JPL D-3698

INFRARED ASTRONOMICAL SATELLITE

ASTEROID AND COMET SURVEY

PREPRINT VERSION No.1
OCTOBER 1986

JPL D-3698

IRAS

ASTEROID AND COMET SURVEY

Preprint Version No. 1

Edited by

Dennis L. Matson

October 1986

JPL D-3698

Infrared Processing and Analysis Center (IPAC)

Jet Propulsion Laboratory,
California Institute of Technology
Pasadena, CA 91109

October 17, 1986

TO: The Reader

FROM: The Editor

SUBJECT: The Preprint

The purpose of this preprint (Version No. 1) is to supply interim documentation to accompany the release to NSSDC of the IRAS data products for known asteroids and comets. This preprint will be reissued at the time the processing has been completed for the asteroids for which orbits are not known. This will be known as Version 2. It will contain Chapter 4, the Acknowledgements, the index and small augmentations to one or two of the existing chapters. Beyond that, it is planned to publish a revision of Preprint Version 2 as a NASA Special Publication or in some other similar format.

We would appreciate hearing of any errors discovered by the readers. Your inputs prior to January 5, 1987 would be most helpful. In bibliographic reference to this volume, the preprint version number should b included.

SUMMARY

The Infrared Astronomical Satellite (IRAS) has enabled the largest, least biased and most uniform survey of asteroids and comets. The survey has increased the number of asteroids for which there are available albedos and diameters by an order of magnitude. Data were obtained for 25 comets, 1,811 known asteroids and ~TBD asteroids without orbits. Several tens of thousands of lesser sightings exist in the database. These did not meet the present catalog thresholds but are still useful for research. As additional orbits become available, it will be possible to upgrade some of these sightings and admit them into the catalogs. This collection is sufficiently robust to support research and analysis for many years to come.

The IRAS ASTEROID AND COMET SURVEY is divided into three parts. Part I is the Asteroid and Comet Explanatory Supplement which gives the characteristics of the data and explains how it was reduced. Part II is a User's Guide in which is found the information useful when actually using the data. Part III contains five of the asteroid and comet catalogs.

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CHAPTER 1. INTRODUCTION

The chief purpose of the Infrared Astronomical Satellite (IRAS) was to survey the sky in four infrared wavelength bands centered at 12, 25, 60 and 100 μm. The satellite was launched in January 1983 and obtained observations until November 1983. In this period it surveyed approximately 96 percent of the sky. The IRAS mission, data processing and products were described in an Explanatory Supplement[1], with which the reader is assumed to be conversant. The IRAS data are available in several catalogs, organized primarily according to the angular size of the source. These include the Point Source Catalog, the Extragalactic Catalog[2], the Small Scale Structure Catalog[3] and an atlas of surface brightness images of the sky (the Sky Brightness Images). The Point Source Catalog contains about a quarter of a million entries of spatially unresolved sources. The Small Scale Structure Catalog contains 16,740 sources with a resolved size of up to 8 arcminutes. The Sky Brightness Images show sources of size larger than 4 arcminutes. These catalogs all deal with sources which are fixed on the sky. To this collection are now added catalogs which tabulate data for moving sources, the asteroids and comets.

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[1] Explanatory Supplement to the IRAS Catalogs and Atlases, Jet Propulsion Laboratory, JPL D-1855, 1984. Referred to herein as ES.
[2] Catalogued Galaxies and Quasars Observed in the IRAS Survey, Jet Propulsion Laboratory, JPL D-1932, 1985. Referenced herein as CGQ.
[3] IRAS Small Scale Structure Catalog, Jet Propulsion Laboratory, JPL D-2988, 1985.

It must always be remembered that the catalogs and databases resulting from Asteroid and Comet Survey are fundamentally a different kind of product than those catalogs and databases produced for fixed sources. Asteroids and comets move and their apparent emission levels can vary by large amounts. Consequently different methods and criteria have been used for collecting observations and determining which are valid sightings. Some of those differences will be contrasted in the following sections.

IRAS Asteroid and Comet Survey is the largest, most uniform and least biased survey ever conducted for asteroids and comets. The size and approach of this survey gave it marked advantages over earlier surveys with which it is compared in Table 1-1. Some ninety-six percent of the sky was scanned, providing a large number of asteroids/comets and an excellent sampling of the spatial distributions. The instrument and survey parameters were relatively constant throughout, thanks to the space environment, yielding a uniform set of data. This was the first survey to observe thermal emission and thereby it avoided the severe albedo bias present in visual surveys. As an example of how severe this bias can be consider two otherwise equal asteroids, one with (bolometric Bond) albedo 0.03 and the other with albedo 0.2. The flux of reflected sunlight differs between them by a factor of almost seven. But, the total radiated infrared flux differs by only a factor of 1.2!

Data for 25 comets, 1,811 known asteroids and ~TBD asteroids without orbits were obtained and accepted into the IRAS asteroid and comet catalogs. These increase the number of available albedos and diameters for asteroids by about an order of magnitude. Many tens of thousands of lesser sightings also exist in the database. These did not meet the catalog thresholds but are still useful for research purposes. Furthermore, as additional orbits become available, it will be possible to upgrade some of these sightings such that they can be added to the catalogs.

This volume contains the documentation of the IRAS Asteroid and Comet Survey as well as some of the asteroid and comet catalogs. Part I is an Explanatory Supplement that documents the characteristics of the asteroid and comet data and tells how they were processed. Part II is a User's Guide in which are found the technical details about the data, including data formats. Part III contains four of the moving source catalogs.

1.1 The IRAS Survey

Effective use of the asteroid and comet data requires knowledge of how the IRAS survey was conducted. So it is appropriate to start with an overview of those aspects of the IRAS mission and data processing that are of particular relevance to users of the Asteroid and Comet Survey. (A complete description of these matters is to be found in the Explanatory Supplement (ES)).

Table 1-1 ASTEROID SURVEY

Survey	Instrument	Region Surveyed (Ecliptic Coord.)	Number of Asteroids Observed	Limiting B Magnitude	Remarks
Yerkes-McDonand (Kupier *et al*. 1958)	10-inc Refractor	±20° Lat. All Longitudes	2,200	~16^m	1,2
Palomar-Leiden (Van Houten *et al*. 1970)	48-inch Schmidt	12° Lat. by 18° Long.	2,200	~20^m.5	2,3
JPL-ROE (Work in progress)	48-inch Schmidt	Selected Areas	~1,500 est.	~21^m est.	2,4
IRAS	Spacecraft	96% of the sky			
Comets			25	N/A	5
Known Asteroids			1,811		
Asteroids/Comets with unknown orbits			TBD		

Key to Remarks:

1. Completion drops sharply for high inclination
2. Biased against dark asteroids
3. Small sky region surveyed leads to large uncertainties in population estimate
4. Designed to determine orbits and not measure population parameters
5. Limiting flux density ~0.5 Jy at 25 μm

1.1.1 The Instrument

The focal plane of the IRAS telescope contained an array of 62 infrared detectors. Their spectral coverage was divided among four wavelength bandpasses, 12, 26, 60 and 100 μm. The detectors were rectangular in plan with typical angular sizes projected on the plane of the sky of 0.76′ x 4.6′ for 12 and 25 μm, 1.5′ x 4.7′ and 60 μm and 3′ x 5′ for 100 μm (ES Sec. II.C.4; ES Fig. II.C.6). A low resolution spectrometer (ES Sec. IX) obtained 8-22 μm spectra of 12 and 25 μm sources brighter than about 10 Jy. Among these were 47 spectra of asteroids.

1.1.2 The Confirmation Strategy

"To be included in the IRAS catalogs a source had to be confirmed on timescales of seconds, hours and weeks (ES Sec. V.D. and ES Sec. V. E.). The layout of the focal plane was such that the image of an inertially fixed source traversed at least two detectors in each band within a few seconds. The requirement of seconds-confirmation rejected signals from non-astronomical sources such as energetic particle hits and fast-moving space debris. The survey strategy (ES Sec. III.C) ensured that each piece of sky was scanned at least twice within a 36-hour period and usually on consecutive orbits 100 minutes apart. A source with seconds-confirmed sightings on two or more orbits within 36 hours was considered to be hours-confirmed. The final level of confirmation was obtained by rescanning the same portion of sky a few weeks later and requiring another complete hours-confirmed sighting of the source. The last two confirmation requirements eliminated comets and asteroids from the point source catalog. All sources in the IRAS point and small extended source catalogs ... have been seconds, hours and weeks confirmed." (CGQ Sec. II.B). The reader is referred to ES Sec. V for further discussion of this process.

All of the data for the Asteroid and Comet Survey were required to be seconds confirmed. The moving source data were split-off from the data for other source types at the hours and weeks confirmation processing steps and saved for later reduction.

1.1.3 The Survey

"The IRAS mission lasted from January to November 1983 during which time 96 percent of the sky was covered with at least two hours-confirming sets of scans and 72 percent of the sky was covered with three or more hours-confirming scans (ES Sec II, ES Sec. VIII. B, ES Sec. XIII). The areas completely missed are contained in two gaps on opposite sides of the sky, 5 degrees wide at the widest point centered on ecliptic longitudes of 160 degrees and 340 degrees and extending 60 degrees above and below the ecliptic plane (ES Sec. F.I.C.1). Many smaller gaps with a single second- or hours-confirming coverage, are to be found randomly across the sky (ES Sec. XIII)".

"The IRAS Point Source Catalog contains about 245,000 objects. The Extragalactic Catalog contains 11,444 point sources and about 1,000 small extended sources. The reliability and completeness of the data are a function of the source density and the level of coverage (ES Sec. VIII.D). At high galactic latitudes, the completeness of the Point Source Catalog is estimated to be essentially unity at 60 μm above 1.5 Jy for areas of the sky with two hours-confirming coverages, and above 0.6 Jy for areas that received three hours-confirming coverages. Outside of confused regions the reliability exceeds 99.9 percent for sources with two or more hours-confirmation". (CGQ Sec. II.C).

1.1.4 Position and Photometric Data

"The accuracy of the position quoted ... depends on the brightest of the ... wavelengths detected. The rectangular aspect of the detectors results in a locus of positional uncertainty for a source that is roughly eliptical in shape. A comparison of Point Source Catalog positions for galaxies with well determined optical positions (Dressel and Condon, 1976) have shown that the absolute position errors are about 4" (in-scan) x 15" (cross-scan) for the fainter galaxies (ES Sec. VII.C.1)". (CGQ Sec. II.D).

The absolute calibration of the IRAS observations is described extensively in ES Sec. VI.C and ES. Sec. VII.D.

"The second calibration uncertainty concerns the photometry of bright 60 and 100 μm sources. In-flight tests revealed that at 60 and 100 μm the frequency response of the detectors was not independent of the total flux falling on the detector, as has been assumed for the data processing (ES

Sec. IV.A.4). For point sources brighter than about 100 Jy at 60 or 100 μm, the uncertainties in the fluxes may be as large as 30% at 60 μm and 70% at 100 μm (ES Sec. VI.V.4.d). This caution applies equally to the small extended sources. This effect depends on the background as well as on the brightness of the source itself. The photometry of any source in a background greater than 10 MJy sr^{-1} at 60 and 100 μm is therefore suspect. The sign of the effect is a function of the frequency". (See ES Fig. IV.A.4)(CGQ Sec. II.D).

"The relative photometry of the IRAS point sources is generally good with uncertainties ranging between 5 and 20% depending on the brightness of the source and the smoothness of the underlying background". (ES Sec. VI.B., ES Sec. VII.D).

1.1.5 Confusion

"Whether the properties of a source were properly measured by IRAS depends in large part on its isolation from other objects. Parts of the infrared sky are highly confused, most notably the regions within several degrees of the Galactic Plane and the Magellanic Clouds, at short wavelengths, and over a large fraction of the sky at 100 μm due to the effects of the highly structured diffuse emission from interstellar dust (see Sec. 1.1.6 below)".

"At the worst, confused sources may have been poorly confirmed so that one or more of the confused sources may have failed to satisfy the basic requirements for inclusion in the Point Source Catalog. Lesser effects include poor piecing together of the measurements at the different wavelengths resulting in peculiar colors. The fact that confusion levels vary with wavelengths, being worst at 100 μm, adds to the difficulty in interpreting such sources. It is quite possible to separate successfully two close galaxies at 12 and 25 μm, but to lose one or the other at 60 and 100 μm. A number of flags warn of possible confusion (ES Sec. VII.H, ES Sec. X.B.; and CGQ Sec. IV)". (CGQ II.E).

Confusion was one of the more common reasons for rejecting asteroid sightings. In fact 21 asteroids had all of their sightings so rejected.

1.1.6 Cirrus

"The far-infrared sky is characterized by extended, filamentary structure, particularly at 100 μm, which reaches almost to the galactic poles (Low, et al., 1984). Knots and ridges in the cirrus can give rise to point-like and extended sources, which may coincide on the sky with galaxies. Cirrus can have a number of effects. First, a source due entirely to cirrus can be in positional coincidence with an extragalactic object and therefore included in ... (the CGQ) catalog. Second, a galaxy detected at, say, 60 μm can take its 100 μm flux from a piece of cirrus. Third, confusion by cirrus can cause a source to lose measurements at 60 or 100 μm".

"A set of flags (ES Sec. V.H.4; ES Sec. VII.H) warn of the likely presence of cirrus-generated sources, but these flags cannot be guaranteed either to identify all possible cirrus sources or to indicate that a particular source is actually cirrus-generated. Therefore the user is warned to be on the lookout for cirrus-related sources in this Catalog. Cirrus typically is detected only at 100 μm (though occasionally also at 60 μm). Cirrus-generated point sources are often of relatively low flux density, low correlation coefficient (see CGQ Sec. IV.A) and low signal-to-noise. They also tend to occur in groups and strings, and to be associated with several unconfirmed small extended sources. Unfortunately, in cirrus-filled areas, it is not possible without studying the field around the particular source very carefully to establish whether a specific IRAS source, especially one detected at 100 μm, is a galaxy or a cirrus fragment. Particularly at $|b|<60^{o}$ the user must be cautious". (CGQ II.D).

In the Asteroid and Comet Survey, the presence of 100μm cirrus was so frequently observed that it was decided not to use any of these data for the determination of asteroid diameters and albedos. The 100μm fluxes are tabulated, but the user must examine each case by hand before deriving diameters or other parameters.

1.2 The Asteroid and Comet Explanatory Supplement

This Supplement characterizes the properties of the asteroid and comet data and documents their processing. Chapters 2 and 3 provide the first look at the IRAS Asteroid and Comet Survey data. The data set is examined in terms of rate of acquisition, distribution of sources on the sky, flux distribution, colors and many other parameters. In the latter parts of Chapter 2 there are key discussions on the estimated reliability and completeness of the survey.

The processing of the comet and asteroid sightings are the subject of Chapters 5 and 6. The Scientific Data Analysis System (SDAS) and its Asteroid Tagging Algorithm (ATA) are considered first. The output from SDAS becomes the input to the Asteroid Data Analysis System (ADAS) which is the software specifically designed to reduce the asteroid/comet survey.

Infrared fluxes alone do not give the albedos and diameters of asteroids. A model is needed to relate how absorbed sunlight spends its time as heat at the asteroid's surface and then is radiated as thermal emission. In considering the model to use we conducted a review of the available models and then adopted a model and a set of parameters. Chapter 7 contains a detailed discussion of the physics of that model as well as the various lookup tables which were used in ADAS.

1.3 The User's Guide to IRAS Asteroid and Comet Data Products

The User's Guide to Data Products (Part II, Chapters 8 and 9) lists the various asteroid and comet data products, their logical organization, parameters and the origin and accuracy of the ground-based data which were incorporated into the ADAS reduction. Appendices to the User's Guide give information on how to order the data products, data formats, acronyms and a glossary.

1.4 IRAS Asteroid and Comet Catalogs

Part III of this volume contains four catalogs: the IRAS Asteroid Catalog, the Asteroid Statistics Catalog, the Low Resolution Spectrometer Spectra of Selected Asteroids and the IRAS Comet Catalog.

1.5 Known Processing Errors

At the time of this writing we are aware of several processing errors. These are now discussed.

(1) Values used for G: Of the 317 asteroids with high quality (Class 1) photometric data for which H and G were determined via least-square fit 79 had values of G which were less than zero or greater than

one-half. During the final IRAS Asteroid Workshop on 3-4 June 1986 several people, including E. Bowell, A. Harris, and (via telephone) B. Marsden, expressed their concern that such values were "non-physical" and were, presumably, the results of using data from more than one opposition (i.e., aspect) and/or not accounting for rotational lightcurve induced brightness variations. Hence, it was recommended that these 79 asteroids be treated as though they were class 2 photometric data (c.f., Chapter 9) and be assigned default values of G. Accordingly a table giving the recomputed values of H, using the indicated default values of G, for the 79 asteroids in question was added to the notes accompanying the IRAS Asteroid Catalog [FDP No. 4]. Asteroids marked with an asterisk are those which appear in the IRAS Asteroid Catalog (FDP 4).

(2) Band-merge failure: A few observations with multi-band detections were not properly assembled or merged and only the 25 μm sighting was accepted. This problem is discussed in Sec. 2.9.6.

(3) Low Signal-to-Noise Ratio (SNR) flux error: The flux densities quoted for low SNR sightings are on the average two bright. This yields diameters that tend to be too large and albedos that tend to be too low. This is discussed in Sec. 2.9.7. This is a problem affecting all IRAS observations, not just the asteroid and comet survey.

(4) Variance Underestimation: Some variances of chi-square parameters were underestimated by about 20 percent. This is discussed at the end of Sec. 5.2.3.2.

Chapter 2. Characteristics of the IRAS Asteroid Data

by

Glenn J. Veeder

Numerous sightings of the known asteroids were made by the IRAS Asteroid Survey. Of these, 7,015 sightings were of sufficient quality to be accepted into the asteroid catalog. This chapter deals with these accepted observations from 1,811 individual asteroids with known orbits. Diameters, albedos and various technical parameters have been derived for these minor planets showing some properties of the population. The simple distribution functions for the sightings are studied first. When and where the asteroids were observed, their fluxes and colors are all considered in detail. Next come the expositions of the survey statistics. The asteroid sightings are dissected several ways into their component sub-populations. Comparisons are made with earlier work and the missing asteroids are accounted for. Analysis shows that the survey is both reliable and near complete. However, it is not perfect and the chapter concludes with caveats which the user should consider.

2.1 Asteroid Sample Distributions in Space and Time

Epoch of observation and spatial distributions were studied. The latter included longitude, latitude, heliocentric distance and distance from the ecliptic. No outstanding biases were found in the sample except for the two gaps in sky coverage which occurred when IRAS ran out of cryogen before the whole sky had been surveyed.

2.1.1 Epochs of Asteroid Observations

The asteroid survey began early in 1983 with SOP 29 of the minisurvey (cf. Rowan-Robinson et al., 1984). It continued during the IRAS mission through SOP 600 until the satellite depleted its supply of liquid helium (cf. Neugebauer et al. 1984). IRAS detected objects throughout the solar system. The asteroid survey was conducted only while IRAS was operating in its point source survey mode. The number of IRAS sightings associated by ADAS with asteroids (whose orbital elements were known as of November 1985) through the course of the 1983 survey is shown as a histogram in Figure 2-1. The ordinate values have been normalized by the fraction of time that IRAS was in its survey mode so this histogram is one of the relative rates at which asteroid observations were obtained. Each bin is 10 SOP's wide.

2.1.2 Coverage in Ecliptic Longitude

The IRAS orbit was chosen to precess throughout the mission so that the survey systematically swept out the entire sky several times. There are two 5 degree gaps in sky coverage near 160 and 340 degrees longitude. The number of accepted IRAS survey observations of asteroids with known orbital elements is histogrammed as a function of ecliptic longitude in Figure 2-2.

2.1.3 Coverage in Ecliptic Latitude

While the IRAS survey strategy was to scan lunes (ES III, c), it still obtained some extra overlap near the poles. The number of accepted IRAS survey observations of asteroids with known orbital

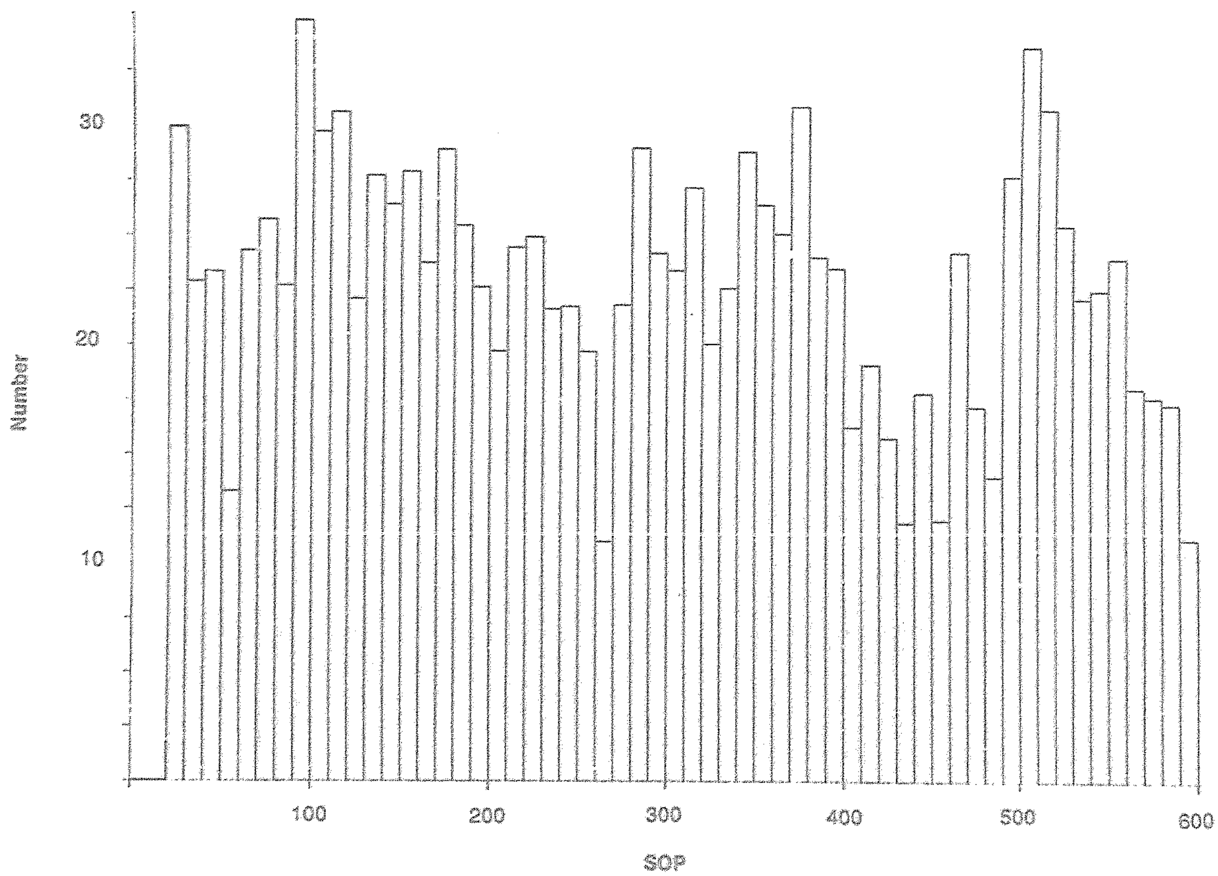

Figure 2-1: IRAS sightings of asteroids: The number of accepted survey observations binned as a function of time (SOP number). The ordinate values have been normalized by the fraction of time that IRAS was in its survey mode. The histogram is one of the relative rates at which asteroid observations were obtained when IRAS was in the survey mode. Each bin is 10 SOP's wide.

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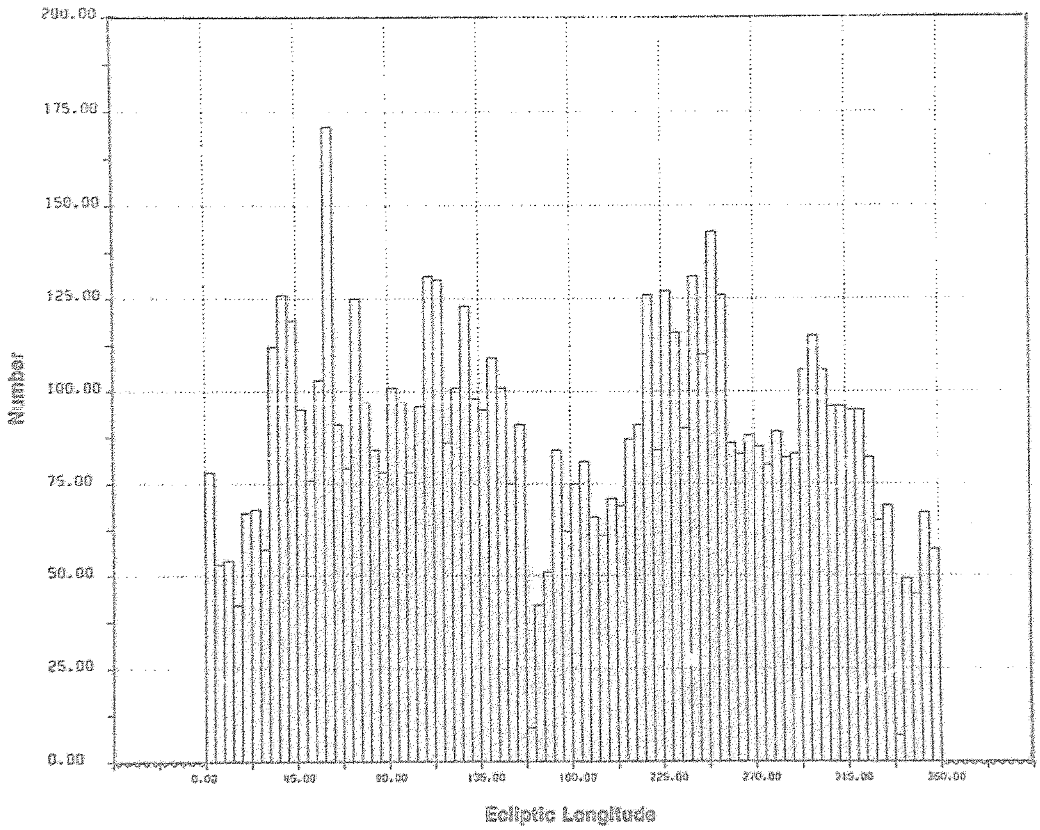

Figure 2-2: IRAS sightings of asteroids: The number of accepted observations of asteroids (with known orbital elements) binned by ecliptic longitude. The very low values near 160 and 340 degrees were caused by two gaps in sky coverage.

elements is shown as a function of ecliptic latitude in Figure 2-3. The counts of the ordinate have been normalized for 1) multiple scan coverage and 2) the (cosine of the) ecliptic latitude. That is, the number observed for each area was first divided by the number of times that the area was scanned and then by the cosine of the latitude. This procedure yields the observed number density of asteroids. The distribution of the accepted asteroid sightings is similar to that expected for the input set of orbital elements. Thus, there is no additional strong bias with respect to inclination in the IRAS asteroid survey. There is a correlation in the IRAS survey between ecliptic latitude and sky background due to thermal emission from zodiacal dust. This may result in some bias against the ADAS detection of small and/or outer belt asteroids near the ecliptic plane.

2.1.4 Distribution of Asteroid Sightings on the Sky

A plot in ecliptic coordinates of the accepted IRAS asteroid survey sightings is shown in Figure 2-4. Multiple sightings of individual asteroids can be seen as tracks. Symbol size is proportional to flux density at 25 μm. As expected, most of these data are close to the plane of the ecliptic. The two main gaps in sky coverage are visible near longitudes 160 and 340 degrees (cf. Figure 2-2). The galactic center is near ecliptic longitude 270 degrees with a low ecliptic latitude. The accepted asteroid sightings are not strongly correlated with galactic latitude (cf. discussion on confusion Sec. 1.1.5).

2.1.5 Polar Projection of Asteroids

IRAS had sufficient sensitivity to detect asteroids throughout the main belt and Trojan clouds. The accepted sightings of asteroids (with known orbital elements) plotted on the ecliptic plane in heliocentric, polar coordinates are shown in Figure 2-5. Multiple sightings of individual asteroids can be seen as tracks. The most prominent gap in sky coverage is projected near longitude 180 degrees (cf. Figure 2-2). Most of the asteroids shown are members of the main belt. A few Apollo and Amor asteroids were also observed. The Trojan asteroids form two loose groups ahead of and behind Jupiter which was near longitude 250 degrees during 1983.

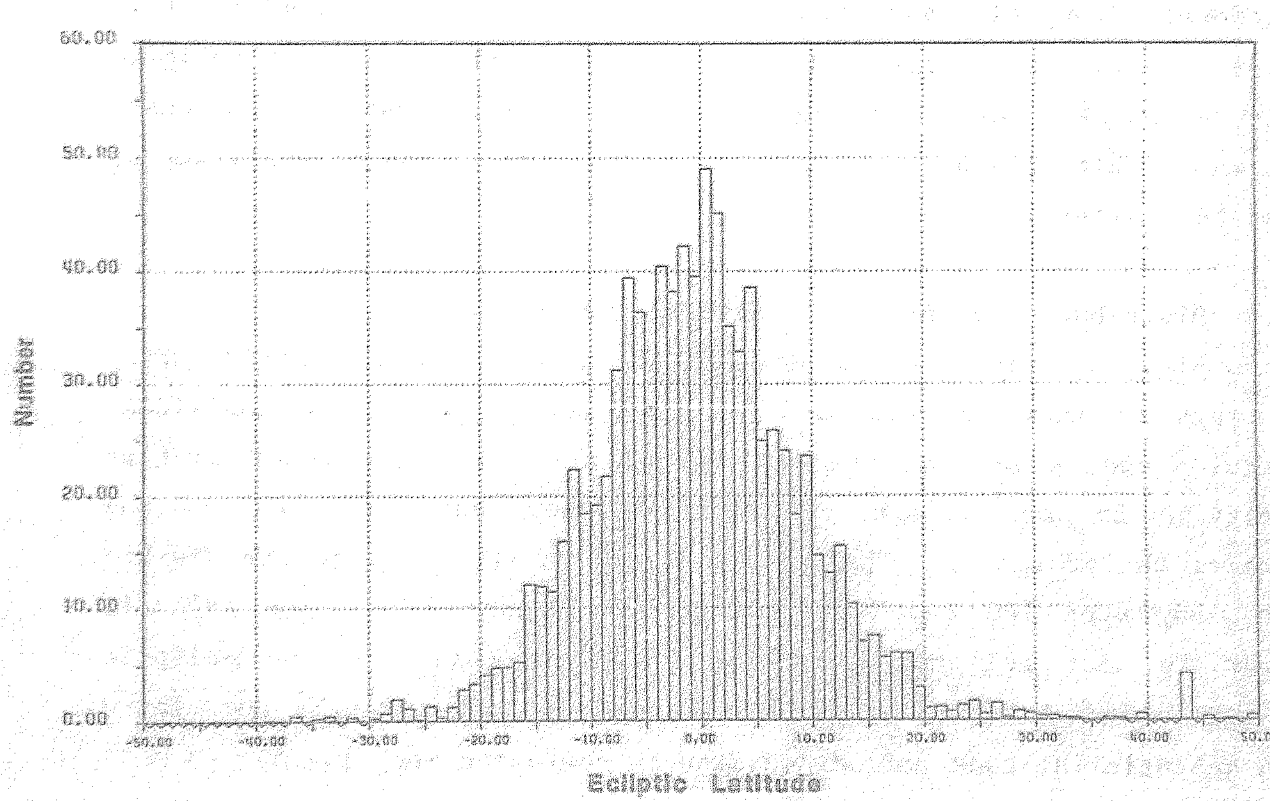

Figure 2-3. IRAS sightings of asteroids: The number of accepted observations binned of asteroids (with known orbital elements) by ecliptic latitude. The numbers have been normalized for multiple scan coverage and by the cosine of the ecliptic latitude.

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Figure 2-4. IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) plotted in ecliptic coordinates. Grid divisions are ten degrees. Multiple sightings of individual asteroids can be seen as tracks. Symbol size is proportional 25 μm flux density.

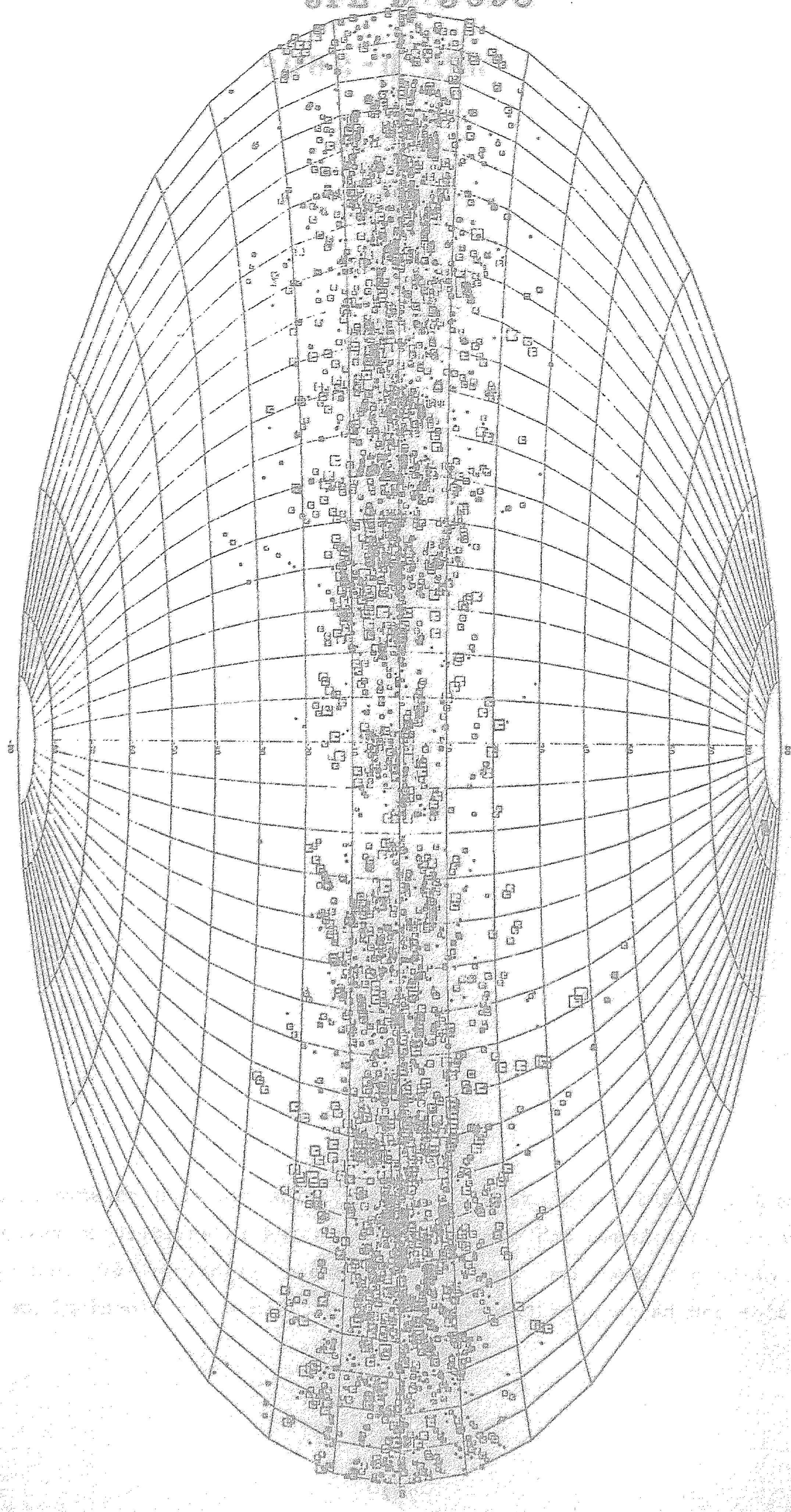

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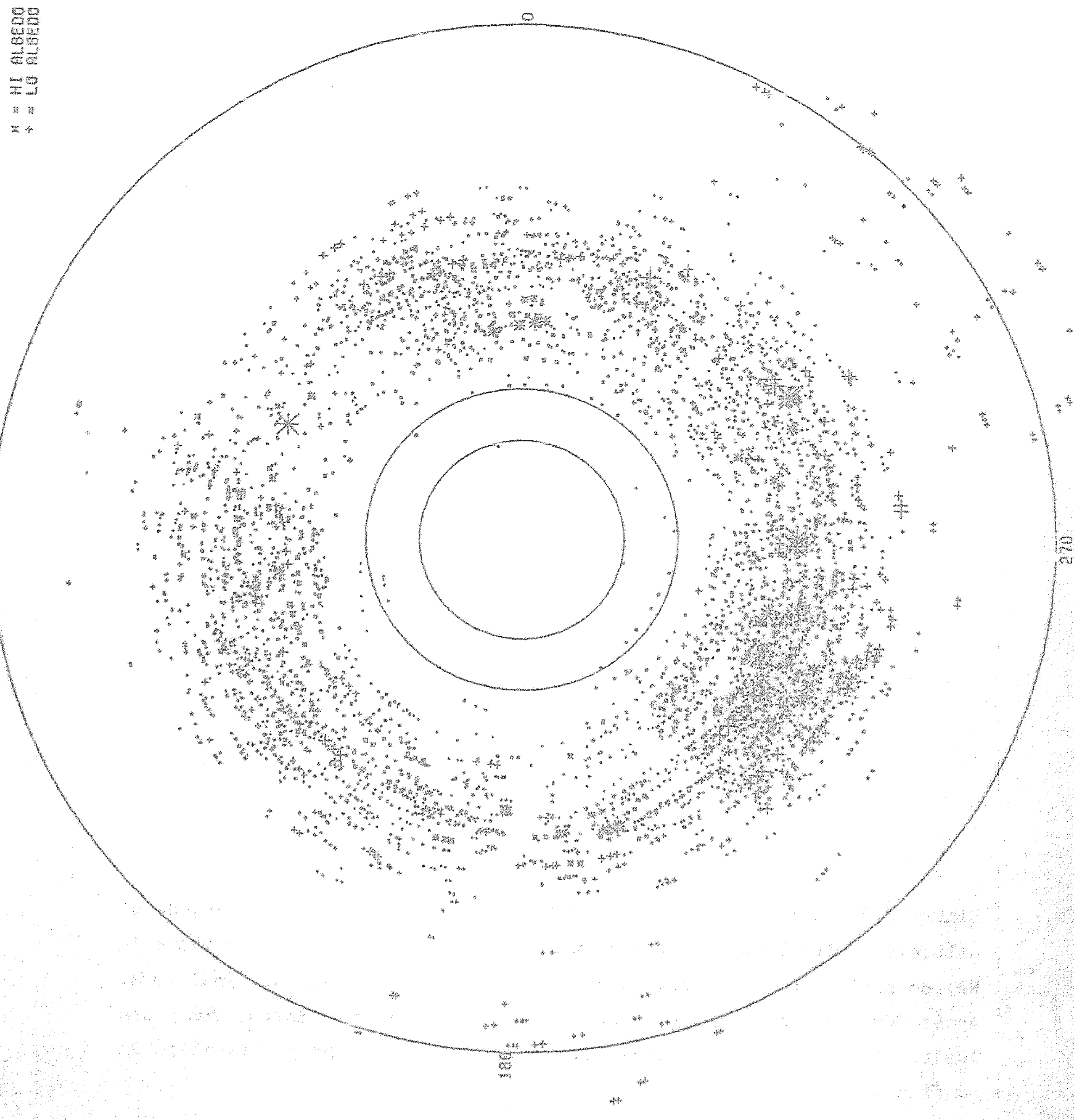
Figure 2-5: IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) plotted on the ecliptic plane in heliocentric, polar coordinates. Multiple sightings of individual asteroids can be seen as tracks. The orbits of the Earth, Mars and Jupiter are indicated for reference. Symbol size is proportional to 25 μm flux density.


* = HI ALBEDO
+ = LO ALBEDO
0
90
180
270

2.1.6 Rectangular Projection of Asteroids

A projected cross section through the accepted IRAS observations of asteroids with known orbital elements is drawn in rectangular coordinates in Figure 2-6 with distance above or below the ecliptic plane plotted against the radial distance from the Sun as measured within the ecliptic plane. Multiple sightings of individual asteroids can be seen as tracks. The point(s) nearest the orbit of the Earth (i.e. 1.0, 0.0) is the Apollo asteroid 2201 Oljato. The point(s) due north of that is the parent body of the Geminid meteor stream 3200 Phaethon. The Trojans are scattered relatively far from the plane of the ecliptic near the orbit of Jupiter.

2.2 Flux Density Distributions of Asteroids

The 25 μm flux density was studied in greater depth than the other wavelengths because a detection at 25 μm was required for a sighting to be accepted into the catalog. Next the asteroid colors, as seen in thermal emission, were analyzed. It was found that a window could be constructed in color space which was an excellent asteroid discriminator.

2.2.1 25 μm Flux Densities of Asteroids

The prime wavelength of this survey was 25 μm because ADAS required a detection at 25 μm for all asteroid associations which it processed. This was done in order to limit the input data base to a manageable size. This trade-off was considered acceptable because the infrared spectra of objects with color temperatures of main belt asteroids peak near 25 μm. In addition, asteroids with detections at multiple wavelengths tend to have the best signal-to-noise ratio in the 25 μm band. The number of accepted IRAS survey observations of asteroids is plotted as a function of 25 μm flux density in Figure 2-7. The decrease in the number of objects at faint flux density is due to the SNR limit for the IRAS survey and the incompleteness of the available asteroid orbital elements.

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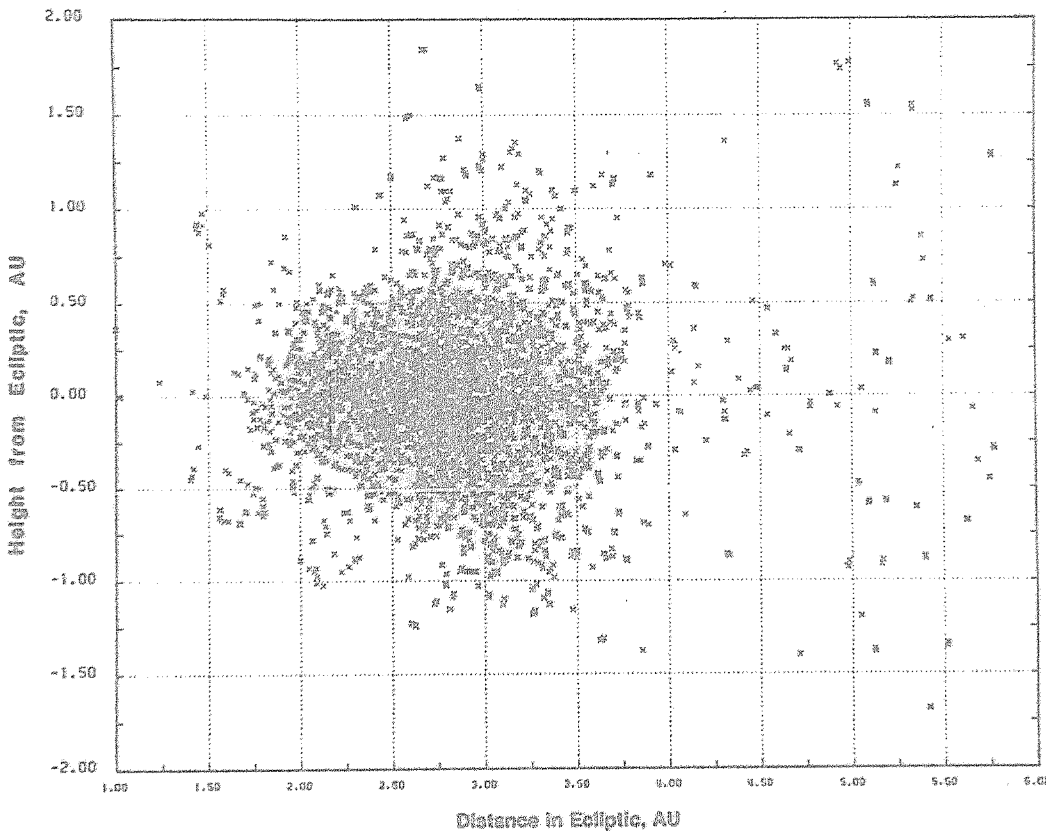

Figure 2-6 IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) plotted in rectangular coordinates with grid divisions of 0.5 AU. The ordinate is the distance from the ecliptic plane and has north towards the top. The abcissa is the projection of the distance from the Sun onto the ecliptic plane. Multiple sightings of individual asteroids can be seen as tracks.

The trend of SNR with 25 μm flux density for accepted survey observations of asteroids (with known orbital elements) is shown in Figure 2-8. As expected, the SNR decreases monotonically with decreasing flux density. The cut off for the IRAS sky survey was at a SNR of three (~0.5 Jy in the 25 μm band).

The number of accepted asteroid observations detected only at 25 μm is drawn as a histogram function of flux density in Figure 2-9. The asteroid sightings in this population sample tend to have low SNR as well as low position scores (see Sec. 2.9.2) compared to those detected at multiple wavelengths. Unfortunately, several of the 25 μm detectors in the IRAS focal plane array were noisy or dead. This produced low flux-status-code assignments due to the lack of explicit seconds-confirmation for many sources detected only at 25 μm. As a result many of them were excluded.

2.2.2 The Color Distribution of the Asteroids

2.2.2.1 The Asteroid Color Window

The most important filter that ADAS used for selecting acceptable asteroid sightings and rejecting others was the color-temperature discriminant. The window used by the ATA was set to bracket the equilibrium blackbody temperatures expected in the solar system. It also had "fuzzy" boundaries (cf. chapter 5 and 6) which allowed for the uncertainties in the sightings being considered. ADAS tightened-up the filter for objects which had good color data (i.e., a sufficiently high flux status at each relevant wavelength). In particular, ADAS rejected all sightings with a 12 μm:25 μm (flux density, color) ratio greater than 1.03 and also rejected all sightings with a 25:60 μm (flux density, color) ratio less than 0.79. This was done to help eliminate asteroid sightings that were confused with hot and cold background sources.

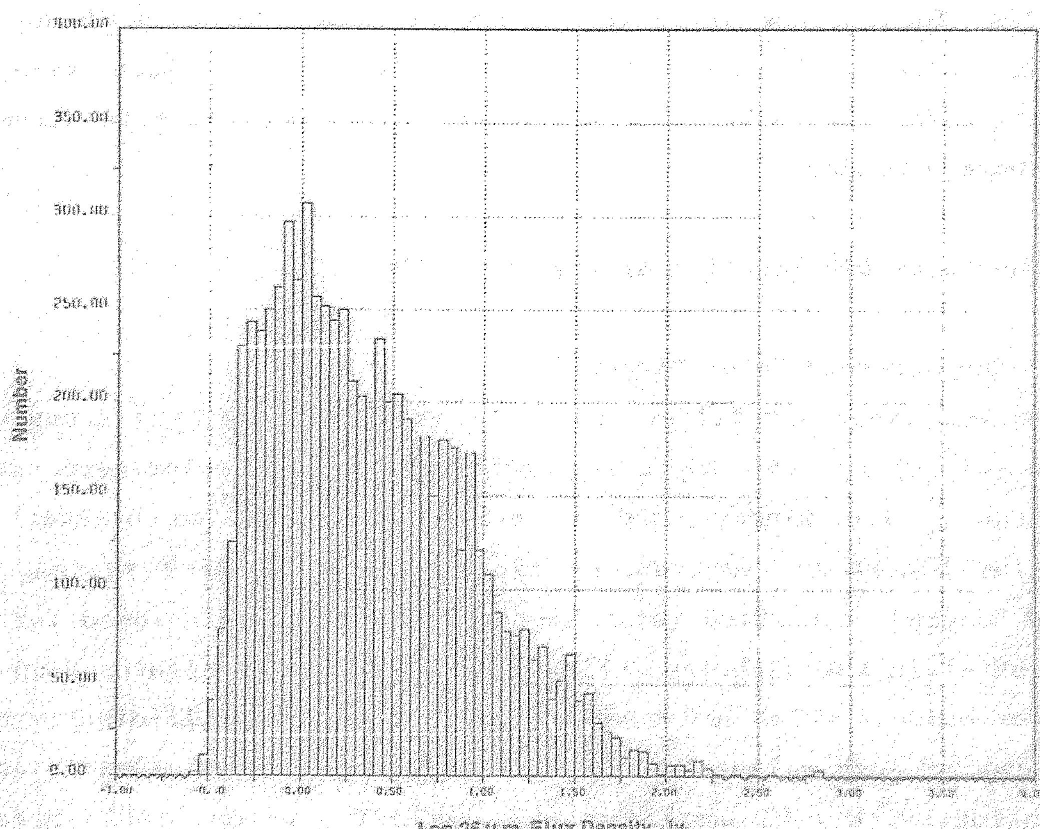

Figure 2-7: IRAS sightings of asteroids: The number of accepted observations binned by the flux density (Jy) detected at 25 μm.

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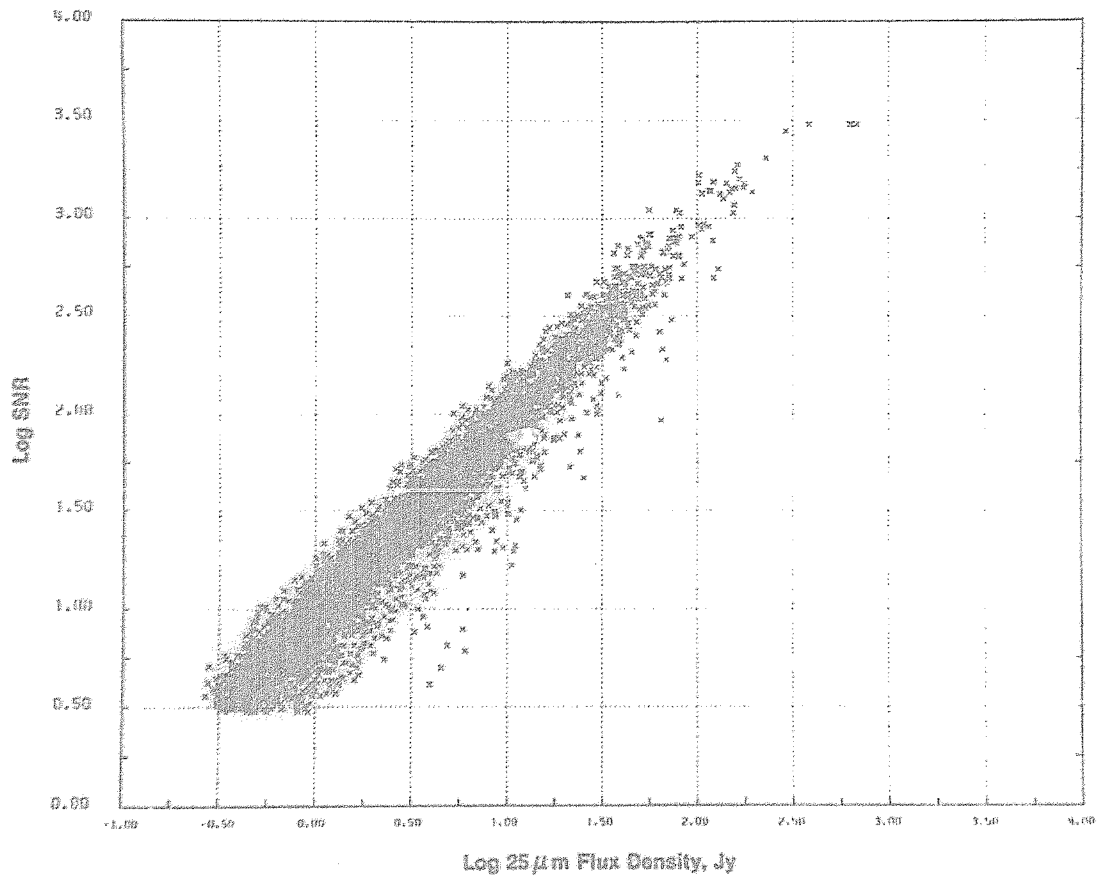

Figure 2-8: IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) plotted for SNR vs. flux density (Jy) at 25 μm.

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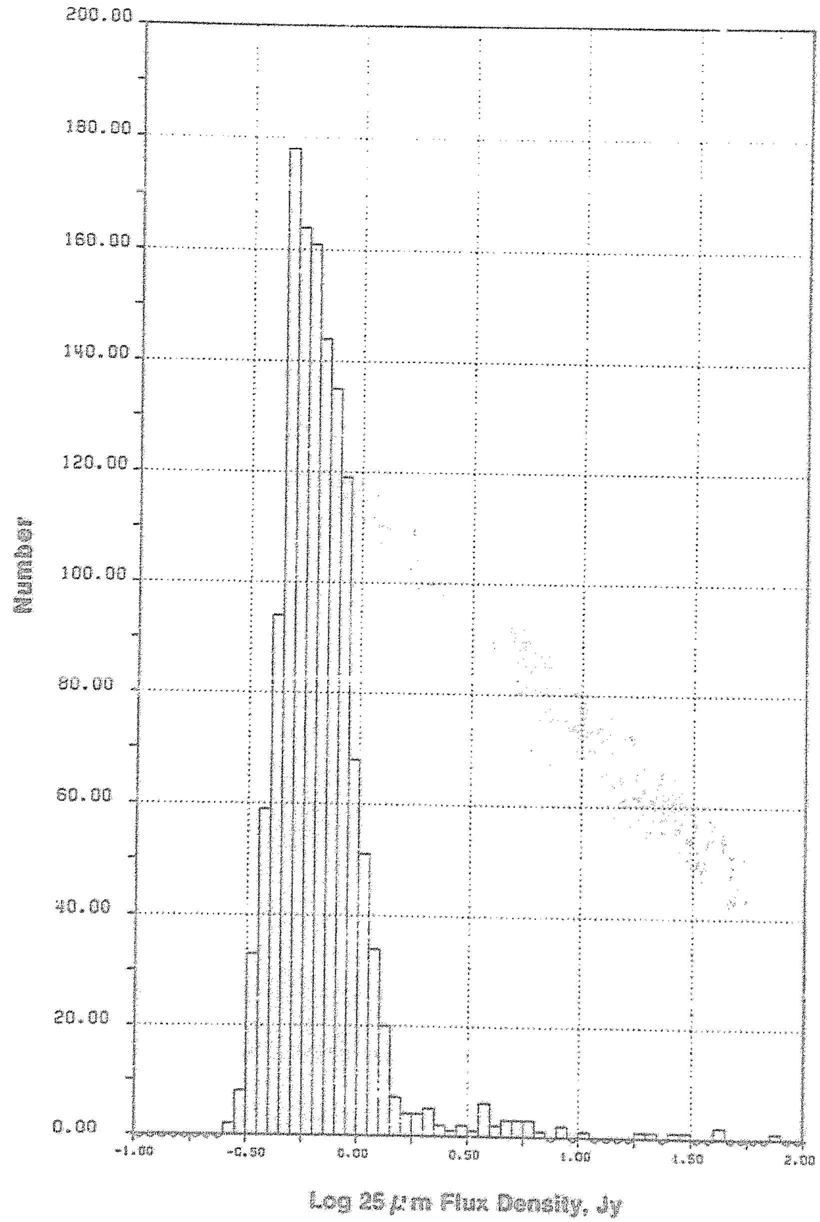

Figure 2-9: IRAS sightings of asteroids: The number of accepted observations which were detected only at 25 μm binned by their flux density (Jy).

2.2.2.2 Asteroid Colors

The distribution of color ratios of flux densities (in Jy) at 12 μm:25 μm vs. 25 μm:60 μm for accepted observations of asteroids is shown in Figure 2-10. Only the brightest objects were detected in all three bands. Color temperature is a useful discriminant against non-asteroid background sources. Hot objects plot to the upper right and cold objects plot towards the lower left. Main belt asteroids have color temperatures near 300 degrees kelvin. Albedo differences among the asteroids tend to shift them along the narrow track defined by the effective temperatures of the thermal models (see Sec. 7). A significant part of the observed scatter is due to photometric uncertainties in the data (i.e. the nominal error bars. cf. Fig. 2-8).

The distribution of colors seen in 25 μm:60 μm vs. 60 μm:100 μm is shown in Figure 2-11. Only the brightest objects were detected in all three bands. Hot objects plot to the upper right and cold objects to the lower left. Galactic "cirrus" is a source of confusion in the 60 μm band and especially in the 100 μm band. When this background sky noise is present it scatters the asteroid data down and to the left in the figure.

2.2.2.3 Asteroid Color vs. Heliocentric Distance

The two types of single color observations are now examined to see if they follow expected trends.

The distribution of color ratios of flux densities at 12 μm:25 μm vs. heliocentric distance for accepted IRAS survey observations of asteroids not detected at 60 μm is shown in Figure 2-12. Asteroids in the outer belt tend to have lower color temperatures. A color ratio greater than 1.03 (0.0 in the log) indicates that the asteroid was confused with a hot background source.

The distribution of the color ratios of flux densities at 25 μm:60 μm vs. heliocentric distance for accepted IRAS survey observations of asteroids which were not detected at 12 μm is shown in Figure 2-13. Asteroids in the outer belt tend to have lower color temperatures. A color ratio lower than 0.79 (-0.1 in the log) indicates that the asteroid was confused with a cold background source.

A comparison of the two figures (Figures 2-12 and 2-13) shows the expected trend. Namely, asteroids missing Band 3 are, on the whole, closer to the Sun while those missing Band 1 tend to be at greater heliocentric distances.

2.3 Thermal Model Results for Asteroids

The parameters derived from thermal model analysis of the observed flux densities are the results of most interest. They yield the physical properties of the asteroids. In this section the diameters and albedos are studied.

2.3.1 Diameter Distributions of Asteroids

Diameters were derived in each passband for each asteroid using the asteroid thermal model (Chapter 7). The trend of diameter with heliocentric distance for the accepted IRAS survey observations of asteroids (with known orbital elements) is shown in Figures 2-14a and b. Separate diameters have been derived for each sighting at 25 μm. The bias against small asteroids at greater heliocentric distances is due to the SNR limit used for the asteroid survey and the incompleteness of the available asteroid orbital elements. This latter bias results from these objects being faint in the visual also.

A histogram of the number of IRAS asteroids as a function of average diameter is shown in Figure 2-15. The decrease in the number of very small asteroids is due to the SNR limit of the IRAS survey and the incompleteness of the available asteroid orbital elements.

A comparison between the IRAS average diameters and "ground based" diameters from the AAG input data (cf. Chapter 9) for asteroids is shown in Figure 2-16. The trend of the data is along the line of unit slope. Some of the scatter is due to lightcurve and aspect angle variation. This type of comparison provides a check on ADAS reliability by showing consistency with previous work.

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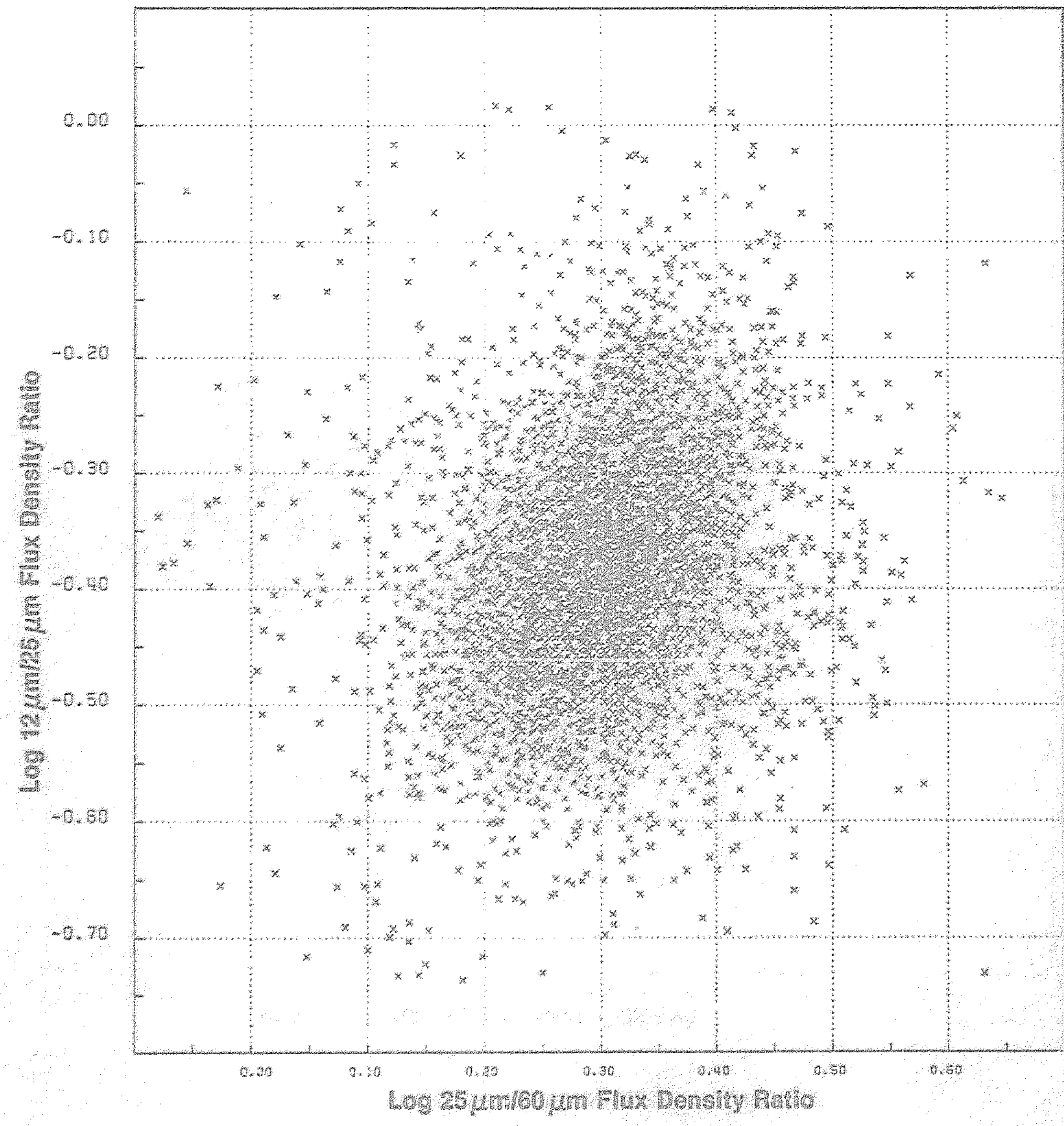

Figure 2-10: IRAS sightings of asteroids: The color ratios of flux densities at 12 μm:25 μm vs. 25 μm:60 μm for accepted observations of asteroids (with known orbital elements).

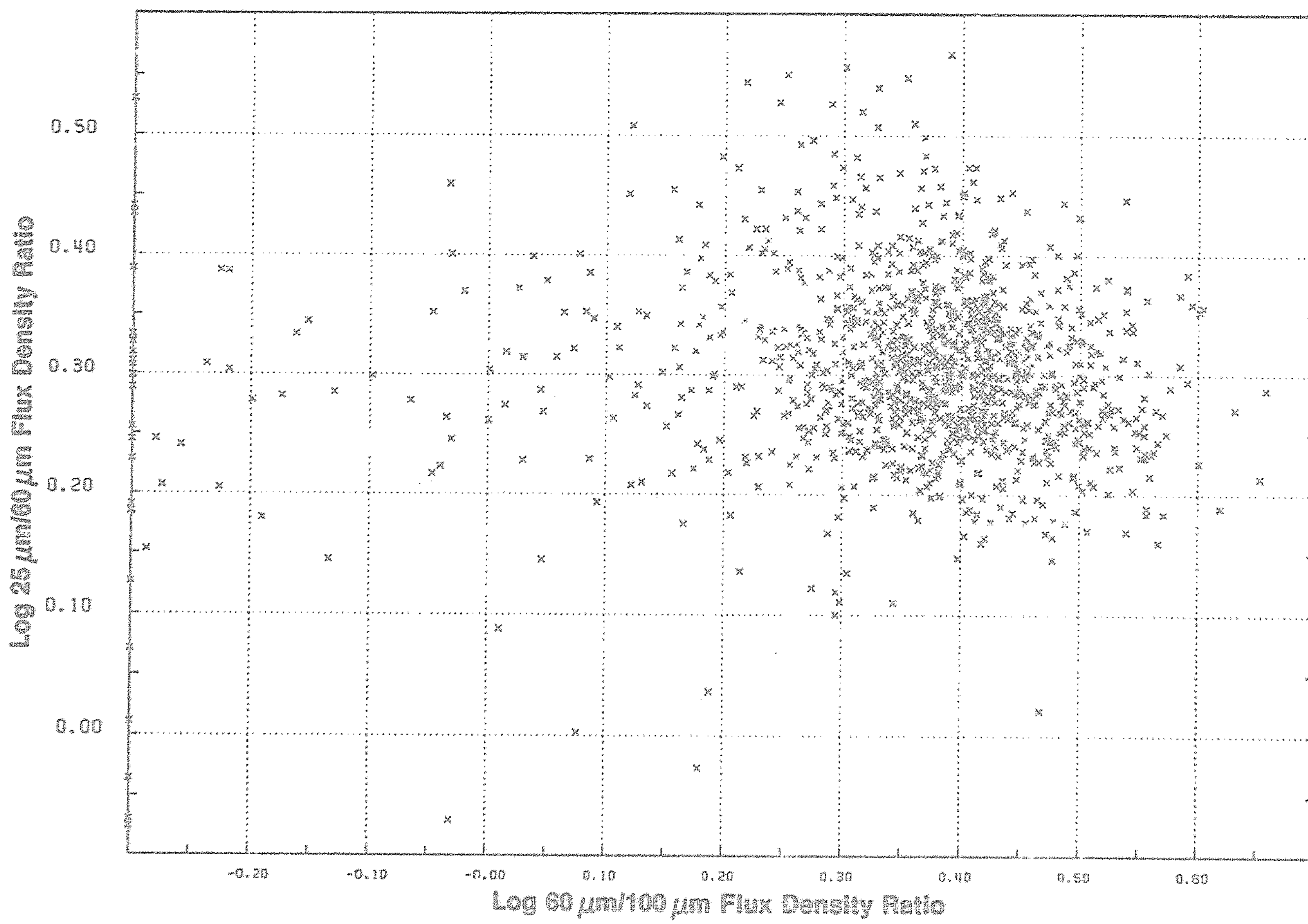

Figure 2-11: IRAS sightings of asteroids: The color ratios of flux densities at 25 µm:60 µm vs. 60 µm:100 µm for accepted observations of asteroids (with known orbital elements).

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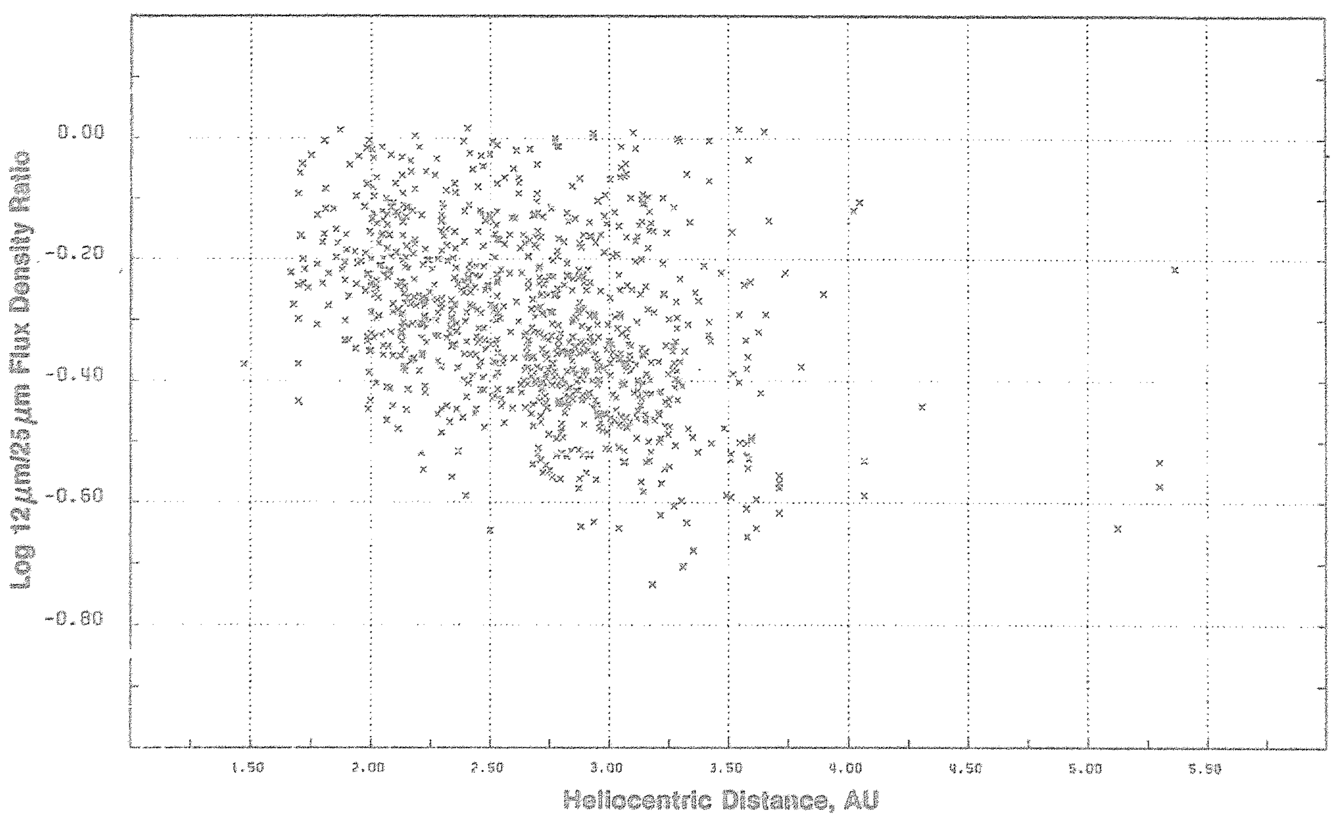

Figure 2-12: IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) which were not detected at 60 μm plotted for the color ratio of flux density 12 μm:25 μm vs. heliocentric distance at AU.

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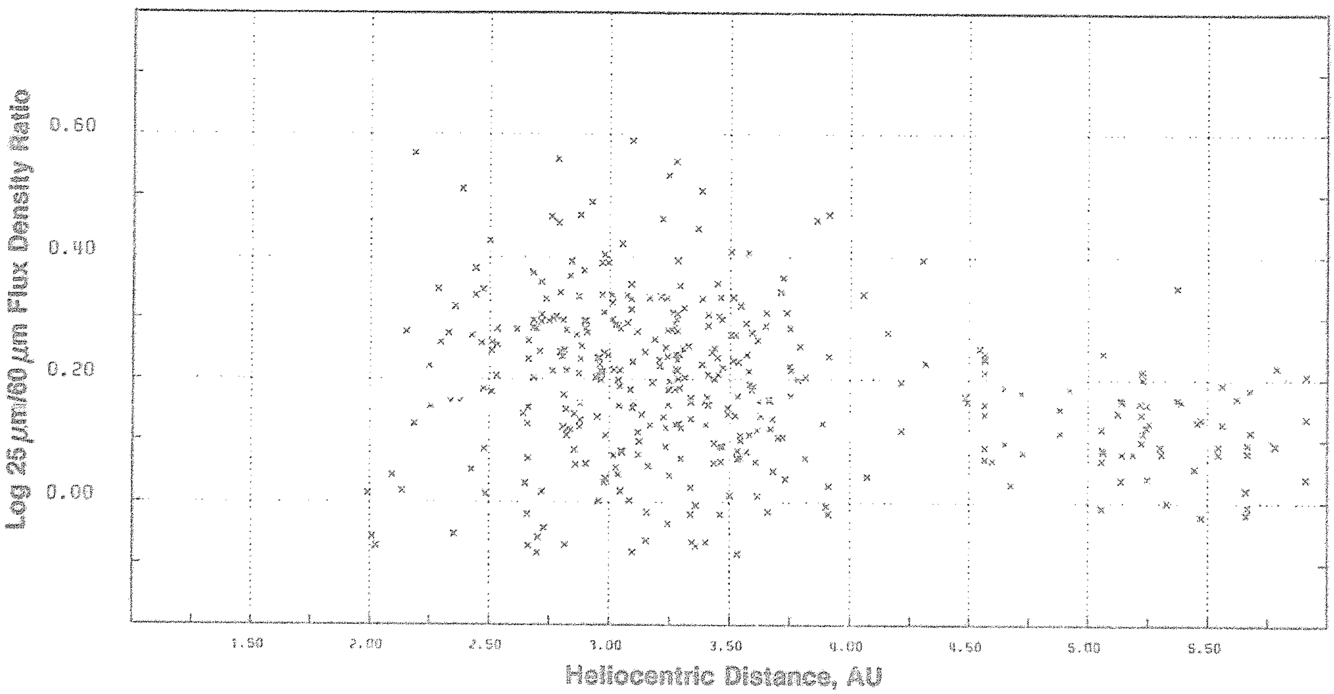

Figure 2-13: IRAS sightings of asteroids: The accepted observations of asteroids (with known orbital elements) not detected at 12 μm plotted as the color ratio of flux density 25 μm:60 μm vs. heliocentric distance in AU.

2.4.2 Albedo Distributions of Asteroids

The trend of visual geometric albedo with heliocentric distance for accepted IRAS survey observations of asteroids is shown in Figure 2-17. Separate albedos have been derived for each sighting at 25 μm. All of the accepted Trojans have low albedos.

A histogram of the number of IRAS asteroids as a function of average visual geometric albedo is shown in Figure 2-18. Low albedo class C asteroids are more numerous than high albedo class S asteroids. The IRAS survey was biased against small very high albedo class E asteroids. Of the high albedo asteroids, only 44 Nysa ($p_V \sim 0.5$) was detected several times at multiple wavelengths with good SNR.

A comparison between the IRAS average visual geometric albedos and "ground based" visual geometric albedos from AAG input data (cf. Chapter 9) is shown in Figure 2-19. The trend of the data is along a line of unit slope. Some of the scatter is due to lightcurve and aspect angle variation. Together with Figure 2-16, this type of comparison provided an important check on ADAS reliability by comparing with previous work.

The pile-up of points at abcissa geometric albedos of 0.035 and 0.16 are due to the choice of those values as default values for C and S asteroids, respectively (see Chapter 9).

