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LONG-TERM OPTICAL VARIATIONS OF 20 VIOLENTLY VARIABLE EXTRAGALACTIC RADIO SOURCES

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ABSTRACT

Photometric data for 20 optically violent variable extragalactic radio sources have been obtained during a continuous 11-year monitoring program. Light curves and photometric data, in some instances in more than one color, are presented and discussed. Evidence of temporal changes in the variability characteristics of particular sources is examined.

I. INTRODUCTION

Since 1968 photographic observations of more than 200 quasars, BL Lac objects, and compact galaxies have been carried on at Rosemary Hill Observatory with the 76- and 46-cm reflectors. Results of the initial seven years of this program were reported by McGimsey *et al.* (1975) and Scott *et al.* (1976), hereafter referred to as Paper I and Paper II, respectively. Paper I presented data for the optically violent variables, or OVVs, in the program at that time. As defined by Penston and Cannon (1970), OVVs exhibit changes of a magnitude or more on a time scale of days or weeks.

The present paper updates, improves, and supplements the data presented in Paper I, extending the completely re-reduced light curves an additional four years. Five of the marginal OVVs from Paper I have not been retained, since extended monitoring has failed to confirm that they currently belong in this class. Five new objects, AO 0235+164, OE 110, NRAO 190, B2 1308+326, and NRAO 530, have been added. It should be emphasized that some known OVVs (e.g., 3C 279, PKS 1510−08, B2 1101+38), while included in our monitoring program, are not included in this paper because they have not shown OVV activity in our observations. Such objects, together with the remaining (non-OVV) sources on the Rosemary Hill program, will be the subject of a subsequent paper.

II. OBSERVATIONS

Most exposures are made at the f/4 Newtonian focus of the 76-cm reflector. However, many plates of the brighter sources were obtained at the f/10.5 Cassegrain focus of the 46-cm reflector. Simultaneous exposure tests using the two telescopes reveal no systematic differences in magnitude for stellar objects. For objects with significant nonstellar components (PKS 1514−24, 3C 120) the f/4, 30-in. exposure times have been adjusted, by careful empirical tests in each case, to record only the stellar component, and again these show no significant systematic differences with the 46-cm data (in a series of such tests the true nuclear magnitude is approached asymptotically as the exposure time is reduced). Objects are monitored using one or more of the following plate/filter combinations, which yield, respectively, m_{pg}, U, B, V, or I magnitudes.

- $m_{\rm pg}$: unfiltered, nitrogen-baked and hydrogen soaked Kodak 103a-0 plates (Scott and Smith 1976) or unfiltered, forming-gas-baked Kodak IIIa-J plates (Scott *et al.* 1977).
- U: 103a-0 (treated as above) + UG-2 filter
- B: 103a-0 (treated as above) + GG-385 filter
- V: nitrogen-baked or hydrogen-soaked Kodak IIa-D plates (Schoening 1977) + GG-495 filter
- I: forming-gas-baked Kodak I-N (Scott *et al.* 1977) + RG-695 filter. (Some early I-N plates were ammonia hypersensitized.)

All plates are exposed in sealed cassettes that have been flushed with dry nitrogen to prevent changes in sensitivity due to atmospheric oxygen and moisture. All plates are developed 9^{m} in MWP-2 (Difley 1968).

III. DATA REDUCTION

Comparison sequences from the literature were used whenever possible. In other cases, sequences were calibrated by photographic transfer from nearby standard fields such as well-calibrated clusters or Selected Areas (SAs). For some of the m_{pg} calibrations the photometry by Brun (1957) of the Mount Wilson Selected Areas was used. In view of the zero-point errors found by Stebbins *et al.* (1950) in the original Mount Wilson photometry, until a similar study of the Brun photometry is done some reservation must be attached to the resulting photographic magnitudes. For all but five objects (PKS 0420-01, NRAO 190, NRAO 530, OX 074, and PKS 2345-16) the original Brun-calibrated magnitudes have been put on the B system by employing an empirically determined $B - m_{pg}$ correction obtained by using a more

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TABLE I. Positional and variability subclass data for the 20 sources.

Object	α(1950.0)	δ(1950.0)	Subclass
AO 0235+164	$02^h35^m52\overset{s}{.}6$	+16°24′05″	I?
OE 110	$03^h06^m20\overset{s}{.}7$	+10°17′56″	III
PKS 0420−01	$04^h20^m43\overset{s}{.}1$	−01°27′32″	IV
3C 120	$04^h30^m31\overset{s}{.}6$	+05°14′53″	II[a]
NRAO 190	$04^h40^m04\overset{s}{.}7$	−00°23′16″	III
PKS 0735+17	$07^h35^m14\overset{s}{.}3$	+17°49′12″	III
OJ 287	$08^h51^m57\overset{s}{.}5$	+20°18′00″	II
PKS 0906+01	$09^h06^m35\overset{s}{.}7$	+01°33′53″	I
ON 231	$12^h19^m01\overset{s}{.}1$	+28°30′36″	I
B2 1308+326	$13^h08^m08\overset{s}{.}2$	+32°36′54″	III
PKS 1514−24	$15^h14^m45\overset{s}{.}0$	−24°11′20″	I
NRAO 512	$16^h38^m49\overset{s}{.}0$	+39°53′00″	III
3C 345	$16^h41^m17\overset{s}{.}7$	+39°54′11″	IV[a]
NRAO 530	$17^h30^m13\overset{s}{.}4$	−13°02′46″	?
3C 371	$18^h07^m18\overset{s}{.}3$	+69°48′56″	III
OX 074	$21^h44^m43\overset{s}{.}2$	+09°15′43″	III
BL Lac	$22^h00^m39\overset{s}{.}0$	+42°02′08″	I
3C 446	$22^h23^m10\overset{s}{.}5$	−05°12′23″	III[a]
3C 454.3	$22^h51^m29\overset{s}{.}2$	+15°52′54″	I[a]
PKS 2345−16	$23^h45^m27\overset{s}{.}2$	−16°48′11″	IV

[a] Subclass change from Paper I.

recently calibrated *B*-sequence in the object field and making near-simultaneous exposures in both systems. In all but one case (PKS 0735+17), these corrections fall in the range expected for typical UV-excess objects (+0.2 to +0.6). While in principle the $B - m_{pg}$ parameter might be a function of epoch for variable objects, our experience indicates that in practice such changes fall within the normal errors of the measurements.

Calibration of comparison sequences in the I bandpass presents a more difficult problem. Photographic transfer is employed whenever there is a suitable set of photoelectric standards sufficiently near the field of interest. However, the extreme paucity of standard I sequences (as opposed to individual stars), combined with their generally bright (I < 14.0) limiting magnitudes, often makes satisfactory transfers of this type difficult or impossible. An alternative exists when a photoelectric *U, B, V* sequence has been established in the field of the object. Johnson *et al.* (1966) tabulated colors (*U–V, B—V, V–R, V–I,* etc.) for nearly 5000 stars of various spectral types and luminosity classes. Thus, given the *U–V* and *B–V* colors, the *V–I* color (and hence the *I* magnitude) of the star can be estimated if the *U–V* and *B–V* values are represented in their table. These Johnson *I* magnitudes can then be converted to the Kron system (I_K) using a known relation between the *B–V* color and the difference between I and I_K. Caution must be exercised if reddening becomes a factor, and stars whose colors make it difficult to establish their luminosity class must be avoided. Reddening is generally not a problem at the high galactic latitudes of most compact sources, and we have found we can estimate *V–I* colors, in general, to $\pm0\overset{m}{.}1$ with this technique, which is adequate for our purpose in view of the smoothing that occurs during actual data reduction.

Plates are read on a Cuffey iris astrophotometer, and preliminary reductions are carried out on a Commodore PET microcomputer. The PET uses a cracovian least-squares routine (Banachiewicz 1942) to fit a parabolic curve to the comparison star magnitudes and the iris readings.

Final magnitudes are obtained with an Amdahl 470/V6 computer that employs a similar least-squares routine. The computed calibration curve for each plate is displayed graphically to insure that it is of the appropriate form (linear for well-exposed stars, but becoming asymptotic to the sky background as the plate limit is approached). This precaution is of most importance when the object is near the plate limit and/or when a small extrapolation of the calibration curve is necessary. The reduction program is iterative, smoothing the reference sequence to correct for errors in the initial magnitudes and for field errors in the telescope. The error quoted in Table II is the rms scatter of the comparison-star magnitudes around the calibration curve, which we adopt as a measure of the quality of the individual plate. A detailed description of the statistical methods employed in this and earlier papers is given by Penston and Cannon (1970).

All data, going back to 1968, have been re-reduced for the present paper to take advantage of the additional smoothing of reference sequences permitted by adding four years of data, to allow for the use of new or extended sequences that have become available since Paper I, and to facilitate the use of computer plotting routines for error-free generation of the light curves. In a number of cases, questionable data points have been re-examined, even to the re-reading of old plates. Thus the light curves have been extended, not only in time, but also in accuracy.

IV. RESULTS

The 20 OVVs are listed in Table I with their 1950.0 co-ordinates and their variability subclass (for a discussion of these subclasses, see Sec. V). References to finder charts are given for all these objects by Veron and Veron (1975), except for OE 110, whose finder is given in Leacock *et al.* (1976). The results of the observations are given in Table II as follows: col. 1, the UT date of the observation; col. 2, Julian Date—2,400,000 for the midpoint of the exposure; col. 3, the observed magnitude; col. 4, the rms error of the observation; col. 5, the magnitude system; plates taken in m_{pg} are denoted by a *P*.

The light curves of each of the objects are presented in Fig. 1. The length of the error bars is $\pm\bar{\sigma}$, where $\bar{\sigma}$ is the average rms error for that object in that color. For sources that had been observed during different epochs in both *B* and m_{pg}, the m_{pg} points were put on the *B* system using an empirically determined correction. Where four or more observations were made on a single night, an average of these points was plotted. The light curves are in order of right ascension with the exception of B2 1308+326 and AO 0235+164, which appear in Figs. 1(a) and 1(f), respectively, in order to conserve space.

The 20 sources are considered individually in the following remarks. Pertinent related work on the objects, and the light curve itself, are discussed. Also, the method and source of the calibration are indicated in each case.

AO 0235+164. This BL Lac object is one of the most violent variables known, both in terms of its large amplitude and its short time scale. Reike *et al.* (1976) recorded a maximum of $B = 15.25$ during the 1975 outburst. On the Palomar Sky Survey print of December 1, 1951 it is very faint ($B \geq 20.5$), yielding a total known range of about $5\overset{m}{.}3$.

AO 0235+164 has been monitored at Rosemary Hill since 1977, during which time it showed four distinct peaks, including a recent outburst nearly as bright as that in 1975. Two smaller events of $1\overset{m}{.}7$ and $1\overset{m}{.}0$ occurred during late 1978, had maxima separated by about 50 days, and were precursors to the major outburst. In 31 days during the latest flare the source brightened from $18\overset{m}{.}26$ to $15\overset{m}{.}45$, and then declined $2\overset{m}{.}3$ to $17\overset{m}{.}77$ in just 12 days. It is possible that the rise time was significantly less than 31 days since there was a three-week hiatus in the observations at the start of the year. In any event, both the rise to maximum and the decline were significantly steeper than those recorded by Rieke *et al.* (1976), although the decline in 1975 was incompletely observed. From archival data Liller and Eachus (1975) found only one definite outburst ($B = 15.8$, 1939–1940). In this case, however, the object remained brighter than 17th magnitude for between 100 days and a year. Such prolonged activity is not indicated in the most recent event, as our latest data (3/15/79) show the source at about $17\overset{m}{.}7$. While this is $2\overset{m}{.}5$ fainter than the recorded maximum it is also $2\overset{m}{.}7$ brighter than the known minimum, indicating that the object is far from quiescent at this point. Plates were reduced using the photoelectric reference stars of Rieke *et al.* (1976) and McGimsey *et al.* (1976).

OE 110. The optical counterpart of the Ohio radio source OE 110 was identified at Rosemary Hill as an optically variable BL Lac object by Leacock *et al.* (1976). Archival studies by Miller (1977) showed the object as bright as $B = 16.0$ in 1940 and revealed $4\overset{m}{.}5$ variability on a time scale of a year or less. OE 110 declined rapidly from its late-1975 maximum ($1\overset{m}{.}8$ in 66 days). A second outburst and decline ($1\overset{m}{.}8$ in 59 days) during late 1976 showed an almost identical decay rate, averaging about $0\overset{m}{.}03$/day. OE 110 has continued to fade slowly, and of five plates taken during 1978, none yielded reliable magnitudes, implying that the object is currently no brighter than 20th magnitude. The data in in Table II include both unfiltered IIIa-J exposures (necessary when the object is faint) and GG-385-filtered 103a-O plates. An empirically determined correction ($B - m_{pg} = 0\overset{m}{.}30$) was used to place the unfiltered magnitudes on the *B* system. A *B* comparison sequence for OE 110 was calibrated by photographic transfer from SA 71, using the p.e. magnitudes of Purgathofer (1969).

PKS 0420-01. At the time Paper I was completed, PKS 0420-01 was undergoing a two-magnitude outburst. At this writing it has just declined to its base level from an even larger outburst during 1977–1978. Dent *et al.* (1979) proposed a correlation between the 1974–75 optical event and a recently recorded radio outburst at 15.5 GHz. The time delay between these two events was 2.2 ± 0.2 years. In view of the similarity between the most recent outburst and the 1974–1975 flare, a second radio outburst might be expected during 1980; detection of such an event would be strong evidence in support of the association proposed by Dent *et al.* The comparison sequence was calibrated by photographic transfer from SA 99.

3C 120. The Florida long-term light curve of 3C 120 shows a continued decline in average brightness by about one magnitude since 1972. Superimposed are short-term fluctuations of up to one magnitude. Reike and Lebofsky (1979) found a similar long-term decline in the infrared region between 1.6 and 3.5 μm, with the infrared flux declining by a factor of three between 1972 and 1978. The Rosemary Hill comparison sequence was selected from the p.e. standards of Kinman (1968) and Angione (1971).

NRAO 190. In Paper II NRAO 190 was considered to be a marginal OVV, based on the 11 rather widely spaced data points available at that time. More intensive recent observations have shown this source to be extremely active, exhibiting at least three two-magnitude outbursts. The nature of the recent light curve makes it likely that some events were missed in the earlier years. Three recent plates indicate yet another very rapid flare. The source was recorded at $19\overset{m}{.}03$ on 12/30–31/78,

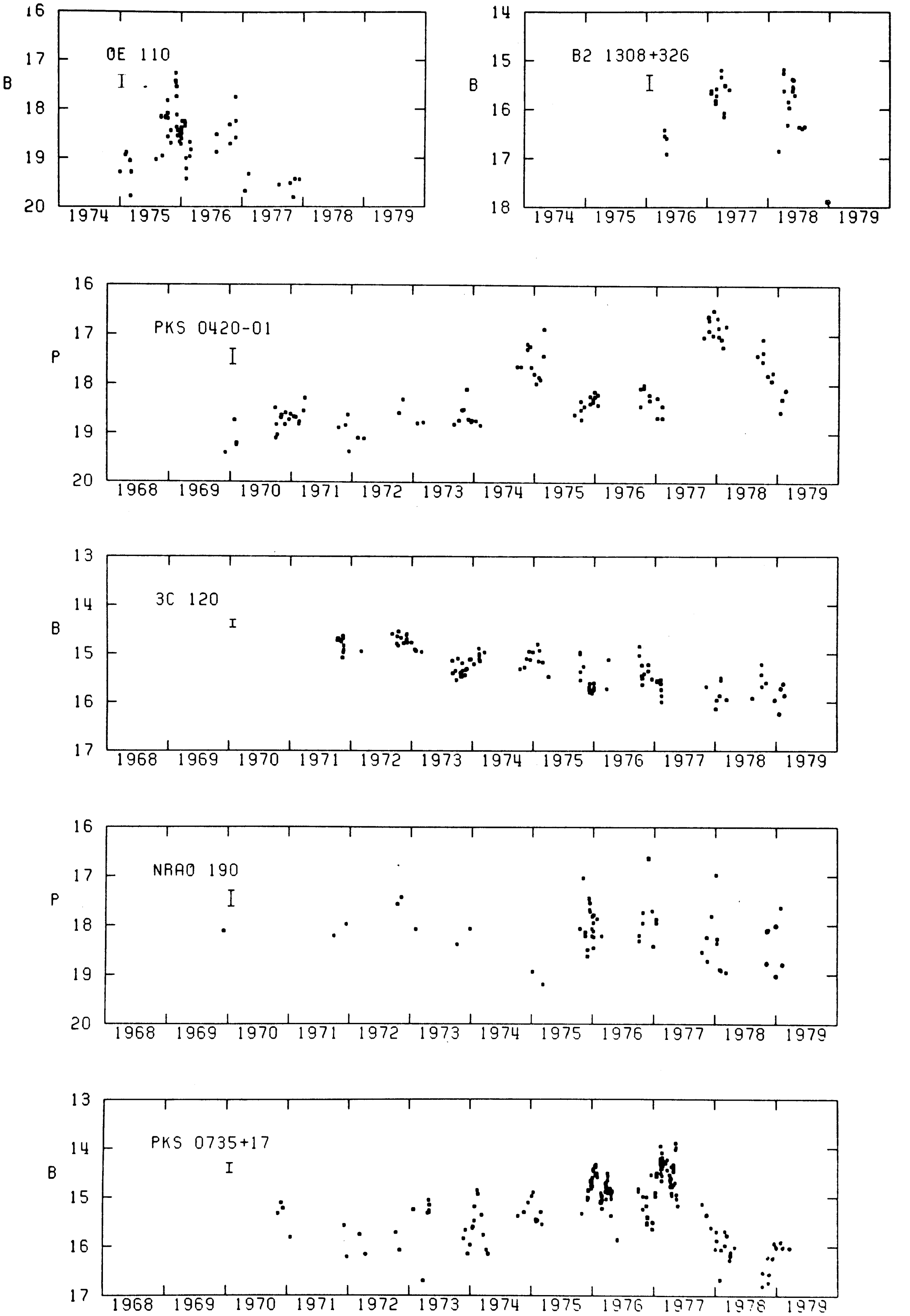

FIG. 1(a). Light curves of 20 OVV sources.

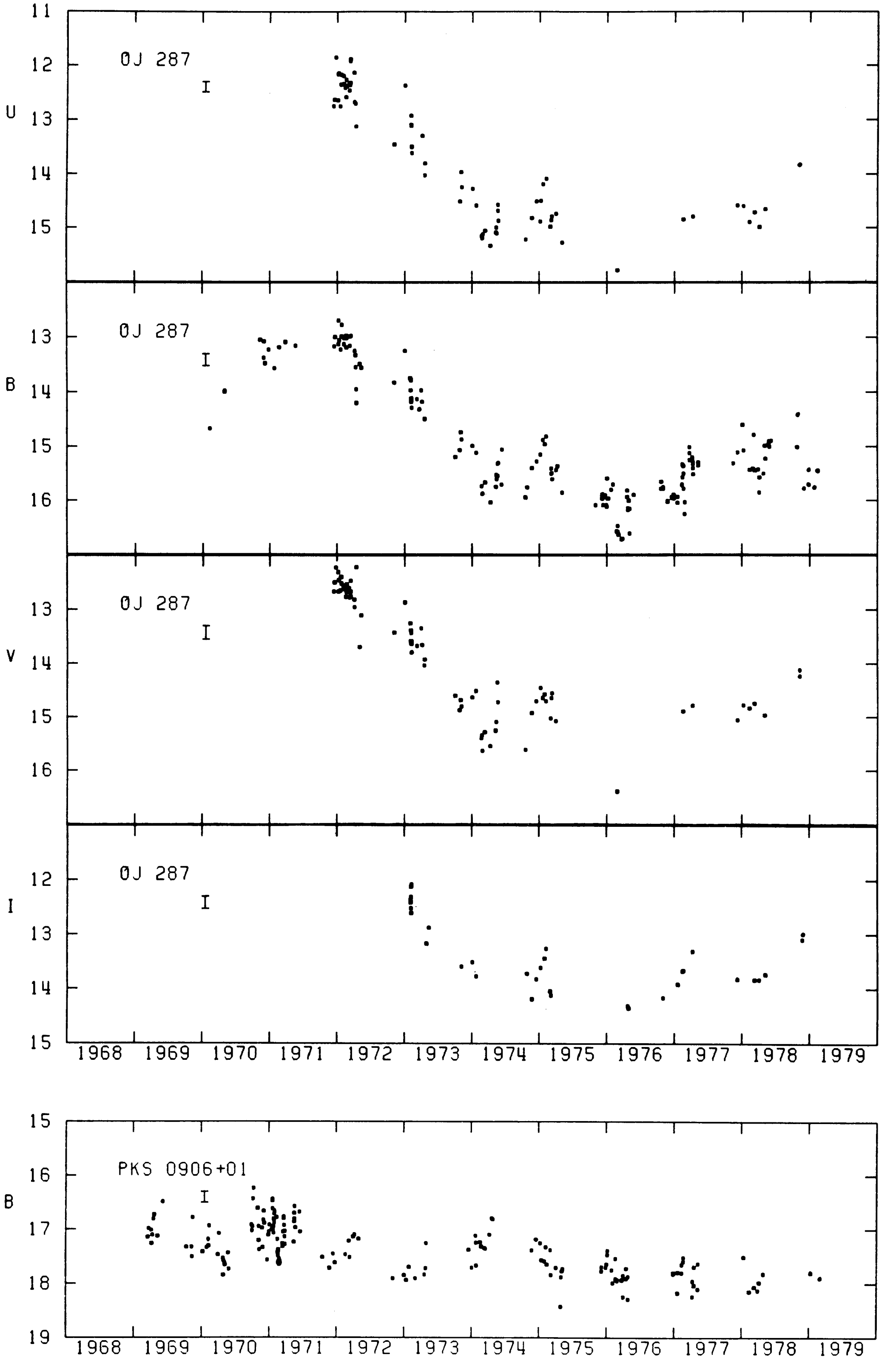

FIG. 1(b). Light curves of 20 OVV sources.

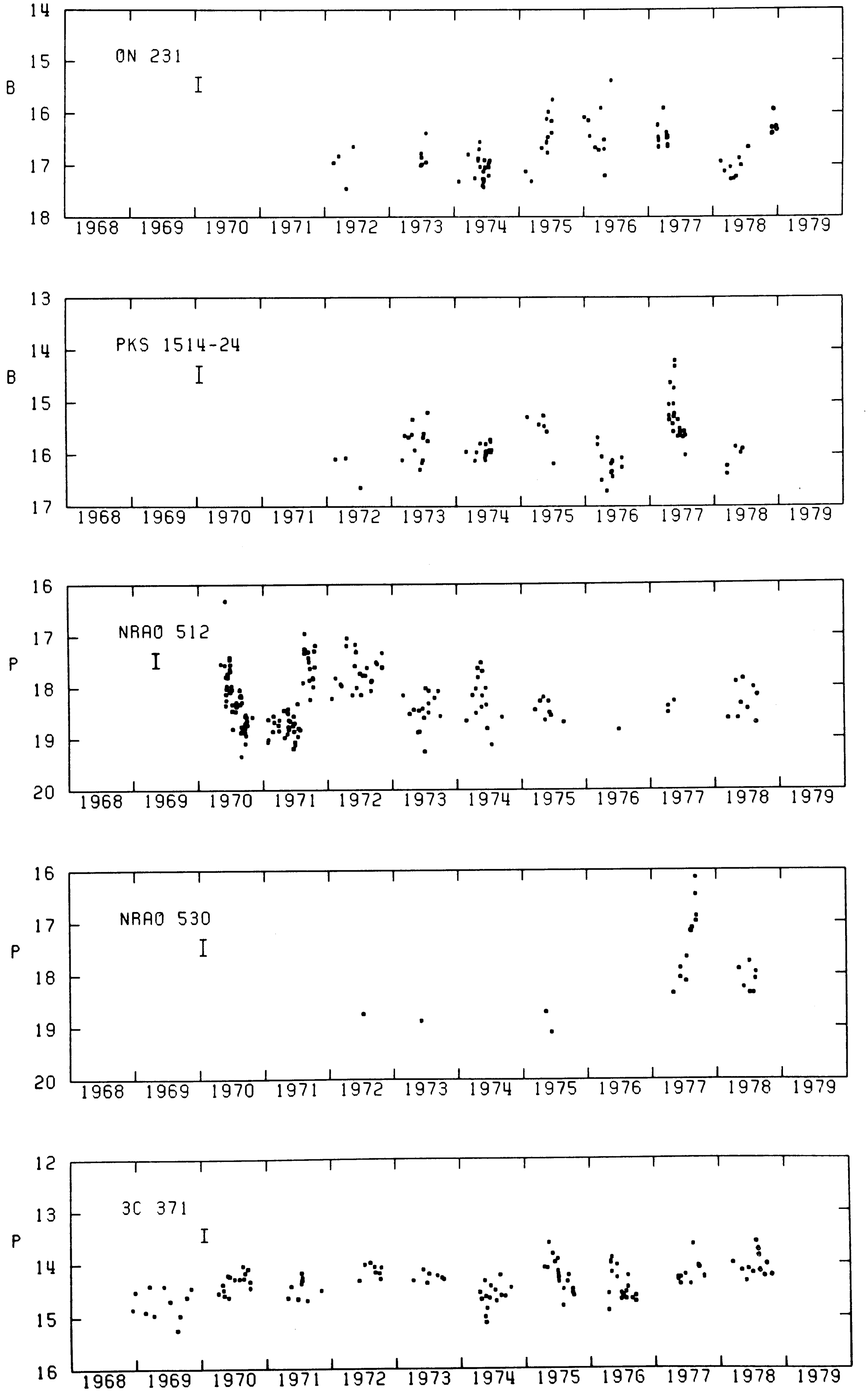

FIG. 1(c). Light curves of 20 OVV sources.

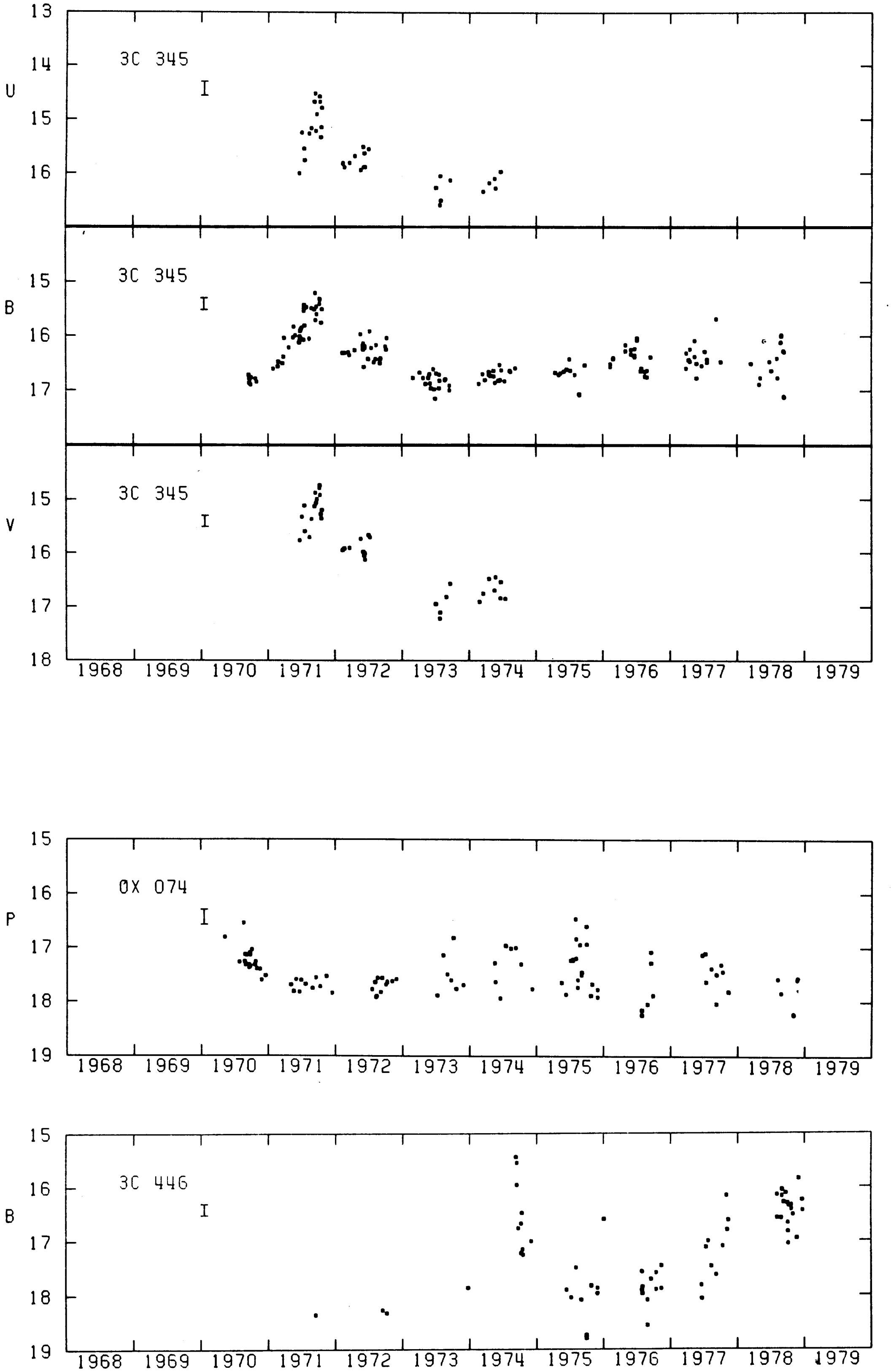

FIG. 1(d). Light curves of 20 OVV sources.

