

# THE MINOR PLANET BULLETIN

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37.

## MINOR PLANET AND DEEP SKY OBJECT APPULSES JANUARY-MARCH 1987

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(Received: 21 July Revised: 14 August)

A list of minor planet appulses with deep sky objects is presented for astrophotographers and deep sky observers seeking a truly unique photograph or observation. To allow easier identification and to keep the list short, only minor planets brighter than 11.5 visual magnitude are considered. The chosen minimum separation was one degree.

This list has been compiled by a manual search of ephemerides of minor planets coming into opposition in late 1986 and early 1987. After a possible event was found, orbital elements in the 1986 *Ephemerides of Minor Planets* (henceforth referred to as *EMP*) were used with a computer program I wrote for a Radio Shack TRS-80 Model I to produce geocentric ephemerides generally accurate to  $\pm 1$  arc minute. The time of closest approach was then refined to the nearest quarter day.

All positions should be close to those generated using the unpublished (as of this writing in mid-July) 1987 orbital elements. The list may not be complete, but should provide enough opportunities to all observers. A more complete list for the rest of 1987 will be published after a search of the 1987 *EMP*.

Observers may want to sketch the field around the deep sky object a week or two before the event and then identify the minor planet, as the object not on your chart, passing through the field. Astrophotographers may want to use my computer program in the February 1986 *Sky and Telescope* (p. 190) to calculate the exposure time necessary to produce a photo showing one "star" that obviously moved during the exposure. (I would love a copy of such a photo!)

-Summary of appulse criteria for inclusion in the Table:

- 1) The minor planet must be brighter than 11.5 visual magnitude.
- 2) Deep sky objects must be plotted on A. Becvar's *Atlas Coeli 1950* or W. Tiron's *Sky Atlas 2000*.
- 3) The minimum angular separation must at some time be less than one degree.
- 4) The event should take place more than 90 degrees from the Sun, preferably near opposition.
- 5) Any event involving a previously listed minor planet and nearby naked eye stars should also be listed.

-The columns in the Table represent the following information:

- 1) The U.T. date of closest approach, accurate to  $\pm 3$  hours (except events on Jan. 10, Jan. 11 (354 Eleonora), Feb. 28 (both), Mar. 19, and Mar. 23 which should be accurate to  $\pm 90$  minutes). All subsequent data pertain to this time.
- 2) The minor planet name.
- 3) The deep sky object (or star). NGC number if no letter prefix.
- 4) The type of deep sky object. OC=open cluster, GX=galaxy, GC=globular cluster, BN=bright nebula, PN=planetary nebula, S=star, MS=multiple star.
- 5) The angular separation in degrees, accurate to  $\pm 1$  arc minute.
- 6) The minor planets' apparent daily motion in degrees per day.
- 7) The position angle of the minor planets' motion, measured eastward from north. A + sign means add 90 degrees to obtain the position angle (measured from the deep sky object to the minor planet) of closest approach. A - sign means subtract 90 degrees from the position angle.
- 8) The illuminated percentage of the Moon. A + sign means waxing; - means waning.
- 9) The elongation of the Moon in degrees. An asterisk means Moonlight should interfere.
- 10) The minor planets' approximate visual magnitude (V). Based on B(1,0) and methods in the 1986 *EMP* and accounting for the phase effect, but not for the opposition effect. 0.8 magnitude was then subtracted from all B magnitudes to product the V magnitudes.
- 11) The deep sky objects' visual magnitude from *Burnhams Celestial Handbook*. Bright nebula magnitudes are for the brightest associated star. Multiple star magnitudes are for the brightest component only.
- 12) The elongation of the Sun in degrees.