The trend of the IRAS average visual geometric albedo with B-V color for asteroids is shown in Figure 2-20. Low albedo class C asteroids have neutral color and high albedo class S asteroids are red. The pile-up at 0.8 is due to the default value used for B-V color (see Chapter 9).

2.4.3 Diameter vs. Albedo

The trend of IRAS average diameter with IRAS average geometric albedo shown in Figure 2-21. The non-rotating thermal model assumes the absolute visual magnitude for each asteroid. Thus, the derived diameter and geometric albedo are not independent (cf. Chapter 9). The gap between low albedo asteroids and high albedo asteroids is more pronounced for larger asteroids. The points for small asteroids tend to have larger error bars.

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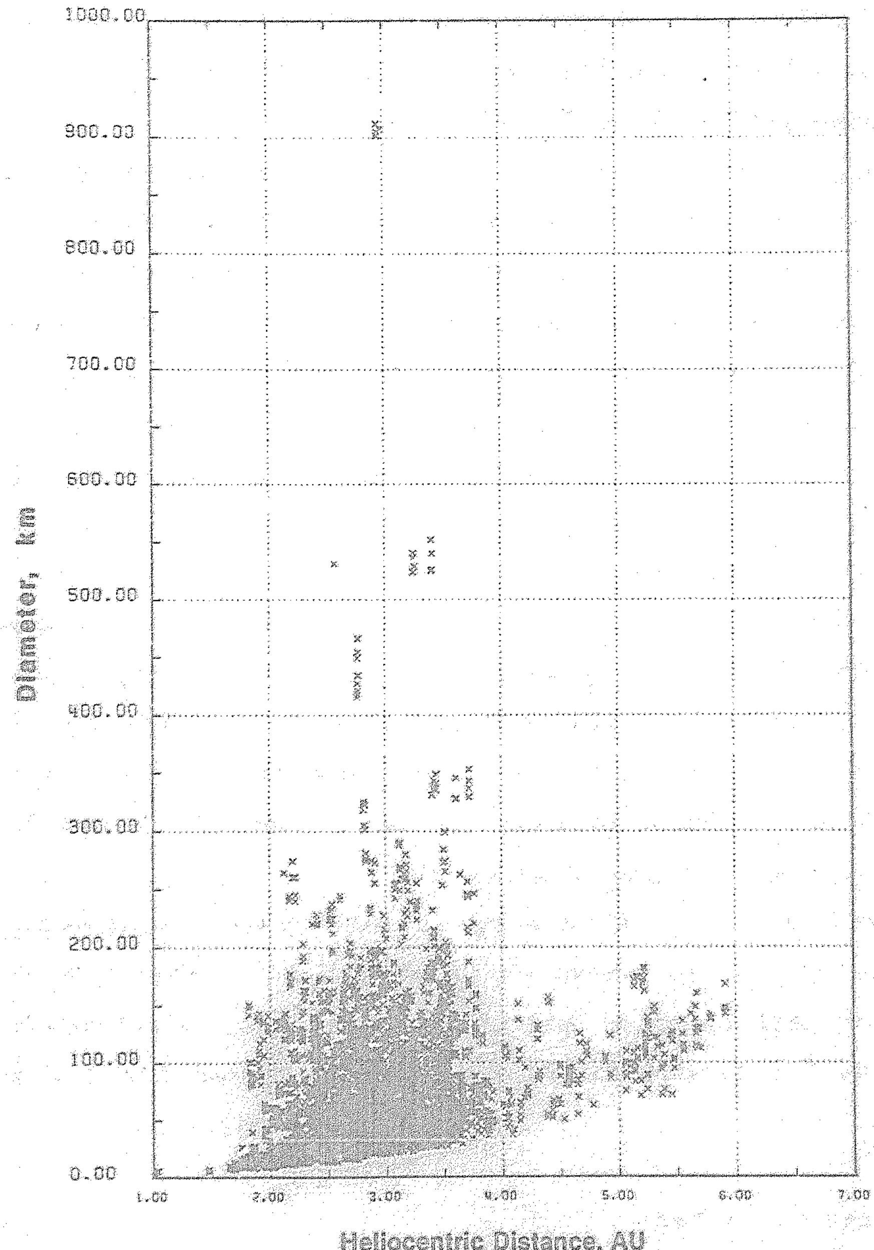
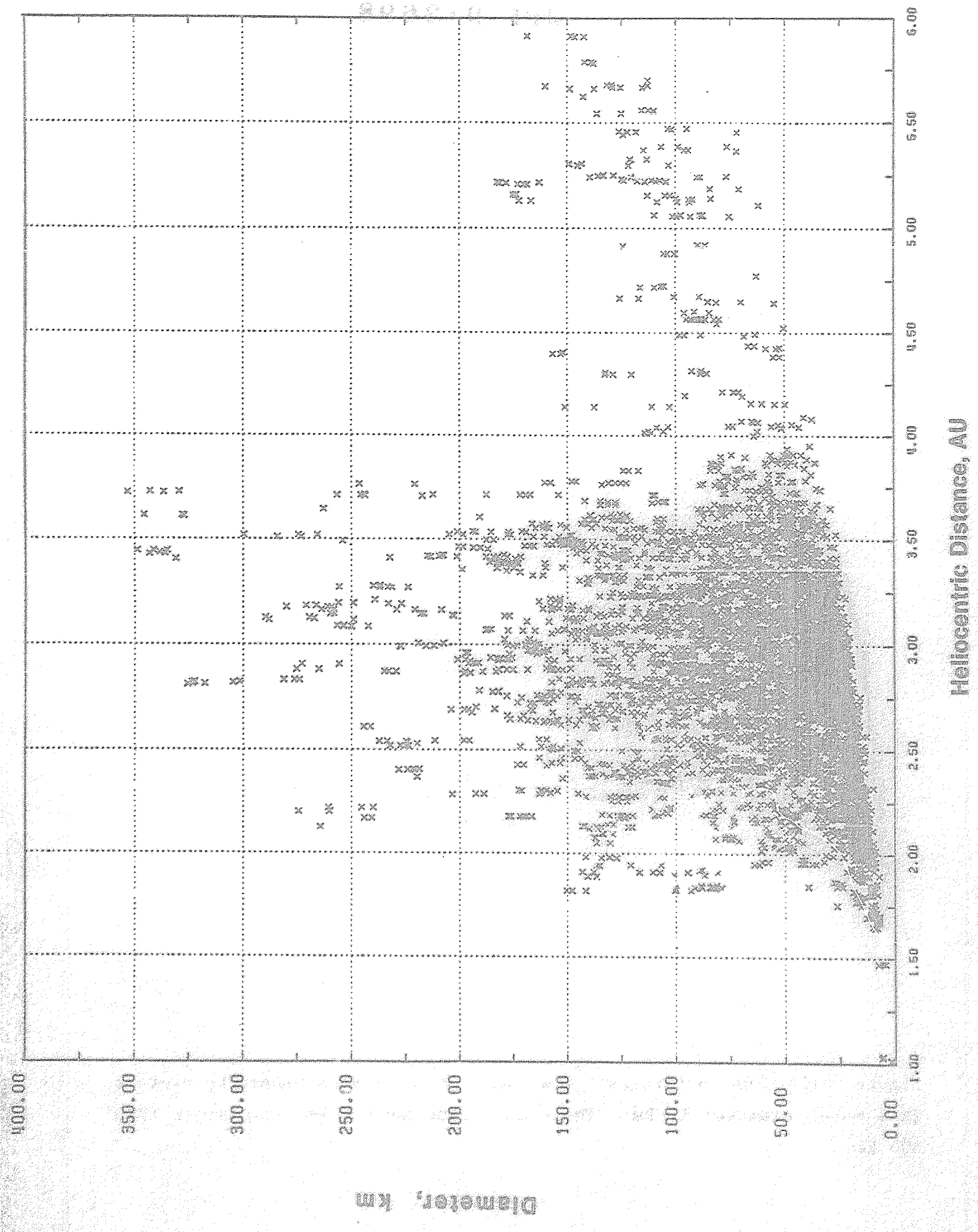


Figures 2-14 a and b. IRAS sightings of asteroids: (a) Asteroids (with known orbital elements) plotted for IRAS model diameter in km vs. heliocentric distance in AU. Separate diameters have been derived from the observed flux density at 25 μm for each accepted observation. (b) An enlargement of the dense part of "a".


Diameter, km
Heliocentric Distance, AU
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00

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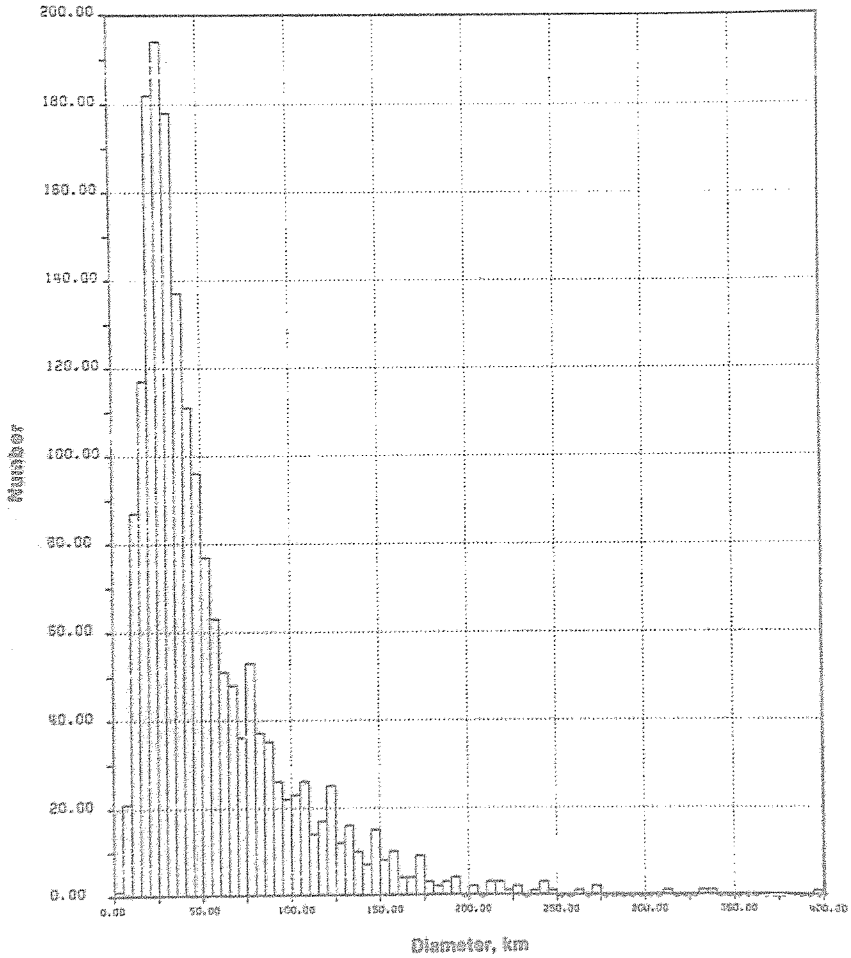

Figure 2-15: IRAS asteroids: The number of asteroids binned by average IRAS model diameter in km. Three asteroids have diameters larger than 400 km.

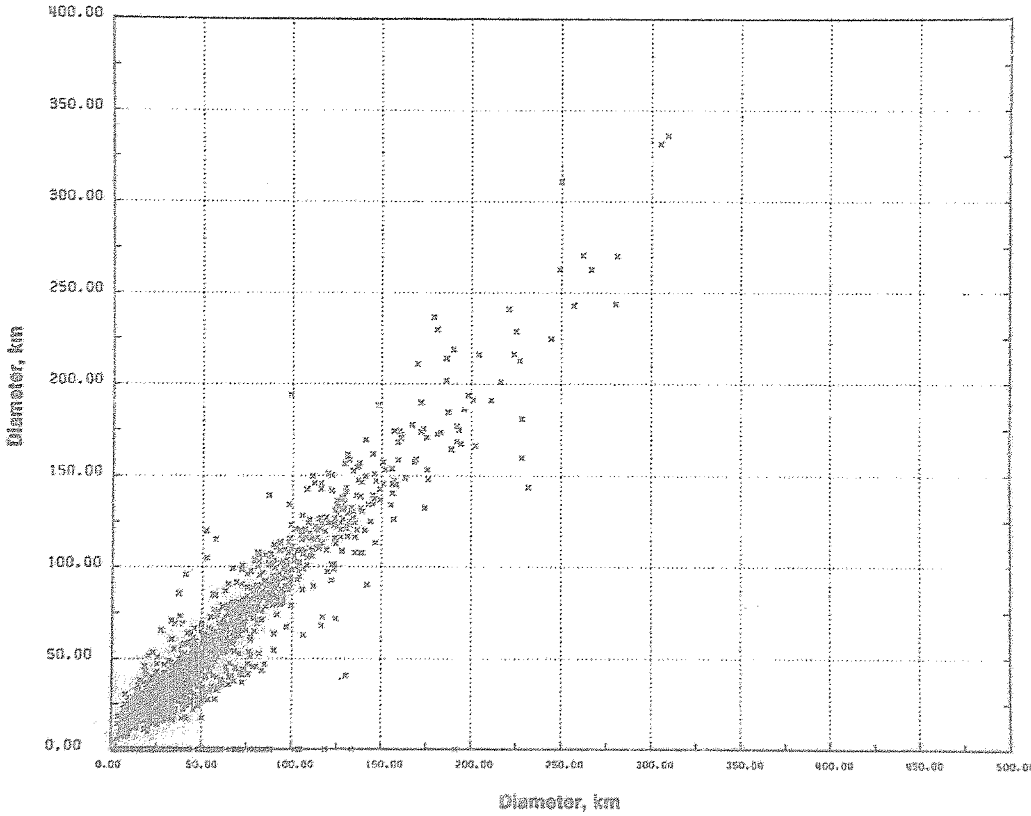

Figure 2-16: IRAS asteroids: Comparison of average IRAS model diameter (ordinate) against "ground based" diameter (abcissa) from AAG input data (cf. Chapter 9). Three asteroids (not shown) have diameters larger than 400 km. Objects with zero value of the ordinate were rejected by ADAS but have diameters determined from ground based radiometry.

2.5 Asteroid Statistics

Here an accounting is provided for all IRAS asteroid sightings, accepted and rejected. Though, at first it may seem counter-intuitive, the study of the rejected sightings also helps to define the properties of the survey.

2.5.1 Asteroid Sightings

A total of 11,449 sightings were associated with the 3,453 sets of orbital elements which were input to ADAS. For the asteroid survey 7,015 sightings were accepted and they yielded derived products for 1,811 individual asteroids. There was a total of 4,434 "poor" (i.e. rejected) sightings for the 1,811 plus 939 other asteroids. ADAS associated 3,993 accepted and 3,285 rejected sightings with asteroids at the seconds-confirmation processing level where each asteroid moved sufficiently that it was not reconfirmed on a repeat scan [HCON]. ADAS associated asteroids with 3,022 accepted and 780 rejected other seconds-confirmed sightings at the hours-confirmation step (HCON). These asteroid sightings were hours confirmed because the asteroid moved slowly and/or the scan was repeated quickly. However, these asteroids were moving sufficiently that they were not reconfirmed on a later scan (i.e. weeks-confirmation). The HCON time interval usually spanned a few orbital periods. ADAS flagged HCON position and time associations of asteroids for future analysis, but made no processing decisions based upon them. ADAS associated an additional 369 (all rejected) seconds-confirmed sightings with asteroids at the weeks-confirmation level which corresponded to a time interval from about 10 days up to 6 months. ADAS also rejected 4 asteroids because SDAS processing generated a "bad Lz" cross scan position error for their sole sighting.

Many of the brighter asteroids were detected by IRAS at 100 μm. ADAS used these observations to derive band 4 diameters and albedos for the relevant sightings but did not use them to calculate the adopted average values. The sky background at 100 μm is very non-uniform due to galactic, infrared, "cirrus" (cf. Low et al. 1984). Therefore, no processing decisions were made based upon 100 μm detections. A breakdown of various categories of sightings including possible spectral combinations is presented in Table 2-1.

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Figure 2-17: IRAS sightings of asteroids: Asteroids (with known orbital elements) plotted for IRAS model visual geometric albedo vs. heliocentric distance in AU. Separate albedos have been derived from the observed flux density at 25 μm for each accepted observation.

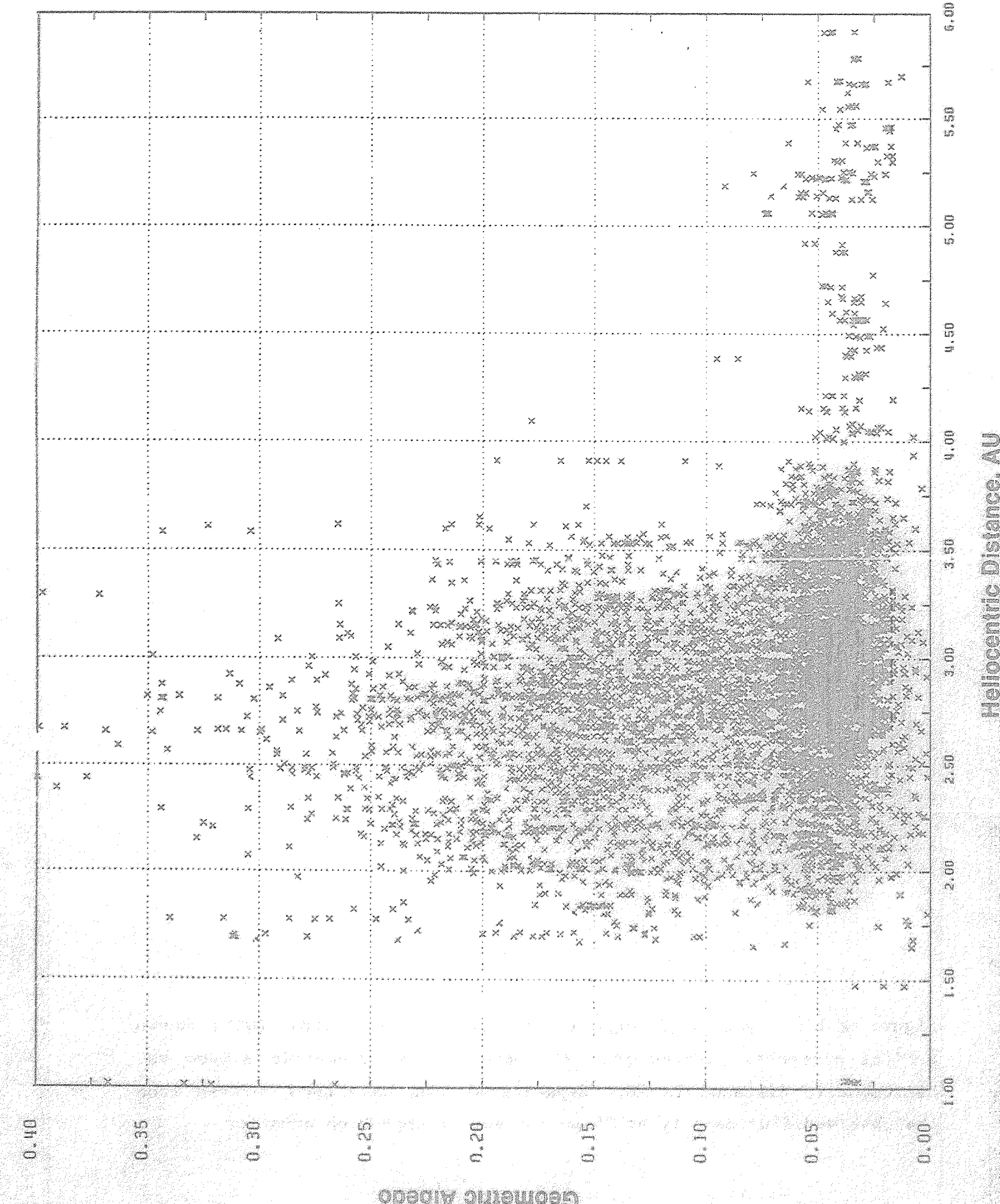
Heliocentric Distance, AU
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
Geometric Albedo
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40

Table 2-1 IRAS Asteroid Sightings

	Associated	Accepted
Seconds Confirmed (only)	7278	3993
Hours Confirmed	3802	3022
Weeks Confirmed	369	0
12 μm + 25 μm + 60 μm	5080	4403
12 μm + 25 μm	1450	907
25 μm + 60 μm	539	381
25 μm	4380	1324

2.5.2 Rejected Asteroid Sightings

A plot in ecliptic projection on the sky of the rejected IRAS survey asteroid sightings is shown in Figure 2-22. Symbol size is proportional to 25 μm flux density. There is a concentration of rejected sightings towards the galactic center due to confusion with inertially fixed point sources. There remained no obvious correlation with galactic latitude for most accepted asteroid associations (cf. the accepted asteroid sightings in Figure 2-4).

The distribution of color ratios of flux densities of 12 μm:25 μm vs. heliocentric distance for IRAS survey asteroid associations which were rejected by ADAS is shown in Figure 2-23. Data with a color greater than 1.03 (0.0 in the log) were rejected because the corresponding temperature would be much too hot for a real asteroid. This is the largest category of sightings (543 in all) rejected by ADAS on the basis of color. Most of these detections were probably confused with faint stars which are much bluer than asteroids. Some data with a 12 μm:25 μm color less than 1.03 were also rejected for various other reasons (cf. the accepted asteroid sightings in Figure 2-12).

Asteroid sightings which produced ADAS data only at 25 μm are obviously less reliable than those which were detected at some other wavelength as well. Not only is useful color information not available for discriminating against non-asteroids for these sightings, but they also tend to have low signal to noise ratios. The infrared spectra of objects with color temperatures of main belt asteroids peak near 25 μm. Objects with a high SNR at 25 μm also tend to be detected at either 12 or 60 μm (or both). Furthermore, the number density of sources on the sky increases with decreasing flux which increases the problem of confusion with background sources and noise.

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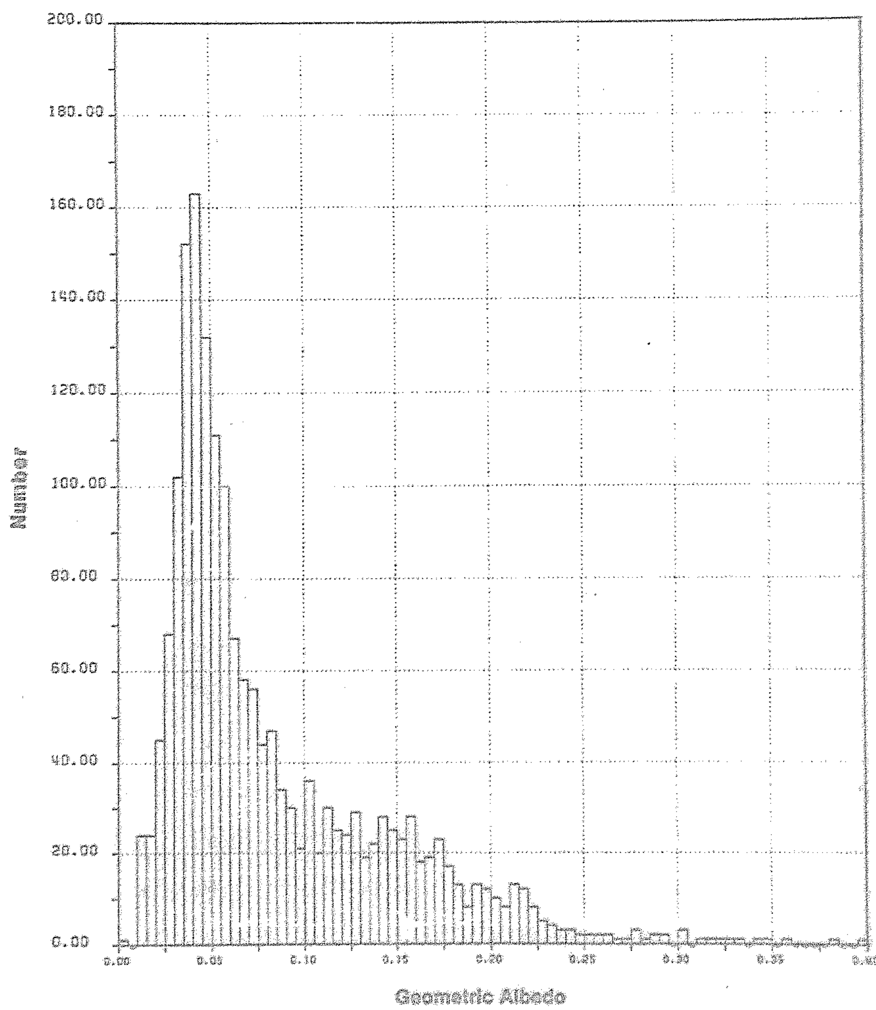

Figure 2-18: IRAS asteroids: The number of asteroids binned by average IRAS model visual geometric albedo.

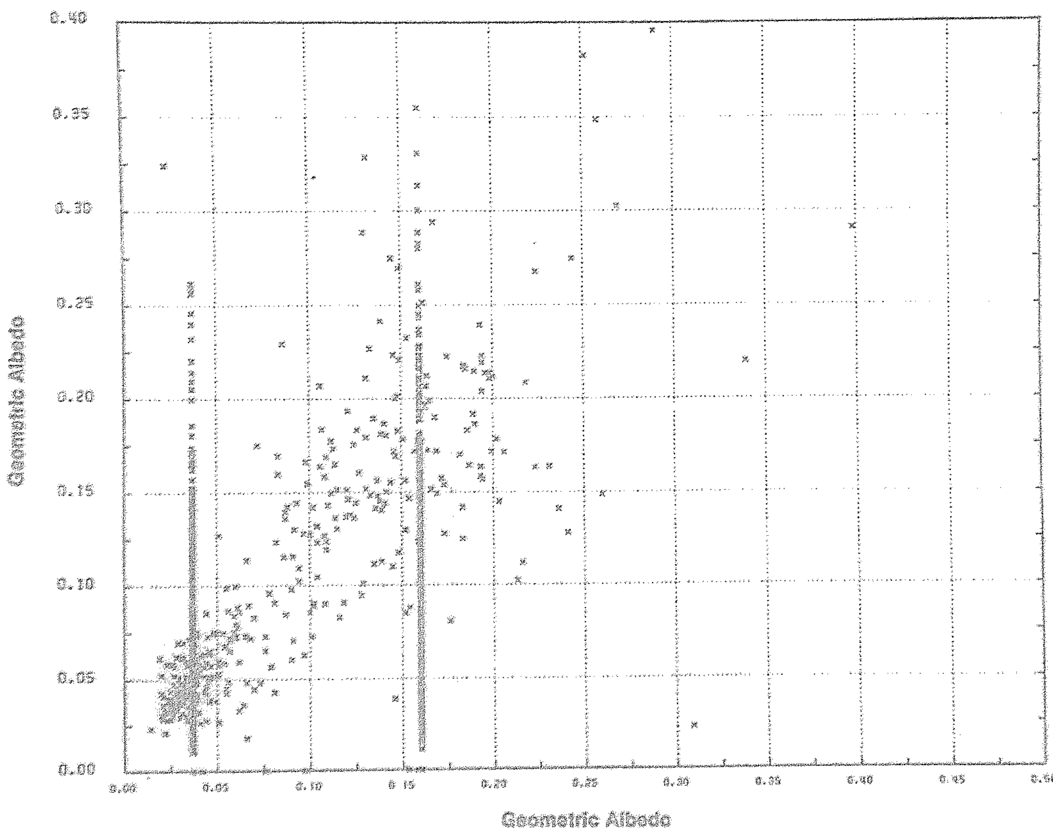

Figure 2-19: IRAS asteroids: Comparison of average IRAS model visual geometric albedos (ordinate) against "ground based" visual geometric albedo (abcissa) from the AAG input data (cf. Chapter 9).

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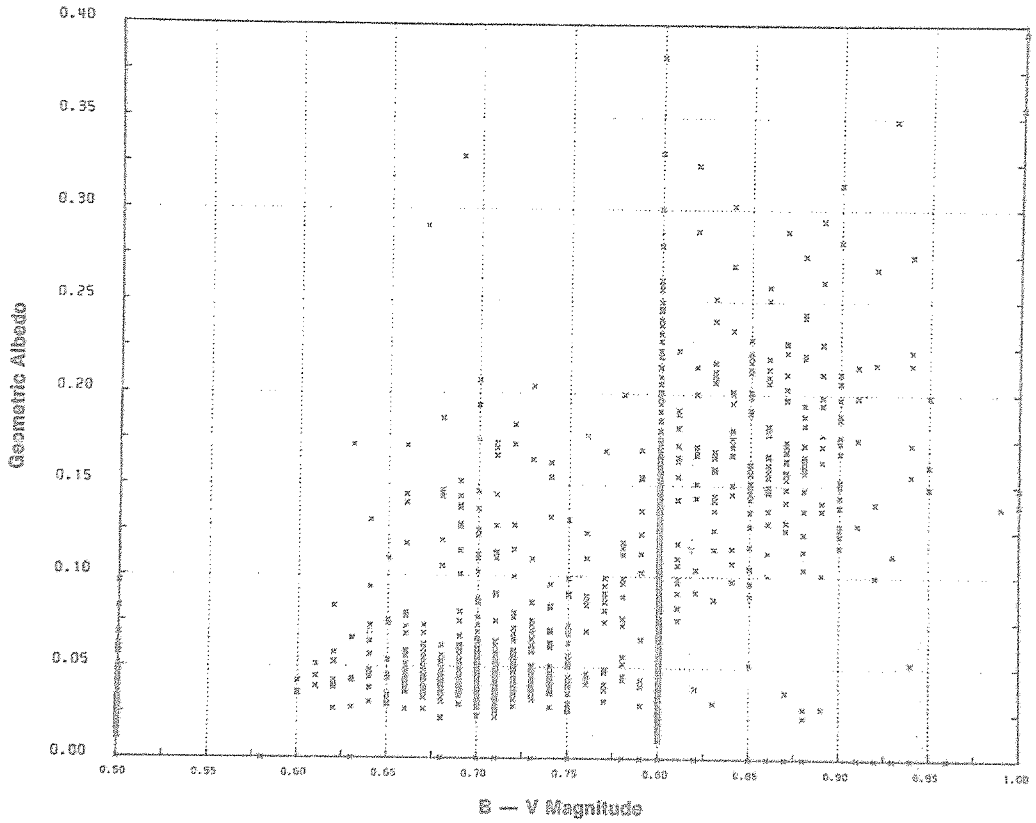

Figure 2-20: IRAS Asteroids: Average IRAS model visual geometric albedo vs. B-V color from the AAG input data (cf. Chapter 9).

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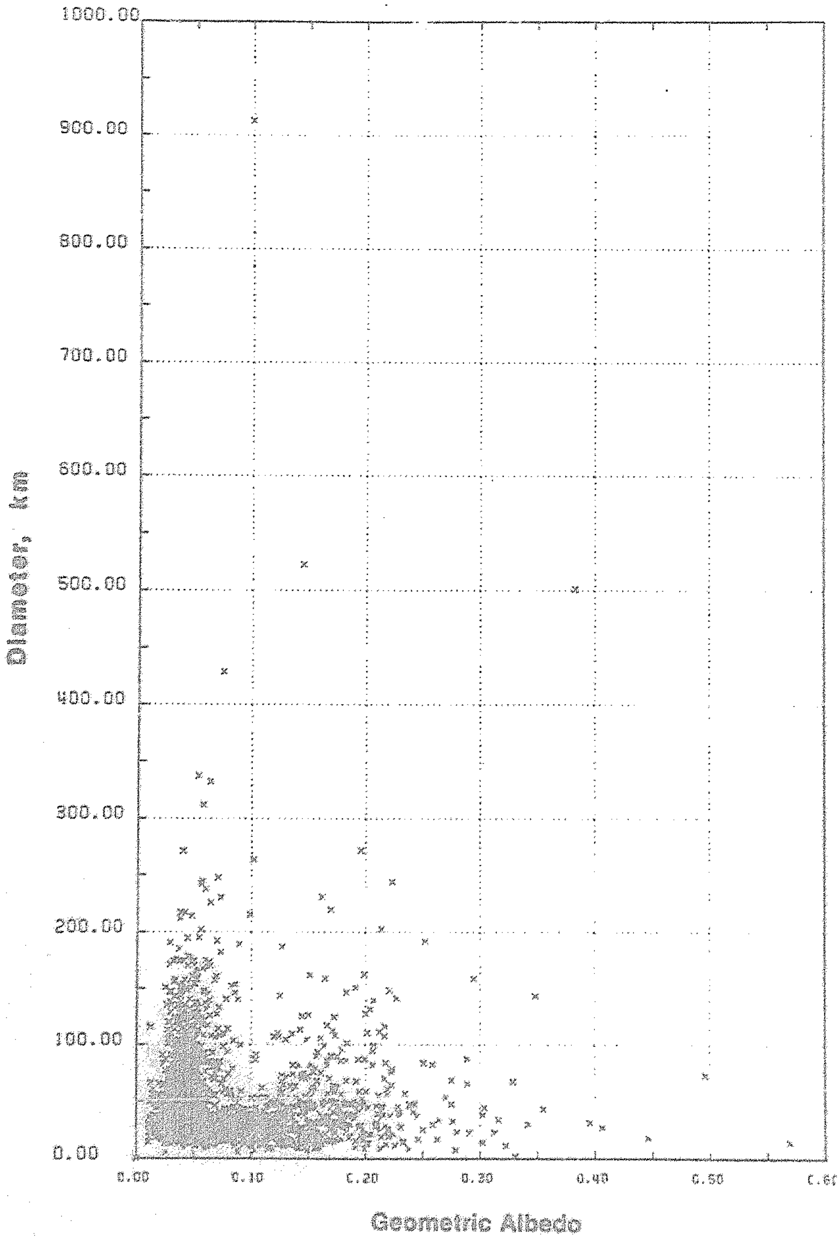
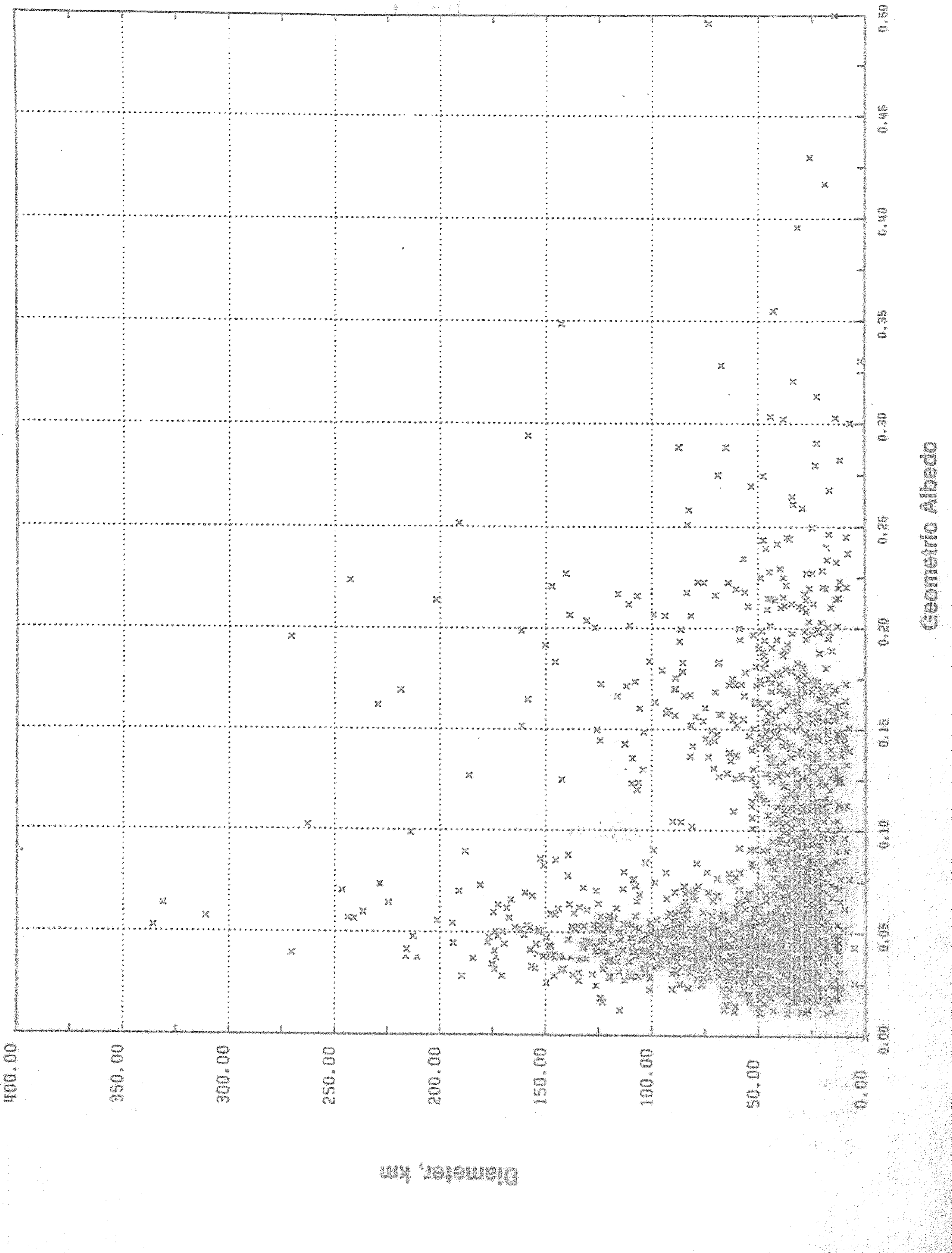


Figure 2-21a and b: IRAS asteroids: (a) Average diameter (km) vs. average visual geometric albedo for the IRAS model. (b) An enlargement of the dense region of "a".


Diameter, km
Geometric Albedo
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50

ADAS used additional, non-color filters to increase the reliability of 25-micron-only asteroid sightings. These filters do not especially discriminate between asteroids and stars or other sky background sources. (1) ADAS rejected all 25-micron-only sightings that were not seconds confirmed by good detectors in order to mitigate against leaks due to dead detectors in the focal plane array. This was the largest category of rejected asteroid sightings. (2) All 25-micron-only sightings with a detection correlation coefficient of less than 0.94 were rejected in order to discriminate against cosmic ray and other noise spikes. (3) Also all 25-micron-only sightings with an association position score of less than 0.25 were rejected. (4) In addition ADAS rejected all 25-micron-only sightings for asteroids which were detected less than one third of the time that they were expected to appear based on nominal predictions. The latter two tests helped mitigate against the problem of confusion.

2.5.3 Confused Asteroid Sightings

There were many different types of confusion within the IRAS survey and the ADAS extraction of asteroid associations. (1) ADAS predicted two different asteroids within its (space-time) resolution window for 14 sightings and was therefore forced to reject them. (2) ADAS found two sources confused for each of 1,727 other predicted asteroid sightings which also had to be rejected. (3) ADAS flagged 452 asteroid sightings in regions with a high density of background 25 μm sources (e.g. near the galactic center). This flag was not used for any processing decisions. Many of these were confused with specific weeks-confirmed sources. (4) ADAS flagged 369 asteroid sightings which were confused in position with sources which repeated at weeks-confirmation level and all of these sightings were rejected. (5) In addition, ADAS flagged 127 of the rejected weeks-confirmed asteroid sightings which qualified for entry and were included in the IRAS point source catalog. ADAS found that 21 asteroids had all of their sightings confused with some weeks-confirmed source and therefore ADAS never produced an asteroid catalog entry for these asteroids.

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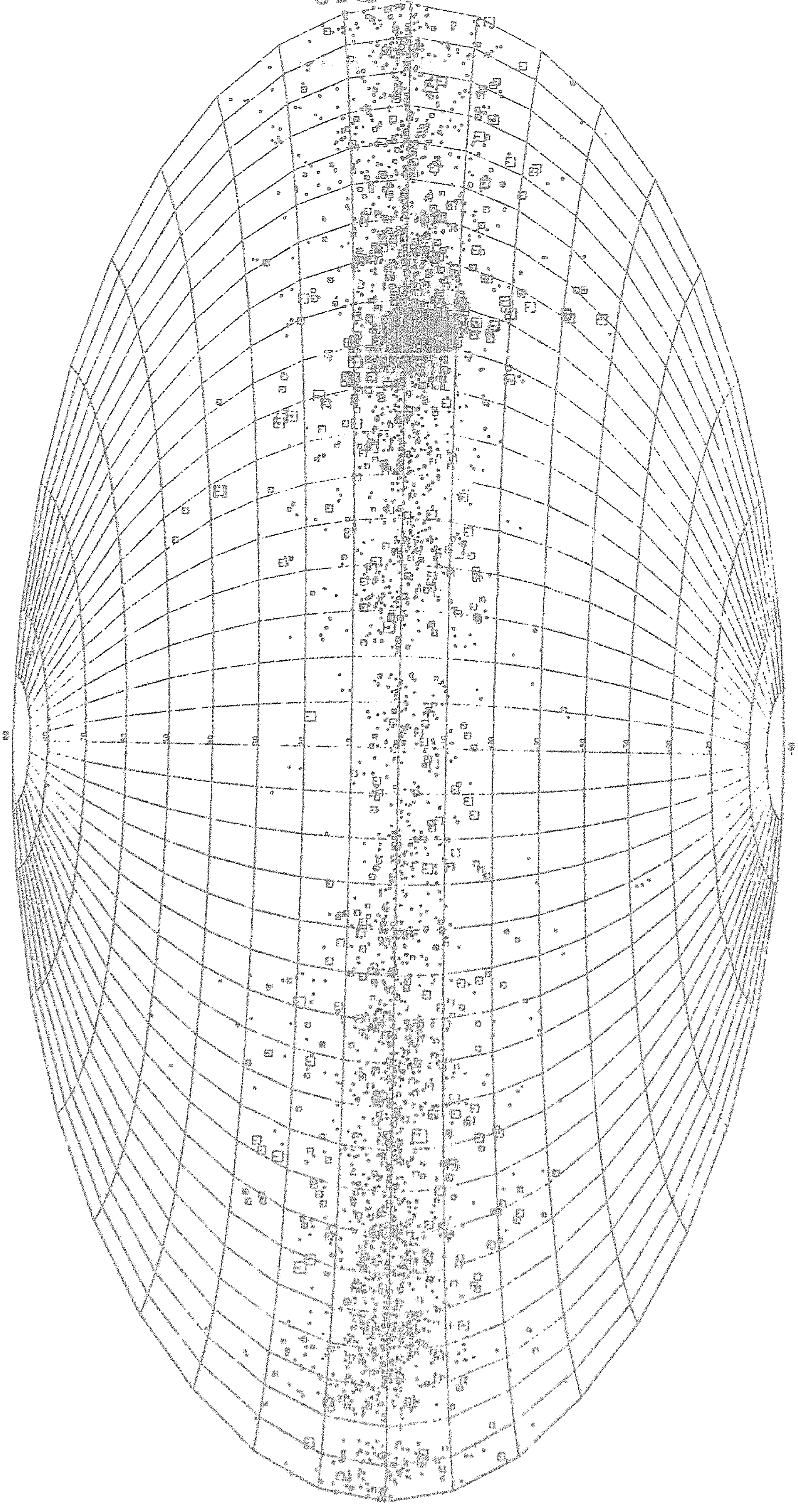
Figure 2-22: IRAS rejected sightings of asteroids: The rejected associations to asteroids (with known orbital elements) or plotted in ecliptic coordinates with grid divisions of ten degrees. Symbol size is proportional to 25 μm flux density.



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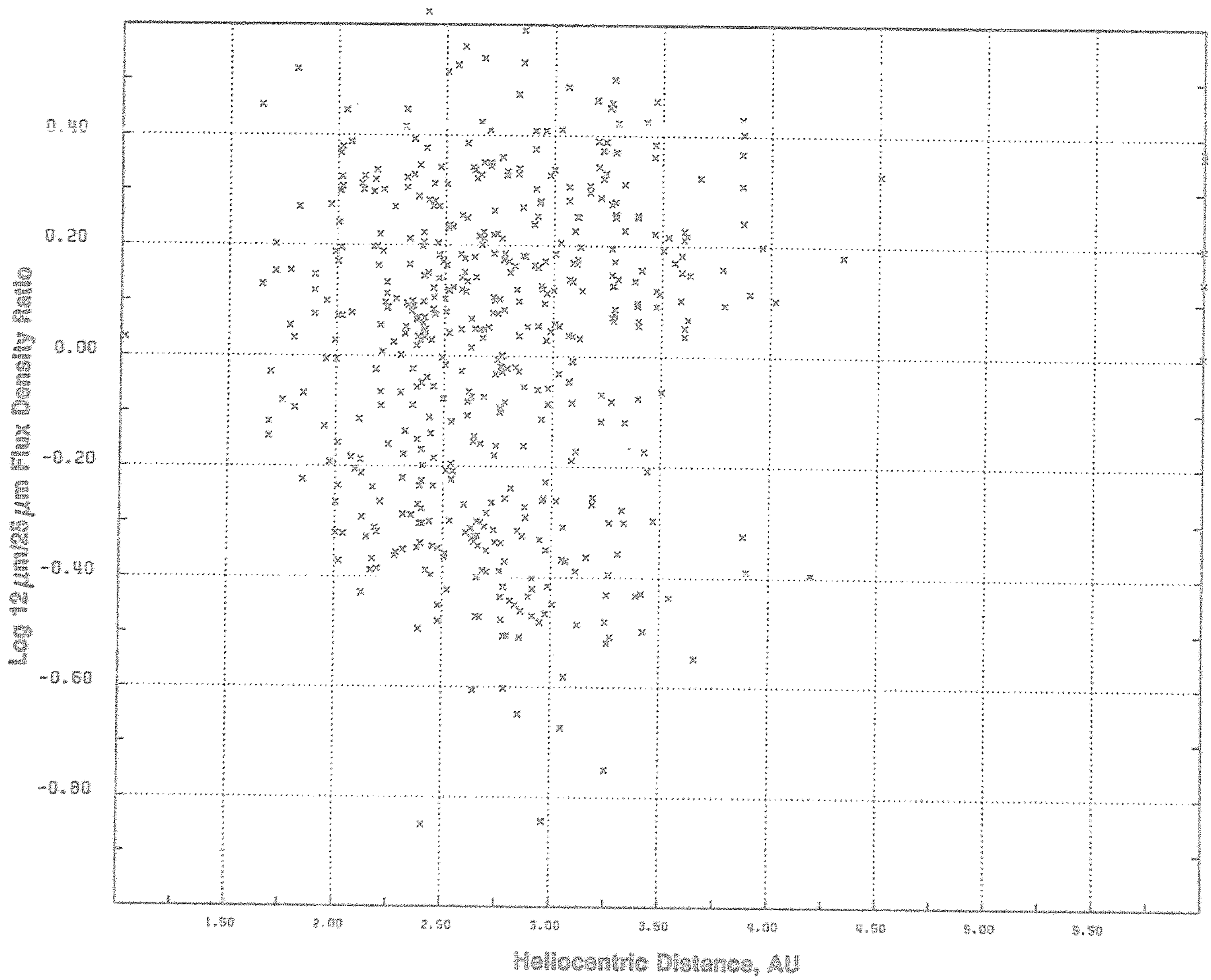

Figure 2-23: IRAS rejected sightings of asteroids: The rejected associations to asteroids (with known orbital elements) plotted for the color ratio of flux densities at 12 μm:25 μm vs. heliocentric distance at AU.

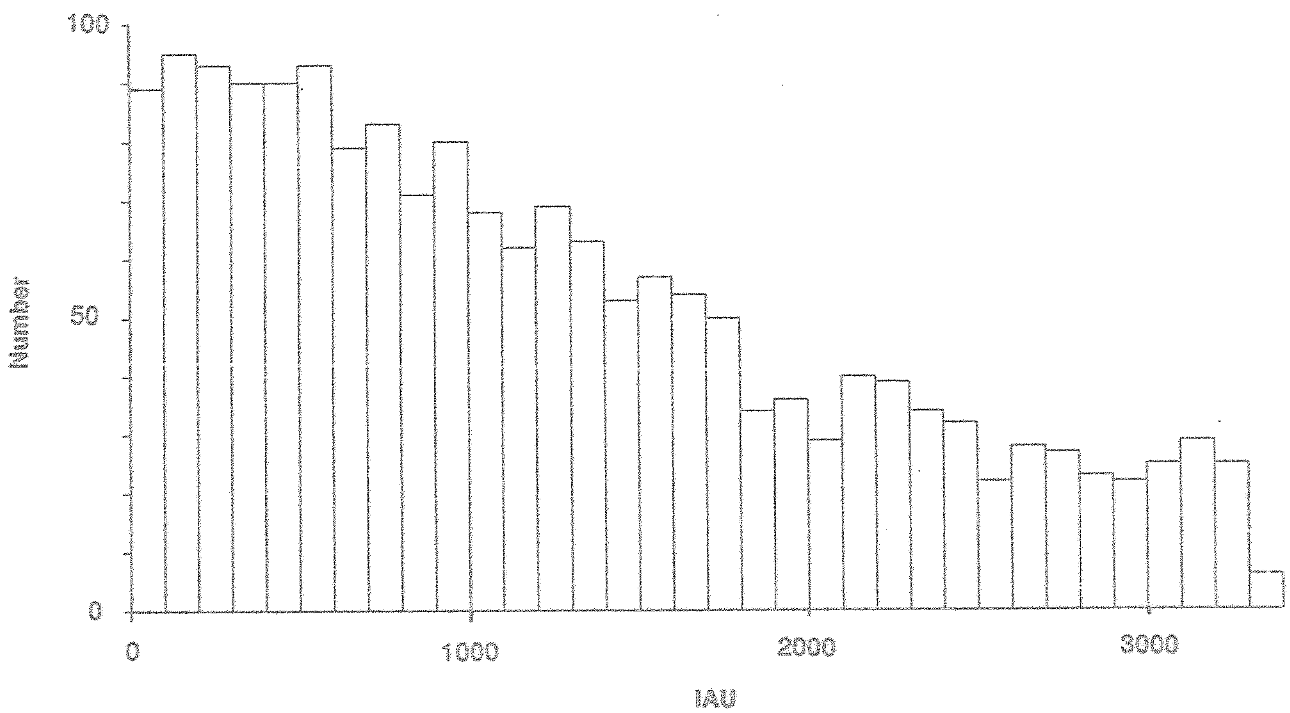

Figure 2-24: IRAS asteroids: The frequency of asteroids (with known orbital elements) with accepted IRAS data binned by IAU number.

2.5.4 Asteroids

TABLE 2-2 IRAS Asteroids

12 μm + 25 μm + 60 μm	1229
12 μm + 25 μm	186
25 μm + 60 μm	104
25 μm	278
No 25 μm	14

A summary by asteroid (rather than by sighting) is presented for the 1,811 asteroids with data accepted by ADAS in Table 2-2. The number of accepted IRAS asteroids as a function of assigned IAU serial number is shown in Figure 2-24. The decrease in the number of objects with large IAU numbers is correlated with the trend toward decreased brightness for the later additions to the asteroid list, both in the visual and the infrared.

The number of accepted IRAS asteroids as a function of absolute blue magnitude is shown in Figure 2-25. The absolute blue magnitudes are on the IAU system which uses the Lumme-Bowell-Harris phase function. The decrease in the number of asteroids with faint absolute fluxes is due to the SNR limit of the IRAS asteroid survey and the incompleteness of the available asteroid orbital elements which becomes progressively more severe for smaller objects. The effective survey limit of IRAS detections of asteroids in its short wavelength bands is comparable to that of an extended integration for each asteroid with a large (low infrared background) ground-based telescope.

2.6 Predictions for Asteroids

The accuracy of our *a priori* predictions is the subject of this section. How close were our infrared flux density guesses? Why did we not see some asteroids?

2.6.1 Asteroid Flux Densities

The trend of observed vs. predicted 25 μm flux density for accepted IRAS survey observations is shown in Figure 2-26. Predicted flux densities were derived from the non-rotating thermal model using nominal visual geometric albedos. The default value assumed for the albedo corresponds to that typical for the dark classes of asteroids. Thus, the predicted flux density is an upper limit if the asteroid happens to be a member of some other class which has a higher albedo. Those flux densities should differ in a systematic way from their predictions (cf. Figure 2-26). As expected the correlation between predicted and observed flux density becomes weaker for fainter asteroids. The survey SNR cutoff of three corresponds to about 0.5 Jy at 25 μm.

The number of accepted observations of asteroids with known orbital elements as a function of the ratio of observed to predicted 25 μm flux density is shown in Figure 2-27. Predicted flux densities were derived from the non-rotating thermal model using the nominal visual geometric albedos. There is a slight systematic tendency for the observed flux densities to be brighter than the nominal predictions because most of the asteroids without any previous ground-based radiometry data are dark, having been discriminated against because of their relatively fainter visual magnitudes when astronomers compiled their observing candidate lists. The width of the histogram is due to lightcurve and aspect differences between the visual and infrared epochs. Scatter is also introduced into the predictions by photographic magnitudes or only estimated magnitudes being available for many of the fainter asteroids.

The observed IRAS 25 μm flux differed by more than a factor of 10 from the nominal flux density predicted by ADAS for 281 accepted and 440 rejected asteroid sightings. ADAS flagged these sightings for additional analysis but made no processing decisions based upon them. The sightings with poor predicted flux densities which were rejected for other reasons are concentrated towards the galactic center.

2.6.2 Missed Asteroids

There are two reasons that an asteroid may not appear in the IRAS Asteroid Catalog. First, it may have been detected but had a poor signal-to-noise ratio(s) or low flux status number(s), or was confused with background source(s) or for other reasons was below the acceptance threshold(s). Second, there may be no sightings for it. It was never observed. The possible causes for "misses" are now considered.

ADAS failed to detect any source for each of a total of 7,183 predicted asteroid sightings. These missed sightings resulted in a lack of data for 509 individual asteroids. Most bright asteroids were seen every time they were predicted unless they were confused with a fixed background source. Many faint asteroids were detected only a fraction of the time they were predicted to cross the focal plane. ADAS did miss 463 asteroids which were predicted to be too faint to expect a detection by IRAS in its survey mode. ADAS also missed 34 other asteroids which were unlucky enough to cross dead (or very noisy) 25 μm detectors when they traversed the focal plane during at least one predicted sighting. ADAS did not have any good alibi for missing the 12 asteroids (see below). The IRAS survey never scanned 187 asteroids. The 7 numbered asteroids could never be searched for in the IRAS data. For these "lost" asteroids the orbital elements are presently unknown. The Asteroid Statistics Catalog (FDP #6 printed in Part III of this volume) lists the results for all input asteroids. The situation for the total of 703 asteroids for which there are no IRAS data is summarized in Table 2-3.

TABLE 2-3 Asteroids Without IRAS Data*

Missed:	Faint	463
	Dead/Noisy	34
	No Alibi	12
No Scan		187
Lost		7
	TOTAL	703

*There are an additional 939 asteroids for which there is IRAS data but which do not appear in the Final Data Products because they did not meet our acceptance thresholds.

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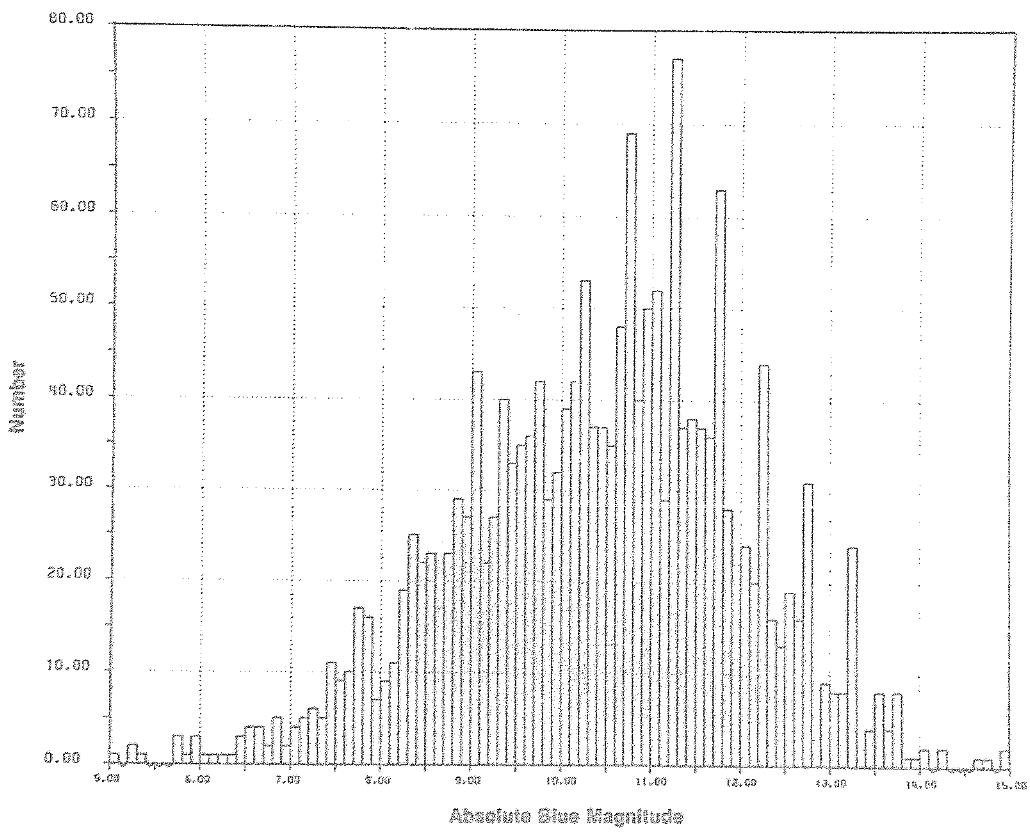

Figure 2-25: IRAS sightings of asteroids: Histogram of absolute blue magnitudes, B(1,0) for accepted observations of asteroids (with known orbital elements).

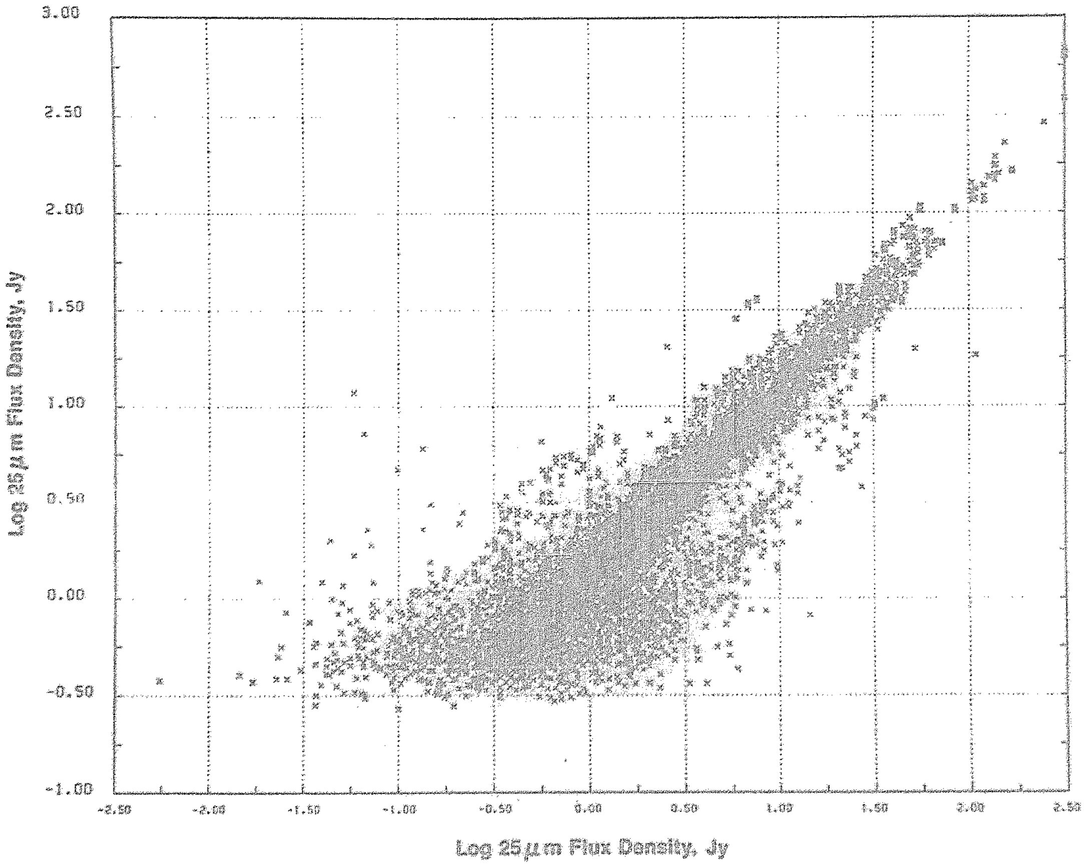

Figure 2-26: IRAS sightings of asteroids: Observed flux density (ordinate) vs. predicted flux density (abcissa) in Jy at 25 μm for accepted observations of asteroids (with known orbital elements).

A total of 12 asteroids had no excuse for being missed. Lebofsky searched for these asteroids in the Calibrated Reconstructed Detector (CRDD) files which show detector output as a function of time. Of the 12 asteroids investigated, 10 show no evidence of any detection, implying either that the asteroids were too faint in the IRAS bands, or had poor orbital elements and so do not appear in the plots. For asteroid 906 there is a source about 6 seconds (20 arc-minutes) later than the predicted asteroid position. This implies either a different source or else poor elements. In the case of asteroid 1465 the asteroid should have been seen twice. Once it crossed two good detectors, but was only seen once above the noise level. For the second sighting there is a source in the correct place, but for some reason, it was not tagged by the ATA.

2.7 Reliability Estimates for Accepted Sightings

We define reliability as the ratio of the number of successes to total number of trials. A "success" means that a real source on the sky corresponds to the instrumental "detection". In practice it is usually easier to identify errors than good observations. Thus the formula for reliability becomes:

$$\text{Reliability} = 1 - \frac{\text{Number of errors}}{\text{Number of trials}} \tag{2-1}$$

Now in order to calculate reliability some spurious observations must be identified and counted so that there is a number for the "number of errors" in Eqn. 2-1. However, ADAS has already been designed to reject all of the spurious observations that we know how to recognize. Thus, if we proceed rigorously, we cannot evaluate Eqn. 2-1 using the information at hand. Our requirement, however, is only for a rough estimate of the reliability. This can be done by conjecturing some types of errors in the sightings, counting how many sightings are thus affected and putting that number into Eqn. 2-1. The accuracy of the estimates can be assessed by devising several different tests, with different assumptions, and comparing the results.

There are at least four types of errors which can be in the data: (1) errors based on predicted flux density, (2) errors based on adopting a range of acceptable albedos, (3) errors based upon the colors of background objects and, (4) errors based upon the frequency with which predicted observations are realized.

The first approach toward assessing reliability is to identify sources which are expected to be too faint to be detected by IRAS and to see how many times they are accepted as sightings. As an experiment a subset of asteroids was identified by ordering the flux density expected at [1983] opposition assuming an albedo of 0.037, typical for dark classes of asteroids. This was done in order to examine a sub-population of asteroids rather than imposing qualifications on associations. The ADAS processing was traced for all (i.e. 153) of the faint asteroids which were tagged because their flux densities were always predicted to be below the quoted IRAS survey limit at 25 μm. Since this was done as an internal check on reliability, no processing decisions were based on this flag. ADAS accepted 22 "spurious" associations for these out of a possible 230 associations. From this, 18 individual asteroids passed through all filtering and therefore appear in the final data products. From Equation 2-1 and the above sighting data an estimated lower bound on reliability is: 1 -22/230 = 0.9. This is a lower bound because our predicted flux may actually be too low for some of these asteroids. In a formal sense this value is a lower bound on the true reliability. Thus, some of the 22 "errors" may be legitimate sightings because some asteroids may be much brighter than assumed.

The same test was repeated for a lower predicted flux density limit using 60 fainter asteroids (i.e. using a predicted flux density cut-off of 0.3 vs 0.5 Jy). From this new set, with 98 possible associations, ADAS accepted 4 spurious associations. The corresponding reliability estimated lower bound on reliability is: 1-3/98 = 0.96.

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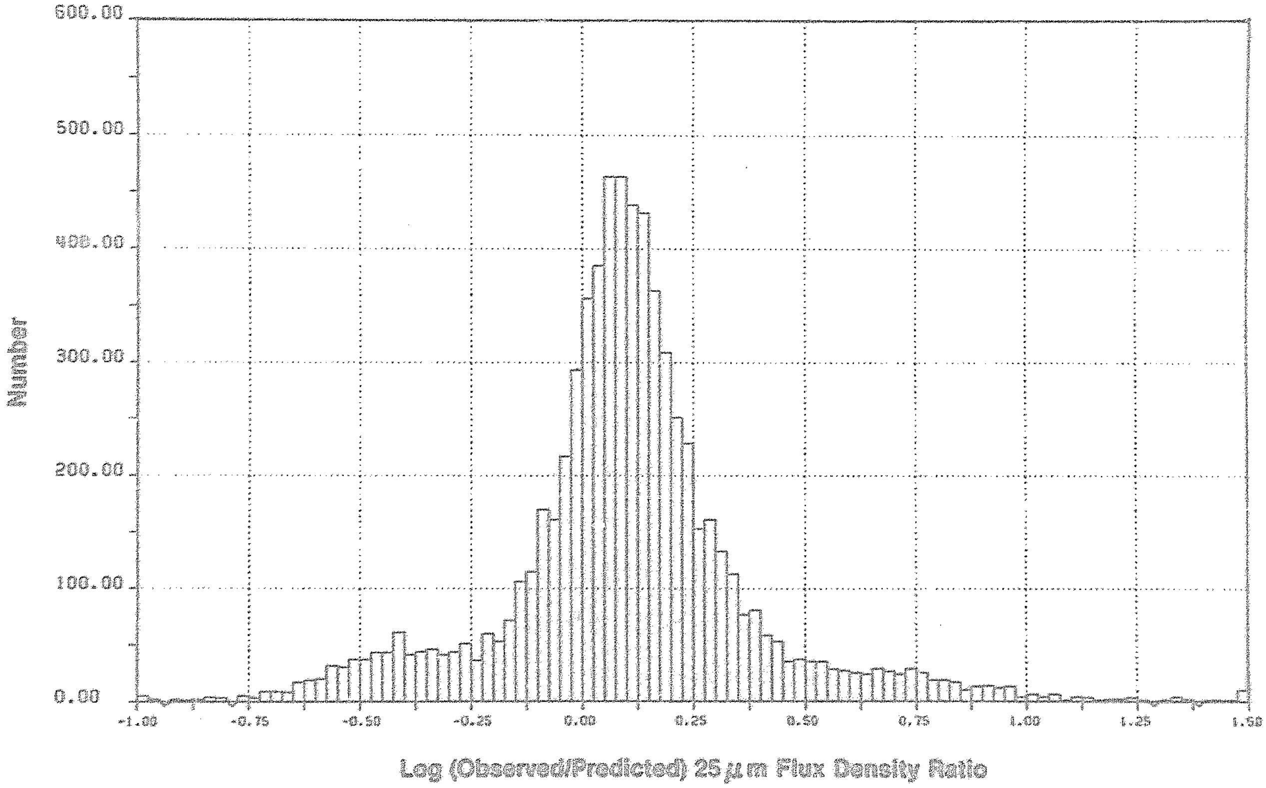

Figure 2-27: IRAS sightings of asteroids: The number of accepted observations of asteroids (with known orbital elements) binned by the ratio of observed to predicted flux density at 25 μm.

It can be conjectured that all albedos below 0.01 are non-physical and therefore are spurious (Sec. 2.9.8). There were 29 such cases accepted out of a possible 386 cases, leading to a reliability lower bound estimate of 357/386 = 0.92. This is a lower bound because there may really be some asteroids that are that dark. With respect to the infrared flux densities this is also a lower bound because these 29 cases are thought to arise from bad visual magnitudes.

Both of the foregoing estimates for reliability are lower bounds in another sense. Namely, this is a 25 μm-band test and 81 percent of the associations have detections at more than one wavelength. Multi-band sightings have additional redundancy and reliability (i.e. through more detections in each sighting). Moreover, the asteroid filter window (Fig. 2-10) is only applicable to those associations which in fact have color information (cf. Sections 2.2.2 and 2.2.3).

The three-band data objects can be used to estimate the reliability for the 2-color associations. This test requires the assumption that the density of sources just outside the asteroid color window is typical of the density of spurious sources inside the window. This approach gives ~30 spurious associations out of 5,080. The corresponding estimated reliability is: 1-30/5080 = 0.994.

The asteroid associations with detections in all three short wavelength bands are the most reliable group in the survey because they tend to have high SNR, have the additional redundancy of multiple detections per sighting, and are consistently observed almost every time they are predicted. Therefore, the estimate of their reliability can be used as an estimated upper bound on the average reliability of all asteroid associations.

The asteroid associations with detections in all three short wavelength bands can also be used to estimate the contribution to reliability of those with only two. This approach merely counts the additional rejected sources around the color window which would have passed one color test but not the other. Again, the density of sources just outside the color window is assumed to be typical of spurious sources inside as well. This implies that there are ~47*(907/4403) = 10 spurious associations within the concentration of asteroid sightings in

Figure 2-13 and ~55*(381/4403) = 5 spurious associations within the concentration of asteroid sightings in Figure 2-13. That is, the reliability of asteroid associations (from the 3-band population) with detections at 12 and 25 μm is estimated to be less than ~1-(30+17)/4403 = 0.989 and the reliability of asteroid associations with detections at 25 and 60 μm is estimated to be less than ~1-(30+25)/4403 = 0.988. From these numbers the following can be concluded: (1) the 12:25 and 25:60 colors are approximately equal in reliability, and (2) a sufficient condition for high reliability is at least one good color measurement. Again, the caveat that these calculations only apply to data with SNR and other characteristics similar to the 3-band population.

Finally, reliability can be estimated based upon the frequency that predicted observations are realized. This was the approach used for estimating the reliability of the IRAS Point Source Catalogue (ES Sec. VIII.D.). The formalism is found in ES pp. VIII-5 through VIII-8. This method has been adapted for moving sources by Chester (private communication). In this application the output from the asteroid predictor was used to find the number of times a moving source had been scanned (i.e. the M value). The number of times the source actually had been sighted, N, was the number of sightings tabulated for it in the Catalogue of Asteroid Sightings [FDP No. 2]. The information for M and N is presented in Table 2-4.

TABLE 2-4 M and N Values for IRAS Asteroids

N\M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	9	102	28	69	33	o6	37	25	23	16	10	4	5	1	1
2	.	143	29	41	19	29	45	18	11	6	6	4	2	1	1
3	.	.	64	65	30	27	15	15	8	3	3	3	2	0	2
4	.	.	.	96	37	21	27	9	7	2	3	1	0	1	0
5	.	.	.	.	72	41	23	15	12	10	3	1	0	0	1
6	.	.	.	.	.	77	37	14	13	4	3	0	1	0	0
7	.	.	.	.	.	.	57	25	13	1	4	2	1	1	2
8	.	.	.	.	.	.	.	43	24	6	3	3	1	0	0
9	.	.	.	.	.	.	.	.	22	17	2	4	0	0	0
10	.	.	.	.	.	.	.	.	.	9	9	1	1	3	0
11	.	.	.	.	.	.	.	.	.	.	8	7	3	0	0
12	.	.	.	.	.	.	.	.	.	.	.	4	0	2	1
13	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1
14	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2
15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0

The essence of this approach is the assumption that sources at which the telescope pointed should have been sighted on most such occasions if the sighting-selection criteria used is selecting reliable sightings. Thus, for the higher values of M one would expect reliable sources to have been detected several times. The next step is to assume that for M all of the entries for N=1 are spurious. As emphasized in the Introduction, this may not be a good assumption since asteroids show definite flux variability. Thus the approach will also yield only a lower limit on reliability. From the data in Table 2-4, Chester (private communication) has computed the following for the IRAS Catalogue of Asteroid Sightings [FDP No. 2]: (1) a single scan reliability of 0.96 and (2) an asteroid reliability of 0.91. For this calculation, the N/M table was broken into three observed flux ranges, since the completeness in a strong function of flux. For the reliability calculation, values of M from 4-7 were used. The single scan reliability is comparable with the other estimates calculated previously in this section. Chester defines the asteroid reliability as the percentage of asteroids with only true associations, i.e.:

$$\text{Reliability per Asteroid} = 1 - \left[\frac{\text{Probability of at least 1 false association}}{\text{Probability of at least 1 false association} + \text{probability of only 1 true associations}}\right] \qquad \text{(Eqn. 2-1)}$$

The main assumption of the N and M analysis can be tested by comparing IRAS and ground-based albedos for those asteroids with N=1. Sixteen asteroids were found to be in both data sets. These are listed in Table 2-5.

TABLE 2-5

Comparison of IRAS and Ground-based Albedos for N = 1

Asteroid No.	Albedos IRAS	Albedos Ground-based	Ratio Ground/IRAS	M
4	0.380	0.347	0.91	2
13	0.099	0.089	0.90	3
45	0.048	0.045	0.94	7
55	0.320	0.241	0.75	2
69	0.120	0.173	1.44	2
90	0.051	0.054	1.06	1
111	0.064	0.067	1.05	1
241	0.062	0.054	0.87	6
387	0.160	0.159	0.99	2
441	0.140	0.157	1.12	2
566	0.032	0.037	1.16	2
660	0.150	0.172	1.15	4
721	0.050	0.049	0.98	7
1001	0.044	0.047	1.07	4
1687	0.084	0.105	1.25	3
2241	0.040	0.041	1.03	4

Of the 16 asteroids, only three have albedo discrepancies greater than twenty percent. One differs by forty-four percent. In this case it is the quality of the ground-based data that is open to question. Inasmuch as twenty percent differences often occur in such comparisons of asteroid data, we are left with no IRAS observations which we can show to be spurious. This small sample also admits the possibility that none of the IRAS data are spurious. In any case, the assumption that all of the N=1 cases are spurious is not supported where the IRAS results can be compared with albedos derived from good ground-based photometry.

Thus this data confirm our previous statement that the reliability estimates provided by the N and M analysis an lower bounds.

2.9 Caveats

2.9.1 Phase Angle

The phase angle is the sun-asteroid-earth angle. The number of accepted observations as a function of phase angle is shown in Figure 2-28. Most observations were made at relatively high phase angles. IRAS did not scan asteroids at low phase angles due to pointing constraints. 2201 Oljato was observed at a phase angle of ~85 degrees, the highest in the survey. The reductions of a high phase angle observation tend to involve larger errors in thermal modeling and in the extrapolation of the available visual magnitudes.