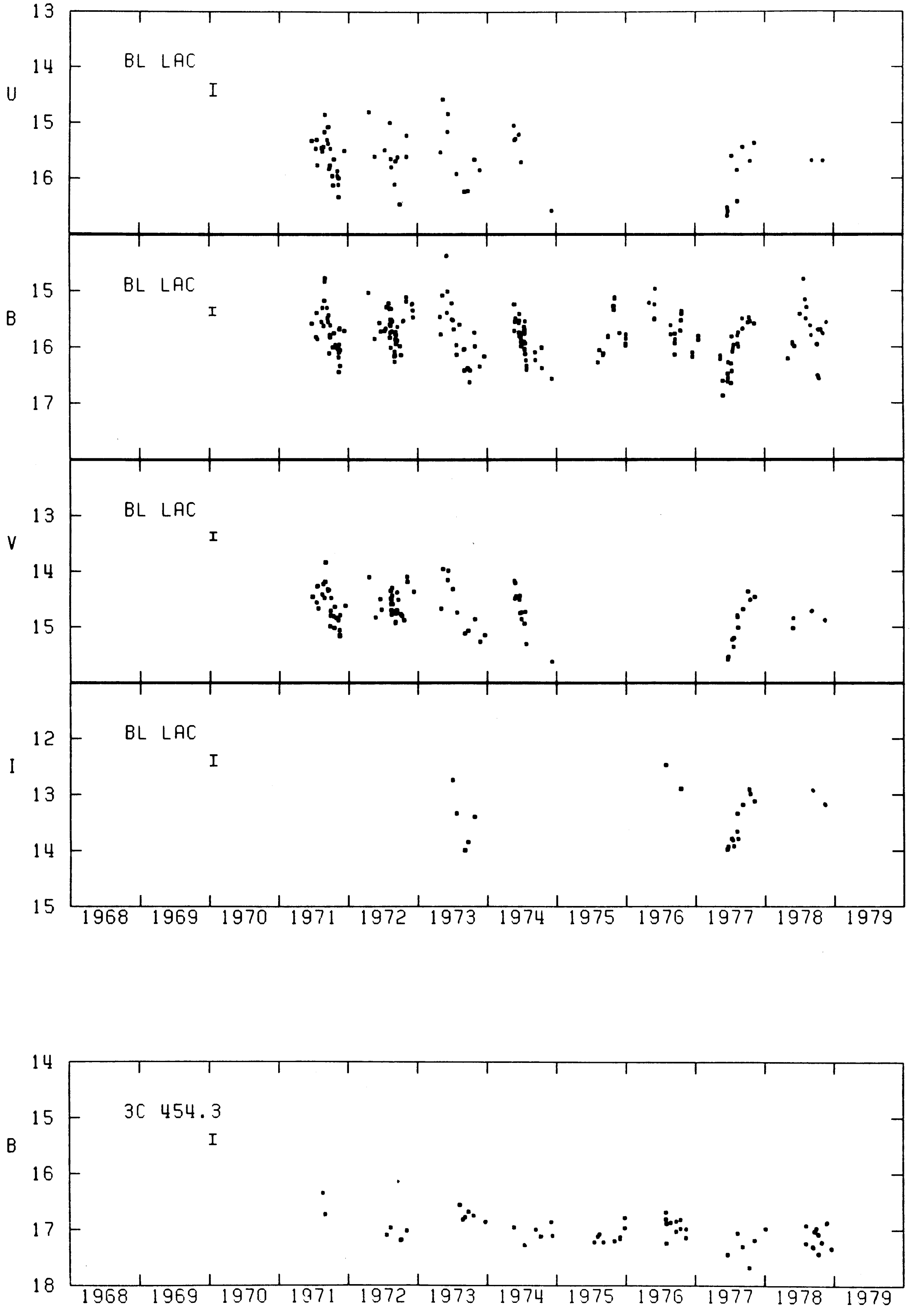

FIG. 1(e). Light curves of 20 OVV sources.

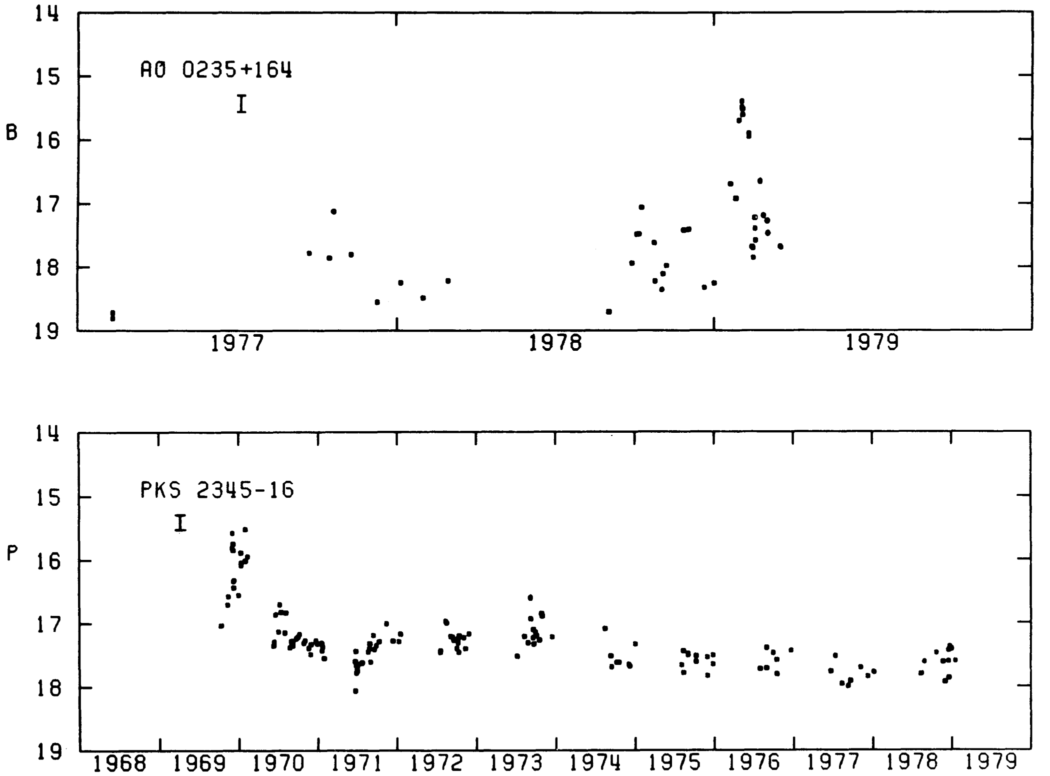

FIG. 1(f). Light curves of 20 OVV sources.

$17.^{m}65$ on 1/18–19/79 and $18.^{m}78$ on 1/28–29/79. SA 96 was used to calibrate the sequence around NRAO 190.

PKS 0735+17. This well-known BL Lac object has exhibited a large number of 1- to 2-magnitude outbursts since 1972. In addition to these rapid excursions there was an increase in average brightness from 1973 to 1977. The brightest recorded magnitude occurred during the 1977 outburst, when PKS 0735+17 reached $B = 13.90$. In 540 days it faded by $3.^{m}3$ to $B = 17.22$, which is below the faintest previously recorded magnitude (Carswell *et al.* 1974, and Pollock 1975). The object is presently relatively quiescent at $B \sim 16.0$. The *U, B,* and *V* comparison sequences are those of Wing (1973). The infrared sequence was derived using the *U–V, B–V,* and *V–I* data of Johnson *et al.* (1966); see the Data Reduction section. The value of $B - m_{pg} = -0.2$ suggests that there may be a zero-point error in the initial m_{pg} sequence.

OJ 287. At the time Paper I was completed, it seemed that the long decline which began in 1972 had been terminated by a one-magnitude flare in early 1975. Subsequently, however, the general decline was resumed until the object reached $B = 16.7$ a year later. Even including the archival data of Craine and Warner (1973), Visvanathan and Elliot (1973), and Pollock (1975b), this was the faintest that OJ 287 had ever been observed to be. The brightest known value was $B = 12.36$, recorded by Dyck *et al.* (1971) during the 1971 maximum. Thus the total range of the four-year decline was $4.^{m}3$, and this is, of course, also the total known range of the object. In early 1977 OJ 287 began a general brightening trend that has continued until the present.

Additional I-band data recorded during the long decline, but not presented in Paper I, are shown in Fig. 1. The infrared decline resembled that at shorter wavelengths, although the amplitude of the brief outburst in early 1975 was slightly smaller ($\Delta I = 0.^{m}93$, $\Delta V = 1.^{m}16$, $\Delta B = 1.^{m}13$, $\Delta U = 1.^{m}13$).

The *U, B,* and *V* sequences are a combination of the sequences of Penston and Wing (1973) and a single star measured by McGimsey (1975) to extend the faint end of the range. The I sequence was established from the *U–B, U–V,* and *V–I* data of Johnson *et al.* (1966); see the Data-Reduction section. The $B - m_{pg}$ correction was +0.50.

PKS 0906+01. This object, identified as an OVV by Folsom and Smith (1969), is one of several in the program that have shown long-term declines in their average brightness (cf. 3C 120, PKS 2345-16). After an extremely active period in 1969–1971 the object declined in average brightness at $0.^{m}4$/year during the next two years. In the 1973–1974 observing season a modest brightening of $0.^{m}5$ occurred, followed by a slow fading over the next four years to $B \sim 18.0$ in 1978. This secular decline is accompanied by "flickering" of $<\pm 0.^{m}5$. The

TABLE II. Results of observations of 20 OVV sources.

UT DATE	J.D.	MAG	RMS	COL
	AO 0235+164			
2/ 9/77	43183.557	18.81	0.08	B
2/ 9/77	43183.562	18.72	0.11	B
9/21/77	43407.798	17.78	0.20	B
10/14/77	43430.712	17.86	0.19	B
10/19/77	43435.764	17.12	0.21	B
11/ 8/77	43455.658	17.80	0.09	B
12/ 8/77	43485.697	18.56	0.06	B
1/ 4/78	43512.622	18.25	0.07	B
1/30/78	43538.554	18.49	0.10	B
2/28/78	43567.549	18.22	0.20	B
8/31/78	43751.853	18.71	0.11	B
9/27/78	43778.702	17.94	0.17	B
10/ 3/78	43784.699	17.48	0.14	B
10/ 5/78	43786.787	17.48	0.20	B
10/ 8/78	43789.833	17.06	0.09	B
10/23/78	43804.658	17.62	0.10	B
10/24/78	43805.682	18.23	0.13	B
11/ 1/78	43813.726	18.36	0.13	B
11/ 2/78	43814.696	18.11	0.10	B
11/ 6/78	43818.733	17.98	0.08	B
11/26/78	43838.638	17.42	0.11	B
12/ 2/78	43844.660	17.41	0.08	B
12/20/78	43862.576	18.33	0.08	B
12/31/78	43873.598	18.26	0.21	B
1/19/79	43892.570	16.69	0.11	B
1/25/79	43898.528	16.92	0.12	B
1/29/79	43902.526	15.70	0.09	B
2/ 1/79	43905.613	15.49	0.09	B
2/ 1/79	43905.651	15.40	0.16	B
2/ 2/79	43906.595	15.61	0.18	B
2/ 2/79	43906.626	15.52	0.16	B
2/ 9/79	43913.569	15.95	0.26	B
2/ 9/79	43913.571	15.90	0.17	B
2/ 9/79	43913.611	16.19	0.27	B
2/13/79	43917.541	17.68	0.14	B
2/14/79	43918.520	17.70	0.12	B
2/14/79	43918.524	17.85	0.14	B
2/16/79	43920.549	17.22	0.11	B
2/16/79	43920.602	17.39	0.20	B
2/17/79	43921.533	17.58	0.17	B
2/21/79	43926.575	16.67	0.15	B
2/24/79	43929.568	17.21	0.08	B
2/31/79	43936.538	17.48	0.16	B
2/31/79	43936.568	17.29	0.20	B
3/16/79	43952.544	17.70	0.10	B
3/16/79	43952.550	17.71	0.12	B
	OE 110			
1/ 2/75	42414.580	18.99	0.08	P
2/ 3/75	42446.562	18.64	0.07	P
2/ 9/75	42452.549	18.59	0.14	P
3/ 2/75	42473.557	18.76	0.16	P
3/ 3/75	42474.542	18.75	0.08	P
3/ 7/75	42478.547	19.48	0.23	P
3/ 9/75	42480.541	19.00	0.11	P
3/10/75	42481.557	18.98	0.07	P
8/ 6/75	42630.882	18.73	0.15	P
9/ 3/75	42658.799	17.87	0.10	P
9/ 4/75	42659.875	17.85	0.12	P
9/13/75	42668.876	18.66	0.16	P
10/ 2/75	42687.762	17.86	0.16	P
10/ 2/75	42687.775	17.88	0.24	P
10/11/75	42696.842	17.53	0.14	P
10/13/75	42698.838	17.79	0.12	P
10/14/75	42699.886	17.89	0.09	P
11/ 1/75	42717.750	18.14	0.14	P
11/29/75	42745.779	17.13	0.08	P
12/ 5/75	42751.519	17.25	0.35	P
1/ 3/76	42780.607	18.08	0.11	P
1/ 5/76	42782.628	18.31	0.10	P
10/19/76	43070.760	18.02	0.17	P
10/22/76	43073.767	18.41	0.13	P
11/22/76	43104.697	17.46	0.17	P
1/20/77	43163.631	19.38	0.17	P
2/11/77	43185.566	19.03	0.17	P

UT DATE	J.D.	MAG	RMS	COL
	OE 110	CONT.		
8/12/77	43367.865	19.25	0.16	P
10/17/77	43433.794	19.22	0.10	P
11/ 6/77	43453.733	19.51	0.14	P
11/14/77	43461.755	19.13	0.14	P
12/12/77	43489.667	19.14	0.08	P
10/15/75	42700.880	18.57	0.25	B
11/ 2/75	42718.678	18.70	0.11	B
11/30/75	42746.731	17.27	0.26	B
11/30/75	42746.736	17.46	0.23	B
12/ 5/75	42751.545	17.75	0.16	B
12/ 7/75	42753.758	18.12	0.14	B
12/ 7/75	42753.763	18.37	0.07	B
12/12/75	42758.781	18.55	0.18	B
12/12/75	42758.785	18.44	0.12	B
12/24/75	42770.565	18.67	0.08	B
12/29/75	42775.628	18.53	0.09	B
1/ 1/76	42778.604	18.38	0.15	B
1/ 1/76	42778.607	18.72	0.14	B
1/ 2/76	42779.696	18.53	0.12	B
1/ 2/76	42779.701	18.57	0.10	B
1/ 3/76	42780.631	18.43	0.18	B
1/ 5/76	42782.603	18.50	0.18	B
1/ 9/76	42786.755	18.25	0.07	B
1/23/76	42800.652	18.25	0.13	B
1/25/76	42802.590	18.28	0.10	B
1/25/76	42802.597	18.35	0.26	B
1/30/76	42808.631	19.01	0.10	B
2/ 3/76	42811.649	19.22	0.06	B
2/ 3/76	42811.656	19.43	0.09	B
2/23/76	42831.531	18.68	0.14	B
2/23/76	42831.538	18.97	0.11	B
2/29/76	42837.537	18.63	0.14	B
8/ 1/76	42991.878	18.88	0.24	B
8/ 1/76	42991.884	18.52	0.12	B
11/25/76	43107.706	18.59	0.20	B
11/25/76	43107.712	18.25	0.08	B
	PKS 0420-01			
12/ 4/69	40559.604	19.41	0.21	P
9/29/70	40858.840	18.49	0.10	P
2/ 8/70	40625.588	19.25	0.15	P
2/10/70	40627.639	19.21	0.15	P
1/29/70	40615.597	18.74	0.08	P
10/ 2/70	40861.845	19.11	0.23	P
10/ 5/70	40864.847	18.83	0.18	P
10/11/70	40870.825	19.04	0.12	P
11/ 2/70	40892.826	18.69	0.15	P
11/ 6/70	40896.781	18.64	0.13	P
11/26/70	40916.667	18.83	0.19	P
11/30/70	40920.722	18.59	0.13	P
12/21/70	40941.654	18.73	0.16	P
12/29/70	40949.639	18.62	0.10	P
1/20/71	40971.642	18.67	0.15	P
1/29/71	40980.622	18.68	0.12	P
2/17/71	40999.578	18.82	0.12	P
2/21/71	41003.557	18.77	0.18	P
3/19/71	41029.549	18.55	0.13	P
3/28/71	41038.545	18.29	0.08	P
10/15/71	41239.799	18.89	0.16	P
11/25/71	41280.815	18.84	0.15	P
12/10/71	41295.691	18.63	0.24	P
12/15/71	41300.675	19.38	0.23	P
2/ 7/72	41354.569	19.10	0.10	P
3/13/72	41389.597	19.11	0.22	P
10/ 9/72	41599.856	18.59	0.23	P
11/ 3/72	41624.843	18.31	0.25	P
1/27/73	41709.539	18.80	0.14	P
3/ 4/73	41745.557	18.78	0.21	P
9/ 5/73	41930.907	18.82	0.20	P
10/ 4/73	41959.869	18.74	0.08	P
10/24/73	41979.774	18.53	0.18	P
11/ 2/73	41988.779	18.52	0.17	P
11/23/73	42009.782	18.11	0.14	P
12/ 2/73	42018.801	18.72	0.16	P
12/18/73	42034.602	18.77	0.15	P

UT DATE	J.D.	MAG	RMS	COL
	PKS 0420-01	CONT.		
12/22/73	42038.676	18.74	0.20	P
1/16/74	42063.681	18.75	0.08	P
2/11/74	42089.544	18.84	0.11	P
9/24/74	42314.879	17.65	0.26	P
10/18/74	42338.829	17.65	0.20	P
11/24/74	42375.826	17.30	0.11	P
11/25/74	42376.655	17.19	0.13	P
12/11/74	42392.655	17.24	0.14	P
12/18/74	42399.681	17.66	0.05	P
1/ 4/75	42416.653	17.80	0.19	P
1/16/75	42428.610	17.99	0.09	P
2/ 3/75	42446.663	17.86	0.23	P
2/12/75	42455.562	17.91	0.11	P
3/ 2/75	42473.573	17.43	0.20	P
3/ 6/75	42477.600	16.89	0.14	P
9/ 4/75	42659.893	18.62	0.25	P
10/11/75	42696.882	18.34	0.08	P
10/11/75	42696.890	18.52	0.16	P
10/15/75	42700.932	18.72	0.21	P
11/ 1/75	42717.808	18.45	0.25	P
12/ 7/75	42753.822	18.24	0.14	P
12/ 7/75	42753.828	18.39	0.18	P
12/24/75	42770.585	18.32	0.08	P
12/24/75	42770.590	18.36	0.13	P
1/ 3/76	42780.692	18.15	0.22	P
1/ 3/76	42780.697	18.25	0.26	P
1/23/76	42800.668	18.42	0.07	P
1/23/76	42800.674	18.21	0.16	P
10/ 3/76	43054.860	18.44	0.18	P
10/ 3/76	43054.866	18.08	0.19	P
10/22/76	43073.804	18.07	0.12	P
10/22/76	43073.809	18.01	0.22	P
11/25/76	43107.794	18.21	0.25	P
11/25/76	43107.801	18.32	0.14	P
1/11/77	43154.592	18.68	0.26	P
1/11/77	43154.597	18.27	0.10	P
2/ 9/77	43183.612	18.68	0.15	P
2/ 9/77	43183.618	18.44	0.14	P
10/14/77	43430.796	17.04	0.11	P
11/ 9/77	43456.787	16.63	0.14	P
11/11/77	43458.760	16.62	0.15	P
11/14/77	43461.780	16.91	0.23	P
11/15/77	43462.810	16.70	0.11	P
12/ 8/77	43485.728	17.00	0.11	P
12/13/77	43490.667	16.51	0.14	P
1/ 4/78	43512.664	16.66	0.11	P
1/10/78	43518.645	16.85	0.18	P
1/12/78	43520.596	17.02	0.05	P
1/29/78	43537.581	17.08	0.07	P
2/ 7/78	43546.594	17.24	0.06	P
2/26/78	43565.565	16.82	0.17	P
8/31/78	43751.862	17.41	0.35	P
10/ 3/78	43784.799	17.53	0.31	P
10/ 5/78	43786.868	17.08	0.22	P
10/ 5/78	43786.873	17.35	0.30	P
11/ 2/78	43814.764	17.81	0.19	P
11/26/78	43838.792	17.92	0.18	P
12/ 4/78	43846.681	17.76	0.09	P
1/19/79	43892.603	18.56	0.31	P
1/29/79	43902.588	18.29	0.15	P
2/17/79	43922.554	18.11	0.14	P
2/28/79	43933.627	18.09	0.19	P
	3C 120			
10/16/71	41240.799	14.73	0.10	B
10/19/71	41243.852	14.69	0.07	B
10/26/71	41250.837	14.72	0.08	B
11/ 8/71	41263.627	14.76	0.06	B
11/14/71	41269.859	15.09	0.12	B
11/17/71	41272.828	14.64	0.05	B
11/18/71	41273.765	15.19	0.11	B
11/18/71	41273.776	15.05	0.08	B
11/18/71	41273.792	15.01	0.04	B
11/18/71	41273.803	15.05	0.03	B
11/18/71	41273.817	14.86	0.09	B

UT DATE	J.D.	MAG	RMS	COL
	3C 120	CONT.		
11/18/71	41273.836	15.10	0.07	B
11/18/71	41273.861	14.99	0.03	B
11/18/71	41273.872	14.94	0.06	B
11/18/71	41273.894	14.94	0.02	B
11/18/71	41273.905	14.93	0.04	B
11/18/71	41273.922	14.89	0.06	B
11/18/71	41273.935	14.84	0.06	B
11/19/71	41274.802	14.69	0.12	B
11/19/71	41274.812	14.63	0.13	B
11/19/71	41274.821	14.66	0.13	B
11/19/71	41274.830	14.79	0.06	B
11/19/71	41274.840	14.76	0.10	B
11/19/71	41274.853	14.65	0.11	B
11/19/71	41274.868	14.68	0.09	B
11/19/71	41274.877	14.62	0.12	B
11/19/71	41274.890	14.67	0.14	B
11/19/71	41274.912	14.77	0.16	B
11/21/71	41276.753	15.02	0.06	B
11/21/71	41276.761	15.00	0.08	B
11/21/71	41276.769	15.04	0.08	B
11/21/71	41276.777	14.95	0.07	B
11/21/71	41276.788	15.05	0.04	B
11/21/71	41276.796	15.03	0.07	B
11/21/71	41276.805	14.98	0.07	B
11/21/71	41276.812	14.96	0.05	B
11/21/71	41276.826	15.02	0.06	B
11/21/71	41276.833	14.92	0.04	B
11/21/71	41276.842	14.91	0.10	B
11/21/71	41276.851	14.85	0.04	B
11/21/71	41276.857	14.94	0.04	B
11/21/71	41276.872	14.94	0.03	B
11/21/71	41276.881	14.93	0.04	B
11/21/71	41276.888	14.84	0.02	B
11/21/71	41276.903	14.86	0.05	B
11/21/71	41276.910	14.88	0.03	B
11/21/71	41276.919	14.77	0.02	B
11/21/71	41276.926	14.79	0.03	B
11/22/71	41277.747	14.98	0.04	B
11/22/71	41277.767	14.89	0.02	B
11/22/71	41277.781	14.85	0.04	B
11/22/71	41277.799	14.84	0.07	B
11/22/71	41277.812	14.88	0.05	B
11/22/71	41277.826	14.86	0.02	B
11/22/71	41277.841	14.90	0.04	B
11/22/71	41277.855	14.75	0.01	B
11/22/71	41277.876	14.82	0.04	B
11/22/71	41277.896	14.76	0.03	B
11/22/71	41277.912	14.78	0.02	B
11/22/71	41277.926	14.79	0.02	B
3/ 6/72	41382.576	14.96	0.07	B
9/ 8/72	41568.878	14.60	0.09	B
10/ 5/72	41595.781	14.80	0.17	B
10/ 8/72	41598.890	14.65	0.09	B
10/14/72	41604.852	14.84	0.14	B
10/16/72	41606.756	14.55	0.21	B
11/ 1/72	41622.821	14.68	0.10	B
11/16/72	41637.847	14.79	0.06	B
12/ 3/72	41654.753	14.62	0.20	B
12/ 4/72	41655.804	14.78	0.08	B
12/ 4/72	41655.817	14.57	0.12	B
12/ 4/72	41655.832	14.74	0.10	B
12/ 4/72	41655.843	14.78	0.07	B
12/ 5/72	41656.778	14.74	0.10	B
12/ 5/72	41656.787	14.60	0.09	B
12/ 5/72	41656.875	14.71	0.13	B
12/ 9/72	41660.726	14.73	0.18	B
12/ 9/72	41660.744	14.61	0.18	B
12/ 9/72	41660.771	14.76	0.08	B
12/ 9/72	41660.790	14.89	0.08	B
12/ 9/72	41660.809	14.87	0.06	B
12/ 9/72	41660.822	14.88	0.04	B
12/ 9/72	41660.837	14.82	0.03	B
12/ 9/72	41660.850	14.70	0.04	B
12/ 9/72	41660.867	14.77	0.05	B
12/ 9/72	41660.880	14.72	0.08	B
12/ 9/72	41660.899	14.73	0.10	B
12/ 9/72	41660.912	14.86	0.10	B

UT DATE	J.D.	MAG	RMS	COL
	3C 120	CONT.		
1/ 2/73	41684.724	14.78	0.07	B
1/23/73	41705.559	14.92	0.09	B
1/29/73	41711.603	14.95	0.07	B
3/ 4/73	41745.580	14.97	0.10	B
9/ 5/73	41930.892	15.15	0.17	B
9/ 8/73	41933.865	15.41	0.19	B
9/24/73	41949.860	15.36	0.08	B
9/30/73	41955.906	15.55	0.14	B
10/ 8/73	41963.842	15.11	0.02	B
10/24/73	41979.792	15.40	0.03	B
10/27/73	41982.758	15.48	0.06	B
10/31/73	41986.837	15.48	0.10	B
11/ 3/73	41989.733	15.20	0.10	B
11/ 3/73	41989.812	15.36	0.05	B
11/20/73	42006.763	15.45	0.01	B
11/24/73	42010.701	15.34	0.01	B
12/ 2/73	42018.699	15.32	0.12	B
12/19/73	42035.617	15.13	0.12	B
12/25/73	42041.610	15.12	0.08	B
1/15/74	42062.628	15.22	0.12	B
2/11/74	42089.562	14.90	0.04	B
2/14/74	42092.549	15.01	0.04	B
2/14/74	42092.624	15.04	0.08	B
2/15/74	42093.561	15.12	0.11	B
2/19/74	42097.572	15.16	0.09	B
3/19/74	42125.570	14.98	0.03	B
10/18/74	42338.847	15.32	0.05	B
11/12/74	42363.803	15.29	0.05	B
11/24/74	42375.847	15.11	0.13	B
12/11/74	42392.672	14.96	0.17	B
12/18/74	42399.664	15.13	0.04	B
1/ 3/75	42415.620	14.97	0.08	B
1/31/75	42443.564	14.81	0.13	B
2/ 5/75	42448.628	15.16	0.06	B
2/12/75	42455.580	14.94	0.10	B
3/ 2/75	42473.585	15.18	0.06	B
4/ 6/75	42508.595	15.48	0.10	B
10/11/75	42696.908	14.97	0.11	B
10/11/75	42696.913	15.01	0.11	B
10/15/75	42700.915	15.38	0.13	B
10/15/75	42700.922	15.55	0.14	B
11/ 2/75	42718.748	15.27	0.04	B
12/ 7/75	42753.838	15.70	0.03	B
12/ 7/75	42753.849	15.75	0.04	B
12/10/75	42756.757	15.62	0.20	B
12/10/75	42756.774	15.80	0.09	B
12/12/75	42758.792	15.77	0.07	B
12/12/75	42758.810	15.80	0.06	B
12/24/75	42770.636	15.82	0.05	B
12/29/75	42775.661	15.76	0.05	B
1/ 1/76	42778.602	15.61	0.05	B
1/ 3/76	42780.552	15.75	0.21	B
1/ 3/76	42780.576	15.61	0.08	B
1/ 5/76	42782.657	15.70	0.12	B
3/21/76	42858.564	15.73	0.13	B
3/31/76	42868.562	15.13	0.10	B
10/ 3/76	43054.880	14.85	0.15	B
10/ 3/76	43054.883	15.04	0.21	B
10/19/76	43070.772	15.24	0.07	B
10/19/76	43070.785	15.46	0.11	B
10/21/76	43072.777	15.51	0.10	B
10/21/76	43072.790	15.64	0.09	B
11/ 1/76	43083.810	15.42	0.12	B
11/25/76	43107.724	15.23	0.02	B
11/25/76	43107.735	15.36	0.04	B
12/18/76	43130.595	15.52	0.06	B
12/18/76	43130.606	15.53	0.03	B
1/17/77	43160.581	15.58	0.07	B
1/17/77	43160.593	15.56	0.03	B
2/ 9/77	43183.599	15.54	0.14	B
2/ 9/77	43183.602	15.62	0.07	B
2/11/77	43185.626	15.74	0.06	B
2/11/77	43185.637	15.75	0.03	B
2/14/77	43188.609	15.87	0.08	B
2/14/77	43188.620	16.00	0.05	B
11/ 9/77	43456.821	15.68	0.20	B
1/ 6/78	43514.717	16.14	0.16	B

