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# LONG-TERM OPTICAL BEHAVIOR OF 114 EXTRAGALACTIC SOURCES

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## ABSTRACT

Photometric data for over 200 extragalactic sources have been obtained during an 11-yr monitoring program. Twenty that are optically violent variables were reported on by Pollock *et al.* (1979). The present paper provides data for 114 less active sources, 58 of which exhibit optical variations at a confidence level of 95% or greater. Light curves are given for the 26 most active sources. In addition, the overall monitoring program at the Rosemary Hill Observatory is reviewed, providing information on the status of 206 objects in all.

## I. INTRODUCTION

Photographic observations of over 200 quasars and related objects have been obtained at the Rosemary Hill Observatory since 1968. Results from the first seven years of the program were presented by McGimsey *et al.* (1975) and by Scott *et al.* (1976), hereafter referred to as Papers I and II, respectively. A recent paper by Pollock *et al.* (1979), hereafter referred to as Paper III, provided updated and improved data for 20 optically violent variables (OVV's) extending through early 1979. The present paper is a report on 114 additional sources that have well established comparison sequences. Of these, 50 are designated as quasi-stellar radio sources, 14 as members of the BL Lacertae class, 14 as N galaxies or Seyferts, and 19 as radio-quiet QSO's. The remaining 17 sources are suspected QSO's but have not been spectroscopically confirmed. Also presented in this paper is a synopsis of the entire monitoring program at Rosemary Hill, including information on 206 extragalactic sources.

The methods of data acquisition, reduction, and error analysis are discussed in Paper III, and we refer the reader to that paper for discussions of such matters.

Comparison sequences from the literature were used when available. In most cases, however, sequences were calibrated by photographic transfer from nearby standard fields such as the Mount Wilson Selected Areas of Brun (1957). Table I cites the references for the comparison sequences used in our reduction procedure. Smoothing of comparison sequences has been facilitated by the additional four years of observations since Papers I and II. All data, going back to 1968, have been re-reduced for the present paper to take advantage of this and to ensure internal consistency over the entire run of data. Furthermore, extended and improved sequences have become available since 1976. In several instances, questionable data points have been reexamined, old plates have been re-read, and the light curves have been improved in accuracy as well as being extended in time.

## II. RESULTS

The 114 extragalactic objects in our sample are listed in Table I in order of increasing right ascension (column 1). The common name of each source is provided in column 2, and column 3 gives the type of object. A source is classified as a QSO if emission lines have been detected spectroscopically and a redshift is available (see Verón and Verón 1975). BL Lacertae objects lack emission lines; these are discussed extensively by Stein, O'Dell, and Strittmatter (1976). References for recently discovered BL Lacertae objects are provided where needed. Some objects are detected as radio sources and appear stellar on the Sky Survey (thus making them prime candidates for designation as QSO's). However, these objects have not been confirmed spectroscopically and for those cases the space in column 3 is left blank. Column 4 indicates the range of variability recorded in the observations at Rosemary Hill. Column 5 gives the confidence level for variability based on the chi-squared statistical test outlined by Penston and Cannon (1970). A confidence level of 95% or greater is a good indication that a source is indeed variable. The reference for the calibration of comparison sequences is given in column 6. Mount Wilson selected areas are designated as SA (followed by the selected area number). In some cases, photoelectric sequences from the literature were used, and these are referenced. In other instances, secondary sequences derived by photographic transfer from other fields are denoted by the object name (e.g., the comparison sequence for 0422+004 was derived by photographic transfer from the 0350−07 field). Finally, column 7 includes comments regarding the source's variability subclass (see Sec. III), unusual properties, etc. For most objects, references to finder charts are given

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TABLE I. Observational data for 114 sources.

| (1) OBJECT | (2) COMMON NAME | (3) TYPE | (4) RANGE(mag.) | (5) $\chi^2$ (%) | (6) CALIBRATION REFERENCE | (7) REMARKS |
|---|---|---|---|---|---|---|
| 0008 + 10 | III Zw 2 | Seyfert | 0.81 | 85 | SA 94 | 1 |
| 0013 - 00 | | | 1.17 | 99.5 | SA 92 | |
| 0024 + 34 | OB 338 | QSO(?) | 0.99 | 95 | SA 20 | |
| 0035 + 41 | OA 33 | BL Lac | 1.04 | 94 | SA 67 | 2 |
| 0035 + 121 | | BL Lac | 0.69 | 86 | a | |
| 0048 - 09 | | BL Lac | 2.19 | >99.5 | SA 117 | III |
| 0109 + 22 | | BL Lac | 0.89 | 82 | b, c | 3 |
| 0119 - 04 | | QSO | 0.62 | 18 | SA 93 | |
| 0141 + 33 | DA 58 | QSO | 0.20 | 31 | SA 45 | |
| 0159 - 11 | | QSO | 1.18 | >99.5 | a | I(?) |
| 0202 - 17 | | QSO | 0.84 | 45 | SA 118 | |
| 0219 + 42 | 3C 66A | BL Lac | 1.10 | 79 | d | I |
| 0222 - 23 | | | 1.48 | >99.5 | SA 119 | II |
| 0229 + 13 | | QSO | 0.63 | 70 | SA 71 | |
| 0251 + 18 | | | 0.58 | 7 | SA 71 | |
| 0301 - 243 | | BL Lac | 0.76 | >99.5 | a | 4 |
| 0333 + 32 | NRAO 140 | QSO | 1.07 | 48 | SA 48 | I |
| 0336 - 01 | CTA 26 | QSO | 1.18 | >99.5 | SA 95 | III |
| 0338 - 214 | | Gal. | 1.17 | >99.5 | 0237 - 23 | 4 |
| 0340 + 04 | 3C 93 | QSO | 1.14 | >99.5 | SA 95 | |
| 0347 + 13 | | | 0.30 | - | SA 72 | |
| 0350 - 07 | | QSO(?) | 0.35 | 6 | a | |
| 0414 - 06 | OF - 024 | QSO | 0.49 | 18 | 0350 - 07 | |
| 0422 + 004 | | BL Lac | 1.96 | >99.5 | 0350 - 07 | |
| 0642 + 44 | OH 471 | QSO | 0.97 | 98 | SA26/NGC2366 | |
| 0711 + 35 | OI 318 | QSO | 1.31 | >99.5 | SA 50a | I(III) |
| 0725 + 14 | | QSO | 0.62 | 99.5 | SA 76 | I |
| 0736 + 01 | | QSO | 0.97 | >99.5 | SA 99 | I(III) |
| 0738 + 31 | OI 363 | QSO | 0.43 | 55 | SA 52 | |
| 0805 + 04 | 4C 05.34 | QSO | 0.70 | 95 | SA 100 | |
| 0812 + 02 | | QSO | 0.57 | 98.5 | SA 100 | |
| 0829 + 18 | | N-gal. | 0.49 | 91 | SA 76 | |
| 0850 + 14 | | QSO | 1.14 | >99.5 | SA 77 | IV(?) |
| 0922 + 14 | | QSO | 0.56 | 50 | SA 77 | |
| 0945 + 07 | | N-gal. | 0.73 | 93 | SA 78 | |
| 0953 + 25 | OK 290 | QSO | 1.04 | >99.5 | SA 54 | I |
| 0957 + 00 | | QSO | 1.02 | 99 | SA 102 | |
| 1004 + 13 | | QSO | 0.72 | >99.5 | SA 78 | II |
| 1021 - 00 | | | 0.94 | 70 | SA 101 | |
| 1040 + 12 | | QSO | 0.99 | >99.5 | SA 78 | |
| 1049 + 21 | | QSO | 0.87 | 97.5 | SA 79 | |
| 1055 + 20 | | QSO | 0.82 | 40 | SA 79 | |
| 1101 + 38 | Mrk 421 | BL Lac | 1.59 | >99.5 | e | |
| 1116 + 12 | | QSO | 1.38 | >99.5 | SA 79 | III |
| 1119 + 18 | OM 133 | QSO | 0.72 | 98.5 | SA 79 | |
| 1123 + 20B | | N-gal. | 1.06 | 98.5 | SA 79 | I |
| 1127 - 14 | | QSO | 0.25 | 10 | SA 128 | |
| 1148 - 00 | | QSO | 0.64 | 88 | SA 104 | |
| 1215 + 30 | ON 325 | BL Lac | 1.53 | >99.5 | f | I |
| 1217 + 02 | | QSO | 1.08 | >99.5 | SA 104 | II |
| 1226 + 02 | 3C 273 | QSO | 0.88 | >99.5 | g | I |
| 1229 - 02 | | QSO | 0.75 | >99.5 | SA 104 | II |
| 1237 - 10 | | QSO | 0.70 | >99.5 | SA 129 | |
| 1240 + 09 | 4C 09.42 | | 0.73 | 95 | SA 81 | |
| 1252 + 11 | | QSO | 0.91 | 98 | SA 81 | I |
| 1253 - 05 | 3C 279 | QSO | 1.53 | >99.5 | SA 104 | |
| 1318 + 29A | Ton 155 | QSO | 0.57 | 72 | SA 57 | |
| 1318 + 29B | Ton 156 | QSO | 0.80 | 15 | SA 57 | |
| 1330 + 02 | | N-gal. | 0.32 | - | SA 104 | |
| 1340 + 05 | | N-gal. | 0.36 | 60 | SA 105 | |
| 1341 + 14 | | | 0.63 | 35 | SA 82 | |
| 1347 + 21 | | | 0.89 | 80 | SA 82 | |
| 1354 + 19 | | QSO | 0.71 | 99.5 | a | |
| 1402 - 012 | | | 0.55 | 55 | SA 106 | |
| 1437 + 22 | | N-gal. | 0.71 | 75 | SA 83 | |
| 1442 + 10 | OQ 172 | QSO | 0.64 | 7 | SA 83 | |
| 1505 + 01 | | | 0.46 | 90 | SA 107 | |
| 1510 - 08 | | QSO | 1.44 | >99.5 | SA 132 | III |
| 1615 + 029 | | | 0.85 | 5 | SA 108 | |
| 1618 + 17 | | QSO | 1.18 | >99.5 | a | II(III) |
| 1645 + 17 | | N-gal. | 0.56 | 2 | SA 85 | |
| 1652 + 39 | Mrk 501 | BL Lac | 0.61 | 99.5 | 3C 345 | |
| 1704 + 60 | 3C 351 | QSO | 0.22 | <1 | h | |
| 1727 + 50 | IZw 186 | BL Lac | 0.89 | >99.5 | d | I |
| 1749 + 09 | OT 081 | BL Lac | 1.56 | >99.5 | d | |
| 1831 + 731 | Wild's Variable | Seyfert | 1.35 | >99.5 | SA 7 | 5 |
| 1845 + 79 | 3C 390.3 | N-gal. | 1.07 | >99.5 | g | III |
| 1921 - 29 | OV - 236 | BL Lac | 2.61 | >99.5 | SA 133a | IV(?) |
| 2059 + 034 | | QSO | 0.84 | 99 | SA 113 | I |
| 2111 - 25 | | | 0.95 | 98 | SA 138 | |
| 2128 - 12 | | QSO | 1.01 | <1 | a | |
| 2131 - 021 | | | 1.23 | >99.5 | SA 113 | |
| 2134 + 004 | | QSO | 1.40 | 78 | SA 113/i | |
| 2135 - 14 | | QSO | 1.00 | >99.5 | SA 137 | |
| 2145 + 06 | | QSO | 0.56 | 27 | SA 90 | |
| 2209 + 08 | | QSO | 1.05 | 40 | SA 114 | |
| 2216 - 03 | | QSO | 0.68 | 60 | 2345 - 16 | |
| 2230 + 11 | CTA 102 | QSO | 1.13 | >99.5 | i | I |
| 2254 + 07 | OY 091 | BL Lac | 0.84 | >99.5 | d | |
| 2300 - 18 | | N-gal. | 0.85 | >99.5 | SA 116 | |
| 2331 - 24 | OZ - 252 | N-gal. | 0.95 | 96 | SA 139 | |
| 2335 - 18 | | | 1.53 | 93 | SA 116 | |
| 2349 - 01 | | N-gal. | 1.26 | >99.5 | SA 92 | II |
| 2354 + 14 | | QSO | 0.69 | 28 | SA 68 | |
| 2354 - 11 | | | 0.79 | 77 | SA 116 | |
| | | | | | | |
| 0058.2 + 019 | PHL 938 | RQ QSO | 0.51 | 72 | j(SA 94) | 6 |
| 0128.4 + 075 | PHL 3375 | RQ QSO | 0.57 | - | j | 7 |
| 0130.5 + 034 | PHL 1027 | RQ QSO | 0.50 | 73 | j | 7 |
| 0139.9 + 062 | PHL 3632 | RQ QSO | 0.66 | 99.5 | j | 8 |
| 0147.6 + 090 | PHL 1186 | RQ QSO | o.85 | 93 | j | 7 |
| 0148.7 + 090 | PHL 1194 | RQ QSO | 0.50 | 28 | j | 7 |
| 0151.2 + 048 | PHL 1222 | RQ QSO | 0.24 | - | j | 7 |
| 0151.8 + 046 | PHL 1226 | RQ QSO | 0.42 | 90 | j | 7 |
| 1246.5 + 377 | BSO 1 | RQ QSO | 0.96 | >99.5 | i (M3) | 8 |
| 1246.5 + 347 | B 46 | RQ QSO | 0.89 | >99.5 | i | 8 |
| 1248.3 + 338 | BSO 2 | RQ QSO | 0.81 | 88 | i | 8 |
| 1252.9 + 359 | B 114 | RQ QSO | 0.98 | 98 | i | 8 |
| 1255.0 + 353 | B 154 | RQ QSO | 0.69 | 97 | i | 8 |
| 1256.1 + 357 | B 194 | RQ QSO | 0.38 | 12 | i | 8 |
| 1257.4 + 347 | B 201 | RQ QSO | 0.55 | 40 | i | 8 |
| 1259.5 + 345 | BSO 6 | RQ QSO | 0.52 | 75 | i | 8 |
| 1300.7 + 361 | B 234 | RQ QSO | 0.88 | 95 | i | 8 |
| 1304.9 + 375 | B 312 | RQ QSO | 0.75 | - | i | 8 |
| 1311.3 + 363 | BSO 11 | RQ QSO | 0.78 | 82 | i | 8 |

Key to Table I

Finder references (column 7)

1. Arp (1968).
2. Donivan *et al.* (1978).
3. Owen and Mufson (1977).
4. Condon, Hicks, and Jauncey (1977).
5. Wills and Wills (1979).
6. Kinman (1966).
7. Sandage and Luyten (1967).
8. Braccesi *et al.* (1968).

Calibration references (column 6)

a. Angione (1971).
b. Sandage and Johnson (1974).
c. Landolt (1970).
d. Craine, Johnson, and Tapia (1975).
e. McGimsey, Miller, and Williamon (1976).
f. Wing (1973).
g. Penston, Penston, and Sandage (1971).
h. Dumortier (1976).
i. Sandage (1970).
j. Purgathofer (1969).

Variability subclasses (column 7)

I. Short time-scale variations dominant.
II. Long-term fluctuations dominant.
III. Short-term and long-term variations comparable.
IV. Behavior is episodic.

by Verón and Verón (1975). Finding charts for newer ID's not appearing in the Verón catalog are referenced in column 7.

In addition to the 114 objects listed in Table I, 92 other sources are presently being monitored at Rosemary Hill. Of these, 20 optically violent variables were reported on in Paper III and data for eight sources in the Ohio State survey were presented in a recent paper by Donivan *et al.* (1980). The 64 remaining objects either are new ID's, are recently added sources, or do not as yet have the accurately calibrated comparison sequences needed to determine their magnitudes.

Table II provides a synopsis of the 92 additional objects monitored. Column 1 lists the PKS-type designation in order of increasing right ascension, while column 2 gives the object's common name. Column 3 lists the type of object and column 4 indicates the approximate date monitoring was begun at Rosemary Hill. (A blank space in column 4 means that we have not as yet taken any plates of that field.) Column 5 is reserved for remarks and includes references for finder charts when these are not provided by Verón and Verón (1975).

The results of our observations of the 114 sources listed in Table I are presented in Table III. Column 1 gives the UT date of the observation, and column 2 gives the Julian date − 2,400,000 for the midpoint of the exposure. Column 3 gives the observed magnitude, column 4 the rms error of the observation (defined as the rms scatter of the comparison-star magnitudes around the calibration curve), and column 5 the magnitude system. Plates taken in $m_{pg}$ are denoted by P. The sources are listed by their common names in order of increasing right ascension except for the radio-quiet QSO's. In both Tables I and III we have grouped the radio-quiets at the end of the list. In this way one can more easily compare these objects as a group and thus study their properties as a whole.

TABLE II. 92 additional sources monitored at Rosemary Hill.

| (1) OBJECT | (2) COMMON NAME | (3) TYPE | (4) DATE BEGAN MONITORING | (5) REMARKS |
|---|---|---|---|---|
| 0038 + 32 | | Gal. | | |
| 0056 - 00 | | QSO | 12/69 | c |
| 0127 + 23 | 3C 43 | QSO | 9/73 | c |
| 0133 + 47 | OC 457 | QSO | 9/71 | b |
| 0134 + 32 | 3C 48 | QSO | 9/79 | |
| 0139 - 09 | | | 12/69 | c |
| 0202 + 14 | | EF | | |
| 0235 + 164 | AO | BL Lac | 12/75 | a |
| 0241 + 62 | | QSO | 2/78 | x-ray source |
| 0256 + 07 | | N-gal. | | |
| 0306 + 10 | OE 110 | BL Lac | 1/75 | a |
| 0309 + 39 | 4C 39.11 | N-gal. | 11/78 | |
| 0400 + 25 | | QSO | 3/80 | |
| 0406 + 12 | | RSO | 9/79 | |
| 0415 + 37 | 3C 111 | Gal. | 9/79 | |
| 0420 - 01 | | QSO | 12/69 | a |
| 0430 + 05 | 3C 120 | Seyfert | 12/68 | a |
| 0440 - 00 | NRAO 190 | QSO | 12/69 | a |
| 0446 + 11 | | Gal. | 3/80 | |
| 0458 - 02 | | QSO | 12/69 | c |
| 0513 - 00 | Ark 120 | Seyfert | 2/80 | 1 |
| 0518 + 16 | | QSO | 12/70 | c |
| 0528 - 25 | | QSO | 10/77 | |
| 0548 - 322 | | Gal. | 11/79 | |
| 0723 - 00 | | Gal. | 3/80 | |
| 0735 + 17 | | BL Lac | 11/70 | a |
| 0743 - 00 | OI-072 | QSO | 4/73 | |
| 0745 - 19 | OI-175 | Gal. | 12/71 | b |
| 0752 - 11 | OI-187 | | 3/72 | b |
| 0754 + 10 | OI-090.4 | BL Lac | 3/79 | 2 |
| 0800 - 17 | OJ-100 | EF | 3/72 | b |
| 0802 + 10 | | QSO | 3/72 | c |
| 0846 + 51 | | QSO/BL Lac | 1/80 | 3 |
| 0851 + 20 | OJ 287 | BL Lac | 11/69 | a |
| 0906 + 01 | | QSO | 3/69 | a |
| 0957 + 56 | | QSO | 5/79 | Gravitational Lens? |
| 1010 + 35 | OL 318 | QSO | 1/70 | c |
| 1019 + 30 | OL 333 | QSO | 5/69 | b |
| 1034 - 293 | | BL Lac | 3/78 | OVV |
| 1038 + 528 | | QSO | 3/78 | 4 |
| 1039 + 02 | | EF | 3/80 | |
| 1049 - 09 | | QSO | 12/69 | c |
| 1055 + 01 | | QSO | 2/70 | c |
| 1117 + 14 | | QSO(?) | 3/80 | |
| 1219 + 28 | ON 231 | BL Lac | 2/72 | a |
| 1225 + 36 | ON 343 | EF | 6/69 | |
| 1308 + 326 | B2 | BL Lac | 4/76 | a |
| 1308 + 14 | OP 114 | | 6/69 | b |
| 1345 + 12 | | Gal. | 3/80 | |
| 1404 + 28 | OQ 208 | Seyfert | 4/69 | c |
| 1418 + 546 | | QSO | 4/78 | Possible OVV; 5 |
| 1422 + 20 | | QSO | 3/80 | |
| 1502 + 036 | | | 6/71 | c |
| 1514 - 24 | AP Lib | BL Lac | 2/72 | a |
| 1532 + 01 | | BL Lac | 4/78 | 6 |
| 1538 + 14 | | BL Lac | 7/79 | |
| 1546 + 02 | | QSO | 5/71 | c |
| 1548 + 05 | 4C 05.64 | QSO | 6/71 | c |
| 1548 + 115 | | QSO | 6/74 | |
| 1600 + 33 | OS 300 | EF | 6/75 | |
| 1606 + 10 | | | 4/71 | c |
| 1607 + 26 | | | 5/69 | c |
| 1611 + 34 | | QSO | 3/80 | |
| 1638 + 39 | NRAO 512 | QSO | 5/70 | a |
| 1641 + 39 | 3C 345 | QSO | 6/70 | a |
| 1657 + 26 | 4C 26.51 | QSO | 6/71 | c |
| 1730 - 13 | NRAO 530 | QSO | 4/71 | a |
| 1749 + 70.1 | | BL Lac(?) | 3/79 | Gal/QSO pair; 7 |
| 1801 + 01 | | QSO | 5/71 | c |
| 1807 + 69 | 3C 371 | N-gal. | 12/68 | a |
| 1901 + 31 | | | 3/80 | |
| 1947 + 07 | OV 080 | | 4/69 | c |
| 2037 + 88 | RN 73 | | 3/79 | 8 |
| 2118 + 18 | OX 131 | QSO | 4/69 | b |
| 2126 - 15 | | QSO | 7/77 | c |
| 2144 + 09 | OX 074 | | 4/69 | a |
| 2154 - 18 | OX - 191 | QSO | 8/69 | c |
| 2155 - 15 | OX - 192 | BL Lac | 7/73 | c |
| 2155 - 30 | | BL Lac | 7/79 | |
| 2200 + 42 | BL Lac | BL Lac | 10/69 | a |
| 2201 + 31 | | QSO | | |
| 2223 - 05 | 3C 446 | QSO | 12/68 | a |
| 2223 + 21 | | QSO | | |
| 2233 - 148 | | | 8/77 | |
| 2243 - 12 | OY - 172.6 | EF | 8/75 | b |
| 2251 - 178 | | QSO | 8/78 | x-ray source |
| 2251 + 15 | 3C 454.3 | QSO | 12/68 | a |
| 2251 + 24 | | QSO | 6/69 | c |
| 2252 + 12 | 3C 455 | QSO | 7/72 | c |
| 2254 + 024 | | QSO | 6/71 | c |
| 2319 + 27 | | Gal. | | |
| 2345 - 16 | | QSO | 10/69 | a |

Finder References
1. Miller (1979)
2. Tapia et al. (1977)
3. Arp et al. (1979)
4. Owen, Wills, and Wills (1980)
5. Cohen et al. (1977)
6. Edwards, Kronberg, and Menard (1975)
7. Arp et al. (1976)
8. Penston (1971)

Additional Notes
a. See Pollock et al. (1979) - OVV
b. See Donivan et al. (1980) - Ohio Sources
c. Source needs calibration

For those objects which have a sufficient amount of data, and have exhibited variability at a confidence level of 95% or greater, we present light curves (Fig. 1). The length of the error bar for each light curve, $\pm\bar{\sigma}$, is simply the average of the rms errors of the individual plates listed in Table III. The light curves are in order of increasing right ascension.

The most interesting objects among the sample of 114 are discussed individually below, with pertinent related work on the objects as well as remarks concerning the light curves.

*III Zw 2.* This compact galaxy was discovered by Zwicky (1967) and spectroscopic studies by several authors reveal it to be a type-I Seyfert (see, for example, Weedman 1977 and references therein). The x-ray and radio emissions were examined by Schnopper *et al.* (1978). They find a sharply rising radio spectrum, with $\alpha = -1.5$ between 4.9 and 31.4 GHz, and substantial variability at 10.7 GHz. *JHKL*-band infrared observations by Rieke and Lebofsky (1979) reveal that slight variations occurred between December 1975 and January 1978, and Miller (1978) reports substantial brightening in the visible.

We began monitoring III Zw 2 in December 1977, and marginal variability has been detected.

*0013−00.* We have been monitoring the radio source identified by Bolton and Ekers (1967) and have detected variability. Johnson (1974) identified a faint red stellar object to the northwest of this source and there is some confusion as to the correct identification. No spectroscopy is reported for either object. Rapid variations were detected in 1972 and 1976. The object brightened by $0^m.9$ between 13 September 1972 and 12 October 1972, although the flare was recorded on only one plate. A rapid drop of $0^m.7$ occurred during a two-month interval in 1976, which seems well substantiated, and similar short-term flickering is evident throughout the Florida light curve.

*0048−09.* Hoskins *et al.* (1974) identified this as a stellar object of neutral color and Tapia, Craine, and Johnson (1976) classify it as a BL Lacertae object. Our data indicate that an outburst occurred in November 1972, in which the source reached $P = 15.3$. A slow decline in mean brightness ensued, with the object reaching a minimum of $17^m.5$ in December 1979, yielding a total range of variability of $2^m.2$. Short-term flickering of as much as $0^m.8$ is superimposed on the long-term activity, possibly putting this source in the class of optically violent variables (OVV's, see Paper III). A historical light curve by Usher, Kolpanen, and Pollock (1974) indicates a total amplitude of almost $3^m$.

The optical energy distribution of 0048−09 was examined by Tapia, Craine, and Johnson (1976) and found to be rather steep ($\alpha_{opt} \simeq 1.85$, where $F_\nu \propto \nu^{-\alpha}$). The radio spectrum is fairly flat ($\alpha_{rad} \simeq -0.4$ according to Altschuler and Wardle 1975), and the optical polarization was found to be as high as 14% (Kinman 1976b). The combination of rapid variability, flat radio and steep