2.9.2 Position Score

A position score was defined for the purpose of quantitatively rating the quality of the agreement between an asteroid's observed and predicted position. Position score is defined in Section 6.1.4.2.2. The number of accepted IRAS survey observations of asteroids with known orbital elements as a function of position score is shown in Figure 2-29. This bimodal distribution was investigated and it is due to differences in the quality of the asteroid orbital elements. ADAS produced a position score of greater than 0.3 for most asteroids detected with good signal to noise in three bands.

2.9.3 Outer Slot Position Error

The IRAS positions reconstructed for sightings which happened to have tracked along the outside of the focal plane detector array are systematically poorer than those which tracked through the interior of the array (ES). ADAS flagged such asteroid sightings because they are probably more vulnerable to various confusion problems but made no processing decisions based upon these flags.

2.9.4 Confused Bright Asteroids

Confusion with weeks-confirmed sources did not depend on flux density or color. In particular, several sightings of bright asteroids were eventually rejected because of position confusion with faint background sources. Stars may contaminate sightings at 12 μm but not affect the asteroid detections at longer wavelengths. Inspection of CRDD plots can often sort out obvious examples and allow the observation of the asteroid to be salvaged. This was not done for the present survey.

2.9.5 Asteroids vs. CUS

ADAS associated the position of small extended CUS sources with 499 accepted and 402 rejected asteroid sightings. Of these, 185 accepted and 94 rejected sightings were also associated in time. Such CUS associations tend to be somewhat concentrated towards the galactic center. Even most of the ones at high galactic latitudes are probably due to confusion. ADAS set flags for future analysis of these sightings, but made no processing decisions based on them.

2.9.6 Fractured Sightings

Occasionally SDAS processing did not properly assemble or merge the multi-band detections for an individual asteroid. This resulted in several 25-micron-only-sighting and 12-and-60-micron-only sighting pairs. The latter were rejected by the ADAS input module because detection at 25 μm was required. This requirement was set by the asteroid-like color temperature test. The most obvious cases involve relatively large 25 μm flux densities with good SNR. This problem has not been corrected for the initial delivery of asteroid data products.

2.9.7 Low SNR Flux Error

The IRAS flux densities quoted for low SNR sightings are systematically too bright. Thus, the asteroid thermal model yields diameters which are too large and albedos which are too low for these sightings. This bias is due to the use of a fixed SNR limit. The effect is expected for surveys of this type and has not been corrected in the initial delivery of asteroid data products. The effect is less on the diameter since it varies to the square root of the flux where as the albedo is inversely proportional to the flux.

2.9.8 Unlikely Albedos

Visual geometric albedos of less than 0.01 and greater than 0.9 lie outside of the range which is considered likely for asteroids. ADAS was unable to derive a finite visual geometric albedo for 14 asteroid sightings. It returned the upper limiting value of 0.9 and subsequently rejected these sightings. These cases probably represent missed asteroid predictions which were also confused with faint background sources. ADAS also derived visual geometric albedos of less than 0.01 for 29 accepted and 357 rejected asteroid sightings. For these the observed infrared flux densities are greatly in excess of what was expected based upon the value of the asteroids nominal visual magnitude. These probably represent faint asteroids confused with brighter background sources since they are concentrated towards the galactic center.

2.9.9 Absolute Calibration at 100 μm

The IRAS absolute calibration at 100 μm in SDAS was based on special observations of a few bright asteroids. For this purpose, SDAS extrapolated the "standard" thermal model for asteroids from 60 to 100 μm (ES). This implies that the absolute values of the ADAS derived diameters and albedos for 100 μm asteroid observations are not well defined. These were not used in calculating the adopted average values for the various asteroid parameters.

2.9.10 Non-Zero Faint Asteroid Penalty

The NAMELIST parameter which controlled processing via the faint source flag was not properly set to zero for the first catalog production. Instead it remained set to a relatively low value. The anticipated result of this is that a few real sightings of asteroids which were predicted a priori to be below the SNR (flux density) cutoff were rejected in addition to those which failed for other bona fide reasons. The affected asteroids are those with bit 11 set in the status word ASTATW. They are also likely to have an entry under column F in FDP 6 and/or column X in FDP 15.

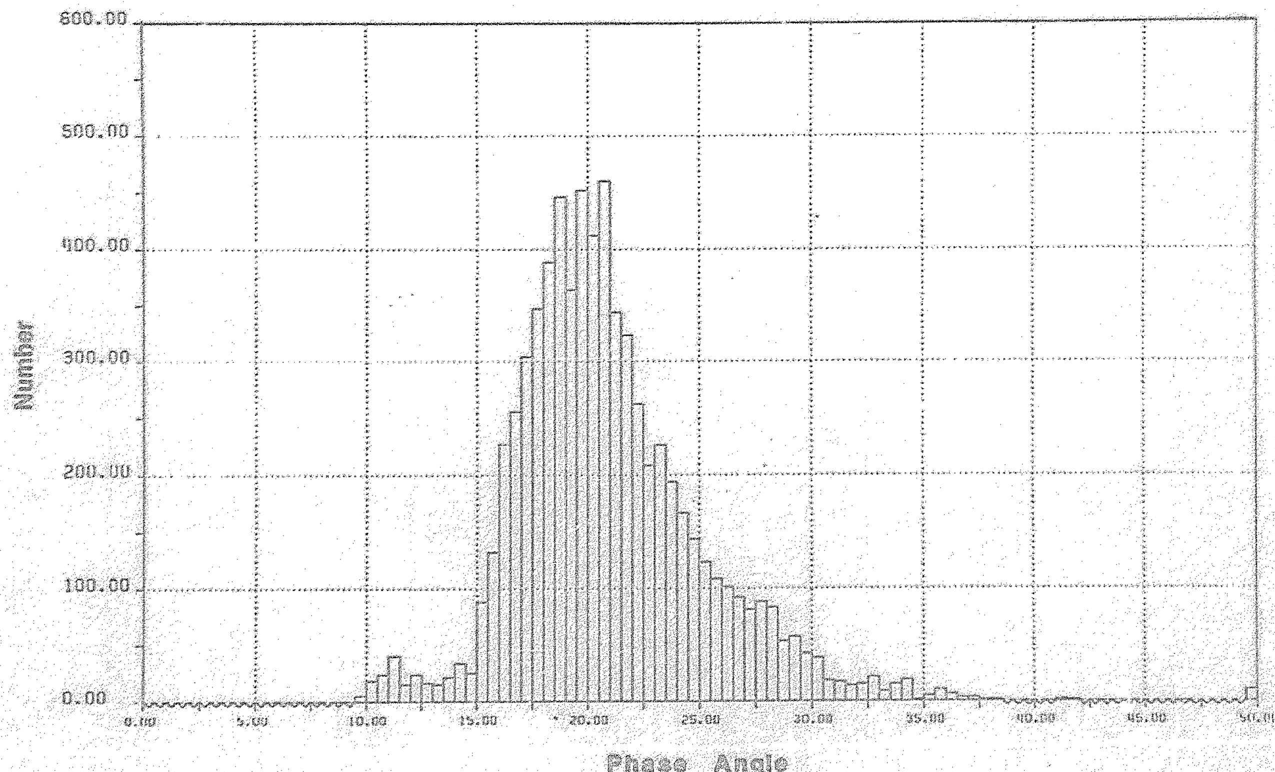

Figure 2-28: IRAS sightings of asteroids: The number of accepted observations of asteroids (with known orbital elements) binned by phase angle in degrees.

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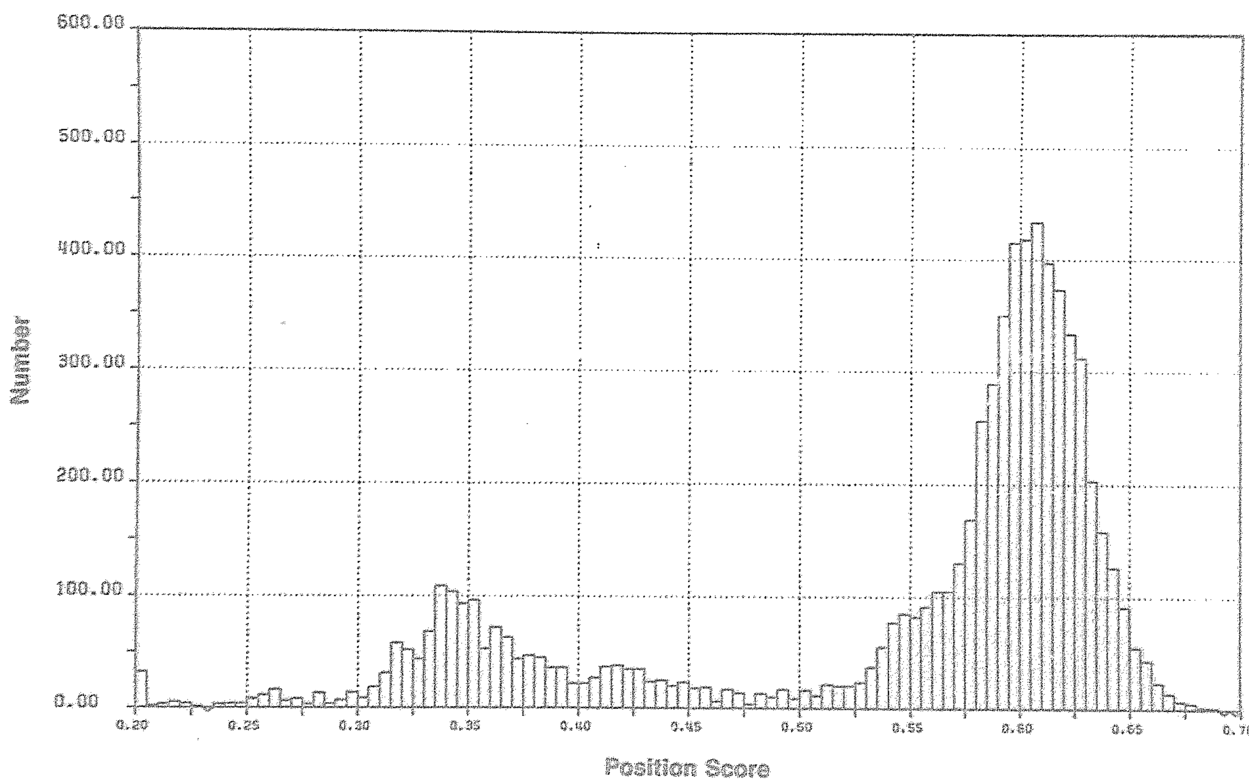


Figure 2-29: IRAS sightings of asteroids: The number of accepted observations of asteroids (with known orbital elements) binned by position score.

Chapter 3. IRAS Comets

by

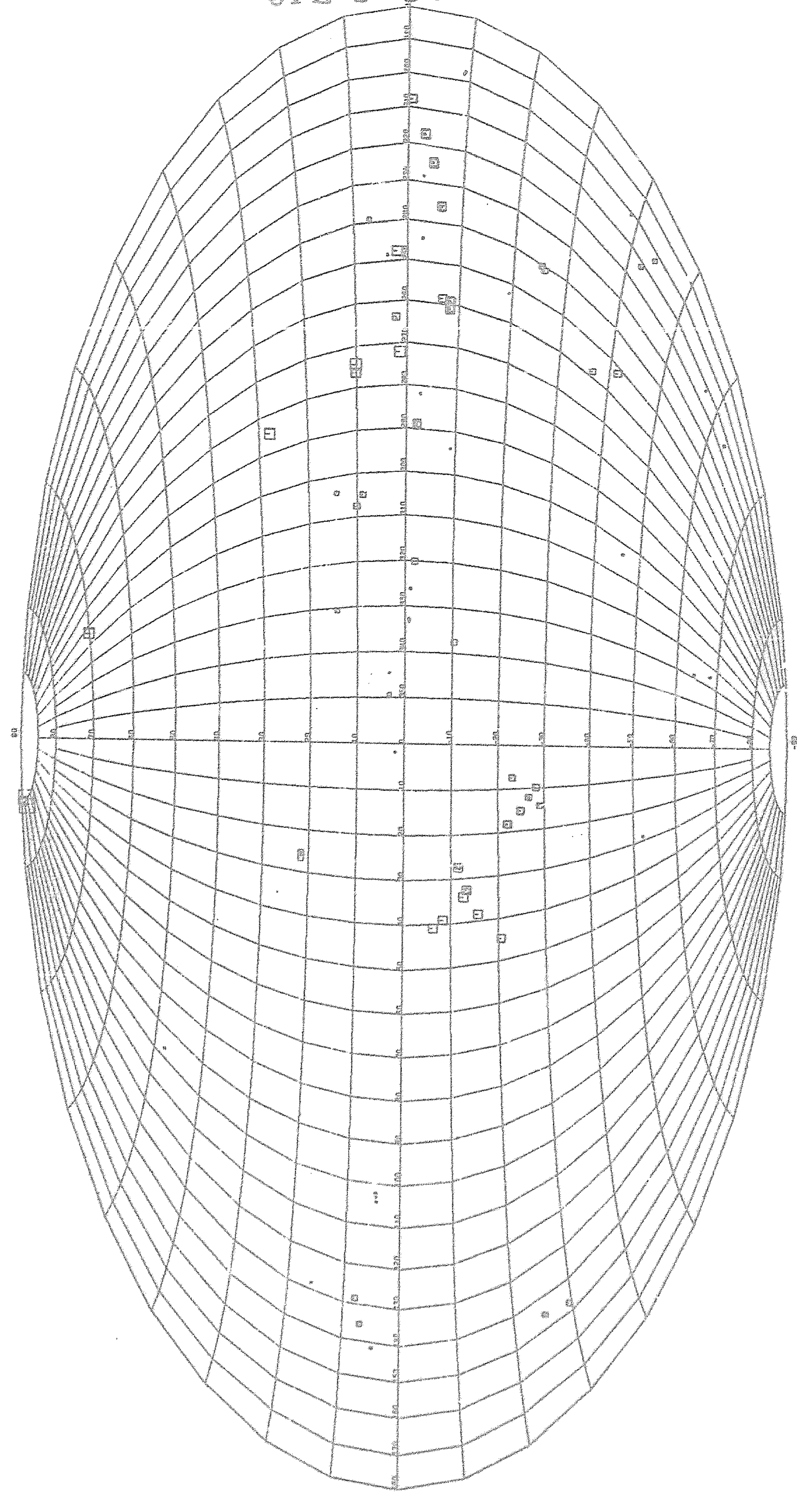
Russell G. Walker

The moderate spatial resolution and high sensitivity of IRAS were particularly well suited to detecting extended thermal emission from cometary dust. Sources with infrared color temperatures characteristic of solar system bodies were selected for ADAS analysis by the Asteroid Tagging Algorithm (ATA) which operated routinely during the daily IRAS bulk data processing.

The detection of comets by IRAS has proceeded on four levels, the first being a near real time detection of rapidly moving objects at the IRAS Preliminary Analysis Facility (PAF), the second by the appearance of an hours confirmed comet detection in the IRAS point source Working Survey Data Base (WSDB) (ES), the third by visual inspection (often by chance) of IRAS detections near the positions of known comets, and the fourth by using the asteroid and comet data set created by the ATA. Results from the first three search methods were used by Walker and Aumann (1984) to make preliminary estimates of the dust production rates for 6 new comets discovered during the year of the IRAS mission and for 6 previously known periodic comets, and by Walker et al. (1984) to study the anomalous tail of comet Bowell. An analysis of the observations of the first comet discovered at PAF, IRAS-Araki-Alcock, has been given by Walker et al., (1984). A summary of the PAF observations and discoveries and of the comet data in the WSDB will be found in the appendix to this chapter.

The positions of high quality, accepted survey detections of known comets are mapped in ecliptic coordinates in Figure 3.1. As is well known, the periodic comets are confined rather closely to the ecliptic, whereas hyperbolic comets can appear in any portion of the sky.

Figure 3-1: IRAS sightings of the comets: The accepted observations of comets plotted in ecliptic coordinates. Grid divisions are ten degrees. Multiple sightings of individual comets can be seen as tracks. Symbol size is proportional to the flux density at 25 μm.



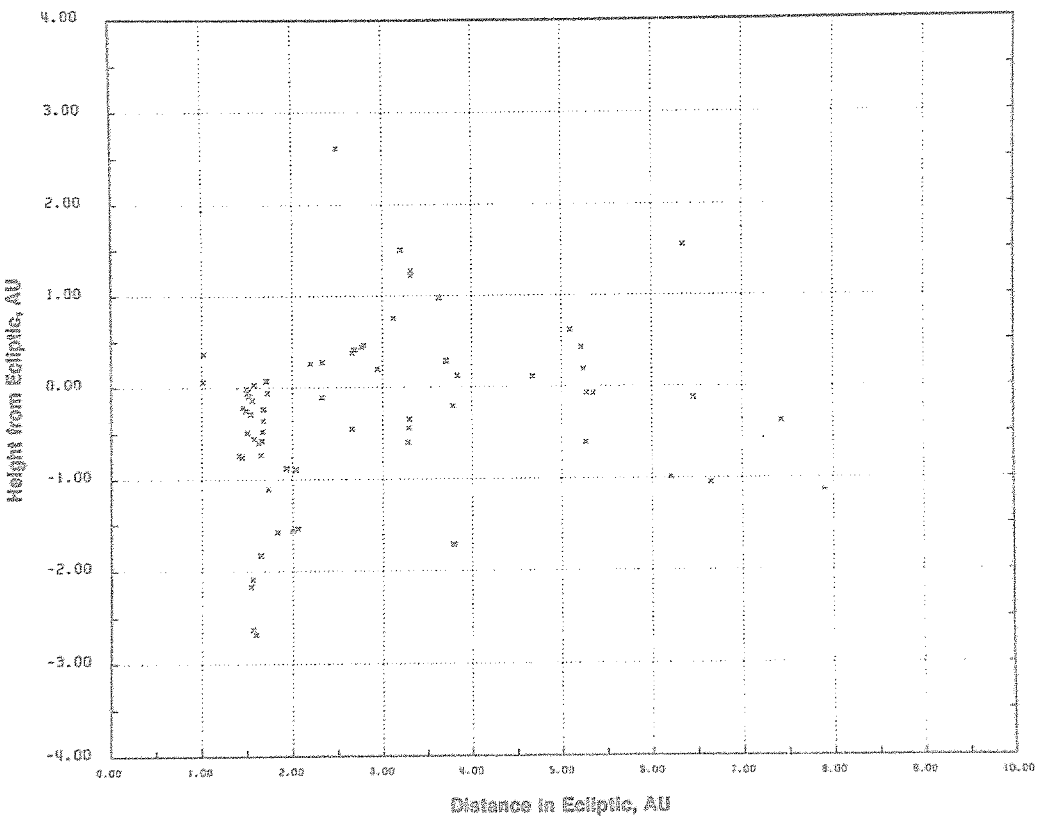


Figure 3-3: IRAS sightings of comets: The accepted observations plotted in rectangular coordinates with grid divisions of 0.5 AU. The ordinate is the distance from the ecliptic plane and has north towards the top. The abcissa is the projection of the distance from the Sun onto the ecliptic plane. Multiple sightings of individual comets can be seen as tracks.

3.1 Comets in the ADAS

The file of IRAS point source detections created by the ATA was searched for detections of 94 periodic comets and 15 comets with parabolic or near hyperbolic orbits. The process was identical to that used for the asteroids, with the software for calculating the objects ephemeris modified to include parabolic and hyperbolic orbits by the methods described by Meeus (1981).

3.1.1 Known Periodic Comets

Table 3-1 is a list of the comets included in the search program. The minimum values of heliocentric and geocentric distances at which the comet was scanned are tabulated. The detection statistics given are the number of point source detections (ND) which IRAS observed at the predicted time and position of the comet, the number of times that the IRAS field of view scanned the predicted position of the comet at the predicted time (NS), and the number (N) of excusable missed detections due to a dead detector (Nd) or excess detector noise (Nn).

In the case of the IRAS point source catalog, it was found that the probability of detection, p = ND/(NS-Nd-Nn), was a good measure of the reliability of a source. In the case of moving sources. such as comets and asteroids, the above statistic may not be as good a measure of the detection probability due to the changing background and background induced noise, as well as, the intrinsic variability of the comet.

This statistic is plotted in Figure 3-4 for two subsets of the detections. The first is a highly reliable sample of seconds-confirmed detections (FSTAT=5) with a minimum signal to noise ratio of 5 or greater (SNR $\geqslant$ 5). These comets are identified in Table 8.2-6 by an ampersand (&) preceding the comet's name. Eighteen of the 23 comets detected (78%) have p=1, and 21 have p>0.8. Comets Austin 1982g and Bradfield were detected at p=0.5 and 0.6 respectively. The second subset is that of the remaining detections. The peak of the distribution is at 0.5, with only 14 of 78 detections (18%) having unit probability. The two distributions differ significantly in the sense that high quality detections have high probability of detection, while low quality detections are spread throughout the probability space.

The search produced a total of 365 detections at the positions of 98 comets. It is of interest to note that only two of the 109 comets examined, Dubiago and Russell 4, were not scanned during the mission.

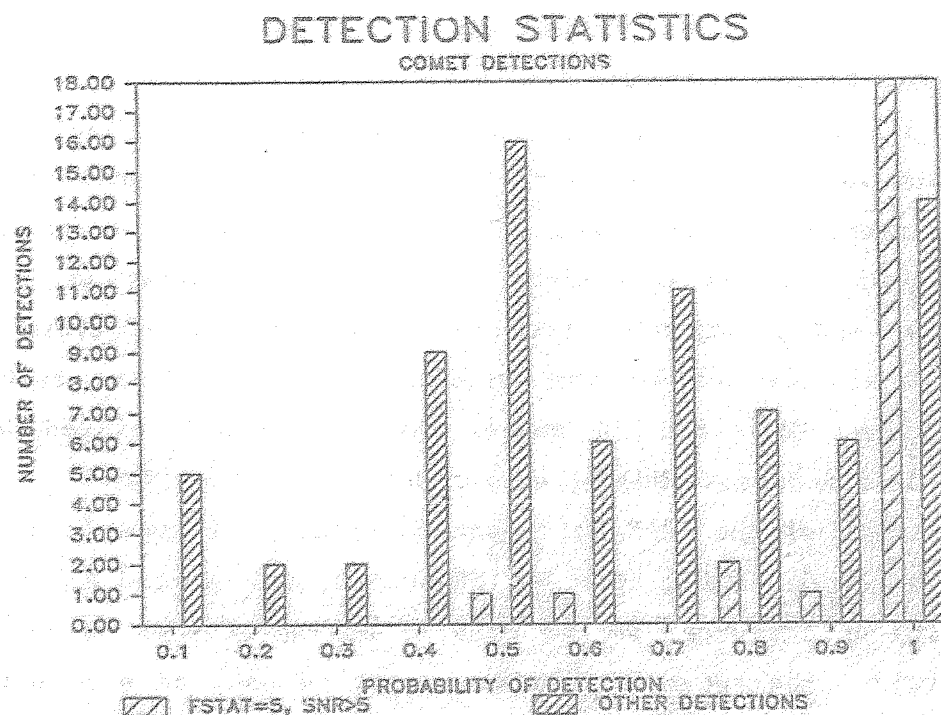


Figure 3-4. Statistics of comet detections by IRAS, where the statistic plotted is the probability of detection defined by p = (N. of detections)/((No. o Scans)-Nd-Nn).

Table 3-6. Summary of Comet Search

COMET	r (AU)	Δ (AU)	NUMBER OF DETECTIONS	NUMBER OF SCANS	ALIBIS (d,n)
Arend	---	---	0	2	----
Arend-Rigaux	3.6	3.7	4	8	3d
Ashbrook-Jackson	4.9	4.8	1	4	
Borrelly	5.6	5.9	5	15	4d
Brooks 2	---	---	0	2	1d
& Churyumov-Gerasimenko	2.2	1.9	6	6	
Comas Sola	6.6	6.7	5	7	1d
Crommelin	3.6	3.5	4	8	2d,1n
Daniel	5.2	4.9	2	6	2d
d'Arrest	---	---	0	2	1d
de Vico-Swift	5.2	5.2	1	4	1d,1n
du Toit 1	10.3	10.3	6	8	2d
& du Toit-Neujmin-Delport	1.7	1.3	5	6	
Encke	3.0	2.7	3	4	
Faye	3.9	3.6	3	7	1d
Finlay	5.3	5.3	4	4	
Forbes	5.1	5.1	3	6	
Giacobini-Zinner	5.5	5.3	1	4	1d
Grigg-Skjellerup	---	---	0	4	2d
& Gunn	2.7	2.5	2	2	
Halley	10.1	10.1	2	6	1d,2n
Harrington	5.2	5.2	2	6	1d
& Harrington-Abel	1.8	1.6	2	2	
Holmes	5.0	4.9	3	5	2d
Honda-Mrkos-Pajdusakova	5.4	5.5	7	10	2d
Jackson-Neujmin	6.6	6.8	3	4	
& Johnson 1983 XIX	2.8	2.5	8	8	
Kearnes-Kwee	4.3	4.1	3	6	1d
Klemola	7.7	7.8	2	4	1d
Kojima	5.1	5.0	2	4	1d
& Kopff 1983 XIII	1.7	1.5	5	5	
Neujmin 1	4.6	4.5	1	3	1d
Neujmin 2	4.2	3.9	3	8	1n
Neujmin 3	2.9	2.6	4	6	1d
Oterma	5.4	5.4	2	5	
Perrine-Mrkos	3.7	3.7	1	2	
& Pons-Winnecke	1.7	1.3	8	8	
Reinmuth 1	5.2	5.0	2	6	2d
Reinmuth 2	4.8	4.8	4	5	
Schaumasse	4.7	4.6	2	5	2d

Table 3-1. Summary of Comet Search (Continued)

COMET	r (AU)	Δ (AU)	NUMBER OF DETECTIONS	NUMBER OF SCANS	ALIBIS (d,n)
& Schwassmann-Wachmann 1	6.3	6.4	4	4	
Schwassmann-Wachmann 2	4.3	4.1	4	5	1n
Schwassmann-Wachman 3	4.7	4.8	3	6	1d
Shajn-Schaldach	5.0	5.4	2	5	
Swift-Gehrels	4.9	4.9	4	4	
& Tempel 1	1.5	1.0	18	19	
& Tempel 2	1.5	1.1	8	8	
Tempel-Swift	2.2	2.0	3	8	2d,1n
Tsuchinshan 1	4.3	4.1	2	4	2d
Tsuchinshan 2	4.8	4.7	2	4	
Tuttle-Giacobini-Kresak	---	---	0	2	1d,1n
Vaisala 1	3.0	2.8	5	7	1n
van Biesbroek	7.8	7.6	3	6	1d
Whipple	5.1	4.9	8	9	
Wild 1	7.3	7.3	2	4	
Wirtanen	5.2	5.2	3	5	1d
Wolf 1	3.5	3.2	4	7	
Wolf-Harrington	3.1	3.0	1	6	2d,2n
Boethin	6.7	7.0	4	9	1d,2n
Bus	4.3	4.1	2	4	1d,1n
Clark	3.3	3.3	3	5	1d,1n
Dubiago	---	---	0	0	
Gehrels 1	7.9	7.9	4	6	
Gehrels 3	4.2	4.0	3	4	
Giclas	4.8	4.9	4	6	
Haneda-Campos	4.3	4.3	7	7	
Howell	4.3	4.1	8	9	
Kohoutek	5.0	5.4	3	10	1d,1n
Kowal 2	3.5	3.2	2	6	1d,1n
Longmore	3.9	3.8	3	4	1d
Peters-Hartley	3.9	3.7	2	4	
Russell 1	4.3	4.0	1	2	
Russell 2	5.2	5.1	2	7	2d,2n
Sanguin	8.9	8.9	1	4	1d
Schuster	4.7	4.9	3	6	1n
& Smirnova-Chernykh	3.7	3.7	6	6	
Taylor	2.0	1.7	2	3	1d
Tritton	2.7	2.3	3	5	1n
West-Kohoutek-Ikemura	4.7	4.9	4	17	2d,1n
Wild 2	---	---	0	2	1d,1n

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Table 3-6. Summary of Comet Search (Continued

COMET	r (AU)	Δ (AU)	NUMBER OF DETECTIONS	NUMBER OF SCANS	ALIBIS (d,n)
Wild 3	---	---	0	2	
du Toit-Hartley	3.8	3.5	4	5	1d
Bowell-Skiff 1983 II	2.1	2.0	2	2	
& IRAS 1983j	1.8	1.3	8	8	
Denning-Fujikawa	7.7	7.8	3	4	1d
& Hartley-IRAS 1983v	2.0	1.4	5	11	2d,1n
& Kowal-Vavrona	2.9	3.1	4	5	1n
& Russell 3 1982 IX	3.2	3.0	9	9	
Russell 4 1984d	---	---	0	0	
& Bradfield 1983 XIX	3.6	3.5	3	6	1d
Takamizawa 1984j	3.5	3.4	1	6	1n
Shoemaker 1 1984q	4.1	4.1	4	12	2n
Shoemaker 2 1984u	4.8	4.6	5	12	1d
Kowal-Mrkos 1984n	3.6	3.7	2	4	1d
& IRAS 1983f	2.1	1.8			
IRAS-Araki-Alcock 1983d	1.1	0.4	4	4	
& IRAS 1983k	2.5	2.2	6	7	
& IRAS 1983o	2.6	2.4	11	11	
Sugano-Saigusa-Fujikawa					
& Shoemaker 1983p	3.5	3.3	5	5	
& Austin 1982g	3.8	3.6	2	5	
& Cernis 1983 l	3.3	3.2	4	4	
Shoemaker 1984f	1.1	1.1	1	6	
Austin 1984i	4.4	4.3	1	2	
Meier 1984o					
Shoemaker 1984r			1	3	
Shoemaker 1984s	6.5	6.3	5	8	
Levy-Rudenko 1984t					
Bowell 1982 I	5.2	5.4	6	6	

Most of the detections (213) occurred in the 25 μm band with no corresponding detection at other wavelengths. This is consistent with the large number of 25 μm detections experienced during the fast moving object survey (Walker and Rowan-Robinson, 1984; Eaton et al., 1984), and may be due to granularity in the zodiacal emission or excess noise induced by the more intense zodiacal background in this spectral region. Only 157 detections were truly seconds-confirmed (FSTAT=5), and 136 of these with SNR ⩾ 5.

To examine the possibility of confusion with objects fixed in inertial space, the IRAS Point Source Catalog was searched for infrared sources within 4 arc minutes of the position of the comet detection. This revealed 55 detections (15% of the total) of infrared point sources that could be responsible for a coincidental detection or a discrepant flux. The sources of potential confusion are listed in the "IRAS PSC" column of the Catalog of Comet Observations. A good example to consider is the series of the first four observations of P/Johnson 1983. In each of these observations the flux is dominated by the background stars. However, the remaining five detections are legitimate, uncontaminated comet measurements.

3.2 Description of Final Products

The final data product for the ADAS search for known comets is the IRAS Comet Catalog (FDP No. 7) included in Part III of this volume. The catalog contains the detection history for each comet reliably detected in the search. Positions were searched for all periodic comets that passed near the sun or earth during the period from 1982 to 1985 plus all comets that were observed during that period.

3.3 Discussion of the Comet Catalog

The data from 24 comets with highly reliable detections (indicated by an ampersand in Table 3-6) have been the subject of a preliminary analysis. The main thrust of the analysis has been to validate the entries as true comet detections. All of the 24 comets have been examined on strip chart records of their respective detection histories. Detections with a peak signal to noise ratio of 10 or greater usually exhibit extended structure when compared to detections of nearby point sources. The data become rapidly ambiguous for fainter detections, and it is not possible by this means to differentiate comets from point sources. Detections with FSTAT=5 and SNR $\geqq$ 5 are, in general, reliable and can be used for analysis. However, while there are certainly a number of real detections meeting less stringent requirements, a great deal of caution must be exercised in their application.

3.3.1 The Infrared Colors

A plot of the logarithm of the ratio of the flux density in the 12 μm band to that in the 25 μm band versus that of the 25 and 60 μm bands is shown in Figure 3-5. The diagonal solid line is the locus of colors for a blackbody radiator with temperature increasing to the upper right. The majority of the observations lie to the left of the blackbody curve, clearly showing that there is excess emission at 60 μm relative to the 12 and 25 μm blackbody colors. The mean color difference is about 0.1 in $\log(F_{25}/F_{60})$.

A similar result is obtained by plotting the log of the flux density ratios of 25 to 60 versus 60 to 100 μm, as is shown in Figure 3.6. Here we see the excess emission at 100 μm relative to the 25 and 60 μm blackbody colors. The mean color difference is about 0.06 in $\log(F_{60}/F_{100})$.

Figure 3-7 is a plot of the three IRAS colors as a function of heliocentric distance. The solid curves shown are the colors of a small blackbody sphere with temperature varying inversely as the square root of the heliocentric distance and T(1 AU) = 277 K. The grains contributing to the flux density at 12 and 25 μm are clearly hotter than the blackbody temperature for the same heliocentric distance, implying grains with diameters small compared to the wavelength of observation Hanner (1980). This is in general agreement with previous infrared observations Hanner <u>et al</u>. (1984).

The 25:60 μm and 60:100 μm colors tend to scatter more about the blackbody curve than the 12:25 μm ratios, however, the tendency is definitely toward colors cooler than the blackbody. The implication is that we are observing the emission from a significant population of cooler, and thus presumably larger grains of diameter comparable to or larger than 100 μm.

Interpretation of these data is complex. The flux ratios are derived from the response of the IRAS point source data filter. The effect of this matched filter is to high pass the data, and thus suppress the response to low spatial frequencies. Extended portions of the coma will be attenuated, and the observed response will be heavily weighted by the steep intensity gradient near the central region. The situation is further confused by the spatial asymmetry of the comet's emission

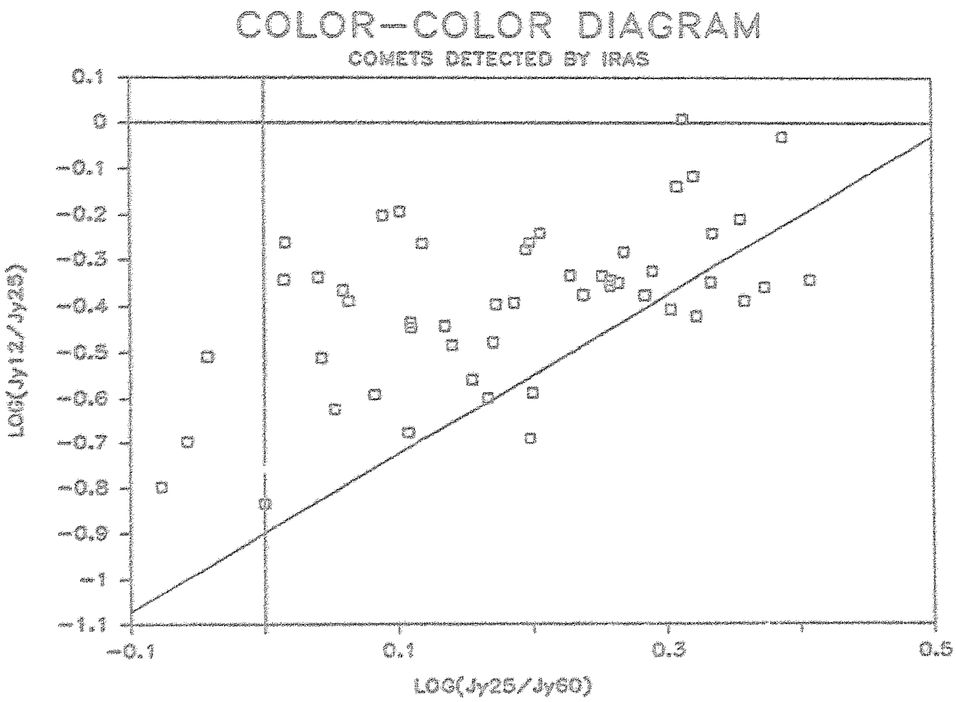

Figure 3-5: Color-color diagram for selected comets, where the color is defined as the logarithm of the in-band flux density ratios, log (F_{12}/F_{25}) and $\log(F_{25}/F_{60})$. The diagonal solid line is the locus of blackbody colors.

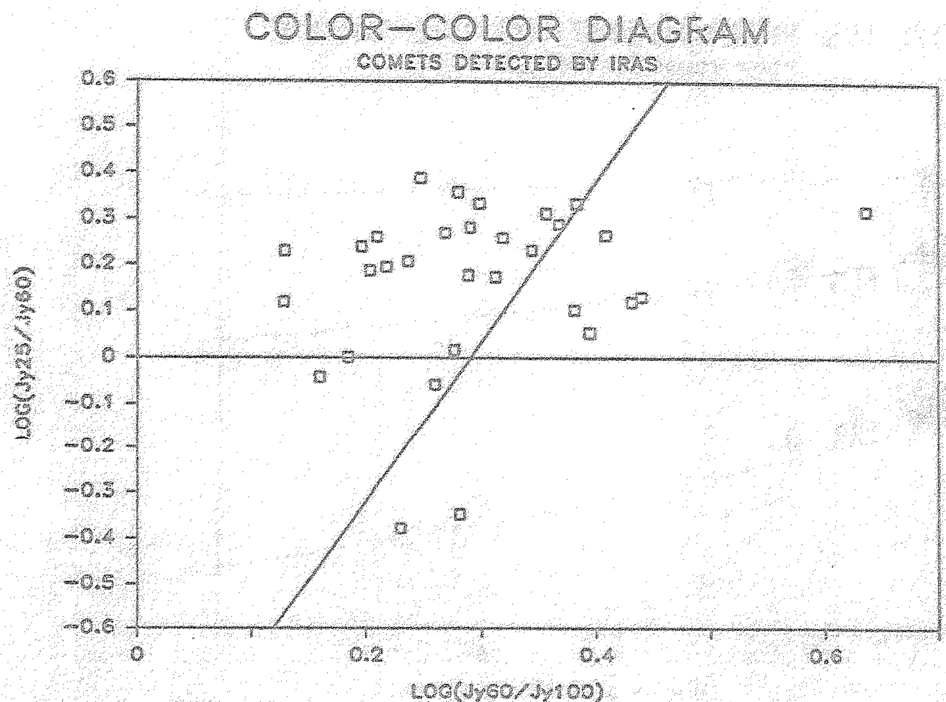

Figure 3-6: Color-color diagram for selected comets, where the color is defined as the logarithm of the in-band flux density ratios, $\log(F_{25}/F_{60})$ and $\log(F_{60}/F_{100})$. The diagonal solid line is the locus of blackbody colors.

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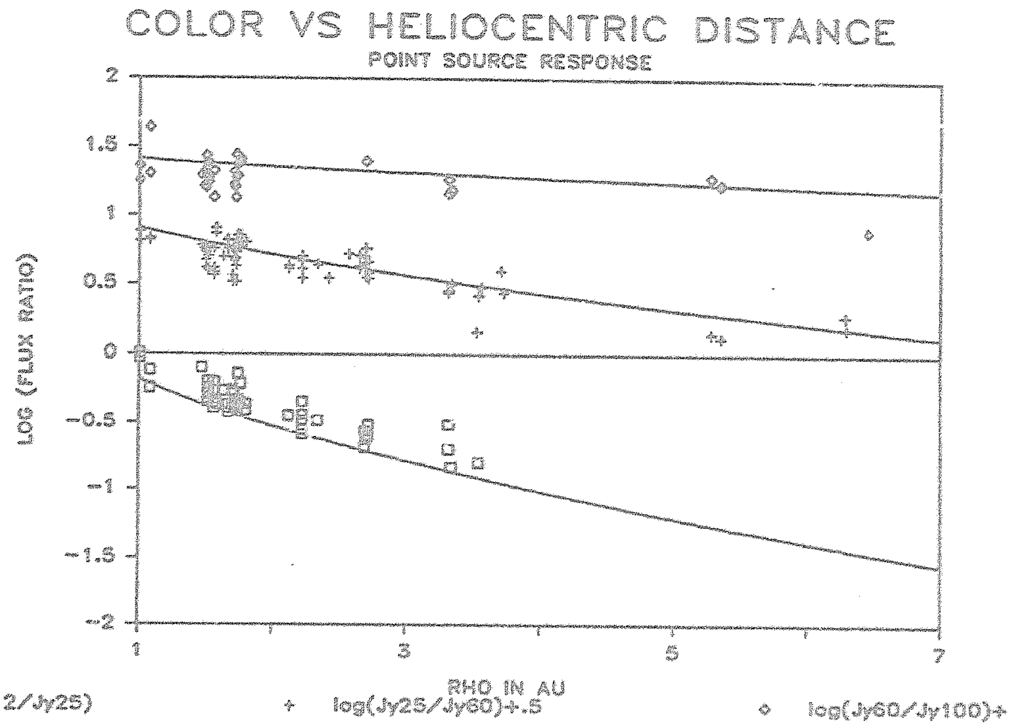

Figure 3-7: Colors of selected comets as a function of heliocentric distance. The solid curves are the locus of colors for small black spheres. For clarity the curves of $\log(F_{25}/F_{60})$ and $\log(F_{60}/F_{100})$ have been displayed by 0.3 and 0.8, respectively.

relative to the direction scanned, and the variation with wavelength of the total field viewed. The data presented here are as observed, with no corrections for the above effects. It will be necessary to develop detailed models of the spatial and temporal history of grains ejected from the nucleus if one is to understand the observations and deduce accurately physical quantities.

3.3.2 Intensity of Infrared Emission

In an attempt to obtain a comparative measure of the activity of a comet, the quantity $H=\log(F_{25}*\Delta*\Delta)$, that is, the product of the flux density in the IRAS 25 μm times the square of the geocentric distance, is plotted in Figure 3-8 for the high reliability detections. This quantity can be related to the cross-section of emitting grains by assuming a model for the grain size and temperature distribution. The solid curve is the locus defined by the IRAS point source completeness limit of 0.4 Jansky at 25 μm and the assumption that all detections were made at solar elongation of 90 degrees.

Values of H range from a minimum of -0.3 for comet du Toit-Neujmin--Delporte to a maximum of 2.26 for the new comet Cernis. Eleven comets have H between 0.79 and 1.29, and the most likely value is 0.96. There is no significant trend of H with either heliocentric distance or period, for example, the short period comets Tempel 1 and Tempel 2 are an order of magnitude more intense than the long period comet IRAS-Araki-Alcock. A plot of the infrared comet intensity versus perihelion distance also shows no correlation.

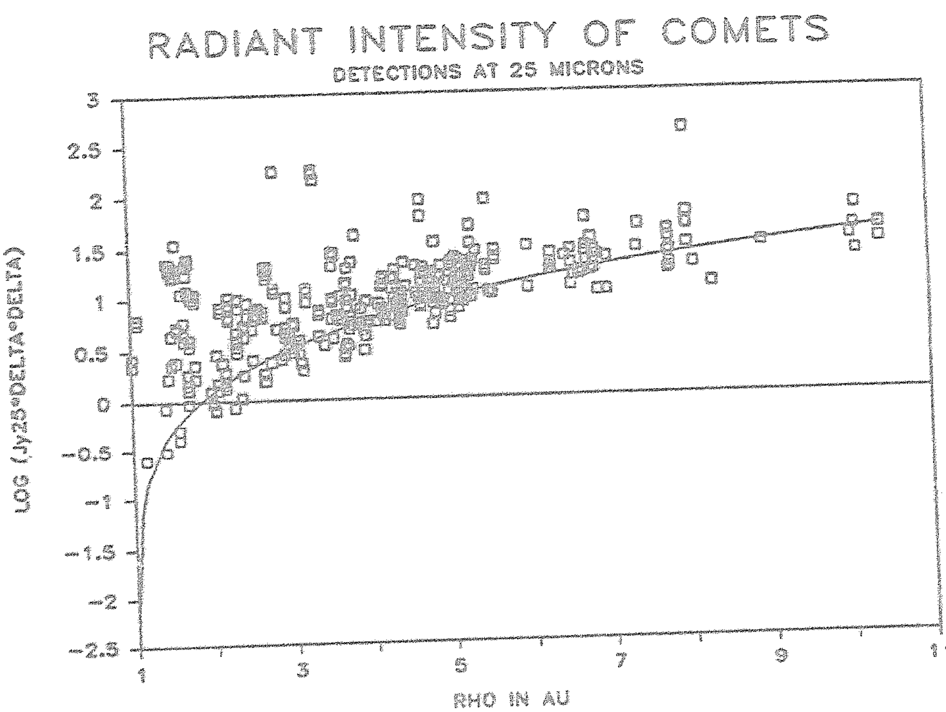

Figure 3-8. The radiant intensity of all potential comet detections is plotted as a function of heliocentric distance. The radiant intensity is defined as the observed flux density at 25 μm reduced to a standard distance of 1 AU.

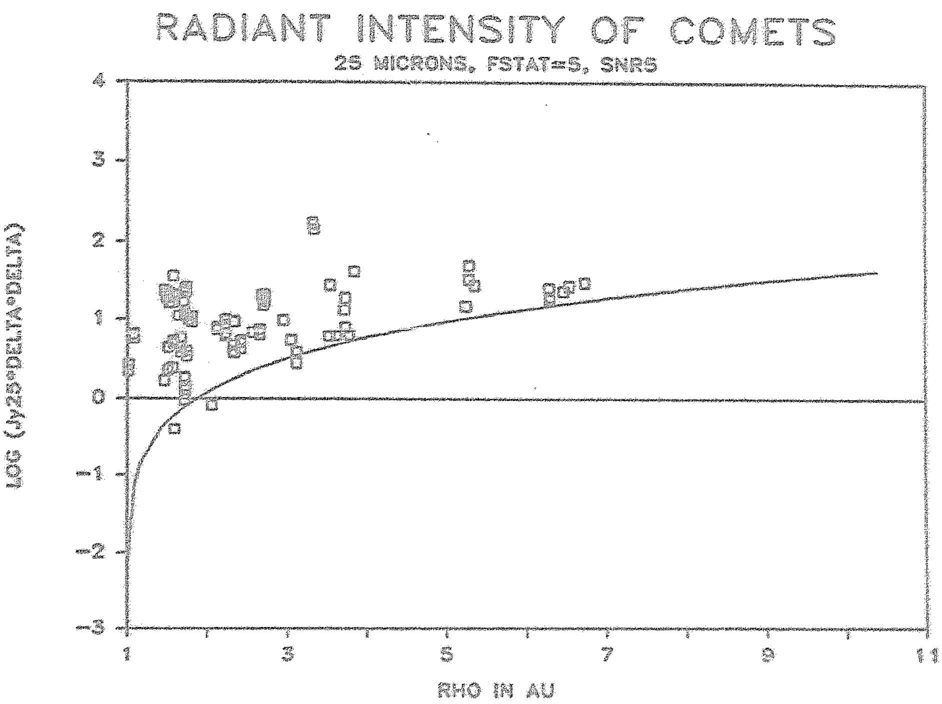

Figure 3-9: The radiant intensity of selected comets is plotted as a function of heliocentric distance. The radiant intensity is defined as the observed flux density at 25 μm reduced to a standard distance of 1 AU.

3.4 Appendix to Chapter 3: IRAS Comet Sightings at PAF and in the WSDB

The IRAS fast-moving object search (Davies et al., 1983) was undertaken to exploit the potential of IRAS for detecting inner solar system objects. The primary objective was the detection of Earth-crossing asteroids.

Data from the satellite were transmitted to the IRAS ground station at the Rutherford Appleton Laboratory in the United Kingdom where they were examined in the Preliminary Analysis Facility (PAF) for seconds and hours confirmation. Confirmations were based on positional agreement only, with no requirement that the observed fluxes be consistent. This was done to insure that an inertially fixed but variable source could be confirmed. All detections with a signal to noise ratio greater than 5 and which passed the seconds, but failed the hours, confirmation thresholds were considered potential fast moving objects, and were subject to further analysis.

Detections within 5 degrees of the galactic plane were rejected on the basis that many real fixed sources failed to hours confirm in confused regions of high source density.

The ratios of the flux densities at 12 μm to that at 25 μm, and the ratio of 25 μm flux density to that at 60 μm measured the color temperature of the object. All multiband, non-hours confirmed detections were rejected if their flux ratios were inconsistent with color temperatures in the range 100 K to 400 K, a range suitable for inner solar system objects.

A region 25 arc minutes in both right ascension and declination was then searched about the position of each remaining detection for possible pairs separated in time by one or two IRAS orbits. The fluxes of a candidate pair were required to differ by less than factor of 6.5 (two magnitudes). All pairs of detections which satisfied the above tests were then output for individual identification. The positions were compared to ephemerides of known asteroids and comets, and overlayed on sky survey plates to identify dark nebulae or confused, fixed sources. The positions and visual magnitude (estimated from the infrared flux) of unidentified candidate moving objects were then issued in the form of an alert to the Central Bureau for Astronomical Telegrams and to observatories with wide field cameras for optical confirmation.

Operations began on 11 February 1983, and continued until the end of the mission on 22 November 1983. A total of 37 alerts were issued. Bad weather, bright moon, or unfavorable position precluded ground based follow-up of 17 alerts with the remaining 20 producing confirmatory observations of six new comets, two new Apollo asteroids, two mainbelt asteroids, and the extensive infrared tail of comet Tempel 2. In addition, five known comets were independently recovered as fast moving objects.

The circumstances of the comets when discovered at PAF are given in Table 3-1. The comets' perihelion distance and perihelion passage time are tabulated for reference, as are the heliocentric (r) and geocentric (Δ) distances at the time of observation. Magnitudes are photographic. The associated photometric data are presented in Table 3-2. The flux densities tabulated are those observed in the IRAS spectral passbands, within the detector field of view, and passed by the IRAS point source detection filter (ES). The large fields of view (nominally varying from 33,000 km x 196,000 km at 12 μm to 131,000 km x 218,000 km at 100 μm projected to 1 AU), the broad spectral passbands (typically an octave), and the spatial frequency filter applied during data processing complicate the analysis of flux densities and colors for extended objects. One must be very cautious of any interpretation of the data which does not explicitly account for these instrumental effects.

Table 3-A1 Discovery Circumstances of IRAS Comets

Comet	Date Observed	Perihelion q(AU)	Perihelion Date	r (AU)	Δ (AU)	Phase (deg)	ArcSec/hr long	ArcSec/hr lat	Mag.*
1983d	4/25	0.99	5/21	1.09	0.41	67	7	40	9
1983f	5/13	1.42	1/19	2.12	1.78	28	-45	73	17
1983j	6/28	1.69	10/24	1.80	1.55	34	65	31	15
1983k	7/11	2.42	5/03	2.54	2.24	24	-62	80	18
1983o	7/27	2.25	11/28	2.65	2.43	22	-69	114	17
1983v	11/10	1.28	12/39	1.52	1.09	41	-51	143	15

*Estimated Photographic Magnitude

Table 3-A2 Photometric Properties of Comets Discovered by IRAS

Comet	Date Observed	F_{12} (Jy)	F_{25}	F_{60}	F_{100}	T_c (K)	T_r (K)	T_c/T_r
1983d	4/25	26.51	39.99	18.79	0.70	276	265	1.04
1983f	5/13	0.89	2.47	0.41	----	213	190	1.12
1983j	6/28	1.76	4.26	2.06	----	225	206	1.09
1983k	7/11	(.51)	1.35	1.06	----	216	174	1.24*
1983o	7/27	----	1.16	0.82	----	177	170	1.04
1983v	11/10	1.71	3.72	1.75	----	235	225	1.04

* Flux at 12 and possibly 25 microns contaminated by a star within the field of view.

Objects moving slower than ±48 arcsec/hr in ecliptic longitude, and/or ±22 arcsec/hr in latitude will usually be hours-confirmed if observed on consecutive orbits Davies et al. (1983). In all cases, as shown in Table 3-1, the apparent motions of the comets at discovery were considerably in excess of these limits. The faintest comet detected was estimated at 18th photographic magnitude. Two comets, (1983k) and (1983o) were detected at low signal to noise ratio near the completeness limit determined for the IRAS point source catalog. The most distant was 2.65 AU from the Sun and 2.43 from the earth. Biases and selection effects of the fast moving survey have been discussed by Green et al. (1985), and an assessment made of the motion and completeness limits. They find that the IRAS discovery rate is consistent with that based on ground-based searches, and speculate that there may be an additional 20 to 30 comets in the hours-confirmed database at IPAC.

The circumstances of previously known periodic comets at the time of recovery by IRAS at PAF are given in Table 3-3, and the associated photometric data in Table 3-4. As with the new discoveries, the faintest comet recovered was 18th magnitude. The most distant was at 3.32 AU from the Sun and 3.06 AU from earth. Unlike the new discoveries, all known comets recovered in the fast moving survey were detected at high signal to noise ratios.

Table 3-A3 Circumstances of Known Comets Recovered at PAF

Comet	Date Observed	Perihelion q(AU)	Perihelion Date	r (AU)	Δ (AU)	Phase (deg)	Mag.*
Pons-Winnecke	6/27	1.25	7/07	1.58	1.25	40	18
Tempel 2	7/27	1.38	6/01	1.51	1.09	42	14
Tempel 1	7/28	1.49	7/09	1.50	1.05	42	15
Kopff	8/14	1.57	8/10	1.58	0.95	38	15
Cernis	8/09	3.31	7/21	3.32	3.06	18	11

* Estimated Photographic Magnitude

Table 3-4 Photometric Properties of Known Comets Recovered at PAF

Comet	Date Observed	F_{12}	F_{25} (Jy)	F_{60}	F_{100}	T_c (K)	T_r (K)	T_c/T_r
Pons-Winnecke	6/27	1.47	3.29	1.34	(.79)	232	220	1.05
Tempel 2	7/27	10.24	18.83	11.05	5.02	251	225	1.12
Tempel 1	7/28	8.92	18.03	12.51	5.49	242	226	1.07
Kopff	8/14	17.95	39.12	17.93	9.95	234	220	1.06
Cernis	8/09	3.01	18.08	19.66	11.95	164	152	1.08

As previously stated, objects moving slower than ±48 arcsec/hr in ecliptic longitude, and/or ±22 arcsec/hr in latitude will usually be hours-confirmed if observed on consecutive orbits (Davies et al., 1983). The orbital elements of 13 periodic comets were included in the IRAS Known Objects File, and the intersection of the IRAS survey scan with the comet's position was calculated by the procedure given in Section 5.2.1.3 Known Asteroid Predictions. The following comets were included in the file: Churyuomov-Gerasimenko, Clark, Crommelin, Encke, Gunn, IRAS 1983f, Kopff, Pons-Winnecke, Taylor, Tempel 2, Tritton, Wild 2.

The circumstances of the hours-confirmed comets in the WSDB are given in Table 3-5, and the associated photometric data in Table 3-6. The comets' perihelion distance and perihelion passage time are tabulated for reference, as are the heliocentric (r) and geocentric (Δ) distances at the time of observation. The flux tabulated is that observed in the IRAS spectral passband, within the detector field of view, and passed by the IRAS point source detection filter (ES??). Data are given for the first hours-confirmation only. The complete detection history is in the Comet Catalog.

Two of the comets, (1983f) and Tempel 1, were hours-confirmed by chance coincidence with fixed point sources. In the case of (1983f) the comet was never detected, only the star. In the case of Tempel 1 the comet flux was detected, being comparable to that from the star. The remaining 5 HCONS of Tempel 1 were of the comet.

Table 3-A5 Circumstances of Known Comets in the WSDB

Comet	Date Observed	Perihelion q(AU)	Perihelion Date	r (AU)	Δ (AU)	Phase (deg)	No. of HCONS
Churymov-Gerasimenko	4/26	1.31	11/15*	2.22	1.94	27	1
Tempel 1	7/28	1.49	7/09	1.50	1.06	42	5
Tempel 2	9/06	1.38	6/01	1.71	1.01	32	1
(1983f??)	**	1.42	1/19				

* 1982, others are 1983
** Spurious observation

Table 3-A6 Photometric Properties of Known Comets in the WSDB

Comet	F_{12}	F_{25} (Jy)	F_{60}	F_{100}	T_c (K)	T_r (K)	T_c/T_r
Churymov-Gerasimenko	0.94	2.42	1.88	----	219	186	1.17
Tempel 1	9.28	17.85	11.87	5.91	245	226	1.08
Tempel 2	5.51	11.84	11.61	4.23	235	208	1.13
(1983f??)	**						

** Spurious observation

3.5 References

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Chapter 4

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Chapter 5. Asteroid Processing in SDAS

by

John W. Fowler and Joseph Chillemi

The main scientifically oriented processing of the asteroid and comet data started in the Science Data Analysis System (SDAS). This system reduced the observations to physical units and generated maps and catalogs of the fixed sources seen on the sky. SDAS was designed to recognize known solar-system sources and to save all other likely solar-system objects for later analysis. This analysis was accomplished using specially designed software known as the Asteroid Data Analysis System (ADAS), which is discussed in the next chapter.

The first step in recognizing asteroids and comets in SDAS was the computation of their apparent positions on the sky. This task was carried out by the Asteroid Predictor. It generated positions as functions of time, which were then compared with the observed sources and labelled as Known Sources in the same way and by the same software module in which bright infrared stars were identified and labelled when their observations appeared in the data stream. This predictor is therefore the first piece of asteroid/comet-specific software, so it is discussed first.

In SDAS a variety of tests were applied to the observations in order to separate fixed sources on the sky from those whose fluxes varied greatly either due to intrinsic variation of the source or due to change in apparent position, as would be the case for most solar-system sources. Sources failing this test and having "solar-system-like" colors were written onto magnetic tape for later processing. The package of software which carried out this analysis is known as the Asteroid Tagging Algorithm (ATA). The description of the ATA comprises the bulk of this chapter.

For the purpose of orientation it is useful to show where the Asteroid Predictor and the Asteroid Tagging Algorithm (ATA) were located in SDAS, Fig. 5-1. A light stipple overlays the parts of SDAS which were not asteroid-specific. The documentation for these parts of the system is given by IRAS Explanatory Supplement (ES, V). The documentation for the asteroid-specific software now follows.

5.1 The SDAS Asteroid and Comet Predictor

A description of the "known source correlation" processing in SDAS is given in the IRAS Explanatory Supplement (ES, V, D.4). This task was performed by a processor named PSCORE for each individual survey observation, which also was the unit of processing in SDAS. The telescope scan control parameters were used to reconstruct the path of the boresight on the sky, and the positions of inertially fixed sources were mapped into the focal-plane coordinate system, in which individual detectors crossed by the image were identified.

The problem was slightly more complicated for solar system objects. In these cases, when the first observation of a SOP was processed, an ephemeris which covered the SOP period was computed for each object in the list of 2500 numbered asteroids, twelve comets, and the outer planets. (Note: This number is different from the number used later in ADAS). Then for each observation, a temporary file was set up which appeared to be just another file of inertially fixed sources to PSCORE. The positions in this file were obtained as follows.

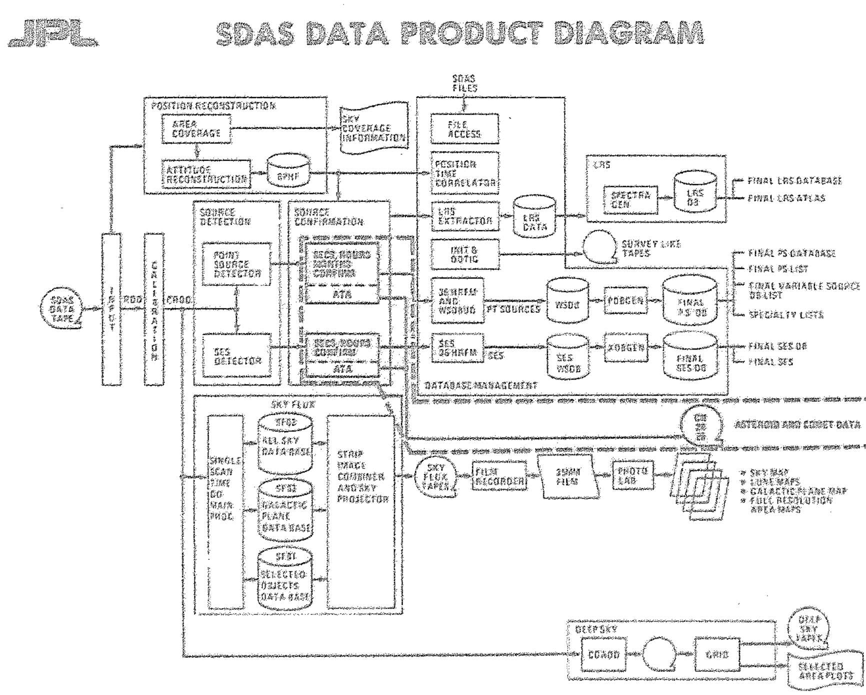

Figure 5-1: Schematic diagram of SDAS data products and processing. Highlight shows location of the Asteroid Togging Algorithm (ATA) and the asteroid/comet data paths.

The moving objects were treated by computing their positions at the beginning and end of the SOP period (about twelve hours), and at sufficient times in between to guarantee an ephemeris for each object with no more than about ten arcminutes separation between snapshots along the path of apparent motion. This was done once for each SOP. Apparent positions were computed in the spacecraft-centered coordinate system. Standard methods were used to compute the ephemerides from osculating orbital elements. Only objects with elliptical orbits were included (in one case, an elliptical approximation to a hyperbolic orbit was used).

As each observation was processed, the positions of all the objects were interpolated to the mid-observation time, and then the time of closest approach of the boresight to the position of each object was interpolated from the scan geometry. The regularity of the scan rate allowed an accuracy of better than three seconds in the predicted scanning time.

Whenever the geometrical calculation indicated a possible intersection of the telescope field of view and the trajectory of one of the moving objects, the approximate time of crossing was used to reinterpolate the apparent position of the moving object. This included a first-order light-time correction for the moving object. The telescope pointing history included aberration corrections for the orbital motion of the earth and the spacecraft. This detailed pointing reconstruction permitted accuracy of better than 0.1 second in the predicted time at which the image crossed each detector. The apparent position of the object was then used as that of an inertially fixed object for the remainder of the computation. In other words, once the file of pseudo-fixed sources was prepared, the rest of the processing did not depend on the fact that solar system objects were involved.

After the detector data streams had been processed to extract point-source detections, and after these had been subjected to seconds-confirmation and band merging (see ES, V, C and D), the known-source predictions were sought among the observations. In order to avoid flux biases, this was done on a position-matching basis only. Associations were tagged by storing the known-source identification codes in the observation data records.

5.2 Asteroid Tagging Algorithm

The Asteroid Tagging Algorithm (ATA) was a postprocessor subroutine of the IRAS SDAS Hours Confirmation Processor (see ES). After all normal processing for each seconds-confirmed sighting was completed, the ATA processed the sighting to determine whether it might possibly be a solar system object.

5.2.1 Input Data

The ATA processed the sighting record with which the main hours confirmation processor (PHRCON) had just finished working. At the same time, a field of sightings serving as candidates for hours confirmation remained in a core buffer, and this was also made available to the ATA. In order to be considered usable, a sighting was required either to be seconds-confirmed or at least to have its failure to be seconds-confirmed explainable by the passage of its image over a dead or noisy detector. The parameters defining each sighting were as follows.

- 1950.0 mean ecliptic longitude, latitude, and twist angle
- Position error parameters on the scan and cross-scan axes
- Fluxes and flux error parameters in the four survey channels
- Detection time and detector identification array
- Status words describing flux quality and confusion level
- Known-source identifier (zero if no association)

The main routine also provided a set of pointers to hours-confirming candidate sightings, if any.

5.2.1.1 Drop-Dead Sighting

The IRAS SDAS hours confirmation processor operated on a first-in-first-out buffer of sightings spanning 36 hours of survey data. In principal, up to 36 hours could pass before hours-redundant coverage was obtained for any given point on the sky. All data were processed in time order. Hours confirmation was performed for the oldest detection in the 36-Hour File, which was required to be hours-confirmed or to be rejected as soon as the buffer had received data time-tagged at least 36 hours later. For this reason, the sighting being processed was given the name "drop-dead" sighting.

5.2.1.2 Candidate Sighting Buffer

Each drop-dead sighting was accompanied by a collection of other sightings to be used as candidates for hours confirmation of the drop-dead. This collection was formed by gathering together all detections in the 36-Hour File within a spatial window centered on the drop-dead sighting. This window spanned twenty arcminutes of ecliptic longitude and ten arcminutes of ecliptic latitude. The shape was chosen to accommodate the tendency of the position error to be greater in longitude than latitude, and to improve the chances of including subsequent sightings of the same asteroid which produced the drop-dead sighting. The window could not be made larger because of execution time limitations.

5.2.1.3 Known Asteroid Predictions

Survey data were processed in twelve-hour segments known as SOPs (Satellite Operations Plans). Before beginning the point-source sighting and confirmation processing, the telescope pointing history file was generated, and other preliminary tasks were carried out. One of these involved using the telescope pointing history to predict which known sources of infrared emission would be scanned during the twelve-hour period. Detection times accurate to a tenth of a second were computed from the geometrical model of the focal plane and the time-dependent telescope pointing information. Detector numbers and approximate fluxes to be measured were also predicted. These data were saved in a file for later comparison to the actual sightings.

5.2.2 SDAS Output for ADAS

The asteroid and comet output from SDAS for processing later by ADAS consisted of positions, fluxes and various status words and other parameters. These were extracted and written on two files as described in the following. The contents and formats for these files are given in Appendix B.

5.2.2.1 CN28 and CN29

The CN28 data file contained a record for each potential asteroid sighting.

The CN29 data file was essentially identical, except that it was generated at the weeks-confirmation level. The ADAS sighting data contain pointers to CN29 records, but n practice these were not used.

5.2.2.2 LRS Extraction Requests

The hours-confirmation processor generated low-resolution spectrometer (LRS) data extraction requests for hours-confirmed sightings with signal-to-noise ratios above 25 in the twelve- or twenty-five-micron channels. The ATA generated similar requests for non-hours-confirmed potential asteroid sightings. These requests contained timing and focal-plane crossing information for a post-processor to use in the actual extraction process.

5.2.2.3 Statistical Data

Certain statistical parameters were computed by the ATA to aid in tuning the thresholds for asteroid recognition. These included dispersion parameters in position and color, counters for correct and incorrect identifications of known asteroids and known inertially fixed point sources, histograms of asteroid sighting group sizes, and correlation analysis of observed vs. predicted apparent motion in ecliptic longitude and latitude. Many plots of these data have been shown in Chapter 2.

5.2.3 Processing

The ATA module was called by the main hours-confirmation routine at the end of the processing for each drop-dead sighting. The ATA processed only seconds-confirmed sightings and candidates. If the drop-dead sighting was hours-confirmed, then the search for associated asteroid sightings was confined to the candidates which the main processor had marked as confirming the drop-dead; otherwise, all sightings in the coarse window were examined by the ATA. This was the only processing step which depended upon whether the drop-dead sighting had been hours-confirmed.

5.2.3.1 Main Logic Flow

Each drop-dead sighting was required to pass a color test designed to eliminate objects with non-solar-system colors. If this test was passed, the object was included in the CN28 input file. Whether any other sightings were grouped with it was determined by several additional tests. In order for a candidate sighting to be regarded as a potential sighting of the same asteroid as the drop-dead, it had to pass the same asteroid-color test, followed by a pair of tests which measured its photometric similarity to the drop-dead. The first of these was a flux test, and the second was a color-similarity test. If these tests produced acceptable results, then a motion test was applied to verify that there was at least some probability that the object was moving. Three of the tests required more than a simple yes/no measurement, and the quantity which was computed to decide the issue is referred to as a "figure of merit".

5.2.3.2 Asteroid Color Test

Each object tested for solar-system color temperature was first classified by a spectral combination code. This indicated the combination of survey channels in which a point-source sighting had occurred. In the case of single-band objects, limits on the colors were obtained from the upper-limit noise estimates in bands adjacent to the detection. Each spectral combination had its own threshold.

The color test involved forming a chi-square parameter as follows. With four survey channels, three independent colors are possible, and so a three-dimensional color space was employed. The locus of points corresponding to solar-system objects was modelled as a straight line joining the points provided by a standard thermal model (see Chapter 7) for an asteroid at 0.87 AU and one at 40 AU. Sightings with three colors were treated as a point in this space; sightings with two colors were treated as points in the corresponding plane, and the projection of the model line into that plane was used as the nominal locus of points for solar-system objects. Sightings with only one color were treated as points on the corresponding axis, and the projection of the model line onto that axis was used as the range into which the point should fall. In practice, the only single-color sightings were those observed only in the 12 μm channel or the 100 μm channel, since two color estimates could be derived from the noise-fill upper limits for the other single-band sightings. For example, a sighting detected only in the 25 μm band had detector noise data for the 12 μm and 60 μm bands from which two low-quality color bounds could be obtained. Of course these had larger uncertainties than colors derived from full-fledged detections, but they often sufficed to rule out spurious data.

Once the appropriate color space was determined, the minimum distance from the observed point to the nominal locus was computed and treated as an error vector. The squared components of this error vector served as the numerators of the chi-square terms; the corresponding denominators were the a priori uncertainties in the observed colors. This produced a chi-square parameter with one, two, or three degrees of freedom, depending on the number of independent colors available. The figure of merit was taken to be the fraction of all chi-square random variables with the same number of degrees of freedom and larger magnitudes. Thus the figure of merit ran from nearly zero for very large error vectors to nearly unity for very small error vectors.

The computation of the minimum distance from the observed color point to the nominal locus took into account the finite extent of the locus. In other words, the nominal locus was a finite line segment; the error vector was first computed as the perpendicular displacement from the line containing this segment to the observed color point; if the error vector intersected the line outside of the range of the nominal locus, then a nonperpendicular line from the nearest end of the nominal-locus range to the observed color point was used instead. In the case of single-color observations, the test degenerated to whether the point was contained within the locus projection on the axis; if so, the error vector was null, and otherwise the distance from the observed point to the nearest end of the locus range was used as a one-dimensional error vector.

The figure of merit was required to be above a threshold set for the specific spectral combination of the sighting. If the drop-dead failed this test, the ATA ceased processing it, proceeding to the statistical computations described below. Candidates which failed the test were dropped from consideration.

Note that while the four IRAS survey channels yield three independent colors in the sense that there are three degrees of freedom, the colors are not all statistically independent. The error in the color derived from the first and second bands is correlated with the error in the color derived from the second and third bands, because the error in the second band affects both colors. The correlation coefficient for the random errors in these two colors is 0.5. Ignoring the correlation resulted in underestimating the variance of the corresponding chi-square parameter by 20%. In the case of three-color tests, the variance was underestimated by 25%. While these correspond only to errors of 11% and 13% in the standard deviation, and hence are about equal to the estimation error in the a priori photometric random error, the thresholds for the corresponding spectral combinations were nevertheless set lower than for other combinations. This compensated for the approximation error.

5.2.3.3 Common Flux Test

The common flux test employed all bands in which the drop-dead and candidate sightings were both detected; if there were none, the test was skipped. The test simply required the fluxes in such bands to be within a factor of ten of each other. This accepted more than the highest known light-curve variation of the time scale of a few hours, while eliminating the most obvious mismatches.

5.2.3.4 Common Color Test

The colors of each sighting in the pair to be tested were computed as described above in Section 5.2.3.2 (i.e., with color bounds based on detector noise used for bands in which no detection occurred). Only colors common to both sightings were used, and if there were none, the test was failed. Otherwise a chi-square random variable was computed by summing terms with numerators equal to the squared difference in a common color and denominators equal to the sum of each sighting's error variance for the corresponding color. The number of degrees of freedom was the number of terms summed, and the figure of merit was the cumulative chi-square distribution for that number of degrees of freedom evaluated at the observed value of chi-square. This figure of merit was required to be above a threshold which depended upon the number of bands detected. The corresponding fractions of all true sightings pairs intended to be retained ranged from 0.99 to 0.998.

5.2.3.5 Angular Motion Tests

An apparent angular motion test was performed which examined pairings of the drop-dead sighting with each hours-confirmed candidate, if any. This test was not required if the drop-dead sighting was not hours-confirmed. The test employed the mutual position information of the drop-dead and the candidate to determine whether it was consistent with the hypothesis that the observed object was moving. The figure of merit was an approximation to the probability that the true position of the drop-dead and candidate sightings were not contained within the same small region of the sky. The region corresponded to a square approximately 2.4 arcminutes on each side, and the probability had to be above 0.001. Sightings with medium to low hours-confirmation scores had no trouble passing this test, but sightings with small position uncertainties and good position agreement could not.

5.2.3.6 LRS Extraction Processing

LRS extraction requests were generated only when the drop-dead sighting was not hours-confirmed (the normal SDAS processing handled confirmed cases), and when accepted sightings had a signal-to-noise ratio of at least 25 in either the 12 or 25 μm survey channel. Furthermore, the reconstructed path of the image through the focal plane had to cross over an LRS aperture; this was determined from the survey detector identifiers. When these conditions were satisfied, a normal SDAS LRS extraction request was generated.

5.2.3.7 Known Object Analysis

After completing all decisions concerning whether sightings were "asteroids", a check of the known-source identifier in the drop-dead sighting's parameter record was made; if any accepted candidates had been found, these were also checked. Values of zero indicated that the sighting was not a known object; values between one and 30,000 indicated that the sighting had been associated with an inertially fixed object; values above 30,000 indicated association with a solar-system object.

In most cases, all sightings either were not associated with any known object, or else they were all associated with the same known object. Separate counters were maintained for the following combinations:

Table 5-1 ATA Sighting Association Counters

Rejected drop-deads

1. Not a known object
2. Known solar-system object
3. Known inertially fixed object

Accepted drop-deads

4. No sightings of known objects
   Some sightings of known objects
5. All known objects were solar-system objects
6. All known objects were inertially fixed objects
7. Some solar-system and some inertially fixed objects

The statistical parameters discussed in the next section were maintained for each of the combinations above. When known solar-system objects were found, they were output to CN28 even if they had failed to be accepted by the ATA. When known inertially-fixed objects were found, they were not output to CN28 even if they had been accepted by the ATA. The separate statistical analysis for each combination was used to tune the threshold parameters to reduce the number of incorrect results while increasing the number of correct results.

5.2.3.8 Statistical Data Gathering

All statistical counters were broken down into ten groups based on the highest signal-to-noise ratio in the set of sightings. In addition, a breakdown by the various combination of known-object identifiers was performed. For known asteroids, correlation coefficients were computed from observed and known motion rates in latitude and longitude. Excellent correlation in latitude was obtained, but as expected, the lower resolution in longitude yielded marginal statistical significance.