UT DATE	J.D.	MAG	RMS	COL
	3C 120	CONT.		
1/12/78	43520.619	15.96	0.10	B
1/29/78	43537.603	15.87	0.09	B
2/ 5/78	43544.542	15.55	0.16	B
2/ 5/78	43544.546	15.50	0.12	B
3/11/78	43578.647	15.95	0.05	B
8/13/78	43733.886	15.92	0.16	B
10/ 5/78	43786.778	15.43	0.09	B
10/ 5/78	43786.840	15.22	0.13	B
10/ 9/78	43790.869	15.68	0.03	B
11/ 2/78	43814.776	15.60	0.10	B
12/27/78	43870.514	15.91	0.13	B
1/19/79	43893.599	16.23	0.20	B
1/29/79	43903.632	15.72	0.03	B
2/ 2/79	43907.640	15.62	0.05	B
2/20/79	43925.589	15.84	0.09	B
	NRAO 190			
12/ 8/69	40563.708	18.12	0.15	P
9/30/71	41224.892	18.22	0.10	P
12/13/71	41298.744	17.98	0.13	P
10/13/72	41603.847	17.57	0.24	P
11/ 5/72	41626.803	17.43	0.18	P
1/31/73	41713.596	18.08	0.18	P
10/ 6/73	41961.875	18.39	0.10	P
12/22/73	42038.693	18.07	0.12	P
1/ 4/75	42416.678	18.94	0.22	P
3/10/75	42481.576	19.20	0.12	P
10/13/75	42698.936	18.07	0.22	P
11/ 1/75	42717.837	17.04	0.19	P
11/14/75	42730.855	18.22	0.23	P
11/14/75	42730.859	18.14	0.25	P
11/29/75	42745.803	18.50	0.08	P
11/29/75	42745.807	18.63	0.07	P
12/ 7/75	42753.799	17.46	0.20	P
12/ 7/75	42753.804	17.45	0.13	P
12/10/75	42756.818	17.54	0.19	P
12/10/75	42756.823	17.68	0.12	P
12/12/75	42758.798	17.55	0.09	P
12/12/75	42758.803	17.72	0.13	P
12/24/75	42770.608	18.07	0.14	P
12/24/75	42770.615	18.22	0.12	P
12/27/75	42773.705	17.82	0.16	P
1/ 1/76	42778.736	17.95	0.10	P
1/ 1/76	42778.741	18.12	0.12	P
1/ 3/76	42780.708	18.46	0.11	P
1/ 3/76	42780.713	17.79	0.20	P
1/ 5/76	42782.709	18.24	0.12	P
1/25/76	42802.615	17.87	0.25	P
2/21/76	42829.596	18.22	0.20	P
10/ 3/76	43054.894	18.21	0.08	P
10/ 3/76	43054.899	18.32	0.22	P
10/22/76	43073.826	17.96	0.30	P
10/22/76	43073.831	17.74	0.16	P
11/25/76	43107.817	16.65	0.20	P
11/25/76	43107.820	16.63	0.18	P
12/18/76	43130.556	17.70	0.32	P
12/18/76	43130.562	17.71	0.14	P
12/25/76	43137.726	18.43	0.08	P
1/11/77	43154.632	17.83	0.23	P
1/11/77	43154.637	17.96	0.27	P
10/14/77	43430.827	18.55	0.14	P
11/11/77	43458.776	18.25	0.16	P
11/15/77	43462.817	18.73	0.17	P
12/ 8/77	43485.741	17.82	0.09	P
1/ 4/78	43512.710	16.98	0.10	P
1/10/78	43518.658	18.37	0.25	P
1/12/78	43520.608	18.28	0.07	P
1/29/78	43537.614	18.90	0.16	P
2/ 5/78	43544.557	18.92	0.14	P
3/ 7/78	43574.594	18.96	0.12	P
11/ 2/78	43815.764	18.78	0.20	P
11/ 6/78	43819.805	18.10	0.20	P
12/27/78	43870.632	18.00	0.16	P
12/31/78	43874.667	19.03	0.12	P
1/19/79	43893.630	17.65	0.25	P

UT DATE	J.D.	MAG	RMS	COL
	NRAO 190	CONT.		
1/29/79	43903.637	18.78	0.15	P
	PKS 0735+17			
11/ 6/70	40896.833	15.54	0.06	P
11/26/70	40916.715	15.32	0.01	P
12/ 7/70	40927.808	15.43	0.06	P
1/22/71	40973.690	16.02	0.18	P
12/10/71	41295.732	15.78	0.08	P
12/26/71	41311.789	16.42	0.18	P
3/10/72	41386.726	15.96	0.06	P
4/15/72	41422.605	16.37	0.04	P
10/13/72	41603.896	15.92	0.07	P
11/ 5/72	41626.852	16.28	0.10	P
1/26/73	41708.659	15.46	0.05	P
3/25/73	41766.649	16.90	0.09	P
4/22/73	41794.563	15.53	0.12	P
4/28/73	41800.587	15.27	0.07	P
4/30/73	41802.569	15.52	0.05	P
5/ 1/73	41803.606	15.48	0.12	P
5/ 2/73	41804.595	15.37	0.10	P
11/24/73	42010.849	16.05	0.09	P
12/ 5/73	42021.824	15.88	0.06	P
12/19/73	42035.749	16.36	0.08	P
1/ 2/74	42049.858	16.18	0.07	P
1/15/74	42062.706	15.84	0.15	P
1/20/74	42067.590	15.81	0.11	P
1/27/74	42074.751	15.69	0.10	P
1/29/74	42076.771	15.40	0.09	P
2/14/74	42092.666	15.07	0.06	P
2/19/74	42097.690	15.15	0.05	P
3/14/74	42120.572	15.57	0.04	P
3/25/74	42131.593	15.98	0.14	P
4/11/74	42148.555	16.28	0.16	P
10/18/74	42338.906	15.59	0.08	P
11/23/74	42374.812	15.51	0.14	P
12/18/74	42399.746	15.32	0.07	P
1/ 8/75	42420.658	15.19	0.12	P
1/17/75	42429.553	15.11	0.09	P
2/ 1/75	42444.607	15.66	0.14	P
2/ 3/75	42446.697	15.70	0.18	P
2/10/75	42453.594	15.68	0.19	P
3/ 3/75	42474.627	15.51	0.08	P
3/10/75	42481.594	15.76	0.11	P
11/ 1/75	42717.873	15.54	0.08	P
12/ 7/75	42753.860	15.21	0.10	P
12/ 7/75	42753.865	15.26	0.07	P
12/10/75	42756.878	15.08	0.09	P
12/10/75	42756.883	15.06	0.09	P
12/12/75	42758.814	15.08	0.11	P
12/12/75	42758.819	15.22	0.09	P
12/24/75	42770.649	14.87	0.05	P
12/24/75	42770.653	14.89	0.09	P
12/27/75	42773.738	14.97	0.05	P
12/27/75	42773.743	14.97	0.04	P
12/29/75	42775.772	15.03	0.08	P
12/29/75	42775.788	14.96	0.09	P
1/ 1/76	42778.824	14.84	0.06	P
1/ 2/76	42779.768	14.89	0.05	P
1/ 3/76	42780.758	14.98	0.10	P
1/ 5/76	42782.731	14.81	0.09	P
1/ 5/76	42782.742	14.81	0.08	P
1/ 9/76	42786.817	14.65	0.03	P
1/10/76	42787.803	14.67	0.04	P
1/10/76	42787.815	14.63	0.04	P
1/21/76	42798.599	14.57	0.12	P
1/21/76	42798.604	14.59	0.17	P
1/22/76	42799.710	14.76	0.05	P
1/22/76	42799.715	14.74	0.10	P
1/25/76	42802.580	14.54	0.08	P
1/26/76	42803.704	14.59	0.05	P
1/30/76	42808.825	14.76	0.04	P
1/30/76	42808.828	14.72	0.04	P
2/ 3/76	42811.665	14.80	0.07	P
2/21/76	42829.637	15.32	0.09	P
2/21/76	42829.643	15.29	0.09	P

UT DATE	J.D.	MAG	RMS	COL
	PKS 0735+17	CONT.		
2/23/76	42831.606	15.12	0.06	P
2/26/76	42834.667	15.18	0.16	P
2/26/76	42834.674	15.32	0.10	P
2/29/76	42837.631	15.29	0.03	P
3/ 2/76	42839.637	15.44	0.15	P
3/ 2/76	42839.642	15.26	0.11	P
3/ 4/76	42841.658	15.18	0.09	P
3/20/76	42857.654	15.10	0.12	P
3/21/76	42858.632	14.93	0.07	P
3/25/76	42862.572	14.91	0.07	P
3/25/76	42862.576	14.98	0.11	P
3/25/76	42862.622	15.00	0.06	P
3/27/76	42864.567	15.00	0.13	P
3/27/76	42864.619	15.25	0.14	P
3/28/76	42865.624	15.09	0.10	P
3/28/76	42865.648	15.06	0.09	P
3/28/76	42865.653	15.07	0.07	P
4/ 2/76	42870.574	15.03	0.06	P
4/ 2/76	42870.580	15.11	0.07	P
4/ 3/76	42871.626	14.72	0.13	P
4/ 3/76	42871.631	14.86	0.12	P
4/ 4/76	42872.689	14.78	0.14	P
4/ 4/76	42872.701	15.12	0.18	P
4/18/76	42886.585	15.03	0.10	P
4/18/76	42886.590	15.08	0.20	P
4/24/76	42892.589	15.24	0.12	P
4/24/76	42892.619	15.16	0.08	P
4/29/76	42897.578	15.08	0.07	P
4/29/76	42897.590	15.10	0.07	P
5/30/76	42928.579	16.08	0.08	P
5/30/76	42928.584	16.06	0.11	P
10/ 3/76	43054.912	15.03	0.11	P
10/ 3/76	43054.916	15.09	0.10	P
10/29/76	43080.870	15.19	0.12	P
10/29/76	43080.876	15.45	0.12	P
11/19/76	43101.839	15.38	0.10	P
11/19/76	43101.843	15.20	0.14	P
12/18/76	43130.699	14.75	0.09	P
1/17/77	43160.739	14.78	0.03	P
1/17/77	43160.751	14.74	0.05	P
1/20/77	43163.755	14.71	0.09	P
1/20/77	43163.760	14.78	0.06	P
2/11/77	43185.602	14.53	0.06	P
2/12/77	43186.576	14.46	0.15	P
2/12/77	43186.581	14.42	0.14	P
2/12/77	43186.648	14.16	0.09	P
2/12/77	43186.653	14.50	0.16	P
2/23/77	43197.744	14.46	0.06	P
1/ 1/76	42778.788	14.16	0.11	U
12/27/76	43139.844	14.89	0.12	U
2/12/77	43186.640	14.03	0.22	U
2/14/77	43188.573	13.82	0.11	U
2/18/77	43192.628	14.15	0.13	U
2/19/77	43193.618	13.91	0.11	U
2/21/77	43195.644	13.63	0.08	U
2/23/77	43197.781	13.74	0.23	U
2/25/77	43199.753	13.72	0.16	U
3/14/77	43216.655	13.85	0.07	U
3/23/77	43225.653	13.84	0.18	U
4/ 6/77	43239.585	14.03	0.21	U
4/ 6/77	43239.588	13.92	0.13	U
4/ 8/77	43241.656	13.88	0.25	U
4/ 9/77	43242.551	14.37	0.21	U
4/10/77	43243.551	14.11	0.17	U
4/11/77	43244.565	14.20	0.24	U
4/11/77	43244.579	14.16	0.28	U
4/12/77	43245.558	14.48	0.28	U
4/13/77	43246.653	13.92	0.17	U
4/15/77	43248.587	14.19	0.17	U
4/16/77	43249.556	14.12	0.19	U
4/18/77	43251.557	14.87	0.18	U
4/19/77	43252.573	14.23	0.06	U
4/21/77	43254.594	14.24	0.07	U
4/29/77	43262.573	13.68	0.08	U
5/ 9/77	43272.572	13.79	0.09	U
5/13/77	43276.583	13.44	0.12	U
5/14/77	43277.576	13.49	0.14	U

TABLE II. (Continued).

UT DATE	J.D.	MAG	RMS	COL
	PKS 0735+17	CONT.		
5/15/77	43278.581	13.38	0.12	U
5/18/77	43281.587	14.09	0.16	U
12/ 8/77	43485.851	15.38	0.14	U
1/12/78	43520.693	15.38	0.12	U
2/ 7/78	43546.651	15.70	0.06	U
4/ 5/78	43603.551	15.70	0.11	U
10/ 9/78	43791.881	16.56	0.07	U
11/ 2/78	43815.719	15.88	0.12	U
11/11/78	43824.846	16.36	0.13	U
11/11/78	43824.877	16.17	0.06	U
12/ 2/78	43845.761	15.44	0.07	U
12/27/78	43870.672	15.68	0.16	U
1/25/79	43899.640	15.42	0.07	U
4/19/74	42156.562	16.18	0.11	B
4/19/74	42156.570	16.20	0.05	B
4/19/74	42156.578	16.57	0.11	B
4/19/74	42156.585	16.13	0.06	B
4/19/74	42156.593	16.29	0.08	B
4/19/74	42156.601	16.07	0.07	B
4/19/74	42156.608	16.33	0.05	B
4/19/74	42156.616	16.04	0.11	B
4/19/74	42156.631	15.97	0.20	B
4/19/74	42156.639	16.15	0.07	B
4/19/74	42156.647	16.04	0.06	B
4/19/74	42156.654	16.04	0.09	B
4/21/74	42158.578	16.23	0.15	B
4/21/74	42158.585	16.17	0.09	B
4/21/74	42158.593	16.10	0.15	B
4/21/74	42158.601	16.12	0.10	B
4/21/74	42158.608	16.16	0.07	B
4/21/74	42158.616	16.45	0.15	B
4/21/74	42158.631	16.01	0.30	B
4/21/74	42158.639	16.05	0.10	B
4/21/74	42158.647	16.21	0.11	B
4/21/74	42158.654	16.15	0.06	B
1/ 1/76	42778.783	14.70	0.14	B
4/23/76	42891.589	15.38	0.13	B
11/22/76	43104.864	15.52	0.11	B
11/22/76	43104.869	15.55	0.10	B
11/25/76	43107.881	15.42	0.07	B
11/25/76	43107.894	15.40	0.05	B
12/25/76	43137.792	15.65	0.16	B
12/25/76	43137.795	15.51	0.23	B
12/27/76	43139.862	15.52	0.07	B
1/11/77	43154.651	14.91	0.10	B
1/11/77	43154.656	14.99	0.11	B
2/14/77	43188.558	14.52	0.14	B
2/14/77	43188.592	14.43	0.08	B
2/14/77	43188.618	14.41	0.18	B
2/18/77	43192.623	14.67	0.10	B
2/18/77	43192.665	14.42	0.14	B
2/19/77	43193.612	14.57	0.14	B
2/21/77	43195.649	14.10	0.08	B
2/23/77	43197.756	14.20	0.05	B
2/25/77	43199.758	14.28	0.16	B
2/25/77	43199.767	14.36	0.07	B
2/25/77	43199.769	14.35	0.15	B
3/14/77	43216.606	14.28	0.06	B
3/14/77	43216.620	14.31	0.08	B
3/23/77	43225.628	14.45	0.10	B
3/24/77	43226.692	14.24	0.11	B
4/ 6/77	43239.546	14.52	0.11	B
4/ 6/77	43239.548	14.59	0.07	B
4/ 6/77	43239.632	14.51	0.15	B
4/ 6/77	43239.633	14.54	0.14	B
4/ 6/77	43239.635	14.61	0.13	B
4/ 8/77	43241.653	14.56	0.15	B
4/ 9/77	43242.549	14.65	0.22	B
4/10/77	43243.548	14.60	0.11	B
4/11/77	43244.567	14.79	0.18	B
4/11/77	43244.569	14.68	0.15	B
4/13/77	43246.658	14.77	0.05	B
4/15/77	43248.584	14.63	0.13	B
4/16/77	43249.553	14.38	0.12	B
4/18/77	43251.554	14.92	0.18	B
4/19/77	43252.556	14.97	0.24	B
4/21/77	43254.590	14.79	0.03	B

UT DATE	J.D.	MAG	RMS	COL
	PKS 0735+17	CONT.		
4/29/77	43262.566	14.39	0.17	B
4/29/77	43262.567	14.48	0.31	B
4/29/77	43262.568	14.42	0.16	B
4/29/77	43262.570	14.34	0.29	B
5/ 1/77	43264.562	14.75	0.10	B
5/ 1/77	43264.563	14.47	0.07	B
5/ 9/77	43272.567	14.71	0.25	B
5/13/77	43276.578	14.03	0.05	B
5/14/77	43277.581	13.90	0.19	B
5/15/77	43278.577	13.99	0.07	B
5/17/77	43280.581	14.95	0.07	B
5/18/77	43281.581	15.04	0.13	B
5/26/77	43289.578	15.18	0.23	B
10/17/77	43433.909	15.14	0.05	B
11/11/77	43458.828	15.37	0.05	B
11/15/77	43462.897	15.36	0.16	B
12/ 8/77	43485.846	15.62	0.03	B
1/ 4/78	43512.762	16.05	0.07	B
1/10/78	43518.755	15.70	0.05	B
1/12/78	43520.685	15.88	0.15	B
1/30/78	43538.617	16.68	0.13	B
2/ 7/78	43546.644	16.06	0.04	B
2/28/78	43567.645	15.69	0.05	B
3/ 2/78	43569.613	15.98	0.07	B
3/14/78	43581.667	15.78	0.06	B
3/30/78	43597.590	16.28	0.02	B
4/ 4/78	43602.551	16.19	0.06	B
4/ 5/78	43603.547	16.12	0.10	B
4/28/78	43626.561	16.02	0.10	B
10/ 5/78	43787.839	16.79	0.17	B
10/ 9/78	43788.881	16.49	0.15	B
11/ 2/78	43815.842	16.19	0.12	B
11/ 4/78	43817.795	16.70	0.12	B
11/ 6/78	43819.839	17.22	0.11	B
11/11/78	43824.838	16.53	0.13	B
11/11/78	43824.839	16.44	0.17	B
11/11/78	43824.841	16.67	0.21	B
11/11/78	43824.879	16.57	0.14	B
12/ 2/78	43845.758	16.22	0.16	B
12/27/78	43870.670	15.99	0.17	B
12/31/78	43874.756	15.93	0.07	B
1/25/79	43899.638	15.88	0.11	B
1/29/79	43903.670	15.99	0.08	B
2/21/79	43926.629	15.99	0.05	B
1/ 1/76	42778.795	14.49	0.09	V
12/27/76	43139.825	15.08	0.04	V
2/12/77	43186.594	13.88	0.18	V
2/14/77	43188.583	13.99	0.15	V
2/18/77	43192.660	14.18	0.13	V
2/19/77	43193.624	14.08	0.15	V
2/21/77	43195.653	13.79	0.10	V
2/23/77	43197.803	13.74	0.07	V
2/25/77	43199.762	13.98	0.06	V
3/14/77	43216.676	13.74	0.13	V
4/ 6/77	43239.551	14.25	0.09	V
4/ 6/77	43239.554	14.34	0.10	V
4/ 8/77	43241.660	14.39	0.10	V
4/ 9/77	43242.556	14.37	0.14	V
4/ 9/77	43242.575	14.36	0.11	V
4/ 9/77	43242.579	14.40	0.19	V
4/10/77	43243.555	14.36	0.08	V
4/11/77	43244.573	14.44	0.07	V
4/11/77	43244.576	14.22	0.09	V
4/12/77	43245.562	14.30	0.09	V
4/13/77	43246.660	14.13	0.06	V
4/15/77	43248.594	14.19	0.07	V
4/16/77	43249.561	14.23	0.07	V
4/18/77	43251.562	14.64	0.15	V
4/19/77	43252.563	14.56	0.17	V
4/21/77	43254.601	14.26	0.25	V
4/29/77	43262.562	13.84	0.12	V
4/29/77	43262.565	13.84	0.11	V
5/ 1/77	43264.569	14.50	0.18	V
5/ 1/77	43264.571	14.08	0.27	V
5/ 9/77	43272.578	14.42	0.06	V
5/13/77	43276.588	13.56	0.10	V
5/14/77	43277.570	13.52	0.18	V

UT DATE	J.D.	MAG	RMS	COL
	PKS 0735+17	CONT.		
5/15/77	43278.590	13.55	0.14	V
5/17/77	43280.570	14.19	0.26	V
5/18/77	43281.575	14.13	0.10	V
5/20/77	43283.583	14.44	0.09	V
5/22/77	43285.573	14.48	0.20	V
5/22/77	43285.578	14.79	0.18	V
12/ 8/77	43485.858	15.28	0.08	V
1/12/78	43520.701	15.35	0.16	V
2/ 7/78	43546.660	15.58	0.06	V
4/ 5/78	43603.558	15.81	0.10	V
10/ 9/78	43791.887	16.86	0.19	V
11/ 2/78	43815.848	16.12	0.13	V
11/11/78	43824.843	16.12	0.16	V
11/11/78	43824.848	16.01	0.15	V
12/ 2/78	43845.764	15.67	0.15	V
12/27/78	43870.676	15.53	0.13	V
1/25/79	43899.669	15.48	0.14	V
2/14/77	43188.606	13.21	0.11	I
2/18/77	43192.644	13.22	0.11	I
2/19/77	43193.642	13.13	0.09	I
2/21/77	43195.632	13.05	0.07	I
2/23/77	43197.822	12.99	0.11	I
2/25/77	43199.741	13.01	0.18	I
4/ 6/77	43239.562	13.55	0.12	I
4/ 6/77	43239.572	13.76	0.12	I
4/ 8/77	43241.668	13.60	0.16	I
4/ 9/77	43242.565	13.64	0.18	I
4/10/77	43243.564	13.55	0.15	I
4/11/77	43244.557	13.59	0.11	I
4/16/77	43249.574	13.39	0.09	I
4/18/77	43251.573	13.43	0.12	I
4/19/77	43252.595	13.40	0.08	I
4/21/77	43254.615	13.41	0.12	I
4/29/77	43262.556	13.21	0.12	I
5/ 1/77	43264.545	13.20	0.12	I
5/ 1/77	43264.556	13.50	0.11	I
5/ 9/77	43272.588	13.27	0.09	I
5/10/77	43273.568	13.59	0.16	I
5/13/77	43276.567	12.95	0.10	I
5/14/77	43277.562	13.33	0.10	I
5/15/77	43278.565	13.06	0.18	I
5/15/77	43278.609	13.09	0.18	I
5/17/77	43280.560	13.33	0.11	I
5/18/77	43281.560	13.43	0.10	I
5/20/77	43283.565	13.44	0.08	I
5/21/77	43284.569	13.61	0.18	I
5/22/77	43285.561	13.59	0.08	I
5/27/77	43290.562	13.24	0.07	I
12/ 8/77	43485.836	15.10	0.16	I
1/ 4/78	43512.772	13.96	0.06	I
1/12/78	43520.712	14.10	0.08	I
2/ 7/78	43546.679	14.31	0.04	I
4/ 5/78	43603.573	14.50	0.08	I
11/11/78	43824.886	14.58	0.10	I
12/27/78	43870.679	14.40	0.15	I
1/25/79	43899.674	14.17	0.16	I

UT DATE	J.D.	MAG	RMS	COL
	OJ 287			
2/ 8/70	40625.735	14.17	0.10	P
4/30/70	40706.625	13.50	0.10	P
5/ 2/70	40708.612	13.48	0.09	P
11/ 8/70	40898.881	12.55	0.11	P
11/28/70	40918.792	12.86	0.14	P
11/29/70	40919.854	12.58	0.09	P
12/ 5/70	40925.896	12.98	0.09	P
12/23/70	40943.781	12.73	0.11	P
1/25/71	40976.816	12.70	0.11	P
2/19/71	41001.694	12.69	0.07	P
3/26/71	41036.677	12.59	0.11	P
5/19/71	41090.597	12.66	0.09	P
12/15/71	41300.865	12.76	0.19	U
12/19/71	41304.855	12.64	0.12	U
12/26/71	41311.869	11.86	0.15	U
1/ 7/72	41323.683	12.17	0.14	U
1/ 8/72	41324.713	12.65	0.09	U

UT DATE	J.D.	MAG	RMS	COL
	OJ 287	CONT.		
1/10/72	41326.746	12.15	0.12	U
1/20/72	41336.741	12.76	0.18	U
1/24/72	41340.905	12.36	0.07	U
1/25/72	41341.820	12.18	0.07	U
2/ 6/72	41353.703	12.20	0.07	U
2/ 7/72	41354.663	12.35	0.07	U
2/14/72	41361.565	12.47	0.09	U
2/14/72	41361.581	12.41	0.09	U
2/14/72	41361.603	12.45	0.06	U
2/14/72	41361.637	12.49	0.08	U
2/14/72	41361.666	12.41	0.04	U
2/14/72	41361.690	12.49	0.05	U
2/14/72	41361.705	12.41	0.08	U
2/14/72	41361.786	12.34	0.08	U
2/14/72	41361.807	12.36	0.09	U
2/14/72	41361.840	12.38	0.12	U
2/14/72	41361.860	12.45	0.07	U
2/14/72	41361.885	12.38	0.09	U
2/19/72	41366.524	12.59	0.07	U
2/20/72	41367.726	12.27	0.05	U
2/22/72	41369.784	12.39	0.07	U
3/ 6/72	41382.658	12.33	0.05	U
3/ 9/72	41385.776	12.47	0.08	U
3/10/72	41386.647	12.37	0.13	U
3/13/72	41389.654	11.89	0.14	U
3/14/72	41390.781	12.33	0.11	U
3/15/72	41391.677	11.93	0.15	U
4/ 3/72	41410.644	12.14	0.08	U
4/ 4/72	41411.695	12.68	0.02	U
4/11/72	41418.594	12.71	0.07	U
4/13/72	41420.576	13.13	0.10	U
11/ 5/72	41626.908	13.16	0.11	U
1/ 2/73	41684.899	12.38	0.14	U
2/ 3/73	41716.746	12.89	0.07	U
2/ 3/73	41716.776	12.99	0.08	U
2/ 3/73	41716.826	12.86	0.12	U
2/ 3/73	41716.860	13.00	0.14	U
2/ 3/73	41716.917	12.90	0.08	U
2/ 4/73	41717.764	13.21	0.11	U
2/ 4/73	41717.828	13.17	0.10	U
2/ 4/73	41717.858	13.20	0.08	U
2/ 4/73	41717.894	12.96	0.08	U
2/ 4/73	41717.931	12.98	0.10	U
2/ 5/73	41718.531	12.97	0.04	U
2/ 5/73	41718.564	13.04	0.09	U
2/ 5/73	41718.593	13.06	0.09	U
2/ 5/73	41718.626	13.12	0.06	U
2/ 5/73	41718.681	13.13	0.14	U
2/ 5/73	41718.716	13.29	0.11	U
2/ 5/73	41718.758	13.22	0.10	U
2/ 5/73	41718.789	13.28	0.15	U
2/ 5/73	41718.819	13.09	0.04	U
2/ 5/73	41718.877	13.00	0.11	U
2/ 6/73	41719.546	13.30	0.10	U
2/ 6/73	41719.593	13.62	0.09	U
2/ 6/73	41719.626	13.80	0.13	U
2/ 6/73	41719.657	14.00	0.12	U
2/ 6/73	41719.722	13.64	0.23	U
2/ 6/73	41719.824	13.09	0.05	U
2/ 6/73	41719.857	13.34	0.19	U
2/ 6/73	41719.897	13.03	0.14	U
2/ 7/73	41720.527	13.25	0.05	U
2/ 7/73	41720.553	13.34	0.10	U
2/ 7/73	41720.585	13.72	0.11	U
2/ 7/73	41720.611	13.65	0.12	U
2/ 7/73	41720.662	13.78	0.11	U
2/ 7/73	41720.700	13.67	0.13	U
2/ 7/73	41720.743	13.59	0.05	U
2/ 7/73	41720.774	13.70	0.04	U
2/ 7/73	41720.800	13.26	0.08	U
2/ 7/73	41720.853	12.99	0.13	U
2/ 8/73	41721.546	13.50	0.10	U
2/ 8/73	41721.575	13.99	0.10	U
2/ 8/73	41721.605	13.73	0.22	U
2/ 8/73	41721.637	14.09	0.05	U
2/ 8/73	41721.689	13.82	0.10	U
2/ 8/73	41721.753	13.64	0.24	U

