in general and amateur astronomers in particular are often resentful of the lack of attention their individual efforts receive from the professional. This feeling is particularly severe after reading histories of astronomy where contributions by certain "non-professionals" are highly praised. In the coming decade, studies of comets using sophisticated electronic, photographic, and space satellite techniques will rightly occupy a major portion of professional effort and there will be even less time for considering and guiding work of a less quantitative nature. However, there are groups, including the Dutch Comet Group in the Netherlands, Hoshino Hiroba in Japan, and the Comets Sections of the Association of Lunar and Planetary Observers (ALPO) and the British Astronomical Association (BAA), to name a few, which continue to direct and support those collective observational activities which can be meaningful to the talented amateur while retaining usefulness to the professional. A major purpose of the ICQ is to provide a central depository for these amateur observations so that they will be readily available to professional astronomers.

In the attempt to mediate between the amateur and the professional, however, there are a number of difficulties. First, combining observations made by a wide variety of equipment and of observers with differing levels of experience always leads to statistical uncertainties. These "errors" may be so large that no clear relationship can be recovered from the "noise". Secondly, inexperienced observers are usually unaware of these pitfalls and totally ignorant of the statistical methodology needed to sort things out. Thirdly, technological improvements often render long-range amateur efforts obsolete even before they are completed. Because the amateur is doing his observing for "fun", it is often difficult to institute changes--even ones which are badly needed. Finally, the very quantities which have the longest historical precedent (e.g., comet total magnitudes, visual hourly rates of meteors, and sunspot numbers) and which are usually left to the domain of the amateur, often turn out to be unsuitable parameters of the phenomena being studied.

In order for an amateur's contribution to be meaningful to the professional, the amateur must use observing techniques which minimize the uncertainties in his observations. In this article, we shall look at the different physical properties of a comet which an amateur can measure visually. The importance of each of these to the professional will be discussed and suggested observing techniques presented.

COMET MAGNITUDE ESTIMATES

The most important reason for observing comets regularly is to monitor their brightnesses. As most amateurs realize, comets do not al-

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ways behave in a predictable manner. Some comets exhibit outbursts in brightness (e.g., P/Schwassmann-Wachmann 1 and P/Tuttle-Giacobini-Kresak 1973 VI) while others fade unexpectedly (e.g., P/Denning-Fujikawa 1978n). By alerting professionals to unusual behavior, the amateur will document events which may otherwise go unnoticed.

A series of brightness estimates of a given comet can be used to construct a light curve. Visual light curves alone are difficult to explain physically and, thus, are of only limited value. However, the gross properties obtained from analyzing a visual light curve (i.e., the comet's absolute magnitude and how it's brightness varies with heliocentric distance) can be used to compare the comet with other comets. Such a comparison will point out comets which are unusual and those which are average or typical. A more detailed examination of a light curve will reveal whether the comet was quiescent or had outbursts in brightness. Hopefully, in the future it will be possible to relate the characteristics of a comet's visual light curve to a specific physical mechanism (e.g., OH production). If this occurs, analyzing visual magnitude estimates of past, current, and future comets will be of much greater importance.

There are two types of magnitude estimates that an amateur can make. The magnitude of the nucleus of the comet (if it is visible) can be estimated in the same manner as a varaible star. However, nuclear magnitude (m_2) estimates made by amateurs are of little value. This is because amateur-size instruments rarely, if ever, show a true nucleus. What is observed is a central condensation or false nucleus which looks different in different instruments and at different magnification. Thus, it is not obvious what is being measured when an m_2-estimate is made. Fortunately, the situation is more clearly defined when an estimate of the comet's total magnitude (m_1) is made.

To estimate the total magnitude of a comet's coma, an observer must compare the coma's "average" surface brightness to that of objects of similar size and known total magnitude. Normally, the in-focus or out-of-focus comet image is compared to out-of-focus comparison star images. Three methods are currently used to do this:

1) Bobrovnikoff method (see Bobrovnikoff, 1941a and 1941b): the eyepiece is racked out of focus

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Fig. 1

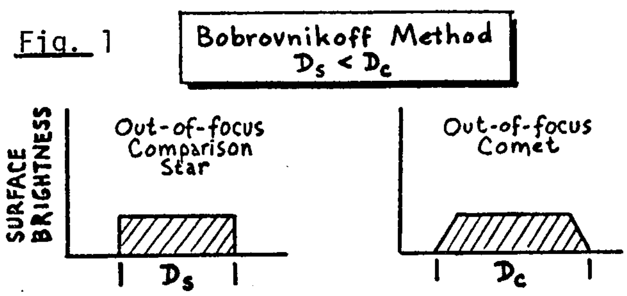


Fig. 2

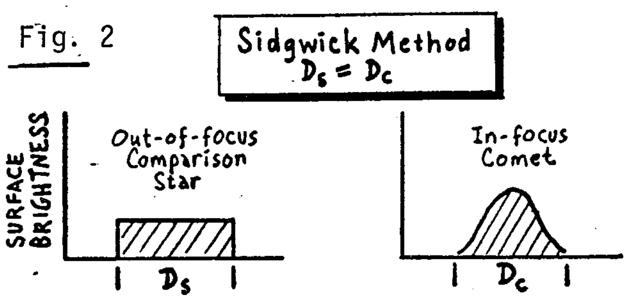
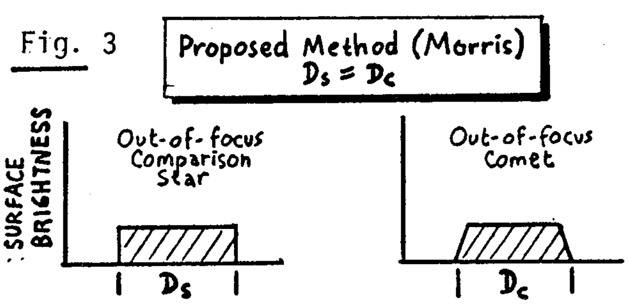


Fig. 3



Above Figures are by J. Marcus, Comet News Service.

A REVIEW OF VISUAL COMET OBSERVING TECHNIQUES -- I

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until the comet and comparison stars appear similar in size.

2) In-out or Sidgwick method (see Sidgwick, 1955): the memorized image of the in-focus comet is compared to equal-sized comparison star imges, which have been racked out of focus.

3) Beyer method (see Beyer, 1952): the eyepiece is racked well out of focus until the comet and the comparison stars are so expanded and diffuse as to be invisible. The comparison is made by noting which disappears first. The comet must be expanded to many times its original size for this method to work.

Of the three methods listed above, the Bobrovnikoff method is the most frequently used (at least in the United States). In many cases, it is also the easiest method to use. Figure 1 illustrates what happens when the Bobrovnikoff method is applied. The comparison stars appear similar to the comet, but the comet is always larger than the comparison stars. This is because the comet, when in-focus, has a significant diameter whereas the comparison stars are stellar. The difference in the size of the out-of-focus comet and the out-of-focus comparison stars will lead to some error in the comet magnitude estimate. It should also be noted that for large comets (e.g., P/comets d'Arrest 1976e and Bradfield 1979l), it may be very difficult to make the comet and comparison stars look "similar in size". The Bobrovnikoff method works best for small comets.

The In-out or Sidgwick method eliminates the problem of coma size because the out-of-focus comparison stars can be made to match the size of the in-focus comet. However, the In-out method does not smooth out the comet's image (see Figure 2). Therefore, the observer must decide what the comet's "average" surface brightness is. This can be difficult for strongly-condensed comets. In general, the In-out method can be used on most comets. It is particularly good for very faint comets.

Of the three methods discussed to this point, the Beyer method is the most difficult to use. In addition, the Beyer method is much more sensitive to sky brightness than the Bobrovnikoff or In-out methods. For these reasons, use of the Beyer method is not recommended.

Recently, this author has proposed an alternate method for estimating the total brightness of a comet (e.g., Morris, 1979). This proposed method combines features of the Bobrovnikoff and In-out methods, and in doing so, it eliminates one problem inherent to each method. Specifically, the problems eliminated include:

1) the difference in size between the out-of-focus comet and the out-of-focus comparison stars which occurs when the Bobrovnikoff method is used; and

2) the variation in surface brightness across the comet's coma when the in-focus comet is observed with the In-out method.