6. The Asteroid Data Analysis System (ADAS)

by

Joseph R. Chillemi and John W. Fowler

The main scientific processing and analysis of the asteroid and comet data was carried out using the Asteroid Data Analysis System (ADAS). As its input, ADAS took the data saved on magnetic tape by the IRAS Scientific Data Analysis System (SDAS) and other files of asteroid and comet information supplied by the IRAS Asteroid Advisory Group (AAG). The chief output from ADAS was a series of data products specified by the AAG. This chapter presents a technical documentation of the ADAS. The description is organized in the order of input, output and then the details of the various processors and their algorithms.

Before getting into the details, it is useful to orient oneself by studying a block diagram of the system, Fig. 6-1. The data input and output are shown as shaded boxes. The other boxes show the various processors and other parts of the system. The IN processor puts the data into the data base. AK is the processor which handles position information for known asteroids (i.e., Asteroids, Known = AK). AS organizes Asteroid Sightings and tests them for color. The moving sources are handled in AM (i.e., Asteroids, Moving). AD is where radiometric diameters and albedos are calculated (i.e., Asteroids,

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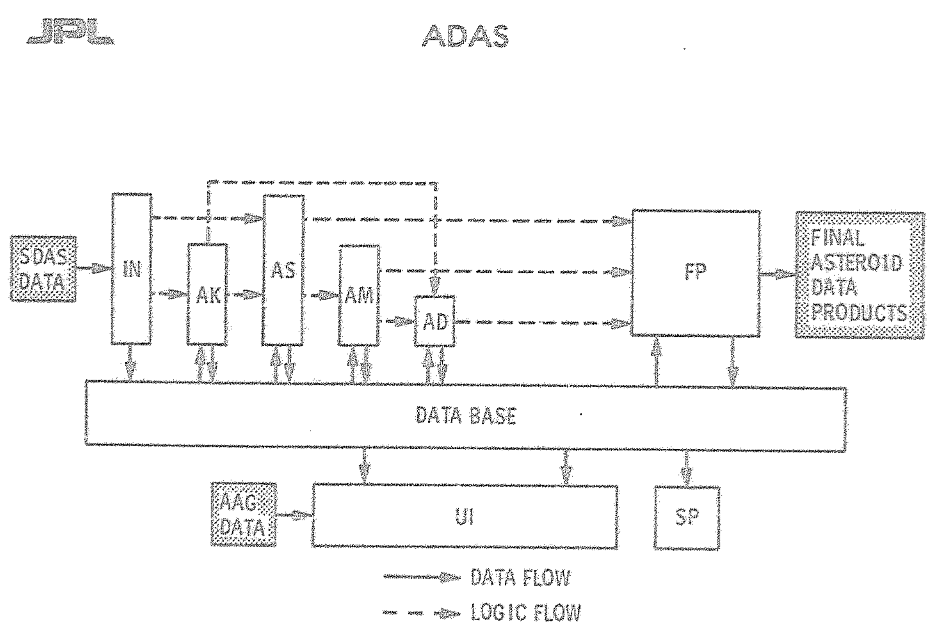

Figure 6-1: Schematic diagram of the Asteroid Data Analysis System (ADAS). Filled boxes indicate input and output. Open boxes show the major processor subsystems and the data base. Solid line arrows trace the routes by which data are passed through the system. Dashed line arrows indicate the sequences of logical steps taken by various subsets of the data.

Derived parameters). FP stands for Final Products. FP is essentially a threshold and format processor. Here the final acceptance parameters for accepted sightings can be set or reset just prior to producing the Final Data Products. Some of the processors have subprocessors, and their names always have the letters of the parent processor as the first two letters.

Most of the work of the processors is accomplished by setting flags or by filling in blank parameters with meaningful values. All of the sightings remain available in the data base. The data base as actually implemented contains a variety of files not shown in the high-level schematic of Fig. 6-1, and these will be discussed later.

UI is the User Interface module through which data can be DowN-loaded (DN) for off-line analysis, printing, etc. SP stands for Special Processing, a module which calculates certain geometric parameters relevant to the coverage of the asteroid and comet survey.

Logic flow and data flow are shown by two different sets of arrows in Fig. 6-1. For the sightings of known asteroids the AS and AM processors are not necessary and are shown as being bypassed for logic flow of IN, AK, AD, FP. For processing of asteroids without known orbital elements the logic flow is IN, AS, AM, AD, FP.

The Asteroid Tagging Algorithm (ATA) ran as an add-on processor in SDAS to save potential point-source solar system data. The Asteroid Data Analysis System (ADAS) processors ran after the SDAS/ATA task was completed in 1984.

The primary goal of ADAS is to obtain derived information concerning the numbered asteroids. The first implementation task was to set up the input data bases. The main data bases are those known as IP01 and IP02, the IRAS sightings and the groundbased numbered-asteroid data bases, respectively. The former is primarily composed of the ATA output, but space was included for key ADAS parameters to be added. The latter is similar to the numbered-asteroid data base used by SDAS, but is considerably expanded in terms of the number of objects involved and the physical parameters included.

The second task was to fill in the blanks in the IP01 data base. These included associations with numbered asteroids, IRAS Catalog objects, SDAS Working Survey Data Base (WSDB) objects, Small Extended

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Source (SES) sightings, etc. This phase was dominated by the process of associating known solar-system objects with the sightings in IP01. The third task was to process sighting records through the AS subsystem, which applied acceptance tests similar to those of the ATA, but with slight modification based on acquired experience. This yielded, among other parameters, figures of merit regarding the spectral similarity of sightings to solar-system objects; thresholds for this quantity governed acceptance and rejection of sightings at this stage. Sightings associated with known objects were passed on even if they had been found unacceptable, with this judgement recorded in the status word ASTATW (see Section 6.1.2.1.1).

The fourth task was to derive albedos and diameters for the known Asteroids and comets which were found in the IP01 sightings file. This involved computing these parameters for each IRAS detection of the object in any survey band, and then averaging them to obtain the best overall estimates for each object. In the process of averaging the data, considerable editing was performed to remove suspected spurious results caused by the various IRAS noise sources. Some asteroids had no usable data remaining after this editing.

The fifth task was to gather all of the information together into the formats needed for deliverable products (machine-readable data bases and hardcopy) and to produce documentation describing these products and the steps taken to obtain them.

The processing for asteroids (with known orbital elements) can be summarized with the aid of Figures 6-2 and 6-3. In Figure 6-2 the logic of the processing is illustrated schematically. The data start out on the left and are operated upon by various processor subsystems (boxes) as they move to the right. At the bottom of the figure some of the files produced by each subsystem are indicated. Figure 6-3 shows a schematic arrangement of files. The incoming data are in the file at the top. As ADAS processing proceeds, the subsequent files are created. The figure distinguishes between files which are organized by sighting and files which are organized by individual asteroids or candidate objects. The caption explains and traces the history of the processing of individual sightings.

Known Asteroid Logic Flow

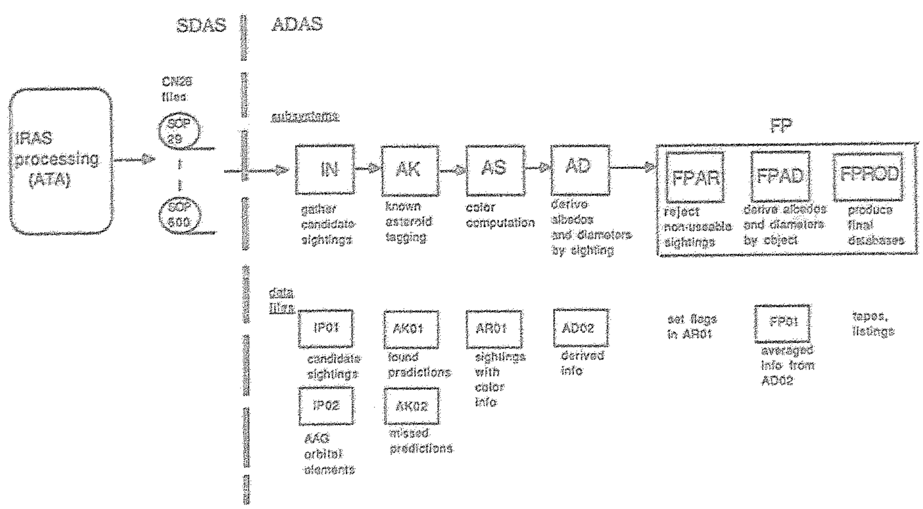

Figure 6-2: Logical steps in the processing of sightings of asteroids whose orbits are known. The heavy dashed vertical line represents the division between SDAS and ADAS. This was not only a division in function but also a separation in time. The upper row of boxes shows the chief subsystems and the sequence in which they operated on the sightings. The bottom portion of the figure shows the more important files produced by the processor directly above.

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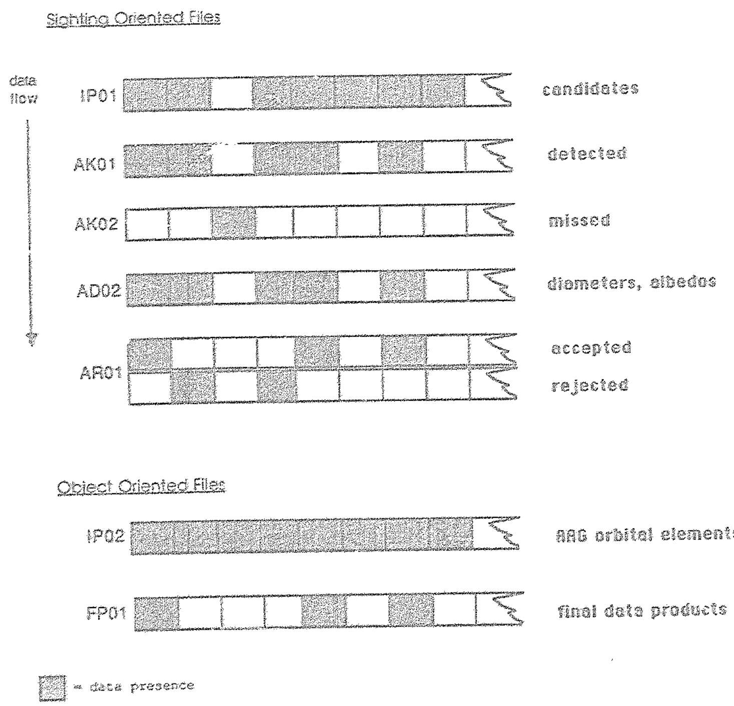

Figure 6-3: Organization of ADAS files. This is a schematic illustration showing the organization among the files identified in Figure 6-2. The filled in box represents data of some sort written on the files. In the top bunch of files the data are organized by sighting. In the bottom pair the data are according to celestial source. A set of good sightings are entries 1, 5, and 7 in the sighting files. For entries 2 and 4 the sightings are made but did not pass the final acceptance thresholds for the asteroid survey. These sightings were rejected. The situation shown by the third entry is a case of an expected sighting not appearing. The 6th and 8th entries show some candidates which were not predicted as asteroids/comets. Hence their data is not processed any further. Near the figure bottom, IPO2 shows a complete file of orbital elements for all the known objects. FPO1 shows only data for those objects which had at least one sighting accepted by ADAS>

6.1.1 Input Data

Input to ADAS came from a variety of sources, some generated by machine, others compiled by hand. There were seven machine readable input files that were used. A description of these is found in Appendix II of the Users Guide (Part II of this volume).

6.1.2 ADAS Output Data

The output from ADAS consisted of a number of asteroid and comet data products. These are discussed in the User's Guide (Chapter 8). The formats for these data products are to be found in Appendix II to the Users Guide (Part II of this volume).

6.1.3 Data System Flow

The input data bases were set up as already described in Section 6.1.1. Associations with numbered asteroids, IRAS Catalog objects, SDAS Working Survey Data Base (WSDB) objects, Small Extended Source (SES) sightings, etc., were made with modules of the IN subsystem. The next data set produced was the file AK01, which contained pointers and association information linking objects (e.g., numbered asteroids) with sightings. AK01 provided the mechanism for accessing sighting data for any given object in all downstream processors. Predicted sightings which were not realized were recorded in AK02; this included sightings which were actually impossible because, for example, the source was too faint or the image crossed dead detectors, etc.

The AS subsystem operated on the IP01 and AK01 data to produce the AR01 data set, which contained information on the sighting acceptance status. The AK01 information was used to preserve sightings associated with known objects which otherwise had failed to be accepted. This was done for quality checking only, since such sightings were barred from the final data products at a later stage.

Albedos and diameters for the known solar-system objects were computed by the AD subsystem. This yielded the files AD01, AD02, and AD03. The first two files contained similar information for asteroids derived by two different ways. AD01 was not used in product generation. AD03 contained analogous derived parameters for comets. In each case, albedos and diameters were computed for each detection of the known object in any survey band.

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The FP subsystem performed the editing of the AD02 and AD03 data and the averaging of the remaining estimates for each source. This produced the intermediate files FP01 and FP02 for asteroids and comets, respectively. Then another FP module gathered all of the various parameters together from all the different files and produced the machine-readable versions of the final products for known objects. Finally, another FP module reformatted the FPN4 records for the printing of the hard-copy catalogs.

6.1.4 System Processing Steps

6.1.4.1 Input Data Preprocessing

Input data preprocessing was performed by the IN subsystem. This involved the following tasks:

A. Conversion of CN28 (ATA output) to IP01

B. Association of IP01 sightings with CN29 records

C. Association of IP01 sightings with WSDB records (hours-confirmed, months-confirmed, position and time matches)

D. Association of IP01 sightings with SES records (months-confirmed SES, band-by-band association with CUSPOOL objects, position and time matches)

E. Association of IP01 sightings with IRAS Catalog sources

F. Setting of high-density-region flags in IP01 records

G. Setting of faint-asteroid flags in IP01

H. Conversion of the SDAS Area Coverage File to the ADAS Area Coverage File

I. Uploading and formatting of the AAG Known Object File (IP02)

J. Conversion of the SDAS Spacecraft Heliocentric Ephemeris File to the ADAS Spacecraft Heliocentric Ephemeris File

K. Apply SDAS final calibrations (including hysteresis corrections) to IP01 fluxes

L. Setting of outer-slot-only flags for IP01 sightings whose detectors all bordered the cross-scan survey array limits.

6.1.4.2 Known Object Prediction

Each object in the IP02 data set was processed by the AK subsystem to search for matching IRAS sightings. The entire mission was searched for each object before going on to the next. The process for a single object was performed in two phases: first geometrical coincidence of the object's trajectory with that of the scanning telescope was sought; then all such coincidence times were checked for actual sightings occurring sufficiently close in position and time. (The first phase was performed by a module named AKSOPS, and the second phase was performed by a module named AKSITS). The algorithms used by these modules will be described next.

6.1.4.2.1 The AKSOPS Module

AKSOPS first determined all of the Area Coverage File (AACV) bins that the asteroid traversed during the entire survey mission. These bin numbers were buffered in an array, and duplications were eliminated. Then each bin was examined to see when the IRAS telescope boresight traversed it; these times were checked for overlap. When overlap was found, the asteroid position was recomputed for the time obtained by averaging the bin entry and exit times of the boresight. With this refined asteroid position, the PR04 data for the observation involved was checked, and the solar aspect angles of the asteroid and the boresight were compared. If they were within sufficient proximity of each other, the trajectory-crossing parameters were prepared for AKSITS, and the crossing counter was incremented.

Standard techniques were used to compute positions as functions of time for the osculating orbits about the sun and for transforming these into the 1950.0 mean ecliptic coordinate system. The vector from the spacecraft to the asteroid (expressed in the same system) was obtained by subtracting the vector from the sun to the spacecraft from the heliocentric asteroid vector; the spacecraft vector was obtained by interpolation from the Spacecraft Heliocentric Ephemeris File (SHEF).

The position of the asteroid was computed for a variety of times as a search for all of the AACV bins it traversed was carried out. These times were chosen in the following way. First the mission start time was taken as the epoch of interest (the orbital element snapshot whose time tag was closest to the epoch was selected each time a position was to be computed). The SHEF file was read up to the first epoch, and the crossing counter was set equal to zero. The asteroid position for the time point was computed, and the time needed to travel ten arcminutes (as seen from the spacecraft) was computed. This time interval is denoted DELTIM, and it is obtained as described below.

In the orbital plane, standard (x,y) coordinates are defined by

$$x = a \cos E \tag{6-1}$$

$$y = b \sin E \tag{6-2}$$

where a is the semimajor axis, b is the semiminor axis, and E is the eccentric anomaly (obtained by solving Kepler's equation for the time point being processed). The origin of this coordinate system is not the sun, but that does not matter since we will be using only the derivatives. Note also that these (x,y) coordinates are not consistent with the IRAS conventions, and this will have to be reconciled below.

We have

$$dx = -a \sin E \, dE \tag{6-3}$$

$$dy = b \cos E \, dE \tag{6-4}$$

The energy integral of motion for the two-body problem provides the relation

$$v^2 = k^2 M_s (2/r - 1/a) \tag{6-5}$$

where k is Gauss's gravitational constant, and M_s is the mass of the sun. This last equation yields the magnitude of the velocity vector, and the two preceding it can be used to obtain the direction. Noting that

$$b/a = \mathrm{SQRT}(1 - e^2) \qquad (6\text{-}6)$$

we can construct a vector (w_x, w_y) which is parallel to the velocity vector (dx/dt, dy/dt), or

$$w_x = -\sin E \qquad (6\text{-}7)$$

$$w_y = \mathrm{SQRT}(1 - e^2) \cos E \qquad (6\text{-}8)$$

This can be unitized by dividing by the root-mean-square magnitude w, which can be reduced to

$$w = \mathrm{SQRT}(1 - (e \cos E)^2) \qquad (6\text{-}9)$$

This leads to the velocity vector components

$$v_x = -v\, w^{-1} \sin E \qquad (6\text{-}10)$$

$$v_y = v\, w^{-1}\, \mathrm{SQRT}(1 - e^2) \cos E \qquad (6\text{-}11)$$

We will now relabel the axes so that they are consistent with the IRAS conventions used elsewhere throughout this document. This involves identifying the x component as the IRAS z component, the y component as minus the IRAS y component, and setting the IRAS x component to zero, so that

$$v_x = 0 \qquad (6\text{-}12)$$

$$v_y = -v\, w^{-1}\, \mathrm{SQRT}(1 - e^2)\cos E \qquad (6\text{-}13)$$

$$v_z = -v\, w^{-1} \sin E \qquad (6\text{-}14)$$

This vector must be rotated about the x-axis in order to align the z-axis with the line of nodes; then it can be transformed into the IRAS (1950.0) mean ecliptic coordinates by the standard Euler rotations. The velocity of the earth can be approximated to sufficient accuracy for these purposes by assuming its mean magnitude, 29.786 km/s, and a direction given by the cross product of the ecliptic north-pole unit vector with the unit vector from the sun to the spacecraft. This is subtracted from the asteroid's velocity vector; we will denote the result V_v, and the vector from the spacecraft to the asteroid will be denoted V_s. Then the angle q between V_v and V_s is

$$q = \cos^{-1}(V_v \cdot V_s/(|V_v| r_s))$$

where $|V_v|$ is the magnitude of V_v, and r_s is the magnitude of V_s. The component of the velocity vector perpendicular to V_s is therefore v sin q, and since this is viewed from a distance of r_s, the angular velocity of the asteroid as seen from the spacecraft, ν_s, is

$$\nu_s = v \sin q \,/\, r_s \qquad (6\text{-}16)$$

The time required to traverse ten arcminutes (or three milliradians) is

$$\mathrm{DELTIM} = 0.003/\nu_s \qquad (6\text{-}17)$$

The second time point follows the first by the interval DELTIM. At this new epoch, the position and velocity were recomputed, along with DELTIM; in this way, the time required to traverse ten arcminutes was continually re-estimated, and this permitted the set of time points to be generated.

At each time point, the asteroid position was obtained. A search square was centered on the asteroid position such that the sides of the square were aligned with the local lines of longitude and cross-longitude of the L_0 (1950.0 mean ecliptic) system, with a half-width of five milliradians. The four corners of this square defined points in latitude and longitude for which AACV bin numbers were obtained via the standard mapping. Such bin numbers were buffered in an array, with duplicates removed, as all time points were processed.

The SHEF data were read and interpolated for each time point. The SOP granularity of the time domain affected the generation of time points in a way which modified the description above slightly. This involves constraining the beginning and ending times of each SOP to be used as time points, so that brief visitations in certain bins will not be overlooked.

After all bin numbers were identified for a given SOP, the processing described in the next section was performed before going on to the next SOP.

The list of bin numbers for the SOP was processed as follows. The Area Coverage File data for each bin number were read in, and for each boresight passage in the bin, the mean of the entry and exit times was computed; the asteroid position at this time was computed as described previously. The SHEF data were interpolated to the time being processed, and topocentric correction was performed. This yielded the vector from the spacecraft to the asteroid; this was not yet corrected for one-way light time delay, but this correction was usually much less than 30 arcseconds. While this is still more than the topocentric correction, the approximate asteroid position was used only for a relatively coarse search (the light-time delay was accounted for later in AKSITS), while the spacecraft position vector was sufficiently accurate to be used again in the more detailed asteroid position computation in AKSITS.

The PR04 data for the time being processed were read in next, and the mean value of the boresight Euler angle ν was found in the parameter $\langle\nu\rangle$; the corresponding angle for the asteroid, ν_a, was computed as follows.

$$\nu_a = \cos^{-1} (\cos b \cos (l - l_s) - \pi/2) \qquad (6\text{-}18)$$

where l_s is the solar longitude at the middle of the OBS, and l and b are the longitude and latitude of the asteroid in the L_0 system (1950.0 mean ecliptic), corresponding to the vector computed by subtracting the sun-to-spacecraft vector from the sun-to-asteroid vector. This vector is denoted V_a and is defined in the L_0 system, which has its X axis in the direction of the north ecliptic pole and its Z axis in the direction of the vernal equinox; therefore

$$l = \tan^{-1} (-V_{a2} / V_{a3}) \qquad (6\text{-}19)$$

$$b = \tan^{-1} (V_{a1} / \mathrm{SQRT}(V_{a2}{}^2 + V_{a3}{}^2)) \qquad (6\text{-}20)$$

If the absolute value of $(\nu_a - \langle\nu\rangle)$ was less than 15 arcminutes + 3 σ_ν, then geometrical coverage was considered to be detected, a crossing counter (ICRS) was incremented by one, and the crossing parameters were loaded into a buffer array for later use by AKSITS. The estimated detection time DETTIM(ICRS) was computed as follows: the asteroid's angle about the sun vector, ψ_a, is

$$\psi_a = \tan^{-1} (\cos b \sin (l_s - l) / \sin b) \qquad (6\text{-}21)$$

If this was negative, 2π. was added; this made ψ_a conform to the range of the boresight's angle about the sun vector. The time it would

The PR04 data for the time being processed were read in next, and the mean value of the boresight Euler angle ν was found in the parameter $<\nu>$; the corresponding angle for the asteroid, ν_a, was computed as follows.

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where l_s is the solar longitude at the middle of the OBS, and l and b are the longitude and latitude of the asteroid in the L_0 system (1950.0 mean ecliptic), corresponding to the vector computed by subtracting the sun-to-spacecraft vector from the sun-to-asteroid vector. This vector is denoted V_a and is defined in the L_0 system, which has its X axis in the direction of the north ecliptic pole and its Z axis in the direction of the vernal equinox; therefore

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If this was negative, 2π. was added; this made ψ_a conform to the range of the boresight's angle about the sun vector. The time it would take the boresight to get to the asteroid from its position ψ_0 at time T_0 is $(\psi_a - \psi_0)/\psi'$, where ψ' is the mean scan rate of the angle about the sun vector during the scan; adding this scanning time to T_0 yielded the estimated time of closest approach of the boresight to the asteroid; since detection should occur a few seconds before this, two seconds were subtracted, and the result was stored in DETTIM(ICRS).

When all of the bins identified for possible geometrical crossing had been prepared, the next SOP was processed as described above until the entire mission had been covered for the given object. At that point the crossing counter, ICRS, was set to the number of predicted crossings of the asteroid by the IRAS focal plane.

6.1.4.2.2 AKSITS

AKSITS processed the geometrical crossings one at a time; for each one, the following processing steps were executed.

A time window was set up by adding and subtracting ten seconds to the DETTIM for the crossing being processed. Then the one-way light-time correction was computed by dividing the distance to the asteroid from the spacecraft by the speed of light. This correction was subtracted from the time for which AKSOPS computed the asteroid position, and this position was recomputed. The vector from the spacecraft to the asteroid was computed by subtracting the sun-to-spacecraft vector from the sun-to-asteroid vector, where the former is the one for the expected instant of observation, and the latter is for the time that the light left the asteroid. Higher-order light-time corrections are ignored. The asteroid position computation was performed as described above.

When the asteroid's L_o position angles (as seen from the spacecraft) had been computed, the time window of sightings was examined by consecutive calls to a Data Base Subsystem subroutine. On each call, the IP01 data were returned for a sighting with a TNAM in the window (a special flag indicated when there were no more sightings). AKSITS then examined the sighting to see how well its position matched that of the computed asteroid position.

Position agreement was tested as follows. A coarse latitude test was applied first; this eliminated most of the sightings in the time window. If the latitude test was satisfied, a dot product test was performed;

unit vectors toward the computed asteroid position and the sighting were dotted, and if the result was less than 0.9999 (i.e., the angular separation was 0.8 degrees or more), the sighting was discarded; otherwise the fine position test was performed.

The fine position test is the same one used by the SDAS PSCORE processor (see Section 5.1); it computed the cross-covariance of the two position probability density functions (i.e., for the sighting and the computed asteroid position) evaluated at the observed separation, and required the result to be above the threshold 1000 (the density functions had units of probability mass per steradian). If this test failed, the sighting was discarded; otherwise it was checked against any previous acceptable results which may have been found. If there were any, then bit number 30 in the ASTATW status word was turned on, and the association with the higher test result was retained.

The units employed in the position probability density functions resulted in the figure of merit having a large value (1000 up to as much as one billion). The corresponding figure of merit used subsequently in ADAS (for such things as final product filtering) was obtained by taking the common logarithm of the cross-covariance figure of merit, subtracting three, and dividing by six. This resulted in a number between zero and one.

A flux ratio test was applied to all sighting/prediction pairs which passed the fine position test and for which the sighting had a signal-to-noise ratio of at least 5.0 in band 1 or 2. In such cases, the sighting's flux was required to be within a factor of three of the predicted flux computed from the thermal model (see chapter 7). If the flux ratio test was failed in either band 1 or 2, the sighting was flagged (via ASTATW bit number 7). If any other sightings also passed the fine position test, the best of the unflagged ones was kept, if any.

After the time window of sightings was exhausted, AKSITS noted whether any associations were made. If not, then a record was written to the AK02 file. If an association was found for the current prediction, then a check was made for an existing AK01 record which would indicate that the sighting involved had already been used in a previous match with another known object. In such a case, ASTATW bit number 30 was set, and if one and only one of the two was flagged as having failed the flux test, the other was kept, and otherwise the association with the higher test result was retained.

If there was no conflicting match, or if there was and the current association was preferred, then AKSITS generated an AK01 record to record the association for the given crossing.

After each predicted sighting for the current asteroid had been processed, AKSITS went on to the next predicted sighting until all had been processed.

6.1.4.3 Single Sighting Processing

The ADAS Single-sighting (AS) subsystem processed all IP01 records associated with known objects to perform the following tasks.

A. Compute the figure of merit for acceptability as a solar-system object based on photometric parameters

B. Compute colors and set status bits for use by downstream processors

The figure of merit was essentially the same as used in the ATA. The main difference was the selection of noise-fill bands for use in deriving color estimates for single-band sightings. The output file, AR01, was a deliberately small file; this permitted high-speed data base access. AR01 was the key to several important downstream modules. An acceptance status word for each sighting contains information about whether it passed certain thresholds of acceptability; other bits in this word were set by the downstream modules. AR01 became the ultimate bottom-line indicator for the acceptability of each sighting.

6.1.4.5 Derived Information Processing

Albedos and diameters were computed for each known object by applying the same algorithm to each detection in any survey band. The results were averaged for each object later during final product preparation. The computation of albedo for each detection employed a table of normalized fluxes as a function of Bond albedo and heliocentric distance; this table was derived from the ADAS standard thermal model (see Chapter 7).

The remaining discussion in this section will be concerned with the computation of the albedo for a given detection of a given asteroid.

Comet diameters were based on assumed albedos, eliminating the iteration described below.

The H_V magnitude was obtained from the H_B magnitude and the B-V color by the formula

$$H_V = H_B - (B-V) \qquad (6\text{-}22)$$

The uncertainty due to error in H_B was common to all albedo determinations for the given asteroid, as so it was not taken into account here. It should be added to the averaged albedo by the user; this can be done by employing the quality code for the H_B.

An initial estimate p_V for the geometric albedo was taken by assuming the IPO2 value. Then the following iteration was performed. After the first band was processed, any subsequent bands began iteration with the previous albedo solution.

1.) The phase integral Q was obtained from the approximation

$$Q = 0.29 + 0.684*G \qquad (6\text{-}23)$$

where G is the slope parameter.

2.) The Bond albedo was computed from the phase integral and the current estimate for the geometric albedo,

$$BOND = Q*p_V \qquad (6\text{-}24)$$

The Bond albedo was used for looking up and interpolating fluxes in the thermal-model table.

3.) The current estimate for the radius was obtained from

$$RAD = 0.5*10.**(3.1236 - 0.2*H_V - 0.5*ALOG10(p_V)) \quad (6\text{-}25)$$

4.) The flux was interpolated in the thermal model table for the current albedo and heliocentric distance. The interpolation was linear in albedo and quadratic in heliocentric distance; the flux was then scaled for the current estimate of the radius and the distance from the spacecraft to the asteroid, and the phase-angle correction was applied by the formula

$$SCALE = 10.**(-0.572958*ABS(a_p)/2.5) \quad (6\text{-}26)$$

where a_p is the phase angle in radians; the interpolated flux corrected for the radius and viewing distance was multiplied by SCALE.

5.) The ratio of the computed flux to the observed flux was calculated, and the absolute deviation from unity was tested for convergence. If it was less than 0.002, or if the number of iterations had reached 99, then iteration ceased; otherwise the geometric albedo p_V was scaled by the ratio of the computed to the observed flux, and the iteration resumed at step (1.) above.

When the iteration ceased, a check was made on the ending value of the geometric albedo p_V under certain circumstances; this was done if (a.) the photometric quality indicator in IP02 was less than the highest quality, and (b.) the G resetting process described below had not already been performed as many times as allowed. If these conditions were in effect, then p_V was checked to see whether it had migrated across a boundary of the p_V-G table (see below); if so, the value for the region of the table where p_V ended up was assigned to G, and the entire iteration was repeated, starting with the same initial estimate as before. A counter was kept for the number of times this resetting had been done for the current case, and if this counter exceeded unity, the iteration was ended. The values of p_V and G in this table were:

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Table 6-21. Boundary Values

p_V	G
0.10	0.15
0.38	0.25
1.00	0.40

The p_V/G jumps discussed in the previous paragraph may have occurred during the iteration for the albedo itself or while the uncertainties were being computed. In the former case only, the occurrence of a jump was recorded in the second bit of the ADSTAT byte for the band (see Section 6.1.8.3), and if more than the maximum permitted number of such jumps occurred, bit number three was set. If the maximum number of iterations was reached, then bit number one of ADSTAT for the band being processed was turned on.

Note that the a priori slope parameters are quoted in the final products, independently of whether a table jump occurred. Since the jump is recorded in the ADSTAT word, the user may wish to consult the table above for such sightings to obtain the value of G appropriate to the final value for the albedo.

The uncertainties, σ_{pV} and σ_D in the geometric albedo and diameter, respectively, were computed as follows. The diameter was treated similarly to the albedo, only the latter will be described. The iteration described above was repeated with the one-sigma IRAS flux uncertainty added to the observed flux. The solution for the albedo in this case was subtracted from the unperturbed value for that band, and the absolute difference was taken as the one-sigma uncertainty due to the error in the IRAS flux. Albedo migration across p_V/G table boundaries during the iteration for the uncertainties was handled in the same way as for the main estimation.

6.1.4.6 Data Base Management

Nearly all of the computer files produced during ADAS production were defined as IBM VSAM files. A user-defined access key is used to point directly to the records desired in the data base. The data access key used was the TNAM/DNAM of an individual sighting, that is, the first time and telescope detector ID of initial detection, which is guaranteed to be a unique sighting identifier.

Given this unique data access key, information for a particular sighting could be easily retrieved from IP01, as well as prediction information from AK01, or derived physical quantities from AD02. Most of the data base access routines were primitive subroutine calls to read the various files whose retrieved record's data would be stored in a FORTRAN COMMON block used by the calling program.

6.1.4.7 User Interface

In order to examine results of the various processors of ADAS, a menu-driven collection of programs was employed to allow users to retrieve plots and listings of various parameters. Users were able to specify a personalized set of constraints to select data from the data base in a very flexible manner; nearly all of the quantities across the various files could be constrained, as well as the association/status words from IP01 and AR01.

The plot options included an X/Y plotter that allowed graphing 40 different quantities as parameters for each axis. A polar projection plot and an equal-area sky plot were also readily available. In fact, many of the plots shown in this document were generated by the menu-driven user interface.

The listings generation part of the menus would create three different types of printouts, depending on the quantity of data the user wished to see.

6.1.4.8 Special Processing

The Special Processing (SP) subsystem computes geometrical coverage completeness for any desired family of orbits. It uses the same algorithms as the AK subsystem, except that instead of real orbital elements, arrays of artificial orbital elements are used. These arrays grid the space to produce uniformly spaced orbit samples. Actual coverage by the IRAS telescope during survey time is sought for each orbit, and the fraction of all orbits yielding at least one coverage is computed.

6.1.4.9 Final Product Preparation

Albedo averaging was performed for each known object by forming a set of albedos composed of those determined from each detection in any survey band, editing this set according to certain rules, and averaging the remaining values. The values averaged were also tested for the presence of significant flux variations. Final diameters were computed directly from the final albedos.

The initial editing involved careful inspection of each sighting's status words, and certain conditions eliminated the sighting from further consideration. For example, association with a months-confirmed WSDB source, failure of the albedo iteration to converge, failure to pass the asteroid color test in the AS subsystem, were all sufficient in themselves to rule out an entire sighting.

Within each sighting, some bands may have been able to contribute to the overall average and others not. Tests were made against absolute albedo limits and relative (to a priori) albedc limits. Possibly one band's albedo iteration may have converged while another's did not.

A more detailed discussion of the data filtering and how it is believed to have affected completeness and reliability is contained in Chapter 2.

When all observations had been identified as usable or unusable, the averaging procedures were carried out. The sample mean for the set of usable measurements was obtained by summing the albedo and the square of the albedo over all usable measurements, while counting them. The mean was computed as an unweighted arithmetic mean at this point, since the samples could come from different populations (including noise), making inverse-variance weights untrustworthy. The unbiassed estimate of the population variance is

```
VARPVP = N/(N-1) * (SUMPV2/N - (SUMPV/N)**2)          (6-27)
```

where SUMPV is the sum of the albedos, SUMPV2 is the sum of the albedos squared, and N is the number of measurements contributing to these sums. The standard deviation is

SIGPVP = SQRT(VARPVP) (6-28)

The overall average was recomputed by disqualifying observations for which the albedo was different from the mean by more than 2 SIGPVP. Again, an unweighted mean was computed, and an estimate of the uncertainty in the mean was obtained by dividing the RMS a priori measurement error by n, where n is the number of samples averaged. The corresponding variance is called VARPV. The mean value for the albedo was the final answer for that parameter, and is called PVBAR.

Once the final value for the albedo was known, all the usable sightings were examined once again to see if any had all of their albedo estimates above or all below this final value. When such sightings were found, the in-sighting mean albedo and its reduced variance contributed a term of the form

(PVBAR - PVS)**2/VARPVS (6-29)

to a summation of such terms over all such sightings, where PVBAR is the final mean albedo, PVS is the in-sighting mean, and VARPVS is the reduced variance of PVS. This summation constitutes a sample of a chi-square random variable (under the hypothesis that the observations were all made under identical conditions with the same true value PVBAR being measured with associated measurement error) with N degrees of freedom, where N is the number of sightings contributing to the summation.

The probability PCHI associated with this chi-square value is the fraction of all chi-square random variables with the same number of degrees of freedom which have the same value as the observed sample or less. If the observed chi-square value was rather large, PCHI would be near unity; this should happen if statistically significant sighting-to-sighting discrepancies in the albedo occur, and a noticeable light curve should emerge in this way (other effects could also cause it, however). If the chi-square value was mediocre, then PCHI would be approximately

0.5. If the chi-square value was rather small, it probably meant that the a priori uncertainties were overestimated, and the value of PCHI would lie between zero and 0.5.

Since the effect of a significant light curve would be to put PCHI between 0.5 and unity, a variable FPLTCV was derived from

$$FPLTCV = 2*PCHI - 1 \qquad (6\text{-}30)$$

$$\text{If } FPLTCV < PLCMIN \text{ then } FPLTCV = PLCMIN \qquad (6\text{-}31)$$

and we loosely refer to FPLTCV as the probability that a light curve effect is present in the data. FPLTCV was then used to set the uncertainty of PVBAR according to

$$FPSGPV = SQRT(FPLTCV*VARPVP + (1-FPLTCV)*VARPV) \qquad (6\text{-}32)$$

where VARPVP is the population variance computed as shown above, and VARPV is the approximate error variance for PVBAR. The value of FPLTCV was not permitted to go below 0.1 as a safety measure. The equation immediately above causes the uncertainty in PVBAR to approach the reduced variance VARPV if it appears that the measurements are all quite consistent with each other (which would rule out significant light curve effects), and to approach the population variance VARPVP in the limit that the measurements are inconsistent to a very significant extent.

The diameter was computed from PVBAR by the equation

$$DIAM = 10.**(3.1236 - 0.2*HV - 0.5*ALOG10(PVBAR)) \qquad (6\text{-}33)$$

The uncertainty in the diameter is set so that its relative uncertainty is half that of the albedo. The ASTATW status word bits 12+I are set on if band I contributed to the final average albedo; this is done for each sighting.

Chapter 7. The IRAS Asteroid Thermal Model

by

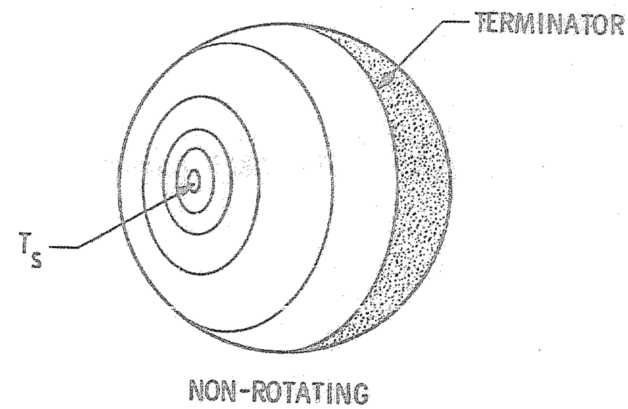
Larry A. Lebofsky, Dennis L. Matson, Glenn J. Veeder and
Edward F. Tedesco

7.1.0 Description

7.1.1 Asteroid Thermal Models

Thermal infrared observations and "standard" thermal models have been used to determine the diameters and albedos of asteroids for the past 15 years. All of these models assume an idealized spherical asteroid whose surface elements are in instantaneous equilibrium with solar insolation, equivalent to a non-rotating body (Fig. 7-1a) and observed at zero solar phase angle. In reality this is never true, but given the uncertainties in the infrared calibration, absolute visual magnitudes, etc., this assumption is acceptable for most asteroid observations. Although models developed by Morrison and his colleagues (Morrison, 1973; Jones and Morrison, 1974) differed somewhat from those of Matson and Lebofsky (Matson, 1971a, b; Matson et al., 1978; Morrison and Lebofsky, 1979), all yielded diameters and albedos which agreed to within 10-20% of each other.

Recently, there have been two attempts to improve upon the standard thermal model to get more accurate asteroid diameters and albedos. In the first study, Brown et al. (1982) made 10- and 20-μm observations of two asteroids whose diameters had been measured by stellar occultations and a Jovian satellite whose diameter had been measured by spacecraft



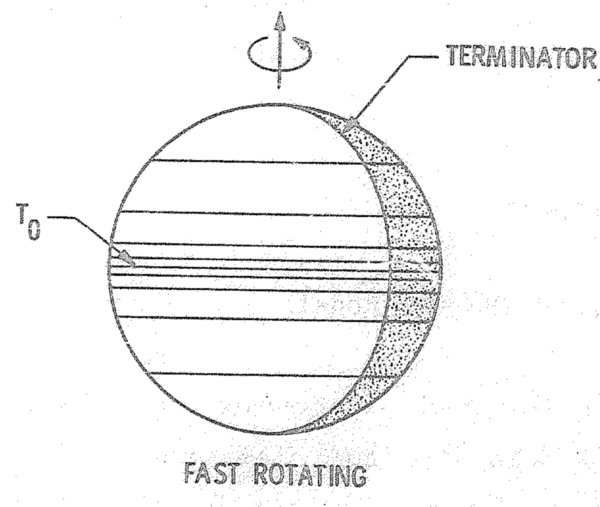


Figure 7-1: Sketches of model isotherms for two rotation rates of a spherical asteroid: a) non-rotating (e.g. standard thermal model) and b) rapidly rotating. The non-rotating case gives good thermal emission flux estimates for most rotating cases too. This is fortunate since their axes of rotation are usually unknown. When the rotation rate approaches two or three hours then the rapidly rotating case gives the superior results. This model also applies to any solid metal or rock asteroids. However, even in these extreme cases the axis of rotation must be known. For example, if the pole of rotation is near the subpolar point then case A applies for all objects.

imaging. They then determined empirical scaling factors for the observed 10 and 20 μm fluxes which brought their model diameters into agreement with the measured diameters. These empirical scaling factors could then be applied to measured 10 and 20 μm fluxes of other asteroids, so that their thermal model would give more accurate diameters and albedos for them as well (Brown and Morrison, 1983). This method was shown to be successful when it predicted (within 2%) the diameter of Ceres as measured subsequently by a stellar occultation (Hubbard et al., 1985). However, these scaling factors are only empirical and have not been related to the physical properties of asteroids, and thus can be used only for the N and Q bandpasses observed by Brown et al. (i.e. 10 and 20 μm).

In the second study, Lebofsky et al. (1984) considered a thermophysical model which used asteroid properties such as thermal inertia, rotation rate, and sense of rotation. They measured 10 and 20 μm fluxes of Ceres over a wide range of solar phase angles about opposition, and applied a thermophysical model to the data to determine diameter, albedo, and thermal inertia. This model was also successful in predicting the diameter to within 3% of the 933 to 945 km occultation diameter (Hubbard et al., 1985; Oswalt, 1985; Millis et al., 1985, 1986).

7.1.2 IRAS "Standard" Thermal Model

It was decided by the Asteroid Advisory Group and by a subcommittee of the asteroid workshops (see Workshop Report Number 3, working group 2), that some form of the standard thermal model should be used for the reduction of the IRAS asteroid data. Originally, it was decided that this model should be based solely on groundbased infrared observations of Ceres, coupled with its occultation diameter. However, it was later decided to include observations of Pallas to reduce the possibility that the thermal parameters for Ceres might not be typical of asteroids as a whole.

It was decided that a thermophysical model was not appropriate since the limited groundbased data on such quantities as rotation rate and the limited observations and low signal to noise of IRAS data for most of the asteroid observations make it impossible to determine parameters such as the sense of rotation. A thermophysical model is only meaningful for an asteroid when sufficient high quality data exist over a large range of solar phase angles about opposition, where the data can be used with the rotation rate of the asteroid to determine the thermophysical properties along with the sense of rotation and an estimate of the pole position (Fig. 7-1b).

We present here a refinement of the standard thermal model based on the occultation diameters of Ceres and Pallas. The primary goal of this work is the development of a standard thermal model that can be used for the reduction of IRAS asteroid data at various wavelengths (12, 25, 60, and 100 μm) where only limited observations exist. Improvements over previous standard thermal models include 1) a redetermination of the infrared beaming factor, 2) the new magnitude system for asteroids recently approved by the 19th General Assembly of the IAU meeting in Delhi, India, and 3) the new 10 and 20 μm absolute flux calibration of Rieke et al. (1985).

7.1.3 The "Standard" Thermal Model

The standard thermal modeling technique has been discussed in detail by several authors (Allen, 1970, 1971; Matson, 1971a, b; Morrison, 1973; Jones and Morrison, 1974; and Morrison and Chapman, 1976). For a general discussion of thermal modeling techniques, see Morrison and Lebofsky (1979) and Lebofsky et al. (1985, 1986). Over the years, minor changes have been made to this model and we will discuss these below.

For a spherical asteroid, the balance between absorbed and emitted radiation may be represented by:

$$\pi R^2 (1 - A) S = \beta \epsilon \sigma R^2 \int_{-\pi}^{\pi} \int_{-\pi/2}^{\pi/2} T^4(\theta,\phi) \cos\phi \, d\phi \, d\theta \qquad \text{(Eqn. 7-1)}$$

where R is the radius of the asteroid, A is the bolometric Bond albedo, S is the solar flux at the distance of the asteroid, β is a normalization constant for adjusting the surface temperatures to compensate for the angular distribution of the thermal emission (infrared beaming), ϵ is the wavelength-independent emissivity, σ is the

Stefan-Boltzmann constant, $T(\theta, \phi)$ is the temperature at a point of the surface at longitude θ and latitude ϕ. The Earth and the Sun are assumed to be in the equatorial plane of the asteroid at $\theta = 0$, $\phi = 0$, i.e., the asteroid is assumed to be observed at zero phase. The only contribution to the integral is from the sunlit hemisphere (i.e., T=0 for $\theta > \pi/2$). Matson (1971b) observed that asteroids had solar phase coefficients, β_E, in the thermal IR that ranged from about 0.005 to 0.017 mag/deg. Therefore, a mean value of 0.01 mag/deg has been used in all standard thermal modeling as a typical thermal phase coefficient to correct the observed thermal fluxes to the zero phase assumed in the thermal models. Recently, Lebofsky et al. (1984, 1986) showed that, at least in the case of Ceres, the phase coefficient may be different before and after opposition. They determined that this was due to the effects of rotation, the so-called morning/evening effect (see below). However, the mean phase coefficient they observed was still about 0.01 mag/deg. In the standard thermal model, $T(\theta,\phi) = T_{max} \cos^{1/4}\theta \cos^{1/4}\phi$ where T_{max} is the subsolar temperature.

Finally, the relationship between the visual magnitude and the thermal flux is used to determine the diameter and albedo. The visual magnitude is a function of the asteroid diameter and geometric albedo, and the visual solar magnitude. As shown in Equation 7-1, the thermal flux is a function of asteroid diameter and Bond albedo, and the solar flux. The geometric and Bond albedos are related by the equation:

$$A = p \cdot q \qquad \text{(Eqn. 7-2)}$$

where p is the geometric albedo and q is the phase integral. Since the visual magnitude and total radiated flux of the sun are known, if one can determine q, then the visual magnitude and the thermal flux can uniquely determine the diameter and albedo of the asteroid.

Within the framework of the standard thermal model the major uncertainty is in β, the infrared beaming factor. The beaming factor is the inverse of the enhancement in total thermal flux at zero solar phase angle over that of a uniformly radiating sphere, and is thought to be due to small-scale surface roughness (Mendell and Lebofsky, 1982). Lebofsky and his coworkers have used a beaming factor of 0.9 (an enhancement of 11% in flux). Morrison and his coworkers determined a beaming factor of about 0.86 from stellar and lunar occultation diameters of the Jovian satellites and Iapetus (Morrison, 1975; Morrison and Chapman, 1976). Unfortunately, in doing so, the infrared diameters of asteroids were calibrated to objects whose surface thermal properties were vastly different, i.e., higher albedos, lower surface temperatures, slower rotation rates, different compositions. A much higher low-phase-angle enhancement of thermal emission (hence smaller β) of about 30% has been observed for Mercury (Murdock, 1974) and the Moon (Mendell and Lebofsky, 1982). Finally, Brown et al. (1982) found that the diameters of asteroids determined by the standard thermal model were about 5% larger than the diameters determined by occultations, implying that the beaming factor being used for asteroids was too small by upwards of 10%, consistent with what is seen on the Moon and Mercury.

Normally, with only a few observations in hand, no attempt is made to determine the value of the infrared beaming for an asteroid. Its effect, under these conditions, cannot be distinguished from that of the asteroid's size. In ADAS a guess of the diameter and albedo of an asteroid is made and then these are used as input to the standard thermal model. These values are iterated until both the visual magnitude and observed infrared flux are matched by the model. Since we now have accurate diameters for Ceres and Pallas, we can eliminate them as variables. In this way we are able to determine the beaming factors directly in a way similar to the method of Morrison and his coworkers (cf. Morrison and Chapman, 1976), and more recently by Brown et al. (1982) and Lebofsky et al. (1986).

In the present work, we have also incorporated the new magnitude system for asteroids which uses zero-phase magnitudes and includes the opposition effect. The new magnitude system is based on an empirical phase function for the scattering of light from solid surfaces developed by Harris et al. (in preparation). This new phase relation has been used by Tedesco to generate the asteroid absolute magnitudes given in Section 4.1.2. Our parameters and constants are listed in Table 7-1 (see end of this Chapter). It should be emphasized that the new magnitude system is just a redefinition of the phase angle at which the magnitude is defined and now includes the opposition effect. This brings the magnitudes of asteroids in line with the way the magnitudes of satellites have always been defined. Likewise, the definition, and thus the value of the geometric albedo is changed, but since there is no change in the definition of the Bond albedo, the phase integral, q, must also change proportionately. To first order, then, there should be no change in the values of diameters that are derived using the new magnitude system. However, since q is now being determined empirically, (and more precisely) the quantity pxq may change slightly and thus affect the calculated diameter by a small amount (1%). Similarly, since use is made of the occultation diameters of the asteroids, the new magnitude system does not affect the beaming factor determined in this paper.

7.1.4 Observations Used for Model Determination

The groundbased observations used for the refinement of the standard thermal model span the 1983 and 1984 apparitions of Ceres and Pallas. Details of the observations have been presented in Lebofsky et al. (1986), so will not be duplicated here. Our primary standards were taken from Rieke et al. (1985), as was the zero-magnitude calibration at 10 μm (10.6 μm, N) and 20 μm (20.2 μm, Q). Since the Q filter we used at the IRTF differs from the one used by Rieke, our effective wavelength is shorter (20.2 μm vs. 21.0 μm). Thus our zero-magnitude flux is different than given by Rieke et al. (1985). (See Table 7-1, see end of Chapter). When the Rieke et al. standards were not available, standards from Tokunaga (1984) were used. However, for consistency, their magnitudes were adjusted to conform with the Rieke et al. calibration. Whenever possible, Rieke standards were also observed on the same night to confirm the adjustments. The standard stars used, along with their magnitudes, are listed in Table 7-2. We give the derived diameters and albedos for Ceres and Pallas from previous studies and from Lebofsky et al. (1986) in Table 7-3. For comparison, we show the albedos and diameters as originally given in TRIAD (Morrison and Zellner, 1979) and Brown et al. (1982) both of which used standard thermal models, and the Ceres albedo and diameter from Lebofsky et al. (1984) which used a thermophysical model. We have also included the occultation diameters which were used by Brown et al. (1982) and Lebofsky et al. (1986) as calibration points for their models. For the results used in the analysis of the IRAS data (Lebofsky et al., 1986), we have given both the derived 10 and 20 μm diameters. The differences between these are due to either the flux calibration at 20 μm or to the breakdown of the standard thermal model, the latter leading to uncertainties in the calculation of diameters and albedos in the IRAS bands which we will discuss below.

7.1.5 Estimated Uncertainties in the Thermal Model

The standard thermal model appears to be unreliable for calculation flux densities for wavelengths which are well on to the blue slope of the thermal emission spectrum. For the mainbelt asteroids, this corresponds to wavelengths shorter than approximately 8 μm. At these wavelengths, accurate thermal modeling requires thermal inertia and other parameters (not included in the standard thermal model) to be taken into account (Lebofsky et al. 1984, 1985, 1986).

Even though the results presented here appear to agree to a few percent, there are a number of uncertainties in the model and observations that have uncertainties in about the same range, (i.e. ±5%):

1) Ceres occultation diameter: Occultation diameters are still model-dependent diameters. They are limited by the number of chords and the accuracy of the measurements. They also only measure the instantaneous cross-section of the asteroid which may vary greatly with the rotation of the asteroid. Finally, the determination of the cross-section and thus the occultation diameter are limited by the shape that is assumed for the asteroid. In the case of Ceres, we know that the lightcurve is about four hundreths of a magnitude, and so its shape is probably close to being spherical. Millis et al. (1986) determined an ellipsoidal cross-section for Ceres, but also found that a spherical cross-section was not much worse and only about 1 percent larger [D_{eff}(ellip.) = 933 ± 7 km, D_{eff}(circ.) = 944 ± 5 km].

2) Pallas occultation diameter: The uncertainty in the cross-section of Pallas may be somewhat larger. Wasserman et al. (1979) determined a mean diameter for Pallas at the time of occultation of 538±12 km. Also, based on a lightcurve, they determined the semidiameters of the three axes to be (263±6 km) x (266±15 km, pole) x (279±4 km). The large uncertainty in the polar dimension was due to the 0.16 magnitude amplitude lightcurve observed by Burchi (1972), when Pallas was nearly equator on. Since Wasserman et al.'s observations were at a time when Pallas was nearly pole on, and since they determined only a small difference between the two axes (263x279), they interpreted the maximum lightcurve amplitude of Pallas observed by Burchi (1972) and Schroll et al. (1976) to be due to albedo variations, since their cross-section was nearly circular. However, the preliminary analysis of the 1983 occultation of Pallas (Dunham et al., 1983) which occurred about 0.02-0.05 mag above minimum light (Binzel, 1984) implies that the shorter axis of Pallas may be closer to 250 km, which is more consistent with the observed lightcurve amplitude. Also, Lebofsky et al. (1986) found that Pallas varied by over 0.1 mag at both N and Q which is indicative of a change in cross-section and not albedo. Therefore it is possible that the true uncertainty in the Pallas effective diameter may be larger than 5%. This may be partially averaged out by the observational coverage, though any non-sphericity will itself create some uncertainty (cf Brown, 1985).

3) Absolute photometric calibration: 3% at N and 5% at Q. These errors are also large enough to encompass the uncertainty in the monochromatic correction, especially at Q. A 3% flux uncertainty leads to a 1.5% uncertainty in diameter and a 2% uncertainty in the beaming parameter.

4) Thermal inertia: Clearly, thermal inertia plays a major role in the uncertainty in the model. This can be seen by the systematic variation in the model diameters with phase

angle for Ceres and in the difference in model diameters between N and Q (plus the failure of the model to predict 5 μm fluxes as seen by Lebofsky et al., 1986). For Ceres at N, the model diameter varies by 4-5% and the Q diameters are systematically larger by about 3%.

5) Modeling of beaming: As in previous studies, we have assumed that the enhancement in flux at low solar phase angles could be modeled as due to an effective increase in temperature over the illuminated hemisphere of the asteroid. We also assume that the observed decrease in this flux enhancement with increasing solar phase angle at 10 μm, i.e., 0.01 mag/deg, is the same at all wavelengths. This assumption may not be true at the longer wavelengths where preliminary analysis of the IRAS data indicates that 0.005 mag/deg may be more typical for large mainbelt asteroids at 60 and 100 μm (Walker, private communication). For an asteroid observed at large phase angle (20°) this would imply a possible over-estimation of the zero-phase angle flux of the asteroid ranging from a few percent at 20 μm to perhaps 10% at 60 and 100 μm.

6) Asteroid surface composition: We have based our model on two large C-class asteroids. For other asteroids that may have vastly different surface properties (albedo, thermal inertia, etc.) the parameters which we determined in this paper may be significantly different. We have no way of determining this until more occultations are observed and more ground-based observations are made.

7.2.0 Lookup Tables

7.2.1 Table Values

Because of the large amounts of data involved, lookup tables were created to allow quicker calculation of asteroid diameters and albedos. Two tables were created: one to facilitate the analysis of the groundbased Ceres and Pallas data (Table 7-4) and one to be used for the reduction of the IRAS data (Table 7-5). Column 1 gives the solar distance (in AU), column 2 gives the Bond albedo used, and the remaining columns give the calculated fluxes. In Table 7-4, the two flux densities are for N (10.6 μm) and Q (20.2 μm) in W cm^{-2} μm^{-1}, and in Table 7-5, the four fluxes are for the four IRAS bandpasses, 12, 25, 60, and 100 μm, and are given in W m^{-2}. To facilitate the calculations, a radius of 1 kilometer was used for the asteroid and it was assumed that the asteroid was 1 AU from the earth. It should be noted that numbers in the Final Data Products are given as flux densities in Janskys, while the numbers in Table 7-5 (see end of Chapter) are fluxes in Wm^{-2}. All albedo and diameter determinations were done using fluxes and were not converted to flux densities until the final output.

7.2.2 Generation of Tables

Broadband filters ($\Delta\lambda/\lambda \sim 0.3$ to 0.5) were used for both the groundbased and IRAS observations. Because of the shapes of the spectra of the standard stars and asteroids through the spectral windows, monochromatic fluxes calculated from the thermal models used for the analysis of the asteroid data could not be compared directly with the actual broadband fluxes at N, Q, and the IRAS bands. Therefore, monochromatic wavelengths were defined to which magnitudes and fluxes could be referenced, independent of the spectrum of the observed object.

For IRAS, the monochromatic wavelengths were taken to be 12, 25, 60, and 100 μm. In general, though, the effective wavelength is defined more formally in one of two ways:

1) If no assumptions are made with respect to the spectrum of the source, the effective wavelength can be defined with respect to the instrument response, $\phi(\lambda)$, which includes the filter and telescope transmission, as well as the atmospheric transmission (Low and Rieke, 1974):

$$\lambda_{eff} = \frac{\int \lambda \phi(\lambda) d\lambda}{\int \phi(\lambda) d\lambda} \qquad \text{(Eqn. 7-3)}$$

2) If some spectrum is assumed for the source, the the effective wavelength then becomes dependent on the source's spectrum. Hanner et al. (1984) define the effective wavelength of their bandpass at the wavelength where

$$\overline{B(T)} = B_\lambda (T) \qquad \text{(Eqn. 7-4)}$$

where $B_\lambda(T)$ is the intensity of the observed source at the wavelength, λ, and $\overline{B(T)}$ is defined as

$$\overline{B(T)} = \frac{\int B_\lambda(T)\phi(\lambda)d\lambda}{\int \phi(\lambda)d\lambda} \qquad \text{(Eqn. 7-5)}$$

Because it is source independent, we have chosen the definition in (7-3). The effective wavelengths for the N and Q filters are shown in Table 7-1 (see end of Chapter). As can be seen in Table 7-1, there is a difference in the effective wavelengths used here and those used by Low and Rieke (1984). This is due to differences in the actual filters used and the atmospheric transmission assumed by Low and Rieke for Arizona and by us for Mauna Kea. The transmissions for Mauna Kea are shown from (Hanner, personal communication; Hanner et al., 1984; and Morrison and Simon, 1973) which assume 1mm of precipitable water and are listed in Table 7-6. The IRAS filter spectral responses are reproduced from Gillett et al. (1985) Table II.C.5.

Tables 7-4 and 7-5 were generated by using the standard thermal model as described previously with a beaming factor, β, of 0.765 determined from the groundbased observations (Lebofsky et al., 1986). The fluxes for both tables were generated by calculating the asteroid fluxes at wavelengths from Tables 7-6 and 7-7 and integrating over the bandpasses of the filters. The flux densities in Table 7-4 have not been corrected for the monochromatic color correction due to the temperatures of the standard stars (the difference between $B\lambda(T)$ and $\overline{B(T)}$). These were applied directly to the observed magnitudes of the asteroids and were equal to -0.21 mag at N and -0.11 mag at Q.

7.2.3 Flux Densities in Final Data Products

As discussed in Section 7.2.1, all asteroid and comet data are given as flux densities in Janskys. In order to convert the original fluxes to flux densities requires some assumed source spectrum (Eqn. 7-5). For all products, we have assumed the same source spectrum as was used for the original IRAS Point Source Catalog, i.e., $F_\lambda \propto \lambda^{-1}$. To correct these flux densities to true asteroid flux densities one still needs to know the asteroid spectrum. For the standard thermal model, this can be tied uniquely to the subsolar temperature, T_{ss}, of the asteroid. Flux density color corrections ($Flux_{FDP}*CC = Flux_{true}$) for given T_{ss} are listed in Table 7-8. T_{ss} as a function of solar distance and Bond albedo are given in Table 7-9.

7.3.0 Use of Lookup Tables

A description of the algorithms and flow charts for the use of the tables is given in Chapter 6, so will not be repeated here.

7.4.0 Calibration

7.4.1 IRAS Flux Calibration

The IRAS flux calibration is discussed in detail in Chapter VI of the IRAS Explanatory Supplement (1984). Basically, the 12 μm absolute flux calibration was tied to the 10.6 μm groundbased flux calibration of Rieke et al. (1985). Extrapolation to the 25 and 60 μm bands was achieved by using atmospheric models of stars, normalized to observations of the Sun. Finally, the extrapolation from 60 to 100 μm was based on observations and standard thermal model calculations of asteroids whose absolute flux at 60 μm was obtained using the stellar calibration. This absolute calibration is thought to be good to 3%, 5%, 5% and 10% at 12, 25, 60, and 100 μm, respectively.

7.4.2 Asteroid Model Calibration

As we have already discussed, the standard thermal model that we are using has an accuracy that probably ranges from about 5% at 12 μm to 10% at 100 μm for asteroids with properties similar to Ceres and Pallas (i.e. most mainbelt asteroids). The uncertainties are larger for asteroids with rocky surfaces (such as 433 Eros), where the standard thermal model is not the best model to use (Lebofsky and Rieke, 1979). However, for most of the known asteroids, the major uncertainty in the model diameters and albedos arises from errors in the measured fluxes due to the limitations of the survey.

7.4.3 Selected Comparison of Results from IRAS with Groundbased IR Results

The individual diameter determinations for Ceres and Pallas are shown in Table 7-10. The numbers that are in parentheses were not included in the asteroid average diameter. Because of the uncertainty in flux calibration, the 100 μm diameters were not used. In Table 7-11, we compare the mean diameters and albedos for Ceres and Pallas with the groundbased diameters and albedos from Table 7-3. As can be seen, the agreement is within the error bars of the IRAS results in both cases.

7.5 Example of Input to Output

In this section we will give a general description of how the IRAS fluxes are put into ADAS with other data on an asteroids to give the final determination of the diameter and albedo of that asteroid. We will use as an example the observation of asteroid 1 Ceres on May 15.9 at 25 μm. The flux for that observation was 3.32×10^{-11} W m^{-2}. The observation was at 20.03°, so, with a phase coefficient of 0.01 mag/deg, we get 3.99×10^{-11} W m^{-2} at 0° phase angle. As an initial guess for the diameter and albedo, we will use the groundbased result from Table 7-3: D = 936 km, $P_V = 0.095$. This gives us from Eqn. 7-2, A = 0.348. With a solar distance of 2.951 AU, we can now interpolate in Table 7-5 and get a value of 0.147×10^{-14} W m^{-2} for a 1 km radius asteroid at 1 Au from the earth. Correcting this to the actual distance of Ceres

(2.767 AU) we get 1.92×10^{-16} W m^{-2}. Comparing with the zero-phase corrected flux yields an estimated radius of 455.8 km and a diameter of 911.6 km. Comparing this with the initial guess implies a correction in the geometric and Bond albedos (to be consistent with the absolute magnitude) of 0.100 and 0.0368, respectively. Interpolating this in Table 7-5 gives the same value as the initial guess to the accuracy of the Table, so no further iteration is necessary. These final values are the same as found in Table 7-10.

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TABLE 7-1
PARAMETER VALUES

Parameter	Value	Source
β	0.756	Lebofsky *et al.* (1986)
ϵ	0.9	
σ	$5.6698 \times 10^{-12} W cm^{-2} K^{-4}$	Labs and Neckel (1970)
p/p_v	1.0	Morrison and Lebofsky (1979)
β_E	$0.01\, mag\, deg^{-1}$	Matson (1971a,b)
c_1†	$3.7416\, W cm^{-2} \mu m^4$	Labs and Neckel (1970)
c_2‡	$1.4388\, cm\, K$	Neckel and Labs (1984)
S_o	$0.1373\, W cm^{-2}$	Neckel and Labs (1984)
V_{sun}	−26.76	Campins *et al.* (1985)
$(K-M)_{sun}$	0.019	Campins *et al.* (1985)
N (0-mag flux at $10.6 \mu m$)	$9.6 \times 10^{-17} W cm^{-2} \mu m^{-1}$	Rieke *et al.* (1985)
Q (0-mag flux at $21.0 \mu m$)	$6.4 \times 10^{-18} W cm^{-2} \mu m^{-1}$	Rieke *et al.* (1985)
Q (0-mag flux at $20.2 \mu m$)	$7.5 \times 10^{-18} W cm^{-2} \mu m^{-1}$	Lebofsky *et al.* (1986)
H_B (Ceres)	4.04	Tedesco
$B-V$ (Ceres)	0.72	"
G (Ceres)	0.111	"
q (Ceres)	0.366	"
H_B (Pallas)	4.79	"
$B-V$ (Pallas)	0.66	"
G (Pallas)	0.148	"
q (Pallas)	0.391	"

† First radiation constant
‡ Second radiation constant

TABLE 7-2
STANDARD STARS

	Star	BS#	Filter	Magnitude
1	β And	337	M	−1.76
			N	−2.02
			Q	−2.07
2	α Ari	617	K	−0.64
			M	−0.64
			N	−0.73
			Q	−0.83
3	α Tau	1457	N	−3.01
			Q	−3.07
4	α Boo	5340	M	−2.98
			N	−3.17
			Q	−3.22
5	α Lyr	7001	K	0.02
			M	0.02
			N	0.02
			Q	0.02
6	γ Aql	7525	K	−0.65
			M	−0.50
			N	−0.75
			Q	−0.80
7	β Peg	8775	M	−2.19
			N	−2.52
			Q	−2.59

TABLE 7-3
COMPARISON OF MAGNITUDE SYSTEMS
AND PREVIOUS DIAMETER DETERMINATIONS

	Ceres		Pallas	
	Diameter km	Albedo	Diameter km	Albedo
TRIAD†	1014	0.059	589	0.098
Brown‡	953	0.068	537	0.110
Old mag. system	939	0.071	537	0.110
New mag. system	936 ± 12	0.095 ± 0.002	532 ± 7	0.134 ± 0.004
Occultation	933 ± 14	—	538 ± 12	—

† Morrison and Zellner (1979)
‡ Brown *et al.* (1982)

TABLE 7-4
IRTF FLUX LOOKUP TABLE

Solar Dist. AU	Bond Alb.	Flux $(W m^{-2})$ 10.6μm	Flux $(W m^{-2})$ 20.2μm	Solar Dist. AU	Bond Alb.	$(W m^{-2})$ 10.6μm	$(W m^{-2})$ 20.2μm
0.50	0.000	0.111E-17	0.178E-18	1.00	0.700	0.102E-18	0.420E-19
0.50	0.050	0.107E-17	0.174E-18	1.00	0.720	0.942E-19	0.401E-19
0.50	0.100	0.103E-17	0.169E-18	1.00	0.740	0.861E-19	0.380E-19
0.50	0.150	0.984E-18	0.165E-18	1.00	0.760	0.780E-19	0.359E-19
0.50	0.200	0.942E-18	0.160E-18	1.00	0.780	0.699E-19	0.337E-19
0.50	0.250	0.898E-18	0.156E-18	1.00	0.800	0.619E-19	0.315E-19
0.50	0.300	0.853E-18	0.151E-18	1.00	0.820	0.539E-19	0.291E-19
0.50	0.350	0.806E-18	0.145E-18	1.00	0.840	0.460E-19	0.266E-19
0.50	0.400	0.758E-18	0.140E-18	1.00	0.860	0.383E-19	0.239E-19
0.50	0.450	0.708E-18	0.134E-18	1.00	0.880	0.308E-19	0.211E-19
0.50	0.500	0.656E-18	0.128E-18	1.00	0.900	0.235E-19	0.181E-19
0.50	0.550	0.603E-18	0.121E-18	1.50	0.000	0.160E-18	0.546E-19
0.50	0.600	0.547E-18	0.114E-18	1.50	0.050	0.151E-18	0.528E-19
0.50	0.620	0.523E-18	0.111E-18	1.50	0.100	0.142E-18	0.510E-19
0.50	0.640	0.500E-18	0.108E-18	1.50	0.150	0.134E-18	0.491E-19
0.50	0.660	0.476E-18	0.105E-18	1.50	0.200	0.125E-18	0.472E-19
0.50	0.680	0.451E-18	0.101E-18	1.50	0.250	0.116E-18	0.452E-19
0.50	0.700	0.426E-18	0.979E-19	1.50	0.300	0.107E-18	0.431E-19
0.50	0.720	0.401E-18	0.943E-19	1.50	0.350	0.978E-19	0.410E-19
0.50	0.740	0.375E-18	0.905E-19	1.50	0.400	0.888E-19	0.387E-19
0.50	0.760	0.348E-18	0.865E-19	1.50	0.450	0.798E-19	0.364E-19
0.50	0.780	0.321E-18	0.824E-19	1.50	0.500	0.708E-19	0.340E-19
0.50	0.800	0.293E-18	0.780E-19	1.50	0.550	0.619E-19	0.315E-19
0.50	0.820	0.264E-18	0.733E-19	1.50	0.600	0.530E-19	0.288E-19
0.50	0.840	0.235E-18	0.684E-19	1.50	0.620	0.495E-19	0.277E-19
0.50	0.860	0.205E-18	0.631E-19	1.50	0.640	0.460E-19	0.266E-19
0.50	0.880	0.174E-18	0.573E-19	1.50	0.660	0.426E-19	0.254E-19
0.50	0.900	0.142E-18	0.510E-19	1.50	0.680	0.392E-19	0.242E-19
1.00	0.000	0.361E-18	0.885E-19	1.50	0.700	0.358E-19	0.230E-19
1.00	0.050	0.345E-18	0.860E-19	1.50	0.720	0.324E-19	0.217E-19
1.00	0.100	0.328E-18	0.834E-19	1.50	0.740	0.291E-19	0.205E-19
1.00	0.150	0.310E-18	0.808E-19	1.50	0.760	0.259E-19	0.191E-19
1.00	0.200	0.293E-18	0.780E-19	1.50	0.780	0.228E-19	0.178E-19
1.00	0.250	0.275E-18	0.751E-19	1.50	0.800	0.197E-19	0.164E-19
1.00	0.300	0.257E-18	0.721E-19	1.50	0.820	0.167E-19	0.149E-19
1.00	0.350	0.238E-18	0.690E-19	1.50	0.840	0.138E-19	0.134E-19
1.00	0.400	0.220E-18	0.658E-19	1.50	0.860	0.111E-19	0.118E-19
1.00	0.450	0.201E-18	0.624E-19	1.50	0.880	0.858E-20	0.102E-19
1.00	0.500	0.182E-18	0.588E-19	1.50	0.900	0.624E-20	0.853E-20
1.00	0.550	0.162E-18	0.550E-19	2.00	0.000	0.820E-19	0.370E-19
1.00	0.600	0.142E-18	0.510E-19	2.00	0.050	0.770E-19	0.357E-19
1.00	0.620	0.134E-18	0.493E-19	2.00	0.100	0.719E-19	0.343E-19
1.00	0.640	0.126E-18	0.475E-19	2.00	0.150	0.669E-19	0.329E-19
1.00	0.660	0.118E-18	0.458E-19	2.00	0.200	0.619E-19	0.315E-19
1.00	0.680	0.110E-18	0.439E-19	2.00	0.250	0.569E-19	0.300E-19

TABLE 7-4 (CONT.)

Solar Dist. AU	Bond Alb.	Flux ($W m^{-2}$) 10.6μm	Flux ($W m^{-2}$) 20.2μm	Solar Dist. AU	Bond Alb.	($W m^{-2}$) 10.6μm	($W m^{-2}$) 20.2μm
2.00	0.300	0.519E-19	0.285E-19	2.50	0.820	0.277E-20	0.538E-20
2.00	0.350	0.470E-19	0.269E-19	2.50	0.840	0.220E-20	0.472E-20
2.00	0.400	0.421E-19	0.253E-19	2.50	0.860	0.167E-20	0.404E-20
2.00	0.450	0.374E-19	0.236E-19	2.50	0.880	0.121E-20	0.336E-20
2.00	0.500	0.326E-19	0.218E-19	2.50	0.900	0.816E-21	0.268E-20
2.00	0.550	0.280E-19	0.200E-19	3.00	0.000	0.275E-19	0.198E-19
2.00	0.600	0.235E-19	0.181E-19	3.00	0.050	0.255E-19	0.190E-19
2.00	0.620	0.218E-19	0.173E-19	3.00	0.100	0.235E-19	0.181E-19
2.00	0.640	0.201E-19	0.165E-19	3.00	0.150	0.216E-19	0.173E-19
2.00	0.660	0.184E-19	0.157E-19	3.00	0.200	0.197E-19	0.164E-19
2.00	0.680	0.167E-19	0.149E-19	3.00	0.250	0.178E-19	0.155E-19
2.00	0.700	0.151E-19	0.141E-19	3.00	0.300	0.160E-19	0.145E-19
2.00	0.720	0.135E-19	0.132E-19	3.00	0.350	0.142E-19	0.136E-19
2.00	0.740	0.120E-19	0.123E-19	3.00	0.400	0.125E-19	0.126E-19
2.00	0.760	0.105E-19	0.114E-19	3.00	0.450	0.108E-19	0.116E-19
2.00	0.780	0.905E-20	0.105E-19	3.00	0.500	0.920E-20	0.106E-19
2.00	0.800	0.768E-20	0.959E-20	3.00	0.550	0.768E-20	0.959E-20
2.00	0.820	0.638E-20	0.864E-20	3.00	0.600	0.624E-20	0.853E-20
2.00	0.840	0.516E-20	0.766E-20	3.00	0.620	0.569E-20	0.810E-20
2.00	0.860	0.403E-20	0.666E-20	3.00	0.640	0.516E-20	0.766E-20
2.00	0.880	0.300E-20	0.563E-20	3.00	0.660	0.465E-20	0.722E-20
2.00	0.900	0.210E-20	0.459E-20	3.00	0.680	0.415E-20	0.677E-20
2.50	0.000	0.460E-19	0.266E-19	3.00	0.700	0.368E-20	0.632E-20
2.50	0.050	0.429E-19	0.255E-19	3.00	0.720	0.322E-20	0.586E-20
2.50	0.100	0.398E-19	0.245E-19	3.00	0.740	0.279E-20	0.540E-20
2.50	0.150	0.368E-19	0.234E-19	3.00	0.760	0.238E-20	0.494E-20
2.50	0.200	0.338E-19	0.223E-19	3.00	0.780	0.200E-20	0.447E-20
2.50	0.250	0.308E-19	0.211E-19	3.00	0.800	0.165E-20	0.400E-20
2.50	0.300	0.278E-19	0.199E-19	3.00	0.820	0.132E-20	0.353E-20
2.50	0.350	0.250E-19	0.187E-19	3.00	0.840	0.103E-20	0.306E-20
2.50	0.400	0.221E-19	0.175E-19	3.00	0.860	0.766E-21	0.259E-20
2.50	0.450	0.194E-19	0.162E-19	3.00	0.880	0.540E-21	0.212E-20
2.50	0.500	0.167E-19	0.149E-19	3.00	0.900	0.352E-21	0.166E-20
2.50	0.550	0.141E-19	0.136E-19	3.50	0.000	0.172E-19	0.152E-19
2.50	0.600	0.117E-19	0.122E-19	3.50	0.050	0.159E-19	0.145E-19
2.50	0.620	0.107E-19	0.116E-19	3.50	0.100	0.146E-19	0.138E-19
2.50	0.640	0.978E-20	0.110E-19	3.50	0.150	0.133E-19	0.131E-19
2.50	0.660	0.888E-20	0.104E-19	3.50	0.200	0.121E-19	0.124E-19
2.50	0.680	0.800E-20	0.982E-20	3.50	0.250	0.108E-19	0.117E-19
2.50	0.700	0.715E-20	0.921E-20	3.50	0.300	0.965E-20	0.109E-19
2.50	0.720	0.633E-20	0.860E-20	3.50	0.350	0.851E-20	0.102E-19
2.50	0.740	0.554E-20	0.797E-20	3.50	0.400	0.741E-20	0.940E-20
2.50	0.760	0.479E-20	0.734E-20	3.50	0.450	0.635E-20	0.862E-20
2.50	0.780	0.407E-20	0.670E-20	3.50	0.500	0.535E-20	0.782E-20
2.50	0.800	0.340E-20	0.605E-20	3.50	0.550	0.441E-20	0.701E-20

TABLE 7-4 (CONT.)