UT DATE	J.D.	MAG	RMS	COL
	OJ 287	CONT.		
2/ 8/73	41721.794	13.15	0.05	U
2/ 8/73	41721.837	13.05	0.13	U
4/ 6/73	41778.672	13.30	0.10	U
4/20/73	41792.594	14.03	0.03	U
4/21/73	41793.624	13.81	0.07	U
10/27/73	41982.869	14.51	0.05	U
11/ 2/73	41988.882	13.97	0.11	U
11/ 6/73	41992.878	14.25	0.12	U
1/ 4/74	42051.860	14.28	0.05	U
1/24/74	42071.773	14.59	0.03	U
2/23/74	42101.694	15.16	0.06	U
2/25/74	42103.705	15.20	0.06	U
3/ 1/74	42107.782	15.13	0.09	U
3/14/74	42120.615	15.06	0.10	U
4/12/74	42149.569	15.34	0.14	U
5/11/74	42178.637	15.09	0.09	U
5/13/74	42180.580	15.00	0.06	U
5/15/74	42182.617	15.11	0.04	U
5/21/74	42188.613	14.58	0.08	U
5/22/74	42189.594	14.69	0.16	U
5/24/74	42191.546	14.87	0.06	U
10/21/74	42341.947	15.22	0.10	U
11/23/74	42374.886	14.82	0.01	U
12/18/74	42399.855	14.51	0.07	U
1/ 8/75	42420.755	14.88	0.05	U
1/10/75	42422.807	14.50	0.05	U
1/21/75	42433.796	14.19	0.13	U
2/ 8/75	42451.747	14.09	0.10	U
3/ 2/75	42473.622	14.98	0.10	U
3/ 7/75	42478.626	14.86	0.06	U
3/ 9/75	42480.626	14.79	0.04	U
4/ 2/75	42504.589	14.74	0.16	U
5/ 5/75	42537.599	15.28	0.08	U
2/28/76	42836.660	15.79	0.07	U
2/18/77	43192.692	14.85	0.13	U
4/10/77	43243.601	14.80	0.08	U
12/ 8/77	43485.890	14.59	0.09	U
1/10/78	43518.851	14.60	0.04	U
2/12/78	43551.745	14.90	0.14	U
3/11/78	43578.687	14.72	0.10	U
4/ 6/78	43604.588	14.99	0.14	U
5/ 9/78	43637.585	14.66	0.09	U
11/ 4/78	43817.834	13.83	0.09	U
11/ 4/78	43817.849	13.76	0.18	U
11/ 5/78	43818.834	13.76	0.09	U
11/ 5/78	43818.862	13.85	0.21	U
12/15/71	41300.837	13.17	0.16	B
12/19/71	41304.783	13.00	0.11	B
1/ 7/72	41323.678	12.70	0.16	B
1/ 8/72	41324.710	13.13	0.06	B
1/10/72	41326.740	13.06	0.13	B
1/20/72	41336.737	13.23	0.13	B
1/24/72	41340.849	12.99	0.04	B
1/25/72	41341.816	12.78	0.05	B
2/ 6/72	41353.700	13.13	0.07	B
2/ 7/72	41354.656	13.02	0.06	B
2/14/72	41361.562	13.06	0.05	B
2/14/72	41361.578	13.00	0.10	B
2/14/72	41361.601	13.04	0.07	B
2/14/72	41361.635	13.02	0.10	B
2/14/72	413 1.665	13.02	0.05	B
2/14/72	41361.687	13.07	0.08	B
2/14/72	41361.718	13.05	0.08	B
2/14/72	41361.784	12.89	0.05	B
2/14/72	41361.805	12.94	0.08	B
2/14/72	41361.837	12.90	0.08	B
2/14/72	41361.858	12.91	0.03	B
2/14/72	41361.883	12.86	0.10	B
2/19/72	41366.523	13.19	0.04	B
2/19/72	41366.541	13.02	0.09	B
2/20/72	41367.723	12.98	0.09	B
2/22/72	41369.781	13.00	0.03	B
3/ 6/72	41382.656	12.99	0.11	B
3/ 9/72	41385.771	13.16	0.08	B
3/10/72	41386.642	12.99	0.03	B
3/14/72	41390.775	12.98	0.09	B
4/ 4/72	41411.691	13.25	0.12	B

UT DATE	J.D.	MAG	RMS	COL
	OJ 287	CONT.		
4/ 9/72	41416.635	13.33	0.12	B
4/11/72	41418.581	13.55	0.11	B
4/13/72	41420.572	13.95	0.10	B
4/15/72	41422.552	14.20	0.17	B
5/ 2/72	41439.562	13.49	0.19	B
5/11/72	41448.615	13.56	0.20	B
11/ 5/72	41626.901	13.83	0.19	B
1/ 2/73	41684.889	13.25	0.12	B
2/ 1/73	41714.693	13.75	0.06	B
2/ 3/73	41716.818	13.81	0.21	B
2/ 3/73	41716.847	13.73	0.02	B
2/ 3/73	41716.726	13.74	0.14	B
2/ 3/73	41716.765	13.76	0.24	B
2/ 3/73	41716.906	13.80	0.17	B
2/ 3/73	41716.939	13.79	0.13	B
2/ 4/73	41717.756	13.99	0.17	B
2/ 4/73	41717.819	13.86	0.17	B
2/ 4/73	41717.851	14.04	0.17	B
2/ 4/73	41717.884	14.03	0.17	B
2/ 4/73	41717.923	13.92	0.09	B
2/ 5/73	41718.522	13.66	0.06	B
2/ 5/73	41718.556	13.76	0.12	B
2/ 5/73	41718.585	13.72	0.10	B
2/ 5/73	41718.617	13.59	0.10	B
2/ 5/73	41718.709	14.04	0.08	B
2/ 5/73	41718.749	13.81	0.16	B
2/ 5/73	41718.781	13.93	0.19	B
2/ 5/73	41718.811	13.89	0.11	B
2/ 5/73	41718.869	13.73	0.11	B
2/ 6/73	41719.538	14.09	0.08	B
2/ 6/73	41719.585	14.23	0.11	B
2/ 6/73	41719.617	14.28	0.20	B
2/ 6/73	41719.650	14.33	0.20	B
2/ 6/73	41719.715	14.19	0.16	B
2/ 6/73	41719.752	13.92	0.21	B
2/ 6/73	41719.815	13.97	0.10	B
2/ 6/73	41719.850	14.15	0.27	B
2/ 6/73	41719.891	13.92	0.23	B
2/ 7/73	41720.519	13.92	0.05	B
2/ 7/73	41720.546	13.95	0.09	B
2/ 7/73	41720.578	14.14	0.19	B
2/ 7/73	41720.603	14.36	0.20	B
2/ 7/73	41720.653	14.35	0.15	B
2/ 7/73	41720.692	14.17	0.10	B
2/ 7/73	41720.734	14.32	0.20	B
2/ 7/73	41720.766	14.25	0.20	B
2/ 7/73	41720.792	14.16	0.16	B
2/ 7/73	41720.842	14.16	0.20	B
2/ 8/73	41721.539	14.10	0.14	B
2/ 8/73	41721.567	14.52	0.05	B
2/ 8/73	41721.598	14.59	0.10	B
2/ 8/73	41721.630	14.46	0.19	B
2/ 8/73	41721.679	14.23	0.06	B
2/ 8/73	41721.744	13.95	0.19	B
2/ 8/73	41721.787	14.40	0.09	B
2/ 8/73	41721.829	14.05	0.10	B
3/10/73	41751.722	14.13	0.07	B
3/23/73	41764.574	14.32	0.07	B
4/ 1/73	41773.564	13.97	0.07	B
4/ 6/73	41778.660	14.18	0.04	B
4/20/73	41792.585	14.50	0.03	B
4/21/73	41793.617	14.49	0.04	B
10/ 4/73	41959.898	15.20	0.06	B
10/27/73	41982.864	15.07	0.08	B
11/ 2/73	41988.865	14.74	0.09	B
11/ 6/73	41992.875	14.87	0.08	B
1/ 4/74	42051.856	14.99	0.08	B
1/24/74	42071.769	15.12	0.13	B
2/23/74	42101.686	15.74	0.08	B
2/25/74	42103.698	15.88	0.06	B
3/ 1/74	42107.776	15.88	0.11	B
3/14/74	42120.607	15.67	0.08	B
4/12/74	42149.566	16.04	0.19	B
5/11/74	42178.623	15.75	0.14	B
5/13/74	42180.594	15.53	0.16	B
5/15/74	42182.606	15.61	0.08	B
5/21/74	42188.603	15.55	0.08	B

UT DATE	J.D.	MAG	RMS	COL
	OJ 287	CONT.		
5/22/74	42189.583	15.32	0.05	B
5/24/74	42191.535	15.31	0.06	B
6/11/74	42209.637	15.71	0.05	B
6/14/74	42212.587	15.06	0.21	B
10/18/74	42338.895	15.94	0.18	B
10/21/74	42341.911	15.95	0.17	B
10/27/74	42347.906	15.76	0.14	B
11/23/74	42374.875	15.40	0.07	B
12/18/74	42399.843	15.28	0.04	B
1/ 8/75	42420.746	15.15	0.18	B
1/21/75	42433.801	14.88	0.03	B
2/ 1/75	42444.667	14.96	0.13	B
2/ 8/75	42451.740	14.82	0.05	B
3/ 6/75	42477.710	15.51	0.14	B
3/ 7/75	42478.619	15.41	0.28	B
3/ 9/75	42480.619	15.50	0.05	B
3/13/75	42484.710	15.61	0.13	B
4/ 2/75	42504.582	15.44	0.11	B
4/10/75	42512.655	15.37	0.01	B
5/ 5/75	42537.583	15.86	0.18	B
11/ 1/75	42717.859	16.09	0.08	B
12/ 7/75	42753.792	15.97	0.05	B
12/ 7/75	42753.806	15.90	0.05	B
12/10/75	42756.806	15.97	0.05	B
12/10/75	42756.821	15.89	0.07	B
12/12/75	42758.834	16.09	0.07	B
12/12/75	42758.857	15.95	0.08	B
12/24/75	42770.664	15.91	0.06	B
12/29/75	42775.685	16.09	0.07	B
1/ 1/76	42778.658	16.12	0.05	B
1/ 3/76	42780.753	15.60	0.30	B
1/ 5/76	42782.716	15.97	0.11	B
1/ 9/76	42786.783	15.97	0.04	B
1/25/76	42802.701	15.81	0.03	B
2/ 3/76	42811.595	15.71	0.03	B
2/23/76	42831.578	16.58	0.05	B
2/28/76	42836.649	16.59	0.19	B
2/29/76	42837.583	16.48	0.12	B
2/29/76	42837.601	16.48	0.11	B
3/ 4/76	42841.706	16.64	0.06	B
3/21/76	42858.583	16.73	0.08	B
3/25/76	42862.601	16.72	0.06	B
4/20/76	42888.610	15.82	0.15	B
4/20/76	42888.616	15.94	0.16	B
4/24/76	42892.597	16.18	0.24	B
4/24/76	42892.603	16.15	0.27	B
4/29/76	42897.608	16.01	0.09	B
5/ 4/76	42902.647	16.62	0.06	B
5/ 4/76	42902.656	16.16	0.09	B
5/26/76	42924.626	15.90	0.12	B
10/21/76	43072.840	15.66	0.07	B
10/21/76	43072.856	15.79	0.19	B
11/ 1/76	43083.849	15.76	0.10	B
11/ 1/76	43083.865	15.79	0.07	B
11/25/76	43107.825	16.03	0.05	B
11/25/76	43107.837	16.02	0.08	B
12/18/76	43130.785	15.94	0.12	B
12/18/76	43130.800	15.96	0.17	B
12/27/76	43139.915	15.90	0.10	B
12/27/76	43139.919	15.97	0.14	B
1/17/77	43160.681	15.94	0.04	B
1/17/77	43160.693	16.05	0.08	B
2/11/77	43185.664	15.72	0.08	B
2/11/77	43185.675	15.71	0.11	B
2/14/77	43188.665	15.34	0.06	B
2/14/77	43188.679	15.58	0.12	B
2/18/77	43192.683	15.37	0.19	B
2/19/77	43193.618	15.79	0.14	B
2/19/77	43193.649	15.51	0.09	B
2/26/77	43200.787	16.04	0.05	B
2/26/77	43200.799	16.26	0.07	B
3/23/77	43225.686	15.02	0.05	B
3/23/77	43225.700	15.13	0.07	B
3/24/77	43226.760	15.26	0.12	B
4/ 8/77	43241.580	15.21	0.04	B
4/ 8/77	43241.591	15.24	0.08	B
4/10/77	43243.594	15.30	0.02	B

UT DATE	J.D.	MAG	RMS	COL
	OJ 287	CONT.		
4/10/77	43243.615	15.33	0.05	B
4/10/77	43243.626	15.41	0.11	B
4/12/77	43245.640	15.52	0.07	B
5/ 9/77	43272.590	15.36	0.05	B
5/ 9/77	43272.622	15.30	0.16	B
11/15/77	43462.915	15.32	0.13	B
12/ 8/77	43485.897	15.12	0.13	B
1/ 6/78	43514.717	14.61	0.09	B
1/10/78	43518.858	15.08	0.09	B
2/12/78	43551.751	15.44	0.12	B
3/ 2/78	43569.658	15.42	0.08	B
3/ 7/78	43574.656	14.79	0.21	B
3/11/78	43578.682	15.45	0.05	B
3/14/78	43581.676	15.45	0.16	B
3/30/78	43597.654	15.43	0.05	B
4/ 4/78	43602.617	15.86	0.09	B
4/ 6/78	43604.583	15.58	0.11	B
4/28/78	43626.587	15.51	0.19	B
5/ 5/78	43633.618	14.99	0.11	B
5/ 9/78	43637.581	15.23	0.07	B
5/26/78	43654.578	14.97	0.24	B
5/29/78	43657.574	14.91	0.12	B
5/30/78	43658.584	15.01	0.14	B
6/ 8/78	43667.587	14.90	0.26	B
11/ 2/78	43815.878	14.98	0.12	B
11/ 4/78	43817.806	14.40	0.21	B
11/ 4/78	43817.807	14.41	0.33	B
11/ 4/78	43817.876	14.50	0.17	B
11/ 4/78	43817.878	14.28	0.26	B
11/ 5/78	43818.805	14.32	0.27	B
11/ 5/78	43818.807	14.18	0.26	B
11/ 5/78	43818.877	14.56	0.18	B
11/ 5/78	43818.879	14.34	0.23	B
11/ 5/78	43818.880	14.52	0.11	B
12/ 2/78	43845.805	15.79	0.30	B
12/31/78	43874.889	15.44	0.35	B
1/ 6/79	43880.760	15.75	0.32	B
1/29/79	43903.716	15.76	0.06	B
2/21/79	43926.671	15.43	0.22	B
12/15/71	41300.856	12.67	0.09	V
12/19/71	41304.828	12.50	0.08	V
12/26/71	41311.882	12.22	0.21	V
1/ 7/72	41323.690	12.31	0.17	V
1/ 9/72	41325.704	12.67	0.09	V
1/10/72	41326.758	12.46	0.12	V
1/20/72	41336.747	12.65	0.09	V
1/24/72	41340.828	12.40	0.06	V
1/25/72	41341.912	12.52	0.15	V
2/ 5/72	41352.709	12.62	0.04	V
2/ 7/72	41354.677	12.58	0.05	V
2/14/72	41361.572	12.70	0.04	V
2/14/72	41361.587	12.71	0.09	V
2/14/72	41361.610	12.70	0.07	V
2/14/72	41361.643	12.69	0.07	V
2/14/72	41361.675	12.60	0.04	V
2/14/72	41361.696	12.67	0.09	V
2/14/72	41361.713	12.65	0.04	V
2/14/72	41361.794	12.57	0.06	V
2/14/72	41361.824	12.60	0.05	V
2/14/72	41361.850	12.60	0.07	V
2/14/72	41361.868	12.56	0.09	V
2/14/72	41361.896	12.51	0.05	V
2/19/72	41366.531	12.77	0.14	V
2/20/72	41367.733	12.68	0.10	V
2/22/72	41369.792	12.54	0.24	V
3/ 6/72	41382.668	12.61	0.08	V
3/ 9/72	41385.746	12.78	0.09	V
3/10/72	41386.658	12.68	0.07	V
3/13/72	41389.661	12.76	0.17	V
3/14/72	41390.788	12.67	0.09	V
3/15/72	41391.682	12.47	0.15	V
4/ 3/72	41410.660	12.82	0.08	V
4/ 4/72	41411.701	12.96	0.11	V
4/15/72	41422.560	12.22	0.19	V
5/ 2/72	41439.573	13.70	0.24	V
5/11/72	41448.626	13.11	0.13	V
11/ 5/72	41626.915	13.43	0.06	V

TABLE II. (Continued).

OJ 287 CONT.

UT_DATE	J.D.	MAG	RMS	COL
1/ 2/73	41684.913	12.87	0.15	V
2/ 1/73	41714.708	13.26	0.07	V
2/ 3/73	41716.736	13.42	0.20	V
2/ 3/73	41716.753	13.50	0.18	V
2/ 3/73	41716.803	13.43	0.07	V
2/ 3/73	41716.835	13.39	0.16	V
2/ 3/73	41716.872	13.28	0.08	V
2/ 3/73	41716.929	13.31	0.07	V
2/ 4/73	41717.774	13.55	0.20	V
2/ 4/73	41717.840	13.70	0.14	V
2/ 4/73	41717.868	13.72	0.03	V
2/ 4/73	41717.906	13.60	0.07	V
2/ 4/73	41717.940	13.40	0.11	V
2/ 5/73	41718.542	13.23	0.10	V
2/ 5/73	41718.574	13.26	0.11	V
2/ 5/73	41718.603	13.50	0.05	V
2/ 5/73	41718.635	13.39	0.07	V
2/ 5/73	41718.692	13.45	C.09	V
2/ 5/73	41718.727	13.49	0.07	V
2/ 5/73	41718.768	13.60	0.15	V
2/ 5/73	41718.800	13.54	0.13	V
2/ 5/73	41718.835	13.48	0.11	V
2/ 5/73	41718.886	13.47	0.08	V
2/ 6/73	41719.566	13.40	0.11	V
2/ 6/73	41719.605	13.78	0.17	V
2/ 6/73	41719.635	13.77	0.18	V
2/ 6/73	41719.672	13.75	0.17	V
2/ 6/73	41719.733	13.82	0.23	V
2/ 6/73	41719.771	13.73	0.24	V
2/ 6/73	41719.837	13.51	0.03	V
2/ 6/73	41719.872	13.39	0.06	V
2/ 7/73	41720.537	13.40	0.06	V
2/ 7/73	41720.563	13.41	0.05	V
2/ 7/73	41720.595	13.64	0.11	V
2/ 7/73	41720.621	13.64	0.09	V
2/ 7/73	41720.672	13.62	0.17	V
2/ 7/73	41720.710	13.70	0.10	V
2/ 7/73	41720.753	13.76	0.26	V
2/ 7/73	41720.783	13.67	0.17	V
2/ 7/73	41720.810	13.71	0.03	V
2/ 7/73	41720.866	13.36	0.13	V
2/ 8/73	41721.555	13.70	0.14	V
2/ 8/73	41721.584	13.99	0.19	V
2/ 8/73	41721.616	13.85	0.14	V
2/ 8/73	41721.648	13.81	0.12	V
2/ 8/73	41721.700	13.68	0.12	V
2/ 8/73	41721.762	13.86	0.08	V
2/ 8/73	41721.806	13.70	0.18	V
3/10/73	41751.782	13.68	0.13	V
4/ 1/73	41773.587	13.35	0.17	V
4/ 6/73	41778.681	13.66	0.13	V
4/20/73	41792.603	14.04	0.18	V
4/21/73	41793.633	13.93	0.17	V
10/ 4/73	41959.902	14.61	0.07	V
10/27/73	41982.876	14.88	0.17	V
11/ 2/73	41988.881	14.69	0.14	V
11/ 6/73	41992.885	14.81	0.12	V
1/ 4/74	42051.867	14.64	0.18	V
1/24/74	42071.781	14.52	0.15	V
2/23/74	42101.705	15.40	0.08	V
2/25/74	42103.714	15.35	0.09	V
3/ 1/74	42107.791	15.64	0.11	V
3/14/74	42120.626	15.29	0.08	V
4/12/74	42149.562	15.55	0.25	V
5/11/74	42178.657	15.26	0.14	V
5/15/74	42182.629	15.10	0.23	V
5/22/74	42189.608	14.36	0.15	V
5/24/74	42191.559	14.73	0.12	V
10/21/74	42341.922	15.62	0.12	V
11/23/74	42374.856	14.93	0.16	V
12/18/74	42399.865	14.71	0.11	V
1/10/75	42422.750	14.46	0.15	V
1/21/75	42433.813	14.65	0.08	V
2/ 1/75	42444.632	14.58	0.10	V
2/ 8/75	42451.757	14.71	0.09	V
3/ 7/75	42478.635	15.03	0.15	V
3/ 9/75	42480.635	14.65	0.14	V

OJ 287 CONT.

UT_DATE	J.D.	MAG	RMS	COL
3/13/75	42484.729	14.56	0.12	V
4/ 2/75	42504.601	15.08	0.15	V
2/28/76	42836.674	16.39	0.12	V
2/18/77	43192.721	14.90	0.22	V
4/10/77	43243.607	14.79	0.10	V
12/ 8/77	43485.903	15.06	0.12	V
1/10/78	43518.867	14.78	0.09	V
2/12/78	43551.767	14.84	0.12	V
3/11/78	43578.692	14.75	0.13	V
5/ 6/78	43634.575	14.97	0.15	V
11/ 4/78	43817.838	14.16	0.13	V
11/ 4/78	43817.846	14.19	0.14	V
11/ 5/78	43818.836	14.14	0.13	V
11/ 5/78	43818.817	13.96	0.17	V
2/ 3/73	41716.891	12.75	0.10	I
2/ 4/73	41717.797	12.81	0.16	I
2/ 5/73	41718.656	12.71	0.05	I
2/ 5/73	41718.849	12.91	0.16	I
2/ 6/73	41719.696	12.52	0.12	I
2/ 6/73	41719.792	13.00	0.17	I
2/ 7/73	41720.826	12.46	0.10	I
4/30/73	41802.619	13.58	0.22	I
5/13/73	41815.585	13.27	0.13	I
11/ 6/73	41992.861	13.98	0.23	I
1/ 4/74	42051.841	13.92	0.05	I
1/24/74	42071.808	14.18	0.10	I
10/27/74	42347.894	14.17	0.16	I
11/23/74	42374.906	14.61	0.06	I
12/18/74	42399.892	14.25	0.05	I
1/10/75	42422.788	14.01	0.17	I
2/ 1/75	42444.651	13.85	0.11	I
2/ 8/75	42451.788	13.59	0.19	I
3/ 2/75	42473.642	14.49	0.06	I
3/ 7/75	42478.651	14.56	0.21	I
4/24/76	42892.573	14.75	0.07	I
4/29/76	42897.582	14.80	0.08	I
11/ 1/76	43083.918	14.63	0.07	I
1/20/77	43163.813	14.36	0.13	I
2/14/77	43188.653	14.09	0.10	I
2/18/77	43192.742	14.07	0.11	I
4/10/77	43243.584	13.71	0.08	I
12/ 8/77	43485.915	14.23	0.05	I
3/11/78	43578.702	14.25	0.07	I
4/ 5/78	43603.604	14.25	0.13	I
5/ 9/78	43637.601	14.14	0.08	I
11/ 4/78	43817.853	13.48	0.09	I
11/ 5/78	43818.850	13.34	0.08	I
11/ 5/78	43818.880	13.36	0.17	I

PKS 0906+01

UT_DATE	J.D.	MAG	RMS	COL
3/20/69	40300.687	16.95	0.05	P
3/23/69	40303.674	16.79	0.06	P
4/ 7/69	40318.562	16.82	0.06	P
4/ 9/69	40320.583	17.07	0.14	P
4/13/69	40324.583	16.91	0.14	P
4/20/69	40331.656	16.61	0.09	P
4/24/69	40335.578	16.53	0.15	P
5/11/69	40352.569	16.93	0.07	P
6/ 8/69	40380.562	16.29	0.09	P
10/13/69	40507.877	17.13	0.16	P
11/10/69	40535.913	17.13	0.12	P
11/12/69	40537.903	17.31	0.09	P
11/15/69	40540.903	16.58	0.09	P
1/ 9/70	40595.771	17.22	0.10	P
1/31/70	40617.759	17.14	0.07	P
2/ 8/70	40625.760	16.99	0.10	P
2/10/70	40627.736	17.11	0.19	P
2/14/70	40631.833	16.74	0.10	P
3/31/70	40676.587	17.27	0.06	P
4/ 7/70	40683.740	16.88	0.13	P
4/29/70	40705.646	17.34	0.12	P
4/30/70	40706.594	17.65	0.13	P
5/ 2/70	40708.562	17.38	0.09	P
5/ 7/70	40713.573	17.42	0.09	P
5/ 9/70	40715.611	17.46	0.05	P

PKS 0906+01 CONT.

UT_DATE	J.D.	MAG	RMS	COL
5/26/70	40732.601	17.24	0.08	P
5/31/70	40737.583	17.54	0.09	P
9/30/70	40859.897	16.72	0.11	P
10/ 3/70	40862.886	16.83	0.09	P
10/ 5/70	40864.899	16.75	0.10	P
10/ 9/70	40868.885	16.24	0.20	P
10/11/70	40870.906	16.04	0.09	P
11/ 2/70	40892.913	16.41	0.10	P
11/ 6/70	40896.882	16.75	0.05	P
11/ 8/70	40898.894	17.01	0.07	P
11/28/70	40918.854	17.14	0.13	P
11/29/70	40919.837	17.14	0.09	P
12/ 3/70	40923.875	16.63	0.12	P
12/ 5/70	40925.906	16.46	C.10	P
12/ 8/70	40928.826	16.69	0.08	P
12/23/70	40943.757	17.37	0.21	P
12/29/70	40949.698	16.91	0.06	P
1/ 1/71	40952.744	16.85	0.07	P
1/ 4/71	40955.814	16.72	0.15	P
1/16/71	40967.601	16.81	0.07	P
1/20/71	40971.705	16.27	0.05	P
1/22/71	40973.776	16.24	0.14	P
1/23/71	40974.865	16.78	0.09	P
1/25/71	40976.799	16.82	0.06	P
1/26/71	40977.724	16.75	0.12	P
1/27/71	40978.830	16.87	0.06	P
1/29/71	40980.771	16.61	0.13	P
1/30/71	40981.687	16.68	0.15	P
2/ 2/71	40984.822	16.46	0.07	P
2/14/71	40996.590	16.58	0.11	P
2/17/71	40999.694	16.99	0.09	P
2/19/71	41001.719	17.23	0.12	P
2/20/71	41002.646	17.26	0.13	P
2/21/71	41003.683	17.29	0.11	P
2/22/71	41004.756	17.42	0.13	P
2/24/71	41006.653	17.39	0.03	P
2/27/71	41009.529	17.35	0.05	P
3/ 1/71	41011.667	17.38	0.11	P
3/ 3/71	41013.772	17.43	0.09	P
3/ 4/71	41014.781	17.41	0.04	P
3/17/71	41027.540	17.07	0.06	P
3/19/71	41029.670	16.85	0.14	P
3/21/71	41031.542	16.60	0.09	P
3/23/71	41033.677	16.57	0.05	P
3/26/71	41036.703	16.73	0.07	P
3/28/71	41038.674	16.94	0.16	P
3/29/71	41039.605	16.84	0.16	P
3/31/71	41041.736	17.08	0.08	P
5/18/71	41089.577	17.04	0.11	P
5/19/71	41090.576	16.66	0.08	P
5/20/71	41091.577	16.61	0.09	P
5/21/71	41092.580	16.65	0.10	P
5/22/71	41093.580	16.38	0.08	P
5/26/71	41097.576	16.77	0.09	P
6/18/71	41120.576	16.48	0.16	P
6/21/71	41123.576	16.85	0.21	P
11/ 9/70	40899.885	17.38	0.18	B
11/26/70	40916.867	16.98	0.07	B
1/ 1/71	40952.805	17.09	0.07	B
1/22/71	40973.833	16.62	0.11	B
1/30/71	40981.731	16.71	0.12	B
2/ 2/71	40984.781	16.68	0.05	B
2/21/71	41003.771	17.38	0.11	B
2/24/71	41006.637	17.40	0.08	B
2/27/71	41009.590	17.65	0.06	B
3/17/71	41027.594	17.32	0.07	B
5/20/71	41091.621	16.70	0.10	B
10/19/71	41243.916	17.52	0.10	B
11/26/71	41281.922	17.72	0.08	B
12/15/71	41300.899	17.46	0.10	B
12/25/71	41310.840	17.62	0.07	B
2/20/72	41367.830	17.47	0.06	B
3/10/72	41386.773	17.22	0.06	B
3/15/72	41391.649	17.52	0.11	B
4/ 3/72	41410.578	17.14	0.05	B
4/11/72	41418.614	17.10	0.12	B
5/ 2/72	41439.591	17.18	0.08	B

PKS 0906+01 CONT.