## -Notes to events, listed by date:

- Jan 8.00 16 Psyche is moving very slowly, near the end of direct motion.  
 Jan 10.13 11 Parthenope will pass between Nu and 16 Geminorum.  
 Feb 3.25 Consists of open cluster NGC 2175 and the faint emission nebula NGC 2174.  
 Feb 3.75 This is the first of several favorable appulses of 354 Eleonora as it passes near the center of the Virgo galaxy cluster. Only very close appulses are listed (<0.3 degrees). Moonlight will interfere from approximately Jan. 10-24, Feb. 7-21, and from Mar. 9-20.  
 Feb 18.75 22 Kalliope will pass almost exactly in between the two objects.  
 Feb 24.25 (and May 23.75) 532 Herculina first passes west of NGC 5172 heading almost due north,

then almost exactly three months later it passes east of NGC 4635 heading almost due south; both at the same rate of 0.18 degrees per day. Also, the Moon is at nearly the same phase on both nights!

- Feb 28.75 354 Eleonora should appear superimposed on NGC 4298, however the minimum separation is less than the accuracy of my computer program.  
 Mar 20.50 A small reflection nebula around the star 12 Geminorum.  
 Mar 29.75 5 Astraea will pass through the southern part of the Praesepe cluster and should prove challenging to follow from night to night.

I would like to thank Frederick Pilcher for preparing ephemerides of selected minor planets coming to opposition in early 1987.

TABLE I

1987						MOTION			MOON			
DATE	PLANET	OBJECT	TYPE	SEP	°/DY	PA	%	EL	PMAG	OMAG	SUN	
JAN 5.25	4 Vesta	245	GX	0.97	0.28	56+	32-	17	7.9	12.9	86	
JAN 8.00	16 Psyche	3611	GX	0.69	0.01	19-	60+	139	11.0	12.6	120	
JAN 10.13	11 Parthenope	Nu Gem	MS	0.05	0.24	280+	79+	43	10.3	4.2	167	
JAN 11.25	11 Parthenope	16 Gem	S	0.19	0.24	280-	87+	29	10.3	6.1	166	
JAN 11.25	354 Eleonora	4215	GX	0.05	0.20	65-	87+	112*	10.6	12.8	109	
JAN 19.00	79 Eurynome	3169	GX	0.27	0.15	284+	86-	12*	11.4	11.4	144	
JAN 19.50	79 Eurynome	3166	GX	0.32	0.15	285+	83-	16*	11.4	11.5	144	
FEB 3.25	11 Parthenope	2174-5	OC	0.78	0.11	289+	26+	77	10.7	6.8	138	
FEB 3.75	354 Eleonora	4424	GX	0.29	0.18	12-	31+	157	10.2	12.5	131	
FEB 4.50	354 Eleonora	4417	GX	0.16	0.18	10-	38+	148	10.2	12.2	132	
FEB 14.00	19 Fortuna	PK171-25.1	PN	0.75	0.30	78+	99-	86*	11.2	13.9	95	
FEB 18.75	22 Kalliope	52 Tau	MS	0.42	0.19	74-	75-	142	10.9	5.0	98	
FEB 18.75	22 Kalliope	IC 359	BN	0.48	0.19	74+	75-	142	10.9	12.0	98	
FEB 19.75	354 Eleonora	4388	GX	0.21	0.23	342-	67-	42*	9.9	12.0	147	
FEB 20.50	354 Eleonora	M 84	GX	0.13	0.23	341-	60-	52	9.9	10.5	148	
FEB 24.25	532 Herculina	5172	GX	0.40	0.18	4-	19-	92	9.2	12.5	136	
FEB 28.63	354 Eleonora	4302	GX	0.04	0.25	332-	1+	162	9.8	12.9	155	
FEB 28.75	354 Eleonora	4298	GX	0.01	0.25	332	1+	163	9.8	11.9	156	
MAR 12.25	11 Parthenope	Eta Gem	MS	0.15	0.14	81+	89+	40	11.4	3.3	102	
MAR 13.75	511 Davida	5230	GX	0.15	0.18	313+	97+	48*	11.1	12.9	148	
MAR 15.50	11 Parthenope	IC 443	BN	0.36	0.16	83+	99+	80*	11.4	8.8	99	
MAR 19.25	354 Eleonora	4147	GC	0.06	0.25	316-	85-	52*	9.8	11.0	162	
MAR 20.50	11 Parthenope	IC 444	BN	0.75	0.18	85+	74-	146	11.5	7.5	95	
MAR 23.13	11 Parthenope	Mu Gem	MS	0.05	0.20	86-	45-	174	11.5	2.9	93	
MAR 29.75	5 Astraea	M 44	OC	0.18	0.14	89+	0+	116	10.2	3.1	119	
MAY 23.75	532 Herculina	4635	GX	0.87	0.18	171-	15-	153	9.6	13.0	117	