The proposed method is described below (see Figure 3):

STEP 1: Put the comet out of focus just enough to obtain approximately a uniform surface brightness.

STEP 2: Memorize the size and surface brightness of the out-of-focus comet.

STEP 3: Put the comparison stars out of focus so that they are the same size as the memorized out-of-focus comet image. THE COMPARISON STARS WILL HAVE TO BE PLACED FURTHER OUT OF FOCUS THAN THE COMET TO OBTAIN EQUAL IMAGE SIZES.

STEP 4: Estimate the comet's magnitude by comparing the surface brightness of the out-of-focus comparison stars with the memor-

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ized surface brightness of the out-of-focus comet.

STEP 5: Repeat STEPS 1-4 until an accurate estimate is obtained.

It is always interesting to look at extreme cases. For a very small comet, the proposed method approaches the Bobrovnikoff method. For a totally diffuse comet (DC = 0), the proposed method becomes the In-out method. This method will be most useful for large comets which have a strong central condensation and a diffuse outer coma. The proposed method has been used with success by the author on several recent comets.

Of the four methods discussed above, it is recommended that most amateurs use either the Bobrovnikoff or In-out methods. More experienced observers may wish to try the new method proposed by the author in addition to one of the established methods. In any case, the observer should always report which method was used.

The following set of guidelines are recommended for those wishing to make useful magnitude estimates.

1) A dark sky observing location is important; a bright sky will in many cases cause an underestimate of the comet's brightness.

2) A low-power, small-aperture instrument should be used whenever possible. Binoculars are an excellent choice. Well-placed comets as faint as 9th magnitude can be seen with 5-cm binoculars; the author has observed P/Ashbrook-Jackson 1977g (m_1 = 11.3) with 20x80 binoculars. The advantage of binoculars is that if a comet becomes relatively bright, one instrument can be used throughout most of the comet's apparition. In addition, the use of binoculars minimizes the aperture effect which causes comets to appear fainter in larger instruments. Generally, the aperture effect is removed from magnitude estimates by applying an empirical correction. Observations are corrected to a standard aperture (usually 6.78 cm). The closer an instrument's aperture is to the standard aperture, the smaller the correction which will have to be applied and, thus, the smaller the potential error in the corrected estimate. Every reported magnitude estimate should include the instrument aperture, type, focal ratio (or focal length), and magnification, in addition to the Universal Time decimal date and observing conditions.

3) It is suggested that the comet magnitude estimate be made with respect to at least THREE comparison stars located as near as possible to the same altitude above the horizon as the comet.

4) Be sure to carefully select the comparison stars (before going out to the telescope, if possible) and identify each according to the primary source of the visual magnitude used for the star. For example, one might quote either the Bonner Durchmusterung (BD number) or the Henry Draper (HD number) cata-catalogues. Variable star observers have an advantage since once the comparison stars are set up for a given variable star, there is no need to change. Obviously-known variable stars should not be used for comet magnitude work, but if the comet happens to pass conveniently near or through a suitable variable star field, then previously-identified comparison stars can be used with confidence.

5) The effect of comparison star color on comet magnitude estimates is not clear since comet spectra contain emission features. Therefore, Bobrovnikoff's original suggestion that bluer stars be given preference and red stars be avoided still seems to be reasonable.

6) Be sure to quote the original magnitude estimate (either the

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single estimate or an average of several estimates made with the same instrument). Under NO circumstances should estimates made with different instruments be averaged or combined before submitting for publication. Likewise, no corrections for extinction or aperture effects should ever be applied to individuals observations.

7) All special circumstances and exceptions to the above guidelines should be noted.

(PART II OF THIS ARTICLE WILL BE PUBLISHED IN THE NEXT ISSUE.)

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OF SEQUENCES AND COMPARISON STAR MAGNITUDES

by Henk Feijth, Werkgroep Kometen (Dutch Comet Section) Recorder

At present, comet observers use comparison star magnitudes from many different sources, thus introducing the possibility of systematical errors in the estimated brightnesses. This can only be eliminated when common reliable magnitudes are used universally.

The following sources of comparison star magnitudes currently are used most often: a) Arizona-Tonantzintla catalogue; b) Yale Bright Star Catalogue; c) U.S.N.O. photoelectrical catalogue; d) S.A.O. Catalog; e) Atlas Coeli catalogue; and f) variable star sequences such as those of the A.A.V.S.O. (see page 88 of this issue). The first three catalogues are based on photoelectric observations under the UBV system, whereas the others are based on the Harvard photometry. In the case of the SAO Catalog, this is only true for the magnitudes coded "H" or "T". The response of the V filter used in standard UBV photometry does not exactly fit that of the dark-adapted eye; the dark-adapted eye has the maximum sensitivity at 520 nm, whereas the V filter peaks at about 570 nm. As a result, the V-magnitudes are not directly usuable for visual estimates. I. D. Howarth and J. Bailey (1980) have derived a formula to convert V magnitudes to visual ones:

$$m_{vis} = V + 0.16\ (B - V),$$

and recommend using this formula for the derivation of accurate comparison star magnitudes for use by visual observers.

I have used this relationship to investigate the usability of the catalogues based on photoelectric measurements under the UBV system and those based on the Harvard photometry. A sample of 100 stars was taken at random from the Arizona-Tonantzintla (TA) catalogue, whereafter the V magnitudes were converted into m_{vis} -magnitudes and compared with those in the Coeli catalogue. I chose the Coeli catalogue since it gives the magnitudes in two decimals whereas the others only give one decimal place. The difference between the corrected TA magnitudes

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OF SEQUENCES AND COMPARISON STAR MAGNITUDES

(Continued from previous page) and the Coeli magnitudes has a standard error of ± 0.09 magnitude, whereas there is practically no systematical difference between the two systems (on the order of 0.01 mag.).

The relationship between the V-magnitudes of the TA catalogue (uncorrected) and the Coeli catalogue, determined according to the method of least squares, is:

$$m_{Coeli} = V + 0.04 + 0.095 (B - V),$$

the correlation coefficient being 0.59. One may conclude that it is best to use the corrected V magnitudes; when these are not available, the sources using Harvard magnitudes are quite usable since there is almost no systematical difference between the two systems, at least for stars brighter than fifth magnitude. The Harvard magnitudes in the Coeli and SAO catalogues may differ by ± 0.1 magnitude from the exact m_v; since the error of a cometary estimate often is ± 0.2 magnitude, this is no serious problem.

On the other hand, the SAO magnitudes which are not coded "H" or "T" are suspect; a test made with 12 AAVSO fields showed that the SAO magnitudes may be brighter up to 0.8 magnitude more than AAVSO values. As a consequence, the estimates based on these SAO magnitudes often are brighter, and sometimes much brighter, than those based on AAVSO sequences. Especially the SAO magnitudes fainter than 8.5 are highly suspect and therefore not usable in my opinion. The Dutch Comet Section has refused, therefore, to use SAO comparison star magnitudes which are not coded "H" or "T". In our opinion, it is much better when a comet is fainter than seventh magnitude to us AAVSO sequences, and, when they are available, V magnitudes of the USNO catalogue (which are reduced to the visual values).

In order to promote homogeneity of cometary estimates made by observers around the world, I'd like to suggest that all observers use the same comparison star magnitudes, provided that they are at least fairly reliable.

REFERENCES

Howarth, I. D.; and J. Bailey, 1980. Journal of the Brit. Astron. Assn. 90, p. 265.