TABLE III. Observation results.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | **III ZW2** | | | |
| 12/12/77 | 43489.560 | 14.92 | 0.10 | B |
| 12/12/77 | 43489.564 | 14.75 | 0.16 | B |
| 12/12/77 | 43489.572 | 14.77 | 0.12 | B |
| 1/ 4/78 | 43512.550 | 14.95 | 0.07 | B |
| 1/10/78 | 43518.547 | 14.73 | 0.06 | B |
| 8/ 5/78 | 43725.865 | 15.37 | 0.08 | B |
| 8/ 8/78 | 43728.843 | 15.10 | 0.21 | B |
| 8/29/78 | 43749.779 | 15.10 | 0.25 | B |
| 9/27/78 | 43778.643 | 14.69 | 0.22 | B |
| 10/ 3/78 | 43784.658 | 14.64 | 0.18 | B |
| 10/ 5/78 | 43786.605 | 14.79 | 0.20 | B |
| 10/ 5/78 | 43786.745 | 14.62 | 0.20 | B |
| 10/ 9/78 | 43790.735 | 14.38 | 0.17 | B |
| 10/23/78 | 43804.631 | 14.56 | 0.27 | B |
| 11/25/78 | 43837.533 | 14.59 | 0.18 | B |
| 12/20/78 | 43862.555 | 14.66 | 0.15 | B |
| 7/30/79 | 44084.815 | 15.15 | 0.15 | B |
| 10/12/79 | 44159.668 | 15.02 | 0.13 | B |
| 10/19/79 | 44166.672 | 15.19 | 0.19 | B |
| 11/15/79 | 44193.626 | 14.88 | 0.13 | B |
| | **0013-00** | | | |
| 9/30/70 | 40859.709 | 18.67 | 0.13 | P |
| 11/21/70 | 40911.708 | 18.46 | 0.21 | P |
| 10/12/71 | 41236.642 | 18.53 | 0.14 | P |
| 8/11/72 | 41540.855 | 18.44 | 0.15 | P |
| 9/13/72 | 41573.778 | 18.89 | 0.21 | P |
| 10/13/72 | 41603.696 | 17.96 | 0.21 | P |
| 9/ 6/73 | 41931.849 | 18.61 | 0.12 | P |
| 10/21/73 | 41976.734 | 18.40 | 0.16 | P |
| 12/22/73 | 42038.557 | 18.42 | 0.10 | P |
| 8/24/74 | 42283.812 | 18.32 | 0.10 | P |
| 8/16/75 | 42640.849 | 18.65 | 0.16 | P |
| 10/27/75 | 42712.565 | 18.25 | 0.13 | P |
| 11/ 1/75 | 42717.621 | 18.60 | 0.26 | P |
| 11/29/75 | 42745.562 | 18.35 | 0.18 | P |
| 11/29/75 | 42745.566 | 18.49 | 0.12 | P |
| 1/ 1/76 | 42778.533 | 18.80 | 0.17 | P |
| 1/ 1/76 | 42778.538 | 18.46 | 0.17 | P |
| 9/ 2/76 | 42992.879 | 18.15 | 0.20 | P |
| 8/28/76 | 43018.804 | 17.87 | 0.13 | P |
| 8/28/76 | 43018.810 | 17.72 | 0.16 | P |
| 10/21/76 | 43072.661 | 18.49 | 0.22 | P |
| 1/20/77 | 43163.530 | 18.50 | 0.21 | P |
| 1/20/77 | 43163.535 | 18.72 | 0.18 | P |
| 9/21/77 | 43407.734 | 18.06 | 0.24 | P |
| 10/17/77 | 43433.678 | 18.04 | 0.26 | P |
| 11/11/77 | 43458.653 | 18.54 | 0.17 | P |
| 12/12/77 | 43489.583 | 18.42 | 0.18 | P |
| 11/ 1/78 | 43813.641 | 18.53 | 0.19 | P |
| 10/18/79 | 44165.653 | 18.48 | 0.17 | P |
| 11/16/79 | 44194.661 | 18.54 | 0.14 | P |
| | **OB 338** | | | |
| 10/14/69 | 40508.667 | 19.60 | 0.25 | P |
| 9/10/70 | 40839.764 | 19.92 | 0.21 | P |
| 9/25/70 | 40854.722 | 19.63 | 0.15 | P |
| 9/30/70 | 40859.757 | 19.80 | 0.16 | P |
| 10/26/70 | 40885.703 | 19.66 | 0.13 | P |
| 11/20/70 | 40910.667 | 19.03 | 0.19 | P |
| 11/29/70 | 40919.677 | 19.31 | 0.23 | P |
| 12/ 1/70 | 40921.642 | 20.02 | 0.25 | P |
| 12/ 3/70 | 40923.649 | 19.73 | 0.24 | P |
| 8/ 3/71 | 41166.858 | 19.79 | 0.20 | P |
| 11/28/72 | 41649.579 | 19.75 | 0.16 | P |
| 9/ 5/73 | 41930.854 | 19.65 | 0.20 | P |
| 10/20/73 | 41975.676 | 19.37 | 0.19 | P |
| 10/ 1/75 | 42687.681 | 19.34 | 0.22 | P |
| 2/ 8/77 | 43184.524 | 19.32 | 0.19 | P |
| 12/13/77 | 43491.551 | 19.90 | 0.20 | P |
| | **OA 33** | | | |
| 10/13/69 | 40508.760 | 19.28 | 0.26 | P |
| 11/20/70 | 40911.622 | 19.76 | 0.19 | P |
| 11/29/70 | 40921.642 | 19.88 | 0.28 | P |
| 12/29/70 | 40950.524 | 20.09 | 0.11 | P |
| 9/22/71 | 41216.755 | 19.68 | 0.07 | P |
| 10/13/72 | 41604.744 | 19.43 | 0.17 | P |
| 10/10/75 | 42716.677 | 19.60 | 0.09 | P |
| 1/17/77 | 43161.548 | 19.44 | 0.18 | P |
| 6/26/77 | 43321.961 | 19.55 | 0.18 | P |
| 7/20/77 | 43345.767 | 19.39 | 0.14 | P |
| 8/15/77 | 43371.833 | 19.55 | 0.22 | P |
| 9/ 9/77 | 43396.790 | 19.35 | 0.25 | P |
| 11/ 9/77 | 43457.620 | 19.16 | 0.28 | P |
| 12/ 9/77 | 43487.521 | 19.18 | 0.20 | P |
| 12/12/77 | 43490.532 | 19.40 | 0.23 | P |
| 9/11/79 | 44127.945 | 19.05 | 0.16 | P |
| | **0035+121** | | | |
| 8/15/77 | 43370.887 | 17.63 | 0.14 | B |
| 9/ 7/77 | 43393.710 | 17.55 | 0.12 | B |
| 10/19/77 | 43435.687 | 17.36 | 0.29 | B |
| 11/11/77 | 43458.678 | 17.23 | 0.12 | B |
| 12/ 8/77 | 43485.617 | 17.34 | 0.05 | B |
| 12/12/77 | 43489.625 | 17.04 | 0.12 | B |
| 1/ 6/78 | 43514.577 | 17.27 | 0.08 | B |
| 8/13/78 | 43733.862 | 17.18 | 0.13 | B |
| 9/ 1/78 | 43752.823 | 17.14 | 0.12 | B |
| 9/27/78 | 43778.674 | 16.94 | 0.09 | B |
| 11/ 1/78 | 43813.653 | 17.18 | 0.18 | B |
| 11/25/78 | 43837.546 | 17.06 | 0.18 | B |
| 12/31/78 | 43873.553 | 17.09 | 0.16 | B |
| 7/30/79 | 44084.870 | 17.20 | 0.18 | B |
| 8/20/79 | 44105.828 | 17.19 | 0.09 | B |
| 10/17/79 | 44164.673 | 17.32 | 0.26 | B |
| 11/15/79 | 44193.635 | 17.49 | 0.19 | B |
| | **0048-09** | | | |
| 11/22/70 | 40912.608 | 15.89 | 0.24 | P |
| 11/29/70 | 40919.588 | 16.15 | 0.14 | P |
| 9/ 1/71 | 41195.901 | 16.25 | 0.09 | P |
| 8/12/72 | 41541.860 | 15.96 | 0.13 | P |
| 9/15/72 | 41575.772 | 15.97 | 0.10 | P |
| 10/ 5/72 | 41595.683 | 16.20 | 0.08 | P |
| 10/11/72 | 41601.715 | 16.09 | 0.13 | P |
| 10/14/72 | 41604.743 | 15.78 | 0.15 | P |
| 11/ 5/72 | 41626.635 | 15.77 | 0.14 | P |
| 11/28/72 | 41649.615 | 15.33 | 0.10 | P |
| 8/25/73 | 41919.871 | 16.36 | 0.13 | P |
| 9/24/73 | 41949.725 | 16.34 | 0.10 | P |
| 9/30/73 | 41955.788 | 16.43 | 0.10 | P |
| 10/19/73 | 41974.641 | 16.58 | 0.06 | P |
| 11/19/73 | 42005.584 | 16.50 | 0.17 | P |
| 11/23/73 | 42009.665 | 16.14 | 0.11 | P |
| 12/15/73 | 42031.549 | 16.15 | 0.04 | P |
| 1/16/74 | 42063.515 | 16.08 | 0.15 | P |
| 8/16/74 | 42275.852 | 16.47 | 0.18 | P |
| 8/24/74 | 42283.869 | 16.47 | 0.10 | P |
| 9/12/74 | 42302.771 | 16.61 | 0.16 | P |
| 10/11/74 | 42331.689 | 16.35 | 0.12 | P |
| 12/ 4/74 | 42385.592 | 15.67 | 0.14 | P |
| 1/ 2/75 | 42414.530 | 16.14 | 0.19 | P |
| 2/10/75 | 42453.524 | 16.12 | 0.12 | P |
| 8/ 9/75 | 42633.876 | 16.90 | 0.11 | P |
| 9/ 3/75 | 42658.792 | 16.94 | 0.16 | P |
| 11/ 1/75 | 42717.634 | 16.18 | 0.09 | P |
| 11/24/75 | 42740.599 | 16.07 | 0.05 | P |
| 11/24/75 | 42740.617 | 16.01 | 0.11 | P |
| 1/ 1/76 | 42778.556 | 16.04 | 0.07 | P |
| 1/ 1/76 | 42778.560 | 16.00 | 0.10 | P |
| 8/23/76 | 43013.779 | 16.45 | 0.21 | P |
| 8/23/76 | 43013.785 | 16.34 | 0.26 | P |
| 9/20/76 | 43041.690 | 16.72 | 0.18 | P |
| 9/20/76 | 43041.697 | 16.99 | 0.23 | P |
| | **0048-09 CONT.** | | | |
| 10/16/76 | 43067.667 | 16.38 | 0.18 | P |
| 10/16/76 | 43067.673 | 16.60 | 0.13 | P |
| 11/22/76 | 43104.597 | 16.57 | 0.11 | P |
| 11/22/76 | 43104.691 | 16.61 | 0.04 | P |
| 12/20/76 | 43132.610 | 16.74 | 0.16 | P |
| 9/16/77 | 43371.829 | 17.09 | 0.21 | P |
| 10/11/77 | 43427.702 | 16.77 | 0.23 | P |
| 11/ 6/77 | 43453.677 | 16.73 | 0.13 | P |
| 11/14/77 | 43461.681 | 16.65 | 0.12 | P |
| 12/13/77 | 43490.578 | 16.40 | 0.15 | P |
| 8/31/78 | 43751.840 | 16.58 | 0.20 | P |
| 10/ 3/78 | 43754.671 | 16.59 | 0.08 | P |
| 11/ 2/78 | 43814.604 | 16.46 | 0.36 | P |
| 12/ 2/78 | 43844.620 | 16.73 | 0.10 | P |
| 12/18/78 | 43860.540 | 16.58 | 0.13 | P |
| 12/18/78 | 43860.544 | 16.95 | 0.17 | P |
| 12/20/78 | 43862.524 | 16.89 | 0.19 | P |
| 12/24/78 | 43866.555 | 17.22 | 0.16 | P |
| 12/31/78 | 43873.539 | 17.15 | 0.15 | P |
| 1/19/79 | 43892.558 | 17.05 | 0.31 | P |
| 10/17/79 | 44164.685 | 17.03 | 0.13 | P |
| 11/20/79 | 44198.647 | 17.52 | 0.11 | P |
| | **0109+22** | | | |
| 11/19/76 | 43101.631 | 16.53 | 0.15 | B |
| 11/19/76 | 43101.634 | 16.41 | 0.12 | B |
| 9/22/77 | 43408.808 | 16.05 | 0.14 | B |
| 10/ 7/77 | 43423.729 | 16.50 | 0.06 | B |
| 11/ 9/77 | 43456.694 | 16.63 | 0.15 | B |
| 12/ 8/77 | 43485.642 | 16.26 | 0.06 | B |
| 1/ 6/78 | 43514.587 | 16.38 | 0.18 | B |
| 8/29/78 | 43749.788 | 15.86 | 0.25 | B |
| 9/ 6/78 | 43757.774 | 15.74 | 0.26 | B |
| 11/ 1/78 | 43813.679 | 16.43 | 0.21 | B |
| 11/ 6/78 | 43818.658 | 16.07 | 0.16 | B |
| 11/25/78 | 43837.557 | 16.27 | 0.13 | B |
| 12/20/78 | 43862.562 | 16.49 | 0.09 | B |
| 8/16/79 | 44101.727 | 16.19 | 0.32 | B |
| 9/19/79 | 44135.763 | 16.00 | 0.18 | B |
| 10/18/79 | 44164.724 | 16.34 | 0.22 | B |
| 11/15/79 | 44193.678 | 16.61 | 0.11 | B |
| | **0119-04** | | | |
| 12/ 4/69 | 40559.708 | 16.66 | 0.16 | P |
| 9/30/70 | 40859.715 | 16.33 | 0.20 | P |
| 11/22/70 | 40912.662 | 16.28 | 0.19 | P |
| 12/27/70 | 40947.574 | 16.33 | 0.13 | P |
| 1/20/71 | 40971.571 | 16.31 | 0.06 | P |
| 8/31/71 | 41194.874 | 16.57 | 0.21 | P |
| 11/17/71 | 41272.776 | 16.34 | 0.15 | P |
| 1/ 7/72 | 41323.647 | 16.54 | 0.05 | P |
| 8/11/72 | 41540.924 | 16.43 | 0.10 | P |
| 8/12/72 | 41541.881 | 16.50 | 0.21 | P |
| 9/11/72 | 41571.783 | 16.21 | 0.21 | P |
| 9/18/72 | 41578.851 | 16.54 | 0.19 | P |
| 10/ 8/72 | 41598.774 | 16.45 | 0.07 | P |
| 11/ 5/72 | 41626.659 | 16.83 | 0.19 | P |
| 8/25/73 | 41919.856 | 16.56 | 0.17 | P |
| 11/ 4/73 | 41990.749 | 16.59 | 0.23 | P |
| 12/15/73 | 42031.569 | 16.55 | 0.04 | P |
| 1/16/74 | 42063.572 | 16.51 | 0.11 | P |
| 8/16/74 | 42275.878 | 16.25 | 0.12 | P |
| 9/12/74 | 42302.790 | 16.38 | 0.17 | P |
| 10/12/74 | 42332.733 | 16.26 | 0.19 | P |
| 12/ 4/74 | 42385.610 | 16.25 | 0.14 | P |
| 1/ 2/75 | 42414.545 | 16.39 | 0.12 | P |
| 2/10/75 | 42453.541 | 16.32 | 0.19 | P |
| 8/16/75 | 42640.866 | 16.39 | 0.13 | P |
| 9/ 5/75 | 42660.752 | 16.29 | 0.14 | P |
| 11/ 1/75 | 42717.644 | 16.55 | 0.22 | P |
| 11/29/75 | 42745.595 | 16.40 | 0.14 | P |
| 11/29/75 | 42745.602 | 16.41 | 0.17 | P |
| 8/29/76 | 43019.808 | 16.33 | 0.15 | P |
| | **0119-04 CONT.** | | | |
| 8/29/76 | 43019.813 | 16.51 | 0.14 | P |
| 10/16/76 | 43067.641 | 16.29 | 0.29 | P |
| 10/16/76 | 43067.666 | 16.39 | 0.13 | P |
| 12/20/76 | 43132.627 | 16.73 | 0.14 | P |
| 8/18/77 | 43373.848 | 16.64 | 0.15 | P |
| 10/17/77 | 43433.716 | 16.34 | 0.21 | P |
| 12/12/77 | 43489.595 | 16.54 | 0.11 | P |
| 8/29/78 | 43749.831 | 16.45 | 0.08 | P |
| 11/25/78 | 43837.571 | 16.50 | 0.29 | P |
| 9/30/79 | 44146.756 | 16.50 | 0.28 | P |
| | **DA 58** | | | |
| 9/ 2/71 | 41196.891 | 16.91 | 0.09 | P |
| 9/19/71 | 41213.866 | 17.05 | 0.10 | P |
| 9/27/71 | 41221.878 | 16.94 | 0.08 | P |
| 12/10/71 | 41295.641 | 16.93 | 0.04 | P |
| 10/14/72 | 41604.838 | 16.94 | 0.05 | P |
| 1/29/73 | 41711.526 | 17.07 | 0.08 | P |
| 11/11/77 | 43458.625 | 17.00 | 0.09 | P |
| 11/ 4/78 | 43816.611 | 17.11 | 0.08 | P |
| 8/20/78 | 43740.840 | 17.09 | 0.07 | P |
| | **0159-11** | | | |
| 12/14/69 | 40569.708 | 16.86 | 0.05 | B |
| 12/ 3/70 | 40923.630 | 16.33 | 0.15 | B |
| 1/16/71 | 40967.571 | 16.59 | 0.03 | B |
| 1/29/71 | 40980.588 | 16.74 | 0.07 | B |
| 9/13/71 | 41207.722 | 16.65 | 0.07 | B |
| 12/10/71 | 41295.603 | 16.70 | 0.15 | B |
| 9/13/72 | 41573.819 | 16.92 | 0.09 | B |
| 10/ 5/72 | 41595.709 | 17.19 | 0.10 | B |
| 10/ 9/72 | 41599.753 | 16.83 | 0.02 | B |
| 11/ 3/72 | 41624.719 | 16.81 | 0.08 | B |
| 9/ 7/73 | 41932.849 | 16.72 | 0.02 | B |
| 10/ 4/73 | 41959.831 | 16.82 | 0.10 | B |
| 10/19/73 | 41974.684 | 16.86 | 0.09 | B |
| 12/18/73 | 42034.546 | 16.54 | 0.12 | B |
| 1/16/74 | 42063.587 | 16.69 | 0.12 | B |
| 1/16/74 | 42063.598 | 16.85 | 0.10 | B |
| 9/16/74 | 42306.872 | 16.62 | 0.13 | B |
| 10/12/74 | 42332.756 | 16.41 | 0.10 | B |
| 12/ 9/74 | 42390.653 | 16.41 | 0.09 | B |
| 1/ 4/75 | 42416.595 | 16.47 | 0.14 | B |
| 2/ 3/75 | 42446.590 | 16.56 | 0.03 | B |
| 8/15/75 | 42639.867 | 16.58 | 0.06 | B |
| 11/ 1/75 | 42717.661 | 16.35 | 0.09 | B |
| 12/29/75 | 42775.650 | 16.46 | 0.03 | B |
| 12/20/76 | 43132.641 | 17.04 | 0.25 | B |
| 1/11/77 | 43154.604 | 16.74 | 0.19 | B |
| 1/11/77 | 43154.609 | 16.66 | 0.11 | B |
| 8/16/77 | 43371.860 | 16.81 | 0.06 | B |
| 9/21/77 | 43407.756 | 16.72 | 0.10 | B |
| 10/14/77 | 43430.665 | 16.62 | 0.09 | B |
| 11/ 7/77 | 43454.583 | 16.70 | 0.09 | B |
| 12/12/77 | 43489.620 | 16.61 | 0.03 | B |
| 1/ 6/78 | 43514.600 | 16.62 | 0.10 | B |
| 10/ 3/78 | 43784.654 | 16.14 | 0.12 | B |
| 11/ 1/78 | 43813.703 | 16.33 | 0.12 | B |
| 11/ 6/78 | 43818.701 | 16.43 | 0.20 | B |
| 11/26/78 | 43838.626 | 16.36 | 0.17 | B |
| 12/ 4/78 | 43846.610 | 16.48 | 0.18 | B |
| 12/31/78 | 43873.573 | 16.79 | 0.17 | B |
| 9/30/79 | 44146.778 | 16.63 | 0.08 | B |
| 10/17/79 | 44163.727 | 16.22 | 0.18 | B |
| 11/15/79 | 44193.656 | 16.85 | 0.15 | B |
| 11/20/79 | 44198.683 | 17.05 | 0.05 | B |
| | **0202-17** | | | |
| 10/18/69 | 40504.799 | 16.94 | 0.11 | P |
| 11/18/69 | 40535.799 | 16.75 | 0.08 | P |
| 12/ 8/69 | 40563.806 | 16.87 | 0.11 | P |
| | **0202-17 CONT.** | | | |
| 12/30/69 | 40585.626 | 16.93 | 0.04 | P |
| 9/ 8/70 | 40837.851 | 17.23 | 0.12 | P |
| 9/12/70 | 40841.836 | 17.08 | 0.12 | P |
| 9/30/70 | 40859.740 | 16.96 | 0.11 | P |
| 10/ 3/70 | 40862.760 | 17.10 | 0.12 | P |
| 11/ 2/70 | 40892.767 | 16.86 | 0.07 | P |
| 11/22/70 | 40912.605 | 16.97 | 0.15 | P |
| 12/21/70 | 40941.599 | 16.84 | 0.12 | P |
| 2/24/71 | 41006.535 | 17.06 | 0.12 | P |
| 12/11/71 | 41296.612 | 16.85 | 0.12 | P |
| 9/13/72 | 41573.841 | 16.86 | 0.10 | P |
| 10/14/72 | 41604.772 | 17.18 | 0.12 | P |
| 11/ 1/72 | 41622.748 | 17.11 | 0.13 | P |
| 9/ 6/73 | 41931.881 | 17.06 | 0.09 | P |
| 9/24/73 | 41949.761 | 17.02 | 0.11 | P |
| 10/ 3/73 | 41958.822 | 17.19 | 0.10 | P |
| 10/19/73 | 41974.700 | 17.05 | 0.15 | P |
| 12/15/73 | 42031.608 | 17.02 | 0.10 | P |
| 9/24/74 | 42314.817 | 17.17 | 0.14 | P |
| 10/21/74 | 42341.721 | 17.13 | 0.11 | P |
| 12/ 9/74 | 42390.669 | 17.00 | 0.13 | P |
| 1/ 2/75 | 42414.614 | 17.01 | 0.08 | P |
| 2/ 3/75 | 42446.608 | 17.17 | 0.15 | P |
| 11/30/75 | 42746.681 | 17.00 | 0.12 | P |
| 11/30/75 | 42746.685 | 16.98 | 0.14 | P |
| 1/ 3/76 | 42780.558 | 16.95 | 0.13 | P |
| 1/ 3/76 | 42780.565 | 17.09 | 0.14 | P |
| 11/19/76 | 43101.657 | 16.83 | 0.11 | P |
| 11/19/76 | 43101.662 | 16.98 | 0.15 | P |
| 12/20/76 | 43132.651 | 17.21 | 0.11 | P |
| 8/18/77 | 43373.887 | 16.70 | 0.21 | P |
| 9/21/77 | 43407.769 | 16.77 | 0.14 | P |
| 10/17/77 | 43433.729 | 16.76 | 0.18 | P |
| 11/ 6/77 | 43453.705 | 16.82 | 0.12 | P |
| 12/13/77 | 43490.592 | 16.96 | 0.10 | P |
| 1/10/78 | 43518.569 | 16.85 | 0.08 | P |
| 11/ 2/78 | 43814.685 | 16.96 | 0.10 | P |
| 12/31/78 | 43873.589 | 17.20 | 0.16 | P |
| 11/15/79 | 44193.688 | 16.67 | 0.18 | P |
| | **3C 66A** | | | |
| 7/19/74 | 42247.908 | 15.80 | 0.17 | B |
| 7/20/74 | 42248.845 | 16.10 | 0.19 | B |
| 7/24/74 | 42252.856 | 15.89 | 0.13 | B |
| 7/24/74 | 42252.869 | 15.92 | 0.11 | B |
| 11/13/74 | 42364.772 | 15.52 | 0.06 | B |
| 1/ 4/75 | 42416.562 | 15.78 | 0.19 | B |
| 2/ 1/75 | 42444.573 | 15.64 | 0.10 | B |
| 2/14/75 | 42457.581 | 15.48 | 0.04 | B |
| 9/12/75 | 42667.847 | 15.82 | 0.19 | B |
| 1/ 1/76 | 42778.792 | 15.70 | 0.10 | B |
| 10/21/76 | 43072.708 | 15.52 | 0.16 | B |
| 9/21/77 | 43407.836 | 15.56 | 0.08 | B |
| 10/19/77 | 43435.726 | 16.25 | 0.26 | B |
| 11/ 8/77 | 43455.710 | 15.63 | 0.20 | B |
| 2/ 5/78 | 43544.515 | 16.12 | 0.15 | B |
| 8/ 8/78 | 43728.885 | 15.89 | 0.25 | B |
| 10/ 3/78 | 43784.749 | 15.97 | 0.13 | B |
| 10/ 5/78 | 43786.801 | 15.58 | 0.13 | B |
| 10/ 9/78 | 43790.777 | 15.73 | 0.05 | B |
| 11/ 2/78 | 43814.668 | 15.54 | 0.08 | B |
| 12/20/78 | 43862.542 | 16.01 | 0.18 | B |
| 1/ 3/79 | 43876.812 | 15.82 | 0.09 | B |
| 3/22/79 | 43954.537 | 15.51 | 0.11 | B |
| 8/16/79 | 44101.727 | 15.60 | 0.23 | B |
| 9/29/79 | 44145.837 | 15.68 | 0.11 | B |
| 10/13/79 | 44160.674 | 15.15 | 0.09 | B |
| 11/15/79 | 44192.717 | 15.30 | 0.14 | B |
| 11/17/79 | 44195.700 | 15.39 | 0.19 | B |
| 11/19/79 | 44197.685 | 15.37 | 0.17 | B |
| | **0222-23** | | | |
| 12/ 3/69 | 40558.708 | 16.25 | 0.21 | P |
| 1/ 1/71 | 40952.672 | 15.77 | 0.08 | P |
| 1/20/71 | 40971.609 | 15.60 | 0.13 | P |
| 2/17/71 | 40999.540 | 15.89 | 0.10 | P |
| 9/29/71 | 41223.878 | 16.31 | 0.07 | P |
| 12/13/71 | 41298.687 | 16.43 | 0.07 | P |
| 9/15/72 | 41575.809 | 16.24 | 0.27 | P |
| 10/ 9/72 | 41599.775 | 16.66 | 0.09 | P |
| 11/ 5/72 | 41626.726 | 16.27 | 0.18 | P |
| 9/24/73 | 41949.803 | 16.50 | 0.16 | P |
| 10/24/73 | 41979.724 | 16.77 | 0.16 | P |
| 12/15/73 | 42031.638 | 16.71 | 0.02 | P |
| 1/16/74 | 42063.619 | 17.08 | 0.15 | P |
| 9/22/74 | 42312.853 | 16.54 | 0.27 | P |
| 10/21/74 | 42341.742 | 17.81 | 0.24 | P |
| 12/ 9/74 | 42390.693 | 16.70 | 0.19 | P |
| 2/ 3/75 | 42446.627 | 16.99 | 0.25 | P |
| 10/11/75 | 42696.757 | 16.70 | 0.21 | P |
| 10/11/75 | 42696.760 | 16.53 | 0.13 | P |
| 1/ 1/76 | 42778.674 | 16.53 | 0.08 | P |
| 1/ 1/76 | 42778.678 | 16.50 | 0.12 | P |
| 12/18/76 | 43130.578 | 16.64 | 0.12 | P |
| 12/18/76 | 43130.594 | 16.73 | 0.14 | P |
| 9/21/77 | 43407.782 | 16.61 | 0.09 | P |
| 11/ 8/77 | 43455.678 | 16.69 | 0.13 | P |
| 12/13/77 | 43490.612 | 16.80 | 0.04 | P |
| 1/10/78 | 43518.582 | 16.70 | 0.09 | P |
| 11/ 6/78 | 43818.721 | 16.30 | 0.18 | P |
| 12/ 2/78 | 43844.636 | 16.29 | 0.09 | P |
| | **0229+13** | | | |
| 10/10/69 | 40504.708 | 16.92 | 0.18 | P |
| 11/10/69 | 40535.833 | 16.89 | 0.12 | P |
| 12/ 8/69 | 40563.838 | 16.98 | 0.07 | P |
| 9/ 8/70 | 40837.871 | 17.11 | 0.13 | P |
| 11/ 2/70 | 40892.803 | 17.30 | 0.08 | P |
| 11/28/70 | 40918.703 | 17.15 | 0.16 | P |
| 12/27/70 | 40947.616 | 17.30 | 0.07 | P |
| 1/29/71 | 40980.609 | 17.28 | 0.19 | P |
| 2/20/71 | 41002.564 | 17.34 | 0.19 | P |
| 11/23/71 | 41278.707 | 17.04 | 0.09 | P |
| 12/11/71 | 41296.674 | 17.06 | 0.17 | P |
| 9/13/72 | 41573.862 | 17.29 | 0.10 | P |
| 10/ 8/72 | 41598.801 | 17.06 | 0.19 | P |
| 10/14/72 | 41604.838 | 16.92 | 0.12 | P |
| 11/ 3/72 | 41624.744 | 17.03 | 0.17 | P |
| 11/28/72 | 41649.683 | 16.76 | 0.23 | P |
| 1/29/73 | 41711.553 | 16.98 | 0.10 | P |
| 9/ 6/73 | 41931.900 | 17.61 | 0.13 | P |
| 9/ 7/73 | 41932.879 | 17.01 | 0.11 | P |
| 11/ 4/73 | 41990.768 | 17.16 | 0.14 | P |
| 2/15/74 | 42093.526 | 16.94 | 0.15 | P |
| 9/24/74 | 42314.844 | 17.12 | 0.17 | P |
| 10/12/74 | 42332.776 | 16.75 | 0.16 | P |
| 12/ 9/74 | 42390.714 | 17.07 | 0.18 | P |
| 2/ 3/75 | 42446.646 | 16.90 | 0.10 | P |
| 11/ 2/75 | 42718.653 | 17.02 | 0.15 | P |
| 11/30/75 | 42746.758 | 17.00 | 0.14 | P |
| 11/30/75 | 42746.762 | 16.94 | 0.11 | P |
| 1/ 1/76 | 42778.703 | 17.08 | 0.12 | P |
| 1/ 1/76 | 42778.706 | 16.94 | 0.21 | P |
| 2/ 1/76 | 42810.519 | 17.00 | 0.13 | P |
| 2/ 1/76 | 42810.525 | 17.18 | 0.16 | P |
| 12/19/76 | 43131.597 | 17.04 | 0.16 | P |
| 12/19/76 | 43131.603 | 16.91 | 0.19 | P |
| 1/11/77 | 43154.534 | 16.93 | 0.07 | P |
| 1/11/77 | 43154.538 | 16.92 | 0.18 | P |
| 10/19/77 | 43435.744 | 16.90 | 0.10 | P |
| 11/ 9/77 | 43456.687 | 16.77 | 0.23 | P |
| 12/ 8/77 | 43485.694 | 16.97 | 0.05 | P |
| 2/ 7/78 | 43546.540 | 16.82 | 0.15 | P |
| 11/ 1/78 | 43813.711 | 17.11 | 0.19 | P |
| 12/ 2/78 | 43844.644 | 16.91 | 0.07 | P |
| 1/25/79 | 43898.576 | 17.84 | 0.17 | P |
| 10/17/79 | 44163.718 | 17.23 | 0.10 | P |
| | **0229+13 CONT.** | | | |
| 11/20/79 | 44198.696 | 16.71 | 0.18 | P |
| | **0251+18** | | | |
| 12/ 3/70 | 40923.682 | 17.14 | 0.21 | P |
| 12/ 5/70 | 40925.756 | 16.99 | 0.05 | P |
| 2/17/71 | 40999.569 | 17.09 | 0.06 | P |
| 11/28/71 | 41283.765 | 17.09 | 0.06 | P |
| 1/ 7/72 | 41323.683 | 17.02 | 0.11 | P |
| 9/18/72 | 41578.879 | 17.04 | 0.13 | P |
| 10/ 8/72 | 41598.836 | 17.11 | 0.12 | P |
| 11/ 1/72 | 41622.774 | 17.21 | 0.14 | P |
| 9/24/73 | 41949.703 | 17.12 | 0.11 | P |
| 10/12/74 | 42332.799 | 17.15 | 0.18 | P |
| 10/29/76 | 43080.696 | 17.08 | 0.13 | P |
| 10/29/76 | 43080.781 | 16.97 | 0.10 | P |
| 10/19/77 | 43435.794 | 16.63 | 0.18 | P |
| 11/ 6/77 | 43453.758 | 16.97 | 0.12 | P |
| 12/13/77 | 43490.626 | 16.99 | 0.15 | P |
| 1/10/78 | 43518.613 | 17.09 | 0.08 | P |
| 11/ 6/78 | 43818.750 | 17.14 | 0.20 | P |
| 10/18/79 | 44164.737 | 17.07 | 0.17 | P |
| | **0301-243** | | | |
| 10/19/77 | 43435.812 | 16.87 | 0.11 | B |
| 11/ 8/77 | 43455.710 | 16.90 | 0.11 | B |
| 12/12/77 | 43489.837 | 16.85 | 0.11 | B |
| 1/10/78 | 43518.599 | 16.86 | 0.08 | B |
| 9/30/78 | 43781.803 | 16.29 | 0.11 | B |
| 12/ 2/78 | 43844.709 | 16.67 | 0.10 | B |
| 10/18/79 | 44164.784 | 16.51 | 0.09 | B |
| 11/20/79 | 44197.712 | 16.22 | 0.19 | B |
| | **NRAO 140** | | | |
| 8/29/71 | 41192.878 | 17.09 | 0.11 | P |
| 10/26/71 | 41250.808 | 17.16 | 0.09 | P |
| 10/11/72 | 41601.757 | 17.12 | 0.11 | P |
| 1/29/73 | 41711.581 | 17.05 | 0.08 | P |
| 10/ 1/73 | 41956.842 | 16.90 | 0.19 | P |
| 10/31/73 | 41986.732 | 17.40 | 0.10 | P |
| 12/18/73 | 42034.568 | 17.07 | 0.07 | P |
| 2/ 1/75 | 42444.596 | 16.66 | 0.22 | P |
| 1/ 2/76 | 42779.873 | 18.04 | 0.14 | P |
| 1/28/76 | 42805.537 | 17.03 | 0.13 | P |
| 1/28/76 | 42805.543 | 17.25 | 0.12 | P |
| 9/29/76 | 43050.847 | 17.30 | 0.17 | P |
| 10/29/76 | 43080.721 | 17.13 | 0.13 | P |
| 12/25/76 | 43137.687 | 17.19 | 0.09 | P |
| 12/25/76 | 43137.693 | 16.86 | 0.24 | P |
| 10/14/77 | 43430.767 | 17.13 | 0.17 | P |
| 11/11/77 | 43458.703 | 17.03 | 0.09 | P |
| 12/12/77 | 43489.602 | 17.05 | 0.06 | P |
| 1/ 6/78 | 43514.624 | 16.91 | 0.21 | P |
| 2/ 7/78 | 43546.569 | 17.24 | 0.13 | P |
| 10/ 3/78 | 43784.776 | 17.03 | 0.22 | P |
| 11/ 4/78 | 43816.758 | 16.65 | 0.30 | P |
| 11/26/78 | 43838.741 | 16.91 | 0.12 | P |
| 12/31/78 | 43873.609 | 17.35 | 0.26 | P |
| 1/25/79 | 43898.588 | 17.15 | 0.10 | P |
| 9/29/79 | 44145.815 | 17.30 | 0.23 | P |
| 10/18/79 | 44164.747 | 16.97 | 0.18 | P |
| 11/15/79 | 44192.731 | 17.36 | 0.24 | P |
| | **0336-01** | | | |
| 12/ 3/69 | 40558.778 | 17.57 | 0.23 | P |
| 1/31/70 | 40617.576 | 17.67 | 0.09 | P |
| 10/ 2/70 | 40861.824 | 17.33 | 0.09 | P |
| 11/22/70 | 40912.708 | 17.28 | 0.13 | P |
| 12/21/70 | 40941.628 | 17.39 | 0.13 | P |
| 2/20/71 | 41002.580 | 17.41 | 0.14 | P |
| | **0336-01 CONT.** | | | |
| 2/24/71 | 41006.582 | 17.26 | 0.11 | P |
| 9/30/71 | 41224.853 | 17.19 | 0.10 | P |
| 11/28/71 | 41283.738 | 17.28 | 0.07 | P |
| 12/10/71 | 41295.667 | 17.78 | 0.16 | P |
| 2/ 8/72 | 41355.585 | 17.86 | 0.12 | P |
| 9/15/72 | 41575.854 | 17.68 | 0.11 | P |
| 11/ 1/72 | 41622.801 | 17.92 | 0.19 | P |
| 1/23/73 | 41705.519 | 17.83 | 0.09 | P |
| 9/ 5/73 | 41930.874 | 17.81 | 0.15 | P |
| 10/ 6/73 | 41961.801 | 17.57 | 0.15 | P |
| 10/24/73 | 41979.783 | 17.90 | 0.09 | P |
| 11/23/73 | 42009.731 | 17.88 | 0.31 | P |
| 12/15/73 | 42031.688 | 17.73 | 0.11 | P |
| 1/16/74 | 42063.641 | 17.64 | 0.14 | P |
| 2/11/74 | 42089.522 | 17.57 | 0.07 | P |
| 9/22/74 | 42312.872 | 17.43 | 0.11 | P |
| 12/ 9/74 | 42390.731 | 18.12 | 0.12 | P |
| 1/ 3/75 | 42415.588 | 17.65 | 0.06 | P |
| 2/12/75 | 42455.542 | 17.97 | 0.14 | P |
| 10/11/75 | 42696.871 | 16.01 | 0.22 | P |
| 10/11/75 | 42696.875 | 17.67 | 0.18 | P |
| 11/ 1/75 | 42717.772 | 17.78 | 0.10 | P |
| 12/27/75 | 42773.689 | 17.89 | 0.15 | P |
| 12/27/75 | 42773.696 | 17.82 | 0.22 | P |
| 1/ 5/76 | 42782.658 | 17.45 | 0.10 | P |
| 1/ 5/76 | 42782.663 | 17.76 | 0.15 | P |
| 10/19/76 | 43070.810 | 16.89 | 0.25 | P |
| 11/22/76 | 43104.721 | 17.52 | 0.13 | P |
| 11/22/76 | 43104.728 | 17.33 | 0.15 | P |
| 1/11/77 | 43154.554 | 17.30 | 0.21 | P |
| 1/11/77 | 43154.560 | 17.44 | 0.04 | P |
| 10/14/77 | 43430.781 | 17.28 | 0.11 | P |
| 11/ 9/77 | 43456.732 | 17.78 | 0.07 | P |
| 12/13/77 | 43490.637 | 17.44 | 0.18 | P |
| 1/ 4/78 | 43512.664 | 17.77 | 0.13 | P |
| 1/12/78 | 43520.632 | 17.70 | 0.05 | P |
| 1/30/78 | 43538.561 | 17.81 | 0.09 | P |
| 2/26/78 | 43565.584 | 16.90 | 0.19 | P |
| 9/11/78 | 43762.908 | 17.71 | 0.25 | P |
| 12/ 2/78 | 43844.733 | 17.82 | 0.11 | P |
| 12/27/78 | 43869.512 | 18.07 | 0.13 | P |
| 12/27/78 | 43869.522 | 17.69 | 0.14 | P |
| 9/30/79 | 44146.813 | 17.61 | 0.25 | P |
| 10/18/79 | 44164.798 | 17.51 | 0.14 | P |
| 11/17/79 | 44194.836 | 17.89 | 0.18 | P |
| | **0338-214** | | | |
| 10/19/77 | 43435.838 | 17.42 | 0.25 | B |
| 11/ 9/77 | 43456.744 | 17.33 | 0.12 | B |
| 11/14/77 | 43461.734 | 17.37 | 0.10 | B |
| 1/ 4/77 | 43147.637 | 17.28 | 0.11 | B |
| 2/ 7/77 | 43181.508 | 17.34 | 0.12 | B |
| 11/ 6/78 | 43818.765 | 16.25 | 0.18 | B |
| 11/26/78 | 43838.729 | 16.58 | 0.18 | B |
| 12/ 2/78 | 43844.719 | 16.77 | 0.09 | B |
| 12/31/78 | 43873.824 | 17.11 | 0.12 | B |
| 1/19/79 | 43892.583 | 16.70 | 0.26 | B |
| 9/30/79 | 44146.823 | 16.78 | 0.14 | B |
| 10/18/79 | 44164.794 | 16.85 | 0.19 | B |
| 11/15/79 | 44192.742 | 17.02 | 0.15 | B |
| | **0348+04** | | | |
| 11/23/71 | 41278.749 | 17.87 | 0.05 | P |
| 3/13/72 | 41389.567 | 17.91 | 0.12 | P |
| 9/10/72 | 41570.987 | 18.24 | 0.13 | P |
| 10/13/72 | 41603.781 | 18.04 | 0.08 | P |
| 11/ 5/72 | 41626.749 | 17.79 | 0.10 | P |
| 10/18/74 | 42338.778 | 17.77 | 0.05 | P |
| 11/ 1/75 | 42717.783 | 17.64 | 0.07 | P |
| 1/ 3/76 | 42780.649 | 17.51 | 0.16 | P |
| 1/ 3/76 | 42780.655 | 17.38 | 0.09 | P |
| 10/22/76 | 43073.785 | 17.41 | 0.19 | P |
| 10/19/77 | 43435.839 | 17.41 | 0.17 | P |



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TABLE III. (continued)