UT_DATE	J.D.	MAG	RMS	COL
11/ 3/72	41624.871	17.91	0.10	B
1/ 2/73	41684.835	17.85	0.09	B
1/14/73	41696.865	17.94	0.07	B
1/29/73	41711.748	17.70	0.07	B
3/ 4/73	41745.687	17.91	0.09	B
4/22/73	41794.616	17.84	0.07	B
4/28/73	41800.610	17.72	0.08	B
5/ 1/73	41803.629	17.26	0.06	B
12/19/73	42035.834	17.38	0.08	B
1/ 4/74	42051.938	17.71	0.10	B
1/24/74	42071.842	17.12	0.07	B
1/27/74	42074.784	17.25	0.08	B
1/29/74	42076.828	17.67	0.08	B
2/19/74	42097.737	17.24	0.11	B
2/24/74	42102.723	17.32	0.07	B
3/14/74	42120.652	17.35	0.08	B
3/19/74	42125.654	17.36	0.09	B
4/11/74	42148.621	17.10	0.06	B
4/23/74	42160.653	16.79	0.09	B
4/28/74	42165.768	16.81	0.26	B
11/24/74	42375.926	17.39	0.09	B
12/19/74	42400.863	17.19	0.11	B
1/10/75	42422.833	17.26	0.10	B
1/18/75	42430.750	17.57	0.09	B
2/ 3/75	42446.743	17.59	0.14	B
2/10/75	42453.716	17.33	0.13	B
2/16/75	42459.784	17.65	0.12	B
3/ 6/75	42477.684	17.38	0.20	B
3/10/75	42481.673	17.84	0.09	B
4/ 6/75	42508.649	17.71	0.07	B
5/ 1/75	42533.571	18.43	0.19	B
5/ 4/75	42536.567	17.88	0.18	B
5/ 9/75	42541.581	17.77	0.13	B
5/12/75	42544.594	17.73	0.14	B
12/ 7/75	42753.940	17.69	0.07	B
12/ 7/75	42753.945	17.77	0.09	B
12/29/75	42775.819	17.70	0.11	B
1/ 3/76	42780.789	17.64	0.15	B
1/ 8/76	42785.816	17.47	0.05	B
1/ 8/76	42785.822	17.39	0.10	B
1/30/76	42808.845	17.75	0.09	B
1/30/76	42808.850	17.75	0.06	B
2/ 6/76	42814.767	17.99	0.13	B
2/21/76	42829.690	17.91	0.08	B
2/21/76	42829.697	17.54	0.09	B
2/29/76	42837.631	17.95	0.12	B
2/29/76	42837.637	17.93	0.12	B
3/25/76	42862.672	17.94	0.11	B
3/25/76	42862.678	17.93	0.09	B
4/ 2/76	42870.616	18.25	0.18	B
4/ 2/76	42870.622	17.85	0.08	B
4/18/76	42886.604	17.72	0.12	B
4/18/76	42886.610	17.91	0.07	B
4/27/76	42895.612	17.87	0.12	B
4/27/76	42895.619	18.29	0.09	B
12/27/76	43139.931	17.82	0.06	B
12/27/76	43139.936	17.80	0.08	B
1/20/77	43163.783	18.17	0.07	B
1/20/77	43163.788	17.79	0.10	B
2/11/77	43185.714	17.80	0.13	B
2/11/77	43185.719	17.65	0.13	B
2/19/77	43193.735	17.52	0.06	B
2/19/77	43193.741	17.59	0.14	B
4/10/77	43243.612	18.24	0.09	B
4/10/77	43243.616	17.95	0.14	B
4/18/77	43251.593	18.03	0.12	B
4/18/77	43251.596	17.69	0.09	B
5/ 9/77	43272.619	18.10	0.08	B
5/ 9/77	43272.624	17.63	0.18	B
1/12/78	43520.735	17.51	0.16	B
2/13/78	43552.725	18.15	0.13	B
3/11/78	43578.658	18.06	0.09	B
3/30/78	43597.667	18.13	0.07	B
4/ 6/78	43604.626	17.98	0.07	B
4/28/78	43626.603	17.82	0.10	B
1/ 3/79	43877.794	17.75	0.07	B
2/21/79	43926.676	17.87	0.14	B

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UT_DATE	J.D.	MAG	RMS	COL
2/22/72	41369.758	16.96	0.17	B
3/21/72	41397.753	16.83	0.05	B
5/ 2/72	41439.672	17.46	0.17	B
6/11/72	41479.608	16.65	0.04	B
6/27/73	41860.627	17.01	0.17	B
6/28/73	41861.622	16.78	0.06	B
6/30/73	41863.593	16.86	0.18	B
7/ 3/73	41866.641	16.99	0.23	B
7/25/73	41888.595	16.39	0.19	B
7/26/73	41889.587	16.95	0.13	B
1/27/74	42074.947	17.32	0.22	B
3/21/74	42127.808	16.80	0.16	B
4/28/74	42165.828	17.26	0.13	B
5/15/74	42182.724	16.92	0.24	B
5/17/74	42184.661	16.88	0.11	B
5/21/74	42188.742	16.70	0.16	B
5/24/74	42191.651	16.56	0.13	B
5/28/74	42195.744	17.04	0.12	B
6/11/74	42209.699	17.40	0.14	B
6/13/74	42211.694	17.27	0.15	B
6/16/74	42214.603	17.13	0.17	B
6/17/74	42215.642	17.43	0.08	B
6/17/74	42215.708	17.33	0.18	B
6/18/74	42216.615	17.30	0.15	B
6/19/74	42217.604	17.28	0.13	B
6/21/74	42219.632	16.91	0.14	B
6/23/74	42221.670	17.05	0.13	B
6/24/74	42222.637	17.06	0.10	B
7/14/74	42242.637	16.99	0.17	B
7/15/74	42243.626	17.21	0.12	B
7/16/74	42244.633	17.05	0.17	B
7/17/74	42245.637	16.95	0.06	.B
7/20/74	42248.592	16.92	0.12	B
2/ 7/75	42450.764	17.13	0.22	B
3/13/75	42484.845	17.32	0.10	B
5/ 9/75	42541.656	16.68	0.23	B
6/ 5/75	42568.594	16.58	0.19	B
6/ 5/75	42568.608	16.56	0.15	B
6/ 6/75	42569.611	16.12	0.09	B
6/11/75	42574.609	16.77	0.19	B
6/13/75	42576.625	16.47	0.13	B
6/13/75	42576.642	16.47	0.07	B
6/14/75	42577.660	15.98	0.05	B
7/ 3/75	42596.614	16.39	0.09	B
7/ 3/75	42596.632	16.16	0.14	B
7/ 8/75	42601.628	15.75	0.06	B
1/ 3/76	42780.876	16.09	0.16	B
1/26/76	42803.843	16.15	0.08	B
2/ 3/76	42811.870	16.45	0.04	B
3/ 4/76	42841.829	16.67	0.16	B
3/25/76	42862.753	16.72	0.08	B
4/ 4/76	42872.778	15.91	0.09	B
4/23/76	42891.689	16.52	0.12	B
4/24/76	42892.692	16.70	0.14	B
4/29/76	42897.676	17.21	0.32	B
6/ 1/76	42930.661	15.38	0.22	B
2/19/77	43193.892	16.23	0.07	B
2/19/77	43193.906	16.25	0.34	B
2/23/77	43197.890	16.47	0.05	B
2/25/77	43199.868	16.54	0.28	B
2/25/77	43199.874	16.51	0.22	B
2/26/77	43200.867	16.65	0.03	B
2/26/77	43200.882	16.67	0.09	B
3/23/77	43225.773	15.92	0.13	B
3/23/77	43225.785	15.91	0.08	B
4/10/77	43243.703	16.38	0.07	B
4/10/77	43243.719	16.42	0.07	B
4/12/77	43245.712	16.49	0.08	B
4/18/77	43251.692	16.62	0.15	B
4/18/77	43251.696	16.65	0.14	B
4/19/77	43252.790	16.45	0.14	B
4/19/77	43252.808	16.48	0.14	B
2/13/78	43552.878	16.94	0.14	B
3/ 7/78	43574.854	17.13	0.13	B
4/ 8/78	43606.686	17.05	0.27	B
4/11/78	43609.696	17.28	0.17	B
4/29/78	43627.661	17.27	0.20	B

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UT_DATE	J.D.	MAG	RMS	COL
5/11/78	43639.756	17.23	0.17	B
5/28/78	43656.650	16.88	0.12	B
6/ 7/78	43666.675	17.01	0.21	B
7/26/78	43716.591	16.65	0.19	B
12/ 2/78	43845.842	16.42	0.21	B
12/10/78	43853.843	15.95	0.14	B
12/10/78	43853.845	16.29	0.17	B
12/27/78	43870.803	16.35	0.05	B
12/31/78	43874.845	16.28	0.28	B

B2 1308+326

UT_DATE	J.D.	MAG	RMS	COL
4/22/76	42890.690	16.55	0.12	B
4/22/76	42890.696	16.43	0.14	B
5/ 3/76	42901.723	16.60	0.22	B
5/ 3/76	42901.728	16.92	0.15	B
1/26/77	43169.877	15.63	0.10	B
1/26/77	43169.883	15.68	0.13	B
2/21/77	43195.915	15.83	0.22	B
2/21/77	43195.922	15.89	0.26	B
2/25/77	43199.922	15.73	0.30	B
2/25/77	43199.928	15.59	0.20	B
3/27/77	43229.857	15.35	0.12	B
3/27/77	43229.862	15.21	0.24	B
4/13/77	43246.747	16.16	0.13	B
4/13/77	43246.754	16.08	0.09	B
4/18/77	43251.758	15.53	0.12	B
4/18/77	43251.762	15.52	0.10	B
5/14/77	43277.667	15.61	0.20	B
3/ 7/78	43574.869	16.86	0.13	B
4/ 2/78	43600.764	15.28	0.15	B
4/ 3/78	43601.692	15.20	0.12	B
4/ 5/78	43603.726	15.64	0.15	B
4/28/78	43626.685	16.33	0.13	B
5/ 2/78	43630.692	15.86	0.19	B
5/ 6/78	43634.631	15.98	0.09	B
5/26/78	43654.628	15.64	0.15	B
5/27/78	43655.660	15.40	0.27	B
5/28/78	43656.672	15.41	0.09	B
5/28/78	43656.678	15.55	0.12	B
5/30/78	43658.620	15.58	0.29	B
5/31/78	43659.710	15.58	0.23	B
6/ 2/78	43661.675	15.42	0.14	B
6/ 9/78	43668.633	15.73	0.16	B
7/ 6/78	43695.663	16.37	0.10	B
7/26/78	43715.613	16.40	0.17	B
8/ 5/78	43726.591	16.35	0.19	B
8/ 8/78	43729.556	16.38	0.15	B
12/31/78	43874.917	17.95	0.20	B

PKS 1514-24

UT_DATE	J.D.	MAG	RMS	COL
2/20/72	41367.931	16.09	0.13	B
4/18/72	41425.806	16.07	0.25	B
7/ 9/72	41507.624	16.64	0.07	B
3/ 4/73	41745.932	16.11	0.28	B
3/18/73	41759.890	15.64	0.26	B
4/ 9/73	41781.812	15.67	0.05	B
4/28/73	41800.770	15.62	0.06	B
5/ 2/73	41804.703	15.33	0.16	B
5/12/73	41814.661	15.92	0.03	B
6/10/73	41843.676	16.29	0.18	B
6/23/73	41856.685	16.16	0.10	B
6/27/73	41860.665	16.11	0.10	B
6/30/73	41863.667	15.68	0.09	B
7/ 3/73	41866.704	15.60	0.15	B
7/26/73	41889.606	15.74	0.26	B
7/26/73	41889.617	15.20	0.18	B
3/ 1/74	42107.926	15.95	0.06	B
4/19/74	42156.851	16.12	0.11	B
4/28/74	42165.858	15.96	0.04	B
5/19/74	42186.763	15.79	0.23	B
6/14/74	42212.716	16.07	0.06	B
6/16/74	42214.716	15.95	0.08	B
6/17/74	42215.750	16.11	0.11	B

PKS 1514-24 CONT.

UT_DATE	J.D.	MAG	RMS	COL
6/18/74	42216.733	16.02	0.10	B
6/19/74	42217.719	15.80	0.21	B
6/21/74	42219.737	15.99	0.09	B
6/23/74	42221.740	15.94	0.11	B
7/11/74	42239.656	15.92	0.11	B
7/15/74	42243.623	15.72	0.11	B
7/16/74	42244.687	15.76	0.13	B
7/17/74	42245.694	15.96	0.14	B
7/20/74	42248.646	15.92	0.04	B
2/ 9/75	42452.933	15.29	0.18	B
4/17/75	42519.847	15.43	0.24	B
5/12/75	42544.747	15.26	0.28	B
5/16/75	42548.791	15.46	0.13	B
6/ 1/75	42564.660	15.57	0.22	B
7/ 8/75	42601.667	16.18	0.14	B
3/11/76	42848.894	15.68	0.16	B
3/11/76	42848.899	15.81	0.14	B
4/ 4/76	42872.810	16.05	0.11	B
4/ 4/76	42872.816	16.50	0.13	B
5/ 4/76	42902.735	16.71	0.20	B
5/26/76	42924.693	16.35	0.19	B
5/26/76	42924.699	16.18	0.19	B
5/31/76	42929.744	16.33	0.21	B
6/ 1/76	42930.719	16.12	0.31	B
6/ 5/76	42934.745	16.14	0.33	B
6/ 5/76	42934.758	16.43	0.14	B
7/28/76	42987.588	16.07	0.13	B
7/28/76	42987.594	16.25	0.25	B
4/19/77	43252.777	15.26	0.26	B
4/19/77	43252.781	15.05	0.19	B
4/21/77	43254.697	15.34	0.17	B
4/27/77	43260.776	14.64	0.14	B
4/27/77	43260.780	14.63	0.15	B
5/ 9/77	43272.673	15.42	0.21	B
5/13/77	43276.707	15.42	0.10	B
5/14/77	43277.753	15.57	0.20	B
5/15/77	43278.761	15.04	0.22	B
5/17/77	43280.717	15.28	0.12	B
5/18/77	43281.734	14.74	0.16	B
5/20/77	43283.749	15.22	0.15	B
5/24/77	43287.679	14.21	0.14	B
5/25/77	43288.744	14.32	0.13	B
6/ 8/77	43302.703	15.66	0.16	B
6/ 9/77	43303.714	15.34	0.11	B
6/20/77	43314.676	15.51	0.11	B
6/21/77	43315.741	15.58	0.20	B
6/23/77	43317.685	15.65	0.17	B
7/ 9/77	43333.587	15.67	0.23	B
7/15/77	43339.590	15.56	0.18	B
7/20/77	43344.628	15.64	0.19	B
7/21/77	43345.672	16.02	0.24	B
3/14/78	43581.887	16.23	0.13	B
3/14/78	43581.892	16.38	0.09	B
5/ 1/78	43629.726	15.86	0.23	B
5/31/78	43659.756	15.98	0.13	B
6/ 9/78	43668.649	15.90	0.24	B

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UT_DATE	J.D.	MAG	RMS	COL
5/ 7/70	40713.750	17.54	0.11	P
5/31/70	40737.680	17.56	0.13	P
6/ 3/70	40740.704	16.32	0.24	P
6/ 5/70	40742.694	17.79	0.11	P
6/ 6/70	40743.621	18.35	0.09	P
6/ 6/70	40743.857	18.13	0.16	P
6/ 8/70	40745.769	18.25	0.17	P
6/ 9/70	40746.725	18.02	0.13	P
6/11/70	40748.753	17.97	0.17	P
6/13/70	40750.760	17.73	0.08	P
6/15/70	40752.800	17.80	0.21	P
6/16/70	40753.821	17.75	0.21	P
6/27/70	40764.609	17.41	0.14	P
6/27/70	40764.734	17.45	0.14	P
6/29/70	40766.635	17.64	0.25	P
6/29/70	40766.737	18.07	0.18	P
6/30/70	40767.599	17.55	0.13	P

NRAO 512 CONT.

UT_DATE	J.D.	MAG	RMS	COL
6/30/70	40767.831	17.68	0.09	P
7/ 1/70	40768.602	18.09	0.19	P
7/ 7/70	40774.604	17.97	0.21	P
7/ 9/70	40776.762	18.04	0.14	P
7/11/70	40778.800	18.33	0.21	P
7/12/70	40779.769	18.46	0.14	P
7/15/70	40782.809	18.81	0.16	P
7/31/70	40798.769	18.47	0.11	P
8/ 2/70	40800.588	18.29	0.12	P
8/ 4/70	40802.705	18.37	0.14	P
8/22/70	40820.569	18.05	0.21	P
8/23/70	40821.566	18.04	0.17	P
8/24/70	40822.604	18.17	0.15	P
8/25/70	40823.678	18.33	0.10	P
8/27/70	40825.565	18.15	0.17	P
8/30/70	40828.577	18.18	0.18	P
8/31/70	40829.571	18.88	0.21	P
9/ 1/70	40830.580	18.77	0.25	P
9/ 1/70	40830.597	19.35	0.17	P
9/ 3/70	40832.553	18.29	0.12	P
9/ 5/70	40834.594	18.77	0.08	P
9/ 6/70	40835.604	18.85	0.14	P
9/20/70	40849.542	18.88	0.16	P
9/21/70	40850.535	18.71	0.15	P
9/22/70	40851.537	18.80	0.12	P
9/22/70	40851.708	18.56	0.21	P
9/24/70	40853.539	18.53	0.28	P
9/25/70	40854.590	19.10	0.09	P
9/27/70	40856.601	18.94	0.23	P
9/30/70	40859.531	18.58	0.14	P
10/ 1/70	40860.549	18.67	0.10	P
10/ 3/70	40862.537	18.66	0.10	P
10/ 5/70	40864.576	18.74	0.16	P
11/ 2/70	40892.519	18.58	0.27	P
1/27/71	40978.937	19.07	0.09	P
1/29/71	40980.942	18.63	0.09	P
1/30/71	40981.928	19.02	0.18	P
2/24/71	41006.928	18.86	0.08	P
2/27/71	41009.862	18.56	0.08	P
3/ 4/71	41014.932	18.68	0.09	P
3/28/71	41038.858	18.74	0.08	P
3/31/71	41041.890	18.85	0.09	P
4/ 2/71	41043.851	18.64	0.15	P
4/25/71	41066.817	18.45	0.10	P
5/ 3/71	41074.828	18.98	0.13	P
5/ 5/71	41076.835	18.45	0.05	P
5/19/71	41090.692	18.91	0.06	P
5/20/71	41091.774	18.50	0.07	P
5/21/71	41092.735	18.42	0.10	P
5/22/71	41093.731	18.51	0.11	P
5/23/71	41094.753	18.77	0.19	P
5/25/71	41096.798	18.64	0.11	P
5/26/71	41097.735	18.82	0.13	P
6/ 3/71	41105.793	18.66	0.10	P
6/18/71	41120.669	18.75	0.10	P
6/21/71	41123.812	19.20	0.11	P
6/22/71	41124.711	18.56	0.14	P
6/24/71	41126.677	18.86	0.12	P
6/27/71	41129.781	18.70	0.11	P
6/30/71	41132.769	19.07	0.12	P
7/ 2/71	41134.742	19.12	0.13	P
7/15/71	41147.591	18.32	0.10	P
7/17/71	41149.625	18.96	0.09	P
7/21/71	41153.631	18.80	0.11	P
7/29/71	41161.728	18.83	0.08	P
8/14/71	41177.586	17.91	0.15	P
8/20/71	41183.656	17.25	0.10	P
8/22/71	41185.573	17.33	0.09	P
8/23/71	41186.569	16.95	0.16	P
8/24/71	41187.569	17.25	0.25	P
8/26/71	41189.735	17.26	0.08	P
8/27/71	41190.615	17.29	0.18	P
9/11/71	41205.549	17.31	0.09	P
9/13/71	41207.619	17.42	0.12	P
9/15/71	41209.551	17.50	0.10	P
9/19/71	41213.535	17.86	0.11	P
9/22/71	41216.559	17.63	0.11	P

TABLE II. (Continued).

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UT DATE	J.D.	MAG	RMS	COL
9/25/71	41219.587	18.24	0.21	P
10/ 9/71	41233.538	17.81	0.18	P
10/11/71	41235.519	17.83	0.09	P
10/12/71	41236.546	17.99	0.15	P
10/16/71	41240.510	17.29	0.18	P
10/19/71	41243.528	17.60	0.19	P
10/22/71	41246.518	17.18	0.07	P
1/25/72	41341.925	18.22	0.10	P
2/14/72	41361.948	17.62	0.06	P
3/14/72	41390.896	17.94	0.16	P
3/21/72	41397.890	17.97	0.21	P
4/16/72	41423.839	17.19	0.18	P
4/18/72	41425.849	17.04	0.09	P
5/21/72	41458.875	18.15	0.07	P
6/ 3/72	41471.635	17.58	0.15	P
6/ 4/72	41472.716	17.17	0.14	P
6/ 9/72	41477.606	17.31	0.21	P
6/14/72	41482.751	17.01	0.17	P
7/ 3/72	41501.601	17.73	0.15	P
7/ 8/72	41506.709	18.15	0.16	P
7/18/72	41516.724	17.77	0.06	P
8/ 3/72	41532.616	17.77	0.13	P
8/11/72	41540.574	17.62	0.12	P
9/ 3/72	41563.572	18.07	0.11	P
9/ 5/72	41565.569	17.69	0.16	P
9/ 8/72	41568.568	17.87	0.23	P
10/ 2/72	41592.537	17.51	0.10	P
10/ 7/72	41597.542	17.54	0.16	P
11/ 3/72	41624.511	17.33	0.14	P
11/ 4/72	41625.612	17.33	0.11	P
11/ 5/72	41626.507	17.60	0.24	P
11/ 5/72	41626.529	17.62	0.17	P
3/ 4/73	41745.909	18.16	0.15	P
4/19/73	41781.877	18.12	0.08	P
5/ 2/73	41804.817	18.44	0.08	P
5/24/73	41826.684	18.88	0.06	P
6/ 1/73	41834.659	18.46	0.11	P
6/ 3/73	41836.786	18.16	0.15	P
6/23/73	41856.615	18.42	0.11	P
6/30/73	41863.707	18.60	0.14	P
7/ 3/73	41866.726	19.26	0.24	P
7/ 8/73	41871.739	19.02	0.19	P
7/24/73	41887.664	18.50	0.20	P
7/25/73	41888.672	18.32	0.15	P
7/26/73	41889.643	18.07	0.17	P
8/28/73	41922.569	18.21	0.14	P
9/18/73	41943.553	18.08	0.16	P
9/30/73	41955.583	18.57	0.16	P
2/24/74	42102.901	18.66	0.26	P
4/ 2/74	42137.865	18.48	0.12	P
4/19/74	42156.871	18.03	0.08	P
4/20/74	42157.825	18.51	0.19	P
4/30/74	42167.808	17.63	0.08	P
5/ 1/74	42168.852	17.81	0.17	P
5/17/74	42184.753	17.52	0.15	P
5/22/74	42189.724	18.39	0.19	P
5/24/74	42191.767	18.17	0.09	P
6/12/74	42210.774	17.69	0.25	P
6/13/74	42211.722	18.02	0.19	P
6/17/74	42215.687	18.35	0.11	P
6/21/74	42219.676	18.81	0.19	P
7/16/74	42244.597	18.51	0.21	P
9/12/74	42302.548	18.59	0.11	P
3/20/75	42491.917	18.45	0.15	P
4/18/75	42520.872	18.28	0.22	P
5/ 7/75	42539.759	18.20	0.11	P
5/16/75	42548.822	18.65	0.12	P
6/ 4/75	42567.709	18.28	0.13	P
6/10/75	42573.699	18.50	0.16	P
6/18/75	42581.753	18.56	0.20	P
8/28/75	42652.560	18.69	0.23	P
7/ 5/76	42964.736	18.84	0.23	P
4/12/77	43245.786	18.39	0.20	P
4/12/77	43245.790	18.51	0.24	P
5/15/77	43276.723	18.29	0.25	P
3/17/78	43584.865	18.63	0.15	P
5/ 1/78	43629.742	17.92	0.20	P
5/11/78	43639.801	18.63	0.13	P
5/20/78	43648.719	18.35	0.15	P
6/ 9/78	43668.725	17.86	0.09	P
7/ 6/78	43695.721	18.45	0.21	P
8/ 8/78	43728.604	18.03	0.19	P
8/26/78	43747.628	18.71	0.21	P
8/31/78	43752.595	18.17	0.18	P