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NEW ADDITIONS: KEY TO OBSERVERS

AKI	06	ISAO AKITA, JAPAN
COM01	05	B. COMSA, CA, U.S.A.
FUK	06	YOSHIHIKO FUKAMI, JAPAN
HAL01	05	D. HALL, NEW ZEALAND
HAR01	06	SYOJI HARADA, JAPAN
HIK	06	YASUNOBU HIKA, JAPAN
HIR	06	MITSUTAKA HIRAGA, JAPAN
HIR01	06	KAZUYOSHI HIRAYAMA, JAPAN
HUD	05	B. HUDGENS, MS, U.S.A.
IKA	06	MASAAKI IKADA, JAPAN
ITO01	06	AKIRA ITO, JAPAN
KAN01	06	HIROSHI KANEDA, JAPAN
KAT	06	MASAMI KATO, JAPAN
KEE	05	R. KEEN, CO, U.S.A.
KIT01	06	MITSUO KITAHATA, JAPAN
KOD	06	EIJI KODA, JAPAN
MCM	05	S. MCMILLAN, AUSTRALIA
MIZ	06	YOSHIKANE MIZUNO, JAPAN
NAK05	06	TETSUYA NAKAMURA, JAPAN
NIH	06	TAKESHI NIHEI, JAPAN
NOG	06	TOSHIHIDE NOGUCHI, JAPAN
OKA04	06	SYUICHI OKADA, JAPAN
OOK	06	NOBUO OOKURA, JAPAN
OOS01	06	NOBUO OOSHITA, JAPAN
OOY	06	YOSHINORI OOYANAGI, JAPAN
SHI	06	HIROYUKI SHIOI, JAPAN
SHI01	06	SHIN-ICHI SHIMIZU, JAPAN
TSU01	06	YASUHIKO TSUDA, JAPAN
UED	06	MASAYOSHI UEDA, JAPAN
UNO	06	YOSHIKAZU UNO, JAPAN
YAM01	06	TETSUYA YAMAMOTO, JAPAN
YAM02	06	MASARU YAMASHITA, JAPAN
YOK	06	MIKIO YOKOKAWA, JAPAN
YON	06	SYOJI YONEZU, JAPAN

TABULATION OF COMET OBSERVATIONS

Included on the following pages are all of the A.L.P.O. observations of comets P/Honda-Mrkos-Pajdusakova 1974 XVI and Mori-Sato-Fujikawa 1975 XII. Also included are Hoshino Hiroba observations of comets Bradfield 1979l, Bradfield 1979c, and P/Schwassmann-Wachmann I. The increase in brightness which occurred in P/Schwassmann-Wachmann I is evident in these observations from late 1979. Other recent observations are also published here of the three "bright" periodic comets (see page 67) and of the new comet Meier 1980q. Note the list of new observers on the previous page, bringing the total in our Observer Key to nearly 350. --D.W.E.G. (11/14/80)

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Comet Mori-Sato-Fujikawa (1975 XII = 1975j)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1976 03 09.79	9		15.0	L							TRE
1975 10 08.35	10.0	A	32.0	L	6	55	1.5	3			BOR
1975 10 14.43	9	:	20.3	L	6		3	0/		65	GRE
1975 10 18.47	10.0		25.0	L	6						HUD
1975 10 19.48	10.0		13.0	R	5						MAL
1975 10 21.37	9.4		5.0	B		20	& 3	0			MAT02
1975 10 21.41	9.5	A	32.0	L	6	55	1.7	1/			BOR
1975 10 23.40	9.6	A	32.0	L	6	55	& 1.8	1			BOR
1975 10 30.40	8.6		15.0	L							KEE
1975 10 31.35	8.9	S	32.0	L	6	66	1.9	5			BOR
1975 10 31.35	8.6	S	5.0	B		10	4.8				BOR
1975 11 01.37	8.7	S	5.0	B		10	5.1		0.20	330	BOR
1975 11 01.37	8.9	S	32.0	L	6	55	2.4	5			BOR
1975 11 01.46	9.0		13.0	R	5						MAL
1975 11 02.25	9.7	A	10.8	L	5		&10	0			SIM
1975 11 02.46	8.7		13.0	R	5						MAL
1975 11 05.34	8.7	S	32.0	L	6	55	2.8	5			BOR
1975 11 05.34	8.5	S	5.0	B		10	4.3				BOR
1975 11 05.34	11.5	:$	32.0	L	6	55	< 0.5				BOR
1975 11 05.46	8.8		13.0	R	5						MAL
1975 11 05.83	8.8	S	20.3	L							BOE
1975 11 08.46	8.8		13.0	R	5						MAL
1975 11 08.84			20.3	L			6				BOE
1975 11 11.37			25.4	L	7		4	6			BOH
1975 11 11.39	8.3	S	5.0	B		10	& 6				BOR
1975 11 11.39			12.0	B		20	4.7				BOR
1975 11 11.39	11.5	:$	32.0	L	6	55	& 0.25				BOR
1975 11 11.39	8.5	S	32.0	L	6	55	3.5	4			BOR
1975 11 11.45	8.7		13.0	R	5						MAL
1975 11 11.86	8.4	S	20.3	L			8				BOE
1975 11 12.41	12	:$	32.0	L	6	88					BOR
1975 11 12.41	8.3	O	32.0	L	6	55	4.5	4/			BOR
1975 11 12.41	8.0	O	5.0	B		10	& 7				BOR
1975 11 13.45	8.5		13.0	R	5						MAL
1975 11 13.72	8.5		15.0	L	4	27					SUM
1975 11 14.45	8.7		13.0	R	5						MAL
1975 11 14.84	8.9	S	20.3	L			6				BOE
1975 11 16.41	7.8	O	5.0	B		10					BOR
1975 11 16.41	12	:$	32.0	L	6	55					BOR

Comet Mori-Sato-Fujikawa (1975 XII = 1975j) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1975 11 16.41	8.4	O	32.0	L	6	55	& 3	4			BOR
1975 11 16.84	8.3	S	20.3	L			8				BOE
1975 11 18.88	9.1	S	20.3	L			& 6				BOE
1975 11 19.88			20.3	L			1.5				BOE
1975 11 29.46	9.0		20.0	L							CAM01
1975 12 06.42	7.8		5.0	R							HAL01
1975 12 09.48	8		15.0	L							TRE
1975 12 26.44	8.7		20.0	L							NIK
1975 12 27.42	8.5		4.5	R					0.17	140	JON
1976 01 02.42	10		30.0	L							MCM
1976 01 05.41	8.5		4.5	R							JON
1976 01 06.43	9.0		30.0	L							MCM
1976 01 31.51	8.9		15.0	L					0.08	140	AUS

Comet Bradfield (1979c)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 08 07.80	9.8:		18.0	L		85	2	3			KAJ
1979 08 13.98	10.8:		12.0	L		33	& 2.5	2			SAK
1979 08 18.77	11.3		16.0	L		55	2	2			HIR
1979 08 22.80	10.8		18.0	L		85	1.5	1/			KAJ

Comet Meier (1979i)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 10 22.80	12 :		20.0	L		56	0.7	2			NAK
1979 11 19.82	11.8		20.0	L		56	2.5	1			NAK
1979 12 16.70	12 :		20.0	L		56	3	0			NAK

Comet Bradfield (1979l)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 01 10.89	5.8		5.0	B		7	7				HIK
1980 01 27.39	5.8		10.0	L		23	7	2			NOG
1980 01 27.40	6.0		7.0	B		16	15	2			TSU01
1980 01 27.41	5.8		8.0	B		20	15	3			OOK
1980 01 27.41	6 :		7.0	B		10	10	2/			FUK
1980 01 27.42	6 :		17.0	L		29	&15	5			NAK03
1980 01 27.42	5.5		5.0	B		7	20	2			UNO
1980 01 27.43	5.8		17.0	L		29	>10	3			MAT03
1980 01 27.43	6.5		8.0	R		22	12	3			NAK
1980 01 27.44	7 :		8.0	B		15	10				KAM
1980 01 27.44	[7		17.0	L		29	> 5				HIR01
1980 01 27.44	5 :		5.0	B		7	10	5			YOS
1980 01 27.44	5.5		5.0	B		7					KOB
1980 01 27.44	6 :		17.0	L		29	>10	5			WAS
1980 01 27.44	5.8		5.0	B		7	10	3/			KIT01
1980 01 27.45			8.0	B		15	40				SHI01
1980 01 27.45	6 :		17.0	L		29	10	5			OOY