## A BIBLIOGRAPHY OF MINOR PLANET BOOKS

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A comprehensive list of books devoted primarily or exclusively to asteroids is given, along with a further selection of books that devote a chapter or section to the subject. Both English and foreign sources are included.

### Introduction

Despite having been observed and written about in scientific papers since 1801, asteroids have generally been given short shrift in books. A selection of references of minor planet names and history was given by LoGuirato (1981), but apparently no comprehensive bibliography of minor planet books has ever been published. What follows is such a comprehensive listing: 22 books from 1888 to 1986 that are devoted largely or exclusively to asteroids are noted, along with a sampling of 27 other books containing some asteroid material. Sources in English, Russian, German and Italian are considered. Wherever possible, data includes author, publisher, date and number of pages. A capsule description following this usually includes a grading system ranging from young reader through amateur, advanced, and professional level.

### Books devoted largely or exclusively to asteroids:

Kirkwood, Daniel (1888). *The Asteroids*. J. B. Lippincott Co.; 60 pages. First book ever written on asteroids, by the man whose name is associated with the gaps in the asteroid belt. Amateur level.

Leuschner, Armin O. (1910). *Tables of Minor Planets Discovered by James C. Watson*. National Academy of Sciences Vol. 10, 7th Memoir.

Williams, Kenneth P. (1934). *The Calculation of the Orbits of Asteroids and Comets*. Principia Press Inc., Indiana; 214 pages. Classic work on celestial mechanics. Professional level.

Komendantov, N. V. (1935). *On the Determination of the General Perturbations of the Minor Planets*. United Scientific & Technical Publishing House, Moscow; 75 pages. Mathematical treatise on celestial mechanics. Professional level.

McDonald, Sophia L. and Leuschner, Armin O. (1952). *Tables of General Perturbations for a Group of Minor Planets*. Berkeley; 210 pages. Professional level.

Putilin, I. I. (1953). *Minor Planets*. Technical-Theoretical Institute, Moscow; 412 pages. An excellent book in Russian, largely devoted to orbital work but containing a wealth of historical data. Professional level.

Krinov, E. L. (1956). *Dwarf Planets*. State Publication of Technical-Theoretical Literature, Moscow; 31 pages. A brief popular review, in Russian.

Roth, Gunter (1962). *The System of Minor Planets*. Faber & Faber Ltd., London; 128 pages. Written largely from a European perspective for the advanced amateur; well done, with a particularly good historical section.

Knight, David C. (1973). *The Tiny Planets*. William Morrow & Co., N.Y.; 95 pages. An excellent book for the young reader; includes a glossary.

Gehrels, Tom (editor) (1971). *Physical Studies of Minor Planets*. U.S. Govt. Printing Office; 687 pages. Proceedings of the first Tucson asteroid conference. Professional level.

Pilcher, Frederick & Meeus, Jean (1973). *Tables of Minor Planets*. Privately published; 104 pages. An important compilation of facts and figures about asteroids.

Cristescu, Cornelia, Klepczynski, W. J., & Millet, B. (eds.) (1974). *Asteroids, Comets, Meteoric Matter*. Colloquium of the International Astronomical Union; 350 pages. A professional review concentrating on celestial mechanics. Partially in French.