PANEL1PLACEHOLDER

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 0422+004 | CONT. | | |
| 1/29/79 | 43902.635 | 17.17 | 0.10 | B |
| 2/17/79 | 43921.584 | 16.52 | 0.19 | B |
| 3/20/79 | 43952.542 | 16.71 | 0.09 | B |
| 9/30/79 | 44146.842 | 16.63 | 0.15 | B |
| 11/15/79 | 44192.764 | 16.71 | 0.16 | B |
| | OH 471 | | | |
| 10/31/73 | 41986.782 | 18.12 | 0.13 | P |
| 11/ 4/73 | 41990.834 | 18.20 | 0.14 | P |
| 11/ 6/73 | 41992.824 | 18.37 | 0.18 | P |
| 12/19/73 | 42035.700 | 18.44 | 0.09 | P |
| 1/29/74 | 42076.723 | 18.40 | 0.11 | P |
| 2/19/74 | 42097.631 | 18.29 | 0.11 | P |
| 2/20/74 | 42098.734 | 18.50 | 0.10 | P |
| 3/16/74 | 42122.549 | 18.49 | 0.17 | P |
| 12/11/74 | 42392.722 | 18.31 | 0.19 | P |
| 12/18/74 | 42399.753 | 18.68 | 0.10 | P |
| 1/10/75 | 42422.715 | 18.49 | 0.09 | P |
| 2/ 5/75 | 42448.674 | 18.43 | 0.07 | P |
| 2/ 9/75 | 42452.631 | 18.68 | 0.14 | B |
| 2/14/75 | 42457.606 | 18.83 | 0.11 | B |
| 2/14/75 | 42457.642 | 18.83 | 0.19 | B |
| 2/14/75 | 42457.656 | 18.47 | 0.14 | B |
| 3/ 7/75 | 42478.580 | 18.77 | 0.11 | B |
| 4/ 4/75 | 42506.586 | 19.20 | 0.15 | B |
| 4/ 4/75 | 42506.619 | 19.07 | 0.28 | B |
| 1/ 2/76 | 42779.735 | 18.63 | 0.11 | B |
| 2/23/76 | 42831.638 | 18.83 | 0.11 | B |
| 2/23/76 | 42831.646 | 18.46 | 0.14 | B |
| 12/18/76 | 43130.828 | 18.54 | 0.21 | B |
| 2/21/77 | 43195.603 | 19.13 | 0.23 | B |
| 2/21/77 | 43195.609 | 18.90 | 0.17 | B |
| 11/15/77 | 43462.839 | 19.23 | 0.10 | B |
| 12/ 8/77 | 43485.783 | 19.16 | 0.09 | B |
| 2/ 7/78 | 43546.610 | 18.92 | 0.11 | B |
| 4/ 3/78 | 43601.553 | 18.62 | 0.15 | B |
| 12/31/78 | 43873.765 | 18.88 | 0.17 | B |
| 1/25/79 | 43898.708 | 18.42 | 0.23 | B |
| 2/21/79 | 43925.612 | 18.69 | 0.26 | B |
| 3/21/79 | 43953.606 | 18.15 | 0.27 | B |
| 11/20/79 | 44197.774 | 18.69 | 0.20 | B |
| 1/22/80 | 44260.705 | 18.92 | 0.17 | B |
| 2/ 8/80 | 44277.582 | 18.96 | 0.18 | B |
| 11/20/79 | 44200.774 | 18.70 | 0.22 | B |
| | OI 318 | | | |
| 11/12/69 | 40537.865 | 18.11 | 0.19 | P |
| 2/19/70 | 40636.674 | 18.19 | 0.18 | P |
| 9/12/70 | 40841.903 | 18.71 | 0.21 | P |
| 11/28/70 | 40918.740 | 17.73 | 0.13 | P |
| 12/ 1/70 | 40921.771 | 18.15 | 0.23 | P |
| 12/ 4/70 | 40924.823 | 18.15 | 0.22 | P |
| 12/28/70 | 40948.722 | 18.14 | 0.10 | P |
| 1/27/71 | 40978.806 | 18.42 | 0.05 | P |
| 3/23/71 | 41033.656 | 18.34 | 0.11 | P |
| 11/26/71 | 41281.788 | 18.19 | 0.16 | P |
| 3/10/72 | 41386.549 | 18.23 | 0.12 | P |
| 4/13/72 | 41420.594 | 17.94 | 0.12 | P |
| 10/31/73 | 41986.815 | 17.81 | 0.25 | P |
| 12/19/73 | 42035.719 | 18.09 | 0.20 | P |
| 1/29/74 | 42076.740 | 18.24 | 0.07 | P |
| 2/15/74 | 42093.700 | 17.66 | 0.20 | P |
| 3/17/74 | 42123.568 | 18.27 | 0.15 | P |
| 11/24/74 | 42375.871 | 17.86 | 0.17 | P |
| 12/19/74 | 42400.807 | 18.08 | 0.21 | P |
| 1/10/75 | 42422.734 | 17.76 | 0.24 | P |
| 1/16/75 | 42428.674 | 18.05 | 0.12 | P |
| 2/ 9/75 | 42452.683 | 17.90 | 0.18 | P |
| 3/ 7/75 | 42478.601 | 17.92 | 0.23 | P |
| 12/29/75 | 42775.775 | 18.01 | 0.16 | P |
| 2/23/76 | 42831.665 | 18.02 | 0.16 | P |
| 2/23/76 | 42831.670 | 18.19 | 0.14 | P |
| 3/ 4/76 | 42841.697 | 18.00 | 0.20 | P |

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | OI 318 | CONT. | | |
| 3/ 4/76 | 42841.703 | 18.08 | 0.24 | P |
| 3/25/76 | 42862.628 | 17.89 | 0.19 | P |
| 3/25/76 | 42862.637 | 18.03 | 0.15 | P |
| 11/11/77 | 43458.802 | 17.40 | 0.18 | P |
| 12/ 8/77 | 43485.813 | 17.81 | 0.13 | P |
| 12/18/77 | 43495.873 | 17.85 | 0.26 | P |
| 12/18/77 | 43495.878 | 17.93 | 0.17 | P |
| 1/ 4/78 | 43512.731 | 17.85 | 0.12 | P |
| 2/13/78 | 43552.690 | 17.68 | 0.09 | P |
| 3/30/78 | 43597.600 | 17.73 | 0.15 | P |
| 11/ 2/78 | 43814.826 | 17.74 | 0.17 | P |
| 12/27/78 | 43869.719 | 17.87 | 0.19 | P |
| 2/17/79 | 43921.623 | 17.69 | 0.18 | P |
| 11/20/79 | 44200.792 | 17.66 | 0.19 | P |
| | 0725+14 | | | |
| 3/26/71 | 41036.556 | 17.85 | 0.08 | P |
| 11/26/71 | 41281.840 | 17.60 | 0.08 | P |
| 1/10/72 | 41326.717 | 17.60 | 0.09 | P |
| 10/13/72 | 41603.875 | 17.52 | 0.06 | P |
| 11/16/72 | 41637.872 | 17.61 | 0.05 | P |
| 1/31/73 | 41713.639 | 17.62 | 0.17 | P |
| 12/22/73 | 42038.788 | 17.59 | 0.04 | P |
| 1/20/74 | 42067.571 | 17.56 | 0.27 | P |
| 2/14/74 | 42092.654 | 17.65 | 0.06 | P |
| 3/14/74 | 42120.561 | 17.76 | 0.06 | P |
| 3/25/74 | 42131.610 | 17.84 | 0.15 | P |
| 10/21/74 | 42341.844 | 17.62 | 0.17 | P |
| 11/23/74 | 42374.790 | 17.68 | 0.10 | P |
| 12/18/74 | 42399.730 | 17.54 | 0.10 | P |
| 1/ 8/75 | 42420.613 | 17.89 | 0.21 | P |
| 2/10/75 | 42453.642 | 17.94 | 0.28 | P |
| 3/ 9/75 | 42480.574 | 17.94 | 0.10 | P |
| 11/ 1/75 | 42717.860 | 17.47 | 0.10 | P |
| 11/30/75 | 42746.876 | 17.45 | 0.09 | P |
| 11/30/75 | 42746.881 | 17.68 | 0.13 | P |
| 12/ 7/75 | 42753.843 | 17.61 | 0.07 | P |
| 12/ 7/75 | 42753.848 | 17.64 | 0.08 | P |
| 1/ 2/76 | 42779.753 | 17.72 | 0.11 | P |
| 1/25/76 | 42802.677 | 17.72 | 0.07 | P |
| 1/25/76 | 42802.683 | 17.85 | 0.14 | P |
| 2/21/76 | 42829.615 | 17.64 | 0.08 | P |
| 2/21/76 | 42829.621 | 17.60 | 0.14 | P |
| 3/ 4/76 | 42841.638 | 17.76 | 0.15 | P |
| 3/ 4/76 | 42841.644 | 17.73 | 0.10 | P |
| 3/21/76 | 42858.601 | 17.51 | 0.16 | P |
| 3/21/76 | 42858.606 | 17.73 | 0.12 | P |
| 10/22/76 | 43073.901 | 17.69 | 0.14 | P |
| 10/22/76 | 43073.906 | 17.49 | 0.17 | P |
| 12/27/76 | 43139.765 | 17.76 | 0.10 | P |
| 12/27/76 | 43139.770 | 17.52 | 0.10 | P |
| 4/16/77 | 43249.608 | 18.07 | 0.15 | P |
| 4/16/77 | 43249.612 | 17.86 | 0.11 | P |
| 11/11/77 | 43458.817 | 17.89 | 0.09 | P |
| 1/ 4/78 | 43512.748 | 17.91 | 0.05 | P |
| 3/ 7/78 | 43574.606 | 17.77 | 0.07 | P |
| 5/ 1/78 | 43629.667 | 17.83 | 0.11 | P |
| 11/ 2/78 | 43814.840 | 17.75 | 0.22 | P |
| 1/25/79 | 43898.646 | 17.60 | 0.10 | P |
| | 0736+01 | | | |
| 11/ 8/70 | 40898.810 | 15.80 | 0.10 | P |
| 11/26/70 | 40916.764 | 15.88 | 0.08 | P |
| 12/ 7/70 | 40927.842 | 15.88 | 0.05 | P |
| 1/22/71 | 40973.754 | 15.69 | 0.05 | P |
| 1/29/71 | 40980.710 | 15.87 | 0.08 | P |
| 2/17/71 | 40999.697 | 16.02 | 0.15 | P |
| 3/23/71 | 41033.624 | 15.91 | 0.08 | P |
| 1/26/73 | 41708.682 | 15.76 | 0.09 | P |
| 3/ 4/73 | 41745.610 | 16.16 | 0.11 | P |
| 3/25/73 | 41766.649 | 15.90 | 0.07 | P |
| 5/ 1/73 | 41803.567 | 15.77 | 0.08 | P |
| 5/ 2/73 | 41804.574 | 15.73 | 0.10 | P |

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 0736+01 | CONT. | | |
| 12/ 2/73 | 42018.842 | 15.69 | 0.05 | P |
| 12/19/73 | 42035.765 | 15.79 | 0.07 | P |
| 1/ 2/74 | 42049.885 | 15.70 | 0.08 | P |
| 1/24/74 | 42071.694 | 15.74 | 0.11 | P |
| 2/19/74 | 42097.717 | 15.95 | 0.06 | P |
| 3/14/74 | 42120.587 | 15.97 | 0.13 | P |
| 3/21/74 | 42127.547 | 16.01 | 0.14 | P |
| 4/11/74 | 42148.578 | 15.79 | 0.12 | P |
| 10/21/74 | 42341.865 | 15.84 | 0.06 | P |
| 11/23/74 | 42374.832 | 16.18 | 0.05 | P |
| 12/18/74 | 42399.761 | 15.96 | 0.06 | P |
| 1/ 8/75 | 42420.710 | 15.45 | 0.12 | P |
| 2/ 3/75 | 42446.714 | 15.92 | 0.07 | P |
| 2/10/75 | 42453.611 | 15.55 | 0.13 | P |
| 3/ 3/75 | 42474.639 | 15.67 | 0.06 | P |
| 3/10/75 | 42481.609 | 15.64 | 0.07 | P |
| 11/ 1/75 | 42717.887 | 15.94 | 0.06 | P |
| 12/ 7/75 | 42753.878 | 15.93 | 0.08 | P |
| 12/ 7/75 | 42753.883 | 15.85 | 0.09 | P |
| 1/ 1/76 | 42778.712 | 15.98 | 0.09 | P |
| 1/ 2/76 | 42779.792 | 16.15 | 0.08 | P |
| 1/ 3/76 | 42780.678 | 16.23 | 0.10 | P |
| 1/ 9/76 | 42786.772 | 16.05 | 0.05 | P |
| 1/ 9/76 | 42786.777 | 16.02 | 0.05 | P |
| 1/21/76 | 42798.619 | 16.08 | 0.09 | P |
| 1/21/76 | 42798.625 | 16.21 | 0.04 | P |
| 1/25/76 | 42802.642 | 16.18 | 0.06 | P |
| 1/25/76 | 42802.650 | 16.19 | 0.05 | P |
| 2/ 3/76 | 42811.712 | 16.14 | 0.04 | P |
| 2/ 3/76 | 42811.719 | 16.03 | 0.08 | P |
| 2/21/76 | 42829.651 | 16.14 | 0.09 | P |
| 2/21/76 | 42829.656 | 16.00 | 0.08 | P |
| 2/23/76 | 42831.632 | 15.92 | 0.11 | P |
| 3/ 2/76 | 42839.658 | 15.94 | 0.11 | P |
| 3/ 4/76 | 42841.679 | 15.69 | 0.09 | P |
| 3/21/76 | 42858.615 | 16.01 | 0.08 | P |
| 3/21/76 | 42858.620 | 16.02 | 0.16 | P |
| 3/27/76 | 42864.631 | 15.97 | 0.12 | P |
| 3/27/76 | 42864.637 | 15.99 | 0.13 | P |
| 10/22/76 | 43073.885 | 16.08 | 0.11 | P |
| 10/22/76 | 43073.890 | 16.23 | 0.07 | P |
| 11/22/76 | 43104.881 | 16.11 | 0.06 | P |
| 11/22/76 | 43104.886 | 16.10 | 0.06 | P |
| 12/27/76 | 43139.783 | 16.25 | 0.04 | P |
| 12/27/76 | 43139.786 | 16.12 | 0.06 | P |
| 1/11/77 | 43154.668 | 15.95 | 0.11 | P |
| 1/11/77 | 43154.672 | 15.98 | 0.22 | P |
| 1/20/77 | 43163.735 | 16.29 | 0.05 | P |
| 1/20/77 | 43163.740 | 16.30 | 0.07 | P |
| 2/11/77 | 43185.701 | 16.20 | 0.13 | P |
| 2/11/77 | 43185.715 | 16.20 | 0.11 | P |
| 2/14/77 | 43188.726 | 16.27 | 0.13 | P |
| 4/ 8/77 | 43241.615 | 16.24 | 0.18 | P |
| 4/10/77 | 43243.569 | 16.01 | 0.13 | P |
| 4/10/77 | 43243.585 | 16.23 | 0.06 | P |
| 4/12/77 | 43245.576 | 16.03 | 0.14 | P |
| 4/12/77 | 43245.588 | 16.11 | 0.12 | P |
| 1/ 4/78 | 43512.789 | 16.08 | 0.05 | P |
| 1/10/78 | 43518.768 | 16.18 | 0.05 | P |
| 2/ 7/78 | 43546.720 | 16.27 | 0.06 | P |
| 3/ 7/78 | 43574.626 | 16.08 | 0.11 | P |
| 3/30/78 | 43597.600 | 16.29 | 0.10 | P |
| 4/ 6/78 | 43604.556 | 16.42 | 0.04 | P |
| 4/28/78 | 43626.569 | 16.20 | 0.07 | P |
| 11/ 6/78 | 43818.859 | 16.34 | 0.19 | P |
| 12/ 2/78 | 43844.839 | 15.70 | 0.08 | P |
| 1/ 2/79 | 43875.702 | 16.16 | 0.06 | P |
| 1/25/79 | 43898.718 | 16.35 | 0.11 | P |
| 2/20/79 | 43924.627 | 15.89 | 0.10 | P |
| 3/18/79 | 43950.576 | 16.31 | 0.13 | P |
| 3/27/79 | 43959.579 | 16.40 | 0.14 | P |
| | OI 363 | | | |
| 2/10/69 | 40262.708 | 16.32 | 0.07 | P |
| 2/12/69 | 40264.708 | 16.35 | 0.05 | P |

PANEL5PLACEHOLDER

TABLE III. (continued)

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 0957+00 | CONT. | | |
| 1/ 1/76 | 42778.901 | 17.38 | 0.16 | P |
| 4/ 2/76 | 42870.655 | 17.30 | 0.08 | P |
| 4/ 2/76 | 42870.660 | 17.14 | 0.09 | P |
| 1/17/77 | 43160.815 | 16.93 | 0.14 | P |
| 1/17/77 | 43160.819 | 16.99 | 0.10 | P |
| 4/18/77 | 43251.632 | 17.05 | 0.20 | P |
| 4/18/77 | 43251.635 | 16.63 | 0.18 | P |
| 2/13/78 | 43552.774 | 17.03 | 0.07 | P |
| 4/ 6/78 | 43604.667 | 17.02 | 0.11 | P |
| 1/ 6/79 | 43879.791 | 16.78 | 0.18 | P |
| | 1004+13 | | | |
| 3/13/72 | 41389.715 | 14.75 | 0.05 | P |
| 5/11/72 | 41448.662 | 14.93 | 0.11 | P |
| 1/14/73 | 41696.917 | 14.97 | 0.06 | P |
| 1/22/73 | 41704.854 | 14.85 | 0.32 | P |
| 1/28/73 | 41710.779 | 14.96 | 0.07 | P |
| 3/15/73 | 41756.697 | 14.78 | 0.15 | P |
| 3/22/73 | 41763.712 | 14.87 | 0.08 | P |
| 4/ 6/73 | 41778.731 | 14.85 | 0.12 | P |
| 4/24/73 | 41796.664 | 15.01 | 0.11 | P |
| 5/ 1/73 | 41803.678 | 14.93 | 0.05 | P |
| 5/21/73 | 41823.630 | 14.89 | 0.11 | P |
| 12/22/73 | 42038.881 | 14.86 | 0.05 | P |
| 1/ 4/74 | 42051.951 | 14.96 | 0.07 | P |
| 1/24/74 | 42071.878 | 15.03 | 0.13 | P |
| 3/ 2/74 | 42108.785 | 14.85 | 0.11 | P |
| 3/16/74 | 42122.655 | 14.92 | 0.09 | P |
| 4/12/74 | 42149.592 | 14.84 | 0.11 | P |
| 4/23/74 | 42160.685 | 15.13 | 0.16 | P |
| 4/24/74 | 42161.618 | 14.92 | 0.13 | P |
| 5/15/74 | 42182.674 | 14.72 | 0.16 | P |
| 5/22/74 | 42189.638 | 14.87 | 0.22 | P |
| 12/19/74 | 42400.912 | 14.94 | 0.12 | P |
| 2/ 9/75 | 42452.715 | 14.73 | 0.09 | P |
| 2/16/75 | 42459.815 | 14.80 | 0.10 | P |
| 3/ 6/75 | 42477.776 | 14.79 | 0.07 | P |
| 5/ 1/75 | 42533.640 | 14.81 | 0.05 | P |
| 5/ 4/75 | 42536.585 | 14.86 | 0.14 | P |
| 5/ 7/75 | 42539.618 | 14.66 | 0.15 | P |
| 6/ 1/75 | 42564.582 | 14.67 | 0.08 | P |
| 12/ 7/75 | 42753.880 | 14.58 | 0.11 | P |
| 12/29/75 | 42775.837 | 14.58 | 0.06 | P |
| 1/ 1/76 | 42778.751 | 14.55 | 0.07 | P |
| 1/ 3/76 | 42780.733 | 14.56 | 0.11 | P |
| 2/ 3/76 | 42811.688 | 14.52 | 0.11 | P |
| 2/23/76 | 42831.686 | 14.54 | 0.13 | P |
| 2/29/76 | 42837.689 | 14.56 | 0.07 | P |
| 3/ 4/76 | 42841.729 | 14.51 | 0.17 | P |
| 3/21/76 | 42858.654 | 14.54 | 0.12 | P |
| 3/25/76 | 42862.661 | 14.71 | 0.18 | P |
| 4/20/76 | 42888.631 | 14.62 | 0.14 | P |
| 4/20/76 | 42888.635 | 14.43 | 0.15 | P |
| 1/17/77 | 43160.870 | 14.56 | 0.08 | P |
| 2/12/77 | 43186.707 | 14.67 | 0.23 | P |
| 2/12/77 | 43186.712 | 14.41 | 0.15 | P |
| 2/19/77 | 43193.692 | 14.63 | 0.15 | P |
| 2/19/77 | 43193.704 | 14.62 | 0.14 | P |
| 4/ 8/77 | 43241.639 | 14.48 | 0.15 | P |
| 1/12/78 | 43520.797 | 14.60 | 0.14 | P |
| 4/12/78 | 43610.666 | 14.62 | 0.14 | P |
| 3/14/78 | 43581.715 | 14.50 | 0.18 | P |
| 6/ 9/78 | 43668.611 | 14.79 | 0.24 | P |
| 6/ 9/78 | 43668.611 | 14.64 | 0.26 | P |
| 1/ 6/79 | 43879.806 | 14.81 | 0.24 | P |
| | 1021-00 | | | |
| 12/12/69 | 40567.875 | 18.19 | 0.18 | P |
| 2/25/74 | 42103.737 | 18.39 | 0.11 | P |
| 3/19/74 | 42125.676 | 17.99 | 0.16 | P |
| 12/23/74 | 42404.901 | 18.05 | 0.18 | P |
| 1/21/75 | 42433.844 | 17.79 | 0.27 | P |
| 3/10/75 | 42481.690 | 17.76 | 0.20 | P |
| | 1021-00 | CONT. | | |
| 1/ 2/76 | 42779.811 | 17.54 | 0.24 | P |
| 2/28/76 | 42836.767 | 18.09 | 0.15 | P |
| 3/30/76 | 42867.708 | 18.30 | 0.20 | P |
| 3/30/76 | 42867.714 | 18.15 | 0.21 | P |
| 4/23/76 | 42891.653 | 18.48 | 0.21 | P |
| 4/23/76 | 42891.660 | 17.90 | 0.20 | P |
| 2/11/77 | 43185.749 | 17.96 | 0.19 | P |
| 2/11/77 | 43185.755 | 18.00 | 0.18 | P |
| 4/12/77 | 43245.640 | 18.02 | 0.31 | P |
| 2/12/78 | 43551.812 | 17.87 | 0.16 | P |
| 4/ 3/78 | 43601.597 | 17.74 | 0.14 | P |
| 2/28/79 | 43932.727 | 18.09 | 0.26 | P |
| | 1040+12 | | | |
| 3/19/71 | 41029.625 | 16.63 | 0.19 | P |
| 4/15/72 | 41422.622 | 16.74 | 0.11 | P |
| 1/10/75 | 42422.926 | 16.47 | 0.20 | P |
| 1/14/75 | 42426.854 | 16.25 | 0.29 | P |
| 3/31/76 | 42868.617 | 16.37 | 0.27 | P |
| 3/31/76 | 42868.623 | 16.26 | 0.15 | P |
| 4/27/76 | 42895.633 | 16.26 | 0.10 | P |
| 4/27/76 | 42895.642 | 16.18 | 0.13 | P |
| 1/17/77 | 43160.876 | 16.08 | 0.07 | P |
| 1/17/77 | 43160.881 | 16.14 | 0.10 | P |
| 2/19/77 | 43193.754 | 16.35 | 0.08 | P |
| 2/19/77 | 43193.760 | 16.30 | 0.12 | P |
| 4/12/77 | 43245.687 | 16.27 | 0.10 | P |
| 2/12/78 | 43551.821 | 16.48 | 0.16 | P |
| 3/14/78 | 43581.724 | 16.80 | 0.18 | P |
| 4/ 3/78 | 43601.617 | 16.59 | 0.17 | P |
| 5/ 1/78 | 43629.602 | 17.07 | 0.14 | P |
| 5/ 9/78 | 43637.628 | 16.67 | 0.14 | P |
| 3/21/79 | 43953.621 | 16.98 | 0.13 | P |
| | 1049+21 | | | |
| 2/ 8/70 | 40625.708 | 17.46 | 0.09 | P |
| 12/ 8/70 | 40928.875 | 17.58 | 0.17 | P |
| 12/29/70 | 40949.792 | 17.74 | 0.20 | P |
| 1/30/71 | 40981.708 | 17.83 | 0.16 | P |
| 2/26/71 | 41008.708 | 17.94 | 0.09 | P |
| 3/10/72 | 41386.802 | 17.79 | 0.25 | P |
| 4/13/72 | 41420.618 | 17.76 | 0.21 | P |
| 1/15/75 | 42427.893 | 17.95 | 0.12 | P |
| 2/14/75 | 42457.779 | 18.33 | 0.10 | P |
| 5/ 4/75 | 42536.614 | 17.72 | 0.15 | P |
| 5/30/75 | 42562.621 | 17.80 | 0.19 | P |
| 12/12/75 | 42758.914 | 17.96 | 0.14 | P |
| 1/ 9/76 | 42786.849 | 17.82 | 0.23 | P |
| 1/ 9/76 | 42786.856 | 17.73 | 0.19 | P |
| 4/ 2/76 | 42870.674 | 17.77 | 0.06 | P |
| 4/ 2/76 | 42870.681 | 18.17 | 0.15 | P |
| 4/23/76 | 42891.676 | 17.79 | 0.21 | P |
| 4/23/76 | 42891.683 | 18.19 | 0.27 | P |
| 2/19/77 | 43193.780 | 18.05 | 0.11 | P |
| 2/19/77 | 43193.787 | 17.91 | 0.18 | P |
| 4/15/77 | 43248.664 | 17.80 | 0.32 | P |
| 4/15/77 | 43248.667 | 17.69 | 0.24 | P |
| 2/13/78 | 43552.791 | 17.96 | 0.22 | P |
| 4/ 3/78 | 43601.630 | 17.90 | 0.27 | P |
| 2/28/79 | 43932.744 | 17.97 | 0.19 | P |
| | 1055+20 | | | |
| 2/20/72 | 41367.906 | 16.13 | 0.08 | P |
| 3/13/72 | 41389.746 | 15.91 | 0.18 | P |
| 4/14/72 | 41421.678 | 16.00 | 0.15 | P |
| 1/31/73 | 41713.797 | 16.35 | 0.09 | P |
| 12/22/73 | 42038.916 | 16.04 | 0.12 | P |
| 1/27/74 | 42074.890 | 16.26 | 0.07 | P |
| 3/19/74 | 42125.717 | 16.08 | 0.18 | P |
| 4/12/74 | 42149.629 | 16.40 | 0.22 | P |
| 4/23/74 | 42160.704 | 16.30 | 0.15 | P |
| | 1055+20 | CONT. | | |
| 5/22/74 | 42189.691 | 16.32 | 0.22 | P |
| 6/19/74 | 42217.614 | 16.20 | 0.11 | P |
| 12/19/74 | 42400.931 | 16.57 | 0.33 | P |
| 1/10/75 | 42422.943 | 16.13 | 0.27 | P |
| 1/18/75 | 42430.824 | 16.11 | 0.20 | P |
| 2/ 8/75 | 42451.847 | 15.87 | 0.33 | P |
| 3/10/75 | 42481.708 | 15.96 | 0.24 | P |
| 4/ 6/75 | 42508.726 | 16.19 | 0.18 | P |
| 5/ 4/75 | 42536.654 | 15.98 | 0.24 | P |
| 5/30/75 | 42562.637 | 15.97 | 0.17 | P |
| 12/12/75 | 42758.927 | 16.40 | 0.17 | P |
| 1/ 5/76 | 42782.848 | 16.15 | 0.23 | P |
| 1/ 5/76 | 42782.852 | 16.12 | 0.25 | P |
| 1/30/76 | 42808.903 | 16.36 | 0.12 | P |
| 1/30/76 | 42808.909 | 16.41 | 0.08 | P |
| 3/31/76 | 42868.662 | 16.39 | 0.23 | P |
| 4/20/76 | 42888.656 | 16.37 | 0.21 | P |
| 4/20/76 | 42888.660 | 16.12 | 0.13 | P |
| 5/30/76 | 42928.670 | 16.20 | 0.16 | P |
| 5/30/76 | 42928.677 | 16.30 | 0.28 | P |
| 1/29/77 | 43172.871 | 16.31 | 0.09 | P |
| 1/29/77 | 43172.876 | 16.43 | 0.12 | P |
| 5/ 9/77 | 43272.653 | 16.28 | 0.23 | P |
| 5/ 9/77 | 43272.657 | 15.87 | 0.25 | P |
| 1/10/78 | 43518.894 | 16.38 | 0.13 | P |
| 2/13/78 | 43552.802 | 16.44 | 0.16 | P |
| 3/14/78 | 43581.737 | 16.65 | 0.15 | P |
| 4/ 4/78 | 43602.656 | 16.22 | 0.17 | P |
| 4/28/78 | 43626.623 | 16.69 | 0.19 | P |
| 4/29/78 | 43627.619 | 16.29 | 0.13 | P |
| 3/ 1/79 | 43933.748 | 16.44 | 0.26 | P |
| 3/29/79 | 43961.662 | 16.54 | 0.23 | P |
| | 1101+38 | | | |
| 2/28/78 | 43567.567 | 13.63 | 0.07 | U |
| 2/28/78 | 43567.613 | 13.77 | 0.12 | U |
| 5/29/78 | 43657.614 | 13.18 | 0.17 | U |
| 3/27/79 | 43959.678 | 13.02 | 0.15 | U |
| 3/28/79 | 43960.658 | 12.98 | 0.04 | U |
| 3/29/79 | 43961.575 | 12.92 | 0.15 | U |
| 4/ 2/79 | 43965.731 | 12.75 | 0.15 | U |
| 11/15/79 | 44192.903 | 13.58 | 0.11 | U |
| 11/17/79 | 44194.886 | 13.31 | 0.19 | U |
| 4/19/77 | 43252.682 | 13.48 | 0.22 | B |
| 4/19/77 | 43252.688 | 13.17 | 0.35 | B |
| 2/28/78 | 43567.564 | 14.16 | 0.06 | B |
| 2/28/78 | 43567.610 | 13.99 | 0.13 | B |
| 3/11/78 | 43578.734 | 14.02 | 0.12 | B |
| 4/ 7/78 | 43605.647 | 14.02 | 0.16 | B |
| 5/ 2/78 | 43630.615 | 13.46 | 0.10 | B |
| 5/ 2/78 | 43630.615 | 13.55 | 0.09 | B |
| 5/ 2/78 | 43630.615 | 13.47 | 0.17 | B |
| 5/11/78 | 43639.661 | 13.62 | 0.05 | B |
| 5/11/78 | 43639.662 | 13.51 | 0.23 | B |
| 5/11/78 | 43639.662 | 13.73 | 0.20 | B |
| 5/26/78 | 43654.603 | 13.53 | 0.24 | B |
| 5/26/78 | 43654.608 | 13.50 | 0.12 | B |
| 5/27/78 | 43655.675 | 13.64 | 0.19 | B |
| 5/27/78 | 43655.676 | 13.63 | 0.15 | B |
| 5/28/78 | 43656.642 | 13.33 | 0.27 | B |
| 5/28/78 | 43656.642 | 13.53 | 0.16 | B |
| 5/29/78 | 43657.612 | 13.91 | 0.17 | B |
| 5/30/78 | 43658.625 | 13.60 | 0.16 | B |
| 5/30/78 | 43658.626 | 13.66 | 0.09 | B |
| 5/31/78 | 43659.729 | 13.56 | 0.13 | B |
| 6/ 2/78 | 43661.664 | 13.61 | 0.15 | B |
| 3/27/79 | 43959.676 | 13.71 | 0.08 | B |
| 3/28/79 | 43960.657 | 13.65 | 0.12 | B |
| 3/29/79 | 43961.574 | 13.57 | 0.16 | B |
| 3/30/79 | 43962.675 | 13.56 | 0.15 | B |
| 4/ 2/79 | 43965.728 | 13.64 | 0.11 | B |
| 6/19/79 | 44044.610 | 14.09 | 0.21 | B |
| 11/15/79 | 44192.897 | 14.34 | 0.09 | B |
| 11/16/79 | 44193.842 | 14.00 | 0.16 | B |
| 11/17/79 | 44194.864 | 13.97 | 0.17 | B |
| | 1101+38 | CONT. | | |
| 2/28/78 | 43567.570 | 13.56 | 0.10 | V |
| 5/29/78 | 43657.616 | 13.18 | 0.21 | V |
| 3/28/79 | 43960.660 | 13.39 | 0.15 | V |
| 3/29/79 | 43961.576 | 13.41 | 0.14 | V |
| 4/ 2/79 | 43965.733 | 13.48 | 0.11 | V |
| 11/15/79 | 44192.905 | 13.89 | 0.22 | V |
| 11/17/79 | 44194.869 | 13.69 | 0.28 | V |
| 2/28/78 | 43567.606 | 13.14 | 0.20 | I |
| 3/ 2/78 | 43569.609 | 13.04 | 0.08 | I |
| 3/ 7/78 | 43574.678 | 13.16 | 0.12 | I |
| 5/29/78 | 43657.672 | 12.76 | 0.13 | I |
| 3/27/79 | 43959.682 | 12.75 | 0.10 | I |
| 3/28/79 | 43960.664 | 12.79 | 0.06 | I |
| 3/29/79 | 43961.581 | 12.92 | 0.07 | I |
| 4/ 2/79 | 43965.737 | 13.01 | 0.07 | I |
| 11/17/79 | 44194.874 | 13.35 | 0.15 | I |
| | 1116+12 | | | |
| 3/17/71 | 41027.656 | 18.69 | 0.12 | P |
| 3/21/71 | 41031.653 | 19.03 | 0.10 | P |
| 3/28/71 | 41038.799 | 18.78 | 0.13 | P |
| 3/30/71 | 41040.809 | 18.55 | 0.26 | P |
| 4/ 1/71 | 41042.768 | 18.79 | 0.13 | P |
| 4/24/71 | 41065.739 | 18.97 | 0.15 | P |
| 2/20/72 | 41367.881 | 18.41 | 0.11 | P |
| 3/15/72 | 41391.786 | 18.37 | 0.24 | P |
| 4/13/72 | 41420.647 | 17.87 | 0.10 | P |
| 1/24/74 | 42071.898 | 18.45 | 0.18 | P |
| 3/18/74 | 42124.803 | 19.66 | 0.15 | P |
| 3/31/74 | 42137.796 | 18.27 | 0.22 | P |
| 4/14/74 | 42151.681 | 18.44 | 0.23 | P |
| 2/ 9/75 | 42452.734 | 18.02 | 0.17 | P |
| 2/14/75 | 42457.878 | 18.09 | 0.12 | P |
| 4/ 6/75 | 42508.746 | 18.43 | 0.17 | P |
| 5/ 9/75 | 42541.600 | 18.46 | 0.24 | P |
| 11/18/75 | 42734.880 | 18.60 | 0.13 | P |
| 12/12/75 | 42758.940 | 18.57 | 0.27 | P |
| 1/ 5/76 | 42782.887 | 18.47 | 0.22 | P |
| 1/ 5/76 | 42782.893 | 18.76 | 0.16 | P |
| 2/ 1/76 | 42809.926 | 18.60 | 0.10 | P |
| 2/ 1/76 | 42809.931 | 18.60 | 0.08 | P |
| 4/ 2/76 | 42870.714 | 18.86 | 0.15 | P |
| 4/ 2/76 | 42870.720 | 18.56 | 0.15 | P |
| 4/20/76 | 42888.648 | 18.99 | 0.14 | P |
| 4/20/76 | 42888.654 | 18.88 | 0.15 | P |
| 2/18/77 | 43192.817 | 18.57 | 0.07 | P |
| 5/13/77 | 43276.663 | 19.25 | 0.20 | P |
| 5/13/77 | 43276.670 | 19.24 | 0.13 | P |
| 2/13/78 | 43552.812 | 18.96 | 0.18 | P |
| 4/ 3/78 | 43601.647 | 18.71 | 0.27 | P |
| 4/12/78 | 43610.654 | 18.36 | 0.22 | P |
| 4/28/78 | 43626.632 | 19.05 | 0.23 | P |
| | ON 133 | | | |
| 1/ 9/70 | 40595.875 | 17.97 | 0.05 | P |
| 5/ 7/70 | 40713.667 | 18.09 | 0.16 | P |
| 12/ 9/70 | 40929.854 | 17.69 | 0.14 | P |
| 2/26/71 | 41008.833 | 17.78 | 0.12 | P |
| 3/27/71 | 41037.750 | 18.07 | 0.17 | P |
| 5/22/71 | 41093.674 | 18.07 | 0.20 | P |
| 1/17/77 | 43160.892 | 18.10 | 0.09 | P |
| 1/17/77 | 43160.898 | 18.08 | 0.11 | P |
| 2/19/77 | 43193.822 | 18.19 | 0.24 | P |
| 2/19/77 | 43193.828 | 18.41 | 0.08 | P |
| 4/18/77 | 43251.676 | 18.03 | 0.22 | P |
| 4/18/77 | 43251.678 | 18.28 | 0.13 | P |
| 5/13/77 | 43276.682 | 18.20 | 0.16 | P |
| 5/13/77 | 43276.685 | 18.09 | 0.07 | P |
| 3/ 7/78 | 43574.821 | 18.22 | 0.10 | P |
| 4/ 4/78 | 43602.668 | 18.10 | 0.12 | P |
| 4/12/78 | 43610.667 | 17.84 | 0.11 | P |
| 4/28/78 | 43626.645 | 18.17 | 0.08 | P |
| 3/ 1/79 | 43933.757 | 17.90 | 0.14 | P |