Comet Bradfield (1979l) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 01 27.45	6	:	5.0	B		7					TSU
1980 01 27.47	7	:	17.0	L		29	20				OKU
1980 01 28.48	5.8		11.0	L		20	&20				HIK
1980 01 30.39	6.5		5.0	R		19	&10	3/			FUK
1980 01 30.40	6.5		16.0	L		31	>10	3			MIT
1980 01 30.40	5.5		10.0	L		24	10				HAR01
1980 01 30.41	7.5		10.0	L		24	13.7	2/			OCH
1980 01 30.41	7.6		20.0	L		32	12	5			OOK
1980 01 30.41	5.5		5.0	B		7	20	2			UNO
1980 01 30.42	5.9		5.0	B		7	20	3			YAM02
1980 01 30.44	5.7		6.0	R		18	15	3			NAK01
1980 01 30.45	5.8		7.0	B		16	8	5	0.07		ITO
1980 01 30.48	7.5:		10.0	L		20	>10	2/			TOK
1980 01 30.50	5.5		13.0	L		22	7.5	3/			MIZ
1980 01 30.50	5.7		3.5	B		7	5	3			SUZ
1980 01 30.51	5.5		5.0	B		7	20	4			NAK03
1980 01 30.52	8	:	25.0	L		50	23	4/			UOM
1980 01 31.40	5.5		13.0	L		22	8.9	3/			MIZ
1980 01 31.41	6.9		25.0	L		41	9.5	4			AKI
1980 01 31.42	6.7		16.0	L		31	10	3			MIT
1980 01 31.43	6.1		5.0	B		7	15				YAM02
1980 01 31.44	7.5		10.0	L		40	6	2			TAK04
1980 01 31.48	6.5		7.0	B		10	10	2			YAS
1980 01 31.51	5.8		3.5	B		7	6	2			SUZ
1980 01 31.51	7	:	11.0	R		20	10	2			SAT
1980 01 31.52	5.7		10.0	L		24	10				HAR01
1980 02 01.40	6.0		13.0	L		22	10	3	0.15		MIZ
1980 02 01.41	7.0		15.0	L		22	10	3			KOD
1980 02 01.41	6.7		16.0	L		31	9	3			MIT
1980 02 01.42	6.5		5.0	B		7	10	4			NAK03
1980 02 01.42	6.4		20.0	L		40	8				KOB
1980 02 01.42	6.5		15.0	L		33	10	3			TAN
1980 02 01.42	6.5		15.0	L		30	8				KAT
1980 02 01.43	6.3		5.0	B		7	10				YAM02
1980 02 01.43	7.8		15.0	L		28	10	5			NOG
1980 02 01.43	8	:	10.0	L		40	5	2			TAK04
1980 02 01.43	7.9		20.0	L		32	7	5			OOK
1980 02 01.44	7.5		10.0	L		25	7	3			NAK05
1980 02 01.45	7	:	6.5	R		20	10	3			ITO01
1980 02 01.46	6.2		5.0	B		7	15	2			UNO
1980 02 01.46	6.8		25.0	L		41	10	4			AKI
1980 02 01.47	7.5:		15.0	L		33	6	1/			TAK03
1980 02 01.47	6.5		7.0	B		10	10	4/			YAS
1980 02 01.49	7.0		6.0	R		32	10	2			SHI
1980 02 01.5	6.2		5.0	B		7					HAR01
1980 02 01.50	6.0		10.0	L		40	10	1			HON
1980 02 02.40	7.7		10.0	L		24	16.7	5			OCH
1980 02 02.40	8.0		15.0	L		33	6	1			TAK03
1980 02 02.40	6.0		10.0	L		40	10	1			HON
1980 02 02.41	7.0		25.0	L		41	8	5			AKI
1980 02 02.43	6.4		5.0	B		7	10	3			YAM02

Comet Bradfield (1979l) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 02.43	6.8		20.0	L		40	6				KOB
1980 02 02.43	6.6		6.0	R		18	11	2			NAK01
1980 02 02.44	8 :		10.0	L		40	5	2			TAK04
1980 02 02.44	7.7		10.0	L		24	14	4			OCH
1980 02 02.44	7 :		6.0	R		28	14	3			YAM01
1980 02 02.44	8.0		15.0	L		28	8	4			NOG
1980 02 02.45	7.0		15.0	L		32	8	4			OKA03
1980 02 02.45	8.9:		25.0	L		50	>20	3	0.40		UOM
1980 02 02.46	7.5		15.0	L		22	10	3			KOD
1980 02 02.46	6.5		7.0	B		10	>10	4/			YAS
1980 02 02.47	6.3		5.0	B		7					HAR01
1980 02 02.47	7.8		10.0	L		25	5	3			NAK05
1980 02 02.51	7.5		17.0	L		29	8	4			NAK03
1980 02 02.51	7.0		15.0	L		30	10				KAT
1980 02 02.52	6.8		8.0	R		43	10	5			IKA
1980 02 02.53	6.3		21.0	L		44	8	4			SAT
1980 02 02.54	6.0		3.5	B		7	4	2			SUZ
1980 02 03.39	7.8		10.0	L		24	13.5	6			OCH
1980 02 03.40	6.4		7.0	B		10	>10	5			YAS
1980 02 03.40	7.9		15.0	L		28	10	5			NOG
1980 02 03.40	7.0		15.0	L		24	10	0/			YON
1980 02 03.41	6.8		16.0	L		31	12	4			MIT
1980 02 03.42	6.4		5.0	B		7	10	2			YAM02
1980 02 03.42	8.3		20.0	L		32	8	5			OOK
1980 02 03.42	6.8		11.5	L		45	10	6			IKA
1980 02 03.44	7.2		15.0	L		22	15	3			KOD
1980 02 03.44	7.8		10.0	L		25	5	3			NAK05
1980 02 03.44	6.2		3.5	B		7	8	3			SUZ
1980 02 03.45	5.9		10.0	L		40	10	1			HON
1980 02 03.47	7.0		7.0	B		10	25	3			ASA
1980 02 03.52	7.3		20.0	L		40					KOB
1980 02 04.52	7.5		7.0	B		10	20	3			ASA
1980 02 05.42	7.8		10.0	L		20	10	2			TOK
1980 02 05.42	6.7		17.0	L		29	15	6			NAK03
1980 02 05.44	7.5		15.0	L		22	10	3			KOD
1980 02 05.44	7.2		5.0	B		7		3			YAM02
1980 02 05.44	7.3:		15.0	L		24	10	1			YON
1980 02 05.46	7.5		16.0	L		40	&18	2			TOM
1980 02 05.46	6.8		10.0	L		30	8				HAR01
1980 02 05.47	6.8		7.0	B		16	6	4	0.50		ITO
1980 02 05.47	7.1		16.0	L		31	11	4			MIT
1980 02 05.48	8.0		20.0	L		32	8	5			OOK
1980 02 05.48	6.5		6.5	R		12	8				YOK
1980 02 05.49	6.7		6.0	R		18	12	3			NAK01
1980 02 05.49	7.5:		6.5	R		20	10	4			ITO01
1980 02 05.50	6.9		11.5	L		45	15	6			IKA
1980 02 05.52	8.0		10.0	L		24	10.7	5			OCH
1980 02 05.54	6.6		3.5	B		7	8	4			SUZ
1980 02 06.40	7.7		25.0	L		41	6.5	5			AKI
1980 02 06.41	7.6		10.0	L		30	7.5				HAR01
1980 02 06.42	7.3		17.0	L		29	10	5	0.5	70	MAT03

Comet Bradfield (1979l) Cont.