Nourse, Alan E. (1975). *The Asteroids*. Franklin Watts Pub., N.Y.; 59 pages. Excellent introduction for the young reader.

Morrison, David & Wells, William (eds.) (1978). *Asteroids: An Exploration Assessment*. NASA Conf. Pub 2053; 300 pages. Deals mainly with meteorites, mineralogy, and space missions to the asteroids. Professional level.

Gehrels, Tom (ed.) (1979). *Asteroids*. Univ. of Arizona Press; 1181 pages. The largest and most comprehensive work ever published on minor planets, it includes the complete TRIAD file. Professional level.

MIT Students System Project (1979). *Project Icarus*. MIT Press; 162 pages. Not about asteroids *per se*, it describes a hypothetical space mission to prevent the asteroid Icarus from colliding with Earth. Professional level.

Silver, Leon T. & Schultz, Peter H. (eds.) (1982). *Geological Implications of Impacts of Large Asteroids and Comets on the Earth*. Special Paper 190, The Geological Society of America; 528 pages. A professional review, based on papers presented at a meeting in Snowbird, Utah in 1981.

Farinella, P., Paolicchi, P. & Zappala, V. (1983). *Gli Asteroidi (The Asteroids)*. Il Castello Collane Tecnica, Milan, Italy; 127 pages. Volume 1 in a series of astronomy books in Italian for the amateur.

Lagerkvist, C.-I. & Rickman, H. (eds.) (1983). *Asteroids Comets Meteors*. Uppsala University, Sweden; 455 pages. Recent European asteroid research is presented in 200 pages of this excellent book. Professional level.

Lagerkvist, C.-I. & Rickman, H. (eds.) (1985). *Asteroids Comets Meteors II*. Uppsala University, Sweden; 620 pages. Another 197 pages of the latest professional research on asteroids in both Europe and North America.

Kessler, J., Grun, E., and Sehna, L. (eds.) (1985). *Space Debris, Asteroids and Satellite Orbits*. Pergamon Press; 229 pages. Proceedings of two workshops and the COSPAR Commission P meeting, held in June-July, 1984. Professional level.

Cunningham, Clifford J. (1986). *Handbook of Asteroids: The Next Frontier*. Willmann-Bell Inc., Richmond, Virginia. A survey of all aspects of asteroid research. Advanced level.

#### Some books with chapters on asteroids:

Brewster, David (1811). *Astronomy*. Edinburgh. The first four asteroids are reviewed on pages 126-133.

Davis, John (1868). *Elements of Astronomy*. J. B. Lippincott & Co., Philadelphia; 343 pages. Good review of our scant knowledge of the asteroids in the mid-19th century. Popular level.

Lieprov, I. I. (1904). *Secrets of the Heavens*. Moscow. Details the discovery circumstances of the first 300 asteroids. In Russian.

MacPherson, Hector (1911). *The Romance of Modern Astronomy*. Seebly & Co. Ltd. Chapter 9 gives a good survey of asteroids.

Chambers, George F. (1913). *Story of the Solar System*. D. Appleton & Co.; 188 pages. A disparaging look at asteroids in the early 20th century. Popular level.

Alfven, Hans (1954). *On the Origin of the Solar System*. Oxford University Press; 191 pages. Chapter 7 draws parallels between the ring system of Saturn and the asteroid belt. Professional level.

Watson, Fletcher G. (1956). *Between the Planets*. Harvard University Press; 222 pages. Chapters 2 and 3 review the history and physical nature of asteroids. Amateur level.

Ley, Willy (1963). *Watchers of the Skies*. Viking Press Inc., N.Y.; 528 pages. Chapter 13 is a superb historical survey of asteroid discovery. Popular level.

*The Flammarion Book of Astronomy* (1964). Simon & Schuster, N.Y.; 669 pages. Good section on history, names and orbits. Popular level.