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | ON 133 | CONT. | | |
| 3/27/79 | 43959.649 | 17.90 | 0.15 | P |
| 4/21/79 | 43984.619 | 18.04 | 0.28 | P |
| 6/17/79 | 44041.611 | 18.21 | 0.09 | P |
| | 1123+208 | | | |
| 2/14/70 | 40631.906 | 17.33 | 0.16 | P |
| 5/ 7/70 | 40713.726 | 17.39 | 0.18 | P |
| 12/ 8/70 | 40928.913 | 17.09 | 0.20 | P |
| 1/ 1/71 | 40952.902 | 17.02 | 0.19 | P |
| 1/30/71 | 40981.822 | 17.24 | 0.09 | P |
| 2/27/71 | 41009.712 | 17.31 | 0.15 | P |
| 5/23/71 | 41094.669 | 17.65 | 0.11 | P |
| 2/22/72 | 41369.806 | 17.22 | 0.16 | P |
| 4/15/72 | 41422.682 | 17.38 | 0.23 | P |
| 3/ 4/73 | 41749.796 | 17.23 | 0.13 | P |
| 1/27/74 | 42074.600 | 17.29 | 0.23 | P |
| 1/22/75 | 42434.881 | 17.09 | 0.24 | P |
| 2/10/75 | 42453.750 | 17.32 | 0.11 | P |
| 3/10/75 | 42481.781 | 17.11 | 0.22 | P |
| 5/ 9/75 | 42541.614 | 16.88 | 0.19 | P |
| 6/ 1/75 | 42564.597 | 17.43 | 0.15 | P |
| 1/ 9/76 | 42786.876 | 17.25 | 0.18 | P |
| 1/ 9/76 | 42786.886 | 17.23 | 0.12 | P |
| 3/25/76 | 42862.756 | 17.56 | 0.30 | P |
| 3/25/76 | 42862.760 | 17.36 | 0.21 | P |
| 4/27/76 | 42895.682 | 17.04 | 0.10 | P |
| 4/27/76 | 42895.686 | 17.57 | 0.18 | P |
| 6/ 1/76 | 42930.624 | 17.15 | 0.15 | P |
| 4/12/77 | 43245.731 | 16.92 | 0.21 | P |
| 1/10/78 | 43518.903 | 16.73 | 0.07 | P |
| 2/13/78 | 43552.824 | 16.72 | 0.25 | P |
| 3/ 7/78 | 43574.833 | 16.83 | 0.17 | P |
| 4/ 3/78 | 43601.658 | 16.73 | 0.17 | P |
| 5/ 1/78 | 43629.610 | 16.59 | 0.18 | P |
| | 1127-14 | | | |
| 5/26/70 | 40732.593 | 16.58 | 0.10 | P |
| 12/ 8/70 | 40928.931 | 16.62 | 0.09 | P |
| 4/15/74 | 42152.699 | 16.83 | 0.15 | P |
| 3/10/75 | 42481.839 | 16.76 | 0.14 | P |
| 4/ 2/76 | 42870.756 | 16.82 | 0.11 | P |
| 4/ 2/76 | 42870.762 | 16.78 | 0.08 | P |
| 2/19/77 | 43193.842 | 16.72 | 0.18 | P |
| 2/19/77 | 43193.847 | 16.60 | 0.11 | P |
| 2/13/78 | 43552.878 | 16.69 | 0.12 | P |
| 3/20/79 | 43952.689 | 16.60 | 0.19 | P |
| | 1148-00 | | | |
| 4/16/69 | 40325.687 | 17.40 | 0.07 | P |
| 5/31/70 | 40737.646 | 17.39 | 0.18 | P |
| 6/ 6/70 | 40743.625 | 17.18 | 0.08 | P |
| 2/ 2/71 | 40984.833 | 16.98 | 0.12 | P |
| 5/23/71 | 41094.625 | 17.10 | 0.17 | P |
| 3/12/72 | 41388.729 | 17.14 | 0.10 | P |
| 1/29/73 | 41711.840 | 17.22 | 0.08 | P |
| 3/19/74 | 42125.736 | 17.15 | 0.12 | P |
| 1/20/75 | 42432.899 | 17.29 | 0.08 | P |
| 5/ 9/75 | 42541.629 | 17.62 | 0.24 | P |
| 1/ 9/76 | 42786.904 | 17.40 | 0.07 | P |
| 1/ 9/76 | 42786.912 | 17.49 | 0.11 | P |
| 4/27/76 | 42895.694 | 17.45 | 0.10 | P |
| 4/27/76 | 42895.700 | 17.23 | 0.13 | P |
| 2/19/77 | 43193.860 | 17.33 | 0.11 | P |
| 2/19/77 | 43193.867 | 17.21 | 0.17 | P |
| 1/10/78 | 43518.935 | 17.11 | 0.04 | P |
| 3/29/79 | 43961.677 | 17.24 | 0.16 | P |
| | ON 325 | | | |
| 2/22/72 | 41369.742 | 16.04 | 0.10 | B |
| | ON 325 | CONT. | | |
| 3/21/72 | 41397.736 | 15.92 | 0.13 | B |
| 5/ 2/72 | 41439.672 | 15.78 | 0.19 | B |
| 6/11/72 | 41479.588 | 15.96 | 0.21 | B |
| 5/ 6/73 | 41808.694 | 15.96 | 0.08 | B |
| 6/28/73 | 41856.623 | 15.73 | 0.12 | B |
| 6/27/73 | 41860.645 | 15.90 | 0.12 | B |
| 6/30/73 | 41863.615 | 15.89 | 0.08 | B |
| 7/ 3/73 | 41866.631 | 15.81 | 0.11 | B |
| 7/25/73 | 41888.585 | 15.78 | 0.20 | B |
| 1/27/74 | 42074.913 | 15.98 | 0.09 | B |
| 3/19/74 | 42125.795 | 15.85 | 0.08 | B |
| 4/28/74 | 42165.797 | 16.03 | 0.07 | B |
| 5/15/74 | 42182.694 | 16.46 | 0.17 | B |
| 5/17/74 | 42184.723 | 16.11 | 0.08 | B |
| 5/22/74 | 42189.753 | 16.55 | 0.08 | B |
| 5/24/74 | 42191.674 | 16.44 | 0.06 | B |
| 5/28/74 | 42195.718 | 16.43 | 0.08 | B |
| 6/ 1/74 | 42199.680 | 16.36 | 0.06 | B |
| 6/14/74 | 42212.681 | 16.03 | 0.06 | B |
| 6/16/74 | 42214.667 | 16.03 | 0.07 | B |
| 6/17/74 | 42215.664 | 15.98 | 0.10 | B |
| 6/18/74 | 42216.654 | 15.95 | 0.09 | B |
| 6/19/74 | 42217.663 | 15.80 | 0.26 | B |
| 6/21/74 | 42219.656 | 15.95 | 0.08 | B |
| 6/23/74 | 42221.646 | 15.95 | 0.09 | B |
| 6/24/74 | 42222.651 | 15.90 | 0.08 | B |
| 7/14/74 | 42242.677 | 15.90 | 0.26 | B |
| 7/15/74 | 42243.607 | 15.96 | 0.15 | B |
| 7/16/74 | 42244.609 | 15.86 | 0.20 | B |
| 7/17/74 | 42245.619 | 16.00 | 0.13 | B |
| 3/ 7/75 | 42478.826 | 16.09 | 0.13 | B |
| 3/13/75 | 42484.829 | 16.15 | 0.06 | B |
| 5/ 8/75 | 42540.632 | 16.12 | 0.11 | B |
| 1/ 3/76 | 42780.886 | 15.65 | 0.16 | B |
| 1/26/76 | 42803.831 | 15.60 | 0.10 | B |
| 2/ 3/76 | 42811.849 | 15.65 | 0.07 | B |
| 2/ 7/76 | 42815.844 | 15.76 | 0.07 | B |
| 3/25/76 | 42862.734 | 15.91 | 0.04 | B |
| 4/22/76 | 42890.626 | 15.70 | 0.10 | B |
| 4/22/76 | 42890.631 | 15.73 | 0.13 | B |
| 4/23/76 | 42891.648 | 15.67 | 0.23 | B |
| 4/24/76 | 42892.676 | 15.94 | 0.22 | B |
| 4/29/76 | 42897.662 | 15.66 | 0.09 | B |
| 2/19/77 | 43193.743 | 16.13 | 0.07 | B |
| 2/19/77 | 43193.758 | 16.12 | 0.07 | B |
| 2/23/77 | 43197.722 | 16.03 | 0.16 | B |
| 2/25/77 | 43199.890 | 16.03 | 0.16 | B |
| 2/26/77 | 43200.829 | 15.90 | 0.10 | B |
| 3/26/77 | 43228.842 | 16.00 | 0.06 | B |
| 3/27/77 | 43229.728 | 16.06 | 0.04 | B |
| 3/23/77 | 43225.744 | 15.75 | 0.24 | B |
| 4/10/77 | 43243.694 | 16.03 | 0.13 | B |
| 4/12/77 | 43245.690 | 15.93 | 0.15 | B |
| 4/19/77 | 43252.756 | 15.88 | 0.12 | B |
| 4/19/77 | 43252.765 | 15.85 | 0.10 | B |
| 5/ 9/77 | 43272.696 | 15.56 | 0.07 | B |
| 5/ 9/77 | 43272.674 | 15.60 | 0.11 | B |
| 5/13/77 | 43276.690 | 15.35 | 0.10 | B |
| 5/13/77 | 43276.712 | 15.39 | 0.21 | B |
| 6/ 7/77 | 43301.628 | 15.83 | 0.15 | B |
| 6/ 7/77 | 43301.631 | 15.74 | 0.10 | B |
| 6/ 8/77 | 43302.553 | 15.57 | 0.18 | B |
| 6/ 9/77 | 43303.620 | 15.63 | 0.23 | B |
| 6/13/77 | 43307.658 | 15.64 | 0.21 | B |
| 6/21/77 | 43315.653 | 15.64 | 0.08 | B |
| 7/ 7/77 | 43331.635 | 15.10 | 0.10 | B |
| 1/10/78 | 43518.924 | 15.74 | 0.10 | B |
| 2/13/78 | 43552.875 | 15.71 | 0.16 | B |
| 3/ 7/78 | 43574.844 | 15.87 | 0.23 | B |
| 3/17/78 | 43584.785 | 16.02 | 0.05 | B |
| 4/ 3/78 | 43601.668 | 16.06 | 0.06 | B |
| 4/29/78 | 43627.594 | 15.93 | 0.12 | B |
| 5/ 5/78 | 43633.629 | 15.63 | 0.17 | B |
| 5/12/78 | 43640.689 | 15.56 | 0.11 | B |
| | ON 325 | CONT. | | |
| 5/26/78 | 43654.618 | 15.54 | 0.17 | B |
| 5/28/78 | 43656.625 | 15.72 | 0.19 | B |
| 6/ 7/78 | 43666.603 | 15.85 | 0.09 | B |
| 1/29/79 | 43902.682 | 16.08 | 0.10 | B |
| 2/28/79 | 43932.783 | 16.10 | 0.16 | B |
| 3/20/79 | 43952.652 | 15.71 | 0.14 | B |
| 3/28/79 | 43960.741 | 15.86 | 0.20 | B |
| 3/30/79 | 43962.732 | 15.93 | 0.13 | B |
| 4/21/79 | 43984.640 | 15.69 | 0.09 | B |
| 5/17/79 | 44010.640 | 15.79 | 0.17 | B |
| 5/28/79 | 44021.626 | 15.72 | 0.13 | B |
| 5/30/79 | 44023.662 | 15.66 | 0.21 | B |
| 6/17/79 | 44041.623 | 15.65 | 0.11 | B |
| 6/26/79 | 44050.644 | 15.78 | 0.26 | B |
| 6/25/79 | 44049.640 | 15.57 | 0.09 | B |
| | 1217+02 | | | |
| 4/26/71 | 41068.708 | 15.75 | 0.07 | P |
| 5/18/71 | 41089.625 | 15.71 | 0.03 | P |
| 4/15/72 | 41422.726 | 15.55 | 0.10 | P |
| 6/ 1/73 | 41834.585 | 15.64 | 0.20 | P |
| 4/12/74 | 42149.685 | 15.90 | 0.18 | P |
| 2/ 8/75 | 42451.869 | 15.93 | 0.06 | P |
| 3/13/75 | 42484.882 | 16.22 | 0.15 | P |
| 4/19/75 | 42521.760 | 16.22 | 0.21 | P |
| 5/ 9/75 | 42541.643 | 16.00 | 0.11 | P |
| 7/ 1/75 | 42594.592 | 16.20 | 0.13 | P |
| 12/29/75 | 42775.872 | 16.11 | 0.31 | P |
| 4/ 2/76 | 42870.780 | 16.27 | 0.11 | P |
| 4/ 2/76 | 42870.785 | 16.26 | 0.09 | P |
| 5/ 3/76 | 42901.640 | 16.24 | 0.10 | P |
| 5/ 3/76 | 42901.646 | 16.18 | 0.15 | P |
| 4/12/77 | 43245.743 | 16.09 | 0.13 | P |
| 5/19/77 | 43282.627 | 16.08 | 0.11 | P |
| 5/27/77 | 43290.620 | 16.02 | 0.10 | P |
| 1/10/78 | 43518.944 | 16.03 | 0.04 | P |
| 3/11/78 | 43578.812 | 16.05 | 0.12 | P |
| 4/ 5/78 | 43603.678 | 15.98 | 0.06 | P |
| 5/ 3/78 | 43631.625 | 15.92 | 0.14 | P |
| 3/ 1/79 | 43933.792 | 15.52 | 0.08 | P |
| 3/21/79 | 43953.631 | 15.64 | 0.18 | P |
| 3/29/79 | 43961.653 | 15.55 | 0.15 | P |
| 4/27/79 | 43990.678 | 15.55 | 0.29 | P |
| | 3C 273 | | | |
| 1/24/74 | 42071.918 | 13.24 | 0.15 | B |
| 2/24/74 | 42102.748 | 12.93 | 0.09 | B |
| 3/ 1/74 | 42107.690 | 13.09 | 0.05 | B |
| 3/19/74 | 42125.756 | 13.35 | 0.13 | B |
| 3/19/74 | 42125.760 | 13.09 | 0.05 | B |
| 4/19/74 | 42156.760 | 13.04 | 0.06 | B |
| 4/23/74 | 42160.724 | 13.46 | 0.21 | B |
| 4/24/74 | 42161.662 | 13.04 | 0.15 | B |
| 5/21/74 | 42188.665 | 13.01 | 0.04 | B |
| 6/13/74 | 42211.668 | 13.03 | 0.04 | B |
| 6/23/74 | 42221.696 | 12.87 | 0.10 | B |
| 1/18/75 | 42430.917 | 13.36 | 0.11 | B |
| 2/ 7/75 | 42450.785 | 13.37 | 0.15 | B |
| 3/10/75 | 42481.808 | 13.11 | 0.14 | B |
| 3/10/75 | 42481.814 | 13.28 | 0.30 | B |
| 5/ 8/75 | 42540.691 | 13.28 | 0.11 | B |
| 5/30/75 | 42562.665 | 13.25 | 0.21 | B |
| 7/ 1/75 | 42594.607 | 13.30 | 0.16 | B |
| 12/12/75 | 42758.950 | 13.32 | 0.10 | B |
| 12/29/75 | 42775.917 | 13.29 | 0.15 | B |
| 1/ 9/76 | 42786.922 | 12.93 | 0.06 | B |
| 1/30/76 | 42808.942 | 13.25 | 0.08 | B |
| 1/30/76 | 42808.948 | 13.24 | 0.09 | B |
| 4/ 2/76 | 42870.890 | 13.36 | 0.14 | B |
| 4/ 2/76 | 42870.890 | 13.17 | 0.17 | B |
| 5/ 3/76 | 42901.680 | 13.23 | 0.07 | B |
| 5/ 3/76 | 42901.681 | 13.15 | 0.13 | B |
| 5/ 3/76 | 42901.685 | 13.20 | 0.16 | B |
| 6/ 1/76 | 42930.644 | 13.38 | 0.15 | B |
| | 3C 273 | CONT. | | |
| 6/ 1/76 | 42930.649 | 13.33 | 0.10 | B |
| 2/25/77 | 43199.902 | 13.12 | 0.09 | B |
| 2/25/77 | 43199.905 | 13.11 | 0.08 | B |
| 3/27/77 | 43229.787 | 13.12 | 0.08 | B |
| 3/27/77 | 43229.790 | 13.22 | 0.13 | B |
| 4/12/77 | 43245.709 | 13.32 | 0.16 | B |
| 4/12/77 | 43245.714 | 13.28 | 0.14 | B |
| 5/13/77 | 43276.647 | 13.34 | 0.11 | B |
| 5/13/77 | 43276.651 | 13.25 | 0.08 | B |
| 3/ 7/78 | 43574.785 | 12.86 | 0.14 | B |
| 3/11/78 | 43578.828 | 13.30 | 0.11 | B |
| 3/14/78 | 43581.762 | 13.27 | 0.12 | B |
| 4/ 3/78 | 43601.691 | 13.04 | 0.10 | B |
| 4/29/78 | 43627.683 | 12.88 | 0.11 | B |
| 5/ 5/78 | 43633.609 | 12.69 | 0.19 | B |
| 5/ 6/78 | 43634.609 | 12.98 | 0.15 | B |
| 5/ 6/78 | 43634.612 | 12.95 | 0.08 | B |
| 5/ 9/78 | 43637.676 | 12.82 | 0.11 | B |
| 5/11/78 | 43639.743 | 12.99 | 0.10 | B |
| 5/26/78 | 43654.587 | 12.86 | 0.08 | B |
| 5/27/78 | 43655.638 | 12.85 | 0.16 | B |
| 5/27/78 | 43655.641 | 12.85 | 0.26 | B |
| 5/28/78 | 43656.619 | 12.94 | 0.08 | B |
| 5/29/78 | 43657.605 | 12.92 | 0.10 | B |
| 5/30/78 | 43658.603 | 12.95 | 0.10 | B |
| 5/31/78 | 43659.681 | 13.05 | 0.08 | B |
| 6/ 2/78 | 43661.684 | 12.88 | 0.10 | B |
| 12/ 9/78 | 43851.924 | 12.92 | 0.04 | B |
| 12/ 9/78 | 43851.931 | 12.97 | 0.11 | B |
| 12/ 9/78 | 43851.940 | 12.95 | 0.05 | B |
| 12/ 9/78 | 43851.940 | 13.07 | 0.07 | B |
| 12/10/78 | 43852.876 | 12.69 | 0.06 | B |
| 12/10/78 | 43852.880 | 12.72 | 0.08 | B |
| 12/10/78 | 43852.923 | 12.76 | 0.06 | B |
| 12/10/78 | 43852.926 | 12.73 | 0.07 | B |
| 12/27/78 | 43869.785 | 12.67 | 0.11 | B |
| 12/27/78 | 43869.799 | 12.82 | 0.10 | B |
| 12/31/78 | 43873.792 | 13.06 | 0.10 | B |
| 12/31/78 | 43873.795 | 12.80 | 0.11 | B |
| 12/31/78 | 43873.836 | 12.82 | 0.09 | B |
| 12/31/78 | 43873.839 | 12.95 | 0.12 | B |
| 12/31/78 | 43873.900 | 12.79 | 0.13 | B |
| 12/31/78 | 43873.903 | 12.83 | 0.13 | B |
| 1/ 3/79 | 43876.837 | 13.08 | 0.09 | B |
| 1/ 3/79 | 43876.840 | 12.79 | 0.05 | B |
| 1/29/79 | 43902.691 | 12.63 | 0.06 | B |
| 2/28/79 | 43932.753 | 12.59 | 0.13 | B |
| 3/20/79 | 43952.659 | 12.62 | 0.09 | B |
| 3/28/79 | 43960.769 | 13.20 | 0.15 | B |
| 3/30/79 | 43962.776 | 13.18 | 0.18 | B |
| 4/ 2/79 | 43965.751 | 13.24 | 0.15 | B |
| 4/21/79 | 43984.664 | 13.30 | 0.13 | B |
| 5/17/79 | 44011.633 | 13.37 | 0.24 | B |
| 6/17/79 | 44041.665 | 13.18 | 0.14 | B |
| 6/26/79 | 44049.631 | 13.50 | 0.25 | B |
| 6/25/79 | 44050.626 | 13.20 | 0.23 | B |
| | 1229-02 | | | |
| 5/26/71 | 41097.644 | 16.65 | 0.14 | P |
| 6/21/71 | 41123.614 | 16.50 | 0.08 | P |
| 3/13/72 | 41389.821 | 16.54 | 0.08 | P |
| 4/15/72 | 41420.722 | 16.56 | 0.06 | P |
| 1/31/73 | 41713.913 | 16.70 | 0.04 | P |
| 3/10/73 | 41751.802 | 16.74 | 0.07 | P |
| 3/31/74 | 42137.796 | 16.77 | 0.10 | P |
| 3/ 7/75 | 42478.827 | 16.95 | 0.05 | P |
| 1/10/76 | 42787.890 | 16.77 | 0.07 | P |
| 1/10/76 | 42787.895 | 16.00 | 0.05 | P |
| 4/ 4/76 | 42872.664 | 16.56 | 0.09 | P |
| 4/ 4/76 | 42872.669 | 16.97 | 0.22 | P |
| 6/ 1/76 | 42930.662 | 16.95 | 0.15 | P |
| 6/ 1/76 | 42930.668 | 16.75 | 0.11 | P |
| 3/29/77 | 43231.803 | 16.61 | 0.10 | P |
| 3/29/77 | 43231.807 | 16.79 | 0.24 | P |
| 5/15/77 | 43278.627 | 16.72 | 0.15 | P |

TABLE III. (continued)

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 1229-02 | CONT. | | |
| 5/15/77 | 43278.665 | 16.49 | 0.24 | P |
| 3/14/78 | 43581.777 | 17.21 | 0.11 | P |
| 4/ 3/78 | 43601.684 | 17.09 | 0.18 | P |
| 4/ 5/78 | 43603.702 | 16.95 | 0.06 | P |
| 5/ 1/78 | 43629.633 | 17.06 | 0.14 | P |
| 3/21/79 | 43953.701 | 17.07 | 0.17 | P |
| | 1237-10 | | | |
| 5/25/70 | 40731.708 | 17.12 | 0.07 | P |
| 5/31/70 | 40737.607 | 17.22 | 0.06 | P |
| 1/30/71 | 40981.869 | 17.33 | 0.05 | P |
| 6/21/71 | 41123.635 | 17.45 | 0.07 | P |
| 4/13/72 | 41420.684 | 17.22 | 0.09 | P |
| 4/24/73 | 41796.698 | 16.81 | 0.06 | P |
| 2/14/75 | 42457.934 | 16.90 | 0.06 | P |
| 1/10/76 | 42787.916 | 17.24 | 0.07 | P |
| 1/10/76 | 42787.921 | 17.32 | 0.08 | P |
| 4/ 4/76 | 42872.686 | 17.40 | 0.12 | P |
| 4/ 4/76 | 42872.692 | 17.45 | 0.22 | P |
| 3/14/78 | 43581.788 | 17.39 | 0.19 | P |
| 5/ 1/78 | 43629.648 | 17.43 | 0.15 | P |
| 3/21/79 | 43953.710 | 17.51 | 0.11 | P |
| 4/21/79 | 43984.688 | 17.44 | 0.21 | P |
| | 4C 09.42 | | | |
| 6/18/71 | 41120.642 | 18.08 | 0.06 | P |
| 12/20/71 | 41305.910 | 18.41 | 0.16 | P |
| 2/22/72 | 41369.840 | 18.12 | 0.05 | P |
| 4/15/72 | 41422.715 | 17.96 | 0.12 | P |
| 5/ 1/73 | 41803.702 | 18.38 | 0.04 | P |
| 5/21/73 | 41823.651 | 17.99 | 0.07 | P |
| 6/ 3/73 | 41836.594 | 18.32 | 0.16 | P |
| 1/24/74 | 42071.938 | 18.32 | 0.21 | P |
| 4/14/74 | 42151.722 | 18.35 | 0.12 | P |
| 2/14/75 | 42457.920 | 18.27 | 0.12 | P |
| 4/ 6/75 | 42508.797 | 18.40 | 0.11 | P |
| 5/ 9/75 | 42541.678 | 18.51 | 0.06 | P |
| 6/ 1/75 | 42564.610 | 18.25 | 0.09 | P |
| 1/10/76 | 42787.938 | 18.69 | 0.05 | P |
| 1/10/76 | 42787.944 | 18.63 | 0.19 | P |
| 2/ 3/76 | 42811.836 | 18.58 | 0.16 | P |
| 2/ 3/76 | 42811.842 | 18.61 | 0.13 | P |
| 4/ 2/76 | 42870.818 | 18.54 | 0.15 | P |
| 4/ 2/76 | 42870.824 | 18.15 | 0.17 | P |
| 6/ 1/76 | 42930.684 | 18.32 | 0.20 | P |
| 6/ 1/76 | 42930.690 | 18.46 | 0.25 | P |
| 4/12/77 | 43245.756 | 18.26 | 0.10 | P |
| 2/13/78 | 43552.889 | 18.37 | 0.17 | P |
| 3/17/78 | 43584.798 | 18.16 | 0.13 | P |
| 5/ 5/78 | 43633.653 | 18.61 | 0.09 | P |
| 5/12/78 | 43640.681 | 18.56 | 0.20 | P |
| 5/28/78 | 43656.646 | 17.98 | 0.19 | P |
| | 1252+11 | | | |
| 6/ 8/69 | 40380.708 | 16.21 | 0.12 | P |
| 6/12/69 | 40384.708 | 16.18 | 0.14 | P |
| 7/ 5/69 | 40407.648 | 16.12 | 0.07 | P |
| 5/ 2/70 | 40708.726 | 15.99 | 0.10 | P |
| 1/30/71 | 40981.884 | 16.32 | 0.14 | P |
| 3/31/71 | 41041.844 | 16.12 | 0.07 | P |
| 5/21/71 | 41092.693 | 16.10 | 0.14 | P |
| 6/21/71 | 41123.708 | 16.12 | 0.04 | P |
| 2/22/72 | 41369.857 | 16.16 | 0.15 | P |
| 4/13/72 | 41420.705 | 15.94 | 0.06 | P |
| 3/ 4/73 | 41745.824 | 16.28 | 0.12 | P |
| 4/28/73 | 41800.683 | 16.15 | 0.05 | P |
| 4/30/73 | 41802.659 | 16.24 | 0.10 | P |
| 6/ 1/73 | 41834.607 | 16.50 | 0.14 | P |
| 2/24/74 | 42102.896 | 16.23 | 0.06 | P |
| 5/15/74 | 42182.745 | 16.45 | 0.14 | P |
| 5/24/74 | 42191.622 | 16.47 | 0.10 | P |

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|---|---|---|---|---|
| | 1252+11 | CONT. | | |
| 2/ 8/75 | 42451.899 | 16.28 | 0.09 | P |
| 3/13/75 | 42484.869 | 16.50 | 0.15 | P |
| 4/19/75 | 42521.787 | 16.32 | 0.06 | P |
| 5/ 9/75 | 42541.703 | 16.62 | 0.16 | P |
| 6/ 1/75 | 42564.628 | 16.35 | 0.15 | P |
| 6/11/75 | 42574.647 | 16.15 | 0.11 | P |
| 6/30/75 | 42593.613 | 16.45 | 0.11 | P |
| 2/ 3/76 | 42811.858 | 16.25 | 0.12 | P |
| 2/ 3/76 | 42811.862 | 16.23 | 0.08 | P |
| 4/ 4/76 | 42872.707 | 16.16 | 0.13 | P |
| 4/ 4/76 | 42872.712 | 15.96 | 0.12 | P |
| 5/ 3/76 | 42901.699 | 16.31 | 0.22 | P |
| 5/ 3/76 | 42901.704 | 16.45 | 0.20 | P |
| 5/26/76 | 42924.669 | 16.25 | 0.18 | P |
| 5/26/76 | 42924.675 | 16.19 | 0.18 | P |
| 2/19/77 | 43193.915 | 16.24 | 0.21 | P |
| 2/19/77 | 43193.920 | 16.23 | 0.14 | P |
| 1/26/77 | 43169.901 | 16.12 | 0.08 | P |
| 1/26/77 | 43169.906 | 16.13 | 0.10 | P |
| 3/27/77 | 43229.708 | 16.21 | 0.30 | P |
| 3/27/77 | 43229.715 | 16.46 | 0.14 | P |
| 4/ 9/77 | 43242.681 | 15.93 | 0.18 | P |
| 4/ 9/77 | 43242.684 | 15.86 | 0.14 | P |
| 4/18/77 | 43251.718 | 16.05 | 0.11 | P |
| 4/18/77 | 43251.720 | 16.26 | 0.11 | P |
| 2/12/78 | 43551.914 | 16.14 | 0.24 | P |
| 3/14/78 | 43581.901 | 16.27 | 0.09 | P |
| 4/ 5/78 | 43603.714 | 15.99 | 0.19 | P |
| 4/28/78 | 43626.708 | 16.10 | 0.12 | P |
| 5/26/78 | 43654.649 | 15.95 | 0.28 | P |
| 6/ 7/78 | 43666.687 | 16.26 | 0.18 | P |
| 2/28/79 | 43932.795 | 16.77 | 0.26 | P |
| 3/21/79 | 43953.665 | 16.34 | 0.21 | P |
| 4/21/79 | 43984.709 | 16.57 | 0.24 | P |
| | 3C 279 | | | |
| 5/26/71 | 41097.708 | 16.70 | 0.17 | P |
| 3/10/72 | 41386.824 | 16.29 | 0.16 | P |
| 4/11/72 | 41418.739 | 16.48 | 0.19 | P |
| 6/10/72 | 41478.681 | 16.12 | 0.23 | P |
| 3/29/77 | 43231.819 | 17.19 | 0.12 | P |
| 3/29/77 | 43231.824 | 16.94 | 0.08 | P |
| 4/15/77 | 43248.737 | 17.65 | 0.12 | P |
| 4/15/77 | 43248.740 | 17.39 | 0.18 | P |
| 6/ 8/77 | 43302.685 | 17.15 | 0.17 | P |
| 6/19/77 | 43313.665 | 17.36 | 0.27 | P |
| 6/19/77 | 43313.670 | 16.95 | 0.12 | P |
| 6/20/77 | 43314.699 | 17.41 | 0.21 | P |
| 6/21/77 | 43315.625 | 17.39 | 0.21 | P |
| 6/21/77 | 43315.629 | 17.05 | 0.20 | P |
| 2/12/78 | 43551.926 | 17.17 | 0.15 | P |
| 3/17/78 | 43584.816 | 17.32 | 0.19 | P |
| 4/12/78 | 43610.697 | 17.48 | 0.13 | P |
| 4/28/78 | 43626.676 | 17.17 | 0.12 | P |
| 5/29/78 | 43657.640 | 16.58 | 0.19 | P |
| 12/11/78 | 43873.891 | 16.46 | 0.16 | P |
| 2/28/79 | 43932.769 | 16.94 | 0.18 | P |
| 3/21/79 | 43953.726 | 17.09 | 0.22 | P |
| 3/30/79 | 43962.801 | 17.33 | 0.20 | P |
| 4/21/79 | 43984.697 | 16.92 | 0.10 | P |
| 5/30/79 | 44023.574 | 17.11 | 0.24 | P |
| | TON 155 | | | |
| 6/14/74 | 42212.624 | 17.31 | 0.20 | P |
| 7/15/74 | 42243.592 | 17.05 | 0.24 | P |
| 2/ 9/75 | 42452.879 | 17.25 | 0.11 | P |
| 4/19/75 | 42521.806 | 17.04 | 0.16 | P |
| 5/ 9/75 | 42541.744 | 16.88 | 0.25 | P |
| 6/14/75 | 42577.701 | 17.10 | 0.20 | P |
| 7/ 4/75 | 42597.601 | 17.42 | 0.15 | P |
| 2/ 3/76 | 42811.877 | 17.04 | 0.22 | P |
| 2/ 3/76 | 42811.882 | 16.90 | 0.21 | P |
| 4/ 4/76 | 42872.749 | 16.91 | 0.14 | P |

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|---|---|---|---|---|
| | TON 155 | CONT. | | |
| 4/ 4/76 | 42872.754 | 16.93 | 0.13 | P |
| 1/17/77 | 43160.896 | 16.71 | 0.15 | P |
| 4/12/77 | 43245.771 | 16.88 | 0.09 | P |
| 3/17/78 | 43584.828 | 16.85 | 0.07 | P |
| 4/12/78 | 43610.715 | 17.19 | 0.23 | P |
| 5/ 1/78 | 43629.658 | 16.94 | 0.17 | P |
| 5/29/78 | 43657.667 | 16.91 | 0.15 | P |
| 6/ 7/78 | 43666.646 | 17.21 | 0.22 | P |
| 6/28/78 | 43687.657 | 16.88 | 0.22 | P |
| 3/28/79 | 43960.778 | 17.40 | 0.16 | P |
| 5/28/79 | 44021.657 | 17.29 | 0.14 | P |
| | TON 156 | | | |
| 6/14/74 | 42212.624 | 16.35 | 0.20 | P |
| 7/15/74 | 42243.592 | 16.46 | 0.24 | P |
| 2/ 9/75 | 42452.879 | 16.35 | 0.11 | P |
| 4/19/75 | 42521.806 | 16.33 | 0.16 | P |
| 5/ 9/75 | 42541.744 | 15.26 | 0.25 | P |
| 6/14/75 | 42577.701 | 16.17 | 0.20 | P |
| 7/ 4/75 | 42597.601 | 16.32 | 0.15 | P |
| 2/ 3/76 | 42811.877 | 16.50 | 0.22 | P |
| 2/ 3/76 | 42811.882 | 16.38 | 0.21 | P |
| 4/ 4/76 | 42872.749 | 16.61 | 0.14 | P |
| 4/ 4/76 | 42872.754 | 16.56 | 0.13 | P |
| 1/17/77 | 43160.896 | 16.43 | 0.15 | P |
| 4/12/77 | 43245.771 | 16.47 | 0.09 | P |
| 3/17/78 | 43584.828 | 16.30 | 0.07 | P |
| 4/12/78 | 43610.715 | 16.97 | 0.23 | P |
| 5/ 1/78 | 43629.658 | 16.65 | 0.17 | P |
| 5/29/78 | 43657.667 | 16.45 | 0.15 | P |
| 6/ 7/78 | 43666.646 | 16.52 | 0.22 | P |
| 6/28/78 | 43687.657 | 16.66 | 0.22 | P |
| 3/28/79 | 43960.778 | 16.74 | 0.16 | P |
| 5/28/79 | 44021.657 | 16.55 | 0.14 | P |
| | 1330+02 | | | |
| 1/18/75 | 42430.903 | 17.94 | 0.15 | P |
| 4/ 4/76 | 42872.769 | 17.72 | 0.13 | P |
| 4/ 4/76 | 42872.774 | 17.67 | 0.13 | P |
| 4/15/77 | 43248.758 | 17.80 | 0.06 | P |
| 4/15/77 | 43248.762 | 17.79 | 0.11 | P |
| 4/ 2/78 | 43600.776 | 17.62 | 0.12 | P |
| | 1340+05 | | | |
| 5/25/71 | 41096.708 | 16.58 | 0.11 | P |
| 3/21/72 | 41397.823 | 16.75 | 0.13 | P |
| 4/28/73 | 41800.724 | 16.84 | 0.07 | P |
| 4/18/75 | 42520.772 | 16.75 | 0.18 | P |
| 2/21/77 | 43195.940 | 16.62 | 0.07 | P |
| 2/21/77 | 43195.944 | 16.57 | 0.09 | P |
| 4/11/77 | 43244.737 | 16.49 | 0.09 | P |
| 4/11/77 | 43244.740 | 16.65 | 0.12 | P |
| 5/17/77 | 43280.660 | 16.85 | 0.17 | P |
| 5/17/77 | 43280.662 | 16.71 | 0.10 | P |
| 4/21/79 | 43984.758 | 16.63 | 0.15 | P |
| | 1341+14 | | | |
| 5/25/71 | 41096.750 | 17.66 | 0.15 | P |
| 4/28/73 | 41800.745 | 17.85 | 0.16 | P |
| 7/ 7/75 | 42600.612 | 17.72 | 0.23 | P |
| 5/10/75 | 42542.775 | 17.62 | 0.16 | P |
| 4/24/76 | 42892.627 | 17.57 | 0.08 | P |
| 4/24/76 | 42892.633 | 17.80 | 0.12 | P |
| 4/13/77 | 43246.785 | 17.62 | 0.20 | P |
| 4/13/77 | 43246.789 | 17.35 | 0.14 | P |
| 3/14/78 | 43581.822 | 17.40 | 0.26 | P |
| 3/30/79 | 43962.830 | 17.91 | 0.12 | P |
| 4/21/79 | 43984.731 | 17.28 | 0.32 | P |
| 5/17/79 | 44010.671 | 17.67 | 0.16 | P |