DATE (UT)	MAG. R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 06.43	8 :	15.0	L		33	3	1			TAK03
1980 02 06.43	7 :	5.0	B		7	20	2			NIH
1980 02 06.43	7.5	17.0	L		29	10	5	0.5		WAS
1980 02 06.44	7.5:	10.0	L		20	10	3			TOK
1980 02 06.44	8.0	15.0	L		22	8	2			KOD
1980 02 06.44	7.8	10.0	L		25	10	3			SHI
1980 02 06.45	7.3	5.0	B		7	10				YAM02
1980 02 06.45	7.8:	15.0	L		24	10	1			YON
1980 02 06.45	8.4	15.0	L		28	10	5			NOG
1980 02 06.46	7.5	16.0	L		40	15	2			TOM
1980 02 06.47	7.8	16.0	L		31	11	3/			MIT
1980 02 06.47	7 :	10.0	L		55	6	3			TSU
1980 02 06.50	6.7	3.5	B		7	7	4			SUZ
1980 02 06.50		21.0	L		33			0.17		SUZ
1980 02 06.50	8.1	20.0	L		40	6				KOB
1980 02 06.54	6.8	3.5	B		7	8				YOK
1980 02 06.56	6.9	20.0	L		28	10	4			SAT
1980 02 07.44	8.3	10.0	L		55	15	2			NIH
1980 02 07.45	8 :	15.0	L		24	> 5	1/			YON
1980 02 07.48	6.7	10.0	L		40	8	1			HON
1980 02 07.50	8.0	5.0	B		7	10				YAM02
1980 02 07.51	8.5	15.0	L		28	7	3			NOG
1980 02 07.51	8.5:	25.0	L		50	20	2	0.50		UOM
1980 02 07.52	7.0	21.0	L		33	6	4	0.10		SUZ
1980 02 07.54	7.8	20.0	L		31	15	3			NAK
1980 02 07.55	7.6	3.5	B		7	6				YOK
1980 02 08.41	6 :	13.0	L		20	6				OOS01
1980 02 08.43	8.5:	10.0	L		20	10	2			TOK
1980 02 08.44	7.9	15.0	L		32	6				OKA03
1980 02 08.46	8.2	5.0	B		7	7	2			YAM02
1980 02 08.46	8 :	16.0	L		40	15	1			TOM
1980 02 08.47	7.8	17.0	L		29	8	4	0.3		WAS
1980 02 08.54	8.4	20.0	L		32	5	5			OOK
1980 02 08.55	8.0	3.5	B		7	5				YOK
1980 02 08.56	8.2	7.0	B		10	8	5			YAS
1980 02 09.44	8 :	10.0	L		20	8	4			TOK
1980 02 09.44	8.0	15.0	L		32	10	4			OKA03
1980 02 09.46	8.4	16.0	L		31	7	4			MIT
1980 02 09.49	9 :	25.0	L		50	&20	3	0.10		UOM
1980 02 09.49	8.6	20.0	L		32	5	5			OOK
1980 02 09.52	7.6	21.0	L		33	7	4	0.20		SUZ
1980 02 09.53	7.7	6.0	R		18	10	2			NAK01
1980 02 09.53	8 :	7.0	B		10	20	3			ASA
1980 02 09.53	8.8	16.0	L		40	12	2			TOM
1980 02 09.54	8.3	5.0	B		7					YAM02
1980 02 09.57	8.3	5.0	B		7	8				YOK
1980 02 10.40	8.9	15.0	L		28	7	2			NOG
1980 02 10.44	8.3	10.0	L		20	8	4			TOK
1980 02 10.46	8.6	16.0	L		31	7	3			MIT
1980 02 10.47	8.3	5.0	B		7					YAM02
1980 02 10.47	8.3	7.0	B		10	8	4			YAS

Comet Bradfield (1979l) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 10.51	8.2		12.0	B		20	15	4			ASA
1980 02 10.51	8.8:		15.0	L		24	5				YON
1980 02 10.52	9 :		6.5	R		20	& 5	3			ITO01
1980 02 10.59	8.3		3.5	B		7	10				YOK
1980 02 11.39	9.3		15.0	L		28	5	2			NOG
1980 02 11.42	7.5:		5.0	B		7	6	4			FUK
1980 02 11.42	8.5		15.0	L		24	5				YON
1980 02 11.43	8.3		10.0	L		20	6	4			TOK
1980 02 11.44	9.2		16.0	L		31	8				HIR
1980 02 11.45	8.4		5.0	B		7	6	3			YAM02
1980 02 11.47	8.3		16.0	L		31	7	3			MIT
1980 02 11.47	8.1		6.0	R		18	9	2			NAK01
1980 02 11.48	8.3		3.5	B		7	10				YOK
1980 02 11.48	8.3		7.0	B		10	15	4			ASA
1980 02 11.49	8.6		10.0	L		24	8	6			OCH
1980 02 11.52	8.2		17.0	L		29	8	5	0.2	115	MAT03
1980 02 11.52			17.0	L		29			0.1	75	MAT03
1980 02 11.55	8.3:		10.0	L		40	8	3			OKA04
1980 02 11.58	7.5:		10.0	L		55	5	5			TSU
1980 02 12.44	8.6		10.0	L		24	7.6	4			OCH
1980 02 12.44	9.3:		15.0	L		24	& 4	1/			YON
1980 02 12.46	7.6		6.5	R		19	5	5/			FUK
1980 02 12.47	8.3		6.0	R		18	7	2			NAK01
1980 02 12.49	8.4		7.0	B		10	15	4			ASA
1980 02 12.56	8.3		15.0	L		43	8	3			TAN
1980 02 13.45	8.4		6.0	R		18	8	2			NAK01
1980 02 13.46	8.4		17.0	L		29	8	3			NAK03
1980 02 13.47	8.6		10.0	L		25		2			YAM02
1980 02 13.48	9.0		15.0	L		32	3				OKA03
1980 02 13.48	9.8:		15.0	L		24	3				YON
1980 02 13.49	9.0		20.0	L		32	6	4			OOK
1980 02 13.49	8.6		10.0	L		24	7	4/			OCH
1980 02 13.59	8.5		10.0	L		40	8.5	3			OKA04
1980 02 14.48	8.5		16.0	L		31	5.5	3			MIT
1980 02 14.48	8.7		10.0	L		24	7	4			OCH
1980 02 14.49	10 :		16.0	L		40	8	1/			TOM
1980 02 14.56	8.5		3.5	B		7	8				YOK
1980 02 15.45	10 :		15.0	L		28	4	1			NOG
1980 02 15.47	9.2		20.0	L		32	6	4			OOK
1980 02 15.48	8.7		10.0	L		25		2			YAM02
1980 02 15.49	8.8		17.0	L		29	8	3			NAK03
1980 02 15.49	8.6		15.0	L		43	10	3			TAN
1980 02 16.40	10 :		15.0	L		28	5	2			NOG
1980 02 16.40	10 :		15.0	L		24	& 3.5	1/			YON
1980 02 16.42	8.9		10.0	L		25					YAM02
1980 02 16.48	9.5		16.0	L		31	3.5				HIR
1980 02 16.49	9.3		20.0	L		32	6	4			OOK
1980 02 16.51	9.0		10.0	L		24	7	4			OCH
1980 02 16.51	9.0		15.0	L		32	6	2			OKA03
1980 02 16.52	8.7		3.5	B		7	8				YOK
1980 02 16.53	9 :		21.0	L		33	6	3			SUZ

Comet Bradfield (1979l) Cont.

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 02 16.54	9.1		17.0	L		29	7	2			UED
1980 02 16.58	8.8		17.0	L		29	4.5	4			WAS
1980 02 16.58	10 :		25.0	L		50	&20	2/			UOM
1980 02 17.41	10 :		15.0	L		24	& 4	1/			YON
1980 02 17.44	10.5:		15.0	L		28	4	1			NOG
1980 02 17.45	8.8		6.0	R		18	8	3			NAK01
1980 02 17.46	8.2		10.0	L		30	6				HAR01
1980 02 17.47	9.5		15.0	L		32	5	2			OKA03
1980 02 17.47	8.6		15.0	L		33	8	4			TAN
1980 02 17.48	9.4		10.0	L		24	8	5			OCH
1980 02 17.48	9.0		16.0	L		31	6	3			MIT
1980 02 17.48	9.1		10.0	L		25	5	2			YAM02
1980 02 17.48	9.4		20.0	L		32	7	4			OOK
1980 02 17.49	9.7		16.0	L		31	3				HIR
1980 02 17.50	9.0		20.0	L		31	15	3			NAK
1980 02 18.51	9.3		12.0	B		20	10	3			ASA
1980 02 19.45	10 :		15.0	L		24	3				YON
1980 02 19.45	11 :		15.0	L		28	3	1			NOG
1980 02 19.47	9.3		6.0	R		18	5	2			NAK01
1980 02 19.47	9.3		16.0	L		31	4	2			MIT
1980 02 19.49	8.7		15.0	L		33	6	3			TAN
1980 02 20.46	9.3		6.0	R		18	4.8	2			NAK01
1980 02 20.49	8.7		15.0	L		33	5	2			TAN
1980 02 20.50	10.5:		15.0	L		24	3				YON
1980 02 21.48	9.4		10.0	L		25					YAM02
1980 02 21.49	9.1		15.0	L		33	4	1			TAN
1980 02 21.5	9.5:		7.0	R		30	7				HAR01
1980 02 22.45	9.4		10.0	L		25					YAM02
1980 02 23.52	9.5		15.0	L		43	3	1			TAN
1980 03 10.49	12 :		16.0	L		31	2				MIT
1980 03 16.47	11.5		20.0	L		56	2.5	0/			NAK