Moore, Patrick (1971). *The New Guide to the Planets*. W. W. Norton Co., N.Y. Chapter 10 reviews minor planets at a popular level.

Kopal, Zdenek (1972). *The Solar System*. Oxford University Press; 152 pages. Chapter 8 primarily considers the orbital properties of asteroids. Amateur level.

McCall, Robert and Asimov, Isaac (1974). *Our World in Space*. New York Graphic Society; 168 pages. Chapter 5 explores the possibilities of colonizing Ceres. Popular level.

Branley, Franklyn M. (1974). *Comets, Meteorites and Asteroids*. Thomas Crowell Co., N.Y. Chapter 2 gives a short overview of asteroids for the young reader.

Duncombe, Raynor L. (ed.) (1979). *Dynamics of the Solar System*. D. Reidel Publishing Co.; 330 pages. Part V includes nine papers on asteroids. Professional level.

Lunan, Duncan (1979). *New Worlds For Old*. William Morrow & Co.; 268 pages. Chapter 8 looks ahead to the exploration and mining of asteroids. Popular level.

Mumford, George (1979). *The Cloudy Night Book*. Sky Publishing Corp.; 115 pages. Designed to occupy astronomers on cloudy nights, it includes a crossword puzzle on page 24 featuring the names of the first 100 asteroids.

Glass, Billy (1982). *Introduction to Planetary Geology*. Cambridge University Press; 469 pages. Chapter 10 deals with asteroids and comets. Professional level.

Levy, David H. (1982). *The Joy of Gazing*. Montreal Centre; 62 pages. Chapter 8 briefly mentions asteroid occultations. Young reader level.

Chapman, Clark (1982). *Planets of Rock and Ice*. Charles Scribner's Sons, N.Y.; 222 pages. Chapter 4 looks at the origin and composition of asteroids. Amateur level.

Fricke, W. and Teleki, G. (eds.) (1982). *Sun and Planetary System*. D. Reidel Pub. Co. Several professional papers.

Markellos, V. V. and Kozai, Y. (eds.) (1983). *Dynamical Trapping and Evolution in the Solar System*. D. Reidel Pub. Co.; 424 pages. Includes sections on asteroids and trapped motion in the three-body problem (Trojans). Professional level.

Genet, Russell M. (1983). *Solar System Photometry Handbook*. Willmann-Bell Inc., Richmond, Virginia. Chapters 1 and 8 cover asteroid photometry and occultations for advanced amateurs.

Hartmann, William K. (1983). *Moon and Planets*. Wadsworth Pub. Co.; 509 pages. Chapter 7 presents a wide-ranging survey of asteroids. Advanced level.

Moore, Patrick (1983). *History of Astronomy 6th revised edition*. Macdonald and Co. Ltd., London; 327 pages. Chapter 17 is an insightful history of asteroid discovery at the popular level.

Hahn, Hermann-Michael (1984). *Between The Planets: Comets, Asteroids, Meteorites*. Franckh'sche Verlagshandlung, West Germany; 208 pages. Written in German by a science journalist, most of the text deals with comets.

Wilford, John Nobel (1985). *The Riddle of the Dinosaur*. Alfred Knopf, N.Y.; 304 pages. The dinosaur extinction debate is well covered in several chapters. Popular level.

Faughnan, B. and Maryniak, G. (eds.) (1985). *Space Manufacturing 5: Engineering with Lunar and Asteroidal Materials*. AIAA, N.Y.; 268 pages. Professional review.

#### Acknowledgements

Thanks to Tom Gehrels, who provided me with English translations of the books by Putilin and Krinov.

#### References

LoGuirato, June (1981). "References On Minor Planet Names And History". *Minor Planet Bulletin* 8, 38-39.