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UT DATE	J.D.	MAG	RMS	COL
9/20/70	40849.559	16.12	0.05	P
9/22/70	40851.559	16.27	0.12	P
9/23/70	40852.542	16.19	0.09	P
9/25/70	40854.604	16.24	0.06	P
10/ 1/70	40860.569	16.30	0.15	P
10/ 3/70	40862.553	16.17	0.14	P
10/28/70	40887.859	16.19	0.09	P
11/ 2/70	40892.535	16.25	0.16	P
1/30/71	40981.942	16.01	0.12	P
2/24/71	41006.937	15.97	0.06	P
2/27/71	41009.875	15.88	0.12	P
3/23/71	41033.881	15.91	0.15	P
3/28/71	41038.889	15.79	0.01	P
3/31/71	41041.899	15.45	0.09	P
4/25/71	41066.831	15.62	0.15	P
5/19/71	41090.701	15.44	0.07	P
5/21/71	41092.753	15.24	0.11	P
5/31/71	41102.764	15.40	0.15	P
6/22/71	41124.733	15.33	0.20	P
6/24/71	41126.697	15.42	0.07	P
6/27/71	41129.802	15.32	0.07	P
6/30/71	41132.781	15.29	0.16	P
7/ 2/71	41134.757	15.46	0.12	P
7/15/71	41147.604	15.48	0.06	P
7/17/71	41149.640	14.95	0.15	P
7/18/71	41150.587	14.84	0.19	P
7/29/71	41161.746	14.88	0.20	P
6/22/71	41124.747	16.01	0.02	U
7/ 4/71	41136.827	15.25	0.09	U
7/18/71	41150.601	15.55	0.15	U
7/21/71	41153.658	15.77	0.17	U
8/14/71	41177.621	15.27	0.08	U
8/27/71	41190.667	15.17	0.15	U
9/11/71	41205.588	14.68	0.21	U
9/15/71	41209.578	14.53	0.16	U
9/19/71	41213.588	15.22	0.06	U
9/25/71	41219.619	14.91	0.13	U
10/11/71	41235.549	14.58	0.16	U
10/12/71	41236.572	15.08	0.05	U
10/16/71	41240.544	15.34	0.13	U
10/19/71	41243.556	15.15	0.21	U
10/22/71	41246.562	14.79	0.33	U
2/13/72	41360.923	15.82	0.09	U
2/22/72	41369.918	15.90	0.06	U
3/21/72	41397.915	15.82	0.10	U
4/18/72	41425.867	15.69	0.10	U
5/21/72	41458.792	15.59	0.13	U
6/ 3/72	41471.618	15.52	0.13	U
6/ 4/72	41472.690	15.90	0.07	U
6/ 9/72	41477.657	15.64	0.17	U
6/12/72	41480.623	15.09	0.15	U
6/14/72	41482.709	15.90	0.20	U
7/ 3/72	41501.633	15.56	0.17	U
7/ 3/73	41866.756	16.28	0.22	U
7/ 8/73	41871.693	16.01	0.10	U
7/26/73	41889.686	16.06	0.16	U
7/29/73	41892.583	16.52	0.12	U
9/19/73	41944.540	16.14	0.19	U
3/18/74	42124.831	16.35	0.20	U
4/19/74	42156.849	16.19	0.09	U
5/19/74	42186.838	16.11	0.12	U
5/24/74	42191.793	16.29	0.08	U
6/21/74	42219.705	15.98	0.23	U
6/22/71	41124.781	16.09	0.09	B
7/ 4/71	41136.857	15.86	0.19	B
7/18/71	41150.629	15.51	0.18	B
7/21/71	41153.649	15.82	0.12	B
8/14/71	41177.613	15.06	0.13	B
8/27/71	41190.653	15.50	0.27	B
9/11/71	41205.605	15.52	0.09	B
9/15/71	41209.572	15.22	0.13	B
9/19/71	41213.581	15.72	0.19	B
9/22/71	41216.583	15.47	0.10	B
9/25/71	41219.614	15.61	0.11	B
10/ 9/71	41233.559	15.42	0.08	B
10/11/71	41235.542	15.53	0.09	B
10/12/71	41236.565	15.34	0.04	B
10/19/71	41243.549	15.77	0.08	B
10/22/71	41246.553	15.52	0.07	B
2/13/72	41360.919	16.32	0.04	B
2/22/72	41369.910	16.32	0.10	B
3/14/72	41390.927	16.31	0.04	B
3/21/72	41397.903	16.36	0.08	B
4/18/72	41425.859	16.27	0.06	B
5/21/72	41458.780	15.98	0.05	B
6/ 3/72	41471.590	16.26	0.04	B
6/ 3/72	41471.608	16.19	0.24	B
6/ 4/72	41472.680	16.15	0.02	B
6/ 9/72	41477.635	16.58	0.15	B
6/12/72	41480.653	16.20	0.14	B
6/14/72	41482.701	16.23	0.09	B
7/ 3/72	41501.622	16.53	0.11	B
7/ 9/72	41507.719	15.93	0.13	B
7/18/72	41516.740	16.23	0.09	B
8/ 3/72	41532.587	16.49	0.17	B
8/11/72	41540.594	16.43	0.13	B
8/14/72	41543.601	16.18	0.08	B
9/ 3/72	41563.553	16.44	0.06	B
9/ 5/72	41565.549	16.51	0.11	B
9/ 8/72	41568.588	16.53	0.13	B
10/ 2/72	41592.558	16.20	0.07	B
10/ 7/72	41597.561	16.26	0.12	B
10/11/72	41601.576	16.05	0.17	B
3/ 4/73	41745.888	15.78	0.06	B
4/ 9/73	41781.917	16.68	0.16	B
4/28/73	41800.808	16.78	0.06	B
5/11/73	41813.831	16.89	0.15	B
5/26/73	41828.703	16.82	0.07	B
6/ 1/73	41834.638	16.71	0.03	B
6/ 5/73	41838.732	16.88	0.17	B
6/ 9/73	41842.809	16.97	0.08	B
6/23/73	41856.631	16.82	0.02	B
6/27/73	41860.697	16.99	0.16	B
7/ 3/73	41866.750	17.16	0.06	B
7/ 8/73	41871.722	16.70	0.17	B
7/23/73	41886.714	16.72	0.17	B
7/24/73	41887.686	16.72	0.12	B
7/26/73	41889.661	16.83	0.17	B
8/23/73	41917.580	16.82	0.15	B
8/29/73	41923.578	16.88	0.13	B
9/18/73	41943.537	17.01	0.19	B
9/19/73	41944.542	16.92	0.18	B
2/25/74	42103.768	16.89	0.06	B
3/18/74	42124.824	16.73	0.08	B
3/31/74	42137.881	16.82	0.06	B
4/19/74	42156.843	16.72	0.10	B
4/21/74	42158.866	16.67	0.08	B
4/30/74	42167.822	16.71	0.21	B
5/17/74	42184.733	16.65	0.06	B
5/19/74	42186.831	16.75	0.05	B
5/24/74	42191.793	16.87	0.03	B
6/ 5/74	42203.784	16.82	0.06	B
6/17/74	42215.744	16.83	0.03	B
6/19/74	42217.708	16.54	0.10	B
6/21/74	42219.694	16.82	0.09	B
6/28/74	42226.789	16.84	0.04	B
7/16/74	42244.613	16.84	0.17	B
8/13/74	42272.597	16.65	0.11	B
8/18/74	42277.597	16.67	0.28	B
9/12/74	42302.571	16.60	0.03	B
4/18/75	42520.859	16.68	0.03	B
5/ 7/75	42539.790	16.72	0.02	B
5/16/75	42548.836	16.69	0.13	B
6/ 4/75	42567.719	16.46	0.12	B
6/18/75	42581.814	16.43	0.15	B
7/ 5/75	42598.748	16.43	0.03	B
7/ 9/75	42602.703	16.64	0.13	B
8/ 2/75	42626.683	16.72	0.13	B
8/28/75	42652.566	17.07	0.10	B
8/29/75	42653.630	17.09	0.33	B
9/26/75	42681.597	16.54	0.12	B
2/11/76	42819.906	16.52	0.10	B
2/11/76	42819.910	16.57	0.13	B
2/28/76	42836.878	16.41	0.11	B
2/28/76	42836.883	16.42	0.10	B
5/ 4/76	42902.782	16.17	0.19	B
5/ 4/76	42902.787	16.28	0.10	B
6/ 1/76	42930.744	16.26	0.17	B
6/ 1/76	42930.749	16.34	0.19	B
6/18/76	42947.698	16.36	0.09	B
6/22/76	42951.697	16.30	0.16	B
6/22/76	42951.744	16.24	0.06	B
6/22/76	42951.750	16.39	0.13	B
7/ 5/76	42964.747	16.08	0.11	B
7/ 5/76	42964.756	16.46	0.22	B
7/26/76	42985.679	16.65	0.21	B
7/29/76	42988.595	16.60	0.12	B
7/29/76	42988.601	16.61	0.21	B
8/17/76	43007.593	16.66	0.03	B
8/17/76	43007.599	16.76	0.24	B
8/29/76	43019.617	16.76	0.05	B
8/29/76	43019.622	16.66	0.10	B
9/16/76	43037.567	16.39	0.11	B
9/16/76	43037.574	16.39	0.09	B
3/29/77	43231.909	16.32	0.03	B
3/29/77	43231.914	16.60	0.14	B
4/12/77	43245.802	16.44	0.04	B
4/19/77	43252.762	16.25	0.05	B
4/19/77	43252.768	16.47	0.06	B
5/15/77	43278.734	16.09	0.23	B
5/15/77	43278.737	16.38	0.23	B
5/25/77	43288.771	16.78	0.09	B
5/25/77	43288.774	16.51	0.07	B
6/23/77	43317.776	16.55	0.19	B
7/ 9/77	43333.685	17.24	0.24	B
7/22/77	43346.694	16.43	0.17	B
7/22/77	43346.697	16.49	0.22	B
9/ 9/77	43395.602	15.69	0.14	B
10/ 6/77	43420.547	16.44	0.13	B
3/17/78	43584.858	16.51	0.06	B
5/ 1/78	43629.758	16.89	0.13	B
5/ 6/78	43634.742	16.77	0.06	B
5/29/78	43657.741	16.09	0.13	B
6/26/78	43685.675	16.47	0.16	B
7/ 6/78	43695.751	16.64	0.06	B
8/ 5/78	43725.670	16.41	0.12	B
8/ 8/78	43728.621	16.77	0.16	B
8/28/78	43748.633	16.12	0.13	B
8/27/78	43747.607	16.11	0.21	B
8/29/78	43749.627	15.98	0.11	B
8/31/78	43751.598	16.27	0.03	B
9/ 3/78	43755.627	17.15	0.10	B
6/22/71	41124.806	15.77	0.09	V
7/ 4/71	41136.810	15.33	0.13	V
7/18/71	41150.646	15.12	0.11	V
7/21/71	41153.675	15.60	0.22	V
8/14/71	41177.637	15.71	0.09	V
8/27/71	41190.685	15.37	0.07	V
9/11/71	41205.614	15.13	0.04	V
9/15/71	41209.590	14.88	0.04	V
9/19/71	41213.567	15.08	0.08	V
9/22/71	41216.615	15.06	0.06	V
9/25/71	41219.642	15.00	0.24	V
10/ 9/71	41233.587	14.79	0.13	V
10/11/71	41235.568	14.74	0.17	V
10/12/71	41236.590	14.92	0.03	V
10/16/71	41240.560	15.28	0.14	V
10/19/71	41243.574	15.36	0.18	V
10/22/71	41246.540	15.20	0.06	V
2/13/72	41360.937	15.95	0.06	V
2/22/72	41369.934	15.92	0.06	V
3/21/72	41397.929	15.91	0.09	V
5/21/72	41458.807	15.74	0.08	V
6/ 3/72	41471.597	15.98	0.09	V
6/ 4/72	41472.703	15.98	0.14	V
6/ 9/72	41477.686	16.05	0.06	V
6/12/72	41480.684	16.01	0.11	V
6/14/72	41482.728	16.13	0.19	V
7/ 3/72	41501.647	15.67	0.14	V
7/ 9/72	41507.744	15.71	0.09	V
7/ 3/73	41866.741	16.95	0.19	V
7/24/73	41887.699	17.22	0.05	V
7/26/73	41889.674	17.11	0.18	V
8/29/73	41923.594	16.82	0.09	V
9/19/73	41944.559	16.57	0.18	V
2/25/74	42103.934	16.91	0.07	V
3/18/74	42124.840	16.76	0.08	V
4/19/74	42156.860	16.48	0.05	V
5/19/74	42186.847	16.70	0.06	V
5/24/74	42191.803	16.45	0.11	V
6/19/74	42217.725	16.84	0.10	V
6/21/74	42219.747	16.54	0.10	V
7/16/74	42244.628	16.85	0.17	V

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UT DATE	J.D.	MAG	RMS	COL
7/11/72	41509.701	18.76	0.14	P
6/ 5/73	41838.859	18.89	0.13	P
5/12/75	42544.826	18.72	0.18	P
6/12/75	42575.756	19.11	0.11	P
4/29/77	43262.927	18.37	0.10	P
6/ 9/77	43303.729	18.07	0.15	P
6/ 9/77	43303.734	17.89	0.20	P
7/11/77	43335.665	18.14	0.27	P
7/15/77	43339.656	17.68	0.16	P
8/ 6/77	43361.579	17.18	0.17	P
8/10/77	43365.644	17.19	0.19	P
8/16/77	43371.613	17.12	0.17	P
9/ 6/77	43392.550	16.48	0.19	P
9/ 7/77	43393.543	16.15	0.09	P
9/ 8/77	43394.553	16.99	0.03	P
9/ 9/77	43395.590	16.89	0.15	P
5/ 5/78	43633.778	17.91	0.14	P
6/ 2/78	43661.772	18.26	0.18	P
7/ 4/78	43693.681	17.77	0.11	P
7/ 6/78	43695.705	18.37	0.19	P
7/26/78	43715.646	16.37	0.14	P
8/ 5/78	43725.631	18.10	0.23	P
8/ 8/78	43728.661	17.97	0.21	P

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UT DATE	J.D.	MAG	RMS	COL
12/16/68	40205.000	14.86	0.13	P
12/30/68	40219.000	14.53	0.09	P
2/25/69	40277.000	14.91	0.08	P
3/20/69	40300.000	14.41	0.11	P
4/13/69	40324.799	14.97	0.06	P
6/ 9/69	40380.000	14.42	0.07	P
7/11/69	40413.723	14.70	0.14	P
8/21/69	40454.816	15.26	0.16	P
9/ 5/69	40469.708	14.98	0.08	P
10/13/69	40507.551	14.63	0.11	P
11/ 6/69	40531.635	14.46	0.11	P
4/ 7/70	40683.904	14.56	0.04	P
5/ 2/70	40708.797	14.39	0.10	P
5/ 7/70	40713.787	14.50	0.11	P
5/11/70	40717.825	14.60	0.08	P
5/31/70	40737.711	14.22	0.17	P
6/ 5/70	40742.735	14.64	0.11	P
6/10/70	40747.791	14.24	0.14	P
7/ 7/70	40774.666	14.29	0.21	P
8/ 2/70	40800.679	14.29	0.13	P
8/23/70	40821.600	14.04	0.16	P
8/27/70	40825.589	14.28	0.11	P
9/ 3/70	40832.613	14.18	0.20	P
9/20/70	40849.708	14.10	0.09	P
10/ 1/70	40860.596	14.34	0.07	P
10/ 3/70	40862.587	14.46	0.17	P
5/ 3/71	41074.868	14.65	0.05	P
5/20/71	41091.808	14.43	0.14	P
6/27/71	41129.756	14.67	0.12	P
7/17/71	41149.667	14.38	0.15	P
7/18/71	41150.680	14.18	0.07	P
7/21/71	41153.713	14.32	0.06	P
7/23/71	41155.589	14.27	0.06	P
8/20/71	41183.631	14.70	0.12	P
11/ 8/71	41263.566	14.51	0.08	P
6/ 9/72	41477.727	14.33	0.10	P
7/ 9/72	41507.812	14.03	0.08	P
8/ 9/72	41538.590	13.99	0.10	P
9/ 3/72	41563.594	14.07	0.10	P
9/ 8/72	41568.645	14.18	0.10	P
10/ 2/72	41592.583	14.19	0.08	P
10/ 7/72	41597.603	14.30	0.11	P
10/11/72	41601.605	14.08	0.11	P
4/11/73	41783.891	14.33	0.08	P
6/ 4/73	41837.766	14.13	0.14	P
6/27/73	41860.742	14.38	0.10	P
7/ 8/73	41871.778	14.21	0.17	P
8/23/73	41917.726	14.24	0.08	P
9/18/73	41943.587	14.28	0.16	P
9/30/73	41955.624	14.31	0.12	P
4/21/74	42158.884	14.56	0.09	P
4/30/74	42167.845	14.69	0.08	P
5/19/74	42186.812	14.34	0.17	P
5/22/74	42189.770	15.02	0.15	P
5/24/74	42191.820	14.64	0.15	P
5/26/74	42193.807	15.13	0.14	P
5/30/74	42197.781	14.86	0.11	P
6/14/74	42212.775	14.67	0.12	P
6/20/74	42218.794	14.44	0.14	P
7/16/74	42244.701	14.52	0.15	P
7/22/74	42250.694	14.72	0.12	P
8/13/74	42272.635	14.23	0.10	P
8/18/74	42277.625	14.62	0.15	P
9/ 9/74	42299.576	14.63	0.11	P
10/11/74	42331.543	14.47	0.14	P
4/20/75	42522.827	14.09	0.07	P
5/ 7/75	42539.810	14.10	0.11	P
5/16/75	42548.870	13.62	0.25	P
6/ 7/75	42570.767	13.83	0.12	P
6/18/75	42581.842	13.99	0.16	P
7/ 4/75	42597.761	13.93	0.06	P
7/ 5/75	42598.794	14.16	0.25	P
7/ 8/75	42601.741	14.22	0.10	P
7/ 9/75	42602.749	14.28	0.18	P
7/10/75	42603.785	14.36	0.19	P
8/ 2/75	42626.710	14.82	0.11	P
8/ 6/75	42630.663	14.50	0.30	P
8/28/75	42652.576	14.36	0.21	P
9/ 3/75	42658.663	14.24	0.11	P
9/26/75	42681.597	14.57	0.07	P
9/26/75	42681.602	14.50	0.15	P
10/ 2/75	42687.625	14.62	0.13	P
4/16/76	42884.891	14.91	0.12	P
4/16/76	42884.894	14.59	0.18	P
4/27/76	42895.708	14.01	0.11	P
4/27/76	42895.711	13.99	0.15	P
5/ 4/76	42902.851	13.91	0.13	P
5/ 4/76	42902.856	14.19	0.17	P
6/ 2/76	42931.788	14.05	0.12	P
6/ 2/76	42931.792	14.29	0.16	P
6/25/76	42954.790	14.58	0.15	P
6/25/76	42954.794	14.70	0.18	P
7/ 5/76	42964.794	14.67	0.08	P
7/ 5/76	42964.800	14.63	0.19	P
7/23/76	42982.666	14.69	0.08	P
7/23/76	42982.671	14.56	0.22	P
8/ 2/76	42992.682	14.26	0.23	P
8/ 2/76	42992.686	14.47	0.24	P
8/25/76	43015.587	14.69	0.17	P
9/16/76	43037.603	14.63	0.12	P
9/16/76	43037.608	14.74	0.09	P
5/13/77	43276.816	14.29	0.11	P
5/13/77	43276.819	14.33	0.09	P
5/25/77	43288.803	14.29	0.13	P
5/25/77	43288.807	14.42	0.13	P
6/23/77	43317.785	14.24	0.19	P
7/22/77	43346.711	14.42	0.13	P
8/ 6/77	43361.650	13.66	0.21	P
9/ 5/77	43391.892	14.07	0.11	P
9/ 8/77	43394.605	14.11	0.15	P
10/ 5/77	43421.549	14.29	0.15	P
10/ 5/77	43421.561	14.27	0.12	P
3/17/78	43564.901	14.02	0.10	P
5/ 5/78	43633.853	14.16	0.07	P
5/31/78	43659.734	14.36	0.11	P
6/ 9/78	43668.758	14.13	0.19	P
7/ 6/78	43695.732	14.20	0.17	P
7/27/78	43717.640	13.57	0.23	P
8/ 5/78	43726.629	13.78	0.25	P
8/ 8/78	43729.629	13.91	0.25	P
8/26/78	43747.637	14.15	0.05	P
9/ 4/78	43756.557	14.24	0.24	P
9/23/78	43775.548	14.03	0.20	P
10/23/78	43805.505	14.24	0.21	P
2/27/69	40279.708	13.32	0.10	I
7/11/69	40413.778	13.41	0.06	I
8/21/69	40454.799	13.71	0.13	I
8/25/69	40458.756	13.53	0.10	I
10/13/69	40507.574	13.57	0.06	I
11/ 6/69	40531.654	13.32	0.11	I
6/11/70	40748.828	13.42	0.16	I
7/ 7/70	40774.699	13.29	0.21	I
7/ 5/76	42964.812	13.44	0.18	I
10/16/76	43067.542	13.18	0.19	I
10/21/76	43072.538	13.36	0.07	I
8/12/77	43367.653	13.07	0.02	I

OX 074

UT DATE	J.D.	MAG	RMS	COL
5/13/70	40719.875	16.82	0.10	P
7/30/70	40797.844	17.28	0.11	P
8/23/70	40821.708	16.56	0.14	P
8/27/70	40825.621	17.27	0.13	P
8/30/70	40828.810	17.14	0.19	P
9/ 1/70	40830.632	17.33	0.14	P
9/ 3/70	40832.698	17.32	0.15	P
9/ 6/70	40835.690	17.15	0.19	P
9/22/70	40851.608	17.38	0.21	P
9/22/70	40851.708	17.33	0.14	P
9/26/70	40855.604	17.11	0.15	P
9/27/70	40856.648	17.36	0.14	P
9/28/70	40857.609	17.15	0.16	P
10/ 5/70	40864.701	17.05	0.07	P
10/22/70	40881.621	17.33	0.08	P
10/26/70	40885.597	17.27	0.06	P
11/ 2/70	40892.562	17.40	0.13	P
11/18/70	40908.537	17.41	0.10	P
11/28/70	40918.610	17.61	0.15	P
12/19/70	40939.528	17.53	0.08	P
5/ 5/71	41076.874	17.70	0.09	P
5/20/71	41091.794	17.82	0.18	P
6/ 3/71	41105.847	17.60	0.05	P
6/20/71	41122.831	17.83	0.08	P
6/30/71	41132.815	17.61	0.13	P
7/24/71	41156.849	17.69	0.13	P
8/31/71	41194.849	17.76	0.12	P
9/19/71	41213.738	17.57	0.15	P
10/12/71	41236.617	17.73	0.08	P
11/15/71	41270.568	17.54	0.07	P
12/15/71	41300.565	17.85	0.10	P
7/18/72	41516.770	17.78	0.14	P
8/ 3/72	41532.670	17.65	0.10	P
8/ 8/72	41537.866	17.92	0.13	P
8/14/72	41543.709	17.91	0.07	P
8/17/72	41546.724	17.57	0.08	P
9/ 3/72	41563.656	17.83	0.10	P
9/11/72	41571.615	17.57	0.12	P
10/ 2/72	41592.619	17.69	0.10	P
10/ 8/72	41598.615	17.64	0.11	P
11/ 3/72	41624.583	17.63	0.16	P
11/28/72	41649.503	17.59	0.12	P
7/ 8/73	41871.802	17.89	0.18	P
8/10/73	41904.821	17.15	0.16	P
9/ 1/73	41926.768	17.50	0.14	P
9/21/73	41946.582	17.61	0.15	P
10/ 4/73	41959.749	16.83	0.10	P
10/19/73	41974.555	17.77	0.22	P
11/28/73	42014.560	17.70	0.12	P
5/19/74	42186.869	17.29	0.15	P
5/22/74	42189.831	17.64	0.18	P
6/17/74	42215.866	17.94	0.18	P
7/17/74	42245.823	16.97	0.11	P
8/14/74	42273.735	17.02	0.12	P
9/ 9/74	42299.640	17.01	0.09	P
10/ 9/74	42329.619	17.31	0.12	P
12/ 9/74	42390.557	17.77	0.11	P
5/19/75	42551.858	17.65	0.11	P
6/11/75	42574.869	17.87	0.16	P
7/ 7/75	42600.857	17.24	0.19	P
7/19/75	42612.837	17.24	0.12	P
7/19/75	42612.842	17.22	0.13	P
8/ 3/75	42627.773	16.47	0.13	P
8/ 6/75	42630.699	16.84	0.22	P
8/ 6/75	42630.705	17.20	0.22	P
8/14/75	42638.717	17.74	0.14	P
8/14/75	42638.724	17.60	0.12	P
8/26/75	42650.654	16.95	0.17	P
9/ 3/75	42658.787	17.51	0.10	P
9/ 6/75	42661.681	17.46	0.20	P
10/ 2/75	42687.671	16.61	0.06	P
10/ 2/75	42687.681	16.94	0.18	P
10/25/75	42710.628	17.89	0.16	P
11/ 1/75	42717.513	17.68	0.18	P
11/30/75	42746.518	17.78	0.11	P
11/30/75	42746.524	17.92	0.09	P
7/29/76	42988.787	18.16	0.10	P
7/29/76	42988.792	18.25	0.19	P
8/29/76	43019.681	18.05	0.26	P
9/16/76	43037.646	17.09	0.15	P
9/16/76	43037.653	17.29	0.15	P
9/26/76	43047.631	17.89	0.11	P
6/23/77	43317.785	17.14	0.21	P
7/ 9/77	43333.731	17.11	0.26	P
7/13/77	43337.786	17.64	0.18	P
8/11/77	43366.722	17.39	0.25	P
9/ 6/77	43392.679	18.04	0.21	P
9/ 8/77	43394.644	17.50	0.23	P
10/ 3/77	43419.608	17.32	0.08	P
10/12/77	43428.583	17.45	0.13	P
11/11/77	43458.562	17.82	0.08	P
8/ 8/78	43728.794	17.58	0.14	P
8/26/78	43746.714	17.84	0.27	P
10/24/78	43806.550	18.28	0.22	P
11/23/78	43836.549	17.58	0.15	P

BL LAC

UT DATE	J.D.	MAG	RMS	COL
6/24/71	41126.835	15.33	0.07	U
7/17/71	41149.699	15.47	0.10	U
7/21/71	41153.856	15.31	0.15	U
7/25/71	41157.781	15.77	0.10	U
8/14/71	41177.684	15.46	0.14	U
8/20/71	41183.720	15.52	0.19	U
8/26/71	41189.805	15.44	0.10	U
8/31/71	41194.778	15.17	0.06	U
9/ 1/71	41195.799	14.86	0.03	U
9/13/71	41207.669	15.31	0.14	U
9/15/71	41209.662	15.08	0.07	U
9/19/71	41213.669	15.38	0.08	U
9/22/71	41216.668	15.08	0.12	U
9/25/71	41219.742	15.83	0.13	U
9/27/71	41221.754	15.81	0.05	U

TABLE II. (Continued).