Comet Černis-Petrauskas (1980k)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 09 08.04	11.5		32.0	L	6	55	& 2.2	1/			BOR
1980 09 09.04	11.4		32.0	L	6	55	& 2.2	1			BOR
1980 09 12.04	11.6		32.0	L	6	55	& 2	0			BOR

Comet Meier (1980q)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 11 06.97	10.5	P	40.6	R							GRE
1980 11 07.00	9.8	A	25.0	L	7	70	3	2/			MOR
1980 11 07.01	9.6:	A	8.0	B		20					MOR
1980 11 07.97	9.8	A	25.0	L	7	70	3	3			MOR
1980 11 09.03	9.8	A	25.0	L	7	70	3	3			MOR
1980 11 09.04	9.6	A	8.0	B		20	6	2/			MOR
1980 11 09.08	9.5	A	20.3	L	6						GRE
1980 11 12.98	9.5	A	25.0	L	7	70	3.5	4			MOR
1980 11 13.09	9.6	A	20.3	L	6		& 4	3			GRE

Periodic Comet Encke

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 09 16.34	[13.0		32.0	L	6	110	&				BOR
1980 09 19.35	12.7		32.0	L	6	55	3.1	1			BOR
1980 09 27.13	11.7	S	32.0	L		45					MOR02
1980 10 03.11	10.8	S	32.0	L		45					MOR02
1980 10 05.32	12.6:	A	25.0	L	7	140	0.7	2			MOR
1980 10 06.26	10.2		32.0	L	6	55	5	2			BOR
1980 10 08.10	9.9	S	32.0	L		56			0.02		MOR02
1980 10 08.33	10.3	A	25.0	L	7	44	5	3			MOR
1980 10 08.35	9.7		32.0	L	6	55	5	1/			BOR
1980 10 09.32	10.1	A	25.0	L	7	44	5	2/			MOR
1980 10 10.10	9.7	S	7.5	R		35					MOR02
1980 10 10.30	9.7	A	25.0	L	7	44	8	3/			MOR
1980 10 10.34	9.6		32.0	L	6	55	5	2		90	BOR
1980 10 12.35	9.4		32.0	L	6	55	5.5	2		50	BOR
1980 10 12.35	8.4		5.0	B		10	9.5				BOR
1980 10 13.38	8.4		5.0	B		10	9.5				BOR
1980 10 13.38	9.2		32.0	L	6	55	5	3		90	BOR
1980 10 14.34	8.9	A	25.0	L	7	44	8	3			MOR
1980 10 14.35	8.4	A	8.0	B		20	10	3			MOR
1980 10 20.36			32.0	L	6	55		4		90	BOR
1980 10 20.36	7.7		5.0	B		10	12				BOR
1980 10 21.10	7.8	S	7.5	R		35		3			MOR02
1980 10 21.39	7.5	A	8.0	B		20	12	3/			MOR
1980 10 22.39	7.4	A	8.0	B		20	11				MOR
1980 10 22.41			32.0	L	6	55		4		70	BOR
1980 10 22.41	7.5		5.0	B		10	13				BOR
1980 10 26.05	6.8	S	7.5	R		45				40	MOR02
1980 10 28.05	6.7	S	7.5	R		35			0.50	42	MOR02
1980 11 01.39	6.8		5.0	B		10	7				BOR
1980 11 01.39			32.0	L	6	55		5	0.25	85	BOR
1980 11 02.37			25.0	L	7	70			0.16	300	MOR
1980 11 02.37	6.6	A	5.0	B		12	11	4			MOR
1980 11 02.37			25.0	L	7	70			0.03	80	MOR
1980 11 02.37			25.0	L	7	70		4/	0.16	90	BOR
1980 11 02.37	6.7		5.0	B		10	10				BOR
1980 11 02.37			25.0	L	7	70			0.08	300	BOR
1980 11 03.40	6.8	A	8.0	B		20	10				MOR
1980 11 06.41	6.7	A	8.0	B		20	10	4			MOR
1980 11 06.41	6.9	S	8.0	B		20					GRE
1980 11 09.42	6.2	S	8.0	B		20	&15		&0.83	290	GRE
1980 11 09.42	6.6	S	8.0	B		20	11	5/	0.42	340	MOR

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UNIVERSAL TIME (UT): This time based on the Greenwich meridian is used throughout the ICQ; it is 24-hour time, from midnight to midnight. In North America, add the following numbers to standard times to convert to UT: EST, 5; CST, 6; MST, 7; PST, 8. For daylight savings time, add 4, 5, 6, and 7 hours, respectively.

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Periodic Comet Honda-Mrkos-Pajdušáková (1969 V = 1974 XVI = 1974f)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1969 09 10.40	8.3		5.1	R							BOR
1969 09 12.40	8.3		5.1	R							BOR
1969 09 14.40	8.0		5.1	R							BOR
1969 09 21.40	8.1		5.1	R							BOR
1974 11 15.91	[12.0	A	32	L	6	146					BOR
1974 12 04.91	10.4	D	32	L	6	55	1.6	1			BOR
1974 12 07.10	9.7		25.4	L	8	80	& 3	2			TRU
1974 12 08.09	9.5		25.4	L	8	80	& 2	2			TRU
1974 12 09.96	9.9	J	32	L	6		1.5	1/			BOR
1974 12 10.0	9.8:	S	15	L	4	24	& 1.5				MOR
1974 12 10.01	11.0:		15.2	R	5		& 3	0			SHE
1974 12 11.96	8.9	S	5.0	B		20	2.5	0	0.17	280	MAT02
1974 12 13.02	10.8:		15.2	R	5	60	3	0			SHE
1974 12 14.02	10.8:		15.2	R	5	60	3	0			SHE
1974 12 14.99	9.3	S	20.3	L	6		& 2.5				GRE
1974 12 16.01	9.2	S	15.2	R	5		5	0			SHE
1974 12 16.09	9.2	I	25.4	L	8	80	& 1	2/			TRU
1974 12 16.99	9.2	S	20.3	L	6		& 2.5	3/			GRE
1974 12 17.06	9.5:		11	L	10	140	1.5	0			WAL
1974 12 18.01	8.8	S	20.3	L	5		2	2			SIM
1974 12 18.05			11	L	10	90	1.3	0			WAL
1974 12 18.05	9.0	S	11	L	10	40	1.7	0			WAL
1974 12 18.96	8.9	J	32	L	6	55	1.8	4/			BOR
1974 12 18.99	9.2	S	20.3	L	6						GRE
1974 12 19.00	9.0	S	10.0	B		14		0			SIM
1974 12 19.98	9.1	S	20.3	L	6		& 3				GRE
1974 12 20.09	9.1	S	25.4	L	8	80	& 1.5	2/			TRU
1974 12 21.71	9.3	S	15.2	L	8	30	& 1.25				MUH
1974 12 21.99	9.0	S	20.3	L	6		& 2.5	3			GRE
1974 12 22.72	9.2	S	15.2	L	8	30	& 1.25				MUH
1974 12 22.95	8.8:	S	32	L	6						BOR
1974 12 22.96	8.1	S	5.0	B		20	3	2	0.22	270	MAT02
1974 12 23.08	9.0	S	25.4	L	8	80	& 1.75	3			TRU
1974 12 25.09	8.9		25	L	6		& 4				COM01
1974 12 26.96	8.6:	S	32	L	6	65	& 0.8	2/			BOR
1974 12 28.95	8.3	S	32	L	6	65	0.8	3			BOR
1974 12 28.98	8.5	S	20.3	L	6		& 3.5				GRE
1974 12 30.09	8.3:		25	L	6	34	& 5				COM01
1974 12 30.95	8.0	D	32	L	6	55	1.4	4/		90	BOR
1974 12 30.95	7.8	D	8.0	B		15	3.1				BOR
1974 12 30.95	8.0	S	5.0	B		20	& 3	3	0.17	270	MAT02
1974 12 30.96			15.2	L	7	56	& 2.5	2			MCC01
1975 01 01.00	7.8:	A	20.3	L	6		& 6				GRE
1975 01 01.06	8.0	S	11	L	10		2	2/			WAL
1975 01 01.98	7.7	A	20.3	L	6		& 5				GRE
1975 01 02.95	7.7	D	8.0	B		15	2.0				BOR
1975 01 02.95	7.6	D	15	L	4		2.0	5/			BOR
1975 01 02.95	7.8	D	32	L	6		1.2	4		75	BOR
1975 01 02.96	7.9	S	5.0	B		20	3	9	&0.25	280	MAT02
1975 01 02.97	8.0	T	10.8	L	10	45	4	1			DIL
1975 01 02.99	7.8	A	20.3	L	6		6				GRE