PHOTOELECTRIC PHOTOMETRY OPPORTUNITIES  
NOVEMBER-JANUARY

Alan W. Harris  
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The table below lists asteroids which come to opposition during the months of November-January that represent useful targets for photoelectric photometry observations. Observations are needed because the asteroid has either an unknown or ambiguous rotational period or because the asteroid will be observable at a very low phase angle. The table also includes asteroids which are candidates for pole determinations (see the article by Di Martino and Zappalá in issue 12, No. 1) or are targets for radar observations (see the article by Ostro in *MPB* 10, No. 4). The table gives (in order of opposition dates) the asteroid number and name, opposition date, opposition B magnitude (the V magnitude is about 0.8 brighter), the rotational period (in hours), the estimated lightcurve amplitude (in magnitudes), and the designation PER if observations are needed to determine the rotational period. AMB implies that previous period determinations have given ambiguous results and these alternate periods are listed in the table. PHA indicates observations of the phase curve are desired because the asteroid will be at an unusually low phase angle, POL indicates the asteroid is a pole position candidate, and RAD indicates the asteroid is a planned radar target. Question marks are used to denote uncertain or unknown values. An outline of recommended observing procedures is given in *MPB* 11, No. 1, page 7. Also recommended is the book *Solar System Photometry Handbook* (see the review by Tholen in *MPB* 11, No. 4). Ephemerides for all of the asteroids in the table are included in this issue. Some of these may appear on finding charts prepared by Mr. Joseph F. Flowers, Route 4 Box 446, Wilson, NC 27893, USA. These charts are free for a self-addressed stamped envelope.

Asteroid	Opp'n Date	Opp'n B Mag	Per	Amp	
19 Fortuna	Nov 21	10.2	7.445	0.25	POL
128 Nemesis	Nov 26	11.8	39.	0.1	PHA
22 Kalliope	Dec 3	11.1	4.148	0.17	PHA+POL
10 Hygiea	Dec 18	11.4	17.495	0.18	AMB
			or 8.75		
11 Parthenope	Dec 31	11.5	7.83	0.12	PHA
704 Interamnia	Jan 26	11.9	8.727	0.11	POL

Photoelectric Photometry Opportunities

DATE	R.A. (1950) DEC.		MAG B	PHASE ANGLE
	HR	MIN		
Minor Planet 10 Hygiea				
Nov 11	6 4.3	25 25.	11.62	11.2
21	5 59.3	25 22.	11.44	8.6
Dec 1	5 52.3	25 17.	11.24	5.7
11	5 44.0	25 8.	10.99	2.4
21	5 35.2	24 57.	10.89	1.2
31	5 26.6	24 42.	11.14	4.5
1987 Jan 10	5 19.1	24 26.	11.35	7.7
20	5 13.4	24 10.	11.52	10.4
30	5 9.7	23 56.	11.69	12.8
Feb 9	5 8.4	23 45.	11.84	14.5

Minor Planet 11 Parthenope				
Dec 1	7 4.6	18 50.	11.49	13.3
11	6 57.5	19 6.	11.30	9.4
21	6 48.3	19 28.	11.07	5.0
31	6 37.7	19 52.	10.80	1.2
1987 Jan 10	6 27.2	20 18.	11.08	4.7
20	6 17.9	20 43.	11.34	9.0
30	6 10.9	21 7.	11.55	12.8
Feb 9	6 6.8	21 28.	11.77	15.9
19	6 5.7	21 48.	11.97	18.4
Mar 1	6 7.5	22 6.	12.16	20.1

Minor Planet 19 Fortuna				
Oct 2	4 8.3	20 34.	11.25	23.8
12	4 10.1	20 28.	10.99	20.6
22	4 8.2	20 10.	10.72	16.5
Nov 1	4 2.7	19 43.	10.44	11.6
11	3 54.5	19 7.	10.16	6.1
21	3 44.8	18 26.	9.77	0.6
Dec 1	3 35.3	17 45.	10.19	5.8
11	3 27.5	17 12.	10.52	11.2
21	3 22.6	16 51.	10.84	15.8
31	3 21.0	16 44.	11.15	19.6
1987 Jan 10	3 22.9	16 51.	11.43	22.5