UT DATE	J.D.	MAG	RMS	COL
	BL LAC	CONT.		
9/29/71	41223.796	15.77	0.09	U
9/30/71	41224.797	15.47	0.06	U
10/12/71	41236.703	15.96	0.06	U
10/16/71	41240.667	16.13	0.05	U
10/19/71	41243.672	15.66	0.07	U
11/ 8/71	41263.509	15.87	0.12	U
11/ 8/71	41263.600	15.96	0.13	U
11/14/71	41269.646	16.12	0.07	U
11/15/71	41270.512	16.00	0.08	U
11/15/71	41270.683	16.34	0.18	U
12/14/71	41299.581	15.51	0.07	U
4/18/72	41425.900	14.81	0.06	U
5/21/72	41458.792	15.61	0.21	U
7/13/72	41511.808	15.49	0.09	U
8/ 8/72	41537.794	15.00	0.16	U
8/14/72	41543.794	15.65	0.10	U
8/16/72	41545.783	15.80	0.11	U
9/ 3/72	41563.694	16.11	0.12	U
9/ 8/72	41568.687	15.69	0.11	U
9/18/72	41578.749	15.62	0.22	U
10/ 1/72	41591.622	16.47	0.15	U
11/ 3/72	41624.549	15.23	0.22	U
11/ 4/72	41625.551	15.61	0.18	U
5/ 1/73	41803.849	15.53	0.13	U
5/11/73	41813.869	14.58	0.03	U
6/ 4/73	41837.856	15.16	0.05	U
6/ 7/73	41840.840	14.84	0.15	U
7/25/73	41888.721	15.92	0.11	U
9/ 5/73	41930.790	16.24	0.06	U
9/22/73	41947.661	16.23	0.14	U
10/28/73	41983.710	15.66	0.13	U
11/24/73	42010.598	15.85	0.07	U
5/21/74	42188.847	15.05	0.16	U
5/24/74	42191.877	15.31	0.12	U
5/30/74	42197.887	15.29	0.03	U
6/17/74	42215.797	15.21	0.14	U
6/29/74	42227.882	15.71	0.08	U
12/10/74	42391.535	16.59	0.10	U
6/19/77	43313.794	16.53	0.17	U
6/20/77	43314.803	16.68	0.08	U
6/23/77	43317.843	16.60	0.12	U
7/11/77	43335.785	15.60	0.13	U
8/10/77	43365.728	15.85	0.13	U
8/12/77	43367.775	16.42	0.19	U
9/ 8/77	43394.705	15.44	0.15	U
10/17/77	43433.620	15.69	0.10	U
11/ 8/77	43455.539	15.37	0.09	U
8/31/78	43752.754	15.59	0.26	U
11/ 2/78	43815.510	15.58	0.09	U
6/24/71	41126.828	15.59	0.12	B
7/17/71	41149.692	15.83	0.09	B
7/21/71	41153.847	15.40	0.05	B
7/25/71	41157.774	15.86	0.09	B
8/14/71	41177.677	15.56	0.11	B
8/20/71	41183.710	15.31	0.08	B
8/26/71	41189.797	15.63	0.07	B
8/31/71	41194.770	15.18	0.07	B
9/ 1/71	41195.788	14.84	0.05	B
9/ 2/71	41196.846	14.78	0.09	B
9/13/71	41207.661	15.31	0.07	B
9/15/71	41209.656	15.49	0.11	B
9/19/71	41213.662	15.56	0.15	B
9/22/71	41216.661	15.44	0.06	B
9/25/71	41219.735	16.12	0.05	B
9/27/71	41221.741	15.79	0.06	B
9/29/71	41223.787	15.83	0.06	B
9/30/71	41224.790	15.62	0.14	B
10/12/71	41236.694	16.01	0.04	B
10/16/71	41240.660	16.01	0.07	B
10/19/71	41243.665	15.76	0.04	B
10/26/71	41250.779	15.97	0.04	B
11/ 8/71	41263.503	16.03	0.11	B
11/ 8/71	41263.593	16.03	0.06	B
11/14/71	41269.524	16.19	0.08	B
11/14/71	41269.635	16.01	0.05	B
11/15/71	41270.503	16.10	0.03	B
11/15/71	41270.674	16.45	0.09	B
11/16/71	41271.722	15.96	0.02	B
11/18/71	41273.569	15.58	0.05	B
11/18/71	41273.576	15.87	0.01	B
11/18/71	41273.585	15.71	0.03	B
11/18/71	41273.592	15.67	0.03	B
11/18/71	41273.603	15.69	0.03	B
11/18/71	41273.611	15.65	0.06	B
11/18/71	41273.631	15.65	0.10	B
11/18/71	41273.642	15.63	0.07	B
11/18/71	41273.651	15.62	0.02	B
11/18/71	41273.659	15.73	0.03	B
11/18/71	41273.670	15.67	0.03	B
11/18/71	41273.678	15.62	0.04	B
11/18/71	41273.687	15.70	0.03	B
11/18/71	41273.694	15.65	0.07	B
11/18/71	41273.703	15.75	0.03	B
11/18/71	41273.712	15.77	0.02	B
11/18/71	41273.719	15.88	0.08	B
11/18/71	41273.730	15.83	0.01	B
11/19/71	41274.669	15.58	0.05	B
11/19/71	41274.681	15.58	0.02	B
11/19/71	41274.692	15.64	0.04	B
11/19/71	41274.701	15.58	0.03	B
11/19/71	41274.710	15.70	0.02	B
11/19/71	41274.718	15.73	0.03	B
11/19/71	41274.730	15.74	0.05	B
11/19/71	41274.752	15.79	0.06	B
11/19/71	41274.765	15.65	0.07	B
11/20/71	41275.504	16.26	0.10	B
11/20/71	41275.515	16.42	0.03	B
11/20/71	41275.521	16.32	0.10	B
11/20/71	41275.535	16.34	0.13	B
11/20/71	41275.544	16.17	0.15	B
11/20/71	41275.558	16.47	0.06	B
11/20/71	41275.566	16.53	0.11	B
11/20/71	41275.584	16.20	0.04	B
11/20/71	41275.592	16.45	0.12	B
11/20/71	41275.603	16.22	0.11	B
11/20/71	41275.612	16.32	0.16	B
11/20/71	41275.625	16.40	0.11	B
11/20/71	41275.637	16.36	0.03	B
11/20/71	41275.646	16.34	0.04	B
11/20/71	41275.654	16.35	0.05	B
11/21/71	41276.501	16.07	0.04	B
11/21/71	41276.508	16.09	0.07	B
11/21/71	41276.515	16.08	0.04	B
11/21/71	41276.522	16.06	0.04	B
11/21/71	41276.528	16.02	0.06	B
11/21/71	41276.535	16.06	0.06	B
11/21/71	41276.546	16.06	0.01	B
11/21/71	41276.552	16.14	0.04	B
11/21/71	41276.560	16.07	0.04	B
11/21/71	41276.566	16.14	0.02	B
11/21/71	41276.576	16.15	0.06	B
11/21/71	41276.583	16.09	0.04	B
11/21/71	41276.592	16.05	0.05	B
11/21/71	41276.598	15.94	0.02	B
11/21/71	41276.604	15.97	0.05	B
11/21/71	41276.610	15.99	0.03	B
11/21/71	41276.629	16.02	0.04	B
11/21/71	41276.635	16.05	0.04	B
11/21/71	41276.643	16.10	0.07	B
11/21/71	41276.649	16.06	0.05	B
11/21/71	41276.656	16.05	0.02	B
11/21/71	41276.662	16.01	0.04	B
11/21/71	41276.676	16.02	0.03	B
11/21/71	41276.682	16.09	0.05	B
11/21/71	41276.692	16.04	0.06	B
11/21/71	41276.701	16.07	0.06	B
11/21/71	41276.714	16.10	0.07	B
11/21/71	41276.721	16.13	0.05	B
11/22/71	41277.506	15.82	0.03	B
11/22/71	41277.520	15.81	0.02	B
11/22/71	41277.535	15.85	0.04	B
11/22/71	41277.544	15.87	0.02	B
11/22/71	41277.561	15.81	0.07	B
11/22/71	41277.572	15.88	0.05	B
11/22/71	41277.585	15.74	0.04	B
11/22/71	41277.597	15.83	0.02	B
11/22/71	41277.609	15.88	0.05	B
11/22/71	41277.625	15.87	0.04	B
11/22/71	41277.641	15.84	0.04	B
11/22/71	41277.653	15.81	0.03	B
11/22/71	41277.682	15.84	0.03	B
11/22/71	41277.696	15.88	0.04	B
11/22/71	41277.710	15.92	0.03	B
11/22/71	41277.722	15.94	0.04	B
12/14/71	41299.571	15.72	0.06	B
4/18/72	41425.886	15.04	0.07	B
5/21/72	41458.780	15.86	0.06	B
6/15/72	41483.823	15.58	0.10	B
6/22/72	41490.765	15.73	0.11	B
7/13/72	41511.798	15.72	0.04	B
7/19/72	41517.819	15.68	0.02	B
7/22/72	41520.777	15.30	0.10	B
8/ 3/72	41532.701	15.23	0.06	B
8/ 7/72	41536.791	15.33	0.07	B
8/ 8/72	41537.794	15.32	0.16	B
8/ 9/72	41538.701	15.61	0.08	B
8/ 9/72	41538.751	15.84	0.13	B
8/10/72	41539.688	15.75	0.14	B
8/11/72	41540.764	15.52	0.09	B
8/12/72	41541.691	15.63	0.06	B
8/13/72	41542.791	16.02	0.09	B
8/14/72	41543.755	16.02	0.17	B
8/15/72	41544.613	15.52	0.06	B
8/15/72	41544.621	15.54	0.08	B
8/16/72	41545.770	15.57	0.10	B
8/17/72	41546.744	15.33	0.13	B
8/19/72	41548.558	15.73	0.15	B
8/23/72	41552.667	15.55	0.14	B
9/ 2/72	41562.658	16.17	0.04	B
9/ 3/72	41563.685	16.09	0.10	B
9/ 4/72	41564.705	16.27	0.16	B
9/ 5/72	41565.711	16.16	0.12	B
9/ 6/72	41566.545	15.78	0.12	B
9/ 8/72	41568.676	15.87	0.05	B
9/ 9/72	41569.534	15.74	0.03	B
9/11/72	41571.682	15.95	0.11	B
9/12/72	41572.569	15.79	0.04	B
9/18/72	41578.647	15.89	0.06	B
9/18/72	41578.739	15.65	0.09	B
10/ 1/72	41591.612	15.99	0.07	B
10/ 7/72	41597.624	16.15	0.09	B
10/19/72	41609.630	15.55	0.12	B
10/20/72	41610.619	15.54	0.11	B
11/ 3/72	41624.538	15.12	0.07	B
11/ 4/72	41625.538	15.20	0.14	B
12/ 4/72	41655.716	15.25	0.13	B
12/ 6/72	41657.576	15.24	0.10	B
12/ 7/72	41658.598	15.36	0.15	B
12/ 8/72	41660.495	15.31	0.08	B
4/28/73	41800.833	15.47	0.04	B
5/ 2/73	41804.849	15.78	0.06	B
5/11/73	41813.860	15.09	0.03	B
6/ 1/73	41834.862	14.38	0.13	B
6/ 4/73	41837.847	15.40	0.21	B
6/ 7/73	41840.835	15.02	0.05	B
6/30/73	41863.782	15.23	0.08	B
7/ 3/73	41866.906	15.52	0.14	B
7/ 6/73	41869.914	15.53	0.08	B
7/11/73	41874.835	15.69	0.08	B
7/23/73	41886.715	15.97	0.13	B
7/26/73	41889.705	15.71	0.15	B
8/ 9/73	41903.789	15.66	0.09	B
8/ 9/73	41903.793	15.61	0.10	B
8/ 9/73	41903.797	15.71	0.10	B
8/ 9/73	41903.799	15.41	0.09	B
8/ 9/73	41903.805	15.40	0.08	B
8/ 9/73	41903.808	15.59	0.13	B
8/ 9/73	41903.812	15.59	0.12	B
8/ 9/73	41903.816	15.54	0.11	B
8/ 9/73	41903.821	15.50	0.08	B
8/ 9/73	41903.824	15.63	0.07	B
8/ 9/73	41903.828	15.64	0.08	B
8/ 9/73	41903.831	15.64	0.09	B
8/ 9/73	41903.837	15.59	0.10	B
8/ 9/73	41903.840	15.53	0.04	B
8/ 9/73	41903.853	15.50	0.10	B
8/ 9/73	41903.856	15.53	0.12	B
8/ 9/73	41903.860	15.56	0.12	B
8/ 9/73	41903.864	15.57	0.06	B
8/ 9/73	41903.867	15.76	0.04	B
8/ 9/73	41903.872	15.62	0.02	B
8/ 9/73	41903.876	15.59	0.04	B
8/ 9/73	41903.880	15.49	0.02	B
8/ 9/73	41903.885	15.76	0.05	B
8/ 9/73	41903.890	15.62	0.03	B
8/ 9/73	41903.894	15.71	0.09	B
8/ 9/73	41903.897	15.70	0.03	B
8/ 9/73	41903.901	15.89	0.15	B
9/ 2/73	41927.701	16.05	0.04	B
9/ 5/73	41930.694	16.42	0.05	B
9/ 5/73	41930.783	16.04	0.05	B
9/22/73	41947.661	16.38	0.10	B
9/30/73	41955.670	16.41	0.08	B
10/ 2/73	41957.769	16.46	0.05	B
10/ 2/73	41957.774	16.70	0.09	B
10/ 2/73	42957.779	16.56	0.13	B
10/ 2/73	41957.783	16.64	0.04	B
10/ 2/73	41957.788	16.70	0.15	B
10/ 2/73	41957.794	16.55	0.04	B
10/ 2/73	41957.797	16.58	0.07	B
10/ 2/73	41957.818	16.73	0.11	B
10/ 2/73	41957.822	16.45	0.13	B
10/ 2/73	41957.826	16.88	0.11	B
10/ 2/73	41957.835	16.63	0.04	B
10/ 2/73	41957.840	16.41	0.06	B
10/ 2/73	41957.847	16.76	0.18	B
10/ 2/73	41957.851	16.90	0.13	B
10/ 2/73	41957.856	16.52	0.08	B
10/ 2/73	41957.860	16.83	0.12	B
10/ 2/73	41957.865	16.60	0.08	B
10/ 2/73	41957.870	16.84	0.13	B
10/ 2/73	41957.876	16.71	0.07	B
10/ 2/73	41957.880	16.68	0.07	B
10/ 2/73	41957.884	16.47	0.10	B
10/ 2/73	41957.889	16.31	0.06	B
10/ 2/73	41957.894	16.54	0.22	B
10/ 4/73	41959.540	16.49	0.17	B
10/ 4/73	41959.542	16.45	0.12	B
10/ 4/73	41959.545	16.42	0.10	B
10/ 4/73	41959.549	16.55	0.14	B
10/ 4/73	41959.553	16.33	0.07	B
10/ 4/73	41959.556	16.47	0.19	B
10/ 4/73	41959.566	16.29	0.09	B
10/ 4/73	41959.569	16.39	0.19	B
10/ 4/73	41959.573	16.48	0.13	B
10/ 4/73	41959.576	16.28	0.16	B
10/ 4/73	41959.579	16.27	0.14	B
10/ 4/73	41959.583	16.36	0.09	B
10/ 4/73	41959.588	16.25	0.11	B
10/ 4/73	41959.592	16.24	0.06	B
10/ 4/73	41959.595	16.52	0.12	B
10/ 4/73	41959.598	16.19	0.03	B
10/ 4/73	41959.606	16.41	0.14	B
10/ 4/73	41959.609	16.42	0.07	B
10/ 4/73	41959.612	16.64	0.09	B
10/ 4/73	41959.615	16.58	0.14	B
10/ 4/73	41959.623	16.48	0.06	B
10/ 4/73	41959.626	16.63	0.16	B
10/ 4/73	41959.630	16.33	0.05	B
10/ 4/73	41959.633	16.44	0.03	B
10/ 4/73	41959.656	16.47	0.03	B
10/ 4/73	41959.658	16.52	0.07	B
10/ 4/73	41959.661	16.56	0.02	B
10/ 4/73	41959.670	16.43	0.05	B
10/ 4/73	41959.673	16.45	0.05	B
10/ 4/73	41959.677	16.36	0.04	B
10/ 4/73	41959.680	16.38	0.06	B
10/ 4/73	41959.686	16.48	0.06	B
10/ 4/73	41959.690	16.42	0.03	B
10/ 4/73	41959.694	16.38	0.05	B
10/ 4/73	41959.697	16.53	0.06	B
10/ 4/73	41959.705	16.58	0.03	B
10/ 4/73	41959.708	16.30	0.02	B
10/ 4/73	42959.713	16.47	0.03	B
10/ 4/73	41959.717	16.38	0.03	B
10/28/73	41983.699	15.75	0.02	B
10/31/73	41986.593	15.99	0.07	B
11/24/73	42010.591	16.35	0.09	B
12/19/73	42035.526	16.17	0.05	B
5/21/74	42188.838	15.25	0.06	B
5/24/74	42191.872	15.72	0.05	B
5/26/74	42193.874	15.25	0.15	B
5/28/74	42195.819	15.56	0.02	B
5/30/74	42197.881	15.50	0.10	B
6/17/74	42215.781	15.58	0.05	B
6/17/74	42215.790	15.54	0.06	B
6/18/74	42216.774	15.76	0.05	B
6/18/74	42216.792	15.82	0.06	B
6/18/74	42216.812	15.81	0.08	B
6/18/74	42216.774	15.78	0.07	B
6/18/74	42216.792	15.67	0.02	B
6/18/74	42216.812	15.68	0.09	B
6/19/74	42217.751	15.54	0.05	B
6/20/74	42218.799	15.42	0.05	B
6/21/74	42219.792	15.81	0.03	B
6/23/74	42221.775	15.93	0.03	B
6/23/74	42221.792	15.97	0.08	B
6/23/74	42221.808	15.82	0.07	B
6/23/74	42221.825	15.78	0.08	B
6/23/74	42221.842	15.85	0.10	B
6/23/74	42221.858	15.91	0.05	B
6/23/74	42221.875	15.79	0.04	B
6/23/74	42221.892	15.94	0.04	B
6/23/74	42221.908	15.73	0.07	B
6/23/74	42221.776	15.60	0.06	B
6/23/74	42221.785	15.82	0.11	B
6/23/74	42221.794	15.79	0.08	B
6/23/74	42221.802	15.84	0.08	B
6/23/74	42221.810	15.90	0.08	B
6/23/74	42221.820	15.62	0.09	B
6/23/74	42221.831	15.75	0.06	B
6/23/74	42221.840	15.75	0.08	B
6/23/74	42221.848	15.82	0.07	B
6/23/74	42221.856	15.72	0.01	B
6/23/74	42221.865	15.85	0.08	B
6/23/74	42221.874	15.82	0.06	B
6/23/74	42221.882	15.67	0.04	B
6/23/74	42221.890	15.86	0.07	B
6/23/74	42221.899	15.70	0.09	B
6/23/74	42221.907	15.65	0.09	B
6/28/74	42226.831	15.79	0.03	B
6/29/74	42227.823	15.77	0.03	B
6/29/74	42227.861	15.85	0.03	B
6/30/74	42228.854	15.92	0.03	B
6/30/74	42228.861	15.99	0.05	B
7/14/74	42242.736	15.65	0.06	B
7/14/74	42242.757	15.72	0.01	B
7/15/74	42243.713	15.85	0.05	B
7/15/74	42243.804	15.96	0.02	B
7/15/74	42243.810	15.92	0.02	B
7/15/74	42243.815	15.85	0.07	B
7/15/74	42243.820	16.11	0.02	B
7/16/74	42244.760	16.02	0.06	B
7/16/74	42244.760	15.67	0.04	B
7/16/74	42244.771	15.90	0.08	B
7/16/74	42244.771	16.07	0.05	B
7/16/74	42244.781	15.94	0.10	B
7/16/74	42244.781	15.91	0.05	B
7/16/74	42244.792	16.00	0.03	B
7/16/74	42244.792	15.88	0.04	B
7/16/74	42244.802	15.86	0.06	B
7/16/74	42244.802	15.87	0.05	B
7/16/74	42244.812	15.85	0.07	B
7/16/74	42244.812	15.91	0.03	B
7/16/74	42244.823	15.92	0.06	B
7/16/74	42244.823	15.90	0.09	B
7/16/74	42244.833	15.90	0.01	B
7/16/74	42244.833	15.88	0.04	B
7/16/74	42244.844	15.95	0.08	B
7/16/74	42244.844	15.92	0.12	B
7/17/74	42245.830	16.04	0.04	B
7/17/74	42245.837	16.05	0.03	B
7/18/74	42246.862	15.55	0.04	B
7/19/74	42247.740	15.77	0.05	B
7/19/74	42247.747	15.70	0.04	B
7/19/74	42247.819	15.73	0.02	B
7/19/74	42247.835	15.77	0.02	B
7/20/74	42248.747	15.94	0.04	B
7/20/74	42248.756	15.94	0.06	B
7/20/74	42248.767	16.13	0.08	B
7/24/74	42252.753	16.18	0.04	B
7/24/74	42252.760	16.26	0.01	B
7/24/74	42252.772	16.23	0.06	B
7/24/74	42252.788	16.27	0.04	B
7/24/74	42252.806	16.24	0.05	B
7/27/74	42255.747	16.36	0.03	B
7/27/74	42255.758	16.34	0.07	B
7/27/74	42255.819	16.41	0.03	B
7/27/74	42255.830	16.37	0.04	B
9/11/74	42301.709	16.10	0.16	B
9/12/74	42302.622	16.24	0.05	B
10/16/74	42336.576	16.01	0.06	B
10/16/74	42336.587	16.02	0.02	B
10/18/74	42338.670	16.38	0.03	B
12/10/74	42391.529	16.57	0.03	B
8/ 9/75	42633.690	16.28	0.13	B
8/16/75	42640.829	16.06	0.07	B
9/ 3/75	42658.792	16.15	0.12	B
9/ 5/75	42660.790	16.12	0.06	B
10/ 1/75	42686.661	15.81	0.04	B
10/ 1/75	42686.665	15.83	0.06	B
10/28/75	42713.613	15.28	0.05	B
10/30/75	42715.640	15.33	0.04	B
10/30/75	42715.670	15.35	0.04	B
11/ 1/75	42717.615	15.28	0.01	B
11/ 1/75	42717.623	15.35	0.04	B
11/ 4/75	42720.619	15.12	0.04	B
11/ 4/75	42720.630	15.15	0.03	B
11/29/75	42745.519	15.76	0.01	B
1/ 1/76	42778.536	15.95	0.07	B
1/ 1/76	42778.547	15.98	0.05	B
1/ 2/76	42779.542	15.86	0.05	B
1/ 2/76	42779.547	15.78	0.05	B
5/ 4/76	42902.846	15.22	0.05	B
5/31/76	42929.803	15.50	0.04	B
5/31/76	42929.815	15.52	0.05	B
6/ 1/76	42930.810	15.25	0.04	B
6/ 5/76	42934.812	14.97	0.10	B
8/25/76	43015.762	15.78	0.04	B
8/25/76	43015.766	15.62	0.14	B
9/16/76	43037.615	15.94	0.05	B
9/16/76	43037.632	15.77	0.05	B
9/17/76	43038.640	16.14	0.05	B
9/17/76	43038.656	15.87	0.07	B
10/16/76	43067.559	15.72	0.09	B
10/16/76	43067.579	15.71	0.10	B
10/19/76	43070.748	15.54	0.06	B
10/19/76	43070.762	15.53	0.06	B
10/21/76	43072.624	15.37	0.09	B
10/21/76	43072.633	15.42	0.03	B
12/18/76	43130.551	16.10	0.03	B
12/18/76	43130.559	16.18	0.08	B
1/17/77	43160.536	15.88	0.06	B
1/17/77	43160.549	15.81	0.07	B
5/13/77	43276.786	16.16	0.04	B
5/13/77	43276.799	16.22	0.06	B
5/25/77	43288.867	16.87	0.08	B
5/25/77	43288.871	16.61	0.10	B
6/20/77	43314.797	16.62	0.15	B
6/21/77	43315.741	16.48	0.10	B
6/23/77	43317.836	16.28	0.25	B
6/23/77	43317.859	16.56	0.06	B
7/ 9/77	43333.698	16.30	0.06	B
7/ 9/77	43333.710	16.65	0.13	B
7/11/77	43335.778	15.82	0.05	B
7/13/77	43337.748	16.43	0.05	B
7/13/77	43337.765	16.44	0.06	B
7/15/77	43339.701	16.09	0.11	B
7/18/77	43342.772	16.04	0.12	B
7/21/77	43345.785	15.97	0.13	B
8/11/77	43366.816	15.80	0.14	B
8/12/77	43367.785	15.95	0.13	B
8/15/77	43370.783	15.75	0.25	B
8/16/77	43371.810	16.00	0.17	B
9/ 6/77	43392.710	15.50	0.16	B
9/ 8/77	43394.700	15.68	0.13	B
10/ 5/77	43421.685	15.57	0.04	B
10/12/77	43428.642	15.48	0.17	B
10/17/77	43433.614	15.55	0.12	B
11/ 8/77	43455.533	15.59	0.11	B
5/ 5/78	43633.883	16.21	0.08	B
5/30/78	43658.767	15.95	0.07	B
5/31/78	43659.769	15.92	0.07	B
6/ 9/78	43668.837	15.99	0.08	B
7/ 9/78	43698.708	15.42	0.05	B
7/27/78	43716.699	14.79	0.05	B
8/ 5/78	43725.757	15.16	0.09	B
8/ 8/78	43728.776	15.50	0.15	B
8/13/78	43733.821	15.30	0.18	B
8/27/78	43748.710	15.57	0.10	B
8/29/78	43750.677	15.75	0.19	B
8/31/78	43752.752	15.80	0.12	B
10/ 3/78	43785.627	15.95	0.09	B
10/ 5/78	43787.596	16.54	0.05	B
10/ 5/78	43787.720	16.47	0.15	B
10/ 9/78	43791.755	15.65	0.07	B
10/23/78	43805.585	15.63	0.21	B
11/ 2/78	43815.508	15.75	0.16	B
11/25/78	43838.507	15.56	0.11	B
6/24/71	41126.816	14.46	0.02	V
7/17/71	41149.709	14.56	0.06	V
7/21/71	41153.868	14.27	0.03	V
7/25/71	41157.792	14.67	0.09	V
8/14/71	41177.669	14.42	0.04	V
8/20/71	41183.733	14.23	0.07	V
8/26/71	41189.816	14.48	0.08	V
8/31/71	41194.790	14.19	0.06	V
9/ 2/71	41196.838	13.84	0.05	V
9/13/71	41207.657	14.32	0.04	V
9/15/71	41209.646	14.35	0.08	V
9/19/71	41213.656	14.34	0.05	V
9/25/71	41219.728	14.99	0.06	V
9/27/71	41221.763	14.71	0.06	V
9/29/71	41223.781	14.80	0.06	V
9/30/71	41224.808	14.48	0.08	V
10/12/71	41236.692	14.81	0.09	V
10/16/71	41240.676	15.02	0.05	V
10/19/71	41243.687	14.64	0.09	V
10/26/71	41250.764	14.84	0.03	V
11/ 8/71	41263.517	14.88	0.01	V
11/ 8/71	41263.588	14.87	0.04	V
11/14/71	41269.547	15.06	0.05	V
11/14/71	41269.623	15.06	0.04	V
11/15/71	41270.523	15.17	0.07	V
11/15/71	41270.667	15.15	0.07	V
11/16/71	41271.751	14.79	0.01	V
12/14/71	41299.593	14.62	0.04	V
4/18/72	41425.906	14.11	0.07	V
5/21/72	41458.885	14.83	0.04	V
6/15/72	41483.815	14.50	0.03	V
6/22/72	41490.785	14.69	0.05	V
8/ 8/72	41537.818	14.35	0.05	V
8/ 9/72	41538.728	14.49	0.19	V
8/10/72	41539.707	14.59	0.07	V
8/11/72	41540.775	14.35	0.03	V
8/11/72	41540.789	14.35	0.08	V
8/12/72	41541.717	14.70	0.07	V
8/13/72	41542.801	14.78	0.20	V
8/14/72	41543.773	14.51	0.13	V
8/16/72	41545.796	14.44	0.09	V
8/17/72	41546.754	14.30	0.06	V
8/19/72	41548.565	14.59	0.07	V
9/ 3/72	41563.706	14.91	0..05	V
9/ 4/72	41564.729	14.93	0.04	V
9/ 5/72	41565.719	14.76	0.07	V
9/ 8/72	41568.701	14.71	0.03	V
9/11/72	41571.700	14.70	0.11	V
9/12/72	41572.577	14.38	0.18	V
9/18/72	41578.731	14.51	0.04	V
10/ 1/72	41591.636	14.77	0.20	V
10/ 7/72	41597.647	14.80	0.09	V
10/19/72	41609.662	14.88	0.08	V
11/ 3/72	41624.560	14.10	0.06	V
11/ 5/72	41626.581	14.19	0.06	V
12/ 9/72	41660.508	14.37	0.05	V
5/ 1/73	41803.868	14.67	0.05	V
5/11/73	41813.883	13.96	0.03	V
6/ 4/73	41837.867	14.16	0.12	V
6/ 7/73	41840.826	13.99	0.04	V
7/ 3/73	41866.899	14.32	0.03	V
7/25/73	41888.730	14.74	0.04	V
9/ 5/73	41930.801	15.12	0.03	V
9/22/73	41947.650	15.07	0.06	V
10/28/73	41983.722	14.86	0.03	V
11/24/73	42010.610	15.27	0.03	V
12/19/73	42035.535	15.15	0.03	V
5/21/74	42188.830	14.17	0.08	V
5/24/74	42191.878	14.49	0.02	V
5/26/74	42193.877	14.21	0.04	V
5/30/74	42197.901	14.45	0.05	V
6/17/74	42215.807	14.50	0.11	V
6/17/74	42215.810	14.51	0.04	V
6/19/74	42217.810	14.44	0.03	V
6/21/74	42219.768	14.75	0.02	V
6/28/74	42226.845	14.86	0.18	V
6/29/74	42227.837	14.74	0.02	V
7/15/74	42243.776	14.94	0.04	V
7/19/74	42247.807	14.73	0.06	V
7/24/74	42252.819	15.31	0.04	V
12/10/74	42391.547	15.63	0.09	V
6/19/77	43313.806	15.55	0.08	V
6/20/77	43314.788	15.59	0.09	V
6/23/77	43317.851	15.54	0.06	V
7/11/77	43335.772	15.23	0.11	V
7/18/77	43342.765	15.36	0.13	V
7/21/77	43345.799	15.20	0.11	V
8/ 8/77	43363.709	14.79	0.17	V
8/10/77	43365.737	14.82	0.09	V
8/12/77	43367.788	15.01	0.22	V
9/ 8/77	43394.711	14.68	0.16	V
10/ 4/77	43420.584	14.36	0.08	V
10/14/77	43430.635	14.51	0.05	V
11/ 8/77	43455.544	14.46	0.22	V
5/29/78	43657.772	15.02	0.04	V
5/31/78	43659.778	14.84	0.07	V
8/31/78	43752.758	14.63	0.09	V
11/ 2/78	43815.513	14.84	0.06	V
7/ 3/73	41866.885	13.16	0.11	I
7/25/73	41888.749	13.62	0.06	I
9/ 5/73	41930.826	14.04	0.08	I
9/22/73	41947.693	14.16	0.10	I
10/28/73	41983.742	13.62	0.09	I
7/29/76	42988.715	12.93	0.13	I
10/16/76	43067.563	13.24	0.11	I
6/19/77	43313.825	14.25	0.10	I
6/23/77	43317.871	14.37	0.08	I
7/11/77	43335.801	14.15	0.05	I
7/15/77	43339.721	14.09	0.11	I
7/21/77	43345.771	14.27	0.13	I
8/ 8/77	43363.726	14.00	0.12	I
8/10/77	43365.762	13.68	0.12	I
8/12/77	43367.807	14.20	0.11	I
9/ 8/77	43394.690	13.55	0.08	I
10/12/77	43428.681	13.31	0.23	I
10/17/77	43433.650	13.38	0.15	I
11/ 8/77	43455.560	13.45	0.10	I

TABLE II. (Continued).