Periodic Comet Tuttle (1980h)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 09 27.11	11.0	B	32.0	L		56					MOR02
1980 10 03.10	10.6	S	32.0	L		56					MOR02
1980 10 08.09	10.4	S	32.0	L		56					MOR02
1980 10 08.37	11.5		32.0	L	6	88	1.6	1			BOR
1980 10 09.35	11.6	A	25.0	L	7	70	1.5	2			MOR
1980 10 10.33	11.4	A	25.0	L	7	70	2.5	3			MOR
1980 10 10.37	11.1		32.0	L	6	65	1.5	3			BOR
1980 10 14.37	10.6	A	25.0	L	7	44	2.5	3			MOR
1980 10 21.11	9.6	S	32.0	L		56		4			MOR02
1980 10 22.39	9.7		32.0	L	6	55	4.0	4			BOR
1980 11 01.25	8.6	A	8.0	B		20	6	3			MOR
1980 11 01.25	8.6	S	8.0	B		20	& 4				GRE
1980 11 01.40	8.8		32.0	L	6	55		4			BOR
1980 11 01.40	8.6		8.0	B		20	6.0				BOR
1980 11 01.40	8.5		5.0	B		10	6.0				BOR
1980 11 02.38	8.4		8.0	B		20	6.0	4			BOR
1980 11 02.40	8.4	A	8.0	B		20	8	4			MOR
1980 11 03.24	8.3	A	8.0	B		20	6	4			MOR
1980 11 06.38	8.2	A	8.0	B		20					GRE
1980 11 06.38	8.2	A	8.0	B		20	8	5			MOR
1980 11 09.25	7.9	A	8.0	B		20	7	5			MOR
1980 11 09.28	8.3:	A	8.0	B		20					GRE
1980 11 09.30	8.1	A	8.0	B		20	& 8.5				GRE
1980 11 13.39	7.3:	S	8.0	B		20	&11				GRE
1980 11 13.42	7.4:	S	8.0	B		20	&10				MOR

Periodic Comet Schwassmann-Wachmann I (1974 II)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1979 10 22.76	12.5		20.0	L		49	1.7	2			KAN01
1979 10 22.78	12 :		20.0	L		84	0.3	5			NAK
1979 10 30.80	12 :		16.0	L		31	1	3			MIT
1979 11 01.80	12.5		20.0	L		56	0.7	2			NAK
1979 12 10.60	12.3		16.0	L		80	1.5	3			MIT
1979 12 12.57	12.5		16.0	L		80	1.5	2			MIT
1979 12 14.62	12.5		16.0	L		80	1.5	3			MIT
1979 12 15.75	11.3		20.0	L		56	1.4	4			NAK
1979 12 15.78	12.0		16.0	L		80	1.5	3			MIT
1979 12 16.69	11.3		20.0	L		56	1.3	4			NAK
1979 12 16.72	11.2		18.0	L		85	1.2	2/			KAJ
1979 12 16.83	11.8		16.0	L		80	1.5	3			MIT
1979 12 20.60	12.3		16.0	L		80	1.5	3			MIT
1979 12 25.62	12.3		16.0	L		80	2	3			MIT
1979 12 25.82	11.6		20.0	L		56	2.0	3			NAK
1980 01 16.72	12.0		20.0	L		56	2.5	2			NAK
1980 02 15.65	12.7		20.0	L		56	0.8	2			NAK
1980 02 17.54	12.7		20.0	L		56	0.8	2			NAK

Periodic Comet Stephan-Oterma (1980g)

DATE (UT)	MAG.	R	AP.	T	F/	PWR	COMA	DC	TAIL	PA	OBS.
1980 09 07.35	13.1		32.0	L	6	110	0.9	0/			BOR
1980 09 09.35	13.1		32.0	L	6	88	0.8	3			BOR
1980 09 11.37	12.8		32.0	L	6	88	1.1	3			BOR
1980 09 16.36	12.4		32.0	L	6	65	1.2	3			BOR
1980 09 16.38	12.5	A	25.0	L	7	70	1.5	1/			MOR
1980 09 19.37	12.3		32.0	L	6	88	1.1	5		180	BOR
1980 09 19.38	12.1	A	25.0	L	7	70	1.5	3/			MOR
1980 10 06.25	11.1		32.0	L	6	65	1.9				BOR
1980 10 08.34	11.2		32.0	L	6	65	1.7	5		180	BOR
1980 10 08.35	11.0	A	25.0	L	7	70	2	5			MOR
1980 10 09.34	10.9	A	25.0	L	7	70	2	6			MOR
1980 10 10.35	11.3:	A	25.0	L	7	70	& 1	6			MOR
1980 10 10.40	10.9		32.0	L	6	65	& 1.5	5			BOR
1980 10 13.39	10.8		32.0	L	6	65	1.5	4			BOR
1980 10 14.30	10.7:	A	25.0	L	7	70	& 1.5	6			MOR
1980 10 20.37	10.5		32.0	L	6	65	2.0	5			BOR
1980 10 21.39	9.8	A	25.0	L	7	70	3	6			MOR
1980 10 22.40	9.5	A	8.0	B		20	5	4			MOR
1980 10 22.42	10.3		32.0	L	6	65	1.7	5/		180	BOR
1980 10 30.15	9.3	A	8.0	B		20					MOR
1980 10 30.15	9.7	A	25.0	L	7	70	3	6			MOR
1980 10 31.16	9.8		32.0	L	6	65	2.1	7		180	BOR
1980 10 31.17	9.5	A	25.0	L	7	70	4	6	0.25	225	MOR
1980 10 31.17			25.0	L	7	70			0.17	180	MOR
1980 11 01.20	9.3	A	8.0	B		20	& 4				GRE
1980 11 01.21	9.6	A	25.0	L	7	70	3	5/	0.33	225	MOR
1980 11 01.21	9.2	A	8.0	B		20	5	4			MOR
1980 11 01.21			25.0	L	7	70			0.25	180	MOR
1980 11 01.41	9.8		32.0	L	6	65	2.0	6			BOR
1980 11 02.38	9.6	A	25.0	L	7	70	2.5	6/			MOR
1980 11 03.20	9.3	A	25.0	L	7	70	2.5	6/			MOR
1980 11 03.22	9.0	A	8.0	B		20	6	4			MOR
1980 11 06.13	9.0	A	8.0	B		20					GRE
1980 11 06.14	8.9	A	8.0	B		20	7				MOR
1980 11 06.14	9.2	A	25.0	L	7	70	2.5	6/	0.08	225	MOR
1980 11 06.40	8.9	A	8.0	B		20					GRE
1980 11 09.22	9.0	A	20.3	L	6					215	GRE
1980 11 09.22	9.0	A	25.0	L	7	70	2	6/	0.17	270	MOR
1980 11 09.23	8.8	A	8.0	B		20	7	4			MOR
1980 11 09.24	8.9:	A	8.0	B		20					GRE
1980 11 13.15	7.5	A	8.0	B		20	&13			90	GRE
1980 11 13.16	7.7	A	8.0	B		20	14	2/			MOR
1980 11 13.18	7.3:	A	5.0	B		12	&18				MOR
1980 11 13.18	7.5:	A	5.0	B		12	&15				GRE

RECENT NEWS CONCERNING COMETS

(Continued from page 68)

P/Kohoutek 1980j was also recovered by Schuster at the ESO in Chile on exposures made August 6 and 7, with total magnitude about 19. (cf. IAUC 3499.)