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|---|---|---|---|---|
| | 1341+14 | CONT. | | |
| 5/28/79 | 44021.665 | 17.50 | 0.18 | P |
| | 1347+21 | | | |
| 2/27/69 | 40279.708 | 14.98 | 0.06 | P |
| 4/13/69 | 40324.840 | 15.08 | 0.09 | P |
| 6/ 8/69 | 40380.708 | 14.99 | 0.14 | P |
| 5/ 2/70 | 40708.751 | 15.31 | 0.18 | P |
| 5/24/70 | 40730.708 | 15.17 | 0.09 | P |
| 6/10/72 | 41478.588 | 14.91 | 0.07 | P |
| 3/ 4/73 | 41745.845 | 15.24 | 0.08 | P |
| 3/10/73 | 41751.867 | 15.27 | 0.06 | P |
| 6/23/73 | 41856.596 | 15.19 | 0.15 | P |
| 3/ 2/74 | 42108.862 | 15.39 | 0.21 | P |
| 3/31/74 | 42137.831 | 15.49 | 0.27 | P |
| 5/13/74 | 42180.674 | 15.40 | 0.20 | P |
| 2/ 8/75 | 42451.915 | 15.38 | 0.16 | P |
| 3/13/75 | 42484.903 | 15.22 | 0.15 | P |
| 4/19/75 | 42521.822 | 15.13 | 0.10 | P |
| 5/10/75 | 42542.729 | 15.40 | 0.19 | P |
| 6/30/75 | 42593.633 | 15.12 | 0.14 | P |
| 7/ 7/75 | 42600.661 | 15.12 | 0.13 | P |
| 2/ 3/76 | 42811.896 | 15.26 | 0.23 | P |
| 2/ 3/76 | 42811.901 | 14.78 | 0.32 | P |
| 4/24/76 | 42892.647 | 15.04 | 0.11 | P |
| 4/24/76 | 42892.651 | 15.02 | 0.10 | P |
| 5/ 3/76 | 42901.752 | 15.24 | 0.18 | P |
| 5/ 3/76 | 42901.756 | 15.27 | 0.13 | P |
| 2/26/77 | 43200.821 | 15.29 | 0.15 | P |
| 2/26/77 | 43200.826 | 15.39 | 0.24 | P |
| 3/29/77 | 43231.832 | 15.17 | 0.17 | P |
| 3/29/77 | 43231.835 | 14.87 | 0.16 | P |
| 4/11/77 | 43244.750 | 15.01 | 0.12 | P |
| 4/11/77 | 43244.757 | 15.12 | 0.18 | P |
| 5/15/77 | 43278.678 | 14.88 | 0.24 | P |
| 5/15/77 | 43278.682 | 15.16 | 0.21 | P |
| 3/14/78 | 43581.833 | 14.93 | 0.20 | P |
| 4/ 3/78 | 43601.832 | 14.61 | 0.18 | P |
| 4/28/78 | 43626.693 | 15.03 | 0.17 | P |
| 5/ 6/78 | 43634.721 | 15.06 | 0.11 | P |
| 6/ 2/78 | 43661.708 | 14.60 | 0.22 | P |
| 6/ 7/78 | 43666.715 | 15.20 | 0.13 | P |
| 7/ 6/78 | 43695.639 | 15.26 | 0.09 | P |
| 2/28/79 | 43932.809 | 14.93 | 0.27 | P |
| 3/30/79 | 43962.837 | 15.07 | 0.16 | P |
| 4/27/79 | 43990.670 | 15.04 | 0.20 | P |
| 6/19/79 | 44044.677 | 14.81 | 0.26 | P |
| 6/24/79 | 44049.664 | 15.28 | 0.13 | P |
| | 1354+19 | | | |
| 4/20/74 | 42157.796 | 16.22 | 0.06 | B |
| 3/10/75 | 42481.868 | 16.28 | 0.05 | B |
| 4/18/75 | 42520.794 | 15.88 | 0.06 | B |
| 4/20/75 | 42522.869 | 16.10 | 0.04 | B |
| 5/10/75 | 42542.792 | 16.09 | 0.15 | B |
| 7/ 4/75 | 42597.616 | 16.15 | 0.07 | B |
| 3/ 4/76 | 42841.871 | 16.35 | 0.05 | B |
| 3/25/76 | 42862.816 | 16.21 | 0.03 | B |
| 4/23/76 | 42891.758 | 16.29 | 0.04 | B |
| 4/24/76 | 42892.744 | 16.30 | 0.14 | B |
| 3/23/77 | 43225.833 | 16.15 | 0.06 | B |
| 3/23/77 | 43225.840 | 16.14 | 0.21 | B |
| 3/14/78 | 43581.874 | 16.39 | 0.04 | B |
| 5/ 2/78 | 43630.674 | 16.59 | 0.09 | B |
| 3/28/79 | 43960.787 | 16.50 | 0.09 | B |
| 4/27/79 | 43990.722 | 16.42 | 0.06 | B |
| | 1402-012 | | | |
| 6/23/71 | 41125.697 | 17.29 | 0.07 | P |
| 6/24/71 | 41126.599 | 17.27 | 0.19 | P |
| 3/14/72 | 41390.839 | 17.05 | 0.12 | P |
| 4/29/73 | 41801.738 | 17.18 | 0.06 | P |

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| | 1402 012 | CONT. | | |
| 6/ 3/73 | 41836.732 | 17.42 | 0.13 | P |
| 2/18/74 | 42096.908 | 17.16 | 0.10 | P |
| 3/ 2/74 | 42108.883 | 17.12 | 0.11 | P |
| 4/14/74 | 42151.751 | 17.15 | 0.13 | P |
| 2/ 9/75 | 42452.910 | 17.06 | 0.04 | P |
| 4/18/75 | 42520.810 | 16.92 | 0.14 | P |
| 5/16/75 | 42548.749 | 17.09 | 0.11 | P |
| 6/12/75 | 42575.716 | 17.43 | 0.05 | P |
| 4/24/76 | 42892.687 | 17.09 | 0.11 | P |
| 4/24/76 | 42892.693 | 17.39 | 0.17 | P |
| 6/ 1/76 | 42930.704 | 17.27 | 0.19 | P |
| 6/ 1/76 | 42930.710 | 17.26 | 0.11 | P |
| 2/26/77 | 43200.842 | 16.91 | 0.05 | P |
| 2/26/77 | 43200.848 | 16.94 | 0.13 | P |
| 4/11/77 | 43244.708 | 17.42 | 0.20 | P |
| 4/11/77 | 43244.715 | 17.23 | 0.16 | P |
| 5/12/78 | 43640.703 | 16.88 | 0.30 | P |
| 5/30/79 | 44023.696 | 17.21 | 0.18 | P |
| | 1437+22 | | | |
| 6/18/69 | 40390.708 | 18.47 | 0.12 | P |
| 6/20/69 | 40392.708 | 18.10 | 0.10 | P |
| 7/ 5/69 | 40407.671 | 18.04 | 0.13 | P |
| 5/ 7/70 | 40713.812 | 18.11 | 0.09 | P |
| 6/ 3/73 | 41836.753 | 18.40 | 0.29 | P |
| 4/15/77 | 43248.775 | 17.76 | 0.20 | P |
| 4/15/77 | 43248.778 | 18.03 | 0.15 | P |
| 4/ 3/78 | 43601.817 | 18.11 | 0.13 | P |
| 4/ 5/78 | 43603.742 | 17.87 | 0.15 | P |
| | OQ 172 | | | |
| 3/ 2/74 | 42108.903 | 17.25 | 0.13 | P |
| 4/14/74 | 42151.782 | 17.19 | 0.09 | P |
| 5/17/74 | 42184.714 | 17.27 | 0.20 | P |
| 5/24/74 | 42191.706 | 17.31 | 0.11 | P |
| 6/14/74 | 42212.666 | 17.15 | 0.14 | P |
| 7/14/74 | 42242.601 | 17.26 | 0.06 | P |
| 4/18/75 | 42520.079 | 17.22 | 0.10 | P |
| 5/12/75 | 42544.763 | 17.17 | 0.07 | P |
| 6/14/75 | 42577.733 | 17.23 | 0.13 | P |
| 8/ 6/75 | 42630.596 | 17.22 | 0.27 | P |
| 6/ 1/76 | 42930.764 | 17.25 | 0.30 | P |
| 6/ 1/76 | 42930.769 | 17.43 | 0.16 | P |
| 2/19/77 | 43193.935 | 17.27 | 0.15 | P |
| 2/19/77 | 43193.940 | 17.31 | 0.09 | P |
| 3/29/77 | 43231.849 | 17.07 | 0.17 | P |
| 3/29/77 | 43231.854 | 17.41 | 0.21 | P |
| 4/13/77 | 43246.803 | 17.41 | 0.13 | P |
| 4/15/77 | 43248.807 | 17.12 | 0.15 | P |
| 4/15/77 | 43248.812 | 16.97 | 0.16 | P |
| 4/ 5/78 | 43603.752 | 17.15 | 0.09 | P |
| 5/ 1/78 | 43629.680 | 17.22 | 0.19 | P |
| 5/29/78 | 43657.701 | 17.20 | 0.18 | P |
| 6/ 7/78 | 43666.737 | 17.43 | 0.17 | P |
| 7/11/78 | 43700.706 | 17.23 | 0.11 | P |
| 4/27/79 | 43990.699 | 16.73 | 0.11 | P |
| 5/30/79 | 44023.714 | 17.42 | 0.13 | P |
| 6/17/79 | 44041.684 | 17.23 | 0.13 | P |
| | 1505+01 | | | |
| 4/20/69 | 40331.882 | 17.99 | 0.05 | P |
| 4/26/69 | 40337.854 | 18.34 | 0.09 | P |
| 5/10/69 | 40351.714 | 17.56 | 0.06 | P |
| 6/ 8/69 | 40380.708 | 18.32 | 0.05 | P |
| 6/12/69 | 40384.708 | 18.24 | 0.05 | P |
| 5/11/70 | 40717.708 | 17.95 | 0.05 | P |
| 5/31/70 | 40737.712 | 17.35 | 0.06 | P |
| 6/ 5/70 | 40742.715 | 17.94 | 0.09 | P |
| 7/ 9/72 | 41507.594 | 18.04 | 0.06 | P |
| 5/12/75 | 42544.781 | 17.83 | 0.04 | P |
| 7/ 7/75 | 42600.645 | 18.11 | 0.08 | P |

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| | 1505+01 | CONT. | | |
| 4/24/76 | 42892.707 | 18.18 | 0.05 | P |
| 4/24/76 | 42892.713 | 17.96 | 0.11 | P |
| 7/13/77 | 43337.678 | 17.79 | 0.17 | P |
| 5/ 2/78 | 43630.661 | 18.30 | 0.11 | P |
| 6/ 9/78 | 43668.658 | 17.94 | 0.10 | P |
| 5/28/79 | 44021.717 | 17.84 | 0.09 | P |
| | 1510-08 | | | |
| 6/13/69 | 40385.667 | 16.89 | 0.10 | P |
| 8/10/69 | 40443.599 | 16.85 | 0.06 | P |
| 3/31/71 | 41041.868 | 16.88 | 0.04 | P |
| 4/25/71 | 41066.860 | 16.86 | 0.11 | P |
| 6/19/71 | 41120.722 | 16.55 | 0.08 | P |
| 6/21/71 | 41123.767 | 16.79 | 0.08 | P |
| 6/ 3/72 | 41471.659 | 16.41 | 0.10 | P |
| 7/11/72 | 41509.610 | 17.20 | 0.07 | P |
| 4/29/73 | 41802.793 | 17.25 | 0.10 | P |
| 6/ 4/73 | 41837.715 | 17.28 | 0.12 | P |
| 3/ 2/74 | 42108.923 | 17.02 | 0.08 | P |
| 4/21/74 | 42158.793 | 16.86 | 0.12 | P |
| 5/24/74 | 42191.731 | 16.97 | 0.11 | P |
| 6/19/74 | 42217.654 | 16.86 | 0.06 | P |
| 7/15/74 | 42243.654 | 16.94 | 0.08 | P |
| 4/ 4/75 | 42506.785 | 16.89 | 0.06 | P |
| 4/19/75 | 42521.869 | 16.86 | 0.09 | P |
| 5/ 9/75 | 42541.760 | 16.54 | 0.09 | P |
| 5/16/75 | 42548.772 | 16.53 | 0.08 | P |
| 6/ 1/75 | 42564.679 | 16.62 | 0.07 | P |
| 6/14/75 | 42577.747 | 16.16 | 0.09 | P |
| 6/30/75 | 42593.647 | 16.61 | 0.05 | P |
| 7/ 4/75 | 42597.628 | 16.58 | 0.10 | P |
| 8/ 6/75 | 42630.610 | 16.95 | 0.23 | P |
| 8/ 6/75 | 42630.615 | 16.56 | 0.22 | P |
| 4/ 4/76 | 42872.787 | 16.69 | 0.21 | P |
| 4/ 4/76 | 42872.792 | 16.80 | 0.06 | P |
| 6/ 1/76 | 42930.791 | 16.99 | 0.12 | P |
| 6/ 1/76 | 42930.797 | 17.20 | 0.12 | P |
| 6/17/76 | 42946.644 | 16.97 | 0.13 | P |
| 4/16/77 | 43249.797 | 17.08 | 0.08 | P |
| 4/16/77 | 43249.801 | 17.11 | 0.14 | P |
| 5/18/77 | 43281.772 | 17.13 | 0.08 | P |
| 5/18/77 | 43281.776 | 17.13 | 0.09 | P |
| 6/19/77 | 43313.742 | 17.60 | 0.12 | P |
| 6/19/77 | 43313.749 | 17.44 | 0.12 | P |
| 6/20/77 | 43314.720 | 17.20 | 0.11 | P |
| 6/20/77 | 43314.724 | 16.97 | 0.11 | P |
| 7/15/77 | 43339.627 | 17.47 | 0.24 | P |
| 7/15/77 | 43339.631 | 17.34 | 0.30 | P |
| 3/14/78 | 43581.904 | 17.04 | 0.11 | P |
| 5/ 1/78 | 43629.713 | 16.86 | 0.14 | P |
| 5/31/78 | 43659.796 | 17.31 | 0.18 | P |
| 7/ 6/78 | 43695.681 | 17.58 | 0.16 | P |
| 8/ 5/78 | 43725.616 | 17.29 | 0.11 | P |
| 8/ 8/78 | 43728.591 | 17.37 | 0.17 | P |
| 3/30/79 | 43962.551 | 16.83 | 0.26 | P |
| 5/ 3/79 | 43996.724 | 16.95 | 0.12 | P |
| 6/17/79 | 44042.695 | 16.74 | 0.19 | P |
| | 1615+029 | | | |
| 6/23/71 | 41125.777 | 17.03 | 0.30 | P |
| 6/24/71 | 41126.760 | 17.27 | 0.17 | P |
| 7/11/72 | 41509.667 | 17.22 | 0.24 | P |
| 4/30/73 | 41802.886 | 17.16 | 0.05 | P |
| 4/30/74 | 42167.862 | 17.28 | 0.15 | P |
| 6/13/75 | 42576.736 | 17.29 | 0.20 | P |
| 6/ 5/76 | 42934.728 | 17.53 | 0.14 | P |
| 6/ 5/76 | 42934.734 | 17.37 | 0.19 | P |
| 7/31/76 | 42990.717 | 16.84 | 0.34 | P |
| 7/31/76 | 42990.724 | 17.24 | 0.18 | P |
| 4/19/77 | 43252.818 | 17.24 | 0.26 | P |
| 4/19/77 | 43252.822 | 16.68 | 0.29 | P |
| 5/14/77 | 43277.777 | 17.46 | 0.26 | P |
| 4/12/78 | 43610.824 | 17.17 | 0.12 | P |

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 1615+029 | CONT. | | |
| 6/ 7/78 | 43666.764 | 17.34 | 0.27 | P |
| 5/ 4/79 | 43997.786 | 17.20 | 0.38 | P |
| 6/24/79 | 44048.685 | 17.17 | 0.25 | P |
| | 1618+17 | | | |
| 5/ 2/71 | 41073.808 | 16.37 | 0.03 | B |
| 6/21/71 | 41123.735 | 16.60 | 0.11 | B |
| 4/29/73 | 41801.871 | 16.68 | 0.15 | B |
| 7/25/73 | 41888.624 | 16.68 | 0.06 | B |
| 4/21/74 | 42158.846 | 16.50 | 0.14 | B |
| 5/21/74 | 42188.794 | 16.47 | 0.06 | B |
| 7/17/74 | 42245.654 | 16.53 | 0.13 | B |
| 8/14/74 | 42273.651 | 16.46 | 0.04 | B |
| 5/ 5/75 | 42537.766 | 16.75 | 0.30 | B |
| 6/ 8/75 | 42571.792 | 16.85 | 0.16 | B |
| 7/ 4/75 | 42597.649 | 16.67 | 0.19 | B |
| 6/ 5/76 | 42934.750 | 17.04 | 0.05 | B |
| 6/ 5/76 | 42934.755 | 17.13 | 0.09 | B |
| 6/28/76 | 42957.763 | 16.83 | 0.06 | B |
| 7/27/76 | 42986.632 | 16.84 | 0.06 | B |
| 7/27/76 | 42986.637 | 17.03 | 0.09 | B |
| 8/28/76 | 43018.583 | 16.93 | 0.16 | B |
| 8/28/76 | 43018.587 | 16.89 | 0.08 | B |
| 3/27/77 | 43229.883 | 16.78 | 0.14 | B |
| 3/27/77 | 43229.887 | 16.49 | 0.22 | B |
| 5/20/77 | 43283.787 | 16.86 | 0.11 | B |
| 5/20/77 | 43283.792 | 17.12 | 0.19 | B |
| 7/ 9/77 | 43333.653 | 17.19 | 0.14 | B |
| 4/12/78 | 43610.769 | 16.40 | 0.20 | B |
| 5/ 2/78 | 43630.744 | 16.93 | 0.07 | B |
| 5/ 6/78 | 43634.859 | 17.03 | 0.14 | B |
| 5/30/78 | 43658.875 | 16.95 | 0.20 | B |
| 7/12/78 | 43701.713 | 16.87 | 0.08 | B |
| 5/20/79 | 44013.753 | 17.55 | 0.21 | B |
| 5/29/79 | 44022.733 | 17.19 | 0.17 | B |
| 5/30/79 | 44023.749 | 17.53 | 0.20 | B |
| 6/23/79 | 44047.736 | 17.02 | 0.14 | B |
| 6/28/79 | 44052.735 | 17.04 | 0.04 | B |
| 7/29/79 | 44083.697 | 16.99 | 0.14 | B |
| | 1645+17 | | | |
| 8/ 6/69 | 40439.646 | 17.82 | 0.16 | P |
| 5/ 9/70 | 40715.837 | 18.06 | 0.16 | P |
| 6/ 3/70 | 40740.767 | 17.69 | 0.17 | P |
| 5/25/71 | 41096.833 | 17.69 | 0.12 | P |
| 6/22/71 | 41124.687 | 17.77 | 0.14 | P |
| 6/24/71 | 41126.784 | 17.88 | 0.12 | P |
| 7/16/72 | 41514.654 | 17.98 | 0.25 | P |
| 6/ 7/73 | 41840.784 | 17.93 | 0.08 | P |
| 4/28/74 | 42165.906 | 17.93 | 0.11 | P |
| 5/21/74 | 42188.794 | 18.02 | 0.16 | P |
| 7/11/74 | 42239.703 | 18.07 | 0.17 | P |
| 5/ 5/75 | 42537.787 | 17.72 | 0.16 | P |
| 6/ 6/75 | 42569.820 | 17.68 | 0.14 | P |
| 6/30/75 | 42593.675 | 17.52 | 0.32 | P |
| 7/ 9/75 | 42602.621 | 17.79 | 0.09 | P |
| 8/ 6/75 | 42630.633 | 17.82 | 0.19 | P |
| 6/28/76 | 42957.706 | 17.73 | 0.12 | P |
| 6/28/76 | 42957.712 | 17.80 | 0.08 | P |
| 7/21/76 | 42980.674 | 17.59 | 0.20 | P |
| 7/21/76 | 42980.679 | 19.08 | 0.19 | P |
| 7/31/76 | 42990.738 | 17.69 | 0.20 | P |
| 7/31/76 | 42990.770 | 18.08 | 0.19 | P |
| 8/28/76 | 43018.599 | 17.86 | 0.25 | P |
| 8/28/76 | 43018.606 | 17.56 | 0.24 | P |
| 4/16/77 | 43249.833 | 17.74 | 0.15 | P |
| 4/16/77 | 43249.840 | 17.78 | 0.11 | P |
| 5/20/77 | 43283.804 | 18.01 | 0.22 | P |
| 5/20/77 | 43283.808 | 18.95 | 0.18 | P |
| 7/15/77 | 43339.637 | 17.72 | 0.30 | P |
| 4/12/78 | 43610.779 | 17.87 | 0.13 | P |
| 5/ 5/78 | 43633.765 | 17.87 | 0.18 | P |
| 6/28/78 | 43687.724 | 17.93 | 0.09 | P |

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 1645+17 | CONT. | | |
| 5/ 4/79 | 43997.797 | 17.88 | 0.20 | P |
| 6/23/79 | 44047.751 | 17.91 | 0.19 | P |
| | MK 501 | | | |
| 3/27/79 | 43959.824 | 14.41 | 0.09 | B |
| 3/27/79 | 43959.824 | 14.39 | 0.12 | B |
| 3/27/79 | 43959.826 | 14.36 | 0.16 | B |
| 3/27/79 | 43959.908 | 14.45 | 0.13 | B |
| 3/28/79 | 43960.799 | 14.37 | 0.08 | B |
| 3/29/79 | 43961.776 | 14.47 | 0.15 | B |
| 3/29/79 | 43961.807 | 14.51 | 0.15 | B |
| 3/30/79 | 43962.805 | 14.75 | 0.09 | B |
| 4/ 2/79 | 43965.767 | 14.39 | 0.12 | B |
| 5/29/79 | 44022.767 | 14.47 | 0.13 | B |
| 6/19/79 | 44043.695 | 14.83 | 0.15 | B |
| 6/30/79 | 44054.721 | 14.93 | 0.27 | B |
| 8/16/79 | 44101.628 | 14.32 | 0.05 | B |
| 10/18/79 | 44164.524 | 14.68 | 0.08 | B |
| 11/14/79 | 44191.522 | 14.37 | 0.18 | B |
| 11/15/79 | 44192.516 | 14.58 | 0.17 | B |
| 11/15/79 | 44192.517 | 14.43 | 0.13 | B |
| 11/15/79 | 44192.517 | 14.68 | 0.08 | B |
| 11/15/79 | 44192.518 | 14.45 | 0.11 | B |
| 11/16/79 | 44193.518 | 14.38 | 0.11 | B |
| 11/16/79 | 44193.521 | 14.68 | 0.08 | B |
| 3/27/79 | 43959.903 | 13.87 | 0.15 | V |
| 3/27/79 | 43959.905 | 14.05 | 0.25 | V |
| 4/ 2/79 | 43965.771 | 13.87 | 0.11 | V |
| 11/14/79 | 44191.528 | 14.17 | 0.12 | V |
| 11/14/79 | 44191.529 | 14.09 | 0.89 | V |
| 11/15/79 | 44192.522 | 13.85 | 0.06 | V |
| 11/15/79 | 44192.523 | 13.93 | 0.23 | V |
| 11/16/79 | 44193.519 | 13.93 | 0.10 | V |
| 11/17/79 | 44194.527 | 14.08 | 0.15 | V |
| 3/27/79 | 43959.856 | 13.35 | 0.06 | I |
| 3/27/79 | 43959.899 | 13.03 | 0.09 | I |
| 4/ 2/79 | 43965.775 | 12.92 | 0.13 | I |
| 11/14/79 | 44191.533 | 13.00 | 0.08 | I |
| 11/15/79 | 44192.501 | 13.08 | 0.08 | I |
| 11/15/79 | 44192.527 | 13.14 | 0.06 | I |
| 11/17/79 | 44194.532 | 13.24 | 0.10 | I |
| | 3C 351 | | | |
| 3/28/79 | 43960.849 | 15.98 | 0.13 | B |
| 3/29/79 | 43961.800 | 16.05 | 0.21 | B |
| 3/30/79 | 43962.892 | 16.09 | 0.15 | B |
| 3/31/79 | 43963.796 | 15.84 | 0.18 | B |
| 4/ 2/79 | 43965.801 | 15.90 | 0.11 | B |
| 5/29/79 | 44022.779 | 15.94 | 0.20 | B |
| 6/24/79 | 44048.737 | 16.03 | 0.26 | B |
| 7/22/79 | 44076.681 | 15.87 | 0.13 | B |
| 7/28/79 | 44082.653 | 15.93 | 0.17 | B |
| 9/10/79 | 44135.572 | 16.00 | 0.08 | B |
| | 1727+50 | | | |
| 5/ 7/75 | 42539.790 | 16.34 | 0.07 | B |
| 5/16/75 | 42548.856 | 16.41 | 0.08 | B |
| 6/ 4/75 | 42567.742 | 16.55 | 0.12 | B |
| 6/ 7/75 | 42570.748 | 16.47 | 0.19 | B |
| 6/13/75 | 42576.799 | 16.15 | 0.18 | B |
| 6/18/75 | 42581.828 | 16.36 | 0.07 | B |
| 7/ 5/75 | 42598.765 | 16.97 | 0.05 | B |
| 7/ 7/75 | 42600.636 | 16.54 | 0.13 | B |
| 7/ 9/75 | 42602.603 | 16.76 | 0.09 | B |
| 7/ 9/75 | 42602.709 | 16.98 | 0.11 | B |
| 7/10/75 | 42603.767 | 16.77 | 0.12 | B |
| 8/ 2/75 | 42626.697 | 16.44 | 0.09 | B |
| 8/28/75 | 42652.585 | 16.31 | 0.11 | B |
| 9/ 3/75 | 42658.646 | 16.40 | 0.18 | B |
| 9/26/75 | 42681.626 | 16.65 | 0.08 | B |
| 10/ 2/75 | 42687.606 | 16.54 | 0.18 | B |



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TABLE III. (continued)