Solar Dist. AU	Bond Alb.	Flux ($W m^{-2}$) 10.6μm	Flux ($W m^{-2}$) 20.2μm	Solar Dist. AU	Bond Alb.	($W m^{-2}$) 10.6μm	($W m^{-2}$) 20.2μm
3.50	0.600	0.354E-20	0.618E-20	4.50	0.050	0.687E-20	0.901E-20
3.50	0.620	0.320E-20	0.584E-20	4.50	0.100	0.624E-20	0.853E-20
3.50	0.640	0.289E-20	0.551E-20	4.50	0.150	0.563E-20	0.805E-20
3.50	0.660	0.258E-20	0.517E-20	4.50	0.200	0.504E-20	0.756E-20
3.50	0.680	0.229E-20	0.483E-20	4.50	0.250	0.448E-20	0.707E-20
3.50	0.700	0.201E-20	0.448E-20	4.50	0.300	0.394E-20	0.657E-20
3.50	0.720	0.175E-20	0.414E-20	4.50	0.350	0.342E-20	0.607E-20
3.50	0.740	0.150E-20	0.379E-20	4.50	0.400	0.293E-20	0.556E-20
3.50	0.760	0.127E-20	0.345E-20	4.50	0.450	0.247E-20	0.504E-20
3.50	0.780	0.105E-20	0.310E-20	4.50	0.500	0.204E-20	0.453E-20
3.50	0.800	0.853E-21	0.275E-20	4.50	0.550	0.165E-20	0.400E-20
3.50	0.820	0.674E-21	0.241E-20	4.50	0.600	0.129E-20	0.348E-20
3.50	0.840	0.515E-21	0.206E-20	4.50	0.620	0.115E-20	0.327E-20
3.50	0.860	0.377E-21	0.173E-20	4.50	0.640	0.103E-20	0.306E-20
3.50	0.880	0.259E-21	0.139E-20	4.50	0.660	0.907E-21	0.285E-20
3.50	0.900	0.164E-21	0.107E-20	4.50	0.680	0.793E-21	0.264E-20
4.00	0.000	0.112E-19	0.119E-19	4.50	0.700	0.687E-21	0.243E-20
4.00	0.050	0.103E-19	0.113E-19	4.50	0.720	0.587E-21	0.222E-20
4.00	0.100	0.940E-20	0.108E-19	4.50	0.740	0.495E-21	0.202E-20
4.00	0.150	0.853E-20	0.102E-19	4.50	0.760	0.410E-21	0.181E-20
4.00	0.200	0.768E-20	0.959E-20	4.50	0.780	0.334E-21	0.161E-20
4.00	0.250	0.686E-20	0.900E-20	4.50	0.800	0.265E-21	0.141E-20
4.00	0.300	0.607E-20	0.839E-20	4.50	0.820	0.204E-21	0.121E-20
4.00	0.350	0.531E-20	0.778E-20	4.50	0.840	0.151E-21	0.102E-20
4.00	0.400	0.458E-20	0.716E-20	4.50	0.860	0.106E-21	0.836E-21
4.00	0.450	0.390E-20	0.653E-20	4.50	0.880	0.703E-22	0.659E-21
4.00	0.500	0.325E-20	0.589E-20	4.50	0.900	0.422E-22	0.491E-21
4.00	0.550	0.265E-20	0.524E-20	5.00	0.000	0.516E-20	0.766E-20
4.00	0.600	0.210E-20	0.459E-20	5.00	0.050	0.470E-20	0.726E-20
4.00	0.620	0.189E-20	0.433E-20	5.00	0.100	0.425E-20	0.686E-20
4.00	0.640	0.169E-20	0.406E-20	5.00	0.150	0.382E-20	0.645E-20
4.00	0.660	0.150E-20	0.380E-20	5.00	0.200	0.340E-20	0.605E-20
4.00	0.680	0.132E-20	0.353E-20	5.00	0.250	0.300E-20	0.563E-20
4.00	0.700	0.115E-20	0.327E-20	5.00	0.300	0.263E-20	0.522E-20
4.00	0.720	0.993E-21	0.300E-20	5.00	0.350	0.227E-20	0.480E-20
4.00	0.740	0.844E-21	0.274E-20	5.00	0.400	0.193E-20	0.438E-20
4.00	0.760	0.706E-21	0.247E-20	5.00	0.450	0.161E-20	0.396E-20
4.00	0.780	0.580E-21	0.221E-20	5.00	0.500	0.132E-20	0.353E-20
4.00	0.800	0.465E-21	0.195E-20	5.00	0.550	0.106E-20	0.311E-20
4.00	0.820	0.363E-21	0.169E-20	5.00	0.600	0.816E-21	0.268E-20
4.00	0.840	0.273E-21	0.143E-20	5.00	0.620	0.728E-21	0.251E-20
4.00	0.860	0.196E-21	0.119E-20	5.00	0.640	0.644E-21	0.234E-20
4.00	0.880	0.122E-21	0.946E-21	5.00	0.660	0.565E-21	0.218E-20
4.00	0.900	0.812E-22	0.716E-21	5.00	0.680	0.492E-21	0.201E-20
4.50	0.000	0.751E-20	0.948E-20	5.00	0.700	0.423E-21	0.184E-20

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TABLE 7-4 (CONT.)

Solar Dist. AU	Bond Alb.	Flux $(W m^{-2})$ 10.6μm	Flux $(W m^{-2})$ 20.2μm	Solar Dist. AU	Bond Alb.	$(W m^{-2})$ 10.6μm	$(W m^{-2})$ 20.2μm
5.00	0.720	0.359E-21	0.168E-20	5.50	0.820	0.711E-22	0.663E-21
5.00	0.740	0.300E-21	0.152E-20	5.50	0.840	0.513E-22	0.550E-21
5.00	0.760	0.247E-21	0.135E-20	5.50	0.860	0.350E-22	0.441E-21
5.00	0.780	0.199E-21	0.120E-20	5.50	0.880	0.223E-22	0.340E-21
5.00	0.800	0.156E-21	0.104E-20	5.50	0.900	0.128E-22	0.247E-21
5.00	0.820	0.118E-21	0.889E-21	6.00	0.000	0.258E-20	0.517E-20
5.00	0.840	0.866E-22	0.743E-21	6.00	0.050	0.233E-20	0.488E-20
5.00	0.860	0.601E-22	0.602E-21	6.00	0.100	0.210E-20	0.459E-20
5.00	0.880	0.389E-22	0.469E-21	6.00	0.150	0.187E-20	0.430E-20
5.00	0.900	0.228E-22	0.345E-21	6.00	0.200	0.165E-20	0.400E-20
5.50	0.000	0.362E-20	0.626E-20	6.00	0.250	0.144E-20	0.371E-20
5.50	0.050	0.328E-20	0.592E-20	6.00	0.300	0.125E-20	0.341E-20
5.50	0.100	0.296E-20	0.558E-20	6.00	0.350	0.106E-20	0.312E-20
5.50	0.150	0.264E-20	0.524E-20	6.00	0.400	0.892E-21	0.282E-20
5.50	0.200	0.234E-20	0.489E-20	6.00	0.450	0.736E-21	0.253E-20
5.50	0.250	0.206E-20	0.455E-20	6.00	0.500	0.593E-21	0.224E-20
5.50	0.300	0.179E-20	0.420E-20	6.00	0.550	0.465E-21	0.195E-20
5.50	0.350	0.154E-20	0.385E-20	6.00	0.600	0.352E-21	0.166E-20
5.50	0.400	0.130E-20	0.350E-20	6.00	0.620	0.311E-21	0.155E-20
5.50	0.450	0.108E-20	0.315E-20	6.00	0.640	0.273E-21	0.143E-20
5.50	0.500	0.876E-21	0.279E-20	6.00	0.660	0.237E-21	0.132E-20
5.50	0.550	0.693E-21	0.244E-20	6.00	0.680	0.204E-21	0.121E-20
5.50	0.600	0.530E-21	0.210E-20	6.00	0.700	0.173E-21	0.110E-20
5.50	0.620	0.471E-21	0.196E-20	6.00	0.720	0.145E-21	0.998E-21
5.50	0.640	0.414E-21	0.182E-20	6.00	0.740	0.119E-21	0.894E-21
5.50	0.660	0.362E-21	0.169E-20	6.00	0.760	0.966E-22	0.791E-21
5.50	0.680	0.313E-21	0.155E-20	6.00	0.780	0.764E-22	0.691E-21
5.50	0.700	0.267E-21	0.142E-20	6.00	0.800	0.588E-22	0.595E-21
5.50	0.720	0.225E-21	0.129E-20	6.00	0.820	0.437E-22	0.502E-21
5.50	0.740	0.187E-21	0.116E-20	6.00	0.840	0.312E-22	0.413E-21
5.50	0.760	0.153E-21	0.103E-20	6.00	0.860	0.210E-22	0.329E-21
5.50	0.780	0.122E-21	0.903E-21	6.00	0.880	0.131E-22	0.251E-21
5.50	0.800	0.945E-22	0.781E-21	6.00	0.900	0.736E-23	0.180E-21

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TABLE 7-5
IRAS FLUX LOOKUP TABLE*

Solar Dist. AU	Bond Alb.	Flux 12μm	Flux 25μm	Flux 60μm	Flux 100μm	Solar Dist. AU	Bond Alb.	Flux 12μm	Flux 25μm	Flux 60μm	Flux 100μm
1.00	0.000	0.192E-13	0.579E-14	0.860E-15	0.119E-15	1.60	0.000	0.775E-14	0.343E-14	0.609E-15	0.889E-16
1.00	0.050	0.184E-13	0.564E-14	0.845E-15	0.117E-15	1.60	0.050	0.734E-14	0.332E-14	0.597E-15	0.875E-16
1.00	0.100	0.175E-13	0.548E-14	0.829E-15	0.115E-15	1.60	0.100	0.693E-14	0.322E-14	0.585E-15	0.860E-16
1.00	0.150	0.166E-13	0.532E-14	0.812E-15	0.113E-15	1.60	0.150	0.651E-14	0.311E-14	0.572E-15	0.845E-16
1.00	0.200	0.157E-13	0.515E-14	0.795E-15	0.111E-15	1.60	0.200	0.609E-14	0.299E-14	0.559E-15	0.828E-16
1.00	0.250	0.148E-13	0.497E-14	0.776E-15	0.109E-15	1.60	0.250	0.567E-14	0.287E-14	0.545E-15	0.811E-16
1.00	0.300	0.139E-13	0.479E-14	0.757E-15	0.107E-15	1.60	0.300	0.524E-14	0.275E-14	0.530E-15	0.793E-16
1.00	0.350	0.129E-13	0.460E-14	0.737E-15	0.104E-15	1.60	0.350	0.482E-14	0.262E-14	0.515E-15	0.774E-16
1.00	0.400	0.120E-13	0.440E-14	0.716E-15	0.102E-15	1.60	0.400	0.439E-14	0.249E-14	0.499E-15	0.754E-16
1.00	0.450	0.110E-13	0.419E-14	0.693E-15	0.991E-16	1.60	0.450	0.396E-14	0.235E-14	0.481E-15	0.733E-16
1.00	0.500	0.100E-13	0.396E-14	0.669E-15	0.961E-16	1.60	0.500	0.353E-14	0.220E-14	0.463E-15	0.710E-16
1.20	0.000	0.138E-13	0.477E-14	0.755E-15	0.106E-15	1.80	0.000	0.601E-14	0.297E-14	0.556E-15	0.825E-16
1.20	0.050	0.131E-13	0.464E-14	0.741E-15	0.105E-15	1.80	0.050	0.567E-14	0.287E-14	0.545E-15	0.811E-16
1.20	0.100	0.125E-13	0.450E-14	0.727E-15	0.103E-15	1.80	0.100	0.534E-14	0.278E-14	0.534E-15	0.797E-16
1.20	0.150	0.118E-13	0.436E-14	0.711E-15	0.101E-15	1.80	0.150	0.500E-14	0.268E-14	0.522E-15	0.783E-16
1.20	0.200	0.111E-13	0.421E-14	0.696E-15	0.994E-16	1.80	0.200	0.467E-14	0.258E-14	0.509E-15	0.767E-16
1.20	0.250	0.104E-13	0.406E-14	0.679E-15	0.974E-16	1.80	0.250	0.433E-14	0.247E-14	0.496E-15	0.751E-16
1.20	0.300	0.972E-14	0.390E-14	0.662E-15	0.953E-16	1.80	0.300	0.399E-14	0.236E-14	0.482E-15	0.735E-16
1.20	0.350	0.901E-14	0.374E-14	0.644E-15	0.931E-16	1.80	0.350	0.365E-14	0.225E-14	0.468E-15	0.717E-16
1.20	0.400	0.830E-14	0.356E-14	0.624E-15	0.908E-16	1.80	0.400	0.331E-14	0.213E-14	0.453E-15	0.698E-16
1.20	0.450	0.757E-14	0.338E-14	0.604E-15	0.883E-16	1.80	0.450	0.297E-14	0.200E-14	0.437E-15	0.678E-16
1.20	0.500	0.683E-14	0.319E-14	0.582E-15	0.857E-16	1.80	0.500	0.264E-14	0.187E-14	0.420E-15	0.657E-16
1.40	0.000	0.103E-13	0.401E-14	0.674E-15	0.968E-16	2.00	0.000	0.473E-14	0.260E-14	0.512E-15	0.770E-16
1.40	0.050	0.969E-14	0.389E-14	0.661E-15	0.952E-16	2.00	0.050	0.446E-14	0.251E-14	0.501E-15	0.758E-16
1.40	0.100	0.917E-14	0.377E-14	0.648E-15	0.936E-16	2.00	0.100	0.418E-14	0.242E-14	0.490E-15	0.744E-16
1.40	0.150	0.865E-14	0.365E-14	0.634E-15	0.919E-16	2.00	0.150	0.391E-14	0.233E-14	0.479E-15	0.731E-16
1.40	0.200	0.812E-14	0.352E-14	0.620E-15	0.902E-16	2.00	0.200	0.364E-14	0.224E-14	0.468E-15	0.716E-16
1.40	0.250	0.758E-14	0.339E-14	0.604E-15	0.884E-16	2.00	0.250	0.336E-14	0.214E-14	0.455E-15	0.701E-16
1.40	0.300	0.705E-14	0.325E-14	0.589E-15	0.864E-16	2.00	0.300	0.309E-14	0.205E-14	0.442E-15	0.685E-16
1.40	0.350	0.650E-14	0.310E-14	0.573E-15	0.844E-16	2.00	0.350	0.282E-14	0.194E-14	0.429E-15	0.668E-16
1.40	0.400	0.595E-14	0.296E-14	0.554E-15	0.823E-16	2.00	0.400	0.254E-14	0.184E-14	0.415E-15	0.650E-16
1.40	0.450	0.540E-14	0.280E-14	0.536E-15	0.800E-16	2.00	0.450	0.227E-14	0.173E-14	0.400E-15	0.632E-16
1.40	0.500	0.485E-14	0.263E-14	0.516E-15	0.776E-16	2.00	0.500	0.201E-14	0.161E-14	0.384E-15	0.611E-16

* Fluxes in $W cm^{-2} \mu m^{-1}$

TABLE 7-5 (CONT.)

Solar Dist. AU	Bond Alb.	Flux 12μm	Flux 25μm	Flux 60μm	Flux 100μm	Solar Dist. AU	Bond Alb.	Flux 12μm	Flux 25μm	Flux 60μm	Flux 100μm
2.50	0.000	0.276E-14	0.192E-14	0.426E-15	0.665E-16	4.00	0.300	0.428E-15	0.685E-15	0.237E-15	0.421E-16
2.50	0.050	0.259E-14	0.185E-14	0.417E-15	0.653E-16	4.00	0.350	0.379E-15	0.640E-15	0.228E-15	0.409E-16
2.50	0.100	0.241E-14	0.178E-14	0.408E-15	0.642E-16	4.00	0.400	0.332E-15	0.595E-15	0.219E-15	0.397E-16
2.50	0.150	0.224E-14	0.171E-14	0.398E-15	0.629E-16	4.00	0.450	0.286E-15	0.548E-15	0.210E-15	0.384E-16
2.50	0.200	0.207E-14	0.164E-14	0.388E-15	0.616E-16	4.00	0.500	0.243E-15	0.500E-15	0.200E-15	0.370E-16
2.50	0.250	0.190E-14	0.156E-14	0.377E-15	0.603E-16	4.50	0.000	0.520E-15	0.763E-15	0.251E-15	0.440E-16
2.50	0.300	0.173E-14	0.148E-14	0.366E-15	0.589E-16	4.50	0.050	0.479E-15	0.729E-15	0.245E-15	0.432E-16
2.50	0.350	0.157E-14	0.140E-14	0.354E-15	0.574E-16	4.50	0.100	0.439E-15	0.695E-15	0.239E-15	0.423E-16
2.50	0.400	0.140E-14	0.132E-14	0.342E-15	0.558E-16	4.50	0.150	0.400E-15	0.660E-15	0.232E-15	0.414E-16
2.50	0.450	0.124E-14	0.123E-14	0.329E-15	0.541E-16	4.50	0.200	0.362E-15	0.624E-15	0.225E-15	0.405E-16
2.50	0.500	0.108E-14	0.114E-14	0.315E-15	0.524E-16	4.50	0.250	0.325E-15	0.588E-15	0.218E-15	0.395E-16
3.00	0.000	0.171E-14	0.147E-14	0.365E-15	0.587E-16	4.50	0.300	0.289E-15	0.551E-15	0.210E-15	0.385E-16
3.00	0.050	0.160E-14	0.142E-14	0.357E-15	0.577E-16	4.50	0.350	0.254E-15	0.513E-15	0.203E-15	0.374E-16
3.00	0.100	0.148E-14	0.136E-14	0.348E-15	0.566E-16	4.50	0.400	0.221E-15	0.475E-15	0.194E-15	0.363E-16
3.00	0.150	0.137E-14	0.130E-14	0.339E-15	0.555E-16	4.50	0.450	0.190E-15	0.436E-15	0.186E-15	0.351E-16
3.00	0.200	0.126E-14	0.124E-14	0.330E-15	0.543E-16	4.50	0.500	0.160E-15	0.397E-15	0.177E-15	0.338E-16
3.00	0.250	0.115E-14	0.118E-14	0.321E-15	0.531E-16	5.00	0.000	0.369E-15	0.631E-15	0.226E-15	0.407E-16
3.00	0.300	0.104E-14	0.112E-14	0.311E-15	0.518E-16	5.00	0.050	0.339E-15	0.602E-15	0.221E-15	0.399E-16
3.00	0.350	0.932E-15	0.105E-14	0.301E-15	0.505E-16	5.00	0.100	0.310E-15	0.572E-15	0.215E-15	0.391E-16
3.00	0.400	0.827E-15	0.986E-15	0.290E-15	0.491E-16	5.00	0.150	0.281E-15	0.542E-15	0.209E-15	0.383E-16
3.00	0.450	0.725E-15	0.916E-15	0.278E-15	0.476E-16	5.00	0.200	0.253E-15	0.512E-15	0.202E-15	0.374E-16
3.00	0.500	0.626E-15	0.845E-15	0.266E-15	0.459E-16	5.00	0.250	0.226E-15	0.481E-15	0.196E-15	0.365E-16
3.50	0.000	0.111E-14	0.116E-14	0.316E-15	0.527E-16	5.00	0.300	0.200E-15	0.450E-15	0.189E-15	0.355E-16
3.50	0.050	0.103E-14	0.112E-14	0.311E-15	0.518E-16	5.00	0.350	0.175E-15	0.418E-15	0.182E-15	0.346E-16
3.50	0.100	0.955E-15	0.107E-14	0.303E-15	0.508E-16	5.00	0.400	0.151E-15	0.385E-15	0.174E-15	0.334E-16
3.50	0.150	0.878E-15	0.102E-14	0.295E-15	0.498E-16	5.00	0.450	0.129E-15	0.352E-15	0.166E-15	0.323E-16
3.50	0.200	0.802E-15	0.969E-15	0.287E-15	0.487E-16	5.00	0.500	0.105E-15	0.319E-15	0.158E-15	0.311E-16
3.50	0.250	0.727E-15	0.918E-15	0.278E-15	0.476E-16	5.50	0.000	0.268E-15	0.528E-15	0.206E-15	0.378E-16
3.50	0.300	0.654E-15	0.866E-15	0.269E-15	0.464E-16	5.50	0.050	0.245E-15	0.503E-15	0.200E-15	0.371E-16
3.50	0.350	0.583E-15	0.812E-15	0.260E-15	0.452E-16	5.50	0.100	0.223E-15	0.477E-15	0.195E-15	0.363E-16
3.50	0.400	0.514E-15	0.757E-15	0.250E-15	0.439E-16	5.50	0.150	0.201E-15	0.451E-15	0.189E-15	0.356E-16
3.50	0.450	0.446E-15	0.701E-15	0.240E-15	0.426E-16	5.50	0.200	0.181E-15	0.425E-15	0.183E-15	0.347E-16
3.50	0.500	0.382E-15	0.643E-15	0.229E-15	0.410E-16	5.50	0.250	0.161E-15	0.398E-15	0.177E-15	0.339E-16
4.00	0.000	0.750E-15	0.934E-15	0.281E-15	0.479E-16	5.50	0.300	0.142E-15	0.371E-15	0.171E-15	0.330E-16
4.00	0.050	0.694E-15	0.894E-15	0.274E-15	0.471E-16	5.50	0.350	0.123E-15	0.344E-15	0.164E-15	0.320E-16
4.00	0.100	0.638E-15	0.854E-15	0.267E-15	0.461E-16	5.50	0.400	0.106E-15	0.316E-15	0.157E-15	0.310E-16
4.00	0.150	0.584E-15	0.813E-15	0.260E-15	0.452E-16	5.50	0.450	0.897E-16	0.288E-15	0.149E-15	0.299E-16
4.00	0.200	0.531E-15	0.771E-15	0.253E-15	0.442E-16	5.50	0.500	0.745E-16	0.260E-15	0.142E-15	0.288E-16
4.00	0.250	0.479E-15	0.728E-15	0.245E-15	0.432E-16						

TABLE 7-6
IRTF SPECTRAL RESPONSE

N Band

λ (μm)	System Transmission
7.6	0.003
7.8	0.0[illegible]9
8.0	0.148
8.2	0.251
8.4	0.251
8.6	0.261
8.8	0.276
9.0	0.273
9.2	0.279
9.4	0.236
9.6	0.220
9.8	0.240
10.0	0.285
10.2	0.276
10.4	0.285
10.6	0.291
10.8	0.307
11.0	0.307
11.2	0.320
11.4	0.301
11.6	0.307
11.8	0.316
12.0	0.309
12.2	0.297
12.4	0.294
12.6	0.244
12.8	0.221
13.0	0.124
13.2	0.007
13.4	0.003
13.6	0.002

Q Band

λ (μm)	System Transmission
16.0	0.001
16.5	0.044
17.0	0.139
17.5	0.138
18.0	0.187
18.5	0.146
19.0	0.120
19.5	0.143
20.0	0.159
20.5	0.181
21.0	0.165
21.5	0.192
22.0	0.025
22.5	0.087
23.0	0.094
23.5	0.062
24.0	0.026
24.5	0.106
25.0	0.024
25.5	0.031
26.0	0.001

TABLE 7-7
IRAS SPECTRAL RESPONSE

12μm Band

λ (μm)	Trans.	Rel. Det. resp.	Rel. System resp.
7.5	0.01	0.35	0.008
8.0	0.60	0.41	0.535
8.5	0.66	0.46	0.689
9.0	0.65	0.52	0.735
9.5	0.67	0.56	0.815
10.0	0.69	0.60	0.900
10.5	0.66	0.63	0.904
11.0	0.59	0.65	0.834
11.5	0.56	0.67	0.816
12.0	0.50	0.73	0.793
12.5	0.51	0.77	0.854
13.0	0.52	0.83	0.938
13.5	0.53	0.86	0.991
14.0	0.50	0.92	1.000
14.5	0.43	1.00	0.934
15.0	0.19	0.94	0.388
15.5	0.00	0.90	0.000

60μm Band

λ (μm)	Trans.	Rel. Det. resp.	Rel. System resp.
27.0	0.00	0.02	0.000
30.0	0.03	0.06	0.010
33.0	0.075	0.09	0.036
36.0	0.115	0.11	0.068
39.0	0.19	0.17	0.174
42.0	0.255	0.23	0.315
45.0	0.31	0.29	0.483
48.0	0.34	0.32	0.585
51.0	0.36	0.34	0.658
54.0	0.36	0.37	0.716
57.0	0.365	0.42	0.824
60.0	0.37	0.46	0.915
63.0	0.36	0.51	0.987
66.0	0.335	0.55	0.990
69.0	0.305	0.61	1.000
72.0	0.275	0.64	0.946
75.0	0.195	0.68	0.713
78.0	0.13	0.76	0.531
81.0	0.04	0.81	0.174
84.0	0.01	0.88	0.047
87.0	0.00	0.91	0.000

25μm Band

λ (μm)	Trans.	Rel. Det. resp.	Rel. System resp.
16.0	0.01	0.33	0.007
16.5	0.14	0.36	0.101
17.0	0.35	0.41	0.288
17.5	0.42	0.46	0.388
18.0	0.46	0.49	0.452
18.5	0.49	0.53	0.521
19.0	0.50	0.56	0.562
19.5	0.52	0.60	0.626
20.0	0.54	0.63	0.683
20.5	0.55	0.66	0.729
21.0	0.57	0.68	0.778
21.5	0.58	0.715	0.832
22.0	0.59	0.75	0.912
22.5	0.58	0.785	0.914
23.0	0.57	0.82	0.938
23.5	0.56	0.83	0.933
24.0	0.545	0.80	0.875
24.5	0.54	0.84	0.910
25.0	0.53	0.94	1.000
25.5	0.51	0.89	0.911
26.0	0.46	0.91	0.840
26.5	0.38	1.00	0.763
27.0	0.41	0.91	0.749
27.5	0.43	0.96	0.829
28.0	0.46	0.99	0.914
28.5	0.48	0.82	0.790
29.0	0.48	0.91	0.877
29.5	0.51	0.545	0.558
30.0	0.47	0.29	0.274
30.5	0.38	0.09	0.069
31.0	0.31	0.02	0.012

100μm Band

λ (μm)	Trans.	Rel. Det. resp.	Rel. System resp.
70.0	0.005	0.62	0.010
75.0	0.06	0.68	0.113
80.0	0.14	0.79	0.306
85.0	0.205	0.89	0.505
90.0	0.27	0.93	0.695
95.0	0.31	0.96	0.824
100.0	0.36	0.95	0.947
105.0	0.39	0.87	0.939
110.0	0.42	0.86	1.000
115.0	0.43	0.53	0.631
120.0	0.36	0.32	0.319
125.0	0.44	0.16	0.195
130.0	0.48	0.08	0.106
135.0	0.48	0.04	0.053
140.0	0.48	0.01	0.010

TABLE 7-8
COLOR CORRECTIONS FOR ASTEROIDS

	BAND			
T_{SS}	12μm	25μm	60μm	100μm
100.00	0.8598	1.2065	1.0000	0.9760
105.00	0.9095	1.1945	0.9898	0.9734
110.00	0.9543	1.1818	0.9802	0.9710
115.00	0.9944	1.1688	0.9711	0.9688
120.00	1.0300	1.1557	0.9626	0.9667
125.00	1.0613	1.1426	0.9546	0.9649
130.00	1.0888	1.1298	0.9471	0.9631
135.00	1.1126	1.1172	0.9401	0.9615
140.00	1.1331	1.1050	0.9335	0.9601
145.00	1.1506	1.0932	0.9273	0.9587
150.00	1.1653	1.0817	0.9214	0.9574
155.00	1.1776	1.0707	0.9159	0.9562
160.00	1.1876	1.0600	0.9108	0.9551
165.00	1.1956	1.0498	0.9059	0.9540
170.00	1.2018	1.0400	0.9012	0.9530
175.00	1.2064	1.0306	0.8969	0.9521
180.00	1.2096	1.0216	0.8927	0.9512
185.00	1.2115	1.0130	0.8888	0.9504
190.00	1.2122	1.0047	0.8851	0.9496
195.00	1.2120	0.9968	0.8816	0.9488
200.00	1.2110	0.9891	0.8782	0.9481
205.00	1.2092	0.9819	0.8750	0.9475
210.00	1.2067	0.9749	0.8720	0.9468
215.00	1.2036	0.9682	0.8691	0.9462
220.00	1.2000	0.9617	0.8663	0.9456
225.00	1.1960	0.9556	0.8637	0.9451
230.00	1.1917	0.9497	0.8612	0.9445
235.00	1.1870	0.9440	0.8587	0.9440
240.00	1.1821	0.9385	0.8564	0.9436
245.00	1.1769	0.9333	0.8542	0.9431
250.00	1.1716	0.9282	0.8521	0.9426
255.00	1.1661	0.9234	0.8501	0.9422
260.00	1.1605	0.9187	0.8481	0.9418
265.00	1.1548	0.9142	0.8462	0.9414
270.00	1.1490	0.9099	0.8444	0.9410
275.00	1.1432	0.9057	0.8427	0.9407
280.00	1.1374	0.9017	0.8410	0.9403
285.00	1.1316	0.8978	0.8394	0.9400
290.00	1.1257	0.8941	0.8378	0.9397
295.00	1.1199	0.8905	0.8363	0.9394
300.00	1.1141	0.8870	0.8349	0.9391
305.00	1.1083	0.8836	0.8335	0.9388
310.00	1.1026	0.8804	0.8321	0.9385
315.00	1.0969	0.8772	0.8308	0.9382
320.00	1.0913	0.8742	0.8296	0.9379
325.00	1.0858	0.8712	0.8283	0.9377
330.00	1.0803	0.8684	0.8272	0.9374
335.00	1.0749	0.8656	0.8260	0.9372
340.00	1.0696	0.8629	0.8249	0.9370
345.00	1.0643	0.8603	0.8238	0.9367
350.00	1.0591	0.8578	0.8228	0.9365
355.00	1.0540	0.8554	0.8218	0.9363
360.00	1.0490	0.8530	0.8208	0.9361
365.00	1.0440	0.8507	0.8198	0.9359
370.00	1.0392	0.8485	0.8189	0.9357
375.00	1.0344	0.8463	0.8180	0.9355
380.00	1.0297	0.8442	0.8171	0.9353
385.00	1.0250	0.8422	0.8163	0.9352
390.00	1.0205	0.8402	0.8154	0.9350
395.00	1.0160	0.8382	0.8146	0.9348
400.00	1.0116	0.8363	0.8138	0.9346
405.00	1.0073	0.8345	0.8131	0.9345
410.00	1.0031	0.8327	0.8123	0.9343
415.00	0.9990	0.8310	0.8116	0.9342
420.00	0.9949	0.8293	0.8109	0.9340
425.00	0.9909	0.8276	0.8102	0.9339
430.00	0.9870	0.8260	0.8095	0.9337
435.00	0.9831	0.8245	0.8088	0.9336
440.00	0.9793	0.8229	0.8082	0.9335
445.00	0.9756	0.8214	0.8076	0.9333
450.00	0.9720	0.8200	0.8070	0.9332
455.00	0.9684	0.8186	0.8064	0.9331
460.00	0.9649	0.8172	0.8058	0.9329
465.00	0.9614	0.8158	0.8052	0.9328
470.00	0.9580	0.8145	0.8046	0.9327
475.00	0.9547	0.8132	0.8041	0.9326
480.00	0.9515	0.8119	0.8036	0.9325
485.00	0.9483	0.8107	0.8030	0.9324
490.00	0.9451	0.8095	0.8025	0.9323
495.00	0.9420	0.8083	0.8020	0.9321
500.00	0.9390	0.8072	0.8015	0.9320
505.00	0.9360	0.8060	0.8010	0.9319
510.00	0.9331	0.8049	0.8006	0.9318
515.00	0.9302	0.8038	0.8001	0.9317
520.00	0.9274	0.8028	0.7997	0.9316
525.00	0.9247	0.8017	0.7992	0.9316
530.00	0.9219	0.8007	0.7988	0.9315
535.00	0.9193	0.7997	0.7984	0.9314
540.00	0.9167	0.7988	0.7979	0.9313
545.00	0.9141	0.7978	0.7975	0.9312
550.00	0.9115	0.7969	0.7971	0.9311

TABLE 7-9
ASTEROID SUBSOLAR TEMPERATURES

Solar Dist. AU	Bond Albedos									
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.6	560.8	546.2	530.4	512.9	493.5	471.6	446.0	415.0	375.0	315.3
0.8	485.6	473.0	459.3	444.2	427.4	408.4	386.2	359.4	324.8	273.1
1.0	434.4	423.1	410.8	397.3	382.3	365.3	345.4	321.5	290.5	244.3
1.2	396.5	386.2	375.0	362.7	349.0	333.4	315.3	293.5	265.2	223.0
1.4	367.1	357.6	347.2	335.8	323.1	308.7	292.0	271.7	245.5	206.4
1.6	343.4	334.5	324.8	314.1	302.2	288.8	273.1	254.1	229.6	193.1
1.8	323.8	315.3	306.2	296.1	284.9	272.3	257.5	239.6	216.5	182.1
2.0	307.2	299.2	290.5	280.9	270.3	258.3	244.3	227.3	205.4	172.7
2.5	274.7	267.6	259.8	251.3	241.8	231.0	218.5	203.3	183.7	154.5
3.0	250.8	244.3	237.2	229.4	220.7	210.9	199.4	185.6	167.7	141.0
3.5	232.2	226.1	219.6	212.4	204.3	195.2	184.6	171.8	155.3	130.6
4.0	217.2	211.5	205.4	198.7	191.1	182.6	172.7	160.7	145.2	122.1
4.5	204.8	199.4	193.7	187.3	180.2	172.2	162.8	151.5	136.9	115.1
5.0	194.3	189.2	183.7	177.7	171.0	163.4	154.5	143.8	129.9	109.2
5.5	185.2	180.4	175.2	169.4	163.0	155.7	147.3	137.1	123.9	104.2
6.0	177.3	172.7	167.7	162.2	156.1	149.1	141.0	131.2	118.6	99.7
6.5	170.4	165.9	161.1	155.8	150.0	143.3	135.5	126.1	113.9	95.8
7.0	164.2	159.9	155.3	150.2	144.5	138.1	130.6	121.5	109.8	92.3
7.5	158.6	154.5	150.0	145.1	139.6	133.4	126.1	117.4	106.1	89.2
8.0	153.6	149.6	145.2	140.5	135.2	129.1	122.1	113.7	102.7	86.4
8.5	149.0	145.1	140.9	136.3	131.1	125.3	118.5	110.3	99.6	83.8
9.0	144.8	141.0	136.9	132.4	127.4	121.8	115.1	107.2	96.8	81.4
9.5	140.9	137.3	133.3	128.9	124.0	118.5	112.1	104.3	94.2	79.3
10.0	137.4	133.8	129.9	125.6	120.9	115.5	109.2	101.7	91.9	77.2
11.0	131.0	127.6	123.9	119.8	115.3	110.1	104.2	96.9	87.6	73.6
12.0	125.4	122.1	118.6	114.7	110.4	105.4	99.7	92.8	83.9	70.5
13.0	120.5	117.3	113.9	110.2	106.0	101.3	95.8	89.2	80.6	67.7
14.0	116.1	113.1	109.8	106.2	102.2	97.6	92.3	85.9	77.6	65.3
15.0	112.2	109.2	106.1	102.6	98.7	94.3	89.2	83.0	75.0	63.1
16.0	108.6	105.8	102.7	99.3	95.6	91.3	86.4	80.4	72.6	61.1
17.0	105.4	102.6	99.6	96.4	92.7	88.6	83.8	78.0	70.5	59.2
18.0	102.4	99.7	96.8	93.6	90.1	86.1	81.4	75.8	68.5	57.6
19.0	99.7	97.1	94.2	91.2	87.7	83.8	79.3	73.8	66.6	56.0
20.0	97.1	94.6	91.9	88.8	85.5	81.7	77.2	71.9	65.0	54.6
22.0	92.6	90.2	87.6	84.7	81.5	77.9	73.6	68.5	61.9	52.1
24.0	88.7	86.4	83.9	81.1	78.0	74.6	70.5	65.6	59.3	49.9
26.0	85.2	83.0	80.6	77.9	75.0	71.6	67.7	63.0	57.0	47.9
28.0	82.1	80.0	77.6	75.1	72.2	69.0	65.3	60.8	54.9	46.2
30.0	79.3	77.2	75.0	72.5	69.8	66.7	63.1	58.7	53.0	44.6
32.0	76.8	74.8	72.6	70.2	67.6	64.6	61.1	56.8	51.4	43.2
34.0	74.5	72.6	70.5	68.1	65.6	62.6	59.2	55.1	49.8	41.9
36.0	72.4	70.5	68.5	66.2	63.7	60.9	57.6	53.6	48.4	40.7
38.0	70.5	68.6	66.6	64.5	62.0	59.3	56.0	52.2	47.1	39.6
40.0	68.7	66.9	65.0	62.8	60.4	57.8	54.6	50.8	45.9	38.6

TABLE 7-9
ASTEROID SUBSOLAR TEMPERATURES

Solar Dist. AU	Bond Albedos									
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.6	560.8	546.2	530.4	512.9	493.5	471.6	446.0	415.0	375.0	315.3
0.8	485.6	473.0	459.3	444.2	427.4	408.4	386.2	359.4	324.8	273.1
1.0	434.4	423.1	410.8	397.3	382.3	365.3	345.4	321.5	290.5	244.3
1.2	396.5	386.2	375.0	362.7	349.0	333.4	315.3	293.5	265.2	223.0
1.4	367.1	357.6	347.2	335.8	323.1	308.7	292.0	271.7	245.5	206.4
1.6	343.4	334.5	324.8	314.1	302.2	288.8	273.1	254.1	229.6	193.1
1.8	323.8	315.3	306.2	296.1	284.9	272.3	257.5	239.6	216.5	182.1
2.0	307.2	299.2	290.5	280.9	270.3	258.3	244.3	227.3	205.4	172.7
2.5	274.7	267.6	259.8	251.3	241.8	231.0	218.5	203.3	183.7	154.5
3.0	250.8	244.3	237.2	229.4	220.7	210.9	199.4	185.6	167.7	141.0
3.5	232.2	226.1	219.6	212.4	204.3	195.2	184.6	171.8	155.3	130.6
4.0	217.2	211.5	205.4	198.7	191.1	182.6	172.7	160.7	145.2	122.1
4.5	204.8	199.4	193.7	187.3	180.2	172.2	162.8	151.5	136.9	115.1
5.0	194.3	189.2	183.7	177.7	171.0	163.4	154.5	143.8	129.9	109.2
5.5	185.2	180.4	175.2	169.4	163.0	155.7	147.3	137.1	123.9	104.2
6.0	177.3	172.7	167.7	162.2	156.1	149.1	141.0	131.2	118.6	99.7
6.5	170.4	165.9	161.1	155.8	150.0	143.3	135.5	126.1	113.9	95.8
7.0	164.2	159.9	155.3	150.2	144.5	138.1	130.6	121.5	109.8	92.3
7.5	158.6	154.5	150.0	145.1	139.6	133.4	126.1	117.4	106.1	89.2
8.0	153.6	149.6	145.2	140.5	135.2	129.1	122.1	113.7	102.7	86.4
8.5	149.0	145.1	140.9	136.3	131.1	125.3	118.5	110.3	99.6	83.8
9.0	144.8	141.0	136.9	132.4	127.4	121.8	115.1	107.2	96.8	81.4
9.5	140.9	137.3	133.3	128.9	124.0	118.5	112.1	104.3	94.2	79.3
10.0	137.4	133.8	129.9	125.6	120.9	115.5	109.2	101.7	91.9	77.2
11.0	131.0	127.6	123.9	119.8	115.3	110.1	104.2	96.9	87.6	73.6
12.0	125.4	122.1	118.6	114.7	110.4	105.4	99.7	92.8	83.9	70.5
13.0	120.5	117.3	113.9	110.2	106.0	101.3	95.8	89.2	80.6	67.7
14.0	116.1	113.1	109.8	106.2	102.2	97.6	92.3	85.9	77.6	65.3
15.0	112.2	109.2	106.1	102.6	98.7	94.3	89.2	83.0	75.0	63.1
16.0	108.6	105.8	102.7	99.3	95.6	91.3	86.4	80.4	72.6	61.1
17.0	105.4	102.6	99.6	96.4	92.7	88.6	83.8	78.0	70.5	59.2
18.0	102.4	99.7	96.8	93.6	90.1	86.1	81.4	75.8	68.5	57.6
19.0	99.7	97.1	94.2	91.2	87.7	83.8	79.3	73.8	66.6	56.0
20.0	97.1	94.6	91.9	88.8	85.5	81.7	77.2	71.9	65.0	54.6
22.0	92.6	90.2	87.6	84.7	81.5	77.9	73.6	68.5	61.9	52.1
24.0	88.7	86.4	83.9	81.1	78.0	74.6	70.5	65.6	59.3	49.9
26.0	85.2	83.0	80.6	77.9	75.0	71.6	67.7	63.0	57.0	47.9
28.0	82.1	80.0	77.6	75.1	72.2	69.0	65.3	60.8	54.9	46.2
30.0	79.3	77.2	75.0	72.5	69.8	66.7	63.1	58.7	53.0	44.6
32.0	76.8	74.8	72.6	70.2	67.6	64.6	61.1	56.8	51.4	43.2
34.0	74.5	72.6	70.5	68.1	65.6	62.6	59.2	55.1	49.8	41.9
36.0	72.4	70.5	68.5	66.2	63.7	60.9	57.6	53.6	48.4	40.7
38.0	70.5	68.6	66.6	64.5	62.0	59.3	56.0	52.2	47.1	39.6
40.0	68.7	66.9	65.0	62.8	60.4	57.8	54.6	50.8	45.9	38.6

TABLE 7-10
IRAS DIAMETERS FOR CERES AND PALLAS

		Diameter (km)			
Asteroid	Date	12μm	25μm	60μm	100μm
1 Ceres	May 15.9	1038	912	932	(868)
	May 16.0	952	902	881	(829)
	May 23.5	973	905	883	(826)
	Nov 05.5	(669)	907	811	(864)
2 Pallas	Apr 12.8	507	524	561	(455)
	Apr 12.9	536	536	566	(510)
	Apr 13.0	498	540	515	(576)
	Apr 21.6	522	528	520	—
	Oct 11.1	(463)	552	494	(472)
	Oct 11.3	492	525	526	(483)
	Oct 15.1	495	540	497	(462)
	Oct 15.2	(624)	527	518	(481)

TABLE 7-11
COMPARISON OF GROUNDBASED AND IRAS RESULTS

	Groundbased		IRAS	
Asteroid	Diameter (km)	Albedo	Diameter (km)	Albedo
1 Ceres	936 ± 12	0.095 ∓ 0.002	910 ± 43	0.100 ∓ 0.009
2 Pallas	532 ± 7	0.139 ∓ 0.004	521 ± 20	0.144 ∓ 0.011

PART II. USER'S GUIDE TO IRAS ASTEROID AND COMET DATA PRODUCTS

Contents

8. IRAS ASTEROID AND COMET DATA PRODUCTS

This chapter describes the Final Data Products (FDP) produced by the Asteroid Data Analysis System (ADAS). These data products were specified at the series of IRAS Asteroid Workshops and were designed to meet the needs of a spectrum of users ranging from the layman to the research scientist. Detail varies among the products accordingly, from summaries to listings of virtually everything that is useful. According to their purpose, the products range from those that place a premium on reliability to those for which completeness is the important property.

The final data products are discussed here in order of subject grouping: asteroids, comets, probable asteroids/comets, survey analysis, and archive. The names for the final products are accompanied by their original FDP (Final Data Product) numbers. These numbers have been used uniformly throughout all of the previous documentation, whereas the descriptive names have changed several times as the products evolved. One can find the FDPs arranged by number in Table 8-1. This table also gives other information about each FDP such as its file name and the disposition of changed, deleted or undelivered products. Note that in the columns on product type or format, the word "catalog" refers to a printed product whereas "database" indicates a machine readable medium.

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TABLE 8-1. IRAS Asteroid and Comet Final Data Products

FDP No.	Name	Type	File Name	Footnotes
1.	Possible Asteroids/Comets	Data base	FPN1	
2.	Catalog of Asteroid Sightings	Data base	FPN2	
3.	Probable Asteroids/Comets	Data base	FPN3	
4.	Asteroid Catalog	Catalog, Data base	FPN4	+
5.	Graphic Data	Catalog	FPN5	+
6.	Asteroid Statistics	Catalog, Data base	FPN6	+
7.	Comet Catalog	Catalog, Data base	FPN7	+
8.	Fast Moving Objects	Table	----	1
9.	Asteroid and Comet LRS Spectra	Catalog, Data base	FPN9	+
10.	Unknown Asteroids' LRS Spectra	------	----	2
11.	Master Asteroid Database	------	----	3
12.	Asteroid Names and Pointers	Catalog, Data base	FPNC	
13.	Asteroid Ground-Based Data	Catalog, Data base	FPND	
14.	Deep Sky Asteroid Catalog	------	----	4
15.	Rejected Sightings	Data base	FPNF	+
16.	Asteroid and Comet Supplement	Book	FPNG	

Footnotes:

1. All fast moving objects are listed in a table in FDP 16. Machine readable data are to be found in FDPs 2, 3 or 1.

2. Combined with FDP 9.

3. Not produced. All of the information in this product can be obtained by merging FDP 1 and FDP 12. The AAG felt that the available resources were better used in the production of non-redundant data products.

4. Not produced. The IRAS Catalog of Pointed Observations was not available in time to be used to produce this data product. This was realized and discussed at the IRAS Asteroid Workshop No. 4 (see page 19).

\+ Published in this Supplement (FDP 16).

8.1 Asteroid Data Products

The final asteroid products consist of a summary catalogue, a catalog of sightings, a collection of LRS spectra and various files of ground-based asteroid data. In all, there are a total of five products.

8.1.1 IRAS Asteroid Catalog [FDP No. 4]

This is a distillation of the IRAS asteroid results, organized by asteroid number or Minor Planet Center provisional designation. One value is given for each property, such as albedo and diameter. The Asteroid Catalog is issued both as a printed catalog and a machine readable data base. The database version also contains the orbital elements used in reducing the IRAS data.

8.1.2 Catalog of IRAS Asteroid Sightings [FDP No. 2]

This is a catalog of the reliable IRAS asteroid sightings. It is replete with all of the detail of observational circumstances, detection qualities, position accuracies and the quantities computed from orbit geometry and the asteroid thermal model. The asteroids appear in ascending numerical order and a header gives the summary information for each asteroid.

This product is issued as both a printed catalog and a machine readable database. The entry for each asteroid contains a header for the summary information and then a listing of all of the sighting data.

8.1.3 Asteroid and Comet LRS Spectra [FDP No. 9]

This is a collection of the forty-seven useful LRS spectra of asteroids. It is organized in ascending asteroid numerical order. Plots of these data appear as Part 2 of this volume.

8.1.4 Asteroid Ground-Based Data [FDP No. 13]

Various ground-based data on asteroids were needed in order to fully reduce the IRAS observations and derive quantities such as diameters and albedos. A major component of the work has been gathering these data together, assessing their quality and putting them into machine readable form. The purpose of FDP No. 13 is to make these data available in machine readable form to all who wish them. Contained herein are the data on 24-color spectrophotometry, eight-color asteroid survey, lightcurves, polarimetry and UBV photometry. The make-up of the data is further described in Chapter 4.

8.1.5 Asteroid Names and Pointers [FDP No. 12]

This file contains the asteroid names, provisional designations and pointers. The pointers identify the types of data available for each asteroid in FDP No. 13. Thus, this product is essentially an index for No. 13, the only new information supplied being the name or provisional designation which is not available anywhere else in the final products.

8.2 Comet Data Products

8.2.1 IRAS Comet Catalog [FDP No. 7]

The Comet Catalog is a compilation of the reliable IRAS sighting data for twenty-four comets. This catalog is printed in Part 2 of this volume.

8.2.2 Comet Low Resolution Spectrometer (LRS) Spectral [FDP No. 9]

None of the comets observed had sufficient flux densities to produce LRS spectra which met our criteria for acceptance into this catalog.

8.3 Data Products for Probable Asteroids/Comets

The "probable asteroids/comets" refers to those higher quality sightings which are believed to be due to asteroids or comets for which no orbits are available. That is, they are objects which have not been "discovered" yet.

8.3.1 Probable Asteroids/Comets [FDP No. 3]

This is a catalogue of the high-quality sightings of asteroids/comets which have unknown orbits. Thus, this product is parallel to the Asteroid Catalog (FDP 2). It is in the format of a data base.

The content are organized into sections according to track identification. A track is a series of sightings believed to be due to the same asteroid. Each section has a header containing summary as well as track information. The header is followed by the data from the individual sightings, organized in the order that the sightings were made.

8.4 Survey Analysis Products

The analysis of surveys for solar system objects is more complex than that required of other types of sky surveys. This is because the objects being surveyed can move significantly during the course of the survey. It is the understanding of all of the biases in the IRAS asteroid and comet survey which allows the characteristics of the actual population to be determined from the observed sample. It was determined at the Workshops that certain data displays and calculations should be part of the final data products. These appear in Chapters 2 and 3.

8.4.1 Graphic Data [FDP No. 5]

The purpose of this product is to display the distribution of the known asteroids with respect to positions, flux densities, visual magnitudes, visual and infrared colors, albedos and other parameters. This information is needed to characterize the IRAS data set. These products are described and presented in Chapter 2.

8.4.2 Asteroid Statistics [FDP No. 6]

This product brings together all of the information on the status of the data and sightings for all of the known asteroids. This information is needed to evaluate completeness, reliability and bias of the survey. The product consists of three elements: 1) machine readable data base, 2) a printed catalogue, and 3) plots. The printed catalog is Part 2 of this volume). The data plots are presented in Chapter 2 and 3.

8.5 Archival Products

Two data products are important and need to be available, though only in an archival sense. They were identified by the Workshops as starting points that would be needed for certain types of data processing and for studies of properties of the IRAS Asteroid Survey.

8.5.1 Rejected Sightings [FDP No. 15]

TBD

8.1.5.2 Possible Asteroids/Comets [FDP No. 1]

This database contains all of the sightings of possible asteroids and comets. Its main use is expected to be in finding IRAS sightings of asteroids and comets with newly determined orbits. It is the least reliable but most complete of the final data products. This product will remain at IPAC and not be delivered to NSSDC because it requires the ADAS for its use.

8.6 Contents of the Final Data Products

The contents of the machine readable Final Data Products are summarized in Table 8-2. In the second column names of the the parameters are given with their Fortran variable names in square brackets. The data product numbers provide the headers for columns three through twelve. An "X" indicates the presence of the parameter. For some products there are header records as well as sighting records. To find the exact location within a product of a particular parameter, the user has to consult the tables in Appendix B.

The identification of a sighting is given in terms of TNAM and DNAM. TNAM is time in deciseconds past 0 hours, January 1, 1982 and DNAM indicates the detectors involved. The asteroid number, comet name and provisional sightings for either are the official numbers or designations are encoded as ASCII in ID and F2ID. The TYPE indication is explained in Table B-5 of Appendix B. ASTNAM is the asteroid's name and PROVIS is the provisional designation for new asteroids; both are written in ASCII.

There are seven parameters related to flux. The flux densities for the four bands are in Jy, as are the formal uncertainties. The method for calculating these is discussed in Chapter 6. The signal-to-noise ratio is the ratio between the flux densities and the formal errors in each band. The correlation coefficients (ASTCOR) and the flux status word (ASTFST) are discussed in Chapter 5. The apparent variability is a measure of the probability that the real flux density has changed between two sightings of the same asteroid. The intrinsic variability is the residual magnitude between observations of the same asteroid which cannot be explained simply by differences in observational geometry. For the most part these are due to temporal variation in the asteroid's projected cross section. Albedo (and color) spots can also cause a change in the flux. Other variables are thought to contribute relatively little to this type of variation in the IRAS data for "average" asteroids.

The parameters related to the circumstances of the sightings are mostly self explanatory. The observed position is referred to "IRAS pointing" which just means that we accepted the positioning system used for the Point Source Catalog (ES Sec. V.C). Two different sets of osculating elements were used and their choice is discussed in Chapter 6 together with the ephemerides quality code.

The three status words for sighting acceptance and rejection flags (ARSTAT), sighting confusion status (ASTCST), and modeling flags (ADSTAT) are defined in Appendix B. The composite status word (F2ASTW) appears in summaries and is the non exclusive logical "or" of the ASTATWs for all the sightings listed under the header for that asteroid.

The derived parameters are also mostly self explanatory. The model used for their calculation is the subject of Chapter 7. The "best albedo" is the average value of all of the albedos obtained from valid detections at 10, 25 and 60 μm (but not 100 μm).

The "best diameter" is calculated using the "best albedo". The formal errors for these parameters are discussed in Chapter 6.

The parameters from the available ground-based asteroid data are discussed in Chapter 9.

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Table 8-2. Parameters for the Machine Readable Asteroid and Comet Data Products

PARAMETERS	Final Data Product Number									
	1	2	3	4	6	7	9	12	13	15
IDENTIFICATION										
1. Identification number, IRAS [TNAM, DNAM]	X	X	X			X	X			X
2. Asteroid number, comet name or provisional designation [ID, TYPE, F2ID, F2TYPE]	X	X		X	X	X	X	X	X	X
3. Asteroid name [ASTNAM]								X		
4. Asteroid provisional designation [PROVIS]								X		
FLUX										
5. Flux densities (4 bands) [ASTFLX(4)]	X	X	X			X				X
6. Uncertainties in flux densities (4 bands) [ASTSGF(4)]	X	X	X			X				X
7. Signal to noise ratio 4 bands [ASTSNR(4)]	X	X	X			X				X
8. Correlation coefficients 4 bands [ASTCOR]	X	X	X			X				X
9. Flux status word (4 bands) (sighting status) [ASTFST(4)]	X	X	X			X				X
10. Apparent variability probability that flux density has changed between observations) [F2FVAR]		X	X	X					X	
11. Intrinsic variability change flux density due to rotation and/or aspect angle change) [F2LTCV(4)]		X		X					X	

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Table 8-2 (continued)

PARAMETERS	1	2	3	4	6	7	9	12	13	15
	Final Data Product Number									
SIGHTING CIRCUMSTANCES										
12. Time and date of observation (U.T.) [MM, YS, DFDD]	X	X	X			X	X			X
13. Observed position of sighting, IRAS Pointing (1950.0 R.A. and Dec.) [ASTRA, ASTDEC]	X	X	X			X	X			X
14. Position uncertainty [ASTSGY, ASTSGZ, ASTLZ, TWIST]	X	X	X			X	X			X
15. Orbital elements used (12) [F2EP1, F2AP1, F2LA1, F2I1, F2E1, F2PD1, F2EP2, F2AP2, F2LA2, F2I2, F2E2, F2PD2]		X		X		X			X	
16. Ephemerides quality code [ER1]		X		X						
17. Heliocentric distance [PRDRAS]		X				X	X			
18. Geocentric distance [PRDREA]		X				X	X			
19. Phase angle [PRDALP]		X				X	X			
20. Estimated visual magnitude for the sighting, V(r, delta, alpha) [V]		X								
SIGHTING STATISTICS FOR EACH SOURCE										
21. Number of times sighted [INSIGHT, F2NSIT]	X	X	X	X	X					
22. Number of times predicted to be in the IRAS Survey [NPRED]					X					
23. Number of times not observed but too faint for detection [N2FAINT]					X					

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Table 8-2 (continued)

PARAMETERS	Final Data Product Number 1	2	3	4	6	7	9	12	13	15
24. Number of times not observed but source passed over dead Band-2 detector [NDEDET]					X					
25. Number of times not observed but source passed over noisy Band-2 detector [NNOISY]					X					
26. Number of times not observed but for which no reason has been identified [NNOALI]					X					
27. Status flags [ASTATW]	X	X	X			X				X
28. Sighting acceptance/rejection flags [ARSTAT]	X	X	X			X				X
29. Sighting confusion status (flags) [ASTCST]	X	X	X			X				X
30. Modeling flags [ADSTAT]		X	X						X	X
31. Composite status word [F2ASTW]		X		X		X				
32. Remark field [F2REMC]			X			X			X	
ASTEROID, ADAS DERIVED										
33. Best albedo [F2ALB]		X	X	X					X	
34. Uncertainty in best albedo [F2SIGA]		X	X	X			X			
35. Best diameter [F2DIAM]		X	X	X					X	
36. Uncertainty in best diameter [F2SIGD]		X	X	X					X	
37. Model diameter (4 bands) [ADDIAM]		X	X							

Table 8-2. (Continued)

PARAMETERS	Final Data Product Number 1	2	3	4	6	7	9	12	13	15
38. Uncertainty in model diameter [ADSID]		X	X							
39. Model albedo (4 bands) [ADALB]		X	X							
40. Uncertainty in model albedo [ADSIGA]		X	X							
ASTEROID, AAG SUPPLIED										
41. Color, B-V, used [F2BMV]		X		X					X	
42. Absolute magnitude, H, used [F2B10]		X		X					X	
43. Color quality code [BMVQ]		X								
44. Absolute magnitude quality code [B10Q]		X		X						
45. Phase integral, q, used [F2Q]		X		X					X	
46. Slope parameter, G, used [F2PC]		X		X					X	
47. Pointers to FDP No. 13 [POINT]								X		
48. Eight-filter asteroid survey colors (7 values) [DATA]									X	
49. 24-color spectrophotometry (24 values) [DATA]									X	
50. Polarimetry (4 values) [DATA]									X	
51. Light curve parameters (3 values) [DATA]									X	

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Table 8-2. (Continued)

PARAMETERS	1	2	3	4	6	7	9	12	13	15
EXTENDED SOURCE										
52. CUS Band-2 flux density [CUSFLX]	X					X				
53. CUS Band-2 size [CUSMNR]	X					X				
54. Average CUS flux density [F2CUSF]								X		
55. Average CUS size [F2CUSS]								X		
LRS										
56. Number of associated spectra [NCNT]									X	
57. LRS spectrum [SPCTRM]									X	

(Column numbers are listed under the heading "Final Data Product Number".)

Chapter 9. Ground-Based Data for Asteroids

by

Edward F. Tedesco

This chapter describes the ground-based data files which have been supplied by the AAG and were used either in reducing the observed asteroid fluxes to albedos and diameters or to complete the data products. The creation of each of these data files is described in this chapter. Section 9.1 describes the files required for identifying IRAS sources with known asteroids and/or needed in reducing the observed IRAS fluxes to diameters and albedos. Section 9.2 documents the supplemental data files which appear in the final data products as a convenience to the user and Section 9.3 describes their structure. Finally, Section 9.4 presents a table of absolute visual magnitudes for the numbered asteroids on the H, G system adopted by Commission 20 of the International Astronomical Union in November 1985 (c.f. Minor Planet Circular [MPC] 10193) followed by the table of UBV colors for the numbered asteroids described in Sections 9.1.3 and 9.3.1.

9.1 Ground-Based Asteroid and Comet Data Required for IRAS Data Reduction

Certain sets of ground-based data (e.g., orbital elements, absolute magnitudes, and UBV colors) were essential for producing the final asteroid and comet data products. Because the user needs to know the particular ground-based data used in reducing the IRAS data these ground-based data sets were included in the final data products. Because the final IRAS asteroid data processing began during December 1985, the ground-based data available as of mid-1985 was the latest data included. In addition, a number of supplementary data sets were designated to be included to enhance the scientific value of the final products. Some of these supplementary files were needed also to assist the evaluation of completeness and reliability of the data reductions. A description of the ground-based data sets follows and is summarized in Table 9-1.

Table 9-1 Summary of Ground-Based Data Files

Files Needed For IRAS Data Reduction	Supplementary Files
Orbital Elements	Eight-color Survey Photometry
Absolute Magnitudes	24-color Spectrophotometry
UBV Colors	Polarimetry
	Lightcurve Parameters

9.1.1 Orbital Elements

The most important data set is the orbital elements. From these data the known asteroids and comets were identified and their distances and phase angles at the time of observation determined. The heliocentric distance, geocentric (actually asteroid-spacecraft) distance, and phase angle were computed in ADAS. The asteroid orbital element file included data on both numbered asteroids (supplied by B. Marsden) and unnumbered asteroids with reliable orbital elements (supplied by E. Bowell).

The IRAS spacecraft conducted survey observations between February 9, 1983 and November 22, 1983, a total of 287 days. In order to have sufficiently accurate position predictions it was decided to provide osculating orbital elements at two epochs which would divide the mission into three segments so that there would be no prediction with an epoch more than 80 days different from the epoch of a set of elements. The dates chosen were JDE 2445440.5 and 2445600.5 or April 16.0, 1983 and September 23.0, 1983.

The source of data for the numbered asteroids was Brian Marsden's 1985 asteroid orbital element file. For the 1985 standard epoch of JDE 2446400.5 this 80 column file contains the calendar date of perihelion (given to 0.0000001 days) the argument of perihelion, the longitude of the ascending node, and the inclination (to 0.0000001 degrees); the perihelion distance (to 0.00000001 AU.); and the eccentricity (to 0.00000001). This source was chosen because it was the most recent, complete, and accurate available at the time that osculating elements had to be calculated. At the time of generating the IRAS files there were 3,302 asteroids in this source file. It included all asteroids numbered through August 1985 (MPC 9960). Subsequently asteroids numbered through 3318 (September 1985, MPC 10062) were included as well.

Dave Bender at JPL took Marsden's data and produced the positions and velocities in cartesian coordinates (Earth ecliptic of 1950.0), and integrated the trajectory of each asteroid using a fifteenth order Cowell integration program written by Edgar Everhart of the University of Denver. The program is written in FORTRAN 77 and was used on a microcomputer, either an IBM-PC or a COMPAQ, in double precision arithmetic. The positions and velocities at the two required times were transformed to orbital elements for the data files.

As a test on accuracy, an approximate ephemeris for all planets from Mercury through Neptune (suitable for use on microcomputers) was generated from the JPL ephemeris DE118. This file (supplied by X. X. Newhall) consists of planetary coordinates on two-day intervals for 1,960 days from April 16, 1983 as well as a cubic interpolation scheme. Comparisons of the positional data generated by this method and DE118 show differences of less than 1 part in 10,000,000 at the two day points and less than 1 part in 1,000,000 at intermediate points.

There were two tests made on the integration program. Objects were integrated from 1985 to 1983 and the 1983 file used to start an integration back to 1985. Errors of only 1 or 2 in the last significant figure were achieved. The second test consisted of comparing the orbital elements for Sept 23, 1983 with those in the Russian ephemeris since this is the standard 1983 epoch. The differences appeared to be random in the last two decimal places shown in the Russian data, except where larger differences indicated that new observational data had been included in the later data.

The orbital elements for the unnumbered asteroids supplied by E. Bowell were integrated by him to the required epochs before delivery to ADAS. There are data for 135 unnumbered asteroids in that orbital elements data file.

The source of the cometary orbital data is also mainly Brian Marsden, either from the Comet Reports or from the Minor Planet Circulars. All periodic comets that were predicted to be near the Sun or Earth from 1982 to 1985 were included as well as all other comets discovered during these three years. There are a total of 109 comets in the comet orbital elements data file.

The only difference between the data in the 80 column file and that supplied to ADAS is that the date of the perihelion is given as a Julian date to 0.00001 days. The number of figures given is two more for each element than is customary in the Russian Ephemeris or on a Minor Planet Circular. Not all of them are significant except for the best known and best determined asteroids. Note that perihelion distance has replaced the more usual semi-major axis, and that the eccentricity can exceed 1.0. Thus even slightly hyperbolic comet orbits may occur in the file, and the programs to compute position and velocity must be capable of handling parabolic and hyperbolic orbits.

9.1.2 Absolute Magnitudes

The absolute magnitudes used are essentially on the system adopted by IAU Commission 20 during the November 1985 General Assembly. This system is described in MPC 10193 (27 December 1985) and makes use of the Lumme-Bowell-Harris (LBH) phase function (unpublished). The only difference between the system adopted and that used in the IRAS data reductions is that the former are obtained by fitting the phase function to visual (V) data while the latter were produced by fitting the blue (B) data and then converting to V by subtracting the B-V color index.

The LBH phase function was used to reduce observed magnitudes to absolute magnitudes on the H, G system. A new data base of observed magnitudes was created by supplementing the data used in producing the last magnitude listing (Gehrels and Tedesco, 1979) with data obtained from publications appearing between 1979 and early 1985. The resulting data base consisted of 10,234 records obtained from a total of 147 different sources. Asteroids number 1 through 3,318 were included. Unnumbered asteroids having published photometry were checked to see whether they had been numbered as of mid-October 1985. The photometry was reduced to the B band on the UBV system and, if from a lightcurve observation which preserved the time, corrected to mean brightness.

The data for each asteroid fell naturally into one of the three classes of Table 9-2.

Table 9-2 Classification of Asteroids by Quality of B Photometry

Class 1: Five or more observations spanning at least 10^{o} in phase,
Class 2: One through four observations each at known phase angles, and
Class 3: One or more B(1,0) values on either the 0.023 mag/deg or 0.039 mag/deg systems.

Each class was treated differently as now explained.

Each class 1 datum was weighted as follows: (0.9) if it was the mean over a complete (half) lightcurve, 0.8 if over a quarter period or from two or more observations obtained during the same night, and 0.5 if it was a single photoelectric observation. All single photographic observations were given a weight of 0.2. The data were then fit with the LBH phase function via weighted least squares. Thus, the H and G were explicitly determined for these asteroids. Because observations were used from two or more oppositions, or at unknown rotational phases, the results may not always be physically meaningful. Nevertheless, the tabulated H and G represent the best fit parameters to the available data (see, however, Section 9.4.1).

Class 2 data sets were treated as follows. Because the slope parameter (G) is essentially a function of albedo, and since the albedo distribution of the asteroids is trimodal, adopted Gs were computed by dividing the sample of asteroids for which high quality Gs were available into three albedo groups. A fit was considered to be of high quality if the weight of the fit was $\geqslant 5.0$ and $\sigma_{\underline{H}}$ was $\leqslant 0.05$, and the observations used spanned at least ten degrees in solar phase angle. The albedo (ALB) groups on the TRIAD system (Morrison and Lebofsky, 1979; Morrison and Zellner, 1979) fall naturally into the three ranges: ALB $\leqslant$ 0.065 (low), 0.065 < ALB $\leqslant$ 0.23 (moderate), and ALB > 0.23 (high). To test the sensitivity of the Gs obtained using this approach the same computation was performed using a lower quality set of Gs, namely the same as for the high quality set but for which the weight of the fit was $\geq$ 2.5. The results of applying this procedure are presented in the Table 9-3.

Table 9-3 G Estimates

	High Quality Data Set			Lower Quality Data Set		
Albedo Group	Mean G	Sample Sigma	No. in Sample	Mean G	Sample Sigma	No. in Sample
Low	0.155	0.085	12	0.137	0.098	29
Moderate	0.214	0.157	19	0.200	0.157	30
High	0.377	0.114	5	-----	-----	5

An alternate method of estimating the mean G for each albedo group was also employed. This method is described by Bowell and Lumme (1979). It gave the results presented in Table 9-4.

Table 9-4 G Estimates by Bowell-Lumme Method

Albedo Class	No. of Asteroids	No. of Observations	$\langle G \rangle$
Low	516	2274	0.142
Moderate	306	1980	0.240
High (>0.23)	24	159	0.351
Very High (>0.30)	11	71	0.431

Based on the results above together with other known facts regarding the relationships among albedos and taxonomic classes, family membership, and semimajor axes, the following scheme was devised for assigning slope parameters:

1. If the albedo (on the TRIAD system) was known then Table 9-5 was used.

Table 9-5 G Used if TRIAD Albedo is Available

$$G = 0.15 \text{ if } ALB \le 0.065,$$
$$0.25 \text{ if } 0.065 < ALB \le 0.23, \text{ and}$$
$$0.40 \text{ if } ALB > 0.23.$$

---

2. If the taxonomic class was known [either from Bowell et al. (1979) ["TRIAD"] or Tholen (1985)] but not the albedo, then Table 9-6 was used.

Table 9-6 G Used if Taxonomic Class Known but Albedo Unknown

G = 0.15 if the taxonomic class began with a C, D, F, G, P, or T and
0.25 if the taxonomic class began with a A, B, M, Q, or S.
0.40 if the taxonomic class began with a E, R, or V.

---

3. If the asteroid belonged to a "key" family (as defined by Gradie and Tedesco (1982) Table 9-7 was used. In these cases no direct taxonomic class information or albedo are available.

Table 9-7 G Used if Asteroid is Member of Key Family

G = 0.15 if a member of the Nysa family,
0.25 if a member of the Eos, Koronis, or Maria families, and
0.40 if a member of Williams family 190.

---

4. If none of the foregoing information was available then Table 9-8 was used.

Table 9-8 Default Values for G

$G = 0.15$ if $a > 2.500$ AU and,
0.25 if $a \leq 2.500$ AU.

For the 3,318 numbered asteroids the resulting distribution of albedos is shown in Table 9-9.

Table 9-9 Distribution of a priori albedos for Asteroids

1,787 had, or were assigned, low albedos
1,502 had, or were assigned, moderate albedos
29 had, or were assigned, high albedos

The next step was the calculation of the absolute magnitudes. Using the adopted slope parameter (G), $B(1,\alpha)$, and α, where α = the solar phase angle, the absolute magnitude on the LBH system (H) was found via:

$$H = B(1,\alpha) + 2.5*\text{Log}_{10}[(1-G)*\phi_1(\alpha) + G*\phi_2(\alpha)]$$

here there was more than one observation the H used is the unweighted mean of the computed H's. Where there are four or more observations, Chauvenet's Criterion (computed based on the sample variance) was applied once to the data set.

Class 3 data were "reduced" to H's as indicated in Table 9-10. The first entry in this table was necessitated by the fact that B(1,0) magnitudes given to one decimal ending in a 0 or 5 were rounded to the nearest half-magnitude due to the scatter in the reported magnitudes used to obtain them (Marsden, personal communication).

Table 9-10 Method of Obtaining H from Class 3 Data

H = B(1,0) - 0.5	if the fractional part of B(1,0) was 0 or .5 regardless of whether 0.023 or 0.039 had been used to obtain them, otherwise:
H = B(1,0 - 0.4	if B(1,0) was derived using 0.023 mag/deg. (Since for 51 well determined H's the mean difference between B(1,0) and H = - 0.43 mag. with a standard deviation, σ = 0.13 mag. For a slightly larger, but somewhat more noisy sample the results were n = 68; mean difference = - 0.43; σ = 0.21), and
H = B(1,0) - 0.3	if B(1,0) was derived using 0.039 mag/deg. (Since B(1,0,0.039) = B(1,0,0.023) - 0.1)

9.1.2.1 Known Errors in Processing: G Values

Of the 317 asteroids with high quality (Class 1) photometric data for which H and G were determined via least-square fit 79 had values of G which were less than zero or greater than one-half. During the final IRAS Asteroid Workshop on 3-4 June 1986 several people, including E. Bowell, A. Harris, and (via telephone) B. Marsden, expressed their concern that such values were "non-physical" and were, presumably, the results of using data from more than one opposition (i.e., from different aspects) and/or not accounting for rotational lightcurve induced brightness variations. Hence, it was recommended that these 79 asteroids be treated as though they were class 2 photometric data (c.f., Section 9.1.2) and be assigned default values of G.

Accordingly a table giving the recomputed values of H, using the indicated default values of G, for the 79 asteroids in question is given as an erratus preceding the IRAS Asteroid Catalog [FDP No. 4, Section III-1]. Asteroids marked with an asterisk are those which appear in the IRAS Asteroid Catalog (FDP 4) and the Catalog of Asteroid Sightings. Note that the albedos and diameters for these asteroids which appear in those data products were computed using the original values of H and G, and that it is these original values which appear in all of the final data products.

As an item of interest I note that of the 51 asteroids for which Lagerkvist and Williams (1987, Astron. Astrophys. Suppl. Ser., in press) derived H and G values using homogeneous data obtained during a single opposition, seven had values of G less than zero.