Minor Planet 22 Kalliope				
Nov 1	5 5.5	21 55.	11.30	14.0
11	4 59.5	22 38.	11.10	10.3
21	4 51.1	23 20.	10.88	6.1
Dec 1	4 41.0	23 59.	10.56	1.6
11	4 30.4	24 32.	10.70	3.3
21	4 20.7	25 1.	11.00	7.7
31	4 13.0	25 27.	11.20	11.7
1987 Jan 10	4 8.1	25 52.	11.41	15.0
20	4 6.2	26 17.	11.62	17.6
30	4 7.4	26 44.	11.81	19.6

Minor Planet 128 Nemesis				
Oct 12	4 35.8	18 11.	12.31	18.9
22	4 33.9	18 20.	12.08	15.8
Nov 1	4 29.8	18 25.	11.85	11.9
11	4 21.4	18 29.	11.63	7.6
21	4 12.0	18 31.	11.33	2.8
Dec 1	4 2.0	18 32.	11.33	2.5
11	3 52.7	18 35.	11.68	7.1
21	3 45.3	18 42.	11.94	11.3
31	3 40.5	18 56.	12.21	14.9
1987 Jan 10	3 38.7	19 16.	12.46	17.8

Minor Planet 704 Interamnia				
Dec 11	8 49.2	11 4.	12.07	14.7
21	8 45.2	10 21.	11.89	12.4
31	8 39.0	9 46.	11.70	9.5
1987 Jan 10	8 31.1	9 21.	11.53	6.4
20	8 22.1	9 5.	11.35	3.7
30	8 12.9	8 57.	11.37	3.7
Feb 9	8 4.3	8 56.	11.58	6.3
19	7 57.2	8 59.	11.80	9.3
Mar 1	7 51.9	9 4.	12.01	11.9
11	7 48.9	9 10.	12.22	14.1

## ASTEROID NEWS NOTES

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### Fifty New Asteroids

Through the August batch of Minor Planet Circulars, 50 asteroids were newly numbered, bringing the total to 3495. Non-main belt objects include the following:

(3347) 1956 SC Hungaria  
(3451) 1984 HA1 Trojan  
(3483) 1976 YP2 Hungaria

### Earth-approaching Asteroid Update

The 1.2-m Schmidt telescope on Palomar Mountain has been completely engaged with the Second Palomar Sky Survey. As you might expect, those deep, wide-field exposures are quite capable of picking up faint fast-moving objects. Of course, those objects would go unnoticed and become lost if nobody took the time to examine the plates shortly after their exposure. Fortunately, E. F. Helin is involved with the new Sky Survey as well as with the planet-crossing asteroid surveys that have in the past utilized both the 1.2-m and 0.46-m Schmidt telescopes at Palomar. Thanks to her efforts, three new earth-approaching asteroids were discovered recently, all with the 1.2-m Schmidt telescope.

1986 LA was discovered by Helin on June 4; the object has an Amor-type orbit. 1986 NA was found by A. Maury on a plate taken by C. Wilson and J. Mueller on July 8; this object also has an Amor-type orbit. Lastly, 1986 PA was discovered by Helin and Wilson on August 2, but this time the asteroid turned out to have an Apollo-type orbit. All three of the new discoveries are rather faint.

In addition to the three objects discovered during the last quarter, the Amor asteroid 1983 RD was recovered by T. Gehrels and J. Scotti using the SpaceWatch Camera on Kitt Peak. 1983 RD is making a very favorable apparition in 1986, reaching its greatest brightness in early October at around  $V = 14.2$ . Northern hemisphere observers will be hampered by the object's declination of about  $-30$  degrees, however; because the object is heading south, northern hemisphere observers should try their luck tracking down the object before greatest brightness. An ephemeris is provided below.