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| | 1727+50 | CONT. | | |
| 10/ 2/75 | 42687.612 | 16.74 | 0.17 | B |
| 5/ 4/76 | 42902.799 | 16.22 | 0.08 | B |
| 5/ 4/76 | 42902.805 | 16.23 | 0.13 | B |
| 6/22/76 | 42951.763 | 16.56 | 0.14 | B |
| 6/22/76 | 42951.769 | 16.71 | 0.13 | B |
| 7/29/76 | 42988.611 | 16.50 | 0.10 | B |
| 7/29/76 | 42988.615 | 16.69 | 0.19 | B |
| 9/16/76 | 43037.585 | 16.60 | 0.09 | B |
| 9/16/76 | 43037.590 | 16.72 | 0.07 | B |
| 4/16/77 | 43249.880 | 16.52 | 0.18 | B |
| 4/16/77 | 43249.883 | 16.55 | 0.09 | B |
| 5/13/77 | 43276.827 | 16.41 | 0.15 | B |
| 5/13/77 | 43276.830 | 16.14 | 0.05 | B |
| 5/25/77 | 43288.786 | 16.42 | 0.06 | B |
| 5/25/77 | 43288.790 | 16.22 | 0.07 | B |
| 6/21/77 | 43315.661 | 16.57 | 0.20 | B |
| 6/21/77 | 43315.672 | 16.68 | 0.16 | B |
| 7/ 9/77 | 43333.668 | 16.28 | 0.03 | B |
| 7/13/77 | 43337.651 | 16.47 | 0.21 | B |
| 7/13/77 | 43337.662 | 16.18 | 0.14 | B |
| 8/ 6/77 | 43361.641 | 16.40 | 0.21 | B |
| 9/ 8/77 | 43394.590 | 16.84 | 0.09 | B |
| 10/ 5/77 | 43421.538 | 16.68 | 0.21 | B |
| 3/17/78 | 43584.892 | 16.47 | 0.14 | B |
| 5/ 5/78 | 43633.838 | 16.58 | 0.12 | B |
| 5/29/78 | 43657.741 | 16.47 | 0.06 | B |
| 7/12/78 | 43701.745 | 16.41 | 0.11 | B |
| 8/29/78 | 43749.639 | 16.76 | 0.23 | B |
| 9/ 2/78 | 43753.565 | 16.40 | 0.23 | B |
| 9/23/78 | 43774.545 | 16.66 | 0.22 | B |
| 3/28/79 | 43960.859 | 16.53 | 0.14 | B |
| 3/29/79 | 43961.819 | 16.05 | 0.17 | B |
| 3/30/79 | 43962.904 | 16.25 | 0.21 | B |
| 3/31/79 | 43963.863 | 16.60 | 0.14 | B |
| 4/ 2/79 | 43965.813 | 16.42 | 0.13 | B |
| 5/28/79 | 44021.745 | 15.86 | 0.15 | B |
| 5/30/79 | 44023.733 | 16.45 | 0.17 | B |
| 6/19/79 | 44044.705 | 16.39 | 0.18 | B |
| 6/24/79 | 44048.740 | 16.47 | 0.17 | B |
| 7/22/79 | 44076.750 | 16.57 | 0.13 | B |
| 7/27/79 | 44082.663 | 16.30 | 0.11 | B |
| 8/16/79 | 44102.660 | 16.59 | 0.16 | B |
| 8/26/79 | 44112.673 | 16.42 | 0.19 | B |
| 9/14/79 | 44131.628 | 16.56 | 0.18 | B |
| 10/13/79 | 44160.520 | 16.41 | 0.16 | B |
| | 1749+09 | | | |
| 8/14/79 | 44099.667 | 17.55 | 0.10 | B |
| 10/12/79 | 44158.550 | 15.99 | 0.13 | B |
| 10/16/79 | 44162.523 | 16.67 | 0.15 | B |
| 10/18/79 | 44164.535 | 17.24 | 0.15 | B |
| 10/20/79 | 44166.558 | 16.89 | 0.24 | B |
| | 1831+731 | | | |
| 6/ 2/76 | 42931.809 | 15.16 | 0.10 | P |
| 6/ 2/76 | 42931.815 | 15.17 | 0.15 | P |
| 6/25/76 | 42954.827 | 15.35 | 0.08 | P |
| 6/25/76 | 42954.832 | 15.34 | 0.07 | P |
| 7/ 4/76 | 42963.741 | 15.27 | 0.13 | P |
| 7/ 4/76 | 42963.747 | 15.24 | 0.10 | P |
| 7/23/76 | 42982.686 | 15.51 | 0.09 | P |
| 7/23/76 | 42982.691 | 15.58 | 0.15 | P |
| 8/ 2/76 | 42992.702 | 15.51 | 0.13 | P |
| 8/ 2/76 | 42992.708 | 15.34 | 0.21 | P |
| 4/16/77 | 43249.708 | 15.27 | 0.22 | P |
| 4/16/77 | 43249.715 | 15.45 | 0.12 | P |
| 5/25/77 | 43288.844 | 15.24 | 0.08 | P |
| 5/25/77 | 43288.847 | 15.46 | 0.08 | P |
| 6/23/77 | 43317.724 | 15.39 | 0.21 | P |
| 7/ 9/77 | 43333.715 | 15.22 | 0.06 | P |
| 8/10/77 | 43365.630 | 15.11 | 0.13 | P |
| 8/18/77 | 43373.675 | 14.93 | 0.15 | P |
| 9/ 5/77 | 43391.606 | 15.05 | 0.21 | P |
| | 1831+731 | CONT. | | |
| 9/ 8/77 | 43394.618 | 15.81 | 0.26 | P |
| 5/ 5/78 | 43633.866 | 15.45 | 0.10 | P |
| 5/30/78 | 43658.740 | 15.59 | 0.12 | P |
| 6/ 8/78 | 43667.750 | 15.62 | 0.08 | P |
| 7/ 3/78 | 43692.742 | 15.35 | 0.15 | P |
| 7/27/78 | 43716.672 | 15.58 | 0.07 | P |
| 8/26/78 | 43746.671 | 15.41 | 0.13 | P |
| 9/23/78 | 43774.567 | 15.59 | 0.14 | P |
| 10/23/78 | 43804.527 | 15.36 | 0.21 | P |
| 5/28/79 | 44021.783 | 15.45 | 0.11 | P |
| 6/19/79 | 44043.740 | 15.53 | 0.23 | P |
| 7/22/79 | 44076.758 | 15.41 | 0.16 | P |
| 8/16/79 | 44101.684 | 15.55 | 0.09 | P |
| 9/19/79 | 44135.603 | 15.43 | 0.17 | P |
| 10/19/79 | 44166.551 | 16.28 | 0.18 | P |
| | 3C 390.3 | | | |
| 7/ 3/73 | 41866.785 | 15.65 | 0.09 | B |
| 8/29/73 | 41923.693 | 15.98 | 0.33 | B |
| 10/ 1/73 | 41956.631 | 15.82 | 0.08 | B |
| 10/17/73 | 41972.531 | 16.00 | 0.04 | B |
| 10/21/73 | 41976.521 | 15.84 | 0.12 | B |
| 4/19/74 | 42156.925 | 15.82 | 0.05 | B |
| 5/19/74 | 42186.887 | 15.73 | 0.08 | B |
| 5/24/74 | 42191.840 | 15.71 | 0.14 | B |
| 5/30/74 | 42197.842 | 15.67 | 0.06 | B |
| 6/21/74 | 42219.777 | 15.55 | 0.10 | B |
| 8/13/74 | 42272.657 | 15.65 | 0.10 | B |
| 9/ 9/74 | 42299.606 | 15.59 | 0.03 | B |
| 9/15/74 | 42305.598 | 15.69 | 0.07 | B |
| 10/12/74 | 42332.545 | 15.81 | 0.14 | B |
| 4/20/75 | 42522.843 | 15.83 | 0.02 | B |
| 5/ 7/75 | 42539.824 | 15.77 | 0.07 | B |
| 6/ 8/75 | 42571.771 | 15.68 | 0.11 | B |
| 6/18/75 | 42581.856 | 15.51 | 0.13 | B |
| 8/ 2/75 | 42626.724 | 15.63 | 0.02 | B |
| 8/16/75 | 42640.813 | 15.69 | 0.13 | B |
| 8/28/75 | 42652.604 | 15.59 | 0.15 | B |
| 8/28/75 | 42652.626 | 15.62 | 0.10 | B |
| 9/ 3/75 | 42658.678 | 15.67 | 0.04 | B |
| 10/ 2/75 | 42687.635 | 15.86 | 0.21 | B |
| 5/ 4/76 | 42902.874 | 16.04 | 0.03 | B |
| 5/ 4/76 | 42902.879 | 16.04 | 0.03 | B |
| 6/ 2/76 | 42931.835 | 15.84 | 0.13 | B |
| 6/ 2/76 | 42931.840 | 16.06 | 0.32 | B |
| 7/ 4/76 | 42963.762 | 15.84 | 0.15 | B |
| 7/ 4/76 | 42963.767 | 15.77 | 0.13 | B |
| 7/23/76 | 42982.702 | 15.94 | 0.03 | B |
| 7/23/76 | 42982.707 | 15.84 | 0.04 | B |
| 8/ 2/76 | 42992.747 | 15.61 | 0.09 | B |
| 8/ 2/76 | 42992.753 | 15.79 | 0.03 | B |
| 8/25/76 | 43015.652 | 16.08 | 0.13 | B |
| 8/25/76 | 43015.657 | 16.00 | 0.25 | B |
| 9/16/76 | 43037.623 | 16.07 | 0.03 | B |
| 9/16/76 | 43037.628 | 16.09 | 0.02 | B |
| 10/16/76 | 43067.514 | 16.00 | 0.22 | B |
| 10/16/76 | 43067.518 | 16.02 | 0.07 | B |
| 6/20/76 | 42949.759 | 16.10 | 0.06 | B |
| 6/20/76 | 42949.764 | 15.98 | 0.29 | B |
| 7/15/77 | 43339.667 | 15.73 | 0.14 | B |
| 8/18/77 | 43373.688 | 16.00 | 0.24 | B |
| 9/ 5/77 | 43391.618 | 16.44 | 0.09 | B |
| 10/ 5/77 | 43421.579 | 16.08 | 0.06 | B |
| 3/17/78 | 43584.916 | 16.13 | 0.02 | B |
| 5/30/78 | 43658.751 | 16.24 | 0.06 | B |
| 6/ 9/78 | 43668.746 | 16.18 | 0.06 | B |
| 7/ 6/78 | 43695.737 | 16.25 | 0.07 | B |
| 7/27/78 | 43716.690 | 15.92 | 0.08 | B |
| 8/26/78 | 43746.690 | 16.09 | 0.07 | B |
| 9/ 4/78 | 43755.606 | 16.02 | 0.09 | B |
| 9/23/78 | 43774.587 | 16.22 | 0.11 | B |
| 10/23/78 | 43804.535 | 16.09 | 0.13 | B |
| 5/28/79 | 44021.793 | 16.15 | 0.06 | B |
| 6/23/79 | 44047.722 | 16.16 | 0.05 | B |
| 7/22/79 | 44076.772 | 16.27 | 0.04 | B |
| | 3C 390.3 | CONT. | | |
| 9/14/79 | 44130.684 | 16.58 | 0.17 | B |
| 10/19/79 | 44166.561 | 16.19 | 0.06 | B |
| | OV-236 | | | |
| 5/31/71 | 41102.819 | 18.03 | 0.16 | P |
| 9/15/71 | 41209.617 | 17.69 | 0.14 | P |
| 6/28/76 | 42957.812 | 18.08 | 0.09 | P |
| 7/29/76 | 42988.639 | 17.98 | 0.17 | P |
| 7/29/76 | 42988.655 | 18.00 | 0.07 | P |
| 7/30/76 | 42990.636 | 18.15 | 0.15 | P |
| 9/17/76 | 43038.547 | 17.48 | 0.10 | P |
| 9/17/76 | 43038.555 | 17.92 | 0.19 | P |
| 7/11/77 | 43335.729 | 15.68 | 0.24 | P |
| 7/11/77 | 43335.733 | 15.51 | 0.19 | P |
| 7/13/77 | 43337.746 | 16.41 | 0.19 | P |
| 7/20/77 | 43344.701 | 16.89 | 0.19 | P |
| 8/ 6/77 | 43361.599 | 16.43 | 0.18 | P |
| 8/10/77 | 43365.599 | 16.72 | 0.12 | P |
| 9/ 6/77 | 43392.550 | 16.63 | 0.16 | P |
| 9/ 8/77 | 43394.553 | 17.00 | 0.16 | P |
| 10/ 3/77 | 43419.542 | 16.27 | 0.37 | P |
| 11/ 6/77 | 43453.513 | 16.53 | 0.08 | P |
| 6/ 9/78 | 43668.810 | 17.12 | 0.17 | P |
| 8/31/78 | 43751.654 | 16.74 | 0.13 | P |
| 5/30/79 | 44023.822 | 15.87 | 0.15 | P |
| 6/25/79 | 44049.809 | 15.83 | 0.09 | P |
| 6/29/79 | 44053.783 | 15.47 | 0.17 | P |
| 6/29/79 | 44053.794 | 15.47 | 0.14 | P |
| 6/30/79 | 44054.751 | 15.88 | 0.07 | P |
| 6/30/79 | 44054.760 | 15.94 | 0.14 | P |
| 7/27/79 | 44081.685 | 15.60 | 0.22 | P |
| 7/30/79 | 44084.669 | 15.59 | 0.23 | P |
| 8/16/79 | 44101.646 | 15.93 | 0.20 | P |
| 8/26/79 | 44111.635 | 16.40 | 0.13 | P |
| 10/17/79 | 44164.544 | 16.26 | 0.11 | P |
| 10/19/79 | 44166.541 | 16.12 | 0.15 | P |
| | 2059+034 | | | |
| 6/23/71 | 41125.798 | 17.93 | 0.14 | P |
| 7/21/71 | 41153.798 | 17.68 | 0.17 | P |
| 11/23/71 | 41278.504 | 18.29 | 0.13 | P |
| 12/11/71 | 41296.500 | 18.21 | 0.12 | P |
| 7/19/72 | 41517.722 | 17.89 | 0.09 | P |
| 8/11/72 | 41540.654 | 17.87 | 0.15 | P |
| 9/ 4/72 | 41564.632 | 18.07 | 0.13 | P |
| 9/11/72 | 41571.592 | 17.91 | 0.15 | P |
| 10/ 5/72 | 41595.536 | 17.90 | 0.14 | P |
| 10/ 8/72 | 41598.581 | 17.82 | 0.14 | P |
| 9/19/73 | 41944.593 | 17.76 | 0.18 | P |
| 6/17/74 | 42215.830 | 17.76 | 0.16 | P |
| 7/17/74 | 42245.805 | 18.28 | 0.18 | P |
| 8/18/74 | 42277.649 | 18.49 | 0.11 | P |
| 12/ 9/74 | 42390.508 | 18.16 | 0.14 | P |
| 5/19/75 | 42551.834 | 17.93 | 0.15 | P |
| 6/ 8/75 | 42571.817 | 17.92 | 0.15 | P |
| 8/ 4/75 | 42628.735 | 18.00 | 0.12 | P |
| 8/30/75 | 42654.684 | 18.06 | 0.15 | P |
| 10/ 1/75 | 42686.626 | 18.21 | 0.17 | P |
| 10/ 1/75 | 42686.631 | 18.01 | 0.11 | P |
| 10/25/75 | 42710.568 | 17.72 | 0.17 | P |
| 7/ 4/76 | 42963.815 | 17.75 | 0.21 | P |
| 7/23/76 | 42982.744 | 18.15 | 0.19 | P |
| 7/23/76 | 42982.749 | 18.38 | 0.18 | P |
| 8/28/76 | 43018.661 | 17.96 | 0.13 | P |
| 9/17/76 | 43038.602 | 18.13 | 0.10 | P |
| 11/22/76 | 43104.507 | 18.19 | 0.15 | P |
| 11/22/76 | 43104.512 | 18.46 | 0.19 | P |
| 7/11/77 | 43335.744 | 18.41 | 0.19 | P |
| 7/11/77 | 43335.747 | 18.46 | 0.16 | P |
| 9/ 6/77 | 43392.605 | 18.52 | 0.24 | P |
| 10/ 3/77 | 43419.578 | 18.23 | 0.16 | P |
| 11/11/77 | 43458.522 | 18.42 | 0.12 | P |
| 8/ 5/78 | 43725.738 | 18.09 | 0.19 | P |
| | 2059+034 | CONT. | | |
| 8/26/78 | 43746.699 | 18.45 | 0.20 | P |
| 6/24/79 | 44048.778 | 18.14 | 0.24 | P |
| 10/13/79 | 44160.569 | 18.09 | 0.19 | P |
| | 2111-25 | | | |
| 10/ 5/70 | 40864.608 | 17.59 | 0.13 | P |
| 10/19/71 | 41243.605 | 17.36 | 0.32 | P |
| 7/19/72 | 41517.749 | 17.77 | 0.19 | P |
| 8/14/72 | 41543.662 | 17.49 | 0.09 | P |
| 6/12/75 | 42575.846 | 17.53 | 0.11 | P |
| 7/19/75 | 42612.812 | 17.47 | 0.13 | P |
| 10/25/75 | 42710.586 | 17.29 | 0.17 | P |
| 9/17/76 | 43038.626 | 18.14 | 0.21 | P |
| 9/17/76 | 43038.632 | 17.82 | 0.21 | P |
| 11/11/77 | 43458.537 | 17.32 | 0.06 | P |
| 8/ 7/78 | 43727.744 | 17.61 | 0.23 | P |
| 10/24/78 | 43805.522 | 17.19 | 0.16 | P |
| 9/19/79 | 44135.620 | 17.29 | 0.13 | P |
| | 2128-12 | | | |
| 9/19/79 | 44135.635 | 16.25 | 0.14 | B |
| 10/18/79 | 44164.572 | 16.14 | 0.22 | B |
| 7/25/69 | 40427.797 | 15.74 | 0.10 | P |
| 8/19/69 | 40452.835 | 15.78 | 0.11 | P |
| 9/ 3/69 | 40467.712 | 15.74 | 0.07 | P |
| 6/ 3/70 | 40740.860 | 15.79 | 0.06 | P |
| 9/ 1/70 | 40830.653 | 15.93 | 0.13 | P |
| 10/ 5/70 | 40864.640 | 15.68 | 0.10 | P |
| 6/ 1/71 | 41103.848 | 15.72 | 0.08 | P |
| 7/25/71 | 41157.812 | 15.60 | 0.38 | P |
| 12/13/71 | 41298.505 | 15.63 | 0.17 | P |
| 7/ 9/72 | 41507.872 | 15.68 | 0.15 | P |
| 8/11/72 | 41540.681 | 15.67 | 0.10 | P |
| 9/ 4/72 | 41564.678 | 15.80 | 0.13 | P |
| 8/18/74 | 42277.681 | 15.49 | 0.15 | P |
| 6/ 8/75 | 42571.850 | 15.72 | 0.07 | P |
| 9/12/72 | 41572.629 | 15.75 | 0.14 | B |
| 9/13/72 | 41573.603 | 15.82 | 0.15 | B |
| 10/ 5/72 | 41595.558 | 15.72 | 0.22 | B |
| 6/ 8/75 | 42571.840 | 15.69 | 0.25 | B |
| 7/ 7/75 | 42600.810 | 15.74 | 0.16 | B |
| 8/ 1/75 | 42625.738 | 15.74 | 0.31 | B |
| 8/29/75 | 42653.618 | 15.57 | 0.04 | B |
| 10/ 1/75 | 42686.712 | 15.56 | 0.12 | B |
| 10/ 1/75 | 42686.715 | 15.57 | 0.13 | B |
| 10/25/75 | 42710.599 | 15.68 | 0.16 | B |
| 7/ 4/76 | 42963.829 | 15.44 | 0.15 | B |
| 7/ 4/76 | 42963.834 | 15.24 | 0.09 | B |
| 7/31/76 | 42990.812 | 15.54 | 0.23 | B |
| 7/31/76 | 42990.817 | 15.46 | 0.07 | B |
| 8/23/76 | 43013.681 | 15.54 | 0.07 | B |
| 8/23/76 | 43013.686 | 15.63 | 0.17 | B |
| 9/17/76 | 43038.648 | 15.49 | 0.11 | B |
| 9/17/76 | 43038.651 | 15.55 | 0.13 | B |
| 10/22/76 | 43073.519 | 15.40 | 0.05 | B |
| 10/22/76 | 43073.523 | 15.50 | 0.05 | B |
| 6/23/77 | 43317.783 | 15.57 | 0.06 | B |
| 6/23/77 | 43317.794 | 15.44 | 0.08 | B |
| 7/21/77 | 43345.828 | 15.61 | 0.20 | B |
| 9/ 7/77 | 43393.581 | 15.78 | 0.24 | B |
| 10/12/77 | 43428.572 | 15.58 | 0.24 | B |
| 8/ 7/78 | 43727.725 | 15.68 | 0.23 | B |
| 9/ 2/78 | 43753.657 | 15.69 | 0.10 | B |
| 11/ 1/78 | 43813.515 | 15.84 | 0.27 | B |
| 6/24/79 | 44048.810 | 15.54 | 0.17 | B |
| 9/19/79 | 44135.635 | 16.25 | 0.14 | B |
| 10/18/79 | 44165.572 | 16.07 | 0.17 | B |
| | 2131-021 | | | |
| 6/28/71 | 41128.715 | 18.44 | 0.13 | P |
| 12/18/71 | 41300.532 | 19.44 | 0.22 | P |
| | 2131-021 | CONT. | | |
| 7/19/72 | 41517.770 | 18.86 | 0.10 | P |
| 8/11/72 | 41540.711 | 18.80 | 0.09 | P |
| 9/ 3/72 | 41563.631 | 18.52 | 0.05 | P |
| 9/ 8/72 | 41568.739 | 18.38 | 0.22 | P |
| 9/13/72 | 41573.626 | 18.23 | 0.05 | P |
| 10/ 8/72 | 41598.579 | 18.54 | 0.10 | P |
| 6/13/75 | 42576.841 | 19.19 | 0.11 | P |
| 8/14/75 | 42638.700 | 19.28 | 0.16 | P |
| 11/29/75 | 42746.499 | 19.21 | 0.09 | P |
| 7/23/76 | 42982.784 | 18.81 | 0.24 | P |
| 7/23/76 | 42982.790 | 18.46 | 0.27 | P |
| 8/28/76 | 43018.667 | 18.64 | 0.30 | P |
| 8/28/76 | 43018.674 | 18.77 | 0.13 | P |
| 9/17/76 | 43038.662 | 18.63 | 0.25 | P |
| 9/17/76 | 43038.668 | 18.21 | 0.12 | P |
| 9/ 4/78 | 43755.632 | 19.13 | 0.11 | P |
| 10/26/78 | 43805.543 | 19.26 | 0.15 | P |
| 11/24/78 | 43836.542 | 19.35 | 0.16 | P |
| | 2134+004 | | | |
| 6/26/71 | 41128.771 | 16.46 | 0.12 | P |
| 7/21/71 | 41153.750 | 16.45 | 0.08 | P |
| 11/ 8/71 | 41263.533 | 16.35 | 0.09 | P |
| 7/20/72 | 41518.756 | 16.51 | 0.12 | P |
| 8/14/72 | 41543.639 | 16.40 | 0.16 | P |
| 10/ 5/72 | 41595.579 | 16.48 | 0.12 | P |
| 10/ 9/72 | 41599.579 | 16.33 | 0.11 | P |
| 10/12/79 | 44158.585 | 16.59 | 0.12 | P |
| 9/ 6/73 | 41931.761 | 17.36 | 0.07 | B |
| 9/21/73 | 41946.540 | 17.46 | 0.07 | B |
| 10/19/73 | 41974.523 | 17.57 | 0.11 | B |
| 10/28/73 | 41983.615 | 17.60 | 0.05 | B |
| 8/18/74 | 42277.806 | 17.36 | 0.20 | B |
| 12/ 9/74 | 42390.529 | 17.51 | 0.07 | B |
| 5/19/75 | 42551.849 | 17.58 | 0.08 | B |
| 8/ 6/75 | 42630.685 | 17.62 | 0.07 | B |
| 9/ 2/75 | 42657.752 | 17.58 | 0.07 | B |
| 7/31/76 | 42990.842 | 17.61 | 0.13 | B |
| 7/31/76 | 42990.847 | 17.70 | 0.12 | B |
| 8/29/76 | 43019.637 | 17.69 | 0.12 | B |
| 8/29/76 | 43019.642 | 17.65 | 0.14 | B |
| 9/20/76 | 43041.542 | 17.73 | 0.18 | B |
| 9/20/76 | 43041.548 | 17.33 | 0.11 | B |
| 6/19/77 | 43313.852 | 17.62 | 0.08 | B |
| 6/21/77 | 43315.817 | 17.45 | 0.08 | B |
| 7/21/77 | 43345.849 | 17.13 | 0.13 | B |
| 8/ 5/78 | 43725.717 | 17.58 | 0.07 | B |
| 10/ 3/78 | 43784.542 | 17.73 | 0.11 | B |
| 7/27/79 | 44081.728 | 17.61 | 0.23 | B |
| 11/20/79 | 44198.559 | 17.64 | 0.28 | B |
| | 2135-14 | | | |
| 6/11/75 | 42574.847 | 15.04 | 0.10 | P |
| 7/19/75 | 42612.824 | 14.97 | 0.10 | P |
| 8/ 6/75 | 42630.726 | 14.90 | 0.12 | P |
| 9/ 6/75 | 42661.667 | 15.15 | 0.09 | P |
| 10/28/75 | 42713.542 | 15.14 | 0.13 | P |
| 7/31/76 | 42990.862 | 14.98 | 0.10 | P |
| 7/31/76 | 42990.867 | 14.92 | 0.07 | P |
| 8/29/76 | 43019.665 | 15.07 | 0.12 | P |
| 8/29/76 | 43019.670 | 14.99 | 0.12 | P |
| 9/20/76 | 43041.584 | 15.40 | 0.28 | P |
| 9/20/76 | 43041.590 | 15.27 | 0.09 | P |
| 10/ 5/77 | 43421.609 | 15.31 | 0.17 | P |
| 8/31/78 | 43751.653 | 15.70 | 0.23 | P |
| 10/ 3/78 | 43784.546 | 15.56 | 0.11 | P |
| 6/24/79 | 44048.819 | 15.88 | 0.21 | P |
| 7/27/79 | 44081.743 | 15.72 | 0.12 | P |
| | 2145+06 | | | |
| 7/26/69 | 40428.667 | 16.12 | 0.21 | P |
| | 2145+06 | CONT. | | |
| 8/19/69 | 40452.628 | 16.27 | 0.12 | P |
| 9/ 7/69 | 40471.667 | 16.23 | 0.05 | P |
| 10/ 8/69 | 40502.681 | 16.31 | 0.09 | P |
| 11/ 7/69 | 40532.535 | 16.14 | 0.14 | P |
| 12/ 3/69 | 40558.507 | 16.26 | 0.07 | P |
| 6/ 2/70 | 40739.826 | 16.10 | 0.09 | P |
| 7/ 1/70 | 40768.789 | 16.61 | 0.23 | P |
| 7/ 7/70 | 40774.750 | 16.51 | 0.19 | P |
| 7/ 7/70 | 40774.809 | 16.39 | 0.20 | P |
| 8/ 2/70 | 40800.733 | 16.58 | 0.08 | P |
| 8/22/70 | 40820.667 | 16.51 | 0.29 | P |
| 8/27/70 | 40825.637 | 16.48 | 0.14 | P |
| 9/ 3/70 | 40832.660 | 16.43 | 0.10 | P |
| 9/21/70 | 40850.583 | 16.62 | 0.19 | P |
| 9/28/70 | 40857.624 | 16.35 | 0.20 | P |
| 11/ 2/70 | 40892.583 | 16.47 | 0.11 | P |
| 11/18/70 | 40908.562 | 16.44 | 0.14 | P |
| 11/22/70 | 40912.548 | 16.44 | 0.13 | P |
| 12/ 1/70 | 40921.528 | 16.47 | 0.19 | P |
| 5/21/71 | 41092.826 | 16.40 | 0.12 | P |
| 6/ 1/71 | 41103.859 | 16.47 | 0.11 | P |
| 6/26/71 | 41128.817 | 16.39 | 0.11 | P |
| 6/27/71 | 41129.826 | 16.46 | 0.10 | P |
| 10/12/71 | 41236.628 | 16.39 | 0.14 | P |
| 11/15/71 | 41270.577 | 16.34 | 0.12 | P |
| 12/15/71 | 41300.575 | 16.43 | 0.09 | P |
| 8/13/72 | 41542.737 | 16.26 | 0.12 | P |
| 9/13/72 | 41573.643 | 16.60 | 0.16 | P |
| 9/ 1/73 | 41926.800 | 16.43 | 0.12 | P |
| 11/23/73 | 42009.506 | 16.46 | 0.12 | P |
| 5/22/74 | 42189.896 | 16.29 | 0.22 | P |
| 8/14/74 | 42273.756 | 16.15 | 0.18 | P |
| 9/11/74 | 42301.618 | 16.25 | 0.12 | P |
| 10/11/74 | 42331.568 | 16.09 | 0.15 | P |
| 6/14/75 | 42577.805 | 16.14 | 0.16 | P |
| 7/10/75 | 42603.815 | 16.28 | 0.14 | P |
| 8/ 6/75 | 42630.726 | 16.16 | 0.10 | P |
| 10/ 2/75 | 42687.696 | 16.34 | 0.11 | P |
| 10/ 2/75 | 42687.700 | 16.36 | 0.12 | P |
| 10/28/75 | 42713.551 | 16.24 | 0.20 | P |
| 7/31/76 | 42990.874 | 16.15 | 0.14 | P |
| 7/31/76 | 42990.879 | 16.28 | 0.15 | P |
| 8/28/76 | 43018.689 | 16.23 | 0.14 | P |
| 8/28/76 | 43018.694 | 16.27 | 0.09 | P |
| 8/29/76 | 43019.701 | 16.33 | 0.10 | P |
| 8/29/76 | 43019.707 | 16.19 | 0.12 | P |
| 9/20/76 | 43041.583 | 16.29 | 0.26 | P |
| 9/20/76 | 43041.589 | 16.32 | 0.18 | P |
| 6/26/77 | 43320.792 | 16.32 | 0.13 | P |
| 7/13/77 | 43337.813 | 16.29 | 0.15 | P |
| 7/13/77 | 43337.824 | 16.18 | 0.14 | P |
| 7/15/77 | 43339.744 | 16.12 | 0.09 | P |
| 7/15/77 | 43339.755 | 16.20 | 0.09 | P |
| 10/12/77 | 43428.558 | 16.18 | 0.19 | P |
| 11/ 6/77 | 43453.588 | 16.11 | 0.14 | P |
| 8/13/78 | 43733.748 | 16.28 | 0.23 | P |
| 12/ 2/78 | 43844.543 | 16.17 | 0.23 | P |
| 6/29/79 | 44053.862 | 16.22 | 0.14 | P |
| 7/22/79 | 44076.801 | 16.06 | 0.18 | P |
| 10/18/79 | 44164.618 | 16.18 | 0.26 | P |
| 11/20/79 | 44198.580 | 16.07 | 0.70 | P |
| | 2209+08 | | | |
| 8/ 8/69 | 40441.641 | 18.23 | 0.14 | P |
| 8/19/69 | 40452.677 | 18.18 | 0.19 | P |
| 8/21/69 | 40454.844 | 18.38 | 0.18 | P |
| 8/26/69 | 40459.833 | 18.25 | 0.12 | P |
| 9/ 5/69 | 40469.792 | 18.18 | 0.15 | P |
| 10/ 8/69 | 40502.750 | 18.29 | 0.18 | P |
| 11/ 9/69 | 40534.628 | 18.40 | 0.17 | P |
| 11/10/69 | 40555.618 | 18.17 | 0.09 | P |
| 11/10/69 | 40556.499 | 18.11 | 0.13 | P |
| 6/13/70 | 40750.817 | 18.64 | 0.22 | P |
| 7/12/70 | 40779.825 | 19.36 | 0.15 | P |
| 8/ 4/70 | 40802.760 | 17.95 | 0.20 | P |
| | 2209+08 | CONT. | | |
| 8/22/70 | 40820.687 | 18.18 | 0.23 | P |
| 8/25/70 | 40823.701 | 17.92 | 0.23 | P |
| 8/31/70 | 40829.823 | 18.17 | 0.28 | P |
| 9/21/70 | 40850.604 | 18.33 | 0.09 | P |
| 9/28/70 | 40857.701 | 18.34 | 0.07 | P |
| 10/26/70 | 40885.611 | 18.35 | 0.11 | P |
| 11/20/70 | 40910.528 | 18.25 | 0.13 | P |
| 11/22/70 | 40912.522 | 18.42 | 0.14 | P |
| 7/28/71 | 41157.823 | 18.34 | 0.16 | P |
| 11/15/71 | 41270.596 | 18.24 | 0.17 | P |
| 12/11/71 | 41296.599 | 18.43 | 0.16 | P |
| 7/18/72 | 41516.794 | 18.17 | 0.14 | P |
| 10/ 5/72 | 41595.599 | 18.34 | 0.12 | P |
| 10/19/72 | 41609.569 | 18.39 | 0.12 | P |
| 9/19/73 | 41944.626 | 18.53 | 0.22 | P |
| 10/11/74 | 42331.592 | 18.72 | 0.14 | P |
| 12/10/74 | 42392.496 | 18.22 | 0.15 | P |
| 6/14/75 | 42577.812 | 18.61 | 0.17 | P |
| 7/10/75 | 42603.830 | 18.23 | 0.16 | P |
| 8/14/75 | 42638.738 | 18.47 | 0.11 | P |
| 10/ 2/75 | 42687.718 | 18.37 | 0.24 | P |
| 10/ 2/75 | 42687.719 | 18.29 | 0.22 | P |
| 11/ 1/75 | 42717.824 | 18.26 | 0.12 | P |
| 11/30/75 | 42746.833 | 18.54 | 0.15 | P |
| 7/29/76 | 42988.842 | 18.66 | 0.23 | P |
| 9/17/76 | 43038.600 | 18.25 | 0.27 | P |
| 10/15/76 | 43066.561 | 18.60 | 0.17 | P |
| 9/ 9/77 | 43395.642 | 18.97 | 0.20 | P |
| 10/ 5/77 | 43421.638 | 18.02 | 0.23 | P |
| 11/ 6/77 | 43453.617 | 18.53 | 0.13 | P |
| 8/13/78 | 43733.763 | 18.34 | 0.19 | P |
| 10/24/78 | 43805.608 | 18.34 | 0.15 | P |
| 12/ 2/78 | 43844.563 | 18.47 | 0.17 | P |
| 7/27/79 | 44081.751 | 18.66 | 0.13 | P |
| 11/20/79 | 44198.592 | 18.45 | 0.13 | P |
| | 2216-03 | | | |
| 8/ 8/69 | 40441.696 | 15.66 | 0.12 | P |
| 8/19/69 | 40452.734 | 15.75 | 0.17 | P |
| 10/ 8/69 | 40502.790 | 15.64 | 0.12 | P |
| 10/14/69 | 40508.615 | 15.62 | 0.06 | P |
| 6/ 9/70 | 40746.836 | 15.72 | 0.09 | P |
| 7/31/70 | 40798.771 | 15.75 | 0.15 | P |
| 9/ 3/70 | 40832.729 | 15.77 | 0.13 | P |
| 10/16/71 | 41240.635 | 15.76 | 0.13 | P |
| 8/13/72 | 41542.759 | 15.81 | 0.07 | P |
| 9/13/72 | 41573.667 | 15.78 | 0.09 | P |
| 7/19/75 | 42612.864 | 15.57 | 0.09 | P |
| 8/ 9/75 | 42633.714 | 15.77 | 0.12 | P |
| 8/ 2/76 | 42992.813 | 15.86 | 0.14 | P |
| 8/ 2/76 | 42992.817 | 15.83 | 0.10 | P |
| 7/24/77 | 43348.755 | 15.70 | 0.07 | P |
| 8/13/78 | 43733.779 | 15.46 | 0.17 | P |
| 5/30/79 | 44023.835 | 16.14 | 0.17 | P |
| 10/17/79 | 44163.595 | 15.73 | 0.09 | P |
| | CTA 102 | | | |
| 8/28/73 | 41919.801 | 17.95 | 0.07 | B |
| 10/19/73 | 41974.589 | 17.50 | 0.16 | B |
| 7/17/74 | 42245.865 | 17.29 | 0.10 | B |
| 8/18/74 | 42277.860 | 17.40 | 0.21 | B |
| 10/ 9/74 | 42329.667 | 17.69 | 0.07 | B |
| 12/ 9/74 | 42390.578 | 17.55 | 0.09 | B |
| 6/16/75 | 42579.846 | 17.62 | 0.10 | B |
| 8/13/75 | 42637.753 | 17.80 | 0.09 | B |
| 9/ 4/75 | 42659.727 | 17.67 | 0.09 | B |
| 8/29/76 | 43019.732 | 17.96 | 0.13 | B |
| 8/29/76 | 43019.738 | 17.91 | 0.14 | B |
| 10/15/76 | 43066.599 | 17.76 | 0.14 | B |
| 7/24/77 | 43348.765 | 17.83 | 0.18 | B |
| 8/10/77 | 43365.719 | 18.23 | 0.13 | B |
| 9/ 7/77 | 43393.679 | 18.25 | 0.23 | B |
| 10/12/77 | 43428.597 | 17.72 | 0.09 | B |
| | CTA 102 | CONT. | | |
| 11/ 6/77 | 43453.602 | 17.88 | 0.10 | B |
| 8/13/78 | 43733.794 | 17.88 | 0.23 | B |
| 8/27/78 | 43747.667 | 18.19 | 0.14 | B |
| 8/29/78 | 43749.714 | 17.12 | 0.28 | B |
| 9/27/78 | 43778.597 | 17.83 | 0.16 | B |
| 10/24/78 | 43805.628 | 17.34 | 0.09 | B |
| 12/ 2/78 | 43844.593 | 17.28 | 0.11 | B |
| 7/ 3/79 | 44057.796 | 17.60 | 0.07 | B |
| 9/19/79 | 44135.692 | 17.69 | 0.04 | B |
| 10/18/79 | 44162.623 | 17.83 | 0.09 | B |
| 11/18/79 | 44194.629 | 17.59 | 0.08 | B |
| | 2254+07 | | | |
| 7/22/79 | 44076.831 | 17.74 | 0.11 | B |
| 7/27/79 | 44081.814 | 17.70 | 0.17 | B |
| 9/28/79 | 44136.731 | 17.44 | 0.10 | B |
| 10/15/79 | 44161.646 | 16.98 | 0.18 | B |
| 10/21/79 | 44167.652 | 16.93 | 0.10 | B |
| 11/10/79 | 44187.608 | 17.08 | 0.17 | B |
| 11/15/79 | 44192.587 | 17.43 | 0.11 | B |
| 11/19/79 | 44196.588 | 17.38 | 0.14 | B |
| | 2300-18 | | | |
| 8/27/71 | 41190.799 | 17.92 | 0.11 | P |
| 11/15/71 | 41270.612 | 17.98 | 0.08 | P |
| 12/11/71 | 41296.526 | 17.76 | 0.14 | P |
| 7/18/72 | 41516.812 | 17.78 | 0.09 | P |
| 8/ 6/75 | 42630.825 | 17.60 | 0.21 | P |
| 11/30/75 | 42746.564 | 17.76 | 0.09 | P |
| 11/30/75 | 42746.869 | 17.86 | 0.09 | P |
| 8/28/76 | 43018.752 | 18.09 | 0.09 | P |
| 8/28/76 | 43018.758 | 18.06 | 0.10 | P |
| 11/11/77 | 43458.630 | 17.79 | 0.04 | P |
| 9/ 4/78 | 43755.730 | 17.68 | 0.20 | P |
| 12/ 2/78 | 43844.518 | 17.82 | 0.15 | P |
| 12/18/78 | 43860.501 | 17.69 | 0.09 | P |
| 12/18/78 | 43860.586 | 17.38 | 0.07 | P |
| 12/24/78 | 43866.528 | 17.58 | 0.26 | P |
| 12/31/78 | 43873.519 | 17.61 | 0.12 | P |
| 10/17/79 | 44164.610 | 17.24 | 0.11 | P |
| | OZ-252 | | | |
| 11/14/71 | 41269.583 | 16.64 | 0.08 | P |
| 9/24/73 | 41949.687 | 17.01 | 0.15 | P |
| 10/13/74 | 42333.658 | 16.80 | 0.11 | P |
| 8/14/75 | 42638.754 | 16.87 | 0.17 | P |
| 8/28/76 | 43018.774 | 16.81 | 0.03 | P |
| 8/28/76 | 43018.780 | 16.62 | 0.18 | P |
| 9/ 9/77 | 43395.690 | 17.27 | 0.12 | P |
| 10/14/77 | 43430.646 | 16.90 | 0.11 | P |
| 9/27/78 | 43778.629 | 16.75 | 0.19 | P |
| 10/23/78 | 43804.602 | 16.61 | 0.20 | P |
| 11/ 1/78 | 43813.611 | 16.55 | 0.15 | P |
| 11/ 2/78 | 43814.581 | 16.59 | 0.19 | P |
| 11/14/71 | 41269.583 | 16.89 | 0.08 | P |
| 9/24/73 | 41949.687 | 17.10 | 0.15 | P |
| 10/13/74 | 42333.658 | 16.96 | 0.11 | P |
| 8/14/75 | 42638.754 | 17.10 | 0.17 | P |
| 8/28/76 | 43018.774 | 17.05 | 0.03 | P |
| 8/28/76 | 43018.780 | 16.96 | 0.10 | P |
| 9/ 9/77 | 43395.690 | 17.41 | 0.12 | P |
| 10/14/77 | 43430.646 | 17.20 | 0.11 | P |
| 9/27/78 | 43778.629 | 17.13 | 0.19 | P |
| 10/23/78 | 43804.602 | 16.66 | 0.20 | P |
| 11/ 1/78 | 43813.611 | 16.77 | 0.15 | P |
| 11/ 2/78 | 43814.581 | 16.46 | 0.19 | P |
| | 2335-18 | | | |
| 12/ 7/69 | 40562.542 | 16.40 | 0.18 | P |

TABLE III. (continued)