9.1.3 UBV Color Indices

The TRIAD UBV file as published in the book Asteroids by Bowell et al. (1985) together with results from the Eight-Color Asteroid Survey (ECAS) as given in Zellner et al. (1985) were combined to produce an updated UBV file. Since the UBV system is not a subset of the ECAS system the published u-v and b-v values were first converted to U-B and B-V using the transformations given by Tedesco et al. (1982). Weights were assigned to each of the ECAS UBV colors based on the sigmas given by Zellner et al. (1985) with their mean u-v and b-v's. In assigning the weights the scheme used was the same as that used by Bowell et al. (i.e., Table 9-11).

Table 9-11 Weight Assignment

Weight	For σ
0	$>$ 0.05 magnitude
1	$\leqslant$ 0.05 but $>$ 0.03 magnitude
2	$\leqslant$ 0.03 but $>$ 0.02 magnitude, and
3	$\leqslant$ 0.02 magnitude

Where both a TRIAD and ECAS value was available a weighted mean was computed for inclusion in the updated file and assigned a weight equal to the rounded rms sum of the two weights used. See Section 9.3.1 for additional details.

9.2 Ground-Based Asteroid Data Required for Supplemental IRAS Data Products

In order to enhance the usefulness of the IRAS Asteroid Data Products certain ground-based data sets were included in addition to those explicitly required to identify an IRAS source with a known asteroid or to reduce an IRAS flux to an albedo and diameter. Only those data sets most fundamental, in the sense of being actual data rather than parameters derived from data, were included. In order to fulfill a recommendation voiced at one or more of the IRAS Asteroid Workshops, only published, homogeneous data sets were used in assembling the supplemental data files.

9.2.2.1 Eight-Color Asteroid Survey Color Indices

This data set is the same as that used in updating the UBV data base (see Section 9.1.3). It consists of the mean color and its uncertainty for each of the 589 asteroids observed in the Eight-Color Asteroid Survey (Zellner et al. 1985).

9.2.2 24-Color Spectrophotometry

The 24-color spectrophotometry data file contains the same data as published by Chapman and Gaffey (1979) augmented with data from McFadden et al. (1984) and McFadden (personal communication, 1986). The format was changed from that of Chapman and Gaffey's printed version to make it more useful in its present machine readable form. See Section 9.3.3 for complete details regarding the structure of this file.

9.2.3 Polarimetry

The present file is a slightly reformatted version of the 1979 computer card "TRIAD" file created by Ben Zellner and published in Morrison and Zellner (1979). See Section 9.3.4 for complete details regarding the structure of this file.

9.2.4 Lightcurve Parameters

All of the lightcurve data in this file were abstracted from Lagerkvist et al. (1985). The data in Lagerkvist et al. were compiled from 199 different references published prior to 1985. The subset of this catalog presented here contains only the rotation period and the range of observed rotational amplitudes. See Section 9.3.5 for complete details regarding the structure of this file.

9.3 Structure for Supplemental Data Files

The formats for the ground-based asteroid and comet data files are given in this section.

9.3.1 UBV Color Indices

Although the B-V color was required in reducing IRAS asteroid flux measurements to albedos and diameters (and therefore appears in data files other than this) the U-B color indices were not used but are clearly a desirable parameter as well.

As noted in Section 9.1.3 this file was created by combining UBV color indices derived from ECAS data with previously published TRIAD data. For asteroids common to both sources a weighted mean was computed and used in this file with an assigned weight equal to the rounded rms sum of the two weights used. The combined file contains these mean values and weights together with a field indicating whether the values were obtained from observations published in TRIAD, ECAS, or both. Each record also has a date indicating when it was last changed. The combined file contains data for 951 different asteroids (945 numbered and 6 unnumbered); all have B-V's and 933 have U-B's as well. There are 369 U-B and 380 B-V observations in common between the TRIAD and ECAS data sets. Of these 749 observations 662 (88%) agree to within 0.04 magnitude; only 27 (3.6%) differ by more than 0.09 magnitude. There are no systematic differences between the two data sets. 207 asteroids have only ECAS data and 364 only TRIAD data.

The data format for the UBV data file is:

File name : UBV.DAT
File size : 36,139 bytes
Number of data records : 951
Date of last update : 11/24/85

Each record contains 36 characters divided into 8 fields.

Table 9-12 UBV Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation.
2	4	U-B from combined ECAS & TRIAD data
3	1	U-B weight
4	4	B-V from combined ECAS & TRIAD data
5	1	B-V weight
6	6	Date record was last changed
7	2	References: 1 Bowell et al. (1979) 2 Zellner et al. (1985) 3 Weighted mean of values from references 1 and 2.
8	9	Provisional designation for a numbered asteroid

9.3.2 Eight-Color Asteroid Survey Indices

Below is the data format for the Eight-Color Asteroid Survey data file.

File name : ECAS.DAT
File size : 49,477 bytes
Number of data records : 589-Date of last update
: 11/19/85
Each record contains 82 characters divided into 18 fields.

Table 9-13 Eight-Color Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	5	s-v color index
3	5	u-v color index
4	5	b-v color index
5	5	v-w color index
6	5	v-x color index
7	5	v-p color index
8	5	v-z color index
9	3	Uncertainty in s-v color index
10	3	Uncertainty in u-v color index
11	3	Uncertainty in b-v color index
12	3	Uncertainty in v-w color index
13	3	Uncertainty in v-x color index
14	3	Uncertainty in v-p color index
15	3	Uncertainty in v-z color index
16	6	Date record was last changed
17	2	Reference: 1 Zellner et al. (1985)
18	9	Provisional designation for asteroids which were numbered since publication of reference 1.

9.3.3 24-Color Spectrophotometry File

Below is the data format for the 24-color spectrophotometry data file. Note that there are actually 26 different fields (bands) in this file but that any given asteroid has data in no more than 24 bands.

File name : 24-COLOR.DAT
File size : 59,779 bytes
Number of data records : 285
Date of last update : 05/13/86

Note: All reflectances are relative to unity at 0.56 μm.

Each record contains 199 characters divided into the following 55 fields:

Table 9-14 Spectrophotometry Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	4	Reflectance at 0.330 μm
3	3	Uncertainty in 0.330 μm reflectance
4	4	Reflectance at 0.340 μm if ref = 1; 0.360 μm if ref = 2
5	3	Uncertainty in 0.340 μm or 0.360 um reflectance
6	4	Reflectance at 0.355 μm if ref = 1; 0.380 μm if ref = 2
7	3	Uncertainty in 0.355 μm or 0.380 um reflectance
8	4	Reflectance at 0.400 μm
9	3	Uncertainty in 0.400 μm reflectance
10	4	Reflectance at 0.430 μm if ref = 1; 0.435 μm if ref = 2
11	3	Uncertainty in 0.430 μm or 0.435 μm reflectance
12	4	Reflectance at 0.470 μm
13	3	Uncertainty in 0.470 μm reflectance
14	4	Reflectance at 0.500 μm
15	3	Uncertainty in 0.500 μm reflectance
16	4	Reflectance at 0.540 μm
17	3	Uncertainty in 0.540 μm reflectance
18	4	Reflectance at 0.570 μm
19	3	Uncertainty in 0.570 μm reflectance
20	4	Reflectance at 0.600 μm
21	3	Uncertainty in 0.600 μm reflectance
22	4	Reflectance at 0.635 μm if ref = 1; 0.630 μm if ref = 2
23	3	Uncertainty in 0.635 μm or 0.630 μm reflectance
24	4	Reflectance at 0.670 μm
25	3	Uncertainty in 0.670 μm reflectance
26	4	Reflectance at 0.700 μm
27	3	Uncertainty in 0.700 μm reflectance
28	4	Reflectance at 0.730 μm if ref = 1; 0.735 μm if ref = 2
29	3	Uncertainty in 0.730 μm or 0.735 μm reflectance
30	4	Reflectance at 0.765 μm
31	3	Uncertainty in 0.765 μm reflectance
32	4	Reflectance at 0.800 μm
33	3	Uncertainty in 0.800 μm reflectance
34	4	Reflectance at 0.830 μm
35	3	Uncertainty in 0.830 μm reflectance
36	4	Reflectance at 0.870 μm if ref = 1; 0.865 μm if ref = 2
37	3	Uncertainty in 0.870 μm or 0.865 μm reflectance
38	4	Reflectance at 0.900 μm
39	3	Uncertainty in 0.900 μm reflectance
40	4	Reflectance at 0.930 μm
41	3	Uncertainty in 0.930 μm reflectance
42	4	Reflectance at 0.950 μm
43	3	Uncertainty in 0.950 μm reflectance
44	4	Reflectance at 0.970 μm
45	3	Uncertainty in 0.970 μm reflectance
46	4	Reflectance at 1.000 μm

Table 9-14 Spectrophotometry Record Format (continued)

Field	Width	Contents
47	3	Uncertainty in 1.000 μm reflectance
48	4	Reflectance at 1.030 μm
49	3	Uncertainty in 1.030 μm reflectance
50	4	Reflectance at 1.060 μm
51	3	Uncertainty in 1.060 μm reflectance
52	4	Reflectance at 1.100 μm
53	3	Uncertainty in 1.100 μm reflectance
54	6	Date record added or updated
55	2	References: 1 Chapman and Gaffey (1979) 2 McFadden et al. (1984) and personal communication (1986).

NOTES: 1. The data for 433 Eros from Ref. 1 were replaced with those from Ref. 2 because the former included a calibration correction which had already been applied to the data.

2. There are two records for 1685 Toro, one from each reference.

9.3.4 Polarimetry File

Below is the data format for the polarimetry data file. The present file is a slightly reformatted version of the 1979 computer card "TRIAD" file created by Ben Zellner. For further details regarding this file see Morrison and Zellner (1979).

File name : POLARIM.DAT
File size : 8,548 bytes
Number of data records : 111 Date of last update
: 06/30/79
Each record contains 75 characters divided into 18 fields.

Table 9-15 Polarimetry Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	4	Minimum polarization (P_{min}) in percent
3	2	Quality: 1 Weak, fragmentary, large scatter, single point 2 Average data set 3 Best or most consistent data (complete set).
4	2	Filter code for data in fields 5 and 7: B = Filter B G = Filter G V = Filter V U = Filter U X = No filter
5	5	Inversion angle in degrees
6	2	Inversion angle quality code (see field 3)
7	6	Polarimetric slope in percent per degree
8	2	Polarimetric slope quality code (see field 3)
9	2	Filter code for data in fields 10 and 12 (see field 4)
10	5	Inversion angle in degrees
11	2	Inversion angle quality code (see field 3)
12	6	Polarimetric slope in percent per degree
13	2	Polarimetric slope quality code (see field 3)
14	5	B-V color index
15	6	V(1,0) from Gehrels and Tedesco (1979)
16	6	Polarimetric visual geometric albedo
17	6	Polarimetric diameter in kilometers
18	3	Reference: 01 Zellner and Gradie (1976a) 02 Zellner and Gradie (1976b) 03 Veverka (1973) [Data re-reduced by Zellner for inclusion in Morrison and Zellner (1979) 99 Unpublished data, University of Arizona.

9.3.5 Lightcurve Parameters

Below is the data format for the Lightcurve data file.

File name : LC.DAT
File size : 10,358 bytes
Number of data records : 345 Date of last update
: 05/15/86
Each record contains 28 characters divided into 3 fields.

Table 9-16 Lightcurve Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	9	Rotation period in hours
3	10	Range of observed rotational amplitudes in magnitudes

9.4 Tabular Data

This section contains the current (as of mid-August 1986) versions of the absolute magnitude and UBV color index data files.

9.4.1 Absolute Magnitudes

The paragraph below, written by B. G. Marsden for inclusion in the October 1986 Minor Planet Circulars, describes the differences between the absolute magnitudes used in processing the IRAS asteroid data and those officially adopted by the standing committee on magnitudes of Commission 20 of the International Astronomical Union. Table 9-17 gives these "official" absolute visual magnitudes and slope parameters for the 3495 asteroids numbered through September 1986. This list should be identical to those appearing in the October 1986 Minor Planet Circulars and in the 1988 volume of the Ephemerides of Minor Planets.

MAGNITUDE PARAMETERS FOR THE NUMBERED MINOR PLANETS.

The following listing of mean absolute magnitudes H and slope parameters G has been prepared in accordance with the resolution of IAU Commission 20 last November and the remarks on MPC 10193-10194. The values have for the most part been determined by E. Tedesco, Jet Propulsion Laboratory, using the precepts discussed by him in the "IRAS Asteroid and Comet Survey" (edited by D. Matson, 1986). The data are essentially of three quality classes. The 237 sets of highest quality make use of extensive photometric data and least-squares fits for both H and G, H being given here to 0.01 mag and G in units of 0.01. The 1898 sets of medium quality also involve the direct use of photometric data, but constraints were placed on the slope parameter, principally from albedo or taxonomic considerations; here H is again given to 0.01 mag, and the three adopted values of G are indicated as

0.15 = X, 0.25 = Y, 0.40 = Z. The remaining sets, with H given to 0.1 mag, were mainly derived from the old absolute magnitudes B(1,0). The most important difference between this listing and that published with the IRAS asteroid data products is that the values of H given here are on the Johnson V system, whereas the IRAS values are on the Johnson B system. A second difference is that the 79 values of G in the IRAS listing outside the range 0.00-0.50 have been replaced by whichever of 0.15, 0.25 and 0.40 is appropriate and new solutions made for H. Thirdly, the single value G = 0.25 has been adopted for all the data of lowest quality. Finally, many of the lowest-quality values of H in the IRAS listing have been improved by B. G. Marsden using actual observations, and the data have been extended from the IRAS cutoff (at 3318) to all the minor planets numbered as of this time.

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
1	3.32	11	2	4.13	15	3	5.31	30	4	3.16	34	5	6.91	Y
6	5.70	24	7	5.56	Y	8	6.48	33	9	6.32	29	10	5.37	X
11	6.62	27	12	7.23	24	13	6.71	X	14	6.27	09	15	5.22	20
16	5.98	22	17	7.77	13	18	6.41	17	19	7.09	10	20	6.52	26
21	7.33	16	22	6.49	22	23	7.07	37	24	7.07	10	25	7.78	09
26	7.61	Z	27	7.07	Y	28	7.17	22	29	5.84	21	30	7.74	41
31	6.53	X	32	7.50	11	33	8.43	24	34	8.37	03	35	8.54	X
36	8.35	X	37	7.28	25	38	8.31	05	39	6.16	Y	40	7.14	31
41	7.34	X	42	7.50	Y	43	8.01	Y	44	7.05	44	45	7.27	X
46	8.38	11	47	7.86	13	48	6.92	X	49	7.91	39	50	9.20	X
51	7.36	06	52	6.29	X	53	8.75	X	54	7.70	15	55	7.68	35
56	8.30	X	57	6.95	07	58	8.79	X	59	7.72	01	60	8.68	33
61	7.66	08	62	8.24	Y	63	7.52	Y	64	7.65	37	65	6.79	X
66	9.39	X	67	8.36	25	68	6.84	11	69	7.10	15	70	7.99	X
71	7.26	37	72	9.00	23	73	9.00	Y	74	8.84	X	75	9.02	Y
76	8.08	44	77	8.57	26	78	8.11	08	79	7.83	18	80	8.10	30
81	8.49	X	82	8.51	34	83	8.89	30	84	9.26	X	85	7.56	05
86	8.51	11	87	6.95	28	88	7.05	17	89	6.57	14	90	8.37	26
91	8.79	X	92	6.74	33	93	7.73	X	94	7.55	08	95	7.83	08
96	7.97	X	97	7.70	25	98	8.92	X	99	9.42	X	100	7.79	Y
101	8.45	50	102	9.23	X	103	7.59	11	104	8.31	20	105	8.89	29
106	7.42	17	107	7.09	X	108	8.27	Y	109	8.87	11	110	7.79	18
111	7.89	04	112	9.80	X	113	8.63	26	114	8.24	10	115	7.51	14
116	7.86	Y	117	8.18	48	118	9.01	Y	119	8.44	Y	120	7.73	17
121	7.39	15	122	7.68	Y	123	8.93	Y	124	8.13	31	125	9.06	36
126	9.31	Y	127	8.48	X	128	7.55	X	129	7.05	37	130	7.06	X
131	9.99	Y	132	9.35	12	133	8.05	24	134	8.67	06	135	8.21	19
136	9.71	Y	137	8.04	10	138	9.04	Y	139	7.79	X	140	8.20	X
141	8.56	X	142	10.26	15	143	9.24	X	144	7.87	08	145	8.05	01
146	8.15	13	147	8.76	X	148	7.60	13	149	10.90	Y	150	8.32	X
151	9.34	Y	152	8.58	Y	153	7.46	03	154	7.09	X	155	11.34	X
156	8.61	X	157	11.2	Y	158	9.49	Y	159	8.07	X	160	9.04	X
161	9.22	Y	162	8.84	Y	163	9.51	X	164	8.60	01	165	7.49	X
166	9.85	X	167	9.16	Y	168	7.93	15	169	9.60	Y	170	9.42	Y
171	8.39	24	172	8.80	Y	173	7.79	12	174	8.40	Y	175	8.43	X
176	8.32	X	177	9.54	X	178	9.41	Y	179	8.20	Y	180	10.39	Y
181	7.77	05	182	9.30	30	183	9.78	Y	184	8.43	Y	185	7.73	27
186	9.08	29	187	8.16	13	188	9.31	Y	189	9.51	Y	190	7.67	X
191	8.98	X	192	7.13	03	193	9.80	X	194	7.66	X	195	9.05	X
196	6.64	47	197	9.44	Y	198	8.54	37	199	8.80	X	200	8.20	06
201	8.48	14	202	7.83	Y	203	9.08	X	204	9.00	Y	205	9.04	X
206	8.65	10	207	9.96	X	208	9.05	Y	209	8.21	X	210	9.32	X
211	7.84	03	212	8.22	X	213	8.83	X	214	9.45	48	215	9.62	Y
216	7.53	25	217	9.87	X	218	8.68	Y	219	9.43	Y	220	11.14	Y
221	7.68	16	222	9.42	X	223	9.95	X	224	8.71	Y	225	8.62	X
226	9.84	X	227	8.97	X	228	12.67	Y	229	9.29	Y	230	7.47	35
231	9.40	X	232	10.27	X	233	8.30	17	234	8.97	04	235	8.76	Y
236	8.29	19	237	9.43	Y	238	8.10	X	239	10.62	X	240	8.99	13
241	7.50	04	242	9.61	X	243	10.02	20	244	12.35	Y	245	7.92	39
246	8.74	Z	247	8.00	07	248	10.14	X	249	11.22	Y	250	7.54	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
251	10.06	X	252	9.53	X	253	10.30	X	254	12.08	Y	255	10.35	X
256	9.90	X	257	9.18	Y	258	8.47	46	259	7.86	X	260	9.26	X
261	9.50	Y	262	11.72	Y	263	10.52	Y	264	8.40	Y	265	11.36	Y
266	8.52	X	267	10.63	Y	268	8.40	X	269	9.84	X	270	8.79	Y
271	9.77	X	272	10.79	X	273	10.35	X	274	10.12	Y	275	8.82	X
276	8.57	15	277	9.96	Y	278	9.38	X	279	8.57	X	280	10.87	X
281	12.08	40	282	10.98	Y	283	8.73	X	284	10.06	X	285	10.78	X
286	9.10	X	287	8.32	29	288	10.08	44	289	9.60	Z	290	12.1	Y
291	11.48	Y	292	10.28	X	293	9.95	X	294	10.11	X	295	10.23	Y
296	12.63	Y	297	9.43	X	298	11.24	Y	299	11.72	Y	300	9.83	X
301	10.03	X	302	10.94	X	303	8.88	X	304	9.76	09	305	9.02	Y
306	9.05	Y	307	10.00	X	308	8.18	28	309	10.49	X	310	10.47	X
311	10.09	Y	312	8.93	Y	313	8.86	05	314	9.77	X	315	13.43	Y
316	11.52	X	317	10.18	Z	318	9.27	X	319	10.2	Y	320	10.63	Y
321	10.20	Y	322	9.02	X	323	9.67	Y	324	6.82	10	325	9.00	Y
326	9.35	X	327	10.23	X	328	9.11	Y	329	9.66	X	330	12.7	Y
331	9.63	X	332	9.24	X	333	9.51	X	334	7.48	X	335	8.96	14
336	9.78	17	337	8.76	Y	338	8.54	Y	339	9.34	25	340	10.38	Y
341	10.96	Y	342	10.15	X	343	11.55	X	344	8.11	17	345	8.75	X
346	7.42	Y	347	9.03	Y	348	9.50	X	349	5.98	32	350	8.48	X
351	9.12	Y	352	10.11	Y	353	11.22	X	354	6.32	32	355	10.49	X
356	8.17	X	357	8.71	X	358	9.06	X	359	9.29	Y	360	8.41	X
361	8.27	X	362	8.95	10	363	8.97	X	364	9.85	Y	365	9.27	30
366	8.46	X	367	10.95	Y	368	9.99	X	369	8.55	22	370	10.69	Y
371	8.79	Y	372	7.3	Y	373	9.17	X	374	8.95	Y	375	7.43	23
376	9.41	Y	377	8.98	31	378	9.99	Y	379	9.08	Y	380	9.43	X
381	8.50	X	382	8.86	Y	383	9.98	24	384	9.68	Y	385	7.46	18
386	7.42	23	387	7.48	24	388	8.41	X	389	7.88	Y	390	10.25	X
391	11.1	Y	392	9.79	X	393	8.40	X	394	9.75	28	395	10.42	26
396	9.77	X	397	9.36	22	398	10.46	X	399	9.14	X	400	10.00	Y
401	9.35	X	402	9.05	16	403	9.34	Y	404	9.05	19	405	8.43	12
406	10.38	X	407	8.92	X	408	9.61	X	409	7.60	28	410	8.26	08
411	9.06	X	412	9.19	X	413	10.24	Y	414	9.55	X	415	9.38	32
416	7.87	26	417	9.31	Y	418	9.84	Y	419	8.39	15	420	8.35	04
421	11.87	Y	422	10.89	Z	423	7.33	X	424	9.63	X	425	9.83	X
426	8.56	X	427	9.41	X	428	11.93	Y	429	9.77	X	430	10.40	X
431	8.97	Y	432	9.09	Y	433	10.74	Y	434	11.47	38	435	10.23	X
436	9.91	X	437	10.44	Y	438	9.97	X	439	9.72	X	440	11.82	Y
441	8.40	Y	442	9.97	X	443	10.23	Y	444	7.85	23	445	9.25	X
446	8.82	Y	447	9.25	X	448	10.39	24	449	9.66	X	450	10.37	Y
451	6.65	20	452	12.3	Y	453	10.81	Y	454	9.06	X	455	8.96	X
456	9.90	X	457	11.19	X	458	9.51	Y	459	10.46	Y	460	10.76	X
461	10.54	X	462	9.27	Y	463	11.73	Y	464	9.55	X	465	9.77	X
466	8.34	X	467	10.86	X	468	9.60	X	469	8.89	X	470	10.10	Y
471	6.61	29	472	9.15	Y	473	10.0	Y	474	10.52	Y	475	11.86	X
476	8.71	X	477	10.25	Y	478	7.99	14	479	9.63	X	480	8.71	47
481	8.75	X	482	9.09	Y	483	8.45	Y	484	10.09	X	485	8.69	X
486	11.03	Y	487	8.21	08	488	7.83	X	489	8.36	X	490	8.32	X
491	8.81	X	492	10.26	Y	493	10.6	Y	494	8.94	09	495	10.97	Y
496	11.89	Y	497	10.01	11	498	8.95	X	499	9.64	42	500	9.37	X

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
501	9.02	X	502	10.76	Y	503	8.98	X	504	10.08	X	505	8.80	X
506	8.82	11	507	9.48	X	508	8.30	X	509	8.51	Y	510	9.71	X
511	6.17	02	512	10.79	Y	513	9.72	Y	514	9.25	X	515	11.23	X
516	8.25	Y	517	9.38	22	518	11.44	X	519	9.24	Y	520	10.93	Y
521	8.51	X	522	9.28	36	523	9.62	X	524	9.81	X	525	12.55	Y
526	10.36	Y	527	10.31	X	528	9.10	X	529	10.15	Y	530	9.27	X
531	11.1	Y	532	5.78	25	533	9.71	Y	534	9.81	Y	535	9.50	X
536	8.08	X	537	8.79	X	538	9.39	X	539	9.85	X	540	10.75	Y
541	10.22	X	542	9.22	Y	543	9.57	X	544	10.18	X	545	8.70	X
546	9.68	X	547	9.73	X	548	11.43	Y	549	11.04	Y	550	9.21	Y
551	9.54	X	552	9.76	X	553	12.41	Y	554	8.89	X	555	10.53	X
556	9.32	Y	557	12.21	Y	558	9.07	Y	559	9.44	X	560	10.60	X
561	11.49	Y	562	10.02	36	563	8.61	Y	564	10.42	X	565	11.05	Y
566	8.15	43	567	9.33	X	568	9.40	X	569	10.10	09	570	8.87	X
571	11.69	Y	572	10.91	Y	573	9.42	Y	574	12.6	Y	575	11.22	Y
576	9.93	X	577	9.84	X	578	9.51	X	579	7.78	05	580	9.83	X
581	9.57	X	582	9.03	Y	583	9.16	X	584	8.74	34	585	10.34	X
586	9.24	X	587	12.4	Y	588	8.59	X	589	9.06	X	590	10.14	43
591	10.74	X	592	9.63	X	593	9.33	07	594	12.6	Y	595	8.09	X
596	8.89	X	597	9.33	X	598	9.65	X	599	8.48	Y	600	10.24	X
601	9.66	X	602	8.41	31	603	12.96	X	604	9.36	X	605	9.4	Y
606	10.40	X	607	9.79	X	608	10.69	Y	609	10.04	X	610	12.1	Y
611	9.36	Y	612	11.2	Y	613	9.83	X	614	10.93	X	615	10.37	X
616	10.75	Y	617	8.17	X	618	8.24	X	619	10.20	46	620	11.37	Z
621	10.60	X	622	10.30	Y	623	10.87	Y	624	7.47	X	625	10.40	X
626	8.99	X	627	10.10	X	628	9.18	Y	629	9.67	X	630	11.3	Y
631	8.77	Y	632	11.74	X	633	9.94	Y	634	9.9	Y	635	9.06	X
636	9.66	X	637	11.00	X	638	9.75	X	639	8.35	43	640	8.97	X
641	12.5	Y	642	10.06	Y	643	9.83	31	644	10.91	Y	645	10.00	Y
646	13.1	Y	647	11.49	Y	648	9.72	X	649	12.30	X	650	13.03	X
651	10.02	03	652	11.47	Y	653	9.31	Y	654	8.43	05	655	10.16	X
656	9.64	Y	657	10.92	X	658	10.56	Y	659	8.80	X	660	9.45	Y
661	9.64	Y	662	10.46	X	663	9.23	X	664	9.99	X	665	8.52	X
666	10.80	X	667	9.12	X	668	12.13	X	669	10.24	Y	670	9.33	X
671	10.35	X	672	11.41	X	673	10.27	Y	674	7.43	Y	675	8.05	Y
676	9.46	X	677	9.74	X	678	8.69	X	679	9.01	X	680	9.41	X
681	10.73	Y	682	12.4	Y	683	8.55	X	684	10.92	Y	685	11.78	Y
686	9.75	Y	687	11.72	X	688	10.51	X	689	12.19	X	690	7.66	X
691	9.35	X	692	9.08	Y	693	9.21	Y	694	9.01	X	695	9.03	Y
696	9.32	X	697	9.61	X	698	10.7	Y	699	11.99	Z	700	11.43	Y
701	9.33	X	702	7.23	13	703	12.5	Y	704	6.00	02	705	8.46	X
706	10.9	Y	707	12.90	Y	708	10.65	Y	709	9.00	X	710	11.14	X
711	12.10	Y	712	8.35	06	713	8.90	X	714	9.09	Y	715	9.97	X
716	10.81	Y	717	11.04	X	718	9.76	X	719	15.7	Y	720	9.79	Y
721	9.28	X	722	12.17	Y	723	9.99	X	724	13.6	Y	725	11.69	X
726	10.78	X	727	9.87	X	728	12.7	Y	729	9.36	Y	730	13.6	Y
731	9.50	X	732	10.76	Y	733	9.07	X	734	10.03	X	735	9.57	X
736	11.55	Y	737	8.84	Y	738	9.96	X	739	8.72	X	740	9.02	X
741	10.39	X	742	9.59	Y	743	10.22	X	744	10.19	X	745	10.38	X
746	9.77	X	747	7.68	X	748	8.99	X	749	11.85	Y	750	12.13	X

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
751	8.64	X	752	10.22	Y	753	10.34	Y	754	9.18	X	755	9.84	Y
756	10.1	Y	757	10.36	Y	758	8.39	X	759	10.55	X	760	8.23	Y
761	10.91	Y	762	8.58	50	763	12.39	Y	764	9.49	X	765	12.29	X
766	9.99	Y	767	10.41	X	768	10.19	X	769	8.84	X	770	10.93	Y
771	10.33	Y	772	8.32	X	773	9.34	X	774	8.86	X	775	10.44	Y
776	7.68	34	777	10.02	X	778	9.58	01	779	8.6	Y	780	8.99	X
781	9.44	X	782	11.53	Y	783	10.98	Y	784	9.13	X	785	9.58	Y
786	8.71	X	787	10.2	Y	788	8.23	X	789	11.09	X	790	8.05	X
791	9.33	X	792	10.13	X	793	10.17	X	794	11.20	X	795	9.81	X
796	9.11	X	797	10.45	Y	798	9.64	24	799	10.35	X	800	11.60	Y
801	11.39	X	802	12.4	Y	803	9.69	X	804	7.87	22	805	9.72	X
806	10.81	X	807	10.62	30	808	9.62	X	809	12.08	Y	810	13.0	Y
811	10.82	Y	812	11.3	Y	813	12.27	Y	814	8.79	X	815	10.82	X
816	10.25	X	817	10.80	X	818	9.35	X	819	12.09	Y	820	10.38	X
821	11.84	X	822	12.18	X	823	11.46	Y	824	10.46	Y	825	11.79	Y
826	11.63	X	827	12.98	Y	828	10.26	X	829	11.07	X	830	9.36	Y
831	12.4	Y	832	11.20	Y	833	11.1	Y	834	9.33	X	835	11.12	X
836	13.2	Y	837	11.9	Y	838	10.13	X	839	10.77	Y	840	9.4	Y
841	13.02	Y	842	10.6	Y	843	13.1	Y	844	9.67	X	845	10.46	X
846	10.47	X	847	10.27	Y	848	11.09	X	849	8.19	Y	850	9.53	X
851	11.75	Y	852	10.16	Y	853	11.68	Y	854	12.41	Y	855	12.05	Y
856	10.62	Y	857	11.38	Y	858	10.17	Y	859	9.91	X	860	10.36	Y
861	9.91	X	862	10.1	Y	863	9.13	Z	864	12.98	Y	865	12.10	Y
866	9.42	X	867	11.0	Y	868	10.17	X	869	12.1	Y	870	11.8	Y
871	12.6	Y	872	9.95	Y	873	11.39	X	874	9.77	X	875	11.75	Y
876	10.95	Y	877	10.94	40	878	15.4	Y	879	11.6	Y	880	11.45	X
881	12.4	Y	882	10.61	X	883	12.86	Y	884	8.89	X	885	10.83	X
886	8.52	X	887	14.20	Y	888	9.52	Y	889	11.58	Y	890	10.79	Y
891	10.23	X	892	9.45	X	893	9.75	X	894	9.80	X	895	8.6	Y
896	11.79	Y	897	10.40	Y	898	12.3	Y	899	10.17	X	900	11.94	Y
901	11.79	Y	902	12.4	Y	903	9.6	Y	904	10.2	Y	905	11.80	Y
906	9.98	X	907	9.64	X	908	10.89	Y	909	8.81	X	910	10.17	X
911	7.88	X	912	9.12	X	913	12.6	Y	914	8.82	X	915	11.97	Y
916	11.55	Y	917	11.51	Y	918	10.84	X	919	11.33	X	920	11.19	X
921	10.03	X	922	11.94	X	923	11.6	Y	924	9.39	X	925	8.41	Y
926	10.5	Y	927	9.31	X	928	10.10	X	929	12.42	Y	930	11.4	Y
931	9.26	Y	932	10.05	X	933	12.60	Y	934	10.3	Y	935	13.27	Y
936	10.08	Y	937	11.70	Y	938	11.2	Y	939	12.06	Y	940	9.33	X
941	11.55	X	942	10.4	Y	943	9.73	Y	944	10.75	X	945	10.09	Y
946	10.51	X	947	10.17	X	948	11.42	X	949	9.59	X	950	11.3	Y
951	11.67	Y	952	9.12	X	953	10.40	X	954	9.94	X	955	11.5	Y
956	12.61	Y	957	9.85	X	958	10.73	X	959	10.7	Y	960	13.12	Y
961	11.39	X	962	11.61	Y	963	12.55	Y	964	10.94	X	965	10.23	X
966	10.02	Y	967	12.56	Y	968	10.05	Y	969	12.59	X	970	12.3	Y
971	9.91	X	972	9.50	X	973	9.86	X	974	10.40	Y	975	10.38	Y
976	9.35	X	977	9.74	X	978	9.72	X	979	10.03	X	980	7.76	06
981	10.84	X	982	10.27	X	983	9.58	X	984	9.23	X	985	13.08	Y
986	9.43	X	987	9.46	X	988	11.3	Y	989	12.2	Y	990	11.61	X
991	11.35	X	992	10.88	X	993	12.02	Y	994	10.28	X	995	10.37	X
996	11.00	Y	997	11.9	Y	998	11.0	Y	999	10.79	X	1000	10.2	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
1001	9.73	X	1002	10.9	Y	1003	10.57	X	1004	9.82	X	1005	9.73	X
1006	11.64	X	1007	11.52	X	1008	10.56	X	1009	14.1	Y	1010	10.76	X
1011	12.85	Y	1012	12.33	X	1013	9.83	X	1014	11.92	X	1015	9.10	X
1016	12.22	Y	1017	11.1	Y	1018	11.01	X	1019	12.73	24	1020	12.06	X
1021	8.89	04	1022	10.1	Y	1023	9.73	X	1024	10.58	X	1025	12.87	Z
1026	13.4	Y	1027	10.7	Y	1028	9.41	X	1029	10.95	34	1030	10.42	X
1031	9.56	X	1032	9.90	X	1033	11.12	Y	1034	12.6	Y	1035	10.6	Y
1036	9.42	31	1037	13.24	Y	1038	10.82	X	1039	11.22	X	1040	10.01	X
1041	10.01	X	1042	10.21	X	1043	9.84	Y	1044	10.87	X	1045	13.09	Y
1046	10.41	X	1047	12.00	Y	1048	9.68	X	1049	10.6	Y	1050	12.7	Y
1051	9.87	X	1052	12.02	Y	1053	12.56	X	1054	10.49	X	1055	12.10	Y
1056	11.62	Y	1057	11.06	X	1058	11.99	Y	1059	10.56	X	1060	13.2	Y
1061	12.07	X	1062	10.10	X	1063	11.41	Y	1064	11.1	Y	1065	12.7	Y
1066	12.34	Y	1067	10.83	X	1068	10.58	X	1069	9.6	Y	1070	10.91	X
1071	10.10	X	1072	10.87	X	1073	11.46	X	1074	10.16	X	1075	10.21	Y
1076	12.51	50	1077	12.8	Y	1078	11.61	Y	1079	11.25	Y	1080	12.32	X
1081	11.65	X	1082	10.41	X	1083	12.8	Y	1084	10.69	X	1085	9.72	X
1086	9.55	X	1087	9.80	Y	1088	11.45	Y	1089	11.78	Y	1090	12.9	Y
1091	10.8	Y	1092	10.61	X	1093	8.82	X	1094	12.02	X	1095	10.59	Y
1096	10.20	X	1097	11.71	X	1098	10.60	X	1099	10.04	X	1100	11.25	Y
1101	10.9	Y	1102	9.69	X	1103	12.49	Z	1104	12.4	Y	1105	10.20	Y
1106	11.8	Y	1107	8.96	X	1108	11.88	X	1109	10.04	X	1110	12.16	Y
1111	10.74	X	1112	10.15	Y	1113	9.52	X	1114	9.72	X	1115	9.31	X
1116	9.65	X	1117	12.13	Y	1118	9.79	X	1119	11.51	X	1120	12.2	Y
1121	11.4	Y	1122	11.6	Y	1123	11.62	Y	1124	10.79	X	1125	12.01	X
1126	12.6	Y	1127	10.92	X	1128	10.79	X	1129	10.04	Y	1130	12.1	Y
1131	14.2	Y	1132	11.07	X	1133	12.30	Y	1134	13.66	X	1135	10.37	X
1136	11.00	X	1137	11.16	Y	1138	11.1	Y	1139	12.55	Y	1140	10.33	Y
1141	13.4	Y	1142	10.48	X	1143	8.43	X	1144	10.12	X	1145	11.10	Y
1146	9.80	X	1147	12.04	Y	1148	10.10	Y	1149	10.29	X	1150	13.3	Y
1151	13.7	Y	1152	11.1	Y	1153	12.26	Y	1154	10.50	X	1155	11.81	Y
1156	12.8	Y	1157	10.09	X	1158	11.03	Y	1159	11.54	Y	1160	11.14	Y
1161	11.14	X	1162	9.58	Y	1163	10.62	X	1164	13.16	Y	1165	10.65	X
1166	11.5	Y	1167	9.94	X	1168	12.41	X	1169	13.2	Y	1170	12.52	Y
1171	9.84	X	1172	8.26	X	1173	8.91	X	1174	11.7	Y	1175	10.41	X
1176	11.1	Y	1177	9.25	X	1178	11.82	X	1179	13.9	Y	1180	9.15	X
1181	11.5	Y	1182	11.44	Y	1183	11.96	Y	1184	11.39	X	1185	12.11	Y
1186	9.52	Y	1187	11.35	X	1188	12.11	Y	1189	9.98	X	1190	12.1	Y
1191	10.5	Y	1192	12.93	Y	1193	12.1	Y	1194	10.62	X	1195	13.4	Y
1196	10.36	X	1197	10.15	X	1198	15.6	Y	1199	10.49	Y	1200	10.68	X
1201	11.50	X	1202	10.2	Y	1203	11.76	X	1204	12.27	Y	1205	14.1	Y
1206	9.48	X	1207	11.22	Y	1208	9.00	X	1209	10.4	Y	1210	10.08	Y
1211	10.94	X	1212	9.38	X	1213	11.0	Y	1214	11.01	X	1215	11.39	Z
1216	12.73	Y	1217	13.4	Y	1218	13.08	Y	1219	12.11	Y	1220	11.1	Y
1221	18.0	Y	1222	12.1	Y	1223	10.66	Y	1224	11.47	Y	1225	12.5	Y
1226	12.1	Y	1227	10.28	X	1228	11.6	Y	1229	11.04	X	1230	13.5	Y
1231	11.6	Y	1232	10.21	X	1233	11.2	Y	1234	10.77	Y	1235	12.96	X
1236	11.92	Y	1237	10.85	X	1238	11.9	Y	1239	12.6	Y	1240	9.80	X
1241	09.45	X	1242	10.31	X	1243	9.80	X	1244	11.41	Y	1245	10.05	49
1246	10.77	X	1247	10.64	X	1248	9.84	X	1249	11.77	Y	1250	12.26	X

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
1251	10.71	Z	1252	10.97	Y	1253	12.1	Y	1254	10.92	X	1255	10.41	X
1256	9.69	X	1257	11.90	Y	1258	10.53	X	1259	10.83	Y	1260	11.8	Y
1261	10.7	Y	1262	10.18	X	1263	10.48	X	1264	9.7	Y	1265	10.80	Y
1266	9.42	X	1267	12.27	Y	1268	9.17	X	1269	8.73	X	1270	12.73	Y
1271	10.52	X	1272	12.4	Y	1273	13.05	Y	1274	11.89	Y	1275	10.72	X
1276	10.7	Y	1277	11.12	X	1278	11.05	Y	1279	12.57	Y	1280	10.30	X
1281	11.51	X	1282	10.07	X	1283	10.8	Y	1284	10.23	X	1285	10.2	Y
1286	10.67	Y	1287	11.06	Y	1288	11.33	X	1289	10.64	Y	1290	12.6	Y
1291	10.36	Y	1292	11.41	X	1293	14.0	Y	1294	10.51	X	1295	10.5	Y
1296	11.5	Y	1297	11.3	Y	1298	10.90	X	1299	11.91	X	1300	11.11	X
1301	10.7	Y	1302	10.8	Y	1303	9.3	Y	1304	9.19	X	1305	10.49	X
1306	9.62	Y	1307	12.33	Y	1308	10.76	X	1309	10.24	X	1310	11.55	Y
1311	12.7	Y	1312	11.02	X	1313	11.8	Y	1314	12.73	Y	1315	9.95	X
1316	13.7	Y	1317	9.93	X	1318	12.0	Y	1319	10.6	Y	1320	10.8	Y
1321	10.29	X	1322	13.0	Y	1323	10.26	X	1324	12.5	Y	1325	12.1	Y
1326	10.96	Y	1327	12.17	X	1328	10.35	X	1329	10.80	Y	1330	10.18	X
1331	10.35	Y	1332	10.2	Y	1333	11.71	X	1334	10.01	X	1335	13.8	Y
1336	10.93	Y	1337	11.00	X	1338	12.91	Y	1339	10.84	Y	1340	11.32	X
1341	10.59	X	1342	11.45	Y	1343	11.42	X	1344	13.00	Y	1345	9.74	X
1346	11.29	X	1347	11.73	X	1348	11.20	X	1349	10.66	X	1350	10.62	Y
1351	10.05	X	1352	11.25	X	1353	10.00	Y	1354	10.32	X	1355	13.18	Y
1356	10.26	X	1357	11.03	X	1358	12.52	Y	1359	10.53	X	1360	11.3	Y
1361	11.40	X	1362	11.10	X	1363	11.60	Y	1364	10.97	Y	1365	12.23	Y
1366	10.39	X	1367	13.1	Y	1368	10.96	X	1369	10.69	X	1370	13.8	Y
1371	11.2	Y	1372	11.6	Y	1373	13.1	Y	1374	13.6	Y	1375	11.88	Y
1376	12.48	Y	1377	13.1	Y	1378	12.25	Y	1379	10.96	X	1380	12.0	Y
1381	11.96	Y	1382	12.26	Y	1383	11.77	X	1384	11.7	Y	1385	10.92	X
1386	13.6	Y	1387	13.2	Y	1388	11.10	Y	1389	11.64	Y	1390	9.21	X
1391	12.08	Y	1392	11.72	X	1393	12.28	Y	1394	11.89	Y	1395	11.6	Y
1396	11.87	Y	1397	11.49	X	1398	10.31	Y	1399	14.1	Y	1400	11.8	Y
1401	12.29	Y	1402	12.94	X	1403	11.29	X	1404	9.1	Y	1405	12.52	Y
1406	11.3	Y	1407	11.22	X	1408	10.9	Y	1409	10.57	X	1410	11.32	Y
1411	10.88	X	1412	12.5	Y	1413	11.41	Y	1414	12.6	Y	1415	12.43	Y
1416	10.47	Y	1417	11.19	X	1418	12.01	Y	1419	11.47	Y	1420	11.7	Y
1421	10.36	X	1422	13.43	Y	1423	11.23	Y	1424	9.48	X	1425	11.7	Y
1426	10.9	Y	1427	10.72	X	1428	10.36	X	1429	12.1	Y	1430	12.1	Y
1431	11.4	Y	1432	12.26	Y	1433	11.7	Y	1434	10.42	Y	1435	12.76	X
1436	10.70	X	1437	8.30	X	1438	11.22	X	1439	10.65	X	1440	11.7	Y
1441	13.0	Y	1442	11.62	Y	1443	11.2	Y	1444	11.0	Y	1445	11.85	X
1446	13.18	Y	1447	11.12	X	1448	13.2	Y	1449	12.6	Y	1450	11.79	X
1451	12.7	Y	1452	11.9	Y	1453	12.58	Y	1454	13.1	Y	1455	13.3	Y
1456	10.92	X	1457	11.3	Y	1458	11.64	X	1459	10.8	Y	1460	12.6	Y
1461	10.07	Y	1462	11.0	Y	1463	10.9	Y	1464	11.14	Y	1465	11.0	Y
1466	12.9	Y	1467	8.55	X	1468	13.49	Y	1469	9.77	X	1470	11.1	Y
1471	11.3	Y	1472	12.63	Y	1473	12.4	Y	1474	12.61	X	1475	13.0	Y
1476	13.7	Y	1477	11.59	X	1478	12.75	Y	1479	11.71	X	1480	13.38	Y
1481	10.47	X	1482	10.97	Y	1483	11.70	X	1484	11.1	Y	1485	11.4	Y
1486	13.47	Y	1487	10.53	X	1488	10.9	Y	1489	11.47	X	1490	12.15	Y
1491	11.5	Y	1492	12.98	Y	1493	11.91	X	1494	13.16	Y	1495	11.72	X
1496	12.46	Y	1497	11.8	Y	1498	11.9	Y	1499	11.44	X	1500	13.12	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
1501	12.43	X	1502	11.6	Y	1503	10.64	X	1504	11.89	Y	1505	11.39	X
1506	12.04	X	1507	13.5	Y	1508	11.90	Y	1509	12.74	Y	1510	11.40	X
1511	13.0	Y	1512	9.59	X	1513	13.40	Y	1514	12.4	Y	1515	12.8	Y
1516	12.04	X	1517	11.0	Y	1518	12.42	Y	1519	11.2	Y	1520	10.37	X
1521	12.1	Y	1522	12.54	Y	1523	12.54	Y	1524	10.74	X	1525	12.5	Y
1526	13.6	Y	1527	12.07	Y	1528	12.4	Y	1529	10.04	X	1530	13.4	Y
1531	11.9	Y	1532	11.01	Y	1533	10.92	Y	1534	11.88	X	1535	11.7	Y
1536	13.07	Y	1537	12.0	Y	1538	14.4	Y	1539	11.12	X	1540	10.7	Y
1541	11.30	X	1542	10.40	X	1543	12.4	Y	1544	11.89	Y	1545	11.60	X
1546	10.6	Y	1547	10.75	X	1548	11.7	Y	1549	12.5	Y	1550	11.80	X
1551	12.54	Y	1552	11.5	Y	1553	11.6	Y	1554	11.57	X	1555	11.55	X
1556	10.57	X	1557	11.25	Y	1558	10.29	X	1559	12.0	Y	1560	11.82	X
1561	10.9	Y	1562	11.80	Y	1563	12.7	Y	1564	10.87	X	1565	12.6	Y
1566	16.65	Y	1567	9.57	X	1568	12.0	Y	1569	12.09	X	1570	12.07	Y
1571	12.0	Y	1572	10.05	X	1573	12.6	Y	1574	10.4	Y	1575	12.6	Y
1576	11.07	Y	1577	14.1	Y	1578	10.33	X	1579	10.69	X	1580	14.55	02
1581	10.88	Y	1582	10.93	X	1583	8.66	X	1584	10.81	Y	1585	10.46	X
1586	12.4	Y	1587	11.7	Y	1588	11.0	Y	1589	12.13	Y	1590	11.87	Y
1591	11.91	Y	1592	11.62	X	1593	13.50	Y	1594	12.3	Y	1595	11.94	X
1596	10.7	Y	1597	12.2	Y	1598	13.2	Y	1599	11.01	X	1600	13.1	Y
1601	12.50	Y	1602	12.56	Y	1603	10.94	X	1604	10.58	24	1605	10.21	Y
1606	11.99	X	1607	11.76	X	1608	12.62	Y	1609	10.72	X	1610	13.6	Y
1611	10.7	Y	1612	11.0	Y	1613	11.75	X	1614	10.45	X	1615	11.36	Y
1616	11.1	Y	1617	10.9	Y	1618	11.6	Y	1619	12.21	Y	1620	15.82	Y
1621	11.64	Y	1622	12.3	Y	1623	10.7	Y	1624	11.24	X	1625	10.32	X
1626	11.40	Y	1627	12.88	Y	1628	10.06	X	1629	12.9	Y	1630	11.4	Y
1631	12.5	Y	1632	11.5	Y	1633	10.4	Y	1634	12.94	Y	1635	11.6	Y
1636	12.3	Y	1637	10.2	Y	1638	11.7	Y	1639	10.97	X	1640	13.5	Y
1641	10.68	Y	1642	11.2	Y	1643	12.6	Y	1644	12.01	Y	1645	11.5	Y
1646	12.05	Y	1647	10.2	Y	1648	12.63	Y	1649	11.6	Y	1650	11.56	X
1651	12.3	Y	1652	12.6	Y	1653	11.6	Y	1654	10.9	Y	1655	11.03	X
1656	13.1	Y	1657	12.79	Y	1658	11.41	Y	1659	10.1	Y	1660	13.0	Y
1661	12.9	Y	1662	11.9	Y	1663	13.7	Y	1664	12.6	Y	1665	11.88	Y
1666	12.91	Y	1667	11.95	Y	1668	12.4	Y	1669	10.75	X	1670	11.22	X
1671	12.40	X	1672	11.9	Y	1673	11.0	Y	1674	11.05	X	1675	12.0	Y
1676	13.0	Y	1677	12.2	Y	1678	10.9	Y	1679	10.4	Y	1680	11.3	Y
1681	11.60	Y	1682	12.89	Y	1683	11.7	Y	1684	10.85	X	1685	13.96	03
1686	10.8	Y	1687	10.15	Y	1688	12.2	Y	1689	11.73	Y	1690	10.7	Y
1691	10.95	X	1692	11.3	Y	1693	11.03	X	1694	12.13	X	1695	11.9	Y
1696	13.2	Y	1697	12.1	Y	1698	11.1	Y	1699	13.2	Y	1700	12.49	Y
1701	10.4	Y	1702	11.03	X	1703	13.1	Y	1704	12.7	Y	1705	13.1	Y
1706	12.8	Y	1707	12.61	Y	1708	11.6	Y	1709	12.98	Y	1710	13.4	Y
1711	11.04	Y	1712	9.9	Y	1713	13.1	Y	1714	11.6	Y	1715	12.1	Y
1716	11.9	Y	1717	12.44	Y	1718	13.6	Y	1719	11.4	Y	1720	13.2	Y
1721	10.6	Y	1722	12.53	X	1723	10.10	Y	1724	11.29	X	1725	11.1	Y
1726	11.9	Y	1727	13.1	Y	1728	11.6	Y	1729	12.4	Y	1730	11.6	Y
1731	9.9	Y	1732	10.8	Y	1733	13.0	Y	1734	11.4	Y	1735	9.6	Y
1736	12.2	Y	1737	11.0	Y	1738	12.6	Y	1739	13.53	Y	1740	13.25	X
1741	11.5	Y	1742	11.88	Y	1743	12.31	Y	1744	13.8	Y	1745	12.1	Y
1746	9.91	X	1747	13.38	Y	1748	10.52	X	1749	10.1	Y	1750	13.52	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
1751	12.2	Y	1752	13.5	Y	1753	11.1	Y	1754	9.74	X	1755	10.81	Y
1756	12.8	Y	1757	13.45	Y	1758	10.7	Y	1759	13.15	X	1760	11.5	Y
1761	11.5	Y	1762	11.7	Y	1763	13.1	Y	1764	11.2	Y	1765	9.92	X
1766	11.97	X	1767	12.26	Y	1768	12.45	X	1769	12.7	Y	1770	12.39	Y
1771	10.1	Y	1772	12.93	X	1773	11.42	Y	1774	12.2	Y	1775	12.2	Y
1776	11.0	Y	1777	11.8	Y	1778	11.8	Y	1779	14.3	Y	1780	10.69	Y
1781	12.7	Y	1782	10.85	X	1783	11.94	X	1784	11.81	Y	1785	12.8	Y
1786	11.0	Y	1787	11.3	Y	1788	11.7	Y	1789	12.54	Y	1790	12.61	Y
1791	12.0	Y	1792	12.05	X	1793	12.6	Y	1794	11.08	X	1795	11.9	Y
1796	9.66	X	1797	12.8	Y	1798	12.6	Y	1799	11.3	Y	1800	12.7	Y
1801	11.2	Y	1802	11.7	Y	1803	12.2	Y	1804	12.3	Y	1805	11.2	Y
1806	12.7	Y	1807	12.7	Y	1808	12.2	Y	1809	11.7	Y	1810	12.8	Y
1811	11.1	Y	1812	11.6	Y	1813	12.5	Y	1814	13.1	Y	1815	11.36	X
1816	13.6	Y	1817	12.2	Y	1818	14.1	Y	1819	10.7	Y	1820	13.5	Y
1821	13.7	Y	1822	13.04	Y	1823	13.0	Y	1824	11.7	Y	1825	11.8	Y
1826	11.84	X	1827	12.41	X	1828	11.1	Y	1829	12.6	Y	1830	12.53	Y
1831	12.84	Y	1832	11.28	X	1833	11.97	X	1834	11.6	Y	1835	11.6	Y
1836	11.5	Y	1837	13.47	Y	1838	10.8	Y	1839	11.6	Y	1840	11.7	Y
1841	11.37	X	1842	12.75	Y	1843	11.5	Y	1844	11.2	Y	1845	11.8	Y
1846	13.5	Y	1847	10.7	Y	1848	11.41	Y	1849	11.1	Y	1850	13.1	Y
1851	12.0	Y	1852	10.7	Y	1853	10.5	Y	1854	12.89	X	1855	12.7	Y
1856	12.3	Y	1857	12.6	Y	1858	11.7	Y	1859	10.84	X	1860	11.5	Y
1861	11.8	Y	1862	16.23	12	1863	15.81	Z	1864	15.02	Y	1865	16.91	Y
1866	13.2	Y	1867	8.60	X	1868	9.6	Y	1869	11.2	Y	1870	10.8	Y
1871	11.2	Y	1872	10.2	Y	1873	10.6	Y	1874	11.0	Y	1875	12.2	Y
1876	14.7	Y	1877	11.3	Y	1878	11.88	Y	1879	13.0	Y	1880	12.13	X
1881	11.0	Y	1882	11.0	Y	1883	13.2	Y	1884	13.2	Y	1885	13.6	Y
1886	11.6	Y	1887	11.53	Y	1888	12.0	Y	1889	10.7	Y	1890	11.2	Y
1891	11.7	Y	1892	12.28	Y	1893	11.3	Y	1894	12.3	Y	1895	12.34	X
1896	13.7	Y	1897	13.79	Y	1898	12.2	Y	1899	12.7	Y	1900	12.2	Y
1901	11.2	Y	1902	9.49	X	1903	10.7	Y	1904	11.7	Y	1905	13.54	Y
1906	12.7	Y	1907	12.1	Y	1908	11.2	Y	1909	12.3	Y	1910	10.6	Y
1911	10.11	X	1912	12.0	Y	1913	11.2	Y	1914	12.5	Y	1915	19.05	16
1916	15.03	Y	1917	15.2	Y	1918	11.2	Y	1919	13.77	Z	1920	14.34	Z
1921	14.5	Y	1922	11.8	Y	1923	13.5	Y	1924	13.2	Y	1925	12.2	Y
1926	12.1	Y	1927	11.8	Y	1928	12.95	Y	1929	12.2	Y	1930	11.2	Y
1931	13.4	Y	1932	13.5	Y	1933	13.3	Y	1934	12.7	Y	1935	13.3	Y
1936	11.2	Y	1937	12.2	Y	1938	12.7	Y	1939	10.7	Y	1940	11.2	Y
1941	11.2	Y	1942	13.1	Y	1943	15.83	Y	1944	13.7	Y	1945	12.2	Y
1946	12.7	Y	1947	10.2	Y	1948	12.2	Y	1949	13.5	Y	1950	13.84	Y
1951	14.5	Y	1952	10.59	X	1953	11.8	Y	1954	12.1	Y	1955	12.08	Y
1956	11.7	Y	1957	11.53	Y	1958	11.0	Y	1959	12.7	Y	1960	11.85	X
1961	11.2	Y	1962	12.2	Y	1963	10.89	X	1964	13.4	Y	1965	12.3	Y
1966	14.0	Y	1967	12.15	Y	1968	11.7	Y	1969	11.5	Y	1970	12.20	X
1971	12.3	Y	1972	13.2	Y	1973	11.7	Y	1974	12.0	Y	1975	12.1	Y
1976	13.49	Y	1977	11.3	Y	1978	13.1	Y	1979	13.6	Y	1980	14.07	Y
1981	16.9	Y	1982	12.90	Y	1983	12.7	Y	1984	11.2	Y	1985	11.2	Y
1986	12.0	Y	1987	11.8	Y	1988	13.6	Y	1989	12.2	Y	1990	13.15	Y
1991	13.5	Y	1992	12.1	Y	1993	12.2	Y	1994	12.2	Y	1995	12.6	Y
1996	12.1	Y	1997	13.3	Y	1998	12.50	Y	1999	10.7	Y	2000	11.36	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
2001	12.96	Y	2002	12.2	Y	2003	11.8	Y	2004	12.8	Y	2005	12.2	Y
2006	13.0	Y	2007	11.7	Y	2008	10.1	Y	2009	11.0	Y	2010	11.54	Y
2011	12.7	Y	2012	13.2	Y	2013	12.1	Y	2014	12.54	Y	2015	12.3	Y
2016	11.2	Y	2017	12.71	Y	2018	14.5	Y	2019	12.2	Y	2020	11.49	Y
2021	13.6	Y	2022	12.14	X	2023	11.6	Y	2024	13.3	Y	2025	10.7	Y
2026	13.2	Y	2027	11.7	Y	2028	14.1	Y	2029	13.2	Y	2030	13.6	Y
2031	13.3	Y	2032	11.6	Y	2033	13.7	Y	2034	12.7	Y	2035	12.78	Z
2036	12.7	Y	2037	13.7	Y	2038	12.2	Y	2039	12.7	Y	2040	11.7	Y
2041	12.5	Y	2042	12.9	Y	2043	11.0	Y	2044	13.2	Y	2045	12.3	Y
2046	11.0	Y	2047	13.7	Y	2048	13.79	Z	2049	15.1	Y	2050	12.79	Y
2051	11.7	Y	2052	10.53	Y	2053	12.14	X	2054	12.5	Y	2055	13.5	Y
2056	12.2	Y	2057	14.7	Y	2058	10.7	Y	2059	14.7	Y	2060	6.62	Y
2061	16.7	Y	2062	16.96	Y	2063	17.6	Y	2064	13.7	Y	2065	12.2	Y
2066	13.0	Y	2067	10.49	X	2068	11.7	Y	2069	11.2	Y	2070	13.6	Y
2071	13.2	Y	2072	12.64	Y	2073	12.7	Y	2074	13.8	Y	2075	13.7	Y
2076	14.2	Y	2077	13.2	Y	2078	12.7	Y	2079	12.2	Y	2080	13.6	Y
2081	12.13	X	2082	12.7	Y	2083	13.33	Y	2084	12.5	Y	2085	11.85	X
2086	11.9	Y	2087	13.2	Y	2088	12.48	Y	2089	11.25	Y	2090	11.02	Y
2091	10.4	Y	2092	11.6	Y	2093	13.2	Y	2094	12.79	Y	2095	12.8	Y
2096	13.2	Y	2097	11.7	Y	2098	12.1	Y	2099	15.44	Y	2100	16.12	17
2101	18.2	Y	2102	16.3	Y	2103	10.63	X	2104	9.9	Y	2105	12.4	Y
2106	11.7	Y	2107	11.5	Y	2108	11.5	Y	2109	11.91	X	2110	13.6	Y
2111	10.53	Y	2112	12.6	Y	2113	13.23	Y	2114	10.9	Y	2115	11.1	Y
2116	12.3	Y	2117	11.7	Y	2118	11.87	X	2119	13.7	Y	2120	10.6	Y
2121	12.5	Y	2122	12.1	Y	2123	11.05	Y	2124	12.05	Y	2125	12.71	X
2126	12.4	Y	2127	11.56	X	2128	14.0	Y	2129	14.0	Y	2130	14.1	Y
2131	12.97	Z	2132	11.2	Y	2133	13.5	Y	2134	13.0	Y	2135	18.0	Y
2136	11.6	Y	2137	11.1	Y	2138	11.6	Y	2139	12.81	X	2140	11.0	Y
2141	11.4	Y	2142	11.7	Y	2143	14.1	Y	2144	11.54	Y	2145	10.5	Y
2146	10.4	Y	2147	11.6	Y	2148	11.1	Y	2149	11.8	Y	2150	13.4	Y
2151	10.7	Y	2152	10.4	Y	2153	11.9	Y	2154	12.6	Y	2155	12.4	Y
2156	12.67	Y	2157	11.5	Y	2158	11.4	Y	2159	12.16	Y	2160	11.96	Y
2161	12.2	Y	2162	12.7	Y	2163	11.6	Y	2164	11.9	Y	2165	11.5	Y
2166	14.3	Y	2167	11.7	Y	2168	12.9	Y	2169	12.1	Y	2170	13.5	Y
2171	13.3	Y	2172	11.5	Y	2173	11.4	Y	2174	13.3	Y	2175	14.5	Y
2176	12.2	Y	2177	11.7	Y	2178	13.5	Y	2179	11.7	Y	2180	11.1	Y
2181	12.2	Y	2182	10.3	Y	2183	11.4	Y	2184	11.6	Y	2185	11.34	X
2186	12.4	Y	2187	13.48	X	2188	12.0	Y	2189	12.4	Y	2190	13.58	Y
2191	11.2	Y	2192	11.4	Y	2193	10.96	X	2194	12.6	Y	2195	12.6	Y
2196	10.24	X	2197	11.28	X	2198	14.5	Y	2199	13.1	Y	2200	12.7	Y
2201	15.41	Y	2202	16.3	Y	2203	12.01	X	2204	12.80	X	2205	11.7	Y
2206	11.6	Y	2207	8.87	X	2208	10.96	X	2209	10.9	Y	2210	14.4	Y
2211	13.9	Y	2212	14.0	Y	2213	13.8	Y	2214	11.7	Y	2215	11.6	Y
2216	10.9	Y	2217	11.20	X	2218	11.7	Y	2219	10.8	Y	2220	12.0	Y
2221	13.1	Y	2222	11.6	Y	2223	9.41	X	2224	11.9	Y	2225	12.0	Y
2226	11.75	Y	2227	13.8	Y	2228	11.85	X	2229	13.2	Y	2230	12.0	Y
2231	12.5	Y	2232	12.0	Y	2233	12.69	Y	2234	12.2	Y	2235	11.26	X
2236	12.4	Y	2237	11.2	Y	2238	12.3	Y	2239	11.46	X	2240	11.9	Y
2241	8.66	X	2242	13.9	Y	2243	12.9	Y	2244	12.2	Y	2245	11.4	Y
2246	10.71	X	2247	13.6	Y	2248	11.06	X	2249	11.40	X	2250	11.6	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
2251	11.6	Y	2252	12.85	X	2253	13.1	Y	2254	12.5	Y	2255	11.6	Y
2256	11.9	Y	2257	13.1	Y	2258	11.7	Y	2259	12.8	Y	2260	8.95	X
2261	13.43	Y	2262	12.7	Y	2263	11.0	Y	2264	10.59	X	2265	13.3	Y
2266	10.81	X	2267	13.7	Y	2268	11.9	Y	2269	10.6	Y	2270	10.81	X
2271	11.4	Y	2272	14.04	Y	2273	13.34	Y	2274	12.70	Y	2275	13.60	Y
2276	13.0	Y	2277	12.11	X	2278	14.27	X	2279	12.97	X	2280	14.14	Y
2281	13.5	Y	2282	13.4	Y	2283	12.70	Y	2284	12.7	Y	2285	13.7	Y
2286	13.2	Y	2287	13.1	Y	2288	11.3	Y	2289	13.4	Y	2290	12.16	X
2291	10.61	Y	2292	11.8	Y	2293	10.8	Y	2294	11.4	Y	2295	12.2	Y
2296	11.4	Y	2297	11.1	Y	2298	12.9	Y	2299	13.4	Y	2300	11.76	Y
2301	11.5	Y	2302	12.20	41	2303	11.5	Y	2304	12.22	X	2305	11.8	Y
2306	12.42	X	2307	11.19	X	2308	11.87	X	2309	11.4	Y	2310	12.1	Y
2311	10.55	X	2312	10.24	X	2313	13.12	X	2314	12.8	Y	2315	10.4	Y
2316	12.57	Y	2317	13.46	X	2318	13.85	Y	2319	12.15	Y	2320	10.7	Y
2321	11.7	Y	2322	12.6	Y	2323	11.1	Y	2324	11.64	X	2325	12.05	X
2326	10.61	X	2327	13.76	Y	2328	12.6	Y	2329	15.1	Y	2330	11.3	Y
2331	12.37	Y	2332	10.64	X	2333	11.88	X	2334	13.5	Y	2335	13.1	Y
2336	11.44	X	2337	12.05	X	2338	11.9	Y	2339	13.55	X	2340	20.2	Y
2341	12.7	Y	2342	11.97	X	2343	13.6	Y	2344	12.0	Y	2345	10.80	Y
2346	12.1	Y	2347	11.42	X	2348	12.5	Y	2349	11.58	X	2350	13.5	Y
2351	13.1	Y	2352	10.79	X	2353	11.9	Y	2354	11.4	Y	2355	11.5	Y
2356	10.67	X	2357	8.99	X	2358	11.2	Y	2359	12.93	Y	2360	12.43	X
2361	11.91	X	2362	13.6	Y	2363	8.8	Y	2364	10.77	X	2365	11.96	X
2366	13.95	Y	2367	13.75	Y	2368	15.6	Y	2369	12.00	X	2370	12.8	Y
2371	12.72	Y	2372	11.8	Y	2373	12.6	Y	2374	11.21	X	2375	10.71	X
2376	10.78	X	2377	12.44	Y	2378	10.59	X	2379	10.93	X	2380	13.2	Y
2381	12.2	Y	2382	11.5	Y	2383	13.47	Y	2384	12.40	30	2385	13.4	Y
2386	12.2	Y	2387	11.58	Y	2388	12.97	Y	2389	13.1	Y	2390	12.33	X
2391	12.5	Y	2392	13.39	Y	2393	10.6	Y	2394	11.49	X	2395	12.4	Y
2396	11.36	X	2397	11.25	X	2398	13.58	Y	2399	13.27	Y	2400	12.43	Y
2401	12.3	Y	2402	13.30	Y	2403	12.4	Y	2404	11.14	X	2405	12.09	Y
2406	13.6	Y	2407	10.77	X	2408	12.6	Y	2409	13.04	Y	2410	12.99	Y
2411	12.98	Y	2412	11.9	Y	2413	10.63	Y	2414	10.9	Y	2415	12.13	X
2416	11.0	Y	2417	12.25	X	2418	12.6	Y	2419	13.45	Y	2420	11.8	Y
2421	10.82	X	2422	13.6	Y	2423	13.7	Y	2424	13.0	Y	2425	11.72	Y
2426	11.55	X	2427	13.2	Y	2428	11.3	Y	2429	12.33	Y	2430	12.2	Y
2431	12.8	Y	2432	13.08	Y	2433	11.88	33	2434	11.61	X	2435	14.9	Y
2436	12.2	Y	2437	13.5	Y	2438	13.69	Y	2439	11.5	Y	2440	13.6	Y
2441	13.7	Y	2442	12.73	Y	2443	10.47	Y	2444	11.86	X	2445	12.94	Y
2446	12.99	Y	2447	13.05	X	2448	10.85	X	2449	14.47	Z	2450	11.55	X
2451	12.02	X	2452	12.02	X	2453	11.09	Y	2454	13.68	Y	2455	11.78	X
2456	9.6	Y	2457	12.9	Y	2458	11.59	X	2459	12.1	Y	2460	11.96	Y
2461	11.4	Y	2462	13.98	Y	2463	12.2	Y	2464	11.92	X	2465	12.4	Y
2466	12.1	Y	2467	12.65	Y	2468	12.8	Y	2469	12.1	Y	2470	11.7	Y
2471	11.66	X	2472	13.5	Y	2473	13.51	Y	2474	11.8	Y	2475	11.1	Y
2476	10.99	Y	2477	12.01	X	2478	12.54	Y	2479	13.1	Y	2480	13.49	Y
2481	13.93	X	2482	12.4	Y	2483	11.18	X	2484	13.5	Y	2485	12.54	X
2486	12.98	Y	2487	13.2	Y	2488	14.0	Y	2489	12.00	X	2490	12.19	X
2491	13.74	Y	2492	11.16	X	2493	12.8	Y	2494	10.70	X	2495	15.6	Y
2496	13.5	Y	2497	13.28	X	2498	12.03	X	2499	12.25	X	2500	12.84	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
2501	12.15	Y	2502	11.56	X	2503	14.1	Y	2504	11.93	X	2505	11.31	X
2506	11.86	Y	2507	11.63	X	2508	13.5	Y	2509	13.15	X	2510	12.28	Y
2511	12.82	Y	2512	12.8	Y	2513	13.5	Y	2514	12.95	X	2515	12.34	X
2516	13.76	Y	2517	11.75	X	2518	13.69	Y	2519	11.40	X	2520	11.73	X
2521	11.7	Y	2522	11.5	Y	2523	11.58	Y	2524	11.08	X	2525	10.76	X
2526	12.1	Y	2527	13.04	X	2528	11.6	Y	2529	13.1	Y	2530	11.8	Y
2531	11.01	Y	2532	12.7	Y	2533	11.76	X	2534	10.67	X	2535	12.64	33
2536	13.11	Y	2537	12.8	Y	2538	13.76	34	2539	14.39	Y	2540	13.2	Y
2541	12.1	Y	2542	11.47	14	2543	11.8	Y	2544	13.1	Y	2545	13.21	Y
2546	11.7	Y	2547	13.7	Y	2548	12.7	Y	2549	12.8	Y	2550	11.34	X
2551	12.40	43	2552	14.98	Y	2553	11.1	Y	2554	12.91	13	2555	12.03	31
2556	13.70	Y	2557	12.49	Y	2558	13.87	Y	2559	12.5	Y	2560	11.81	X
2561	13.12	Y	2562	10.56	Y	2563	11.42	X	2564	13.53	Y	2565	14.6	Y
2566	12.71	Y	2567	11.75	X	2568	13.4	Y	2569	11.34	X	2570	12.21	X
2571	13.21	Y	2572	13.4	Y	2573	11.3	Y	2574	12.56	Y	2575	12.8	Y
2576	11.22	X	2577	12.7	Y	2578	11.70	Y	2579	13.1	Y	2580	13.49	Y
2581	13.3	Y	2582	10.8	Y	2583	13.12	Y	2584	13.65	Y	2585	12.6	Y
2586	13.10	Y	2587	11.19	X	2588	13.43	X	2589	12.05	Y	2590	12.84	Y
2591	11.58	X	2592	11.7	Y	2593	14.01	Y	2594	11.7	Y	2595	12.37	X
2596	12.9	Y	2597	11.74	X	2598	12.59	X	2599	12.27	X	2600	11.29	Y
2601	11.30	X	2602	13.08	Y	2603	11.98	X	2604	13.0	Y	2605	12.7	Y
2606	11.42	X	2607	13.47	Y	2608	17.57	Y	2609	13.27	Y	2610	13.5	Y
2611	11.96	X	2612	11.20	X	2613	11.38	X	2614	13.3	Y	2615	12.9	Y
2616	12.4	Y	2617	10.66	X	2618	12.2	Y	2619	12.6	Y	2620	12.61	Y
2621	10.75	X	2622	11.6	Y	2623	13.3	Y	2624	10.6	Y	2625	13.4	Y
2626	11.9	Y	2627	11.93	X	2628	12.7	Y	2629	14.76	Y	2630	11.68	X
2631	11.79	X	2632	11.5	Y	2633	13.02	Y	2634	10.36	X	2635	13.25	Y
2636	11.46	X	2637	13.3	Y	2638	12.4	Y	2639	13.34	Y	2640	13.31	Y
2641	13.16	Y	2642	12.5	Y	2643	14.8	Y	2644	13.86	Y	2645	12.3	Y
2646	11.7	Y	2647	12.80	Y	2648	13.02	Y	2649	11.79	X	2650	11.7	Y
2651	12.4	Y	2652	11.8	Y	2653	12.2	Y	2654	12.6	Y	2655	11.30	X
2656	13.84	Y	2657	11.93	X	2658	12.6	Y	2659	11.15	X	2660	12.09	X
2661	11.6	Y	2662	14.4	Y	2663	13.86	Y	2664	13.9	Y	2665	13.34	Y
2666	11.8	Y	2667	11.9	Y	2668	13.52	Y	2669	12.77	X	2670	10.70	X
2671	13.7	Y	2672	12.34	X	2673	12.5	Y	2674	9.05	X	2675	12.45	Y
2676	12.7	Y	2677	11.87	X	2678	12.6	Y	2679	12.0	Y	2680	13.5	Y
2681	12.58	X	2682	13.76	Y	2683	11.97	X	2684	11.79	X	2685	12.36	X
2686	11.6	Y	2687	12.07	X	2688	11.84	X	2689	13.87	Y	2690	11.0	Y
2691	13.61	Y	2692	12.33	X	2693	13.22	Y	2694	13.94	Y	2695	12.10	X
2696	12.1	Y	2697	10.62	X	2698	12.15	X	2699	12.0	Y	2700	12.31	Y
2701	12.4	Y	2702	11.5	Y	2703	13.46	Y	2704	12.93	Y	2705	13.7	Y
2706	11.9	Y	2707	11.6	Y	2708	11.98	32	2709	13.44	Y	2710	13.43	X
2711	11.88	Y	2712	14.4	Y	2713	11.68	Y	2714	12.86	Y	2715	12.24	X
2716	13.5	Y	2717	12.76	Y	2718	11.9	Y	2719	13.5	Y	2720	14.0	Y
2721	12.0	Y	2722	12.27	X	2723	12.93	X	2724	12.32	X	2725	10.69	X
2726	12.4	Y	2727	12.4	Y	2728	12.59	X	2729	11.62	Y	2730	11.71	X
2731	10.90	X	2732	12.27	X	2733	13.39	33	2734	11.5	Y	2735	14.41	Y
2736	12.98	Y	2737	11.8	Y	2738	12.0	Y	2739	12.55	Y	2740	11.9	Y
2741	11.6	Y	2742	12.0	Y	2743	12.35	X	2744	15.09	Y	2745	13.37	Y
2746	13.68	Y	2747	11.5	Y	2748	13.0	Y	2749	12.26	X	2750	12.85	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
2751	12.9	Y	2752	11.4	Y	2753	11.81	X	2754	13.6	Y	2755	11.9	Y
2756	13.19	X	2757	11.56	X	2758	13.85	X	2759	9.77	X	2760	10.04	X
2761	12.08	X	2762	13.69	Y	2763	12.43	Y	2764	13.48	Y	2765	11.7	Y
2766	12.2	Y	2767	11.60	Y	2768	12.79	Y	2769	12.12	X	2770	13.1	Y
2771	13.03	X	2772	13.43	Y	2773	13.24	Y	2774	11.08	X	2775	13.5	Y
2776	12.62	Y	2777	13.40	Y	2778	13.06	Y	2779	13.53	Y	2780	13.3	Y
2781	12.03	X	2782	12.5	Y	2783	13.2	Y	2784	13.1	Y	2785	12.0	Y
2786	12.1	Y	2787	11.4	Y	2788	13.0	Y	2789	13.7	Y	2790	12.85	X
2791	11.5	Y	2792	13.00	Y	2793	11.0	Y	2794	13.1	Y	2795	13.19	Y
2796	12.51	50	2797	8.51	X	2798	13.0	Y	2799	14.6	Y	2800	12.9	Y
2801	12.31	X	2802	10.7	Y	2803	11.7	Y	2804	11.9	Y	2805	12.3	Y
2806	13.2	Y	2807	12.6	Y	2808	11.44	Y	2809	13.69	Y	2810	12.3	Y
2811	12.11	Y	2812	13.51	Y	2813	11.09	X	2814	12.44	Y	2815	13.12	Y
2816	11.87	X	2817	13.91	Y	2818	13.89	Y	2819	12.3	Y	2820	13.1	Y
2821	13.4	Y	2822	12.53	X	2823	13.3	Y	2824	13.58	Y	2825	13.4	Y
2826	11.60	X	2827	12.2	Y	2828	13.7	Y	2829	11.08	X	2830	12.55	Y
2831	12.15	Y	2832	12.5	Y	2833	12.15	Y	2834	12.0	Y	2835	11.9	Y
2836	11.1	Y	2837	11.94	Y	2838	14.27	Y	2839	12.7	Y	2840	12.96	Y
2841	12.8	Y	2842	11.9	Y	2843	12.94	Y	2844	13.61	Y	2845	13.51	Y
2846	10.6	Y	2847	12.6	Y	2848	11.50	X	2849	12.5	Y	2850	12.0	Y
2851	12.36	Y	2852	12.2	Y	2853	13.61	Y	2854	13.0	Y	2855	13.1	Y
2856	11.2	Y	2857	12.7	Y	2858	13.8	Y	2859	13.5	Y	2860	13.02	Y
2861	12.73	Y	2862	13.57	Y	2863	12.31	X	2864	12.68	X	2865	11.50	Y
2866	11.79	X	2867	12.81	Y	2868	13.22	X	2869	12.37	X	2870	12.92	Y
2871	12.75	Y	2872	12.62	X	2873	13.13	39	2874	13.58	Y	2875	12.39	X
2876	12.68	X	2877	12.1	Y	2878	11.57	X	2879	11.7	Y	2880	12.7	Y
2881	13.64	Y	2882	12.03	22	2883	13.19	Y	2884	12.1	Y	2885	14.2	Y
2886	13.5	Y	2887	13.07	Y	2888	13.2	Y	2889	11.50	Y	2890	12.96	Y
2891	11.11	X	2892	10.3	Y	2893	8.99	X	2894	12.2	Y	2895	9.23	X
2896	12.85	Y	2897	13.79	Y	2898	12.7	Y	2899	13.57	Y	2900	12.9	Y
2901	12.28	Y	2902	14.43	Y	2903	12.1	Y	2904	11.70	X	2905	11.99	X
2906	10.0	Y	2907	11.6	Y	2908	11.65	X	2909	11.49	Y	2910	13.91	Y
2911	11.4	Y	2912	12.8	Y	2913	12.5	Y	2914	13.95	Y	2915	13.39	X
2916	13.5	Y	2917	11.89	X	2918	12.1	Y	2919	12.09	X	2920	8.83	X
2921	13.4	Y	2922	13.8	Y	2923	13.3	Y	2924	11.9	Y	2925	14.2	Y
2926	13.6	Y	2927	12.23	X	2928	11.67	Y	2929	11.70	43	2930	12.52	X
2931	11.82	Y	2932	11.8	Y	2933	11.64	X	2934	11.2	Y	2935	13.03	X
2936	12.43	X	2937	13.09	Y	2938	11.44	X	2939	12.69	Y	2940	14.1	Y
2941	13.54	Y	2942	13.49	Y	2943	12.74	Y	2944	12.6	Y	2945	12.1	Y
2946	13.24	Y	2947	12.9	Y	2948	12.9	Y	2949	13.69	Y	2950	12.08	X
2951	10.0	Y	2952	14.2	Y	2953	11.68	X	2954	13.83	Y	2955	13.19	Y
2956	12.40	X	2957	10.6	Y	2958	12.2	Y	2959	11.09	X	2960	13.9	Y
2961	13.0	Y	2962	11.39	X	2963	12.50	Y	2964	12.4	Y	2965	13.7	Y
2966	13.58	Y	2967	11.18	X	2968	14.9	Y	2969	12.63	Y	2970	12.76	X
2971	13.6	Y	2972	14.13	Y	2973	12.53	Y	2974	13.9	Y	2975	12.8	Y
2976	10.88	X	2977	12.73	X	2978	11.7	Y	2979	11.75	X	2980	13.2	Y
2981	11.83	X	2982	12.00	Y	2983	11.12	X	2984	13.16	18	2985	12.29	Y
2986	12.04	X	2987	11.83	X	2988	11.9	Y	2989	13.05	Y	2990	13.3	Y
2991	13.77	Y	2992	13.0	Y	2993	12.67	X	2994	14.2	Y	2995	12.5	Y
2996	11.87	X	2997	13.16	X	2998	14.4	Y	2999	13.36	18	3000	13.2	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
3001	12.40	Y	3002	12.8	Y	3003	11.38	X	3004	14.4	Y	3005	13.88	Y
3006	13.61	Y	3007	12.76	Y	3008	11.88	X	3009	13.82	Y	3010	12.43	X
3011	11.9	Y	3012	11.1	Y	3013	13.54	Y	3014	13.18	Y	3015	11.15	X
3016	12.22	X	3017	11.99	X	3018	12.92	Y	3019	11.95	X	3020	12.17	X
3021	11.93	X	3022	13.5	Y	3023	13.75	43	3024	10.74	X	3025	11.6	Y
3026	11.99	X	3027	12.9	Y	3028	10.9	Y	3029	13.2	Y	3030	14.4	Y
3031	13.14	Y	3032	11.38	X	3033	12.51	Y	3034	12.28	Y	3035	12.62	X
3036	9.9	Y	3037	11.33	X	3038	13.45	Y	3039	12.6	Y	3040	14.7	Y
3041	12.52	12	3042	13.6	Y	3043	13.75	Y	3044	12.1	Y	3045	11.45	X
3046	12.9	Y	3047	12.91	X	3048	13.75	Y	3049	11.48	X	3050	14.65	Y
3051	12.9	Y	3052	13.2	Y	3053	12.53	Y	3054	11.27	X	3055	12.6	Y
3056	12.69	Y	3057	13.48	Y	3058	14.4	Y	3059	13.63	Y	3060	13.3	Y
3061	11.92	X	3062	10.96	X	3063	8.6	Y	3064	13.13	X	3065	12.09	X
3066	11.39	X	3067	13.2	Y	3068	13.3	Y	3069	13.9	Y	3070	14.11	Y
3071	11.9	Y	3072	13.57	Y	3073	13.57	Y	3074	13.60	Y	3075	14.0	Y
3076	13.84	Y	3077	12.96	40	3078	11.47	X	3079	13.22	X	3080	11.67	X
3081	14.07	Y	3082	12.38	X	3083	13.95	Y	3084	13.54	Y	3085	13.39	Y
3086	13.60	Y	3087	12.9	Y	3088	11.63	X	3089	10.9	Y	3090	12.1	Y
3091	13.8	Y	3092	10.68	X	3093	11.6	Y	3094	11.9	Y	3095	11.5	Y
3096	12.49	X	3097	12.31	X	3098	14.8	Y	3099	11.16	X	3100	14.0	Y
3101	13.4	Y	3102	16.04	Y	3103	14.7	Y	3104	11.17	X	3105	13.0	Y
3106	10.81	X	3107	13.8	Y	3108	13.9	Y	3109	11.7	Y	3110	12.96	X
3111	14.0	Y	3112	13.55	Y	3113	13.17	Y	3114	14.13	Y	3115	11.37	Y
3116	12.34	Y	3117	12.31	X	3118	11.03	X	3119	12.24	X	3120	11.86	X
3121	13.62	Y	3122	14.3	Y	3123	13.36	X	3124	13.24	X	3125	12.11	01
3126	12.30	X	3127	12.16	X	3128	11.34	X	3129	12.51	X	3130	12.9	Y
3131	12.03	X	3132	11.72	X	3133	13.53	Y	3134	10.34	X	3135	14.1	Y
3136	11.7	Y	3137	13.4	Y	3138	13.07	Y	3139	10.3	Y	3140	10.96	35
3141	10.3	Y	3142	12.43	X	3143	12.6	Y	3144	13.7	Y	3145	14.4	Y
3146	13.06	Y	3147	14.2	Y	3148	12.6	Y	3149	13.75	Y	3150	10.97	X
3151	11.99	X	3152	11.4	Y	3153	13.11	Y	3154	12.62	X	3155	12.4	Y
3156	11.56	X	3157	11.67	X	3158	12.54	X	3159	12.53	X	3160	13.71	40
3161	12.29	X	3162	11.46	15	3163	13.7	Y	3164	11.7	Y	3165	13.0	Y
3166	12.8	Y	3167	11.5	Y	3168	11.88	X	3169	12.32	X	3170	12.1	Y
3171	10.6	Y	3172	13.36	Y	3173	13.3	Y	3174	11.9	Y	3175	13.9	Y
3176	10.9	Y	3177	12.12	X	3178	11.9	Y	3179	11.9	Y	3180	14.6	Y
3181	13.0	Y	3182	12.3	Y	3183	12.7	Y	3184	12.90	X	3185	13.8	Y
3186	12.52	X	3187	13.2	Y	3188	13.4	Y	3189	13.1	Y	3190	13.01	X
3191	12.39	X	3192	13.8	Y	3193	13.26	15	3194	12.1	Y	3195	12.61	X
3196	12.4	Y	3197	11.88	33	3198	13.53	Y	3199	15.03	Y	3200	14.65	Y
3201	13.7	Y	3202	10.4	Y	3203	14.17	Y	3204	12.29	X	3205	13.22	X
3206	13.6	Y	3207	12.64	X	3208	12.17	X	3209	13.50	Y	3210	11.28	X
3211	12.8	Y	3212	13.89	Y	3213	12.28	X	3214	11.0	Y	3215	12.3	Y
3216	13.87	02	3217	14.5	Y	3218	13.6	Y	3219	11.8	Y	3220	13.3	Y
3221	13.28	Y	3222	11.42	X	3223	11.37	X	3224	11.35	X	3225	13.40	Y
3226	13.2	Y	3227	12.8	Y	3228	12.5	Y	3229	12.4	Y	3230	11.8	Y
3231	13.1	Y	3232	11.82	X	3233	13.0	Y	3234	12.8	Y	3235	13.1	Y
3236	13.81	Y	3237	10.7	Y	3238	13.1	Y	3239	14.66	Y	3240	9.9	Y
3241	12.09	X	3242	12.2	Y	3243	11.6	Y	3244	14.1	Y	3245	13.0	Y
3246	11.47	X	3247	13.01	Y	3248	10.97	X	3249	13.56	Y	3250	11.1	Y