UT DATE	J.D.	MAG	RMS	COL
	BL LAC	CONT.		
8/31/78	43751.797	13.29	0.13	I
11/ 2/78	43814.545	13.57	0.09	I
	3C 446			
9/15/71	41209.701	18.36	0.13	B
9/15/72	41575.719	18.28	0.06	B
10/ 8/72	41599.610	18.33	0.16	B
12/25/73	42041.506	17.87	0.22	B
9/11/74	42301.656	15.44	0.11	B
9/15/74	42305.590	15.55	0.11	B
9/16/74	42306.785	15.96	0.04	B
9/24/74	42314.735	16.77	0.16	B
10/ 9/74	42329.639	16.68	0.13	B
10/10/74	42330.647	17.23	0.09	B
10/13/74	42333.640	16.48	0.11	B
10/18/74	42338.759	17.16	0.08	B
10/21/74	42341.683	17.26	0.12	B
12/ 4/74	42385.516	17.01	0.13	B
6/14/75	42577.837	17.91	0.05	B
7/10/75	42603.855	18.05	0.05	B
8/ 6/75	42630.797	17.50	0.17	B
9/ 2/75	42657.854	18.09	0.10	B
10/ 3/75	42687.735	18.74	0.13	B
10/ 3/75	42687.740	18.80	0.08	B
10/28/75	42713.583	17.83	0.09	B
11/30/75	42746.547	17.87	0.06	B
11/30/75	42746.553	17.97	0.14	B
1/ 3/76	42780.524	16.60	0.03	B
7/29/76	42988.865	17.57	0.07	B
7/29/76	42988.870	17.91	0.07	B
8/ 1/76	42991.794	17.85	0.05	B
8/ 1/76	42991.800	17.97	0.11	B
8/28/76	43018.728	18.09	0.14	B
8/28/76	43018.733	18.56	0.15	B
9/16/76	43037.671	17.71	0.06	B
10/15/76	43066.576	17.59	0.13	B
10/15/76	43066.580	17.90	0.08	B
11/12/76	43094.528	17.88	0.15	B
11/12/76	43094.533	17.46	0.14	B
6/19/77	43313.865	17.82	0.16	B
6/21/77	43315.832	18.07	0.13	B
7/13/77	43337.811	17.12	0.16	B
7/24/77	43348.772	17.01	0.20	B
8/11/77	43366.750	17.47	0.11	B
9/ 6/77	43392.694	17.63	0.11	B
10/12/77	43428.549	17.10	0.14	B
11/ 1/77	43448.561	16.16	0.08	B
11/ 6/77	43453.558	16.80	0.06	B
11/11/77	43458.586	16.62	0.07	B
8/ 5/78	43725.801	16.15	0.15	B
8/ 7/78	43727.805	16.58	0.09	B
8/27/78	43747.695	16.58	0.17	B
8/29/78	43749.728	16.59	0.14	B
8/31/78	43751.719	16.17	0.15	B
9/ 1/78	43752.747	16.05	0.17	B
9/ 4/78	43755.704	16.06	0.09	B
9/11/78	43762.770	16.29	0.17	B
9/23/78	43774.608	16.12	0.13	B
10/ 2/78	43783.628	16.31	0.18	B
10/ 3/78	43784.601	16.67	0.07	B
10/ 5/78	43786.585	16.83	0.17	B
10/ 5/78	43786.707	17.06	0.31	B
10/ 9/78	43790.692	16.35	0.04	B
10/23/78	43804.559	16.42	0.13	B
10/24/78	43805.612	16.34	0.24	B
11/ 1/78	43813.533	16.52	0.08	B
11/23/78	43835.574	16.96	0.16	B
12/ 2/78	43844.580	15.85	0.10	B
12/23/78	43865.505	16.25	0.14	B
12/24/78	43866.510	16.44	0.13	B
	3C 454.3			
8/20/71	41183.792	16.36	0.07	B
	3C 454.3	CONT.		
9/ 1/71	41195.878	16.74	0.09	B
7/22/72	41520.812	17.11	0.08	B
8/11/72	41540.737	16.98	0.07	B
10/ 2/72	41592.656	17.20	0.08	B
10/ 8/72	41598.638	17.19	0.04	B
11/ 3/72	41624.641	17.03	0.07	B
8/10/73	41904.839	16.57	0.10	B
8/25/73	41919.784	16.83	0.17	B
9/ 7/73	41932.796	16.79	0.08	B
9/24/73	41949.650	16.69	0.05	B
10/21/73	41976.613	16.76	0.13	B
12/22/73	42038.510	16.87	0.04	B
5/22/74	42189.918	16.97	0.10	B
7/17/74	42245.881	17.28	0.06	B
9/12/74	42302.723	17.01	0.12	B
10/10/74	42330.671	17.13	0.09	B
12/ 4/74	42385.537	16.87	0.06	B
12/ 9/74	42390.596	17.12	0.04	B
7/19/75	42612.856	17.23	0.08	B
8/ 6/75	42630.810	17.13	0.15	B
8/14/75	42638.766	17.09	0.09	B
9/ 4/75	42659.742	17.23	0.05	B
11/ 2/75	42718.517	17.21	0.14	B
11/30/75	42746.598	17.17	0.08	B
11/30/75	42746.603	17.14	0.09	B
12/26/75	42772.540	16.98	0.10	B
12/26/75	42772.544	16.80	0.09	B
7/29/76	42988.881	16.82	0.10	B
7/29/76	42988.885	16.70	0.08	B
8/ 1/76	42991.815	17.25	0.16	B
8/ 1/76	42991.819	16.90	0.11	B
8/23/76	43013.718	16.88	0.12	B
9/20/76	43041.623	16.86	0.09	B
9/20/76	43041.628	17.04	0.13	B
10/15/76	43066.615	16.83	0.15	B
10/15/76	43066.616	16.99	0.19	B
11/12/76	43094.551	17.15	0.07	B
11/12/76	43094.556	17.00	0.07	B
6/19/77	43313.874	17.45	0.30	B
8/11/77	43366.783	17.07	0.22	B
9/ 7/77	43393.644	17.31	0.22	B
10/12/77	43428.533	17.68	0.12	B
11/ 8/77	43455.625	17.20	0.07	B
1/ 6/78	43514.516	16.99	0.07	B
8/ 7/78	43727.814	17.25	0.07	B
8/ 8/78	43728.887	16.93	0.10	B
9/ 7/78	43759.713	17.28	0.26	B
9/23/78	43775.598	17.03	0.21	B
10/ 3/78	43785.633	16.98	0.17	B
10/ 5/78	43787.589	17.09	0.13	B
10/ 5/78	43787.714	17.43	0.13	B
10/23/78	43805.587	17.22	0.09	B
11/23/78	43836.584	16.87	0.10	B
12/24/78	43867.550	17.33	0.15	B
	PKS 2345-16			
10/10/69	40504.691	17.04	0.10	P
11/ 9/69	40534.677	16.71	0.09	P
11/12/69	40537.691	16.58	0.17	P
11/30/69	40555.590	15.82	0.14	P
12/ 3/69	40558.556	15.58	0.10	P
12/ 5/69	40560.512	15.85	0.20	P
12/ 5/69	40560.578	15.75	0.12	P
12/ 6/69	40561.708	16.34	0.18	P
12/ 8/69	40563.507	16.33	0.11	P
12/ 8/69	40563.593	16.44	0.14	P
12/30/69	40585.563	16.56	0.08	P
1/ 9/70	40595.521	15.89	0.19	P
1/11/70	40597.531	16.09	0.13	P
1/11/70	40597.539	16.05	0.10	P
1/29/70	40615.526	16.02	0.12	P
1/31/70	40617.533	15.52	0.18	P
2/ 8/70	40625.526	15.95	0.07	P
6/ 9/70	40746.860	17.36	0.04	P
6/11/70	40748.857	17.30	0.12	P
	PKS 2345-16	CONT.		
6/16/70	40753.860	16.87	0.18	P
7/ 1/70	40768.632	17.14	0.16	P
7/ 7/70	40774.865	16.71	0.10	P
7/11/70	40778.856	16.83	0.15	P
7/31/70	40798.622	17.16	0.13	P
8/ 4/70	40802.868	16.86	0.10	P
8/23/70	40821.653	17.39	0.06	P
8/29/70	40827.635	17.29	0.09	P
8/31/70	40829.849	17.31	0.12	P
9/ 6/70	40835.750	17.36	0.12	P
9/ 7/70	40836.776	17.29	0.09	P
9/22/70	40851.628	17.25	0.12	P
9/24/70	40853.690	17.24	0.13	P
9/30/70	40859.599	17.22	0.09	P
10/ 5/70	40864.753	17.18	0.08	P
10/26/70	40885.642	17.32	0.08	P
11/ 1/70	40891.655	17.28	0.13	P
11/18/70	40908.589	17.40	0.07	P
11/28/70	40918.641	17.50	0.12	P
11/29/70	40919.572	17.34	0.08	P
12/21/70	40941.506	17.28	0.12	P
12/27/70	40947.507	17.33	0.06	P
1/16/71	40967.516	16.82	0.12	P
1/18/71	40969.521	17.33	0.08	P
1/20/71	40971.520	17.44	0.06	P
1/22/71	40973.519	17.38	0.12	P
1/29/71	40980.517	17.56	0.15	P
6/21/71	41123.864	17.61	0.07	P
6/22/71	41124.857	16.07	0.12	P
6/24/71	41126.864	17.45	0.16	P
6/26/71	41128.853	17.79	0.08	P
6/27/71	41129.847	17.67	0.10	P
6/30/71	41132.869	17.76	0.14	P
7/ 2/71	41134.860	17.70	0.10	P
7/21/71	41153.880	17.64	0.11	P
7/24/71	41156.867	17.63	0.08	P
8/20/71	41183.819	17.46	0.09	P
8/26/71	41189.842	17.41	0.09	P
8/27/71	41190.833	17.33	0.09	P
9/ 1/71	41195.849	17.62	0.10	P
9/13/71	41207.691	17.20	0.11	P
9/19/71	41213.767	17.42	0.07	P
9/27/71	41221.816	17.36	0.10	P
10/11/71	41235.674	17.30	0.04	P
11/14/71	41269.646	17.02	0.10	P
12/14/71	41299.608	17.29	0.06	P
1/10/72	41326.508	17.30	0.11	P
1/18/72	41334.521	17.18	0.09	P
7/16/72	41516.867	17.47	0.05	P
7/20/72	41518.869	17.45	0.12	P
8/11/72	41540.811	16.98	0.10	P
8/16/72	41545.893	17.01	0.09	P
9/ 4/72	41564.844	17.22	0.11	P
9/12/72	41572.673	17.23	0.09	P
9/18/72	41578.802	17.28	0.13	P
10/ 2/72	41592.681	17.41	0.08	P
10/ 8/72	41598.697	17.25	0.11	P
10/ 9/72	41599.659	17.32	0.15	P
10/11/72	41601.676	17.47	0.11	P
10/13/72	41603.647	17.21	0.14	P
11/ 3/72	41624.617	17.24	0.10	P
11/11/72	41632.617	17.41	0.09	P
11/27/72	41648.565	17.18	0.10	P
7/ 8/73	41871.841	17.53	0.09	P
8/10/73	41904.886	17.22	0.08	P
8/25/73	41919.819	17.32	0.12	P
9/ 6/73	41931.813	16.60	0.08	P
9/ 7/73	41932.773	16.61	0.10	P
9/ 8/73	41933.810	16.94	0.16	P
9/18/73	41943.610	17.24	0.18	P
9/19/73	41944.662	17.11	0.11	P
9/22/73	41947.719	17.34	0.09	P
9/30/73	41955.776	17.16	0.11	P
10/ 4/73	41959.749	17.21	0.10	P
10/19/73	41974.625	17.28	0.14	P
10/28/73	41983.666	17.36	0.15	P
10/31/73	41986.696	16.90	0.10	P
	PKS 2345-16	CONT.		
12/15/73	42031.510	17.23	0.11	P
8/16/74	42275.801	17.10	0.18	P
9/11/74	42301.677	17.53	0.19	P
9/16/74	42306.805	17.70	0.14	P
10/ 9/74	42329.619	17.63	0.12	P
10/21/74	42341.698	17.63	0.06	P
12/ 4/74	42385.551	17.66	0.10	P
12/10/74	42391.575	17.69	0.07	P
1/ 2/75	42414.509	17.34	0.09	P
8/ 6/75	42630.833	17.67	0.12	P
8/13/75	42637.803	17.45	0.10	P
8/13/75	42637.807	17.79	0.11	P
9/ 4/75	42659.766	17.49	0.15	P
9/ 4/75	42659.777	17.51	0.12	P
10/11/75	42696.717	17.53	0.08	P
10/11/75	42696.721	17.62	0.07	P
11/30/75	42746.669	17.55	0.11	P
11/30/75	42746.706	17.84	0.10	P
12/27/75	42773.600	17.52	0.20	P
12/27/75	42773.618	17.66	0.18	P
8/ 1/76	42991.834	17.73	0.21	P
8/30/76	43020.786	17.72	0.24	P
8/30/76	43020.791	17.40	0.15	P
9/29/76	43050.768	17.48	0.11	P
10/16/76	43067.609	17.81	0.18	P
10/16/76	43067.612	17.59	0.16	P
12/20/76	43132.533	17.44	0.09	P
6/21/77	43315.870	17.77	0.13	P
7/13/77	43337.849	17.53	0.15	P
8/11/77	43366.799	17.96	0.21	P
9/ 9/77	43395.700	18.00	0.15	P
9/20/77	43406.728	17.92	0.15	P
11/ 6/77	43453.635	17.71	0.10	P
12/ 9/77	43486.580	17.85	0.06	P
1/ 6/78	43514.537	17.76	0.07	P
8/13/78	43733.841	17.81	0.19	P
8/29/78	43749.754	17.62	0.15	P
10/23/78	43804.621	17.48	0.22	P
11/23/78	43835.597	17.62	0.08	P
12/ 2/78	43844.529	17.93	0.15	P
12/18/78	43860.519	17.61	0.12	P
12/18/78	43860.524	17.44	0.19	P
12/20/78	43862.512	17.87	0.18	P
12/24/78	43866.542	17.38	0.26	P
12/31/78	43873.528	17.42	0.16	P
1/19/79	43892.512	17.61	0.22	P

B sequence of PKS 0906+01 was photographically calibrated using *M* − 3 and the photometry of Sandage (1970). The $B - m_{pg}$ correction was +0.20.

ON 231. This BL Lac object shows the violent optical variability characteristic of this class of sources. The archival data on this object indicate a range of $14.4 \leq B \leq 16.5$ (Pollock *et al.* 1975), but more recent observations (Battistini *et al.* 1974 and Paper I) have recorded ON 231 as faint as $B = 17.4$. The Florida light curve shows two distinct peaks. During the 1975 flare the source brightened from $17^m.32$ (near base level) to $15^m.75$ in 120 days. Because of the interposition of the Sun, ON 231 was not observed again until 1/3/76, at which time it had faded to $16^m.09$. The total amplitude of this event thus remains unknown. After declining to $17^m.21$ (4/29/76), the object brightened to $15^m.38$ in just 33 days. Unfortunately, as in 1975, ON 231 was again lost to the Sun. A two-year decline followed the 1976 outburst. After approaching base level in 1978 a new period of activity is apparently beginning, as recent plates show the object at B ~ 16.3. The photoelectric sequence of Wing (1973) was used.

B2 1308+326. This BL Lac object is an extremely active variable, with a total known range of $14.2 < B < 20.0$ (Liller and Gottlieb 1976). In addition, it was noted that the object was usually fainter than $17^m.5$ on the Harvard plates. Recent photometric studies (O'Dell *et al.*, 1978, Puschell *et al.* 1979, and this paper) show that the object is in an active phase, with outbursts occurring in 1977 and 1978. During this period B2 1308+326 was recorded below $B = 16.5$ only once at Rosemary Hill, $16^m.86$ on 3/7/78 shortly before the 1978 outburst. Twenty-six days after this minimum the source had brightened by $1^m.6$ to $15^m.28$ on 4/2/78. Puschell *et al.* (1979) found the maximum observed fluxes from 0.36 to 3.5 μm to be approximately 70% as large as in the 1977 outburst. Our data indicate that the peak of the 1978 outburst ($15^m.20$ on 4/2/78) was approximately equal to that of the 1977 outburst ($15^m.28$ on 3/27/77) in the *B* bandpass. A recent plate (12/31/78) shows B2 1308+326 at $B = 17.95$, about one magnitude fainter than any time since the onset of this active period. The *B* sequence was obtained photographically from SA 57, using the photometry of Purgathofer (1969). Our data are in good agreement with those of Mufson (1979). We would be particularly interested in knowing if an unpublished photoelectrically derived *U, B, V* sequence is available for this source to facilitate multicolor photographic photometry.

PKS 1514−24. Rapid variability of this BL Lac object (also designated AP Librae) was first reported by Biraud (1971), who found a range of $14 \leq m_{pg} \leq 16.4$ and a $0^m.7$ change in five hours. Until 1977, Rosemary Hill data showed one-magnitude "flickering" and slow changes in the seasonal brightness, but no major, well-defined outbursts. The $0^m.6$ decline of the continuum source from 1975 to 1976 reported by Rodgers and Peterson (1977) is clearly reflected in our data. In 1977 a major flare occurred, with the source reaching $B = 14.21$ on 5/24/77. The subsequent decline of $1^m\!.8$ in 58 days was identical in decay rate to the two $1^m\!.8$ declines seen in OE 110. By early 1978 PKS 1514−24 was relatively faint ($B = 16.3$), although still $0^m\!.4$ brighter than its faintest recorded value of 16.71 in 1976. The B sequence was calibrated from SA 107 (Purgathofer 1969) and our results are in good agreement with Andrews *et al.* (1974) and Strittmatter *et al.* (1972). However, there is a half-magnitude difference between our magnitudes and those of Disney *et al.* (1974). Since no details of the latter observations are given it is difficult to comment on this apparent discrepancy. We do note that the $B-V$ values of Disney *et al.* for 6/14/74 and 6/17/74 are anomolously blue (by about 0.4 mag) when compared with the photometry of Andrews *et al.*, Kinman (1976), and Westerlund and Wall (1969). All of these measurements were obtained when PKS 1514−24 was at $V \sim 15.1$, although not on the same date.

NRAO 512. This object has shown very violent short-term activity, as well as long-term trends. In the four years since Paper I, however, it has not shown a major outburst. Less intensive monitoring may influence this result, but on 13 plates obtained between 1976 and 1978 NRAO 512 was not visible, implying that it was certainly fainter than 19th magnitude. Barbieri *et al.* (1977), using their own data plus that of Paper I, suggested a "best period" for NRAO 512 of 720 days. Our observations give no evidence of any major activity since the 1974 outburst, and it should be noted that a 720-day period is an almost exact harmonic of the observational artifact introduced by the annual apparition of an object. The sequence for NRAO 512 was calibrated from SA 17. Barbieri *et al.* determined $B - m_{pg} = +0.3$ for Rosemary Hill data on this object.

3C 345. This extensively observed QSO was extremely active between 1965 and 1973, undergoing two $2^m\!.5$ outbursts (a summary of data from this period is given by Barbieri *et al.* (1977). Since its decline from the 1972–1973 event, 3C 345 has not exhibited such violent behavior, but rather showed a slowly rising envelope with one-magnitude fluctuations superimposed. In only one case was it recorded brighter than $B = 16.0$ during this period. Barbieri *et al.* gave evidence for possible periodicities of 1600, 800, and 140 days. These results would predict a maximum in early 1976. A small event did occur during 1976; however, its amplitude and duration were much less than in the two events that occurred in 1967 and 1971. Observations through the next proposed maximum, some time during 1980, should provide more conclusive evidence concerning periodic behavior and shed light on the applicability of spinar-type models (such as that of Morrison 1969) for this and similar objects. The data were reduced using the sequence of Angione (1971). A $B - m_{pg}$ of +0.60 was used.

NRAO 530. Using the radio position of Wade (1970), Kristian and Sandage (1970) identified the optical counterpart of NRAO 530 as a faint ($m_{pg} \simeq 21$) object, perhaps associated with a cluster of galaxies. Welch and Spinrad (1973) reported the mean radio spectrum to be relatively flat, with a flux of 7 Jy at 407 MHz and 3.9 Jy at 22,300 MHz. Slight radio variability was observed at 2.9 and 4.5 cm (Medd *et al.* 1972) and 3.8 cm (Dent and Kojoian 1972). Welch and Spinrad (1973) reported $m_{pg} = 18.5$ from a blue plate taken 5/23/72. Baldwin *et al.* (1973) observed NRAO 530 spectroscopically between 3468 and 6797 Å, finding only one emission line (5333 Å). They estimated a magnitude of $m_b = 18.0 \pm 1.0$, confirming the apparent brightening detected by Welch and Spinrad. The four plates of NRAO 530 obtained at Rosemary Hill between 1972 and 1976 showed no significant variability. A small brightening in early 1977 motivated more intensive observations, which revealed a sharply peaked three-magnitude flare. The object brightened from $18^m\!.37$ to $16^m\!.15$ in 130 days, then faded $0^m\!.85$ in one day. At this point the object was lost to the Sun. Considering the rapid variability and total range ($16 \leq m_{pg} \leq 21$) of NRAO 530, continued multifrequency monitoring and a renewed attempt to establish its redshift are important. The NRAO 530 comparison sequence was calibrated using the photometry of NGC 6356 by Sandage and Wallerstein (1960) and the conversion formula of Arp (1961).

3C 371. The Florida light curve of this well-known N-galaxy is characterized by a slowly varying component with more rapid ~1-magnitude flickering. There is a strong suggestion of a secular increase in brightness at a rate of $0^m\!.1\ \mathrm{yr}^{-1}$. Only one well-defined, peaked outburst has been recorded (in 1975), and the total range of $1^m\!.3$ is similar to that found by Usher and Manley (1968) using Harvard archival data. The m_{pg} comparison sequence was derived from the U, B, V photometry of McGimsey and Miller (1977), using the conversion formula of Arp (1961).

OX 074. As reported in Paper I, OX 074 underwent a radical change in its variability characteristics between 1972 and 1973. After declining from a large outburst in 1970, the object was very constant ($\Delta m < 0^m\!.5$) for two years. Since that time it has shown continual 1- to 1.5-magnitude fluctuations while maintaining about the same base level. This type of behavior also existed to a lesser extent in 3C 345 after its 1971 outburst, but it is not evident for PKS 2345-16, which underwent a similar outburst and decline between 1969 and 1978. Our most recent plate (11/22–23/78) shows OX 074 at $\sim 17^m\!.6$, about $0^m\!.5$ above base level. The comparison sequence was calibrated with SA 89.

BL Lac. BL Lac is one of the most active objects in our monitoring program. The archival data (Shen and Usher 1970) reveal extremely violent activity, including a 400-day period during which the object varied over nearly its entire recorded range ($12.4 \leq B \leq 16.7$). Similar chaotic activity is evident in the composite light curve for 1969 to 1971 presented by Bertaud *et al.* (1973), although in this case the object always remained at least one magnitude below its maximum recorded brightness. The Florida light curve illustrates that this erratic behavior has continued over the last eight years, with two large, well-defined outbursts occurring since 1977. The *U, B, V* sequences for BL Lac were selected from the sequence of Bertaud *et al.* (1969). The infrared sequence was derived using the *U–V, B–V,* and *V–I* data of Johnson *et al.* (1966); see the Data-Reduction section.

3C 446. This OVV has been closely monitored at Rosemary Hill since its large outburst in 1974, when it attained a peak magnitude of $B = 15.44$, about equal to the maximum reported for the 1966 outburst (Kinman *et al.* 1966). In 1975 3C 446 faded to $18^{\mathrm{m}}_{.}77$, only $0^{\mathrm{m}}_{.}1$ brighter than its faintest recorded magnitude (Sandage *et al.* 1966). From 1976 through 1978 the object has undergone a $0^{\mathrm{m}}_{.}7\ \mathrm{yr}^{-1}$ general brightening with rapid 1- to 2-magnitude fluctuations superimposed. 3C 446 peaked at $15^{\mathrm{m}}_{.}85$ (12/1/78), then faded about $0^{\mathrm{m}}_{.}6$ in three weeks before being lost to the Sun. Data were reduced using the sequence of Angione (1971).

3C 454.3. Although this object is a known OVV (Tritton and Selmes 1971; Lü 1972; and Angione 1971) it has shown little activity since monitoring began at Rosemary Hill in 1971. The minimum brightness ($B = 17.64$) found by Tritton and Selmes was equaled on 1/12/77 ($B = 17.68$). Since 1971 the object has remained at least $1^{\mathrm{m}}_{.}5$ fainter than the maximum of $14^{\mathrm{m}}_{.}8$ obtained from the Harvard archives by Angione, while showing a very slow (0.08/year) decline over an eight-year period. The sequence of Angione (1971) was used to reduce the data.

PKS 2345−16. The Florida light curve for PKS 2345−16 provides an excellent example of the necessity of observations over a long-time base (order of decades) to determine the real optical behavior of QSOs. Since the $2^{\mathrm{m}}_{.}0$ flare in 1969 reported by Folsom *et al.* (1970), the source has been quiescent, exhibiting intrayear fluctuations of $<1^{\mathrm{m}}_{.}0$ superimposed on a general decline of $\sim 0^{\mathrm{m}}_{.}05\ \mathrm{yr}^{-1}$. A striking similarity exists between the Florida light curves of 3C 345 from 1970 to 1977 and PKS 2345−16 from 1969 to 1973, especially when the durations of the respective major outbursts are taken into account. SA 116 was used to calibrate the sequence for PKS 2345−16.

V. DISCUSSION

On the basis of the overall nature of their light curves, each of the OVVs of Paper I was assigned to one of four variability subclasses. Subclass I includes objects whose behavior is dominated by rapid flickering without conspicuous long-term trends. Objects of subclass II, conversely, show long-term changes in mean level much larger than any short-term flickering. In subclass III the short-term and long-term effects are of comparable amplitudes. Finally, subclass IV is episodic, displaying long intervals of quiescence punctuated by brief outbursts of activity.

The extended light curves of the present work afford an opportunity to test the stability of such classifications. Table I lists new and independently determined subclasses for the OVVs of the present paper. Paper I emphasized that these categories do not have rigid boundaries and thus overlap somewhat. For the 15 objects common to both papers, 11 retained their original classifications on the basis of this completely independent evaluation. The reclassifications of 3C 120 and 3C 345 are borderline cases that now appear to contain characteristics of both the original and new subclasses. With the elimination of the single bright magnitude in September 1972 (see Paper I), which is of dubious quality, 3C 454.3 is now more appropriately placed in subclass I. The most obvious change occurred in 3C 446, which at the time of Paper I had shown a large, spiked outburst but no long-term trends. Since that time it has shown a steady, three-year brightening. For two of the new OVVs the appropriate subclass is in doubt because of their relatively short-time baselines. It should be pointed out that some (or perhaps all?) of these objects may alter their variability characteristics from epoch to epoch. For example, examination of the composite historical light curve of OJ 287 (Pollock 1975b) shows that from 1934 to 1940 it would have been placed in subclass III, from 1945 to 1952 and from 1970 to 1979 in subclass II, and from 1953 to 1958 in subclass I. Consequently, it is preferable to consider these classifications as representative of recent behavior, rather than as necessarily indicating some intrinsic difference between the sources. Even the appropriateness of the OVV classification itself may be subject to temporal variation (cf. PKS 2345−16).

The diversity of the time scales and amplitudes of optical variability in these objects makes explanation of the fluctuations by a single physical mechanism difficult. Background flickering of about half a magnitude seems to be a common feature of all these objects (and many non-OVVs as well), whether they are in an active or a quiescent phase. Well-defined outbursts of several magnitudes (with relatively monotonic rises and declines) occur on time-scales as short as a few weeks (e.g., AO 0235+164) to as long as several years (e.g., OJ 287). Any comparison of such events, however, cannot be complete without considering the total absolute flux represented by each event. This requires the distance to the source be known (for which we must assume cosmological redshifts), as well as the pre-, inter-, and post-flare fluxes at all frequencies. The latter are, of course, never completely available, but on at least one occasion, the 1975 outburst of AO 0235+164, a significant portion of the spectrum was observed. The wealth of information available for that event graphically illustrates the value of co-operative programs to obtain simultaneous, multifrequency data during outbursts. A much larger data base is available for the flux variations in a single bandpass (generally the *B* band). The results of an examination of this information, using previously published light curves, data from this paper, and the Florida data on approximately 100 non-OVVs (Pica *et al.,* 1979) will be the subject of future work. Such a study will put constraints on mechanisms proposed to account for the diverse variability seen in these objects.

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