2335-18 CONT.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 9/25/70 | 40854.660 | 16.17 | 0.16 | P |
| 9/25/70 | 40854.734 | 16.47 | 0.20 | P |
| 12/27/70 | 40947.531 | 16.21 | 0.08 | P |
| 9/ 1/71 | 41195.839 | 16.62 | 0.18 | P |
| 11/15/71 | 41270.642 | 16.37 | 0.11 | P |
| 7/19/72 | 41517.847 | 16.48 | 0.16 | P |
| 7/20/72 | 41518.846 | 16.55 | 0.13 | P |
| 8/17/72 | 41546.893 | 16.49 | 0.16 | P |
| 9/ 4/72 | 41564.773 | 16.68 | 0.16 | P |
| 9/13/72 | 41573.733 | 16.54 | 0.21 | P |
| 10/ 5/72 | 41595.642 | 16.65 | 0.10 | P |
| 11/28/72 | 41649.541 | 16.37 | 0.24 | P |
| 9/ 6/73 | 41931.796 | 16.44 | 0.10 | P |
| 9/30/73 | 41955.760 | 16.77 | 0.11 | P |
| 10/20/73 | 41975.645 | 16.60 | 0.12 | P |
| 9/12/74 | 42302.739 | 16.54 | 0.18 | P |
| 10/11/74 | 42331.631 | 16.64 | 0.15 | P |
| 12/11/74 | 42392.519 | 16.21 | 0.18 | P |
| 8/15/75 | 42639.774 | 16.53 | 0.19 | P |
| 11/ 2/75 | 42718.546 | 16.69 | 0.17 | P |
| 1/ 1/76 | 42778.518 | 16.63 | 0.18 | P |
| 1/ 1/76 | 42778.521 | 16.64 | 0.15 | P |
| 8/29/76 | 43019.756 | 16.79 | 0.23 | P |
| 8/29/76 | 43019.762 | 16.56 | 0.15 | P |
| 12/19/76 | 43131.559 | 16.68 | 0.15 | P |
| 7/13/77 | 43337.833 | 15.89 | 0.13 | P |
| 11/ 1/77 | 43448.581 | 16.69 | 0.15 | P |
| 8/29/78 | 43749.766 | 16.39 | 0.37 | P |
| 10/ 2/78 | 43783.660 | 15.99 | 0.28 | P |
| 7/27/79 | 44081.824 | 17.42 | 0.24 | P |
| 9/19/79 | 44135.733 | 16.80 | 0.26 | P |
| 10/18/79 | 44165.630 | 16.81 | 0.19 | P |

2349-01

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/ 9/69 | 40564.562 | 15.79 | 0.19 | P |
| 9/25/70 | 40854.708 | 15.59 | 0.19 | P |
| 9/30/70 | 40859.678 | 15.20 | 0.34 | P |
| 8/20/71 | 41183.860 | 15.77 | 0.14 | P |
| 7/19/72 | 41517.874 | 16.27 | 0.09 | P |
| 8/13/72 | 41542.829 | 16.31 | 0.09 | P |
| 9/13/72 | 41573.753 | 16.07 | 0.22 | P |
| 9/18/72 | 41578.823 | 16.01 | 0.08 | P |
| 10/ 5/72 | 41595.662 | 16.13 | 0.13 | P |
| 10/13/72 | 41603.672 | 16.09 | 0.10 | P |
| 11/ 9/72 | 41626.603 | 16.12 | 0.10 | P |
| 11/27/72 | 41648.538 | 15.82 | 0.11 | P |
| 8/25/73 | 41919.840 | 15.73 | 0.13 | P |
| 10/ 1/73 | 41956.745 | 16.04 | 0.09 | P |
| 10/20/73 | 41975.660 | 15.74 | 0.11 | P |
| 11/23/73 | 42009.690 | 15.66 | 0.21 | P |
| 8/16/74 | 42279.828 | 15.41 | 0.08 | P |
| 8/20/74 | 42283.792 | 15.43 | 0.13 | P |
| 8/24/74 | 42287.826 | 15.65 | 0.08 | P |
| 9/12/74 | 42302.757 | 15.54 | 0.14 | P |
| 10/11/74 | 42331.650 | 15.40 | 0.10 | P |
| 12/ 4/74 | 42385.575 | 15.44 | 0.08 | P |
| 8/ 6/75 | 42630.847 | 15.65 | 0.19 | P |
| 8/ 6/75 | 42630.853 | 15.56 | 0.11 | P |
| 8/14/75 | 42638.782 | 15.72 | 0.17 | P |
| 9/ 6/75 | 42661.720 | 15.68 | 0.15 | P |
| 10/11/75 | 42696.734 | 15.99 | 0.12 | P |
| 10/11/75 | 42696.737 | 15.87 | 0.09 | P |
| 11/29/75 | 42745.547 | 15.78 | 0.12 | P |
| 11/29/75 | 42745.551 | 15.50 | 0.14 | P |
| 12/26/75 | 42772.566 | 15.80 | 0.07 | P |
| 12/26/75 | 42772.570 | 15.92 | 0.08 | P |
| 8/ 1/76 | 42991.857 | 15.99 | 0.14 | P |
| 8/ 1/76 | 42991.862 | 15.94 | 0.25 | P |
| 8/23/76 | 43013.760 | 16.08 | 0.11 | P |
| 8/23/76 | 43013.765 | 16.07 | 0.23 | P |
| 9/20/76 | 43041.642 | 16.21 | 0.21 | P |
| 9/28/76 | 43047.694 | 16.00 | 0.24 | P |
| 10/21/76 | 43072.571 | 16.20 | 0.14 | P |
| 11/12/76 | 43094.572 | 16.13 | 0.14 | P |
| 11/12/76 | 43094.577 | 16.37 | 0.17 | P |

2349-01 CONT.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 11/22/76 | 43104.583 | 16.19 | 0.15 | P |
| 11/22/76 | 43104.588 | 16.33 | 0.09 | P |
| 12/20/76 | 43132.542 | 16.46 | 0.08 | P |
| 6/26/77 | 43320.833 | 15.55 | 0.25 | P |
| 7/24/77 | 43348.808 | 15.35 | 0.17 | P |
| 9/ 7/77 | 43393.697 | 15.35 | 0.22 | P |
| 10/11/77 | 43427.680 | 15.57 | 0.14 | P |
| 12/ 9/77 | 43453.651 | 15.95 | 0.11 | P |
| 12/ 9/77 | 43486.596 | 15.70 | 0.09 | P |
| 1/ 6/78 | 43514.549 | 15.76 | 0.22 | P |
| 10/24/78 | 43805.642 | 15.55 | 0.16 | P |
| 11/23/78 | 43835.607 | 15.50 | 0.10 | P |
| 9/20/79 | 44136.757 | 15.62 | 0.21 | P |
| 10/18/79 | 44165.640 | 15.88 | 0.29 | P |
| 11/15/79 | 44193.612 | 15.68 | 0.18 | P |

2354+14

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 10/10/69 | 40504.708 | 18.21 | 0.15 | P |
| 11/ 7/69 | 40532.667 | 17.99 | 0.17 | P |
| 11/ 9/69 | 40534.674 | 18.13 | 0.17 | P |
| 12/30/69 | 40585.625 | 18.09 | 0.07 | P |
| 8/30/70 | 40828.833 | 17.92 | 0.15 | P |
| 9/ 5/70 | 40834.771 | 18.26 | 0.15 | P |
| 9/ 7/70 | 40836.785 | 18.07 | 0.08 | P |
| 9/22/70 | 40851.750 | 18.24 | 0.15 | P |
| 11/28/70 | 40918.667 | 18.11 | 0.18 | P |
| 12/21/70 | 40941.625 | 18.31 | 0.05 | P |
| 8/20/71 | 41183.875 | 18.08 | 0.13 | P |
| 12/15/71 | 41300.628 | 18.12 | 0.12 | P |
| 7/22/72 | 41520.857 | 18.06 | 0.16 | P |
| 9/14/72 | 41574.760 | 17.95 | 0.09 | P |
| 10/ 8/72 | 41598.723 | 17.99 | 0.09 | P |
| 10/11/74 | 42331.670 | 18.09 | 0.08 | P |
| 12/ 9/74 | 42390.615 | 18.09 | 0.09 | P |
| 1/31/75 | 42443.547 | 18.09 | 0.11 | P |
| 8/ 9/75 | 42633.844 | 18.09 | 0.13 | P |
| 8/14/75 | 42638.803 | 18.08 | 0.20 | P |
| 9/ 6/75 | 42661.701 | 18.09 | 0.15 | P |
| 12/27/75 | 42773.632 | 17.82 | 0.21 | P |
| 12/27/75 | 42773.639 | 18.08 | 0.18 | P |
| 8/25/76 | 43015.791 | 18.09 | 0.18 | P |
| 8/25/76 | 43015.797 | 18.17 | 0.09 | P |
| 10/15/76 | 43066.636 | 18.34 | 0.15 | P |
| 10/15/76 | 43066.641 | 18.39 | 0.19 | P |
| 12/19/76 | 43131.569 | 18.07 | 0.18 | P |
| 7/24/77 | 43348.797 | 17.65 | 0.23 | P |
| 8/15/77 | 43370.672 | 17.83 | 0.14 | P |
| 11/11/77 | 43458.640 | 18.00 | 0.09 | P |
| 1/ 6/78 | 43514.562 | 18.15 | 0.22 | P |
| 12/ 2/78 | 43844.610 | 17.97 | 0.09 | P |
| 10/15/79 | 44162.669 | 18.23 | 0.29 | P |
| 11/20/79 | 44198.633 | 17.82 | 0.27 | P |

2354-11

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 10/10/69 | 40504.726 | 18.82 | 0.22 | P |
| 12/ 3/69 | 40558.608 | 18.73 | 0.08 | P |
| 12/11/69 | 40566.583 | 18.69 | 0.16 | P |
| 8/29/70 | 40827.835 | 18.56 | 0.19 | P |
| 9/ 6/70 | 40835.822 | 18.62 | 0.13 | P |
| 9/24/70 | 40853.720 | 18.49 | 0.16 | P |
| 9/28/70 | 40857.698 | 18.71 | 0.18 | P |
| 1/10/72 | 41326.544 | 18.89 | 0.11 | P |
| 9/15/72 | 41575.744 | 18.76 | 0.19 | P |
| 7/ 8/73 | 41871.865 | 18.65 | 0.18 | P |
| 9/ 6/73 | 41931.836 | 18.66 | 0.11 | P |
| 12/18/73 | 42031.526 | 18.52 | 0.12 | P |
| 12/10/74 | 42391.611 | 18.46 | 0.08 | P |
| 11/22/76 | 43104.577 | 18.39 | 0.20 | P |
| 11/22/76 | 43104.583 | 18.46 | 0.08 | P |
| 11/ 1/77 | 43448.633 | 18.10 | 0.21 | P |

PHL 938

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/18/74 | 42399.610 | 16.35 | 0.10 | B |
| 8/14/75 | 42638.818 | 16.38 | 0.06 | B |
| 9/ 4/75 | 42659.812 | 16.55 | 0.08 | B |
| 10/28/75 | 42713.633 | 16.45 | 0.07 | B |
| 11/ 2/75 | 42718.514 | 16.58 | 0.09 | B |
| 12/25/75 | 42771.514 | 16.35 | 0.14 | B |
| 1/ 5/76 | 42782.590 | 16.45 | 0.15 | B |
| 2/24/76 | 42832.535 | 16.79 | 0.29 | B |
| 10/22/76 | 43073.680 | 16.44 | 0.06 | B |
| 10/22/76 | 43073.685 | 16.49 | 0.07 | B |
| 12/19/76 | 43131.517 | 16.74 | 0.09 | B |
| 12/19/76 | 43131.524 | 16.52 | 0.09 | B |
| 9/22/77 | 43408.835 | 16.86 | 0.29 | B |

PHL 1027

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/18/74 | 42399.649 | 16.78 | 0.07 | B |
| 8/14/75 | 42638.844 | 16.96 | 0.09 | B |
| 9/ 4/75 | 42659.826 | 17.12 | 0.15 | B |
| 10/15/75 | 42700.887 | 17.00 | 0.06 | B |
| 10/27/75 | 42712.595 | 17.15 | 0.12 | B |
| 11/22/76 | 43104.619 | 16.78 | 0.09 | B |
| 11/22/76 | 43104.625 | 16.77 | 0.08 | B |
| 12/26/76 | 43138.628 | 16.85 | 0.15 | B |
| 12/26/76 | 43138.635 | 16.79 | 0.13 | B |
| 9/20/77 | 43406.812 | 16.65 | 0.17 | B |
| 11/ 7/77 | 43454.812 | 16.91 | 0.05 | B |
| 11/ 4/78 | 43816.681 | 16.90 | 0.09 | B |

PHL 1186

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/10/74 | 42391.687 | 17.94 | 0.12 | B |
| 8/14/75 | 42638.874 | 17.47 | 0.10 | B |
| 10/13/75 | 42698.797 | 17.49 | 0.10 | B |
| 11/ 2/75 | 42718.601 | 17.19 | 0.14 | B |
| 12/25/75 | 42771.627 | 17.09 | 0.15 | B |
| 2/19/76 | 42827.555 | 17.39 | 0.16 | B |
| 8/23/76 | 43013.814 | 17.67 | 0.17 | B |
| 8/23/76 | 43013.820 | 17.45 | 0.11 | B |
| 8/28/76 | 43018.839 | 17.58 | 0.07 | B |
| 8/28/76 | 43018.845 | 17.51 | 0.11 | B |
| 10/22/76 | 43073.763 | 17.44 | 0.12 | B |
| 10/22/76 | 43073.769 | 17.82 | 0.10 | B |
| 12/19/76 | 43131.540 | 17.56 | 0.10 | B |
| 12/19/76 | 43131.544 | 17.49 | 0.11 | B |
| 9/20/77 | 43406.844 | 17.81 | 0.19 | B |
| 11/ 4/78 | 43816.641 | 17.68 | 0.14 | B |

PHL 1194

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/10/74 | 42391.647 | 17.70 | 0.15 | B |
| 8/14/75 | 42638.856 | 17.46 | 0.15 | B |
| 10/13/75 | 42698.779 | 17.49 | 0.14 | B |
| 11/ 2/75 | 42718.616 | 17.36 | 0.05 | B |
| 12/25/75 | 42771.634 | 17.54 | 0.10 | B |
| 8/28/76 | 43018.823 | 17.28 | 0.14 | B |
| 8/28/76 | 43018.829 | 17.69 | 0.14 | B |
| 10/22/76 | 43073.778 | 17.53 | 0.17 | B |
| 10/22/76 | 43073.783 | 17.41 | 0.11 | B |
| 12/19/76 | 43131.557 | 17.40 | 0.12 | B |
| 12/19/76 | 43131.563 | 17.31 | 0.08 | B |
| 9/20/77 | 43406.853 | 17.20 | 0.16 | B |
| 11/ 4/78 | 43816.648 | 17.48 | 0.18 | B |

PHL 1222

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 1/ 3/75 | 42415.537 | 17.55 | 0.09 | B |
| 8/15/75 | 42639.849 | 17.68 | 0.14 | B |
| 10/27/75 | 42712.640 | 17.65 | 0.10 | B |
| 12/25/75 | 42771.647 | 17.61 | 0.15 | B |
| 11/22/76 | 43104.620 | 17.56 | 0.10 | B |
| 11/22/76 | 43104.626 | 17.61 | 0.07 | B |

PHL 1222 CONT.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 11/ 8/77 | 43455.618 | 17.44 | 0.12 | B |
| 11/ 4/78 | 43816.699 | 17.65 | 0.08 | B |

PHL 1226

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/10/74 | 42391.703 | 17.83 | 0.07 | B |
| 8/15/75 | 42639.849 | 17.25 | 0.12 | B |
| 10/13/75 | 42698.803 | 17.30 | 0.11 | B |
| 10/27/75 | 42712.651 | 17.32 | 0.07 | B |
| 1/ 2/76 | 42779.510 | 17.02 | 0.15 | B |
| 11/22/76 | 43104.665 | 17.44 | 0.12 | B |
| 11/22/76 | 43104.629 | 17.43 | 0.12 | B |
| 12/25/76 | 43137.651 | 17.20 | 0.12 | B |
| 12/25/76 | 43137.658 | 17.38 | 0.08 | B |
| 11/ 8/77 | 43455.618 | 17.40 | 0.19 | B |
| 11/ 4/78 | 43816.706 | 17.18 | 0.10 | B |

PHL 3375

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 12/18/74 | 42399.631 | 18.25 | 0.09 | B |
| 10/13/75 | 42698.762 | 18.26 | 0.10 | B |
| 11/ 2/75 | 42718.587 | 17.87 | 0.17 | B |
| 12/26/75 | 42772.584 | 17.84 | 0.11 | B |
| 1/ 1/76 | 42778.573 | 17.69 | 0.15 | B |
| 11/ 8/77 | 43455.597 | 17.91 | 0.11 | B |

PHL 3632

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 1/ 3/75 | 42415.521 | 17.01 | 0.16 | B |
| 8/15/75 | 42639.794 | 17.44 | 0.13 | B |
| 10/13/75 | 42698.772 | 17.84 | 0.17 | B |
| 10/27/75 | 42712.605 | 17.47 | 0.08 | B |
| 12/25/75 | 42771.553 | 17.77 | 0.15 | B |
| 11/19/76 | 43101.610 | 17.91 | 0.09 | B |
| 11/19/76 | 43101.617 | 17.80 | 0.09 | B |
| 1/19/77 | 43162.599 | 17.80 | 0.17 | B |
| 1/19/77 | 43162.605 | 18.10 | 0.17 | B |
| 9/20/77 | 43406.865 | 17.89 | 0.09 | B |
| 11/ 4/78 | 43816.630 | 17.98 | 0.09 | B |

BSO 1

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 3/20/75 | 42491.842 | 18.38 | 0.12 | B |
| 12/10/75 | 42756.938 | 18.51 | 0.11 | B |
| 1/ 2/76 | 42779.919 | 18.57 | 0.11 | B |
| 2/11/76 | 42819.876 | 18.57 | 0.19 | B |
| 1/ 5/76 | 42782.951 | 18.40 | 0.35 | B |
| 3/28/76 | 42865.603 | 18.44 | 0.09 | B |
| 6/25/76 | 42954.676 | 18.55 | 0.14 | B |
| 7/18/76 | 42977.620 | 18.11 | 0.19 | B |
| 1/26/77 | 43169.926 | 18.12 | 0.15 | B |
| 4/13/77 | 43246.675 | 18.25 | 0.13 | B |
| 4/13/77 | 43246.679 | 18.23 | 0.10 | B |
| 5/20/77 | 43283.676 | 17.61 | 0.21 | B |
| 5/20/77 | 43283.681 | 17.79 | 0.13 | B |
| 4/ 6/78 | 43604.653 | 18.00 | 0.09 | B |
| 6/ 8/78 | 43667.660 | 17.85 | 0.18 | B |
| 7/ 3/78 | 43692.631 | 18.08 | 0.15 | B |

BSO 2

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 6/12/75 | 42575.628 | 18.52 | 0.08 | B |
| 1/ 2/76 | 42779.933 | 18.71 | 0.12 | B |
| 3/28/76 | 42865.631 | 18.61 | 0.17 | B |
| 4/ 3/76 | 42871.647 | 18.98 | 0.15 | B |
| 5/30/76 | 42928.501 | 18.89 | 0.15 | B |
| 2/21/77 | 43195.889 | 18.75 | 0.08 | B |
| 2/21/77 | 43195.895 | 18.87 | 0.17 | B |
| 4/11/77 | 43244.649 | 18.60 | 0.20 | B |
| 4/11/77 | 43244.653 | 18.70 | 0.10 | B |
| 5/ 5/78 | 43633.669 | 18.86 | 0.20 | B |
| 6/ 8/78 | 43667.680 | 18.69 | 0.16 | B |

BSO 2 CONT.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 7/ 3/78 | 43692.649 | 19.33 | 0.18 | B |

BSO 6

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 5/12/75 | 42544.720 | 18.34 | 0.14 | B |
| 3/ 6/76 | 42843.895 | 18.39 | 0.13 | B |
| 3/28/76 | 42865.724 | 18.23 | 0.14 | B |
| 4/29/76 | 42897.664 | 18.58 | 0.15 | B |
| 2/18/77 | 43192.915 | 18.46 | 0.10 | B |
| 2/18/77 | 43192.926 | 18.39 | 0.08 | B |
| 3/28/77 | 43230.812 | 18.13 | 0.11 | B |
| 3/28/77 | 43230.817 | 18.48 | 0.12 | B |
| 4/13/77 | 43246.728 | 18.65 | 0.08 | B |
| 4/13/77 | 43246.728 | 18.38 | 0.09 | B |
| 4/ 6/78 | 43604.699 | 18.38 | 0.12 | B |
| 5/30/78 | 43658.672 | 18.36 | 0.07 | B |
| 7/ 3/78 | 43692.677 | 18.37 | 0.12 | B |

BSO 11

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 6/14/75 | 42577.670 | 18.99 | 0.10 | B |
| 4/29/76 | 42897.680 | 18.80 | 0.17 | B |
| 2/21/77 | 43195.862 | 18.75 | 0.15 | B |
| 4/11/77 | 43244.699 | 18.67 | 0.12 | B |
| 4/11/77 | 43244.702 | 18.70 | 0.09 | B |
| 5/17/77 | 43280.621 | 18.76 | 0.18 | B |
| 5/17/77 | 43280.626 | 18.68 | 0.23 | B |
| 2/15/78 | 43554.926 | 19.45 | 0.22 | B |
| 5/ 5/78 | 43633.762 | 18.87 | 0.19 | B |
| 7/ 4/78 | 43693.626 | 19.12 | 0.19 | B |

B 46

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 5/12/75 | 42544.682 | 17.82 | 0.19 | B |
| 1/ 2/76 | 42779.911 | 17.86 | 0.12 | B |
| 3/28/76 | 42865.616 | 17.83 | 0.10 | B |
| 4/22/76 | 42890.644 | 17.90 | 0.11 | B |
| 4/22/76 | 42890.649 | 17.84 | 0.10 | B |
| 7/18/76 | 42977.631 | 17.86 | 0.15 | B |
| 2/25/77 | 43199.796 | 18.52 | 0.13 | B |
| 2/25/77 | 43199.802 | 18.24 | 0.10 | B |
| 4/13/77 | 43246.697 | 18.24 | 0.14 | B |
| 4/13/77 | 43246.701 | 18.33 | 0.16 | B |
| 5/20/77 | 43283.694 | 18.71 | 0.17 | B |
| 5/20/77 | 43283.699 | 18.48 | 0.13 | B |
| 7/26/76 | 42985.585 | 18.00 | 0.15 | B |
| 2/12/78 | 43551.852 | 18.05 | 0.16 | B |
| 4/ 6/78 | 43604.665 | 18.41 | 0.10 | B |
| 7/ 3/78 | 43692.637 | 18.44 | 0.12 | B |

B 114

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 5/12/75 | 42544.703 | 17.32 | 0.19 | B |
| 1/ 2/76 | 42779.945 | 17.41 | 0.17 | B |
| 3/28/76 | 42865.670 | 17.42 | 0.20 | B |
| 4/22/76 | 42890.668 | 17.11 | 0.11 | B |
| 7/26/76 | 42985.609 | 17.44 | 0.19 | B |
| 2/18/77 | 43192.886 | 17.35 | 0.15 | B |
| 2/18/77 | 43192.892 | 17.46 | 0.14 | B |
| 4/13/77 | 43246.710 | 17.51 | 0.22 | B |
| 4/13/77 | 43246.714 | 17.65 | 0.25 | B |
| 4/ 6/78 | 43604.682 | 17.90 | 0.19 | B |
| 5/30/78 | 43658.647 | 17.91 | 0.15 | B |
| 7/ 3/78 | 43692.657 | 18.09 | 0.18 | B |

B 154

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 6/12/75 | 42575.677 | 18.51 | 0.21 | B |
| 1/ 2/76 | 42779.962 | 19.15 | 0.10 | B |
| 4/ 3/76 | 42871.683 | 19.20 | 0.11 | B |
| 5/30/76 | 42928.641 | 18.90 | 0.22 | B |
| 2/25/77 | 43199.817 | 18.62 | 0.12 | B |

B 154 CONT.

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 2/25/77 | 43199.823 | 18.69 | 0.10 | B |
| 4/11/77 | 43244.666 | 18.90 | 0.12 | B |
| 4/11/77 | 43244.672 | 18.86 | 0.23 | B |
| 6/20/77 | 43314.611 | 18.63 | 0.15 | B |
| 2/15/78 | 43554.909 | 19.08 | 0.19 | B |
| 5/ 5/79 | 43998.685 | 18.95 | 0.17 | B |
| 6/ 8/78 | 43667.690 | 18.71 | 0.13 | B |

B 194

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 6/12/75 | 42575.660 | 18.12 | 0.19 | B |
| 2/11/76 | 42819.890 | 18.29 | 0.08 | B |
| 3/28/76 | 42865.735 | 18.07 | 0.10 | B |
| 4/23/76 | 42891.730 | 18.15 | 0.15 | B |
| 2/25/77 | 43199.841 | 18.31 | 0.11 | B |
| 2/25/77 | 43199.847 | 18.25 | 0.11 | B |
| 4/15/77 | 43248.697 | 18.19 | 0.16 | B |
| 4/15/77 | 43248.703 | 18.00 | 0.17 | B |
| 2/12/78 | 43551.894 | 18.13 | 0.13 | B |
| 5/ 5/78 | 43633.694 | 18.38 | 0.24 | B |
| 7/ 4/78 | 43693.606 | 18.21 | 0.16 | B |

B 201

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 5/ 5/75 | 42537.706 | 17.05 | 0.17 | B |
| 3/ 6/76 | 42843.883 | 17.05 | 0.16 | B |
| 3/28/76 | 42865.685 | 16.94 | 0.10 | B |
| 4/23/76 | 42891.771 | 17.30 | 0.15 | B |
| 7/18/76 | 42977.646 | 17.03 | 0.09 | B |
| 2/18/77 | 43192.936 | 17.08 | 0.14 | B |
| 3/28/77 | 43230.790 | 16.90 | 0.06 | B |
| 3/28/77 | 43230.795 | 17.04 | 0.10 | B |
| 4/15/77 | 43248.711 | 17.00 | 0.18 | B |
| 4/15/77 | 43248.715 | 17.20 | 0.16 | B |
| 2/12/78 | 43551.938 | 17.45 | 0.18 | B |
| 4/ 6/78 | 43604.722 | 17.26 | 0.23 | B |
| 5/30/78 | 43658.658 | 17.27 | 0.21 | B |
| 7/ 3/78 | 43692.687 | 17.06 | 0.22 | B |

B 234

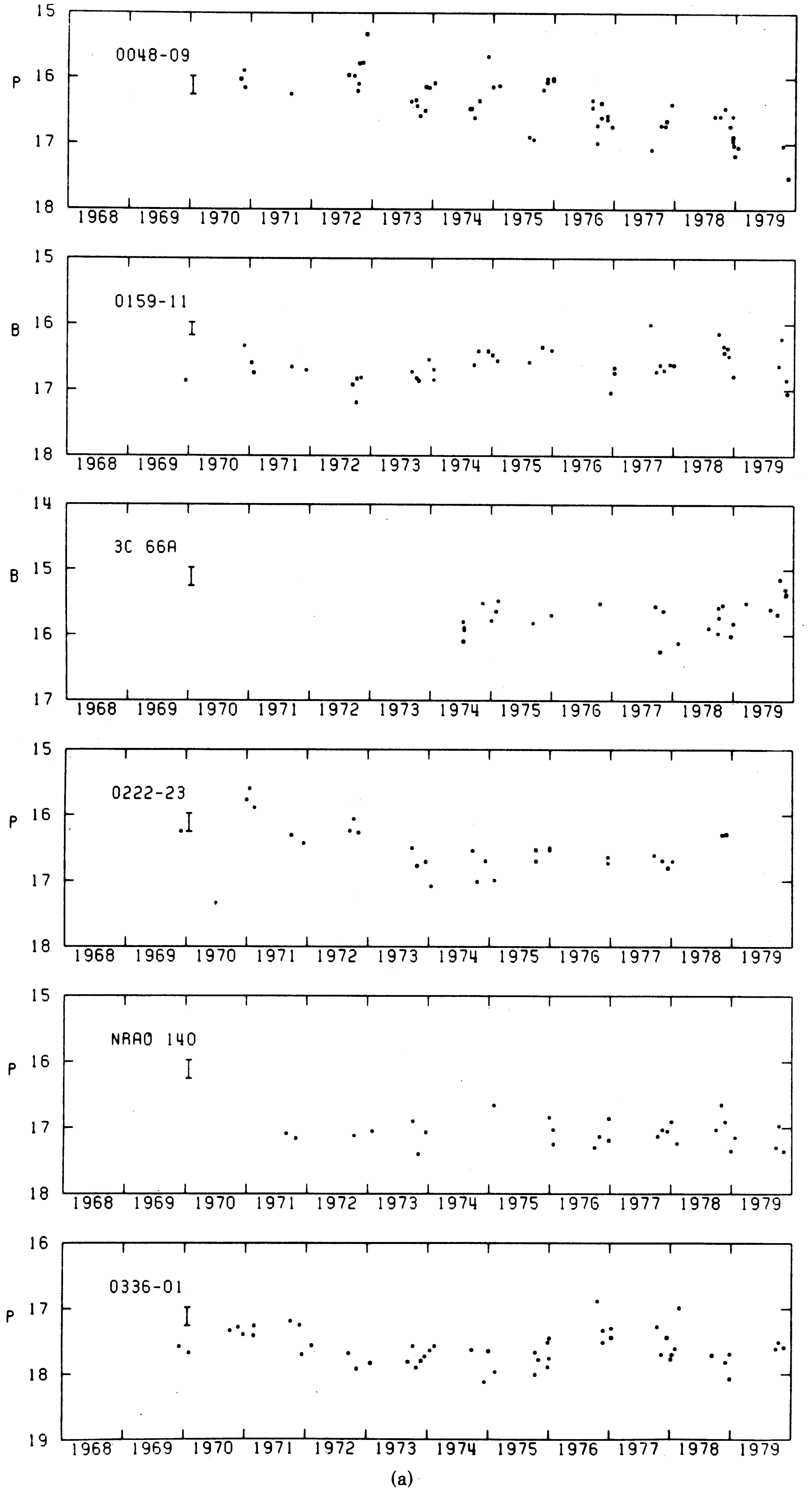
| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 6/10/75 | 42571.681 | 18.65 | 0.14 | B |
| 4/22/76 | 42890.672 | 18.07 | 0.13 | B |
| 4/29/76 | 42897.628 | 18.43 | 0.15 | B |
| 4/ 9/77 | 43242.700 | 18.20 | 0.12 | B |
| 4/11/77 | 43244.715 | 18.05 | 0.11 | B |
| 4/11/77 | 43244.719 | 18.15 | 0.10 | B |
| 5/17/77 | 43280.635 | 18.45 | 0.15 | B |
| 5/17/77 | 43280.640 | 18.41 | 0.18 | B |
| 2/15/78 | 43554.893 | 18.61 | 0.19 | B |
| 5/30/78 | 43658.680 | 18.34 | 0.20 | B |
| 7/ 4/78 | 43693.615 | 18.89 | 0.28 | B |
| 12/10/78 | 43852.896 | 18.16 | 0.18 | B |
| 12/10/78 | 43852.901 | 18.35 | 0.10 | B |
| 12/31/78 | 43873.874 | 18.01 | 0.16 | B |

B 312

| UT DATE | J.D. | MAG | RMS | COL |
|---|---|---|---|---|
| 4/ 3/76 | 42871.694 | 19.45 | 0.22 | B |
| 4/11/77 | 43244.683 | 19.31 | 0.11 | B |
| 4/11/77 | 43244.687 | 19.44 | 0.17 | B |
| 5/17/77 | 43280.610 | 19.34 | 0.21 | B |
| 2/12/78 | 43551.874 | 19.27 | 0.10 | B |
| 5/ 5/78 | 43633.751 | 18.97 | 0.20 | B |
| 7/ 4/78 | 43693.637 | 18.70 | 0.21 | B |

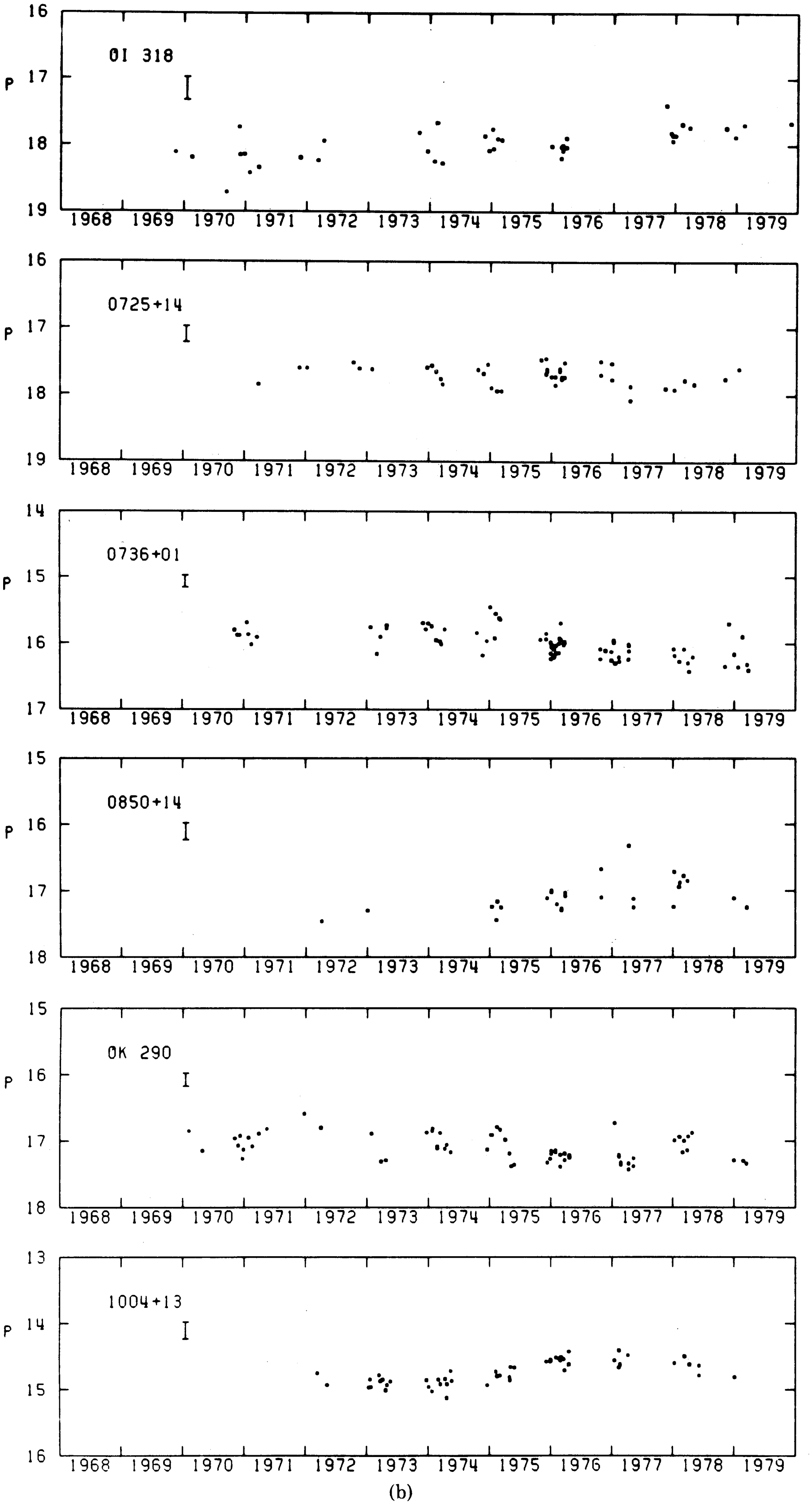


1980AJ.....85.1442P



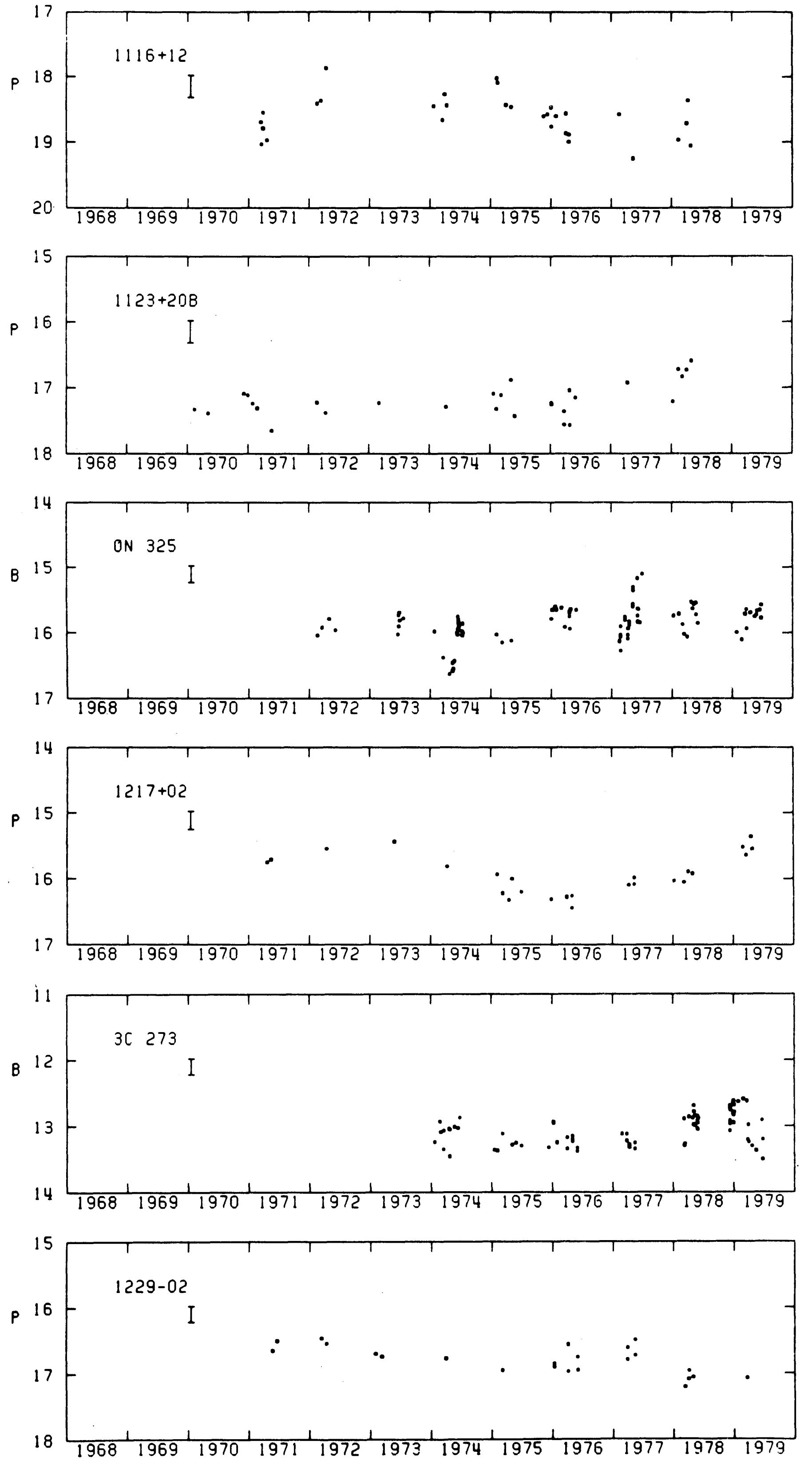

(a)

FIG. 1. Light curves of 26 sources.