No.	H	G	No.	H	G	No.	H	G	No.	H	G	No.	H	G
3251	12.2	Y	3252	12.14	X	3253	13.51	Y	3254	10.99	X	3255	13.72	30
3256	12.38	X	3257	13.50	Y	3258	13.36	Y	3259	9.9	Y	3260	12.79	Y
3261	11.77	X	3262	10.83	X	3263	13.11	Y	3264	12.32	X	3265	13.25	49
3266	13.50	Y	3267	12.90	Y	3268	13.4	Y	3269	12.74	X	3270	14.7	Y
3271	16.9	Y	3272	13.6	Y	3273	11.8	Y	3274	12.2	Y	3275	13.59	Y
3276	12.01	X	3277	11.27	X	3278	11.3	Y	3279	13.78	Y	3280	12.4	Y
3281	12.8	Y	3282	13.5	Y	3283	12.9	Y	3284	12.84	X	3285	12.39	X
3286	13.06	X	3287	14.3	Y	3288	15.34	Y	3289	14.2	Y	3290	11.5	Y
3291	12.2	Y	3292	12.2	Y	3293	13.7	Y	3294	12.6	Y	3295	12.9	Y
3296	13.04	X	3297	12.52	X	3298	13.6	Y	3299	13.4	Y	3300	10.5	Y
3301	13.2	Y	3302	12.9	Y	3303	11.8	Y	3304	13.0	Y	3305	12.4	Y
3306	12.6	Y	3307	13.5	Y	3308	11.72	X	3309	13.9	Y	3310	10.8	Y
3311	12.2	Y	3312	11.5	Y	3313	12.2	Y	3314	14.02	Y	3315	12.50	X
3316	11.6	Y	3317	8.4	Y	3318	11.0	Y	3319	12.4	Y	3320	13.4	Y
3321	13.0	Y	3322	12.1	Y	3323	13.6	Y	3324	12.1	Y	3325	11.9	Y
3326	12.8	Y	3327	12.0	Y	3328	11.2	Y	3329	11.9	Y	3330	11.2	Y
3331	13.4	Y	3332	11.8	Y	3333	11.7	Y	3334	12.1	Y	3335	12.5	Y
3336	14.5	Y	3337	12.5	Y	3338	14.5	Y	3339	11.2	Y	3340	13.8	Y
3341	12.6	Y	3342	12.4	Y	3343	13.3	Y	3344	12.9	Y	3345	11.8	Y
3346	11.1	Y	3347	11.7	Y	3348	11.9	Y	3349	12.8	Y	3350	14.4	Y
3351	12.9	Y	3352	15.9	Y	3353	13.7	Y	3354	13.0	Y	3355	13.8	Y
3356	13.3	Y	3357	11.4	Y	3358	12.4	Y	3359	14.1	Y	3360	16.4	Y
3361	19.9	Y	3362	18.0	Y	3363	12.0	Y	3364	13.1	Y	3365	12.2	Y
3366	11.5	Y	3367	12.1	Y	3368	11.2	Y	3369	12.2	Y	3370	14.2	Y
3371	11.9	Y	3372	12.3	Y	3373	13.7	Y	3374	12.9	Y	3375	13.8	Y
3376	12.4	Y	3377	12.5	Y	3378	13.2	Y	3379	13.3	Y	3380	12.1	Y
3381	13.6	Y	3382	13.3	Y	3383	12.6	Y	3384	13.9	Y	3385	12.8	Y
3386	12.8	Y	3387	12.8	Y	3388	13.2	Y	3389	12.6	Y	3390	13.6	Y
3391	10.3	Y	3392	14.3	Y	3393	12.8	Y	3394	13.4	Y	3395	11.8	Y
3396	11.2	Y	3397	14.3	Y	3398	13.7	Y	3399	12.4	Y	3400	14.3	Y
3401	13.0	Y	3402	15.4	Y	3403	13.0	Y	3404	12.9	Y	3405	12.2	Y
3406	11.6	Y	3407	12.4	Y	3408	13.4	Y	3409	12.2	Y	3410	13.5	Y
3411	13.5	Y	3412	13.6	Y	3413	13.5	Y	3414	13.8	Y	3415	10.6	Y
3416	14.2	Y	3417	13.8	Y	3418	12.2	Y	3419	11.1	Y	3420	11.6	Y
3421	13.7	Y	3422	12.4	Y	3423	12.3	Y	3424	12.7	Y	3425	10.9	Y
3426	12.8	Y	3427	13.6	Y	3428	12.2	Y	3429	13.9	Y	3430	12.4	Y
3431	9.9	Y	3432	11.6	Y	3433	13.0	Y	3434	13.1	Y	3435	13.0	Y
3436	12.2	Y	3437	13.4	Y	3438	11.5	Y	3439	12.6	Y	3440	12.3	Y
3441	12.0	Y	3442	11.7	Y	3443	13.5	Y	3444	12.8	Y	3445	12.2	Y
3446	13.5	Y	3447	12.9	Y	3448	13.2	Y	3449	12.7	Y	3450	12.6	Y
3451	8.1	Y	3452	13.4	Y	3453	11.8	Y	3454	13.8	Y	3455	12.8	Y
3456	13.9	Y	3457	11.9	Y	3458	12.7	Y	3459	13.0	Y	3460	12.3	Y
3461	13.3	Y	3462	13.3	Y	3463	13.2	Y	3464	13.6	Y	3465	13.5	Y
3466	13.4	Y	3467	13.0	Y	3468	11.8	Y	3469	11.2	Y	3470	13.2	Y
3471	11.3	Y	3472	13.9	Y	3473	13.7	Y	3474	12.8	Y	3475	11.4	Y
3476	12.0	Y	3477	13.4	Y	3478	12.9	Y	3479	11.6	Y	3480	13.2	Y
3481	13.6	Y	3482	12.3	Y	3483	13.6	Y	3484	12.6	Y	3485	12.9	Y
3486	13.5	Y	3487	12.9	Y	3488	12.9	Y	3489	13.4	Y	3490	13.3	Y
3491	12.4	Y	3492	11.5	Y	3493	13.4	Y	3494	12.9	Y	3495	11.5	Y

9.4.2 UBV Color Index Data Base

This file was created as explained in Section 9.3.1. The combined file contains data for 945 different numbered asteroids; all have B-V's and 933 have U-B's as well.

There were 369 U-B and 380 B-V observations in common between the TRIAD and ECAS data sets. Of these 749 observations 662 (88%) w\agreed to within 0.04 magnitude: only 27 (3.6%) differed by more than 0.09 magnitude. There are no systematic differences between the two data sets. 204 asteroids have only ECAS data and 361 only TRIAD data.

The table presented here gives the minor planet number (MP), U-B and B-V color indices and weights (U-B and B-V), and the source(s) (S) from which they were obtained. The source code is as follows:

S	Source
1	Bowell et al. (1979) ["TRIAD"]
2	Zellner et al. (1985) ["ECAS"]
3	Weighted mean of values from sources 1 and 2

Table 9-18 UBV Color Indices

MP	U-B		B-V		S
1	0.43	4	0.72	4	3
2	0.29	4	0.66	4	3
3	0.41	4	0.81	4	3
4	0.50	4	0.80	4	3
5	0.41	4	0.83	4	3
6	0.38	4	0.83	4	3
7	0.48	4	0.85	4	3
8	0.48	4	0.89	4	3
9	0.51	4	0.86	4	3
10	0.35	4	0.69	4	3
11	0.42	4	0.85	4	3
12	0.51	4	0.88	4	3
13	0.46	4	0.75	4	3
14	0.39	4	0.84	4	3
15	0.46	4	0.84	4	3
16	0.25	4	0.70	4	3
17	0.42	4	0.83	4	3
18	0.39	4	0.85	4	3
19	0.39	3	0.75	3	3
20	0.42	4	0.81	4	3
21	0.20	4	0.70	4	3
22	0.25	4	0.69	4	3
23	0.43	4	0.85	4	3
24	0.35	4	0.68	4	3
25	0.51	4	0.94	4	3
26	0.51	3	0.88	4	3
27	0.49	4	0.87	4	3
28	0.46	4	0.85	4	3
29	0.42	4	0.83	4	3
30	0.47	2	0.87	2	3
31	0.32	1	0.67	1	1
32	0.43	4	0.86	4	3
33	0.47	2	0.86	3	3
34	0.37	3	0.70	3	3
35	0.33	1	0.70	2	3
36	0.35	2	0.73	2	1
37	0.42	4	0.84	4	3
38	0.41	3	0.72	3	3
39	0.50	4	0.89	4	3
40	0.43	4	0.85	4	3
41	0.37	4	0.73	4	3
42	0.46	4	0.88	4	3
43	0.49	4	0.87	4	3
44	0.24	4	0.70	4	3
45	0.27	4	0.66	4	3
46	0.22	4	0.70	4	3
47	0.31	3	0.66	3	3
48	0.43	4	0.72	4	3
49	0.39	2	0.75	2	3
50	0.35	2	0.71	2	3
51	0.47	4	0.77	4	3
52	0.33	4	0.66	4	3
53	0.32	3	0.71	2	1
54	0.36	4	0.70	4	3
55	0.25	2	0.69	3	3
56	0.32	4	0.69	4	3
57	0.44	4	0.83	4	3
58	0.37	3	0.69	2	3
59	0.29	4	0.67	4	3
60	0.44	4	0.85	4	3
61	0.40	4	0.85	4	3
62	0.36	4	0.71	4	3
63	0.48	3	0.90	3	3
64	0.26	4	0.75	4	3
65	0.27	4	0.67	4	3
66	0.36	3	0.71	3	3
67	0.43	4	0.86	4	3
68	0.48	4	0.84	3	3
69	0.23	2	0.70	3	3
70	0.38	3	0.74	4	3
71	0.43	3	0.82	4	3
72	0.38	2	0.78	3	1
73	0.43	1	0.82	1	1
74	0.32	1	0.69	2	1
75	0.26	4	0.71	3	3
76	0.29	4	0.70	4	3
77	0.24	4	0.75	4	3
78	0.36	4	0.71	4	3
79	0.43	4	0.88	4	3
80	0.50	4	0.90	4	3
81	0.35	3	0.71	3	3
82	0.38	3	0.81	4	3
83	0.26	3	0.70	3	3
84	0.44	1	0.73	3	1
85	0.28	4	0.66	4	3
86	0.33	4	0.71	4	3
87	0.25	4	0.70	4	3
88	0.29	4	0.66	4	3
89	0.48	4	0.88	4	3
90	0.32	4	0.69	4	3
91	0.32	3	0.73	3	1
92	0.26	4	0.73	4	3
93	0.25	3	0.73	2	3
94	0.30	4	0.66	4	3
95	0.37	4	0.71	4	3
96	0.34	2	0.77	2	1
97	0.22	4	0.70	4	3
98	0.38	1	0.75	1	3
99	0.33	4	0.70	4	3
100	0.34	1	0.83	2	1
101	0.45	3	0.87	4	3
102	0.37	1	0.72	3	3
103	0.44	4	0.86	4	3
104	0.34	4	0.68	4	3
105	0.31	2	0.70	3	3
106	0.47	4	0.74	4	3
107	0.30	4	0.70	4	3
108	0.48	2	0.86	2	3
109	0.39	4	0.73	4	3
110	0.27	4	0.71	4	3
111	0.39	4	0.70	4	3
112	0.29	2	0.70	2	1
113	0.52	4	0.94	4	3
114	0.35	4	0.76	4	3
115	0.43	3	0.86	3	3
116	0.41	1	0.87	1	3
117	0.30	4	0.68	4	3
118	0.43	1	0.86	2	3
119	0.47	3	0.89	2	3
120	0.38	4	0.70	4	3
121	0.39	3	0.72	4	3
122	0.41	1	0.78	0	1
123	0.39	2	0.85	2	1
124	0.42	4	0.85	4	3
125	0.24	2	0.68	3	3
126	0.49	2	0.87	3	1
127	0.35	2	0.70	2	1
128	0.36	3	0.68	3	3
129	0.25	3	0.72	3	1
130	0.47	4	0.75	4	3
131	0.39	2	0.77	2	3
132	0.19	3	0.68	3	2
133	0.53	2	0.92	2	1
134	0.34	4	0.68	4	3
135	0.27	3	0.70	4	3
136	0.23	1	0.74	1	1
137	0.33	4	0.70	4	3
138	0.49	2	0.88	2	1
139	0.29	1	0.70	1	1
140	0.30	2	0.72	2	1
141	0.29	1	0.66	2	1
142	0.23	4	0.62	4	3
143	0.34	2	0.74	2	1
144	0.39	4	0.72	4	3
145	0.36	3	0.69	3	3
146	0.40	4	0.68	4	3
147	0.28	2	0.69	2	3
148	0.41	4	0.86	3	3
149	0.50	2	0.80	2	1
150	0.27	2	0.71	2	1
151	0.50	2	0.87	3	1
152	0.37	3	0.68	3	1
153	0.25	4	0.67	4	3
155	0.23	1	0.68	2	1
156	0.32	4	0.70	4	3
158	0.41	3	0.80	3	3
159	0.38	4	0.69	4	3
160	0.36	1	0.72	2	1
161	0.23	3	0.72	3	3
162	0.39	2	0.76	2	1
163	0.33	2	0.70	2	1
164	0.32	3	0.68	3	1
165	0.31	1	0.74	2	1
166	0.42	1	0.72	1	1
167	0.40	2	0.86	3	3
168	0.38	4	0.75	4	3
169	0.46	3	0.85	3	2
170	0.45	2	0.89	3	2
171	0.33	4	0.69	4	3
172	0.49	2	0.90	3	1
173	0.32	4	0.70	4	3
174	0.48	2	0.86	2	1
175	0.33	2	0.70	2	1
177	0.35	1	0.73	1	1
178	0.49	2	0.90	3	1
179	0.41	4	0.83	4	3
180	0.45	2	0.83	2	1
181	0.37	3	0.80	4	3
182	0.43	2	0.89	2	1
183	0.36	2	0.84	2	1
184	0.24	3	0.71	4	3
185	0.33	4	0.68	4	3
186	0.36	4	0.84	4	3
187	0.34	4	0.71	4	3
188	0.39	1	0.89	1	2
189	0.48	4	0.90	4	3
190	0.28	3	0.68	3	2
191	0.26	0	0.68	1	1
192	0.48	4	0.94	4	3
194	0.35	4	0.73	4	3
195	0.39	4	0.69	4	3
196	0.46	4	0.86	4	3
197	0.47	1	0.89	1	1
198	0.41	3	0.88	4	3
200	0.37	4	0.71	4	3

Table 9-18 UBV Color Indices (continued)

MP	U-B	B-V	S	MP	U-B	B-V	S	MP	U-B	B-V	S
201	0.25 3	0.71 3	3	288	0.41 3	0.85 3	3	381	0.32 3	0.67 3	3
202	0.46 2	0.86 2	1	289	0.65 3	1.05 3	2	382	0.25 2	0.69 2	3
203	0.29 2	0.70 1	1	293	0.35 2	0.72 3	1	383	0.35 2	0.67 2	3
204	0.41 2	0.82 3	3	295	0.50 2	0.85 2	1	384	0.41 2	0.85 2	1
205	0.32 1	0.69 1	1	296	0.46 3	0.88 3	2	385	0.44 1	0.90 2	1
206	0.36 4	0.70 4	3	302	0.28 3	0.65 3	3	386	0.40 4	0.74 4	3
207	0.36 2	0.73 2	1	304	0.26 4	0.71 3	3	387	0.46 4	0.88 4	3
208	0.40 3	0.80 4	3	305	0.49 2	0.89 2	1	388	0.29 4	0.72 3	3
209	0.29 4	0.69 4	3	306	0.46 4	0.86 4	3	389	0.41 4	0.86 4	3
210	0.26 4	0.67 4	3	307	0.30 1	0.67 1	1	390	0.29 1	0.79 1	1
211	0.36 4	0.72 4	3	308	0.37 4	0.79 4	3	393	0.32 2	0.74 3	1
212	0.29 1	0.70 1	1	311	0.43 1	0.83 1	1	394	0.40 3	0.83 3	2
213	0.21 4	0.64 4	3	312	0.41 2	0.84 1	1	395	0.38 2	0.73 3	1
214	0.23 3	0.70 4	3	313	0.33 3	0.71 3	3	397	0.37 2	0.81 3	1
215	0.45 2	0.84 2	1	317	0.23 1	0.67 1	3	402	0.40 3	0.80 3	3
216	0.24 4	0.70 4	3	318	0.29 1	0.68 1	1	403	0.00 0	0.90 1	1
218	0.42 1	0.86 1	1	321	0.41 2	0.79 2	1	404	0.33 3	0.66 3	3
219	0.49 1	0.87 2	3	322	0.23 2	0.72 3	2	405	0.37 4	0.69 4	3
221	0.40 4	0.79 4	3	323	0.48 2	0.90 3	3	406	0.28 3	0.73 3	2
222	0.39 3	0.66 4	3	324	0.30 3	0.70 3	1	407	0.38 2	0.70 2	3
223	0.29 2	0.71 3	2	325	0.24 1	0.70 1	1	409	0.34 2	0.72 3	1
224	0.20 3	0.75 3	1	326	0.32 4	0.71 4	3	410	0.40 2	0.75 2	3
225	0.27 3	0.66 2	3	328	0.42 1	0.89 1	1	413	0.22 1	0.68 1	1
228	0.60 1	0.92 3	2	329	0.31 3	0.69 3	3	414	0.38 2	0.75 3	2
229	0.25 2	0.71 2	2	331	0.30 2	0.70 2	1	415	0.23 2	0.71 3	1
230	0.44 3	0.85 4	3	333	0.37 1	0.75 1	1	416	0.46 3	0.88 4	3
232	0.35 4	0.70 4	3	334	0.36 4	0.72 3	3	417	0.36 1	0.76 2	2
233	0.33 3	0.78 3	3	335	0.23 4	0.62 4	3	418	0.25 3	0.69 3	3
234	0.49 4	0.87 4	3	336	0.27 2	0.73 2	3	419	0.24 3	0.64 3	3
235	0.54 2	0.90 2	1	337	0.31 2	0.69 2	3	420	0.23 3	0.69 3	3
236	0.44 4	0.85 4	3	338	0.24 3	0.70 3	3	421	0.45 1	0.85 1	2
237	0.41 0	0.79 1	1	339	0.41 4	0.77 4	3	422	0.28 2	0.70 2	1
238	0.38 4	0.73 4	3	341	0.00 0	0.92 1	1	423	0.30 4	0.67 4	3
240	0.34 3	0.70 2	3	342	0.36 2	0.71 2	1	426	0.34 1	0.71 1	1
241	0.29 3	0.69 4	3	343	0.46 1	0.77 2	1	429	0.35 3	0.74 2	2
243	0.44 3	0.81 4	3	344	0.38 2	0.71 3	3	431	0.33 3	0.64 3	2
245	0.47 4	0.84 4	3	345	0.41 4	0.72 4	3	432	0.45 2	0.87 2	1
246	0.59 3	0.99 3	3	346	0.49 3	0.85 3	3	433	0.52 4	0.90 4	3
247	0.26 2	0.69 3	1	347	0.26 3	0.68 3	2	434	0.25 4	0.71 4	3
250	0.26 4	0.72 4	3	349	0.54 4	0.93 4	3	435	0.29 3	0.70 3	1
254	0.50 1	0.85 2	1	350	0.37 4	0.69 4	3	438	0.20 1	0.61 1	1
255	0.25 2	0.68 1	1	351	0.40 2	0.84 2	1	439	0.24 1	0.72 1	1
257	0.38 1	0.76 1	1	352	0.52 4	0.90 4	3	441	0.27 2	0.69 3	1
258	0.45 4	0.86 4	3	354	0.54 4	0.95 4	3	442	0.33 3	0.69 3	2
259	0.28 1	0.67 1	1	356	0.35 3	0.73 3	1	443	0.48 3	0.90 3	2
260	0.31 1	0.71 1	1	357	0.35 2	0.72 3	1	444	0.30 4	0.68 4	3
261	0.31 3	0.69 4	3	359	0.30 2	0.70 2	3	445	0.37 2	0.68 2	1
262	0.53 1	0.84 1	1	360	0.28 2	0.68 3	3	446	0.62 2	1.03 2	3
264	0.42 4	0.84 4	3	361	0.19 4	0.75 4	3	447	0.36 1	0.78 1	1
266	0.34 2	0.71 2	2	362	0.35 2	0.71 2	1	448	0.30 3	0.66 3	1
267	0.00 0	0.80 1	1	363	0.37 2	0.75 3	1	449	0.38 3	0.70 2	3
268	0.26 4	0.64 4	3	364	0.52 3	0.89 3	3	450	0.48 1	0.78 1	1
270	0.53 3	0.87 3	1	365	0.32 4	0.72 4	3	451	0.33 4	0.65 4	3
271	0.33 2	0.71 1	1	368	0.29 3	0.73 3	2	454	0.35 2	0.66 2	1
273	0.38 2	0.76 2	1	369	0.26 4	0.71 4	3	455	0.31 2	0.70 2	1
275	0.33 4	0.72 4	3	370	0.29 1	0.71 1	1	458	0.47 1	0.88 1	1
276	0.27 4	0.71 4	3	371	0.51 1	0.82 1	1	459	0.45 1	0.87 2	2
277	0.42 2	0.83 3	3	373	0.36 2	0.67 2	3	461	0.31 2	0.61 2	1
279	0.21 2	0.75 4	3	374	0.44 3	0.85 3	3	462	0.42 4	0.84 4	3
281	0.49 2	0.95 2	1	375	0.34 2	0.68 2	1	463	0.29 1	0.71 1	1
282	0.27 1	0.63 1	3	376	0.47 2	0.88 3	3	464	0.00 0	0.64 1	1
283	0.30 1	0.71 1	1	377	0.28 2	0.75 2	1	466	0.34 2	0.66 2	3
284	0.38 2	0.70 3	1	378	0.39 1	0.84 1	1	468	0.31 2	0.67 3	1
286	0.30 1	0.67 1	1	379	0.29 1	0.67 1	3	469	0.27 3	0.65 3	2
287	0.47 3	0.87 3	3	380	0.37 3	0.71 3	3	470	0.47 3	0.89 3	2

Table 9-18 UBV Color Indices (continued)

MP	U-B	B-V	S	MP	U-B	B-V	S	MP	U-B	B-V	S
471	0.49 4	0.83 4	3	565	0.42 2	0.81 3	1	686	0.42 3	0.84 3	3
472	0.46 3	0.88 4	3	566	0.30 4	0.70 4	3	687	0.25 2	0.68 3	2
475	0.30 1	0.70 1	2	567	0.31 1	0.65 1	1	689	0.31 1	0.71 1	1
476	0.37 2	0.71 2	3	569	0.38 2	0.74 2	1	690	0.28 2	0.66 2	1
477	0.47 2	0.89 3	3	570	0.37 3	0.78 4	3	691	0.31 1	0.74 1	1
478	0.44 3	0.86 3	3	571	0.44 2	0.87 3	2	692	0.43 3	0.86 4	3
480	0.43 4	0.87 4	3	572	0.29 2	0.69 2	1	693	0.41 1	0.78 1	1
481	0.32 1	0.70 1	1	579	0.42 4	0.82 4	3	694	0.35 1	0.72 1	1
482	0.46 1	0.87 1	1	582	0.56 1	0.89 1	3	695	0.41 2	0.87 2	2
483	0.41 3	0.86 3	2	583	0.31 2	0.66 2	2	697	0.39 1	0.73 1	1
487	0.43 2	0.85 2	1	584	0.51 3	0.89 4	3	699	0.38 3	0.86 3	2
488	0.36 3	0.70 3	3	585	0.32 1	0.70 1	1	701	0.30 1	0.66 2	1
489	0.36 1	0.69 2	1	586	0.37 1	0.66 1	1	702	0.32 4	0.66 4	3
490	0.37 1	0.75 2	1	588	0.23 3	0.77 2	3	704	0.26 4	0.64 4	3
494	0.37 2	0.73 3	1	589	0.36 2	0.72 2	1	705	0.29 2	0.70 2	3
496	0.51 3	0.86 3	2	591	0.20 2	0.69 2	1	708	0.38 2	0.88 2	1
497	0.25 1	0.70 1	3	593	0.32 4	0.65 3	3	709	0.33 3	0.72 3	1
498	0.38 4	0.75 4	3	596	0.18 2	0.72 2	1	712	0.36 4	0.73 4	3
499	0.29 3	0.67 3	2	598	0.38 1	0.74 1	1	713	0.28 3	0.66 3	2
502	0.48 2	0.87 2	1	599	0.45 2	0.88 3	2	714	0.45 3	0.88 3	3
503	0.32 1	0.72 1	1	601	0.24 1	0.66 1	1	716	0.33 2	0.86 1	1
505	0.23 1	0.66 1	3	602	0.34 4	0.70 4	3	717	0.24 2	0.70 1	1
506	0.33 3	0.71 4	3	606	0.39 1	0.77 1	2	720	0.44 1	0.81 3	1
508	0.33 4	0.73 4	3	611	0.41 1	0.82 2	1	721	0.24 3	0.78 3	3
509	0.42 4	0.82 4	3	613	0.29 2	0.64 3	3	725	0.42 1	0.74 1	2
510	0.25 2	0.73 2	1	615	0.31 3	0.71 2	1	727	0.30 1	0.78 1	1
511	0.36 4	0.72 4	3	616	0.44 3	0.88 4	3	729	0.38 1	0.78 1	1
512	0.54 3	0.94 3	3	617	0.21 3	0.70 4	3	731	0.30 2	0.69 2	1
513	0.44 1	0.81 1	1	618	0.32 4	0.70 4	3	733	0.29 3	0.68 3	3
514	0.26 3	0.65 3	3	619	0.46 1	0.86 1	1	735	0.32 2	0.70 2	1
515	0.41 1	0.88 2	2	620	0.24 1	0.68 1	1	736	0.51 1	0.90 1	1
516	0.27 3	0.74 3	1	621	0.28 1	0.65 1	1	737	0.39 0	0.83 1	1
517	0.29 2	0.71 3	1	622	0.44 2	0.81 2	2	738	0.50 1	0.76 1	1
519	0.36 3	0.83 3	2	623	0.33 2	0.71 1	1	739	0.32 4	0.71 4	3
520	0.57 1	0.74 1	1	624	0.24 3	0.79 4	3	740	0.31 3	0.72 3	3
521	0.35 3	0.71 4	3	626	0.31 3	0.70 3	3	742	0.45 1	0.84 3	1
522	0.24 3	0.67 3	3	627	0.26 1	0.68 1	1	744	0.16 1	0.66 1	1
524	0.32 2	0.72 2	1	628	0.30 1	0.82 1	1	746	0.28 1	0.73 2	2
525	0.56 1	0.95 1	1	631	0.44 4	0.87 4	3	747	0.32 2	0.71 2	1
526	0.37 3	0.64 3	2	633	0.42 1	0.79 1	1	748	0.21 3	0.69 3	2
529	0.45 3	0.79 3	2	635	0.32 3	0.68 3	3	749	0.50 1	0.86 1	1
530	0.30 3	0.65 3	3	639	0.47 4	0.84 4	3	750	0.21 3	0.60 3	3
532	0.41 4	0.85 4	3	640	0.47 3	0.75 3	2	751	0.36 4	0.68 4	3
533	0.42 1	0.87 2	1	642	0.40 2	0.88 1	1	753	0.49 1	0.94 1	1
534	0.39 2	0.83 2	1	643	0.33 1	0.71 3	3	754	0.34 1	0.70 2	1
535	0.39 1	0.74 2	1	644	0.41 2	0.81 2	1	755	0.22 3	0.70 4	3
536	0.28 3	0.69 3	3	645	0.41 1	0.86 2	1	757	0.23 2	0.70 2	3
537	0.00 0	0.82 0	1	647	0.27 2	0.73 2	1	758	0.42 1	0.74 1	1
540	0.49 1	0.91 2	3	648	0.28 1	0.68 1	3	760	0.52 2	0.95 1	1
542	0.38 1	0.80 1	1	650	0.27 0	0.53 0	2	761	0.41 2	0.76 2	2
545	0.30 1	0.69 2	1	651	0.49 2	0.85 2	3	762	0.31 1	0.65 2	3
546	0.38 2	0.77 3	1	653	0.44 3	0.84 3	3	764	0.40 2	0.72 2	1
547	0.25 1	0.76 1	1	654	0.33 3	0.68 4	3	766	0.00 0	0.81 1	1
548	0.49 3	0.88 3	2	658	0.36 1	0.87 1	1	768	0.24 1	0.72 1	2
549	0.36 3	0.83 3	2	659	0.25 1	0.72 1	2	770	0.55 2	0.88 2	1
550	0.39 1	0.85 1	1	660	0.47 4	0.85 4	3	771	0.25 1	0.66 1	2
551	0.30 3	0.67 3	3	661	0.40 3	0.81 4	3	772	0.36 2	0.67 2	3
554	0.34 4	0.66 4	3	663	0.31 2	0.68 2	3	773	0.29 3	0.70 3	2
556	0.41 3	0.83 2	3	664	0.26 3	0.71 3	3	775	0.43 3	0.81 2	3
558	0.28 3	0.73 3	2	669	0.47 1	0.82 1	1	776	0.39 4	0.70 4	3
559	0.37 4	0.74 4	3	673	0.43 1	0.78 1	1	778	0.26 4	0.62 4	3
561	0.00 0	0.75 1	1	674	0.43 2	0.88 1	1	785	0.18 4	0.64 4	3
562	0.41 4	0.80 3	3	675	0.44 1	0.85 1	2	786	0.25 3	0.69 3	2
563	0.45 4	0.87 4	3	679	0.43 1	0.86 1	1	790	0.30 3	0.70 3	3
564	0.31 1	0.73 1	1	680	0.27 2	0.69 2	1	791	0.28 3	0.71 3	2

Table 9-18 UBV Color Indices (continued)

MP	U-B	B-V	S	MP	U-B	B-V	S	MP	U-B	B-V	S
793	0.00 0	0.82 1	1	963	0.53 1	0.90 2	1	1172	0.26 4	0.73 4	3
796	0.27 1	0.70 2	1	966	0.45 2	0.87 3	1	1173	0.26 3	0.71 2	3
797	0.51 2	0.89 2	1	968	0.37 1	0.87 1	1	1177	0.24 2	0.67 2	2
798	0.39 0	0.69 0	2	969	0.23 2	0.62 2	3	1180	0.22 3	0.70 3	2
800	0.52 1	0.92 1	1	974	0.48 3	0.90 2	2	1185	0.51 3	0.92 2	2
801	0.27 1	0.73 1	2	975	0.39 1	0.85 1	1	1186	0.43 1	0.79 1	1
804	0.38 4	0.71 4	3	976	0.25 1	0.74 1	1	1199	0.33 1	0.76 1	1
805	0.28 2	0.70 3	2	977	0.39 2	0.71 2	1	1208	0.32 1	0.69 1	3
807	0.46 2	0.85 2	1	978	0.24 1	0.67 2	1	1210	0.00 0	0.83 1	1
811	0.42 2	0.86 2	3	980	0.54 4	0.91 4	3	1212	0.22 4	0.70 4	3
814	0.34 3	0.68 3	1	981	0.33 1	0.62 1	1	1215	0.46 2	0.88 2	3
821	0.32 3	0.71 3	2	983	0.28 2	0.74 1	1	1216	0.53 0	0.90 1	1
822	0.00 0	0.77 1	1	991	0.37 1	0.66 1	1	1223	0.40 1	0.84 2	1
824	0.41 1	0.85 1	1	996	0.39 3	0.69 3	3	1224	0.41 1	0.90 1	1
825	0.54 2	0.91 3	1	1001	0.26 4	0.70 4	3	1235	0.33 1	0.75 1	1
828	0.00 0	0.67 1	1	1004	0.12 1	0.72 1	1	1236	0.38 2	0.76 2	2
830	0.50 1	0.90 2	1	1011	0.52 2	0.90 2	1	1241	0.29 1	0.75 1	1
834	0.47 1	0.75 2	1	1012	0.22 2	0.66 3	3	1245	0.44 3	0.83 4	3
838	0.31 2	0.71 3	2	1013	0.36 2	0.74 1	1	1247	0.29 1	0.68 2	1
846	0.39 1	0.61 1	1	1015	0.32 2	0.69 3	1	1249	0.48 2	0.88 3	2
847	0.46 1	0.90 1	1	1019	0.50 4	0.94 4	3	1251	0.26 2	0.71 3	3
849	0.25 4	0.70 4	3	1021	0.23 3	0.66 3	3	1252	0.42 1	0.89 1	1
851	0.48 1	0.86 2	2	1023	0.49 2	0.74 2	1	1256	0.24 3	0.73 3	2
853	0.29 1	0.73 2	1	1025	0.29 2	0.71 2	2	1263	0.29 1	0.73 1	1
857	0.14 1	0.63 1	1	1028	0.28 1	0.68 1	2	1266	0.34 2	0.73 3	3
860	0.21 1	0.66 1	2	1029	0.40 2	0.79 3	1	1268	0.24 3	0.66 3	3
863	0.61 3	1.08 4	3	1031	0.32 1	0.68 1	1	1269	0.27 2	0.77 3	2
864	0.55 2	0.91 2	2	1036	0.42 3	0.84 3	3	1274	0.53 1	0.90 2	1
868	0.36 1	0.71 1	1	1038	0.23 0	0.77 0	2	1275	0.29 3	0.70 3	3
872	0.28 1	0.73 1	1	1043	0.45 1	0.90 1	1	1277	0.38 3	0.73 3	2
873	0.32 2	0.68 2	2	1047	0.54 3	0.91 2	2	1280	0.36 1	0.67 1	2
876	0.43 1	0.81 2	1	1048	0.32 3	0.71 3	1	1284	0.35 2	0.77 2	2
877	0.24 3	0.64 3	3	1052	0.54 1	0.90 1	1	1286	0.43 1	0.85 1	1
880	0.30 2	0.63 2	2	1061	0.34 1	0.68 3	2	1289	0.38 1	0.78 1	1
883	0.48 1	0.86 1	1	1075	0.37 2	0.76 2	1	1306	0.40 1	0.85 1	1
884	0.20 2	0.71 2	3	1076	0.24 4	0.63 4	3	1307	0.55 2	0.88 2	2
887	0.43 1	0.84 2	3	1078	0.49 3	0.89 2	2	1310	0.44 3	0.91 3	2
888	0.50 3	0.88 3	1	1079	0.40 2	0.80 1	1	1314	0.46 1	0.87 1	1
890	0.33 2	0.77 1	1	1080	0.21 2	0.62 2	2	1317	0.34 1	0.72 1	1
893	0.23 1	0.67 1	1	1082	0.32 2	0.70 2	1	1326	0.48 1	0.78 1	1
897	0.39 3	0.83 3	2	1087	0.37 2	0.80 1	3	1328	0.16 1	0.70 1	1
899	0.26 2	0.68 3	1	1088	0.48 2	0.93 4	3	1329	0.53 1	0.87 2	1
901	0.55 3	0.90 2	2	1093	0.36 2	0.68 2	1	1330	0.17 1	0.67 1	1
907	0.27 3	0.71 3	2	1102	0.39 1	0.72 1	1	1331	0.35 1	0.64 1	1
909	0.28 2	0.69 2	2	1103	0.24 3	0.73 3	2	1336	0.37 2	0.81 2	2
911	0.22 2	0.77 3	1	1105	0.42 2	0.77 2	2	1339	0.43 2	0.79 2	1
914	0.35 3	0.74 3	3	1108	0.31 1	0.68 2	2	1341	0.26 2	0.68 2	1
920	0.30 1	0.80 1	1	1109	0.29 0	0.60 2	1	1342	0.30 3	0.71 3	2
924	0.34 1	0.72 2	1	1111	0.00 0	0.63 1	1	1345	0.30 2	0.71 2	3
925	0.42 2	0.84 4	3	1112	0.44 1	0.78 2	1	1350	0.37 1	0.85 3	2
927	0.34 1	0.67 1	1	1124	0.22 3	0.70 3	2	1355	0.26 1	0.71 1	2
931	0.22 3	0.68 3	2	1127	0.30 2	0.70 2	1	1357	0.00 0	0.73 1	1
932	0.33 2	0.67 2	1	1129	0.41 1	0.78 1	1	1359	0.36 1	0.72 1	1
937	0.53 2	0.94 2	2	1133	0.51 1	0.88 2	2	1362	0.36 2	0.72 2	1
939	0.54 1	0.93 1	1	1139	0.50 3	0.92 3	2	1390	0.21 2	0.71 3	3
940	0.36 1	0.58 1	1	1140	0.48 2	0.91 2	1	1391	0.46 3	0.87 4	3
941	0.31 1	0.70 1	1	1143	0.24 2	0.80 2	3	1392	0.23 1	0.76 1	1
943	0.39 1	0.78 1	1	1144	0.24 3	0.71 3	2	1401	0.48 2	0.88 2	1
944	0.22 2	0.75 2	1	1146	0.23 3	0.68 3	3	1415	0.48 1	0.86 2	1
945	0.39 2	0.81 2	2	1148	0.44 3	0.86 3	3	1416	0.41 1	0.79 1	1
946	0.34 4	0.66 4	3	1154	0.23 1	0.66 1	2	1418	0.48 1	0.92 1	2
951	0.55 1	0.87 1	2	1162	0.26 3	0.77 3	3	1422	0.52 1	0.87 1	2
954	0.31 2	0.62 2	1	1167	0.20 2	0.74 2	2	1434	0.40 2	0.81 2	3
958	0.19 0	0.83 0	2	1170	0.45 2	0.86 2	2	1437	0.24 2	0.70 2	1
962	0.41 2	0.82 3	2	1171	0.25 4	0.69 4	3	1439	0.32 1	0.75 1	1

Table 9-18 UBV Color Indices (continued)

MP	U-B		B-V		S
1442	0.44	1	0.87	1	2
1445	0.33	2	0.66	2	2
1453	0.53	2	0.94	2	3
1456	0.34	1	0.69	1	1
1461	0.20	2	0.71	2	3
1467	0.38	2	0.72	2	3
1474	0.20	1	0.63	3	1
1477	0.00	0	0.72	1	1
1479	0.00	0	0.69	2	1
1493	0.23	3	0.64	3	3
1500	0.52	1	0.92	1	1
1504	0.42	1	0.88	1	1
1508	0.25	3	0.64	3	2
1509	0.47	2	0.89	2	2
1512	0.20	2	0.72	3	3
1529	0.32	1	0.76	2	3
1532	0.36	1	0.84	1	1
1533	0.48	1	0.80	1	1
1547	0.34	2	0.78	2	1
1556	0.20	3	0.71	3	2
1564	0.33	2	0.70	1	2
1566	0.54	1	0.80	1	1
1567	0.00	0	0.72	2	1
1576	0.32	1	0.63	1	3
1578	0.30	2	0.79	3	2
1579	0.29	2	0.64	3	2
1580	0.27	2	0.66	2	1
1581	0.35	1	0.66	1	2
1583	0.24	2	0.75	4	3
1584	0.44	3	0.89	3	3
1595	0.48	1	0.66	1	1
1601	0.49	1	0.95	1	2
1602	0.55	1	0.93	1	1
1604	0.37	3	0.75	3	3
1606	0.39	2	0.73	3	2
1615	0.32	2	0.69	3	3
1619	0.55	1	0.90	1	2
1620	0.50	2	0.89	2	3
1621	0.47	1	0.90	1	1
1625	0.33	3	0.75	3	3
1627	0.47	4	0.87	3	3
1639	0.37	2	0.68	2	1
1644	0.40	1	0.87	2	2
1648	0.50	0	0.79	1	1
1650	0.21	3	0.63	4	3
1655	0.26	2	0.64	3	2
1657	0.00	0	0.86	1	3
1658	0.61	1	0.96	2	1
1665	0.48	2	0.85	2	2
1669	0.46	1	0.73	1	1
1681	0.45	2	0.88	1	1
1685	0.47	2	0.88	2	1
1691	0.32	1	0.68	2	2
1693	0.33	2	0.74	2	3
1694	0.42	2	0.74	2	1
1700	0.32	3	0.72	3	2
1702	0.20	1	0.74	1	1
1707	0.53	1	0.87	1	1
1711	0.43	1	0.85	2	2
1723	0.44	1	0.76	1	1
1724	0.26	0	0.69	1	2
1740	0.19	3	0.61	3	2
1746	0.23	3	0.72	3	2
1747	0.48	0	1.28	0	1
1748	0.26	1	0.73	1	2
1750	0.50	2	0.88	2	1
1754	0.25	2	0.67	2	3
1755	0.36	1	0.92	2	1
1765	0.27	2	0.75	2	1
1767	0.34	1	0.75	1	1
1768	0.23	1	0.61	1	2
1792	0.34	1	0.74	1	1
1794	0.31	2	0.70	2	2
1796	0.29	2	0.68	2	2
1815	0.33	2	0.62	1	2
1827	0.00	0	0.81	1	1
1830	0.50	1	0.91	1	1
1842	0.52	2	0.87	3	2
1862	0.50	3	0.82	3	2
1863	0.37	3	0.77	3	2
1864	0.50	2	0.83	2	1
1865	0.40	2	0.79	3	2
1867	0.24	4	0.72	4	3
1902	0.19	2	0.70	2	2
1911	0.22	2	0.70	2	2
1915	0.41	0	0.74	0	2
1916	0.41	1	0.85	2	1
1919	0.25	2	0.75	3	2
1920	0.26	2	0.72	3	2
1931	0.32	1	0.69	1	1
1943	0.45	2	0.84	2	2
1952	0.31	1	0.74	1	1
1963	0.33	2	0.74	2	2
1980	0.46	1	0.96	1	1
1990	0.50	1	0.86	2	2
2000	0.49	2	0.89	2	1
2001	0.27	3	0.71	3	2
2010	0.34	1	0.70	1	2
2035	0.28	1	0.81	1	3
2048	0.24	3	0.71	3	2
2050	0.42	2	0.87	3	2
2052	0.43	2	0.83	2	2
2060	0.28	2	0.70	2	2
2061	0.35	1	0.76	1	1
2062	0.46	1	0.93	1	1
2067	0.24	2	0.66	2	2
2081	0.22	2	0.60	3	2
2083	0.22	3	0.70	3	3
2089	0.40	1	0.82	2	1
2090	0.50	2	0.87	3	2
2099	0.35	1	0.83	1	1
2100	0.31	2	0.72	4	3
2111	0.46	1	0.80	2	2
2131	0.44	3	0.87	3	2
2134	9.99	0	0.94	1	1
2139	0.23	1	0.64	1	2
2151	0.50	1	0.77	1	1
2156	0.53	1	0.92	1	2
2196	0.25	1	0.67	1	2
2207	0.24	3	0.73	3	2
2208	0.24	2	0.75	2	2
2212	0.41	2	0.77	2	1
2223	0.22	2	0.79	3	2
2241	0.21	3	0.74	3	2
2246	0.24	3	0.74	3	2
2260	0.34	0	0.79	0	2
2266	0.26	3	0.75	3	2
2272	0.49	2	0.88	2	2
2274	0.41	1	0.77	1	1
2278	0.23	1	0.64	2	2
2279	0.22	3	0.62	3	2
2311	0.21	1	0.75	1	2
2312	0.25	3	0.73	3	2
2340	0.50	1	0.77	1	1
2345	0.43	3	0.81	2	2
2357	0.23	2	0.72	2	2
2363	0.25	2	0.75	2	2
2368	0.52	1	0.83	3	1
2375	0.23	3	0.73	3	2
2379	0.34	3	0.65	3	2
2405	0.31	1	0.70	1	2
2407	0.25	1	0.70	2	2
2411	0.55	1	0.93	1	2
2422	0.50	1	0.85	1	1
2430	0.42	2	0.82	2	1
2449	0.34	2	0.70	3	2
2491	0.26	2	0.76	2	2
2501	0.58	1	1.06	2	2
2510	0.47	2	0.89	2	2
2577	0.34	3	0.79	3	2
2608	0.41	1	0.80	2	1
2674	0.25	2	0.76	2	2
2735	0.41	0	0.83	0	2
2744	0.47	1	0.86	1	3
2760	0.26	3	0.72	3	2
2791	9.99	0	1.02	1	1
2809	0.24	1	0.65	1	2
2830	0.44	3	0.87	3	2
2893	0.24	2	0.73	3	2
3102	0.52	2	0.84	3	2
3123	0.28	2	0.60	3	2
3124	0.38	1	0.75	1	2
3169	0.30	3	0.77	3	2
3199	0.38	2	0.94	2	2
3288	0.50	3	0.92	3	2

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Appendix A. How to Obtain IRAS Asteroid and Comet Data

Final Data Products which have been released by the Infrared Processing and Analysis Center (IPAC) are regarded as being in the public domain.

These data may be obtained on magnetic tape from the National Space Science Data Center (NSSDC). A photocopy of the form shown as Form 1 (see attached page) and Form 2 (see attached pages) should be filled out and sent to the appropriate address along with a 2400-foot (732-m) (preferably new) magnetic tape. The data will be written on the requester's tapes and returned with documentation and a tape description. Please include the following information on the form: 1) your title (Dr., Mr., Ms., Prof., etc.) and full name (first and middle initial or first initial and middle name if preferred); 2) your return address; 3) telephone number and date the form is completed; 4) what the data are to be used for (research project [describe briefly], educational purposes, etc.; and 5) the maximum block size (physical record length) that your computer can process; otherwise, tapes will be prepared at about 32 Kbytes/block.

Uncertainties regarding type parameters, or special requests should be clarified by telephone by calling Dr. Wayne H. Warren, Jr. [(301) 286-8310, FTS 888-8310] or by TELEX (89675, answerback NASCOM GBLT) or letter before requests are submitted. The charge and service policy is outlined on the order form: charges can generally be waived for modest numbers of data when tapes are supplied.

NSSDC DATA REQUEST FORM*

Scientists OUTSIDE the United States send order to:	Requestors WITHIN the United States send order to:
WORLD DATA CENTER A ROCKETS AND SATELLITES CODE 630.2 GODDARD SPACE FLIGHT CENTER GREENBELT, MARYLAND 20771, USA	NATIONAL SPACE SCIENCE DATA CENTER CODE 633.4 GODDARD SPACE FLIGHT CENTER GREENBELT, MARYLAND 20771

REQUESTER INFORMATION (Please print)

NAME	TITLE/POSITION
DIVISION/BRANCH/DEPARTMENT	MAIL CODE
ORGANIZATION	
ADDRESS	
CITY	STATE
ZIP CODE OR COUNTRY	TELEPHONE (Area Code) (Number) (Extension)
DATE OF REQUEST	DATE DATA DESIRED (Our average processing time for a request is 3 to 4 weeks. Please allow ample time for delivery. We will notify you if we cannot meet the date specified.)

INTENDED USE OF DATA (check all that apply)

- ☐ Support of a NASA effort (project, study, etc.); Contract No. ______________
- ☐ Support of a U.S. Government effort (other than NASA)
- ☐ Research and analysis project (individual or company sponsored)
- ☐ Educational purposes (explain below)
- ☐ Preparation of Master's thesis
- ☐ Preparation of Doctoral thesis
- ☐ Other:
- ☐ Exhibit or display
- ☐ Reference material
- ☐ Use in publication

NSSDC requests the submission of all publications resulting from studies in which data supplied by NSSDC have been used. Please state briefly the research projects in which you are engaged and if you plan to prepare any articles based on this research.

*NSSDC has available special forms for ordering photographic data from the Surveyor, Lunar Orbiter, Apollo, and Mariner missions. These forms will be provided on request.

633-28 (12/84)

NSSDC CHARGE AND SERVICE POLICY

The purpose of the National Space Science Data Center (NSSDC) is to provide data and information from space science flight experiments in support of additional studies beyond those performed by the principal investigators. Therefore, NSSDC will provide data and information upon request to any individual or organization resident in the United States. In addition, the same services are available to scientists outside the United States through the World Data Center A (WDC-A) for Rockets and Satellites. (The addresses for both NSSDC and WDC-A are given on the reverse side.) Normally, a charge is made for the requested data to cover the cost of reproduction and the processing of the request. The requester will be notified of the cost, and payment must be received prior to processing the request. However, the Director of NSSDC may waive, as resources permit, the charge for modest amounts of data when they are to be used for scientific studies or for specific educational purposes and when they are requested by an individual affiliated with: (1) NASA installations, NASA contractors, or NASA grantees; (2) other U.S. Government agencies, their contractors, or their grantees; (3) universities or colleges; (4) state and local governments; and (5) non-profit organizations.

DATA REQUESTED

	Data Set Names	Form of Data* (e.g., 16mm microfilm) Refer to Data Announcement Bulletin	Subset Needed

Additional Specifications

*If requesting data on magnetic tape, please supply the necessary information below.

Density	Mode	Computer	
☐ 1600 bpi	☐ BIN (FITS)	____________	☐ New tapes will be supplied prior to processing.
☐ 6250 bpi	☐ ASCII		☐ Original NSSDC tapes will be returned.
	☐ EBCDIC		☐ I shall pay for new tapes.

APPENDIX B. DATA FORMATS

The formats for selected data records, files and products are tabulated in this appendix.

B.1 Scientific Data Analysis System (SDAS) Formats

The following information was generated by the SDAS Asteroid Tagging Algorithm (ATA).

B.1.1 CN28 and CN29

The CN28 data file contained a record for each potential asteroid sighting. Each record consisted of parameters as shown in Table B-1.

Table B-1 CN28 Parameters

1950.0 mean ecliptic longitude, latitude, and twist angle
1950.0 mean equatorial right ascension, declination, and twist angle
Position error parameters on the scan and cross-scan axes
Phase angle
Fluxes, flux error parameters, and signal-to-noise ratios in the four survey channels
Detection-template correlation coefficients for the four survey channels, and detector baselines in the twelve- and twenty-five micron channels
Detection time and detector identification array
Status words describing flux quality and confusion level
Known-source identifier (zero if no association)
Sequence number for grouped asteroid sightings (drop-dead sightings tagged with "1", other associated sightings with incremented-sequence numbers)
Figures of merit for motion probability and color temperature appropriate to solar system objects

The CN29 data file was essentially identical, except that it was generated at the months-confirmation level. The ADAS sighting data contain pointers to CN29 records, but in practice these were not used.

B.1.2 LRS Extraction Requests

The hours confirmation processor generated low-resolution spectrometer (LRS) data extraction requests for hours-confirmed sightings with signal-to-noise ratios above 25 in the twelve- or twenty-five-micron channels (bands one and two, respectively). The ATA generated similar requests for non-hours-confirmed potential asteroid sightings. These requests contained timing and focal-plane crossing information for a post-processor to use in the actual extraction process.

B.1.3 Statistical Data

Certain statistical parameters were computed by the ATA to aid in tuning the thresholds for asteroid recognition. These included dispersion parameters in position and color, counters for correct and incorrect identifications of known asteroids and known inertially fixed point sources, histograms of asteroid sighting group sizes, and correlation analysis of observed vs. predicted apparent motion in ecliptic longitude and latitude.

B.2 Asteroid Data Analysis System (ADAS) Formats

B.2.1 Input Data

Input to ADAS came from a variety of sources, some generated by machine, others compiled by hand. A description of the input data follows.

B.2.1.1 Asteroid Tagging Algorithm Output (IP01)

The ATA output has been defined earlier in section 5.2.2.1. While only CN28 data were used directly in ADAS, the ATA also operated at the months confirmation processing stage and produced a very similar file, CN29. This was originally intended to gather slow-moving objects. Since the ADAS approach was different, and since the CN29 records were a subset of the CN28 (with some loss of position information for (hours-confirmed averaged sightings), the presence of some sightings in CN29 was simply noted with an association bit in the status word of the IP01 records.

The CN28 data were filtered and reformatted. Specifically, the *a priori* (i.e., predicted) known-object records were stripped out, and a small fraction of the records affected by an SDAS processing problem were removed (this problem involved an erroneous value for the cross-scan uniform component of position uncertainty, and rendered position values unusable). In addition, the way in which the ATA was forced to operate produced a significant amount of redundancy, since candidate sightings could be output more than once as part of a sighting group, and then they could come up again as drop-deads and be output yet again. This redundancy was removed, but the linking information was preserved in a small parallel file.

At this point, the non-seconds-confirmed sightings were filtered out; this means that to be retained, a sighting had to be detected in the twenty-five-micron channel (band 2) with at least a status of non-seconds-confirmed due (possibly) to a failed detector. This reduced the size of IP01 from about 4.5 million sightings to about 2.5 million. In addition, the status word ASTATW was initialized, and the SOP and OBS numbers were looked up and inserted into the record. The bin number for the data base position-access key was also computed.

Finally a band-merge correction was performed which involved combining the pieces of certain sightings which had not been put together during the SDAS processing. Since the SDAS products were intended to be inertially fixed sources, and since there was a requirement on the completeness of the catalog to be produced, whenever any significant doubt existed about whether a combination of detections was caused by two close sources, the detections were left unmerged in order to avoid producing one spurious source with an unconfirmable position. The unmerged detections are sometimes referred to as "fractured" sightings in the literature, but in fact they were never put together in the first place. Since the potential failure at hours confirmation was not a concern in the ADAS processing, and since all the

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data that would ever come along were available at the time, these detections were put together as they would have been in SDAS if the completeness concern had not existed.

The parameters for each sighting in IP01 are defined in Table B-2.

Table B-2. IP01 Parameters

ASTLAM	: 1950.0 mean ecliptic longitude (spacecraft-centered)
ASTBET	: 1950.0 mean ecliptic latitude (spacecraft-centered)
ASTGAM	: 1950.0 mean ecliptic twist angle (spacecraft-centered; third Euler angle for transforming from 1950.0 mean ecliptic coordinates to focal-plane coordinates centered on the sighting with the orientation about the line of sight equal to that in effect when the source was scanned)
ASTSGY	: gaussian in-scan position uncertainty
ASTLZ	: uniform cross-scan position uncertainty
ASTSGZ	: gaussian cross-scan position uncertainty
ASTRA	: 1950.0 mean equatorial right ascension (spacecraft-centered)
ASTDEC	: 1950.0 mean equatorial declination (spacecraft-centered)
ASTGAC	: 1950.0 mean equatorial twist angle (spacecraft-centered)
ASTANG	: solar elongation
ASTFLX(4)	: flux in the four IRAS survey bands
ASTSGF(4)	: log-gaussian uncertainties in ASTFLX
ASTNAM	: detection time in deciseconds past 1981.0
ASTDET	: primary detector ID
ASTDTS(4)	: detector ID array (packed in-band detector numbers)
ASTFST	: flux status array (packed codes for confirmation/detection status)
ASTSNR(4)	: signal-to-noise ratio in each survey band
ASTCST	: confusion status word
ASTID	: numbered asteroid association found by SDAS
INNSOP	: SOP number
INNOBS	: OBS number
IP01S1	: spare
BINNUM	: position bin number
ASTBL1	: detector baseline in the ten-micron channel
ASTBL2	: detector baseline in the twenty-micron channel
ASTCOR	: correlation coefficient array (packed)
ASTATW	: status word

For more information on the ASTCST and ASTFST (confusion and flux) status words, see Beichman et al (1985), Chapter V, pages 21 and 33. For more information on the ASTATW status word, see Section B.2 herein.

B.2.1.2 Spacecraft Heliocentric Ephemeris File (SHEF)

The Spacecraft Heliocentric Ephemeris File (SHEF) is a slightly reformatted version of a standard SDAS file. It is used to obtain the heliocentric 1950.0 mean ecliptic spacecraft vector so that conversion of asteroid position vectors from sun-center to spacecraft-center can be performed. A SHEF record covers one SOP period, so it is necessary to know the SOP number, which is also the direct-access record number for the corresponding SHEF record. The contents of each record are as shown in Table B-3.

Table B-3. SHEF Parameters

NSOP	: SOP number
NRECS	: number of spacecraft vectors in this record
V(4,300):	double-precision vector table; V(I,J), I = 2, 3, 4, is the Jth instantaneous sun-spacecraft vector in kilometers, and V(1,J) is the corresponding time tag in deciseconds past 1981.0

B.2.1.3 ADAS Area Coverage File (AACV)

The ADAS Area Coverage File (AACV) contains information about the passage of the IRAS telescope boresight through each bin in the all-sky bin system. This bin system is the same one used by SDAS to keep track of area coverage. The bins are formed by partitioning the sky into ecliptic latitude bands and then segmenting these bands into bins of approximately 46 arcminute width. The latitude range of the bands varies from about six degrees at the ecliptic to about half a degree near the poles, and is set to optimize parameters involved with the sun-locked scanning mode which are not important to the discussion herein. Any position in 1950.0 mean ecliptic coordinates can be mapped to one of the bins in this system, and the bin number can be used as a direct-access record number in the AACV. The contents of each AACV record are as follows.

Table B-4. AACV Parameters

NORB	: number of orbits on which the telescope passed through the corresponding bin
VTINA(200)	: array of times that the boresight entered the bin
VTOUTA(200)	: array of times that the boresight exited the bin
VNORBA(200)	: array of orbit numbers on which the boresight passed through the bin

B.2 AAG Known Object File (IP02)

The other main input file which was produced contained orbital elements and physical parameters for five types of known solar system objects that IRAS might have seen. The contents of the file are as in Table B-5.

Table B-5. Object Types

Type 1	- the first 3318 numbered asteroids
Type 2	- 135 unnumbered asteroids for which good orbital elements were available
Type 3	- The nine major Planets
Type 4	- 94 Comets with elliptical orbits
Type 5	- 15 Comets with hyperbolic orbits

The record for each object contains the following parameters:

Table B-6. Parameters for Objects in IP02

Time of perihelion passage	for epoch	2445440.5
Argument of perihelion	"	"
Longitude of ascending node	"	"
Inclination	"	"
Eccentricity	"	"
Perihelion distance	"	"
The above parameters repeated for epoch 2445600.5		
Absolute magnitude and associated quality code		
Slope parameter and associated quality code		
Diameter and associated quality code		
B-V color index and associated quality code		
Albedo and associated quality code		
Object type and identification number used by ADAS		
Name and/or provisional designation		
Taxonomic class and associated quality code		

B.2.1.5 IRAS Working Survey Data Base

The file known as the Working Survey Data Base (WSDB) produced by SDAS contains positions, flux densities, uncertainties, and other observational and processing histories of point-like sources detected by IRAS (see ES Sec. X.B.3.); the WSDB was used to remove contamination of fixed point sources from the asteroid data base. The status word assigned to every sighting in the ADAS data base (see ASTATW in Section 6.1.1.8 below) revealed whether that particular detection was associated with a point source on the months-confirmed level, and whether there was a time match, as well. This association would ultimately cast doubt upon the worthiness of the particular sighting in question and make it a candidate for rejection during asteroid catalog production.

B.2.1.6 SES Files

The Small Extended Source (SES) file is another by-product of SDAS processing which contains sources between one and ten arcminutes in angular extent. Again, association of individual asteroid sightings with entries in the SES file are noted in the sightings' status word. There were several intermediate products in SDAS involving small extended sources. The one actually referenced by this association is known technically as the CUSPOOL data set. It is the output of the Cluster Analysis Processor (CAP), and consists of spatially merged small extended sources which were found not to be fragments of larger-scale structure during the cluster analysis.

B.2.1.7 Observation Parameters File (PR04)

The SDAS Observation Parameters File (PR04) is used as it was produced by SDAS. It contains the parameters in Table B-7 for each survey observation.

Table B-7. PR04 Parameters

NSOP	:	SOF number
NOBS	:	OBS number
TO	:	Observation start time (TO)
TF	:	Observation stop time (TF)
NORB	:	Orbit number
NUBAR	:	Mean solar aspect Euler angle ($\langle \nu \rangle$)
PSIO	:	Starting value of the angle about the sun vector (ψ_o)
DPSI	:	Total change in angle about the sun vector during this observation
PSIDB	:	Mean rate of change of the angle about the sun vector ($\dot{\psi}$)
SIGNU	:	Standard deviation of the solar aspect Euler angle (σ_ν)
SIGPSD	:	Standard deviation of the rate of change of the angle about the sun vector
SOLONG	:	Mean solar longitude during this observation (1950.0 mean ecliptic, $\lambda_\odot$)

B.2.1.8 Status Word Definitions

Many of the properties of sightings are recorded via individual bit settings in "status words" in the SDAS and ADAS intermediate and final data products. Three of the most important are named ASTATW, ARSTAT, and ADSTAT.

B.2.1.8.1 ASTATW

The status word, ASTATW, is very important throughout the ADAS processing; it is a 32-bit integer with each bit assigned a meaning as indicated in Table B-8.

Table B-8. ASTATW

hex bit	bit position	decimal number equivalent	association indicated
00000001	1	1	LRS extraction requested
00000002	2	2	spare bit
00000004	3	4	appears in CN29
00000008	4	8	WSDB position match (HCON only)
00000010	5	16	WSDB position match (MCON)
00000020	6	32	months SES position match
00000040	7	64	relative flux out of spec
00000080	8	128	known asteroid/comet
00000100	9	256	IRAS Catalog source
00000200	10	512	outer-slot detections only
00000400	11	1024	faint asteroid
00000800	12	2048	band-merge correction was applied (see section 6.1.1.1)

00001000	13	4096	used in band 1 albedo average
00002000	14	8192	used in band 2 albedo average
00004000	15	16384	used in band 3 albedo average
00008000	16	32768	used in band 4 albedo average
00010000	17	65536	CUSPOOL band 1 position match
00020000	18	131072	CUSPOOL band 2 position match
00040000	19	262144	CUSPOOL band 3 position match
00080000	20	524288	CUSPOOL band 4 position match
00100000	21	1048576	CUSPOOL band 1 time match
00200000	22	2097152	CUSPOOL band 2 time match
00400000	23	4194304	CUSPOOL band 3 time match
00800000	24	8388608	CUSPOOL band 4 time match
01000000	25	16777216	band 1 high density region
02000000	26	33554432	band 2 high density region
04000000	27	67108864	band 3 high density region
08000000	28	134217728	band 4 high density region
10000000	29	268435456	WSDB time match
20000000	30	536870912	matched 2 different known asts
40000000	31	1073741824	not the only 1 to match known
80000000	32	2147483648	spare bit

B.2.1.8.2 ARSTAT

This status word contains information concerning the sighting's acceptance or rejection. A "1" bit indicates the condition is true; a "0" bit indicates the condition is false.

Table B-9. ARSTAT

hex bit position	bit no.	decimal value	condition and notes
00000001	1	1	sighting was accepted
00000002	2	2	associated with Known Asteroid/Comet
00000004	3	4	passed AS signal/noise test
00000008	4	8	passed AS color test
00000010	5	16	AS decision based on ASTATW
00000020	6	32	spare bit
00000040	7	64	at least one flux status OK
00000080	8	128	at least one correlation coefft OK
00000100	9	256	at least one S/N ratio OK
00000200	10	512	N/M ratio OK
00000400	11	1024	position match score OK
00000800	12	2048	at least one derived albedo is OK
00001000	13	4096	ASTATW OK
00002000	14	8192	absolute colors OK
00004000	15	16384	CSTAT bits OK in all bands
00008000	16	32768	passed hand inspection

B.2.1.8.3 ADSTAT

This status word contains information concerning the albedo and diameter estimates for the sighting. These codes are kept for each band separately, one byte per band. The four bytes are treated as an array of four LOGICAL*1 elements, with the first corresponding to band one, the others in band order. A "1" bit indicates the condition is true; a "0" bit indicates the condition is false. The bit definitions for each band are as follows.