Comet 1980l was discovered by Kenneth S. Russell of the United Kingdom (U.K.) Schmidt Telescope Unit in Australia as a 17th-magnitude fuzzy trail with signs of a tail on plates exposed September 6 and 7. Elements by Brian Marsden [IAUC 3524] indicate that perihelion will occur on 1981 March 6 at the large distance of 2.1 AU (e = 1.0).

P/Harrington was recovered by P. Jekabsons at Perth Observatory in Australia on exposures taken September 4, 8, and 9. The object was of total magnitude 18-19, and was given the designation comet 1980m by the Central Bureau. This is the third apparition of this comet, which was originally discovered in 1953; it has a period of about 6.8 years (q = 1.58, e = 0.56, from Marsden's Catalogue of Cometary Orbits, 1979).

Jekabsons also recovered P/Reinmuth 2 on photographs taken the 10th and 11th of the same month; named comet 1980n, the diffuse, condensed 18th-magnitude object was close to the ephemeris on MPC 5043. This is the sixth appearance of this comet, initially discovered in Heidelberg, Germany, by Karl Reinmuth in 1947; the object orbits the sun every 6.7 years. Computations by Marsden indicate that comet 1980n will reach perihelion on 1981 January 29 at a distance of 1.946 AU (cf. MPC 4773).

Russell discovered yet another comet on a photograph taken by J. Barrow on September 28, this one also of 17th magnitude. Comet Russell 1980o was found by Marsden to be a periodic comet [IAUC 3523]. Elements by M. P. Candy, Perth Observatory, indicate a period of 7.1 years and an eccentricity of 0.416. Perihelion occurred around 1980 May 19 at a distance of 2.16 AU. This object is also fading as it recedes from both the sun and earth.

The designation "comet 1980p" was given erroneously to a cometary suspect found by E. Helin and R. S. Dunbar from exposures taken at Palomar in California.

Schuster recovered periodic comet West-Kohoutek-Ikemura as an essentially-stellar object on a plate exposed Nov. 12; named comet 1980r, this object will not become brighter than about magnitude 18 [cf. IAUC 3538]. This is the first apparition of this comet since its discovery; it was known as comet 1975 IV, and has a period of 6 yrs.

--D.W.E.G. (1980 Nov. 14)

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CHART FOR OBSERVING P/COMET STEPHAN-OTERMA (1980g)

On page 87 of this issue is published Chart 59 from the new American Association of Variable Star Observers (AAVSO) Variable Star Atlas (see page 88), with the path of P/Comet Stephan-Oterma 1980g plotted on the chart. This is a good example to note how one can make magnitude estimates of comets (and asteroids and variable stars!) quite easily with such an aide. The path of the comet is plotted until mid-December, when it leaves the range of Chart 59. Decimal points are omitted from stellar magnitudes on the chart, with magnitude values given to tenths of a magnitude (i.e., "65" = "6.5").

The chart on page 87 is published courtesy of Janet Mattei and the AAVSO, and of Leif Robinson and Sky Publishing Corporation.

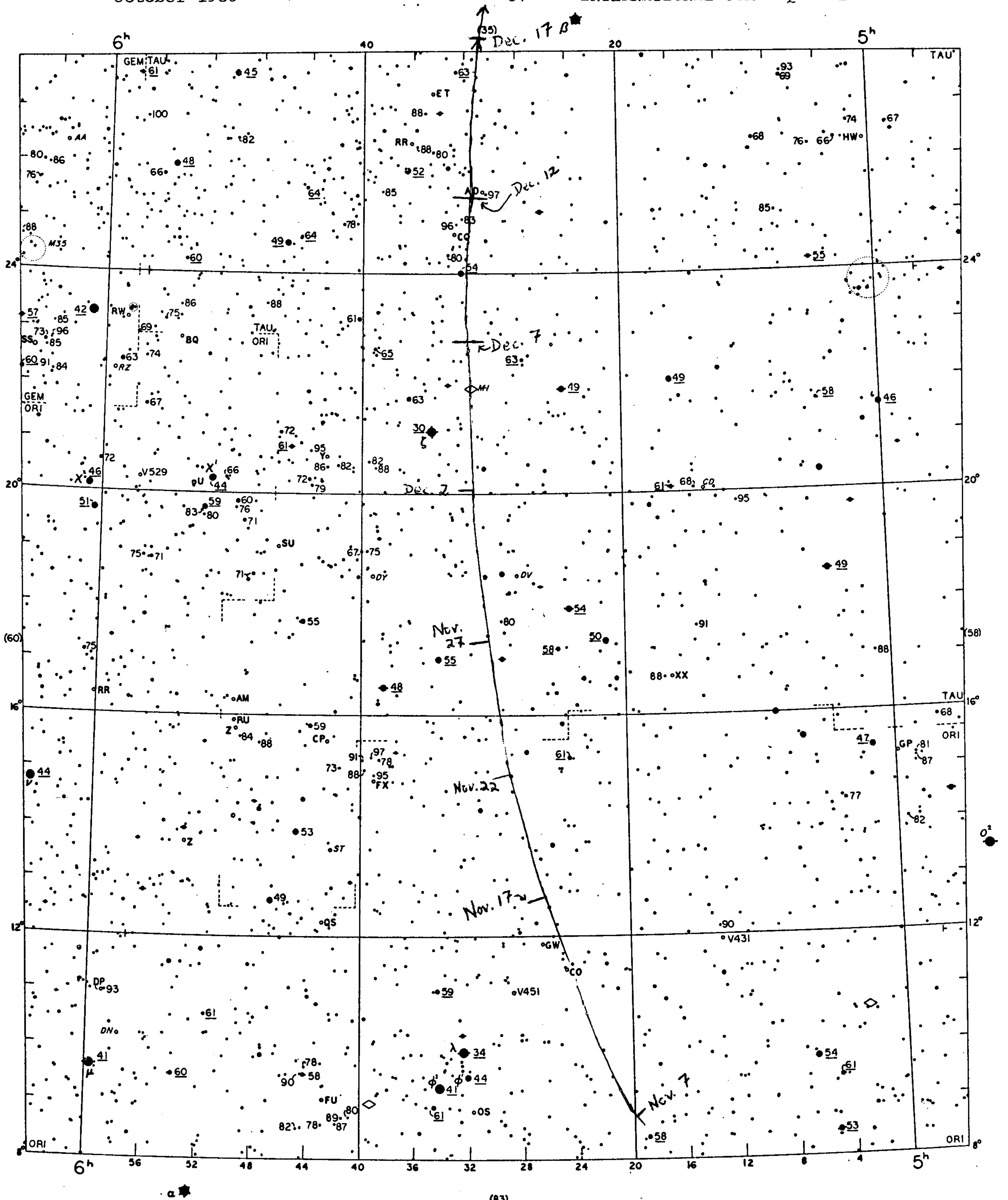

CHART 59

P/Stephan-Oterma's Path through Taurus in Late 1980

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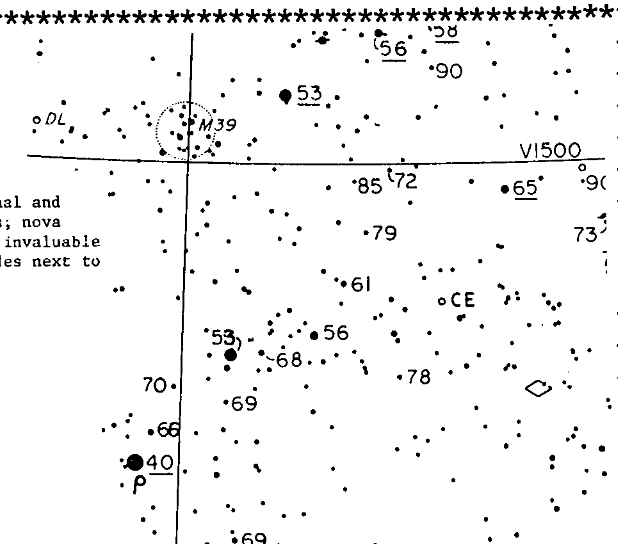
AAVSO VARIABLE STAR ATLAS

Prepared by Charles E. Scovil



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