#### 1983 RD

UT DATE	R.A.	DEC	V
1986 Sep 07	19 28 02.0	-03 45 56	15.0
1986 Sep 12	19 38 53.3	-07 51 30	14.8
1986 Sep 17	19 54 36.3	-12 43 48	14.6
1986 Sep 22	20 16 28.4	-18 21 49	14.5
1986 Sep 27	20 46 02.4	-24 32 12	14.3
1986 Oct 02	21 24 38.4	-30 40 27	14.2
1986 Oct 07	22 12 05.1	-35 51 36	14.2
1986 Oct 12	23 05 02.3	-39 12 21	14.3
1986 Oct 17	23 57 17.7	-40 22 58	14.4
1986 Oct 22	00 43 09.7	-39 44 10	14.6
1986 Oct 27	01 20 13.7	-37 54 06	14.8
1986 Nov 01	01 48 56.3	-35 25 38	15.0

### New Asteroid Names

The June batch of MPCs contained 35 new names for numbered asteroids. The one that MPB readers should instantly recognize is (3123) Dunham, named in honor of David Dunham, who has been actively leading the effort to predict and observe occultations of stars by asteroids.

### Jay Gunter Retires From *Tonight's Asteroids*

[This News Note contributed by the editor.]

In April 1971 Dr. Jay U. Gunter, a hospital pathologist, began a project which would soon become the publication, *Tonight's Asteroids*. Gunter constructed finding charts for bright asteroids and distributed this publication bi-monthly to over 700 subscribers free for a self-addressed stamped envelope. After 15 years, 100 issues, and 1006 finding charts, Jay has chosen to retire from what he modestly describes as a "Project in Amateur Astronomy." His efforts have been recognized by the Astronomical Society of the Pacific which bestowed upon him the 1983 Amateur Achievement Award. Gunter's work is also recognized by minor planet 2136 JUGTA (Jay U. Gunter's *Tonight's Asteroids*). Fortunately, *Tonight's Asteroids* will continue under the hand of Joseph F. Flowers, Jr., Route 4 Box 446, Wilson, NC 27893.

Undoubtedly, many MPB readers (including the editor) were first introduced to observing minor planets by *Tonight's Asteroids* and have benefited greatly from Jay's personal communications. The ALPO Minor Planets Section offers its thanks to Jay Gunter for his considerable efforts in promoting interest in this field. We also offer our best wishes for the years ahead.

**THE MINOR PLANET BULLETIN** is the quarterly journal of the Minor Planets Section of the Association of Lunar and Planetary Observers. The Minor Planets Section is directed by its Recorder, Prof. Frederick Pilcher, Department of Physics, Illinois College, Jacksonville, IL 62650 USA. The MPB is edited and composed by Dr. Richard P. Binzel, Department of Astronomy, University of Texas, Austin, TX 78712 USA and is distributed by Derald D. Nye, Route 7 Box 511, Tucson, AZ 85747 USA. Bob Werner, Route 1 Box 237A, Solon, Iowa 52333 USA assists with the typesetting. The subscription rate is \$7.00 US a year for surface mail and \$9.00 US a year for overseas air mail. Checks or money orders should be made payable to the "Minor Planet Bulletin". Subscription payments, address changes, or other subscription business should be sent to Mr. Nye. The numbers in the upper-right corner of your mailing label indicate the volume and issue number with which your subscription expires.

Articles for submission to the MPB should be sent to the editor who also serves as the Photoelectric Photometry Coordinator. Authors with access to an Apple Macintosh computer are strongly encouraged to submit their manuscripts on diskette. All authors should follow the guidelines given in "Instructions for Authors" in MPB 13-3. Visual photometry observations, positional observations, any type of observation not covered above, and general information requests should be sent to the Recorder.

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The deadline for the next issue (14-1) is November 1, 1986. The deadline for issue 14-2 is February 1, 1987.