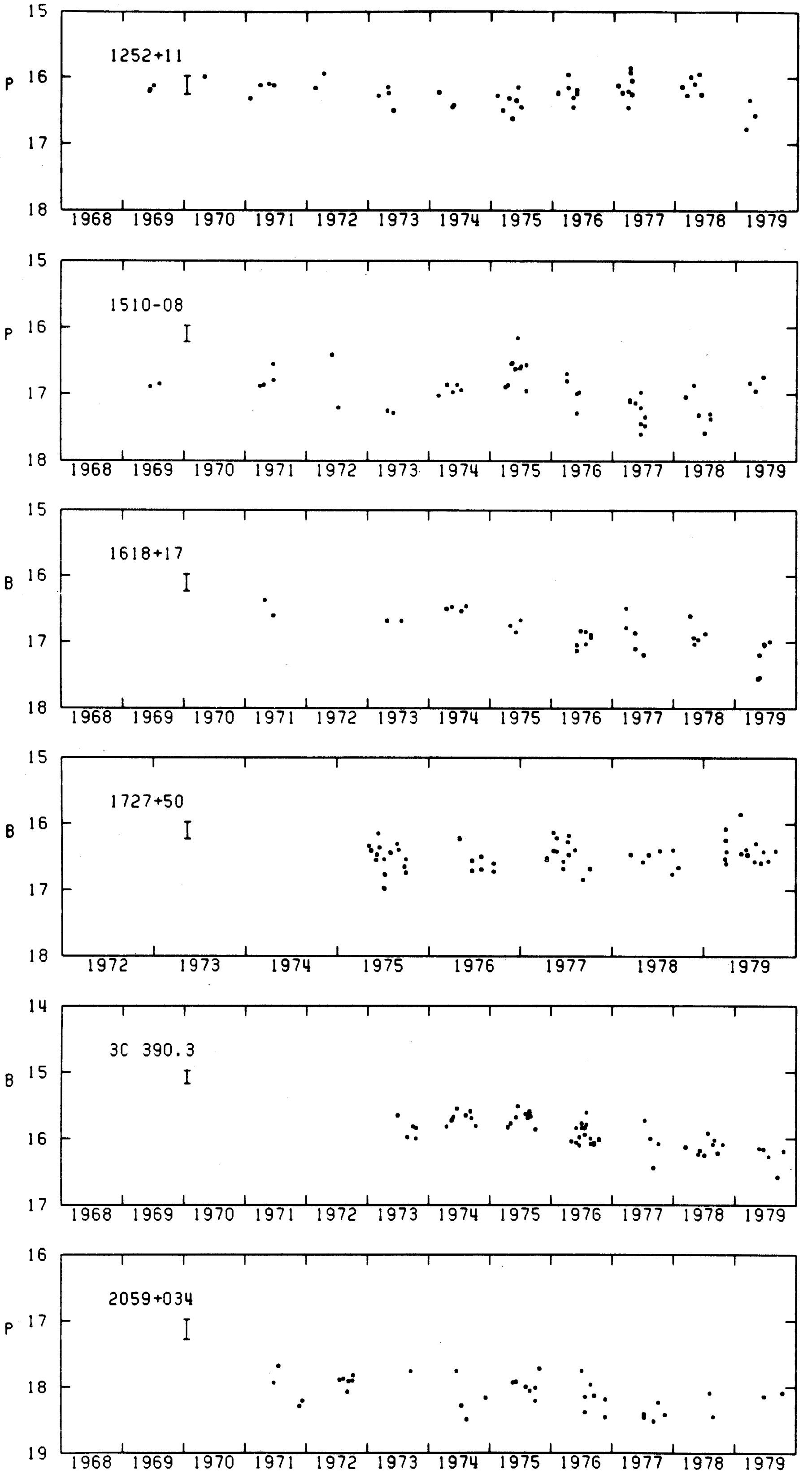

(b)

FIG. 1. (continued)



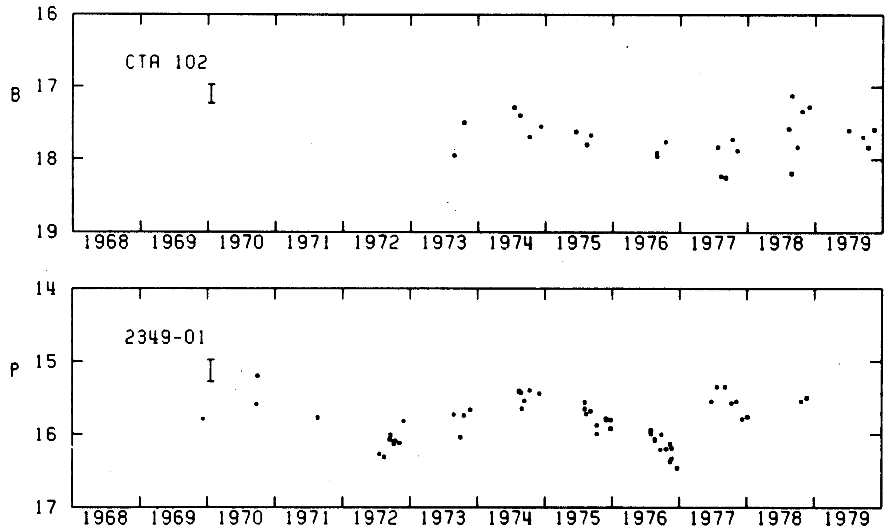

(c)

FIG. 1. (continued)




(d)

FIG. 1. (continued)




(e)

FIG. 1. (continued)

optical spectra, and high degree of linear polarization is typical of members of the BL Lacertae class (Stein, O'Dell, and Strittmatter 1976).

*0109+22*. While this BL Lacertae object has been monitored at Rosemary Hill since late 1977, it has shown little activity. The optical identification was established by Owen and Mufson (1977), and a continuous optical spectrum was observed by Wills and Wills (1979). Despite the object's recent quiescence, Pica's (1976, 1977) examination of the Harvard plate archives showed that it displayed a total range of more than $3^{m}$, with a rather violent outburst in 1943. 0109+22 exhibits a flat radio spectrum and a rather flat optical continuum as well (O'Dell *et al.* 1978a).

*0159−11*. This QSO, also known as 3C 57, shows a range of slightly greater than $1^{m}$. Short-term activity dominates the light curve, with rapid flickering of up to $0^{m}8$ appearing in 1978 and 1979. The historical light curve compiled by Angione (1973) shows similar activity in the past. In addition, a long-term increase in brightness seems evident between late 1972 and 1977.

*3C 66A*. The Rosemary Hill data indicate that this BL Lacertae object has varied by about $1^{m}2$ since 1974. No long-term trend appears in the light curve, but short-term variations are present. Photoelectric intraday observations were obtained by Miller and McGimsey (1978), but no significant variation was detected. O'Dell *et al.* (1977) obtain a mean spectral index of $\alpha \simeq 1.1$ between 86 and 830 THz (3.5–0.36 $\mu$m), which is consistent with the observations of Tapia, Craine, and Johnson (1976).

*0222−23*. The Florida light curve for this object shows that a long-term maximum occurred in January 1971, with a smaller outburst in October 1972. A subsequent decline of about $1^{m}5$ ensued, with the object seeming to level off at $P = 16.8$. A small outburst of about $0^{m}5$ was detected in late 1978.

*0301−243*. Condon, Hicks, and Jauncey (1977) identified this source as a neutral stellar object with a continuous spectrum, making it a member of the BL Lacertae class. Eight plates have been obtained at Rosemary Hill, dating back to October 1977, during which time the object varied by about $0^{m}75$.

*NRAO 140*. This QSO is a radio variable according to Medd *et al.* (1972). The optical object has shown no long-term trend in nine years of monitoring at Rosemary Hill. However, short-term activity is strongly suggested, with variations as large as $0^{m}7$ recorded in late 1978. NRAO 140 was detected as an x-ray source by Marscher *et al.* (1979) using the new A2 experiment on HEAO-1.

*0336−01*. This QSO, also known as CTA 26, has exhibited radio variability at 2.7 GHz (Medd *et al.* 1972), 7.8 GHz (Dent and Kojoian 1972), 6.6 and 10.7 GHz (Andrew *et al.* 1978), and 15.5 GHz (Dent, Kapitzky, and Kojoian 1974). A radio outburst detected at several wavelengths in early 1972 may be correlated with a broad optical maximum which peaked in 1971. A cross-correlation analysis performed by Pomphrey *et al.* (1976) indicates that this correlation is real, with a radio time lag of about one year. Furthermore, both the radio intensity at 10.7 GHz and the optical intensity rose by the same factor (a factor of 1.8 above the "base" level).

Short-term optical activity of up to $0^{m}9$ shows up in the Florida light curve, with rapid outbursts detected in late 1976 and early 1978. Long-term trends of the same magnitude are also suggested by the present data.

*0338−214*. This source is classified as a possible galaxy by Wright *et al.* (1977) but exhibits some properties of the BL Lacertae class. Since we began monitoring it in October 1977, the source has varied by about $1^{m}15$, with short-term fluctuations of up to $0^{m}5$ recorded on a time scale of a month.

*0340+04.* Also designated as 3C 93, this QSO was recently confirmed spectroscopically by Smith and Spinrad (1980). The Florida data indicate a range of variability of about $1^{m}$, with a possible outburst recorded in late 1977. The radio spectrum is fairly steep ($\alpha_{\rm rad} \simeq 0.8$ according to Craine 1976), a characteristic that seems typical of the less active BL Lacertae objects (Stein, O'Dell, and Strittmatter 1976).

*0422+004.* Kinman (1976a) assigned this object to the BL Lacertae category. We began monitoring it in late 1976, at which time it was rather bright ($B = 15.45$). The object remained at this level for about two years and then faded rapidly to $B = 17.41$ in early 1979. This "antiflare," or sudden dip below an apparent "base" level, may in fact indicate that the source had been in a prolonged active phase.

*OH 471.* This high-redshift quasar ($z = 3.40$) has been relatively quiescent throughout our observing program. The most pronounced activity occurred in early 1975, when the object faded by about $0^{m}5$ in two months. Similar short-term flickering was also recorded in late 1976 and in 1979. Andrew *et al.* (1978) found that the 10.7-GHz radio emission showed absolutely no variation between 1973 and 1976.

*OI 318.* Both short- and long-term activity are evident in the light curve of this QSO. An outburst of nearly $1^{m}$ was recorded in late 1970 and flickering of about $0^{m}5$ is common throughout the Florida light curve. In addition, a long-term increase between 1970 and 1979 is suggested.

*0725+14.* This QSO has exhibited a fairly constant base level in the nine years it has been monitored at Rosemary Hill. The short-term activity amounts to $0^{m}4$ or less, and the quiescent nature of this source is verified by Grandi and Tifft (1974) and Lü (1972).

*0736+01.* The light curve for this QSO indicates that the dominant activity is rapid flickering with a range of about $0^{m}5$. A long-term maximum was observed in January 1975, with a steady decline thereafter, the total amplitude of this drop being about $1^{m}$. The source is a radio variable at 6.6 and 10.7 GHz (Andrew *et al.* 1978) and at 15.5 GHz (Dent, Kapitzky, and Kojoian 1974), but no optical-radio correlation was found by Pomphrey *et al.* (1976).

*4C 05.34.* This high-redshift quasar ($z = 2.877$) is only marginally variable according to our analysis. The data show a relatively constant brightness level of $P \simeq 18.2$, with the suggestion of some short-term activity. Most notable is a fluctuation of $0^{m}4$ recorded in April–May 1978, although the variation is probably not statistically significant. Grandi and Tifft (1974) indicate an amplitude of only about $0^{m}5$, in agreement with our observations.

*0850+14.* Little activity was reported for this object at the time Paper II was written. However, a long-term rise in brightness occurred between early 1975 and mid-1977, with short-term activity of about $0^{m}5$ present as well.

*OK 290.* The radio emission at 6.6 and 10.7 GHz showed little variation from 1971 to 1978 (Andrew *et al.* 1978), but Medd *et al.* (1972) observed a 50% increase in flux between 1967 and 1971 at the same frequencies. The optical light curve shows significant activity during the entire monitoring program (1970–1979). Short-term activity of about $0^{m}7$ is present, superimposed on what appears to be a gradual, long-term decline.

*1004+13.* The Florida light curve of this QSO has a strikingly sinusoidal appearance. The maximum brightness was recorded in February 1977, and short-term flickering of about $0^{m}4$ is superimposed on the long-term activity. Jackisch (1971) found no significant optical variability, and historical records show a total amplitude of only $1^{m}$ (Grandi and Tifft 1974). The radio spectrum of 1004+13 is quite steep ($\alpha_{\rm rad} \simeq 1.0$ according to Craine 1976), while the energy distribution in the optical and near-infrared is perfectly flat (Neugebauer *et al.* 1979).

*B2 1101+38.* While this BL Lacertae object, also known as Mk 421, is generally considered to be an optically violent variable (OVV), it has been relatively quiescent since we began observing it in April 1977. Miller (1975) reports that its total historical range of optical variability is $\Delta B \geq 4^{m}7$, which is among the largest of all known QSO's. High-time-resolution photometry was obtained by Miller, McGimsey, and Williamon (1977), but no evidence for short-term variability was detected. Zhukov (1976), however, reported fluctuations of $0^{m}05$ on a time scale of twenty minutes or so.

The Rosemary Hill data span a range of about $1^{m}$, with a rapid event occurring in February–March 1978. The object brightened from $B = 14.1$ to $B = 13.3$ in only two days, and then quickly faded to $B = 14.0$ over the next ten days. Photographic photometry of this object requires great care because of the strong surrounding nebulosity and the nearby $6^{m}0$ star. Exposure times have been adjusted to record nuclear magnitudes.

Coordinated spectroscopic observations in the radio, infrared, and optical regions were obtained by O'Dell *et al.* (1978a). Their data show a perfectly flat radio spectrum between 1 and 100 GHz, and a steep optical continuum ($\alpha_{\rm opt} \simeq 1.7$) with some curvature in the near-infrared. Since the object lies in the nucleus of an elliptical galaxy, this curvature, as noted by O'Dell *et al.* (1978b), is concave downward ($C^{-}$) because of the contamination by galactic starlight.

Mk 421 was detected as an intense and variable x-ray source by Mushotzky *et al.* (1978), with the x-ray emission being at least as great as the optical luminosity.

*1116+12.* This quasar has shown a total amplitude of about $1^m4$ during the nine years it has been observed at Rosemary Hill. The source brightened between 1971 and 1972. Following a brief hiatus in the observations, the object underwent a 2½-yr period of activity which peaked in early 1975. Short-term excursions of up to $0^m6$ also appear to be a normal phenomenon of this source, with the variations sometimes manifesting themselves on a time scale of only a week or so.

*1123+20B.* A range of a little over $1^m$ has been detected for this N galaxy at Rosemary Hill. Short-term activity of $0^m5$ or so seems common and an outburst was observed in April 1978. No real long-term activity is evident in the ten years of data we have obtained.

*ON 325.* This BL Lacertae object exhibits rapid and intense variability that marginally places it in the class of optically violent variables (see Paper III). An outburst in 1977 displayed fluctuations in excess of $1^m$ over a four- or five-month period. Several "sub-bursts" occurred during this event, with peaks observed in May, June, and July. This multipeak activity seems common to the BL Lacertae objects, and particularly to the OVV's (see Pollock 1975b, Leacock *et al.* 1976, and Pica, Smith, and Pollock 1980). Archival records indicate that ON 325 displays a total amplitude of variability of about $2^m$ (Hall and Usher 1973).

The radio spectrum is relatively flat ($\alpha_{rad} \simeq 0.3$ according to Altschuler and Wardle 1975) and the energy distribution in the optical and near- infrared shows $\alpha_{opt} \simeq 1.0$ (Craine, Tapia, and Johnson 1976; O'Dell *et al.* 1977). The optical–near-IR spectrum is not as steep as in most BL Lacertae objects (the average being $\alpha_{opt} \simeq 1.8$ according to Stein, O'Dell, and Strittmatter 1976), and this may be correlated with the somewhat less violent nature of the source.

*1217+02.* A cursory examination of the Florida light curve of this QSO might suggest the presence of a sinusoidal variation. The data prior to 1975 are quite spotty, however, and there is probably no significance to the seemingly periodic phenomenon observed. No short-term activity is present in our data, and a total amplitude of about $1^m$ is observed.

*3C 273.* No violent activity has ever been detected for this QSO and our data indicate an amplitude of about $0^m8$, in agreement with the findings of Grandi and Tifft (1974). The source appears to have brightened by about $0^m3$ in 1978 and remained bright for an entire year, reaching $B = 12.59$ in February 1979.

Andrew *et al.* (1978) find evidence for radio variability at 6.6 and 10.7 GHz and Dent, Kapitzky, and Kojoian (1974) report variability at 15.5 GHz. A search for an optical-radio correlation was performed by Pomphrey *et al.* (1976) with negative results.

*1229−02.* The dominant characteristic of the light curve of this QSO is a long-term decline between 1971 and 1979.

*1252+11.* A possible long-term variation is present in the Florida light curve, with a minimum occurring in early 1975. Short-term fluctuations of about $0^m6$ also appear, particularly in 1976 and 1977. According to Folsom *et al.* (1971), the source has varied considerably since the date of the Palomar Sky Survey. Our measurements indicate the object was at $P \cong 17.5$ on the Sky Survey, about $1^m3$ fainter than the average brightness recorded at Rosemary Hill.

*3C 279.* This well-known OVV has been rather quiescent over the past few years, showing only $1^m3$ of variability in our data. The historical light curve was derived by Eachus and Liller (1975). They found the total amplitude to be $\Delta B \geq 6^m7$, possibly making it the most variable and most luminous QSO ever studied. The object reached $B = 11.27$ in early 1937 with variations of $2^m2$ reported over a 13-day interval in 1936. Oke, Neugebauer, and Becklin (1970) found the optical spectrum to be rather steep ($\alpha \simeq 1.5$) between 0.32 and 2.2 $\mu$m. Andrew *et al.* (1978) find that 3C 279 is an intense radio variable at 6.6 and 10.7 GHz, with a large and prolonged outburst recorded between 1966 and 1968.

*1354+19.* The Florida light curve of this QSO spans 1974–1979. Little activity has been detected, which is consistent with observations reported by Grandi and Tifft (1974). Oke, Neugebauer, and Becklin (1970) find that the optical spectrum is relatively flat ($\alpha_{opt} \simeq 0.3$) in the spectral region from 0.32 to 2.2 $\mu$m, while the radio data show a fairly steep slope ($\alpha_{rad} \simeq 1.0$, Craine 1976).

*OQ 172.* This source exhibits the largest redshift ($z = 3.53$) of all known QSO's. Optically, OQ 172 is one of the more quiescent objects monitored at Rosemary Hill, with a total range of about $0^m6$ and a confidence of variability of only 7%.

*1510−08.* Substantial activity is observed in the light curve of this QSO. In an outburst occurring in June 1975, the object brightened by about $0^m8$ in only two months, and then faded by the same amount over the next two months. Short-term fluctuations of $0^m6$ or more occur repeatedly, and long-term variations are present as well. An overall range of almost $1^m5$ has been recorded since we began monitoring 1510−08 in 1969.

The optically violent nature of this source has been discovered by Liller and Liller (1975), who found a range of $6^m$! From Harvard archival records, they found the source to vary between $B = 11.8$ and $B = 17.8$, dropping by a factor of 2 in 24 hr. They report that at one point, the object was the most luminous known source in the Universe!

The energy distribution in the near-infrared is fairly steep ($\alpha_{IR} \simeq 1.13$; Oke, Neugebauer, and Becklin 1970), but it flattens substantially in the optical region (Neugebauer *et al.* 1979). The radio spectrum appears to be relatively flat (Craine 1976) and intense variability has been detected at 6.6 and 10.7 GHz (Andrew *et al.* 1978) and at 15.5 GHz (Dent, Kapitzky, and Kojoian 1974). A radio outburst was observed in early 1971 at all three frequencies. The possibility of an optical-radio correlation was examined by Pomphrey *et al.* (1976)

with negative results, but the optical data prior to 1974 are somewhat sparse.

*1618+17.* Also known as 3C 334, this QSO exhibits a steep radio spectrum ($\alpha_{\rm rad} \simeq 1.2$, Craine 1976), but a flat optical spectrum ($\alpha_{\rm opt} \simeq 0.45$; Oke, Neugebauer, and Becklin 1970). The total amplitude of variability observed at Rosemary Hill is $\Delta B = 1^{\rm m}2$, with a steady long-term decline over the interval 1971–1979. Short-term excursions are also in evidence during 1977 and 1979.

*Mk 501.* This radio source was identified with a galaxy of magnitude $B = 14.4$, and it exhibits properties of the BL Lacertae class of objects. No optical variability was detected by Ulrich *et al.* (1975), Kinman (1976b), or Miller and McGimsey (1978). Our observations, initiated in March 1977, indicate that the object has been only marginally variable. Similar caveats are to be applied to photographic photometry of this source as to B2 1101+38 because of associated nebulosity.

Mk 501 was detected as an x-ray source by Mushotzky *et al.* (1978); the x-ray emission is of the same order as the optical luminosity. Maza, Martin, and Angel (1978) report a spectral index of $\alpha \simeq 0.8$ for the optical continuum.

*1727+50.* I Zw 186 is the alternative designation for this BL Lacertae object. Rapid short-term variability is the dominant characteristic of the Florida light curve, with changes of up to $0^{\rm m}8$ recorded during a three-week interval in June 1975. Usher (1975) has determined that $\Delta B \simeq 2^{\rm m}0$ based on the Harvard archival records. The radio spectrum is flat ($\alpha_{\rm rad} \simeq 0.3$; Stein, O'Dell, and Strittmatter 1976), and the optical–near-infrared spectral energy distribution is steep and variable ($\alpha_{\rm opt} \simeq 1.9$; Tapia, Craine, and Johnson 1976).

*1749+09.* Also known as OT 081, this source was identified as a BL Lacertae object by Browne, Crowther, and Adgie (1973). Since observations began at Rosemary Hill in August 1978, the source has shown substantial variability. A range of $1^{\rm m}56$ has been recorded on only six plates, with an outburst detected on 11 April 1979. Examination of the Palomar Sky Survey print reveals the source of $P \simeq 18.4$, yielding a total known range of variability of about $2^{\rm m}4$. Andrew *et al.* (1978) find the object to be a radio variable at 6.6 and 10.7 GHz, with a major outburst occurring in early 1970.

*1831+731.* Wild (1975) initially identified this as a possible BL Lacertae object but it exhibits Seyfert characteristics according to Wills and Wills (1979). Our data indicate that it has remained at a relatively constant level of $P \simeq 15.4$ over the past four years, with a brightening of about $0^{\rm m}5$ recorded in August 1977. It is noteworthy that Wild's variable appears much fainter on the Palomar Sky Survey (Wills and Wills 1979). Our measurements indicate a magnitude of $P = 18.3$ on the Sky Survey, making the total amplitude in excess of $3^{\rm m}3$. It is equally interesting that the source has remained at its present brightness for over five years, indicating a prolonged phase of intense activity, or that an antiflare occurred when the Sky Survey plate was obtained in September 1953.

*3C 390.3.* A change in brightness of $1^{\rm m}15$ in only three days was reported for this N galaxy by Shen, Usher, and Barrett (1972), suggesting it is in the class of *optically* violent variables. No such extreme activity has been seen at Rosemary Hill, but short-term fluctuations are suggested, particularly over the period July–September 1977, where $\Delta B \simeq 0^{\rm m}7$. The outbursts in 1974 and 1975 display remarkable similarity in their overall shape and duration. A steady long-term decline from 1974 to the present is also quite noticeable.

*OV−236.* This BL Lacertae object has recently undergone much violent activity. The most intense activity was recorded in July 1977, when the source faded by $1^{\rm m}4$ in only nine days, with a $0^{\rm m}8$ drop between 12 and 14 July. Our most recent data indicate an outburst occurred in mid-1979 with the object reaching $P = 15.47$, making its total amplitude in excess of $2^{\rm m}5$.

Recently, an exceedingly large radio outburst was detected by Dent and Balonek (1980). At 31 GHz, they report that OV−236 is presently the strongest known quasar in the sky. An optical-radio correlation based on these most recent data is clearly a possibility, but further analysis is needed.

*2059+034.* A possible long-term decline ensued between 1972 and 1978, and short-term excursions are present, especially during 1975 and 1976.

*2135−14.* This QSO, which has been monitored at Rosemary Hill since mid-1975, has shown about $1^{\rm m}$ of variability. Historical data indicate that the total range of variability is only about $1^{\rm m}3$ (Lü 1972). The radio spectrum is quite steep ($\alpha_{\rm rad} \simeq 1.2$, Craine 1976) and the energy distribution in the optical and near-infrared is fairly flat ($\alpha_{\rm opt} \simeq 0.75$, Neugebauer *et al.* 1979).

*2145+06.* The most striking characteristic of this QSO is its remarkably constant brightness level. In 11 yr of monitoring, the source has maintained a magnitude of $P \simeq 16.3$ with few exceptions. Interestingly enough, Oke, Neugebauer, and Becklin (1970) report the optical–near-infrared spectrum is very flat ($\alpha = 0.13$), a characteristic typical of the more quiescent QSO's. The 6.6- and 10.7-GHz data of Andrew *et al.* (1978) show a steady decline in radio flux between 1966 and 1976, and Dent, Kapitzky, and Kojoian (1974) report a relatively constant flux at 15.5 GHz.

*CTA 102.* The dominant feature of the Florida light curve is a rapid outburst occurring in August 1978, when the object brightened from $B = 18.19$ to $B = 17.12$ in only three days! The analysis shows that this event is significant at the $2.5\sigma$ level, suggesting that this QSO is a member of the class of optically violent variables. Spectral scans by Oke, Neugebauer, and Becklin (1970) show that $\alpha_{\rm opt} = 0.95$. The source is a radio variable at 6.6 and 10.7 GHz, according to Andrew *et al.* (1978).

*2254+07.* Commonly referred to as OY 091, this BL Lacertae object exhibits a steep and variable optical continuum and flat radio spectrum ($2.08 \leq \alpha_{\rm opt} \leq 2.72$,

$\alpha_{rad} = -0.36$; Tapia, Craine, and Johnson 1976). Pollock (1975a) reports a total amplitude of $1^m6$, based on archival records, and the Florida data indicate substantial activity for the source. A range of $0^m84$ was recorded on only 11 plates obtained at Rosemary Hill between July 1979 and the present.

*2349−01*. The Florida light curve of this N galaxy shows a well defined long-term outburst which lasted 4½ yr, reaching a maximum in late 1974. Short-term excursions of about $0^m5$ on a time scale of a few months are present as well. The Palomar Sky Survey indicates the source to be at $P = 14.6$, about $0^m6$ brighter than we have ever observed it, making its total amplitude at least $1^m8$.

### *a) Radio-quiet QSO's (RQQSO's)*

A program to monitor the optical brightness of 19 radio-quiet quasi-stellar objects has been conducted at Rosemary Hill since 1974. The RQQSO's in the sample are grouped in two survey fields, one centered at $1^h36^m+06°$ and the other at $13^h+36°$. The objects in the $1^h36^m+06°$ field were detected on the basis of ultraviolet excess by Haro and Luyten (1962), and photometric studies were carried out by Sandage and Luyten (1967). Sandage and Verón (1965) used the same method to detect sources in the $13^h+36°$ field.

Of the 19 RQQSO's studied, six exhibit optical variability at a confidence level of 95% or greater. Based on our limited data, the incidence of variability among RQQSO's seems lower than that of the rest of our sample of 114 sources. However, when a complete sample of radio-emitting and radio-quiet QSO's is considered, the RQQSO's tend to show variability as often as radio-emitters. Recent studies by Bonoli *et al.* (1979) on the $13^h+36°$ field tend to confirm this. Studies of other survey fields have also been undertaken with similar results. Examination of the Sandage-Luyten field at $8^h48^m+18°$ by Usher (1978), and a field at $15^h10^m+24°$ by Usher and Mitchell (1978) also reveals that a large percentage (~60%) of the RQQSO's exhibit optical variability at a confidence level of 97%. It is interesting to note, however, that the number of optically violent variables among the radio-quiets is very small. Bonoli *et al.* (1979) report that the incidence of OVV's among the RQQSO's is a factor of 10 less frequent than among the radio-emitters. Furthermore, the radio-quiets in general have a smaller amplitude of variability than the radio-emitters. Certainly, our observations tend to support this conclusion.

## III. DISCUSSION

A continuing 11-yr study of a large sample of quasi-stellar objects reveals that the optical variability of these sources is a complex and multifaceted phenomenon. More than half show convincing evidence of variability, with 20 sources exhibiting optically violent activity (see Paper III). If we use the 95% confidence level as our criterion for variability, we find that 58 of the 114 sources reported here are variable by this definition. Undoubtedly, more objects in the sample will be classified as variable as the data base expands. There is evidence that the 95% level may represent a somewhat rigid criterion, since several known variables (according to Grandi and Tifft 1974) are not classified as such by our data when the 95% criterion is imposed. For example, 0202−17, 1148−00, 2128−12, and 2145+06 are all known variables that did not meet the rigid criterion for variability in our study.

In an attempt to categorize the similarities and differences between sources in our sample, each object in Fig. 1 has been assigned to one of the four variability subclasses originally defined in Paper I. Subclass I includes sources whose light curves are dominated by short time-scale variations without conspicuous long-term trends. Members of this subclass include ON 235 and I Zw 1727+50. On the other hand, objects in subclass II exhibit conspicuous long-term changes with little or no short-term flickering. Examples are 1004+13, 1217+02, and 2349−01. In subclass III, long-term variations and short-term flickering are of similar amplitude, with the best examples being 0048−09 and 3C 390.3. Finally, objects in subclass IV are episodic in nature, exhibiting only sporadic activity. The QSO 0850+14 might be categorized in this group.

Examination of the light curves in Fig. 1 makes it obvious that the classification scheme described above is by no means definitive. Sources such as OI 318 and 0736+01 may fit into more than one subclass. Other objects, such as 0159−11, may even change their subclass from one epoch to another. While the distinction between subclasses may not always be well defined (and this tends to be especially true for objects that are only moderately variable), the system nevertheless provides one useful tool for categorizing the diverse and extensive sample of presently known quasars.

Several potentially significant properties associated with optical variability have been mentioned here. Correlations between optical variability and parameters such as optical spectral index and radio variability were discussed for a number of individual sources. The data show that active sources tend to have steeper optical spectra and flatter radio spectra than the less active sources. The BL Lacertae objects are prime illustrations of this pattern. A more detailed analysis of this relationship is being undertaken.

Correlations between optical and radio variability were mentioned for certain objects, with positive correlations appearing in the cases of 0336−01 (see Pomphrey *et al.* 1976) and OV−236 (Dent and Balonek 1980).

Various other properties related to optical variability are being studied and will be discussed in a future paper. The absolute energy associated with specific optical outbursts of a number of sources is presently being analyzed, and a continuing investigation of color changes during flares has been undertaken (see Pica, Smith, and Pollock 1980).

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