Table B-10. ADSTAT

hex bit position	bit no.	decimal value	condition and notes
00000001	1	1	albedo iteration not converged
00000002	2	2	PV/G table jump occurred
00000004	3	4	more than the max permitted no. of PV/G table jumps occurred
00000008	4	8	spare bit
00000010	5	16	spare bit
00000020	6	32	spare bit
00000040	7	64	spare bit
00000080	8	128	spare bit

*The "PV/G table jump" is discussed in Section 6.1.4.5 herein.

B.2.2 Output Data

B.2.2.1 Known Object Products

Output data take the form of both machine-readable data bases and printed catalogs. Product descriptions follow.

B.2.2.1.1 FPN2 - Asteroid Catalog and Data Base (FDP No. 2)

This product consists of a header record for each object, followed by a list of sighting records. The number of sightings varies from object to object, and is given by the parameter F2NSIT in the header record.

Header Record List:

F2ID, F2TYPE, F2NSIT, F2ALB, F2SIGA, F2DIAM, F2SIGD, F2EP1, F2AP1, F2LA1, F2I1, F2E1, F2PD1, F2EP2, F2AP2, F2LA2, F2I2, F2E2, F2PD2, F2B10, F2PC, F2Q, F2BMV, F2LTCV, F2FVAR, F2ASTW, ER1, B10Q, BMVQ, CLSQD, SPARQ

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Header Record Format:

(3I10,1P4E14.6,1P12D20.12,1P9E14.6,2I10,6A1)

Header Record Parameter Definitions:

Table B-11. FPN2 Header Record Parameters

Name	Units	Format	Description
F2ID	-	I10	ADAS ID
F2TYPE	-	I10	ADAS TYPE
F2NSIT	-	I10	No. of usable sightings
F2ALB	-	1PE14.6	Derived geometric albedo (p_V)
F2SIGA	-	1PE14.6	Uncertainty (one-sigma) in derived albedo (σ_{pv})
F2DIAM	km	1PE14.6	Derived diameter (D)
F2SIGD	km	1PE14.6	Uncertainty (one-sigma) in derived diameter (σ_D)
F2EP1	JD	1PD20.6	Time of perihelion passage[1] (T)
F2AP1	deg	1PD20.6	Argument of perihelion[1] (ω)
F2LA1	deg	1PD20.6	Longitude of the ascending node[1] (Ω)
F2I1	deg	1PD20.6	Inclination[1] (i)
F2E1	-	1PD20.6	Eccentricity[1] (e)
F2PD1	AU	1PD20.6	Perihelion distance[1] (q)
F2EP2	JD	1PD20.6	Time of perihelion passage[2] (T)
F2AP2	deg	1PD20.6	Argument of perihelion[2] (ω)
F2LA2	deg	1PD20.6	Longitude of the ascending node[2] (Ω)
F2I2	deg	1PD20.6	Inclination[2] (i)
F2E2	-	1PD20.6	Eccentricity[2] (e)
F2PD2	AU	1PD20.6	Perihelion distance[2] (q)
F2B10	mag	1PE14.6	Blue absolute magnitude (H_B)
F2PC	-	1PE14.6	Slope parameter (G)
F2Q	-	1PE14.6	Phase integral (Q)
F2BMV	mag	1PE14.6	B-V color
F2LTCV	-	1PE14.6	Probability that flux variation significantly affected the flux measurements (P_{FV})
F2FVAR	mag	1P4E14.6	Magnitude of flux variation in each band (Δmag)
F2ASTW	-	I10	Composite status word
ER1	-	I10	Ephemeris quality code
B10Q	-	2A1	Absolute magnitude quality code
BMVQ	-	2A1	Color quality code
SPARQ	-	2A1	Spare

Table B-11. FPN2 Header Record Parameters (continued)

Notes: 1) Orbital element set no. 1
2) Orbital element set no. 2

Sighting Record List:

TNAM, DNAM, MM, YS, ASTRA, ASTDEC, ASTSGY, ASTSGZ, ASTLZ, TWIST, ASTFLX, ASTSGF, ASTSNR, ASTCOR, ASTFST, ASTATW, ARSTAT, ADSTAT, ASTCST, PRDRAS, PRDREA, PRDALP, V, ADDIAM, ADSIGD, ADALB, ADSIGA

Sighting Record Format: (3I10,1P19E14.6,6I10,1P20E14.6)

Sighting Record Parameter Definitions

Table B-12. FPN2 Sighting Record Parameters

Name	Units	Format	Description
TNAM	ds	I10	SDAS sighting name (time part)
DNAM	-	I10	SDAS sighting name (detector ID part)
MM	YYMM	I10	Observation time, year and month
YS	day	1PE14.6	Observation day (UT day and fraction of day)
ASTRA	rad	1PE14.6	Right ascension (geocentric)
ASTDEC	rad	1PE14.6	Declination (geocentric)
ASTSGY	rad	1PE14.6	In-scan position uncertainty (one-sigma)
ASTSGZ	rad	1PE14.6	Cross-scan gaussian position uncertainty (one-sigma)

Table B-12. FPN2 Sighting Record Parameters

Name	Units	Format	Description
ASTLZ	rad	1PE14.6	Cross-scan uniform position uncertainty (one-sigma)
TWIST	rad	1PE14.6	Position twist angle (from north counter-clockwise to cross-scan axis)
ASTFLX	Jy	1P4E14.6	Flux density in each survey band
ASTSGF	Jy	1P4E14.6	Flux density uncertainty (one-sigma) in each survey band
ASTSNR	-	1P4E14.6	Signal-to-noise ratio in each survey band
ASTCOR	-	I10	Correlation coefficients in each survey band (packed)
ASTFST	-	I10	Flux status words for each survey band (packed)
ASTATW	-	I10	Associated data status word
ARSTAT	-	I10	Acceptance/rejection status word
ADSTAT	-	I10	Albedo determination status word
ASTCST	-	I10	Confusion status word
PRDRAS	AU	1PE14.6	Asteroid-sun distance
PRDREA	AU	1PE14.6	Asteroid-earth distance
PRDALP	rad	1PE14.6	Phase angle
V	mag	1PE14.6	Expected visual magnitude
ADDIAM	km	1P4E14.6	Derived diameter in each survey band
ADSIGD	km	1P4E14.6	One-sigma uncertainty in ADDIAM
ADALB	-	1P4E14.6	Derived albedo in each survey band
ADSIGA	-	1P4E14.6	One-sigma uncertainty in ADALB

B.2.2.1.2 FPN4 - Asteroid Summary Catalog and Data Base (FDP No. 4)

This product is identical to the header records in FPN2 except that in the printed version, the two sets of orbital elements have been omitted.

B.2.2.1.3 FPN6 - Asteroid Statistics Catalog and Data Base (FDP No. 6)

This product contains information pertaining to the number of times each object was sighted, the number of times it was predicted, and possible reasons for any failures to be sighted each time it was predicted.

Record List:

ID, TYPE, NPRED, NSIGHT, N2FANT,
NDEDET, NNOISY, NNOALI

Record Format: (8I10)

Record Parameter Definitions

Table B-13. FPN6 Record Parameters

Name	Units	Format	Description
ID	-	I10	ADAS ID
TYPE	-	I10	ADAS TYPE
NPRED	-	I10	No. of predicted sightings
NSIGHT	-	I10	No. of realized sightings
N2FANT	-	I10	No. of times predicted too faint to detect
NDEDET	-	I10	No. of times not detected and image crossed over dead band 2 detector
NNOISY	-	I10	No. of times not detected and image crossed over noisy band 2 detector
NNOALI	-	I10	No. of times not detected and no likely reason identified for the nondetection

B.2.2.1.4 FPN7 - Comet Catalog and Data Base (FDP No. 7)

This product contains information concerning known comets. The structure is similar to FPN2, implying a header record for each object and a list of sighting records.

Header Record List:

F2ID, F2TYPE, F2NSIT, FPDIAM, FPSIGD, F2EP1, F2AP1, F2LA1, F2I1, F2E1, F2PD1, F2EP2, F2AP2. F2LA2, F2I2, F2E2, F2PD2, F2ASTW, F2CUSF, F2CUSS, F2REMC

Header Record Format:

(3I10,1P2E14.6,1P12D20.6,I10,1P2E14.6,248A1)

Header Record Parameter Definition

Table B-14. FPN7 Header Record Parameters

Name	Units	Format	Description
F2ID	-	I10	ADAS ID
F2TYPE	-	I10	ADAS TYPE
F2NSIT	-	I10	No. of usable sightings
F2EP1	JD	1PD20.6	Time of perihelion passage[1] (T, fractional part)
F2AP1	deg	1PD20.6	Argument of perihelion[1] (ω)
F2LA1	deg	1PD20.6	Longitude of the ascending node[1] (Ω)
F2I1	deg	1PD20.6	Inclination[1] (i)
F2E1	-	1PD20.6	Eccentricity[1] (e)
F2PD1	AU	1PD20.6	Perihelion distance[1] (q)
F2EP2	JD	1PD20.6	Time of perihelion passage[2] (T, fractional part)
F2AP2	deg	1PD20.6	Argument of perihelion[2] (ω)
F2LA2	deg	1PD20.6	Longitude of the ascending node[2] (Ω)
F2I2	deg	1PD20.6	Inclination[2] (i)
F2E2	-	1PD20.6	Eccentricity[2] (e)
F2PD2	AU	1PD20.6	Perihelion distance[2] (q)
F2ASTW	-	I10	Associated data status word
F2CUSF	Jy	1PE14.6	Band-2 flux of associated small extended source
F2CUSS	rad	1PE14.6	Band-2 size of associated small extended source
F2REMC	-	248A1	Remark field

Table B-14. FPN7 Header Record Parameters

Notes: 1) Orbital element set no. 1
2) Orbital element set no. 2

Sighting Record List:

TNAM, DNAM, MM, YS, ASTRA, ASTDEC, ASTSGY, ASTSGZ, ASTLZ, TWIST, ASTFLX, ASTSGF, ASTSNR, ASTCOR, ASTFST, ASTATW, ARSTAT, ASTCST, PRDRAS, PRDREA, PRDALP, ADDIAM, ADSIGD, ADCRSC, CUSFLX, CUSMNR

Sighting Record Format: (3I10,1P19E14.6,5I10,1P17E14.6)

Sighting Record Parameter Definitions

Table B-15. FPN7 Sighting Record Parameters

Name	Units	Format	Description
TNAM	ds	I10	SDAS sighting name (time part)
DNAM	-	I10	SDAS sighting name (detector ID part)
MM	YYMM	I10	Observation time, year and month
YS	day	1PE14.6	Observation day (UT day and fraction of day)
ASTRA	rad	1PE14.6	Right ascension (geocentric)
ASTDEC	rad	1PE14.6	Declination (geocentric)
ASTSGY	rad	1PE14.6	In-scan position uncertainty (one-sigma)
ASTSGZ	rad	1PE14.6	Cross-scan gaussian position uncertainty (one-sigma
ASTLZ	rad	1PE14.6	Cross-scan uniform position uncertainty (one-sigma)

Table B-15. FPN7 Sighting Record Parameters

Name	Units	Format	Description
TWIST	rad	1PE14.6	Position twist angle (from north counter-clockwise to cross-scan axis)
ASTFLX	Jy	1P4E14.6	Flux in each survey band
ASTSGF	Jy	1P4E14.6	Flux uncertainty (one-sigma) in each survey band
ASTSNR	-	1P4E14.6	Signal-to-noise ratio in each survey band
ASTCOR	-	I10	Correlation coefficients in each survey band (packed)
ASTFST	-	I10	Flux status words for each survey band (packed)
ASTATW	-	I10	Associated data status word
ARSTAT	-	I10	Acceptance/rejection status word
ASTCST	-	I10	Confusion status word
PRDRAS	AU	1PE14.6	Comet-sun distance
PRDREA	AU	1PE14.6	Comet-earth distance
PRDALP	rad	1PE14.6	Phase angle
ADDIAM	km	1P4E14.6	Derived diameter in each survey band
ADSIGD	km	1P4E14.6	One-sigma uncertainty in ADDIAM
ADCRSC	km**2	1P4E14.6	Cross-sectional area in each band
CUSFLX	Jy	1PE14.6	Band-2 flux of associated small extended source
CUSMNR	rad	1PE14.6	Band-2 size of associated small extended source

B.2.2.1.5 FPN9 - Asteroid LRS Spectra Catalog and Data Base (FDP No. 9)

Header Record List:

ID,TYPE,NSPEC

Header Record Format:

(3I10)

Header Record Parameter Definitions

Table B-16. FPN9 Header Record Parameters

Name	Units	Format	Description
ID	-	I10	ADAS ID
TYPE	-	I10	ADAS TYPE
NCNT	-	I10	No. of associated spectra

Spectral Record List:

TNAM,DNAM,MM,YS,SGY,SGZ,LZ,TWIST,SPCTRM,PRDRAS,PRDREA, PRDALP

Spectral Record Format:

(3I10,1P208E14.6)

Spectra Record Parameter Definitions

Table B-17. FPN9 Spectral Record Parameters

Name	Units	Format	Description
TNAM	ds	I10	SDAS sighting name (time part)
DNAM	-	I10	SDAS sighting name (detector ID part)
MM	YYMM	I10	Observation time, year and month
YS	day	1PE14.6	Observation day (UT day and fraction)
SGY	rad	1PE14.6	In-scan position uncertainty
SGZ	rad	1PE14.6	Cross-scan gaussian position uncertainty
LZ	rad	1PE14.6	Cross-scan uniform position uncertainty
TWIST	rad	1PE14.6	Position twist angle
SPCTRM	w/m2	1P200E14.6	LRS spectra(100 samples in each channel, 8 to 15 and 14 to 22 microns, resp.)
PRDRAS	AU	1PE14.6	Asteroid-sun distance
PRDREA	AU	1PE14.6	Asteroid-earth distance
PRDALP	rad	1PE14.6	Phase angle

B.2.2.1.6 FPNC - Asteroid Name, Provisional Designation, and Pointers to FPND (FDP No. 12)

Record List:

ID,TYPE,POINT,ASTNAM,PROVIS

Record Format:

(3I10,16A1,9A1)

Record Parameter Definition:

Table B-18. FPNC Record Parameters

Name	Units	Format	Description
ID	-	I10	ADAS ID
TYPE	-	I10	ADAS TYPE
POINT	-	I10	pointers to files in FPND ("1" indicates association, "0" indicates none) bit no. / decimal value / file 1 / 1 / 24 color 2 / 2 / 8 color 3 / 4 / Lightcurve 4 / 8 / Polarimetry 5 / 16 / UBV
ASTNAM	-	16A1	Asteroid name
PROVIS	-	9A1	Provisional Designation

B.2.2.1.7 FPND - Asteroid Ground-Based Data (FDP No. 13)

Record List:

FILE,ID,TYPE,DATA

Record Format:

(I1,I5,1X,I1,204A1)

Record Parameter Definition:

Table B-19. FPND Record Parameters

Name	Format	Description
FILE	I1	Ground-based data file 1 - 24 color spectrophotometry 2 - 8 color survey 3 - Lightcurve 4 - Polarimetry 5 - UBV
ID	I5	ADAS ID
TYPE	I1	ADAS TYPE
DATA	204A1	corresponding format of data file (see Section 9.3)

B.2.2.1.8 FPNF - Asteroid Reject Data Base (FDP No. 15)

This product contains those sightings rejected during catalog production.

Record List:

TNAM, DNAM, ID, TYPE, MM, YS, ASTRA, ASTDEC, ASTSGY, ASTSGZ, ASTLZ, TWIST, ASTFLX, ASTSGF, ASTSNR, ASTCOR, ASTFST, ASTATW, ARSTAT, ADSTAT, ASTCST, IDPSC

Record Format: (5I10,1P19E14.6,6I10,1X,12A1)

Record Parameter Definitions

Table B-20. FPNF Record Parameters

Name	Units	Format	Description
TNAM	ds	I10	SDAS sighting name (time part)
DNAM	-	I10	SDAS sighting name (detector ID part)
ID	-	I10	ADAS ID
TYPE	-	I10	ADAS TYPE
MM	YYMM	I10	Observation time, year and month
YS	day	1PE14.6	Observation day (UT day and fraction of day)
ASTRA	rad	1PE14.6	Right ascension (geocentric)
ASTDEC	rad	1PE14.6	Declination (geocentric)
ASTSGY	rad	1PE14.6	In-scan position uncertainty (one-sigma)
ASTSGZ	rad	1PE14.6	Cross-scan gaussian position uncertainty (one-sigma)
ASTLZ	rad	1PE14.6	Cross-scan uniform position uncertainty (one-sigma)
TWIST	rad	1PE14.6	Position twist angle (from north counter-clockwise to cross-scan axis)
ASTFLX	Jy	1P4E14.6	Flux in each survey band
ASTSGF	Jy	1P4E14.6	Flux uncertainty (one-sigma) in each survey band
ASTSNR	-	1P4E14.6	Signal-to-noise ratio in each survey band
ASTCOR	-	I10	Correlation coefficients in each survey band (packed)
ASTFST	-	I10	Flux status words for each survey band (packed)
ASTATW	-	I10	Associated data status word
ARSTAT	-	I10	Acceptance/rejection status word
ADSTAT	-	I10	Albedo determination status word
ASTCST	-	I10	Confusion status word
IDPSC	-	12A1	IRAS Point Source Catalog name

B.2.2.2 New Object Products

B.2.2.3 Ancillary Products

B.3 Structure for Supplemental Data Files

The formats for the ground-based asteroid data files are given in this section.

B.3.1 UBV Color Indices

Although the B-V color was required in reducing IRAS asteroid flux measurements to albedos and diameters (and therefore appears in data files other than this) the U-B color indices were not used but are clearly a desirable parameter as well.

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As noted in Section 9.1.3 this file was created by combining UBV color indices derived from ECAS data with previously published TRIAD data. For asteroids common to both sources a weighted mean was computed and used in this file with an assigned weight equal to the rounded rms sum of the two weights used. The combined file contains these mean values and weights together with a field indicating whether the values were obtained from observations published in TRIAD, ECAS, or both. Each record also has a date indicating when it was last changed. The combined file contains data for 951 different asteroids; all have B-V's and 933 have U-B's as well. There are 369 U-B and 380 B-V observations in common between the TRIAD and ECAS data sets. Of these 749 observations 662 (88%) agree to within 0.04 magnitude; only 27 (3.6%) differ by more than 0.09 magnitude. There are no systematic differences between the two data sets. 207 asteroids have only ECAS data and 364 only TRIAD data.

The data format for the UBV data file is:

File name : UBV.DAT
File size : 36,139 bytes
Number of data records : 951
Date of last update : 11/24/85

Each record contains 36 characters divided into 8 fields.

Table B-21 UBV Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation.
2	4	U-B
3	1	U-B weight
4	4	B-V
5	1	B-V weight
6	6	Date record was last changed
7	2	References: 1 Bowell et al. (1979) [TRIAD] 2 Zellner et al. (1985) [ECAS] 3 Weighted mean of values from references 1 and 2.
8	9	Provisional designation for a numbered asteroid

B.3.2 Eight-Color Asteroid System Color Indices

Below is the data format for the Eight-Color Asteroid Survey data file.

File name : ECAS.DAT
File size : 49,477 bytes
Number of data records : 589
Date of last update : 11/19/85
Each record contains 82 characters divided into 18 fields.

Table B-22 Eight-Color Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	5	s-v color index
3	5	u-v color index
4	5	b-v color index
5	5	v-w color index
6	5	v-x color index
7	5	v-p color index
8	5	v-z color index
9	3	Uncertainty in s-v color index
10	3	Uncertainty in u-v color index
11	3	Uncertainty in b-v color index
12	3	Uncertainty in v-w color index
13	3	Uncertainty in v-x color index
14	3	Uncertainty in v-p color index
15	3	Uncertainty in v-z color index
16	6	Date record was last changed
17	2	Reference: 1 Zellner et al. (1985)
18	9	Provisional designation for asteroids which were numbered since publication of reference 1.

B.3.3 24-Color Spectrophotometry File

Below is the data format for the 24-color spectrophotometry data file. Note that there are actually 26 different fields (bands) in this file but that any given asteroid has data in no more than 24 bands.

File name	: 24-COLOR.DAT
File size	: 59,779 bytes
Number of data records	: 285
Date of last update	: 05/13/86

Note: All reflectances are relative to unity at 0.56 μm.

Each record contains 199 characters divided into the following 55 fields:

Table B-23 Spectrophotometry Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	4	Reflectance at 0.330 μm
3	3	Uncertainty in 0.330 μm reflectance
4	4	Reflectance at 0.340 μm if ref = 1; 0.360 μm if ref = 2
5	3	Uncertainty in 0.340 μm or 0.360 um reflectance
6	4	Reflectance at 0.355 μm if ref = 1; 0.380 μm if ref = 2
7	3	Uncertainty in 0.355 μm or 0.380 um reflectance
8	4	Reflectance at 0.400 μm
9	3	Uncertainty in 0.400 μm reflectance
10	4	Reflectance at 0.430 μm if ref = 1; 0.435 μm if ref = 2
11	3	Uncertainty in 0.430 μm or 0.435 μm reflectance
12	4	Reflectance at 0.470 μm
13	3	Uncertainty in 0.470 μm reflectance
14	4	Reflectance at 0.500 μm
15	3	Uncertainty in 0.500 μm reflectance
16	4	Reflectance at 0.540 μm
17	3	Uncertainty in 0.540 μm reflectance
18	4	Reflectance at 0.570 μm
19	3	Uncertainty in 0.570 μm reflectance
20	4	Reflectance at 0.600 μm
21	3	Uncertainty in 0.600 μm reflectance
22	4	Reflectance at 0.635 μm if ref = 1; 0.630 μm if ref = 2
23	3	Uncertainty in 0.635 μm or 0.630 μm reflectance
24	4	Reflectance at 0.670 μm
25	3	Uncertainty in 0.670 μm reflectance
26	4	Reflectance at 0.700 μm
27	3	Uncertainty in 0.700 μm reflectance
28	4	Reflectance at 0.730 μm if ref = 1; 0.735 μm if ref = 2
29	3	Uncertainty in 0.730 μm or 0.735 μm reflectance
30	4	Reflectance at 0.765 μm

Field	Width	Contents
31	3	Uncertainty in 0.765 μm reflectance
32	4	Reflectance at 0.800 μm
33	3	Uncertainty in 0.800 μm reflectance
34	4	Reflectance at 0.830 μm
35	3	Uncertainty in 0.830 μm reflectance
36	4	Reflectance at 0.870 μm if ref = 1; 0.865 μm if ref = 2
37	3	Uncertainty in 0.870 μm or 0.865 μm reflectance
38	4	Reflectance at 0.900 μm
39	3	Uncertainty in 0.900 μm reflectance
40	4	Reflectance at 0.930 μm
41	3	Uncertainty in 0.930 μm reflectance
42	4	Reflectance at 0.950 μm
43	3	Uncertainty in 0.950 μm reflectance
44	4	Reflectance at 0.970 μm
45	3	Uncertainty in 0.970 μm reflectance
46	4	Reflectance at 1.000 μm
47	3	Uncertainty in 1.000 μm reflectance
48	4	Reflectance at 1.030 μm
49	3	Uncertainty in 1.030 μm reflectance
50	4	Reflectance at 1.060 μm
51	3	Uncertainty in 1.060 μm reflectance
52	4	Reflectance at 1.100 μm
53	3	Uncertainty in 1.100 μm reflectance
54	6	Date record added or updated
55	2	References: 1 Chapman and Gaffey (1979) 2 McFadden et al. (1984) and personal communication (1986).

NOTES: 1. The data for 433 Eros from Ref. 1 were replaced with those from Ref. 2 because the former included a calibration correction which had already been applied to the data.

2. There are two records for 1685 Toro, one from each reference.

B.3.4 Polarimetry File

Below is the data format for the polarimetry data file. The present file is a slightly reformatted version of the 1979 computer card "TRIAD" file created by Ben Zellner. For further details regarding this file see Morrison and Zellner (1979).

File name : POLARIM.DAT
File size : 8,548 bytes
Number of data records : 111
Date of last update : 06/30/79
Each record contains 75 characters divided into 18 fields.

Table B-24 Polarimetry Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	4	Minimum polarization (P_{min}) in percent
3	2	Quality: 1 Weak, fragmentary, large scatter, single point 2 Average data set 3 Best or most consistent data (complete set).
4	2	Filter code for data in fields 5 and 7: B = Filter B G = Filter G V = Filter V U = Filter U X = No filter
5	5	Inversion angle in degrees
6	2	Inversion angle quality code (see field 3)
7	6	Polarimetric slope in percent per degree
8	2	Polarimetric slope quality code (see field 3)
9	2	Filter code for data in fields 10 and 12 (see field 4)
10	5	Inversion angle in degrees
11	2	Inversion angle quality code (see field 3)
12	6	Polarimetric slope in percent per degree
13	2	Polarimetric slope quality code (see field 3)
14	5	B-V color index
15	6	V(1,0) from Gehrels and Tedesco (1979)
16	6	Polarimetric visual geometric albedo
17	6	Polarimetric diameter in kilometers
18	3	Reference: 01 Zellner and Gradie (1976a) 02 Zellner and Gradie (1976b) 03 Veverka (1973) [Data re-reduced by Zellner for inclusion in Morrison and Zellner (1979)] 99 Unpublished data, University of Arizona.

B.3.5 Lightcurve Parameters

Below is the data format for the Lightcurve data file. All data sets were obtained from Lagerkvist et al. (1985).

File name : LC.DAT
File size : 10,358 bytes
Number of data records : 345
Date of last update : 05/15/86

Each record contains 28 characters divided into 3 fields.

Table B-25 Lightcurve Record Format

Field	Width	Contents
1	9	Asteroid number or provisional designation
2	9	Rotation period in hours
3	10	Range of observed rotational amplitudes in magnitudes

REFERENCES

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APPENDIX C.

Acronyms and Glossary

Acronyms Used in the IRAS Project

Acronym	Meaning
AACV	Area Coverage File
AAG	Asteroid Advisory Group
ACFU	Area Coverage Updates File (SDAS)
ACOV	Area Coverage
AD	Asteroid Derived Information Computation Subsystem
ADAS	Asteriod Data Analysis System
ADPC	ADAS Download PC (An IBM-XT Personal Computer)
AIF	AAG Input File
AK	Asteroid Known Object Association Subsystem
AM	Asteroid Multiple Sighting Association Subsystem
AOFH	Asteroid Parameters File from Hours Confirmation (SDAS)
AOFM	Asteroid Parameters File from Months Confirmation (SDAS)
APAS	Asteroid Processing and Analysis System
AR	Asteroid Single Sighting Recognition Subsystem (alias)
AS	Asteroid Single Sighting Recognition Subsystem
ASTCOM	Asteroid and Comet orbital elements file (maintained by D. Bender)
ATA	Asteroid Tagging Algorithm (SDAS)
AU	Astronomical Unit
AWF	Asteroid Working File
BPHF	Boresight Pointing History File
CDJ	Critical Daily Job
CGQ	Catalogued Galaxies and Quasars observed in the IRAS Survey, JPL D-1932, 1985
CN	Source Confirmation Subsystem (SDAS)
CN28, CN29	SDAS Asteroid and Comet Data Output. See Glossary
CPC	Chopped Photometric Channel
CRDD	Calibrated Reconstructed Detector Data File (SDAS)
CUS	
DAX	Dutch Additional Experiment
DB	Database Interface & Management Subsystem
DN	Status & Data Download Subsystem
DOBS	Data Directory Observation File (SADS)

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Acronym	Meaning
DP	Display Subsystem (old: now is User Interface)
DS	Deep Sky Data Extraction Subsystem (deleted)
ES	(1) Infrared Astronomical Satellite (IRAS) Catalogs and Atlases Explanatory Supplement, JPL D-1855, 1984. (2) Small Extended Source Data Extraction Subsystem
FP	Final Product Preparation Subsystem
FPS	Focal Plane Shutter
GROC	Netherlands Committee for Geophysics and Space Research
GSFC	Goddard Space Flight Center
HCON	Hours Confirmed
ICIRAS	Industrial Consortium for IRAS
IGO	IRAS Ground Operations
IN	Input Subsystem (SDAS)
IN	IRAS Sighting and Auxiliary Input Data Collection Subsystem
IP	IRAS Sighting and Auxiliary Input Data Collection Subsystem (alias)
IPAPP	IRAS Project Asteroid Program Plan
IPL	Image Processing Laboratory
IRAS	Infrared Astronomical Satellite
JIPEG	Joint IRAS Project Executive Group
JISWG	Joint Infrared Science Working Group
JPL	Jet Propulsion Laboratory
JPRD	Joint Project Requirements Document
KADB	Known Asteroid Data Base
KAPS	Known Asteroid Processing Subsystem (SDAS)
LBH	Lumme-Bowell-Harris phase function
LRS	Low Resolution Spectrometer
MCON	Months Confirmed
MDD	Mission Design Document
NIVR	Netherlands Agency for Aerospace Programs
NSCF	Non Seconds Confirmed due to a Failed detector (SDAS)

Acronym	Meaning
NSSDC	National Space Science Data Center located at the Goddard Space Flight Center
OBS	Observation
OCC	Operations Control Center
PAF	Preliminary Analysis Facility
PMR	Program Master Schedule
POP	Project Operating Plan
PR	Pointing Reconstruction Subsystem (SDAS)
PS	Point Source Data Extraction Subsystem (the ATA in SDAS)
RA	Resident Astronomer
RAL	Rutherford and Appleton Laboratories (Site of PAF)
ROG	Space Research Department of the University of Groningen
SCON	Seconds Confirmed
SCONS	Source Confirmation Subsystem (SDAS)
SCP	Software Change Proposal
SDAS	Scientific Data Analysis System
SES	Small Extended Source
SHEF	Satellite Heliocentric Ephemeris File (SDAS)
SOP	Satellite Operations Plan
SOTS	Science Operations Team, SDAS
SP	Special Processes Subsystem
SPA	Survey Performance Analysis
SRC	Science Research Council, U.K.
SSS	IRAS Small Scale Structure Catalog, JPL D-2988, 1985
SWC	Short Wavelength Channel
SY	System Execution & Control Subsystem
TSO	Time Sharing Option (IBM)
UI	User Interface Subsystem
UIDB	Universal Input DataBase
UTC	Universal Time, Coordinated
WSDB	Working Survey Data Base
ZZ	Database Interface & Management Subsystem (alias)

GLOSSARY

A

The Bond albedo

Asteroid Advisory Group

This is the team of scientists responsible for the scientific content of the asteroid program. (i.e., H. Aumann, M. Hanner, L. Lebofsky, E. Tedesco, G. Veeder, R. Walker, and chaired by D. Matson)

Asteroid Tagging Algorithm

This is software in the Source Confirmation Subsystem of SDAS which wrote each source of asteroid-like color into one or both of two files (CN28 & CN29) for use as input to ADAS.

ADAS Sighting

This is a logical unit of ADAS scientific data. At the time the UIDB is built, some of the fields belonging to the "ADAS Sighting" become determined, while others are accumulated during the course of ADAS processing. Thus some fields of each ADAS Sighting appear in the UIDB while others appear in an AWF.

ADAS Tracking

This is a logical unit of ADAS scientific data. AM attempts to "link" sightings which might be of the same object. Each mutually consistent set of sightings so linked is called a tracking. Note also that there may be multiple trackings of what may be a single object: this happens when the trackings are too far apart to combine with confidence.

ADAS Download PC

This is the personal computer connected to the IBM 3032 which is provided as an analysis facility for the AAG.

AAG Input File

The scientific data provided by the AAG is contained in the set of these files.

Absolute Magnitude

The magnitude an asteroid would have if observed at zero phase angle and unit distance (1 AU) from both the Sun and Earth.

Asteroid Data Analysis System (ADAS)

The set of algorithms and programs used to extract and reduce the IRAS asteroid data.

Asteroid Tagging Algorithm

This is the software within SDAS which builds the primary source of ADAS scientific input data files: CN28 & CN29.

Asteroid Working File

Each one of these is a collection of datasets which contain information derived by the AS, AM, & AD subsystems. Different AWFs at the same time allow simultaneous testing of multiple versions of ADAS subsystems.

b

Galactic latitude

Bond Albedo

The fraction of the total incident light reflected by a spherical body. It is equal to the phase integral multiplied by the ratio of its brightness at zero solar phase angle to the brightness of a perfectly diffusing disk with the same diameter viewed at zero solar phase angle and perpendicular to its surface.

CN28 & CN29

These are the files of sightings determined by the ATA to be of asteroid-like color. CN28 & CN29 were written by the portions of the ATA residing in the hours & months confirmation processing. Note that all sightings in CN29 also appear in CN28.

Detection

The perceptible response of a detector to the radiation from a source in the sky.

Entity

An "entity" is a basic type of unit of ADAS scientific data. This term is useful as different portions of the ADAS software work on different types of "entities": Known Objects, ADAS Sightings, ADAS Trackings.

G

The "slope parameter" (analogous to the phase coefficient) of the Lumme-Bowell-Harris phase function (c.f., MPC 10193). See Absolute Magnitude and H_B.

Geometric Albedo

See P_V.

H_B

Absolute magnitude on the Lumme-bowell-Harris system in the blue band of the Johnson UBV system (c.f., MPC 10193). See Absolute Magnitude and G.

Known Object

This is a logical unit of ADAS scientific data. It includes data supplied by the AAG on known asteroids and comets (which resides in the UIDB), as well as the data derived from the IRAS observations of the objects as determined in the course of ADAS processing (which resides in an AWF).

Lambertian Disk

A disk which scatters light according to Lambert's law.

Lambert's Law

Intensity of reflected light is proportional to the cosine of the angle of emission, where the angle of emission is the angle between the normal to the surface and the direction of the emitted radiation.

Non-Seconds Confirmed due to a Failed detector

The design of the focal plane of the IRAS telescope provided that each source would pass across two detectors in each band. When this happens, the source is said to be "seconds confirmed". In cases where a detection could not have seconds confirmed because it was aligned with a failed detector, the sighting is declared NSCF.

Phase Integral

Twice the integral of the product of the phase law and the sine of the solar phase angle evaluated at zero and 180 degrees.

Phase Law or Phase Function

A function of describing the change in brightness of a spherical body as a function of solar phase angle.

p_V

The visual (V band of Johnson UBV system) geometric albedo. The ratio of the flux received from a (presumed spherical) object to that which would be received from a Lambertian disk of the same size located at the same distance and at zero solar phase angle.

Solar Phase Angle

q

The perihelion distance in AU or the phase integral.

Q

The aphelion distance in AU or the phase integral.

Sighting

A sequence of detections attributable to a single source in the sky and which satisfy the requirements of seconds confirmation (ES, page V-36).

Solar Phase Angle

The Sun - asteroid or comet - Spacecraft angle.

Time Sharing Option

This is the portion of the IBM operating system software which services the terminals. People often talk about "getting on TSO" to refer to using the IBM mainframe via a terminal.

Version Handling

Files output by the AS, AM and AD subsystems of ADAS have "version handling" support. This means that each run of on of these subsystems generates another "version" of its output files without destroying previous "versions". Processes which use the files output by these subsystems are pointed to a particular "version" to use.

Universal Input Database

This is the collection of datasets whose content can be determined at the time of running of the IN & AK subsystems. Other information derived downstream (and subject to change as a result of the evolution of the scientific algorithms) will be contained in an AWF.

Visual Geometric Albedo

See p_V.

PART III. IRAS ASTEROID AND COMET CATALOGS

Contents

JPL D-3698

SECTION III-1

IRAS ASTEROID CATALOG [FDP 4]

Preprint No. 1

Errata Regarding G Values

Of the 317 asteroids with high quality (Class 1) photometric data for which H and G were determined via least-square fit 79 had values of G which were less than zero or greater than one-half. During the final IRAS Asteroid Workshop on 3-4 June 1986 several people, including E. Bowell, A. Harris, and (via telephone) B. Marsden, expressed their concern that such values were "non-physical" and were, presumably, the results of using data from more than one opposition (i.e., aspect) and/or not accounting for rotational lightcurve induced brightness variations. Hence, it was recommended that these 79 asteroids be treated as though they were class 2 photometric data (c.f., Chapter 9) and be assigned default values of G.

The following table gives the recomputed values of H, using the indicated default values of G, for the 79 asteroids in question. Asteroids marked with an asterisk are those which appear in the IRAS Asteroid Catalog (FDP 4) and the Catalog for Asteroid Sightings (FDP 2). Note that the albedos and diameters for these asteroids which appear in those data products were computed using the original values of H and G, and that it is these original values which appear in all of the final data products.

As an item of interest I note that of the 51 asteroids for which Lagerkvist and Williams (1987, Astron. Astrophys. Suppl. Ser., in press) derived H and G values for using homogeneous data obtained during a single opposition, seven had values of G less than zero.

Edward F. Tedesco

JPL D-3698

Table 1-Errata

Asteroid	G	H	Asteroid	G	H
5*	7.74	.25	521*	9.22	.15
7*	6.41	.25	545*	9.39	.15
10*	6.06	.15	570*	9.65	.15
13*	7.46	.15	631*	9.64	.25
27	7.94	.25	720*	10.60	.25
36*	9.08	.15	739*	9.43	.15
39*	7.05	.25	755*	10.54	.25
41*	8.07	.15	785*	10.22	.25
42*	8.38	.25	814*	9.47	.15
43*	8.88	.25	887	15.04	.25
48*	7.64	.15	944	11.50	.15
52*	6.95	.15	1001*	10.43	.15
53*	9.46	.15	1266*	10.15	.15
63*	8.42	.25	1390*	9.92	.15
84*	9.99	.15	1493*	12.55	.15
93*	8.46	.15	1566	17.45	.25
107*	7.79	.15	1620	16.71	.25
119*	9.33	.25	2290	12.96	.15
130*	7.81	.15	2316	13.37	.25
161*	9.94	.25	2375	11.44	.15
184*	9.14	.25	2633	13.82	.25
190	8.35	.15	2684	12.59	.15
209*	8.90	.15	2772	14.23	.25
222*	10.08	.15	2812	14.31	.25
238*	8.83	.15	2813*	11.89	.15
250*	8.26	.25	2815	13.92	.25
279*	9.32	.15	2870	13.72	.25
306*	9.91	.25	2917	12.69	.15
326*	10.06	.15	3008	12.68	.15
334*	8.20	.15	3021	12.73	.15
346*	8.27	.25	3054*	12.07	.15
356*	8.90	.15	3057	14.28	.25
389*	8.74	.25	3064	13.93	.15
423*	8.00	.15	3115*	12.17	.25
433	11.64	.25	3172	14.16	.25
442*	10.66	.15	3209	14.30	.25
446*	9.85	.25	3253	14.31	.25
462*	10.11	.25	3262	11.63	.15
472*	10.03	.25	3263	13.91	.25
498*	9.70	.15			

The IRAS Asteroid Catalog is Final Data Product No. 4 and contains summary information on each asteroid observed by IRAS. The column headings are as indicated below:

(Even Pages)

ID/1 :	asteroid number
No. :	number of sightings
P_V :	weighted, mean visual, geometric albedo
σP_V :	standard deviation of P_V
D :	weighted, mean diameter (km)
σ_D :	standard deviation of D
H_B :	blue (B) absolute magnitude on the IAU system together with quality codes of 1 to 3 with 3 being highest quality
B-V :	B-V color index (mag.). The quality codes 0 to 4 with 4 being best and 0 being the default used in the absence of data
G_B :	slope parameter in IAU system
Q :	phase integral

(Odd Pages)

ER	ephemerides reliability, 0 to 3 with 3 being best
P_{FV}	probability of source variability
Δmag_1	12μm peak to peak variation of accepted fluxes in magnitudes
Δmag_2	25μm peak to peak variation of accepted fluxes in magnitudes
Δmag_3	60μm peak to peak variation of accepted fluxes in magnitudes
Status flags	See Asteroid and Comet Explanatory Supplement, Chapter 6 and Users Guide to Data Products, Appendix B.

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ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1	4	0.10	0.01	913	43	4.04	3	0.72	4	0.111	0.366
2	8	0.14	0.01	523	20	4.79	3	0.66	4	0.148	0.391
3	8	0.22	0.02	244	12	6.12	3	0.81	4	0.300	0.495
4	1	0.38	0.03	501	24	3.96	3	0.80	4	0.338	0.521
5	3	0.14	0.01	125	7	8.07	3	0.83	4	0.672	0.750
6	7	0.25	0.01	192	4	6.53	3	0.83	4	0.240	0.454
7	3	0.21	0.01	203	5	6.61	3	0.85	4	0.509	0.638
8	6	0.22	0.01	141	3	7.37	3	0.89	4	0.327	0.514
10	8	0.075	0.003	429	8	5.96	3	0.69	4	-0.039	0.263
11	4	0.15	0.01	162	3	7.47	3	0.85	4	0.272	0.476
12	2	0.16	0.01	117	4	8.11	3	0.88	4	0.240	0.454
13	1	0.099	0.006	215	7	7.22	3	0.75	4	-0.020	0.276
15	6	0.19	0.01	272	6	6.06	3	0.84	4	0.199	0.426
16	10	0.10	0.01	264	4	6.69	3	0.70	4	0.217	0.438
17	3	0.15	0.01	93.2	2.5	8.60	3	0.83	4	0.134	0.382
18	3	0.22	0.01	148	3	7.26	3	0.85	4	0.175	0.410
20	3	0.19	0.02	151	11	7.33	3	0.81	4	0.263	0.470
21	5	0.20	0.02	99.5	5.5	8.04	3	0.70	4	0.163	0.401
22	3	0.12	0.01	187	4	7.19	3	0.69	4	0.215	0.437
23	6	0.21	0.01	111	3	7.92	3	0.85	4	0.370	0.543
25	6	0.22	0.01	78.2	2.0	8.72	3	0.94	4	0.095	0.355
26	4	0.16	0.01	98.7	2.2	8.49	2	0.88	4	0.400	0.564
28	7	0.15	0.01	126	2	8.02	3	0.85	4	0.221	0.441
29	5	0.16	0.01	219	5	6.67	3	0.83	4	0.208	0.432
30	5	0.13	0.01	104	2	8.61	3	0.87	2	0.413	0.572
31	8	0.070	0.031	248	54	7.20	2	0.67	1	0.150	0.393
32	9	0.25	0.01	82.6	2.0	8.36	3	0.86	4	0.110	0.365
34	7	0.057	0.003	118	3	9.07	3	0.70	3	0.035	0.314
35	2	0.058	0.004	108	3	9.24	2	0.70	2	0.150	0.393
36	2	0.076	0.008	109	6	8.96	3	0.73	2	-0.054	0.253
37	8	0.17	0.01	112	2	8.12	3	0.84	4	0.251	0.462
38	9	0.058	0.002	120	2	9.03	3	0.72	3	0.054	0.327
39	2	0.29	0.02	159	5	6.83	3	0.89	4	-0.029	0.270
40	6	0.20	0.02	111	7	7.99	3	0.85	4	0.307	0.500
41	2	0.073	0.014	182	18	7.89	3	0.73	4	-0.057	0.251
42	3	0.12	0.01	107	3	8.63	3	0.88	4	0.587	0.692
43	2	0.28	0.02	65.3	3.0	8.76	3	0.87	4	-0.048	0.257
44	6	0.49	0.05	73.3	3.7	7.75	3	0.70	4	0.440	0.591
45	1	0.048	0.004	214	8	7.93	2	0.66	4	0.150	0.393
46	3	0.046	0.005	131	7	9.08	3	0.70	4	0.106	0.363
47	7	0.072	0.009	133	8	8.52	3	0.66	3	0.125	0.376
48	4	0.064	0.006	225	11	7.55	3	0.72	4	-0.047	0.258
49	1	0.051	0.003	154	5	8.66	3	0.75	2	0.389	0.556
51	6	0.086	0.004	153	3	8.13	3	0.77	4	0.061	0.332
52	7	0.057	0.002	312	7	6.91	3	0.66	4	-0.004	0.287

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1	3	0.60	0.20	0.09	0.29	0.0	1......1....111..1.............
2	3	0.44	0.67	0.35	0.54	0.0	1..1...1....111..1.........11..
3	3	0.85	1.13	1.01	0.87	0.0	1..1...1....111.............1..
4	3	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
5	3	0.52	0.31	0.13	0.36	0.0	.......1....111................
6	3	0.10	0.75	0.51	0.49	0.0	1..1...1...1111............11..
7	0	0.13	0.20	0.19	0.13	0.0	1......1....111................
8	0	0.10	0.54	0.41	0.67	0.0	1..1...1....111.............1..
10	3	0.10	0.57	0.69	0.42	0.0	1..1...1.1..111.............1..
11	3	0.10	0.23	0.11	0.19	0.0	...1...1....111............11..
12	0	0.10	0.09	0.02	0.00	0.0	1..1...1....111.............1..
13	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
15	3	0.10	0.27	0.36	0.18	0.0	...1...1....111.............1..
16	3	0.10	0.35	0.41	0.45	0.0	1..1...1....111.............1..
17	3	0.10	0.23	0.21	0.35	0.0	...1...1....111.............1..
18	3	0.10	0.09	0.08	0.00	0.0	1......1....111................
20	3	0.97	0.57	0.40	0.35	0.0	1..1...1....111.............1..
21	3	0.59	0.32	0.28	0.57	0.0	1..1...1....111.............1..
22	3	0.10	0.06	0.07	0.02	0.0	1..1...1....111.............1..
23	3	0.10	0.41	0.35	0.45	0.0	11.1...1....111.............1..
25	3	0.10	0.28	0.44	0.80	0.0	1......1....111................
26	2	0.10	0.35	0.33	0.39	0.0	...1...1....111............1...
28	3	0.10	0.48	0.34	0.40	0.0	1..1...1....111.............1..
29	3	0.10	0.40	0.08	0.12	0.0	1..1...1....111.............1..
30	3	0.10	0.56	0.38	0.34	0.0	...1...1....111............11..
31	3	1.00	0.71	1.82	1.62	0.0	1..1..11.1..111............11..
32	3	0.10	0.75	0.81	0.80	0.0	1..1...1....111............11..
34	0	0.20	0.78	0.50	0.52	0.0	...1...1....111............11..
35	3	0.10	0.01	0.05	0.12	0.0	1..1...1....111.............1..
36	0	0.76	0.15	0.26	0.13	0.0	.......1....111................
37	3	0.10	0.37	0.37	0.25	0.0	1..1...1....111............11..
38	3	0.10	0.41	0.45	0.50	0.0	1..1...1....111..1...1......1..
39	3	0.10	0.19	0.06	0.07	0.0	...1...1....111............1...
40	3	0.93	0.33	0.43	0.25	0.0	1..1...1....111.............1..
41	3	0.97	0.34	0.23	0.41	0.0	1..1...1....111.............1..
42	3	0.33	0.00	0.22	0.01	0.0	...1...1.1.1111.............1..
43	3	0.30	0.28	0.18	0.07	0.0	1..1...1....111................
44	3	0.64	0.86	0.83	0.91	0.0	1..1...1....111.............1..
45	0	0.50	0.0	0.0	0.0	0.0	...1...1.1..111................
46	3	0.84	0.45	0.15	0.09	0.0	.......1....111................
47	3	0.75	0.40	0.40	0.49	0.0	...1...1....111.............1..
48	3	0.40	0.17	0.07	0.46	0.0	1..1...1....111.............1..
49	3	0.50	0.0	0.0	0.0	0.0	...1...1....111................
51	3	0.10	0.25	0.17	0.19	0.0	1..1...1....111.............1..
52	3	0.10	0.27	0.40	0.29	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
53	4	0.045	0.002	119	3	9.32	3	0.71	2	-0.101	0.221
54	6	0.050	0.002	171	3	8.40	3	0.70	4	0.149	0.392
55	1	0.32	0.03	67.5	3.6	8.37	3	0.69	3	0.347	0.527
56	8	0.062	0.002	117	2	8.99	2	0.69	4	0.150	0.393
57	1	0.21	0.01	116	3	7.78	3	0.83	4	0.071	0.339
58	3	0.056	0.004	97.7	3.0	9.48	2	0.69	2	0.150	0.393
59	4	0.048	0.005	173	8	8.39	3	0.67	4	0.014	0.300
60	2	0.15	0.01	61.6	1.8	9.53	3	0.85	4	0.332	0.517
61	8	0.21	0.01	83.6	3.5	8.51	3	0.85	4	0.076	0.342
62	5	0.090	0.004	99.3	2.1	8.95	2	0.71	4	0.250	0.461
63	3	0.17	0.01	108	3	8.25	3	0.90	3	-0.018	0.278
65	7	0.057	0.003	245	6	7.46	2	0.67	4	0.150	0.393
66	7	0.050	0.009	78.3	6.6	10.10	2	0.71	3	0.150	0.393
67	3	0.21	0.01	60.3	1.5	9.22	3	0.86	4	0.247	0.459
68	6	0.20	0.01	127	4	7.68	3	0.84	3	0.110	0.365
69	1	0.12	0.01	143	4	7.80	3	0.70	3	0.153	0.395
70	2	0.070	0.004	127	4	8.73	2	0.74	4	0.150	0.393
71	5	0.28	0.01	87.3	1.7	8.08	3	0.82	4	0.370	0.543
72	8	0.056	0.004	89.3	2.8	9.78	3	0.78	3	0.232	0.449
73	6	0.21	0.02	45.5	2.0	9.82	2	0.82	1	0.250	0.461
74	3	0.034	0.002	123	3	9.53	2	0.69	2	0.150	0.393
75	7	0.12	0.02	58.3	4.5	9.73	2	0.71	3	0.250	0.461
76	4	0.029	0.001	190	4	8.78	3	0.70	4	0.438	0.590
77	3	0.13	0.01	71.0	2.0	9.32	3	0.75	4	0.259	0.467
78	9	0.064	0.003	125	3	8.82	3	0.71	4	0.079	0.344
79	4	0.27	0.01	68.8	1.8	8.71	3	0.88	4	0.178	0.412
80	11	0.15	0.01	81.7	1.2	9.00	3	0.90	4	0.300	0.495
81	11	0.046	0.002	124	2	9.20	2	0.71	3	0.150	0.393
82	5	0.17	0.01	63.6	1.7	9.32	3	0.81	4	0.336	0.520
83	7	0.069	0.003	84.2	1.8	9.59	3	0.70	3	0.301	0.496
84	3	0.070	0.004	83.0	2.0	9.64	3	0.73	3	-0.224	0.137
85	2	0.068	0.004	157	5	8.22	3	0.66	4	0.053	0.326
86	4	0.043	0.002	127	3	9.22	3	0.71	4	0.115	0.369
87	7	0.040	0.004	271	12	7.65	3	0.70	4	0.275	0.478
89	4	0.16	0.01	159	3	7.45	3	0.88	4	0.144	0.388
90	1	0.051	0.003	125	4	9.06	3	0.69	4	0.260	0.468
91	2	0.042	0.002	114	3	9.52	2	0.73	3	0.150	0.393
92	2	0.20	0.01	132	4	7.48	3	0.73	4	0.326	0.513
93	2	0.085	0.006	146	5	8.20	3	0.73	2	-0.113	0.213
94	6	0.038	0.001	212	4	8.21	3	0.66	4	0.085	0.348
95	4	0.062	0.010	145	11	8.55	3	0.71	4	0.078	0.343
96	7	0.038	0.002	174	4	8.74	2	0.77	2	0.150	0.393
97	8	0.19	0.03	87.1	7.6	8.40	3	0.70	4	0.255	0.464
98	8	0.041	0.002	109	2	9.67	2	0.75	1	0.150	0.393
100	8	0.16	0.01	92.0	2.0	8.62	2	0.83	2	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
53	3	0.10	0.14	0.21	0.13	0.0	...1...1....111.............1..
54	3	0.10	0.30	0.20	0.29	0.0	1..1...1....111.............1..
55	3	0.50	0.0	0.0	0.0	0.0	...1...1....111................
56	3	0.10	0.37	0.35	0.51	0.0	1..1...1....111.............1..
57	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
58	3	0.10	0.11	0.04	0.22	0.0	.......1....111................
59	3	0.72	0.39	0.14	0.22	0.0	1..1...1....111................
60	3	0.14	0.22	0.08	0.17	0.0	...1...1....111................
61	3	0.26	0.86	0.51	0.67	0.0	11.1...1.1..111..1......11111..
62	3	0.10	0.15	0.17	0.26	0.0	...1...1....111.............1..
63	3	0.10	0.05	0.06	0.13	0.0	...1...1....111.............1..
65	3	0.10	0.31	0.35	0.31	0.0	1..1...1...1111................
66	3	0.98	0.80	0.55	1.05	0.0	1..1...1.1..111................
67	3	0.10	0.06	0.18	0.13	0.0	1..1...1....111.............1..
68	3	0.47	0.36	0.36	0.31	0.0	1..1...1....111.............1..
69	3	0.50	0.0	0.0	0.0	0.0	1......1....111................
70	0	0.10	0.07	0.08	0.06	0.0	...1...1....111................
71	3	0.10	0.48	0.31	0.32	0.0	1..1...1....111.............1..
72	3	0.34	0.49	0.37	0.35	0.0	...1...1....111............11..
73	3	0.53	0.53	0.51	0.24	0.0	...1...1....111..1...1.....11..
74	3	0.10	0.08	0.05	0.24	0.0	...1...1....111............11..
75	3	0.76	0.71	0.38	0.57	0.0	...1...1.1..111.............1..
76	3	0.10	0.15	0.27	0.16	0.0	...1...1....111.............1..
77	3	0.10	0.23	0.16	0.13	0.0	.......1....111..1..........1..
78	3	0.10	0.35	0.53	0.50	0.0	1..1...1....111.............1..
79	3	0.10	0.24	0.40	0.24	0.0	.......1....111................
80	3	0.10	0.96	0.73	0.66	0.0	1..1...1....111............11..
81	3	0.10	0.48	0.38	0.48	0.0	1..1...1.1..111..1........111..
82	3	0.10	0.35	0.39	0.39	0.0	1..1...1....111.............1..
83	3	0.10	0.57	0.59	0.53	0.0	...1...1....111.........11111..
84	3	0.10	0.14	0.10	0.15	0.0	...1...1....111.............1..
85	3	0.10	0.17	0.13	0.02	0.0	...1...1....111................
86	3	0.10	0.32	0.11	0.05	0.0	...1...1....111.............1..
87	3	0.45	0.36	0.61	0.56	0.0	1..1...1....111.............1..
89	3	0.10	0.23	0.08	0.26	0.0	1..1...1....111.............1..
90	3	0.50	0.0	0.0	0.0	0.0	1......1....111................
91	3	0.10	0.13	0.25	0.10	0.0	1......1....111................
92	3	0.10	0.04	0.08	0.11	0.0	...1...1....111.............1..
93	3	0.10	0.01	0.02	0.01	0.0	1......1....111................
94	3	0.10	0.29	0.31	0.27	0.0	1..1...1....111..1..........1..
95	0	0.89	0.52	0.61	0.68	0.0	...1...1....111.............1..
96	3	0.10	0.46	0.40	0.41	0.0	1..1...1....111.............1..
97	3	0.95	0.51	0.47	0.96	0.0	1..1...1....111............1...
98	3	0.10	0.96	0.85	0.86	0.0	.1.1...1....111.............1..
100	3	0.10	0.34	0.40	0.39	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
101	5	0.15	0.01	68.3	1.5	9.32	3	0.87	4	0.497	0.630
102	5	0.049	0.002	86.0	2.0	9.95	2	0.72	3	0.150	0.393
103	9	0.17	0.01	95.2	5.0	8.45	3	0.86	4	0.107	0.363
104	6	0.052	0.004	127	5	8.99	3	0.68	4	0.196	0.424
105	3	0.032	0.002	123	3	9.59	3	0.70	3	0.292	0.490
106	6	0.083	0.004	152	3	8.16	3	0.74	4	0.168	0.405
107	8	0.060	0.007	237	14	7.50	3	0.70	4	-0.173	0.172
108	4	0.19	0.03	67.2	6.0	9.13	2	0.86	2	0.250	0.461
109	6	0.060	0.003	91.6	2.3	9.60	3	0.73	4	0.110	0.365
110	5	0.17	0.01	89.1	2.3	8.50	3	0.71	4	0.184	0.416
111	1	0.064	0.006	139	6	8.59	3	0.70	4	0.043	0.319
112	13	0.037	0.004	75.5	4.1	10.50	2	0.70	2	0.150	0.393
113	3	0.27	0.03	47.6	2.7	9.57	3	0.94	4	0.263	0.470
114	7	0.084	0.003	103	2	9.00	3	0.76	4	0.098	0.357
115	7	0.25	0.01	83.5	2.5	8.37	3	0.86	3	0.144	0.388
116	2	0.22	0.04	75.5	6.8	8.73	2	0.87	1	0.250	0.461
117	4	0.040	0.005	154	9	8.86	3	0.68	4	0.484	0.621
118	10	0.20	0.01	45.7	1.2	9.87	2	0.86	2	0.250	0.461
119	6	0.17	0.01	60.7	1.1	9.50	3	0.89	2	0.574	0.683
120	8	0.045	0.002	178	3	8.43	3	0.70	4	0.172	0.408
121	6	0.042	0.002	217	4	8.11	3	0.72	4	0.150	0.393
122	3	0.20	0.01	86.5	2.0	8.46	2	0.78	0	0.250	0.461
123	5	0.19	0.02	49.8	3.2	9.78	2	0.85	2	0.250	0.461
124	4	0.15	0.01	79.5	1.8	8.98	3	0.85	4	0.311	0.503
125	5	0.18	0.01	47.5	1.5	9.74	3	0.68	3	0.357	0.534
126	2	0.15	0.01	46.5	1.3	10.18	2	0.87	3	0.250	0.461
128	3	0.045	0.002	194	4	8.23	2	0.68	3	0.150	0.393
129	2	0.17	0.01	125	4	7.77	3	0.72	3	0.366	0.540
130	7	0.089	0.013	189	13	7.61	3	0.75	4	-0.036	0.265
131	2	0.095	0.011	43.3	2.5	10.76	2	0.77	2	0.250	0.461
132	2	0.14	0.01	47.0	1.8	10.03	3	0.68	3	0.117	0.370
133	3	0.21	0.02	70.1	4.0	8.97	3	0.92	2	0.242	0.456
134	7	0.041	0.014	122	21	9.35	3	0.68	4	0.064	0.334
135	5	0.13	0.01	82.0	2.5	8.91	3	0.70	4	0.194	0.423
136	3	0.13	0.01	41.7	1.0	10.45	2	0.74	1	0.250	0.461
137	4	0.048	0.002	150	4	8.74	3	0.70	4	0.098	0.357
138	2	0.18	0.02	47.5	3.1	9.92	2	0.88	2	0.250	0.461
139	7	0.051	0.002	162	3	8.49	2	0.70	1	0.150	0.393
140	2	0.071	0.004	114	3	8.92	2	0.72	2	0.150	0.393
141	3	0.036	0.002	135	3	9.22	2	0.66	2	0.150	0.393
142	2	0.042	0.003	57.1	1.6	10.88	3	0.62	4	0.145	0.389
143	8	0.041	0.002	92.8	2.3	9.98	2	0.74	2	0.150	0.393
144	6	0.059	0.003	146	4	8.59	3	0.72	4	0.081	0.345
145	3	0.044	0.002	155	4	8.74	3	0.69	3	0.013	0.299
146	5	0.052	0.002	137	3	8.83	3	0.68	4	0.135	0.382

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ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
101	3	0.10	0.20	0.36	0.20	0.0	1..1...1....111................
102	3	0.10	0.18	0.28	0.35	0.0	...1...1....111.............1..
103	3	0.72	0.46	0.62	0.50	0.0	1..1...1....111..1...1......1..
104	3	0.30	0.61	0.65	0.61	0.0	1..1...1....111.............1..
105	0	0.10	0.12	0.12	0.10	0.0	1..1...1....111............1...
106	3	0.10	0.29	0.29	0.24	0.0	1..1...1....111.............1..
107	3	0.53	0.32	0.53	0.68	0.0	1..1...1....111............11..
108	3	0.86	0.70	0.37	0.72	0.0	...1...1....111............11..
109	3	0.10	0.22	0.29	0.15	0.0	1..1...1...1111..1......11111..
110	3	0.10	0.15	0.32	0.35	0.0	...1...1....111.............1..
111	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
112	3	0.82	0.33	0.37	0.26	0.0	1..1...1.1..111............1...
113	3	0.37	0.31	0.19	0.28	0.0	1..1...1....111.............1..
114	3	0.10	0.36	0.30	0.47	0.0	...1...1.1..111.............1..
115	3	0.25	0.37	0.41	0.36	0.0	1..1...1.1..111.............1..
116	3	0.98	0.50	0.37	0.22	0.0	1......1....111................
117	3	0.77	0.19	0.33	0.28	0.0	...1...1....111.............1..
118	3	0.10	0.81	0.60	0.66	0.0	.1.1...1.1..111............11..
119	3	0.10	0.21	0.19	0.30	0.0	1..1...1....111.............1..
120	3	0.10	0.49	0.58	0.51	0.0	1..1...1....111..1...1..11111..
121	3	0.10	0.47	0.27	0.17	0.0	1..1...1....111............11..
122	3	0.10	0.03	0.04	0.13	0.0	...1...1....111................
123	3	0.69	0.84	0.32	0.11	0.0	1......1....111................
124	3	0.10	0.17	0.05	0.22	0.0	1..1...1....111.............1..
125	3	0.10	0.51	0.11	0.27	0.0	11.1...1.1..111.............1..
126	3	0.10	0.04	0.12	0.06	0.0	1......1....111................
128	3	0.10	0.11	0.08	0.06	0.0	1..1...1....111.............1..
129	3	0.10	0.08	0.14	0.19	0.0	.......1....111............11..
130	3	0.84	0.41	0.52	0.61	0.0	1..1...1....111................
131	3	0.76	0.72	0.12	0.0	0.0	1..1...1....111............11..
132	0	0.10	0.0	0.52	0.0	0.0	.......1....111..1......1111...
133	3	0.38	0.25	0.17	0.36	0.0	1..1...1....111.............1..
134	3	0.99	0.17	0.19	1.23	0.0	1..1...1.1..111............1...
135	3	0.10	0.28	0.23	0.30	0.0	1..1...1....111.............1..
136	0	0.10	0.30	0.17	0.08	0.0	1..1...1....111.............1..
137	3	0.10	0.08	0.14	0.16	0.0	...1...1....111.............1..
138	3	0.36	0.32	0.44	0.03	0.0	1..1...1....111................
139	3	0.10	0.25	0.22	0.26	0.0	1..1...1....111................
140	3	0.10	0.05	0.11	0.07	0.0	1......1....111................
141	3	0.10	0.04	0.04	0.04	0.0	1......1....111............1...
142	2	0.10	0.18	0.03	0.18	0.0	1..1...1....111.............1..
143	2	0.10	0.43	0.49	0.61	0.0	1..1...1....111............11..
144	3	0.23	0.57	0.48	0.40	0.0	1..1...1.1..111............11..
145	3	0.16	0.24	0.37	0.22	0.0	...1...1....111.............1..
146	0	0.10	0.36	0.28	0.32	0.0	...1...1....111............11..

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ID/1	No.	P_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
147	4	0.029	0.002	137	5	9.45	2	0.69	2	0.150	0.393
148	4	0.14	0.01	104	2	8.46	3	0.86	3	0.130	0.379
149	6	0.15	0.03	22.0	2.0	11.70	2	0.80	2	0.250	0.461
150	6	0.034	0.001	157	3	9.03	2	0.71	2	0.150	0.393
151	7	0.14	0.01	46.7	1.0	10.21	2	0.87	3	0.250	0.461
153	6	0.060	0.003	175	4	8.13	3	0.67	4	0.031	0.311
154	5	0.070	0.003	192	4	7.89	2	0.80	0	0.150	0.393
155	3	0.021	0.002	49.5	2.7	12.02	2	0.68	2	0.150	0.393
156	4	0.040	0.002	126	3	9.31	2	0.70	4	0.150	0.393
157	2	0.15	0.04	19.1	2.7	12.04	1	0.80	0	0.150	0.393
158	3	0.17	0.02	39.8	2.3	10.29	2	0.80	3	0.250	0.461
159	6	0.061	0.003	131	3	8.76	2	0.69	4	0.150	0.393
160	2	0.059	0.004	85.0	2.5	9.76	2	0.72	2	0.150	0.393
161	9	0.12	0.02	45.7	4.5	10.27	3	0.72	3	0.731	0.790
162	3	0.047	0.003	105	3	9.60	2	0.76	2	0.250	0.461
163	5	0.047	0.006	76.5	4.7	10.21	2	0.70	2	0.150	0.393
164	4	0.053	0.003	110	3	9.28	3	0.68	3	0.011	0.298
165	2	0.069	0.005	160	6	8.23	2	0.74	2	0.150	0.393
167	2	0.21	0.02	42.2	2.1	10.02	2	0.86	3	0.250	0.461
168	2	0.050	0.003	154	4	8.68	3	0.75	4	0.155	0.396
169	4	0.19	0.03	36.5	2.8	10.45	2	0.85	3	0.250	0.461
170	3	0.14	0.01	46.2	1.0	10.31	2	0.89	3	0.250	0.461
171	4	0.053	0.008	121	9	9.08	3	0.69	4	0.244	0.457
172	7	0.12	0.01	64.5	1.3	9.70	2	0.90	3	0.250	0.461
173	5	0.053	0.003	159	4	8.49	3	0.70	4	0.121	0.373
174	8	0.14	0.01	71.7	4.2	9.26	2	0.86	2	0.250	0.461
175	6	0.065	0.004	107	3	9.13	2	0.70	2	0.150	0.393
176	11	0.053	0.002	125	2	9.12	1	0.80	0	0.150	0.393
177	2	0.048	0.003	75.3	2.2	10.27	2	0.73	1	0.150	0.393
178	6	0.21	0.01	37.8	0.7	10.31	2	0.90	3	0.250	0.461
179	11	0.14	0.01	81.0	1.5	9.03	2	0.83	4	0.250	0.461
180	1	0.11	0.01	32.7	1.8	11.22	2	0.83	2	0.250	0.461
181	6	0.12	0.02	107	12	8.57	3	0.80	4	0.053	0.326
182	5	0.16	0.03	45.3	4.5	10.19	3	0.89	2	0.296	0.492
183	3	0.16	0.04	36.0	4.2	10.62	2	0.84	2	0.250	0.461
184	3	0.18	0.01	68.2	2.2	9.00	3	0.71	4	-0.060	0.249
185	10	0.053	0.002	165	3	8.41	3	0.68	4	0.273	0.477
186	3	0.15	0.01	52.3	2.0	9.92	3	0.84	4	0.287	0.486
187	4	0.053	0.002	135	3	8.87	3	0.71	4	0.128	0.378
188	7	0.19	0.01	41.3	1.0	10.20	2	0.89	1	0.250	0.461
189	4	0.18	0.03	38.5	3.3	10.41	2	0.90	4	0.250	0.461
191	2	0.041	0.003	105	4	9.66	2	0.68	1	0.150	0.393
192	6	0.21	0.01	107	2	8.07	3	0.94	4	0.029	0.310
194	2	0.050	0.003	174	5	8.39	2	0.73	4	0.150	0.393
195	9	0.053	0.002	89.7	1.7	9.74	2	0.69	4	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
147	3	0.40	0.38	0.27	0.45	0.0	1..1...1....111............1...
148	3	0.10	0.18	0.09	0.17	0.0	1..1..11....111.............1..
149	0	0.99	0.40	0.57	0.50	0.0	1......1.1..111................
150	3	0.10	0.30	0.28	0.35	0.0	1..1...1....111.............1..
151	3	0.10	0.41	0.27	0.30	0.0	1..1...1.1..111..1...1......1..
153	3	0.10	0.38	0.24	0.46	0.0	11.1...1....111.............1..
154	3	0.10	0.27	0.16	0.22	0.0	1..1...1....111.............1..
155	3	0.10	0.0	0.20	0.0	0.0	...1...1.1...11............1...
156	0	0.10	0.36	0.37	0.48	0.0	1..1...1....111................
157	2	0.97	0.0	0.75	0.0	0.0	......11.1..111................
158	3	0.74	0.55	0.08	0.26	0.0	...1...1....111..1..........1..
159	3	0.10	0.08	0.26	0.25	0.0	1..1...1....111.............1..
160	2	0.10	0.11	0.02	0.18	0.0	1..1...1....111.............1..
161	3	1.00	0.88	0.67	0.59	0.0	...1...1....111.............1..
162	3	0.10	0.05	0.15	0.28	0.0	1..1...1....111.............1..
163	3	0.63	0.19	0.53	0.63	0.0	...1...1.1..111.............1..
164	0	0.10	1.47	1.25	0.95	0.0	1......1....111..1......1111...
165	3	0.10	0.03	0.06	0.12	0.0	1..1...1....111.............1..
167	2	0.56	0.11	0.23	0.37	0.0	1..1...1....111.............1..
168	3	0.10	0.01	0.11	0.00	0.0	1..1...1....111.............1..
169	3	0.66	0.29	0.51	0.43	0.0	...1...1.1..111.............1..
170	3	0.10	0.10	0.05	0.16	0.0	1......1....111................
171	3	0.93	0.67	0.14	0.48	0.0	...1...1....111.............1..
172	3	0.10	0.21	0.26	0.30	0.0	1..1...1....111.............1..
173	3	0.10	0.36	0.55	0.47	0.0	11.....1....111..1...1.........
174	3	1.00	1.08	0.72	0.71	0.0	1..1...1.1..111.............1..
175	3	0.10	1.05	0.84	0.87	0.0	1..1...1....111............11..
176	3	0.10	0.72	0.42	0.42	0.0	1..1...1....111.............1..
177	2	0.10	0.01	0.13	0.22	0.0	1..1...1....111.............1..
178	3	0.10	0.15	0.30	0.29	0.0	.1.1...1....111.............1..
179	3	0.10	0.44	0.54	0.48	0.0	11.1...1....111..1...1....111..
180	2	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
181	3	1.00	0.86	0.28	0.26	0.0	...1...1.1..111.............1..
182	3	0.99	0.53	0.20	0.72	0.0	.......1....111................
183	0	0.89	0.36	0.34	0.0	0.0	...1...1.1..11..........1......
184	3	0.10	0.29	0.14	0.25	0.0	...1..11....111.............1..
185	3	0.10	0.22	0.40	0.52	0.0	1..1...1....111.............1..
186	3	0.37	0.23	0.33	0.29	0.0	.......1....111................
187	3	0.10	0.20	0.18	0.28	0.0	1..1...1....111.............1..
188	3	0.10	0.37	0.57	0.22	0.0	...1...1....111.............1..
189	3	0.91	0.77	0.61	0.83	0.0	...1...1...1111............11..
191	3	0.10	0.13	0.23	0.29	0.0	1..1...1....111.............1..
192	3	0.10	0.24	0.34	0.33	0.0	1..1...1....111.............1..
194	0	0.10	0.07	0.03	0.27	0.0	1..1...1....111.............1..
195	3	0.10	0.32	0.18	0.36	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
196	7	0.18	0.01	146	4	7.50	3	0.86	4	0.475	0.615
197	7	0.27	0.03	32.6	1.7	10.33	2	0.89	1	0.250	0.461
198	6	0.19	0.02	58.7	3.1	9.43	3	0.88	4	0.373	0.545
199	1	0.13	0.01	63.0	4.1	9.60	2	0.80	0	0.150	0.393
200	9	0.053	0.002	132	3	8.91	3	0.71	4	0.059	0.330
201	5	0.14	0.01	70.5	2.1	9.19	3	0.71	3	0.139	0.385
202	2	0.17	0.02	65.5	5.3	8.69	2	0.86	2	0.250	0.461
203	5	0.029	0.001	120	3	9.78	2	0.70	1	0.150	0.393
204	9	0.17	0.01	50.8	1.0	9.82	2	0.82	3	0.250	0.461
205	7	0.061	0.002	83.5	1.5	9.73	2	0.69	1	0.150	0.393
207	3	0.050	0.002	60.7	1.3	10.69	2	0.73	2	0.150	0.393
208	2	0.21	0.01	44.3	1.3	9.85	2	0.80	4	0.250	0.461
209	6	0.044	0.036	149	62	8.84	3	0.69	4	-0.086	0.231
210	1	0.041	0.003	90.0	2.7	9.99	2	0.67	4	0.150	0.393
211	20	0.059	0.003	148	4	8.56	3	0.72	4	0.032	0.312
212	5	0.046	0.002	140	3	8.92	2	0.70	1	0.150	0.393
213	2	0.072	0.005	84.6	2.7	9.47	2	0.64	4	0.150	0.393
214	5	0.40	0.03	26.8	1.2	10.15	3	0.70	4	0.480	0.618
215	6	0.18	0.01	37.3	1.1	10.46	2	0.84	2	0.250	0.461
216	2	0.088	0.006	140	5	8.23	3	0.70	4	0.247	0.459
218	4	0.15	0.01	62.0	1.2	9.54	2	0.86	1	0.250	0.461
219	7	0.15	0.01	43.6	2.0	10.30	2	0.87	2	0.250	0.461
220	3	0.066	0.015	30.6	3.5	11.94	2	0.80	0	0.250	0.461
221	6	0.12	0.01	110	2	8.48	3	0.79	4	0.157	0.397
222	11	0.082	0.013	58.0	4.5	10.18	3	0.66	4	0.651	0.735
223	6	0.022	0.002	90.7	4.0	10.66	2	0.71	3	0.150	0.393
225	6	0.041	0.002	124	3	9.28	2	0.66	2	0.150	0.393
226	3	0.13	0.01	39.2	1.3	10.64	2	0.80	0	0.150	0.393
227	4	0.056	0.005	90.1	3.7	9.77	2	0.80	0	0.150	0.393
228	1	0.12	0.01	10.7	0.5	13.59	2	0.92	3	0.250	0.461
229	1	0.037	0.006	96.0	7.8	10.00	2	0.71	2	0.250	0.461
230	6	0.14	0.01	113	2	8.32	3	0.85	4	0.354	0.532
231	3	0.042	0.002	85.1	2.2	10.20	2	0.80	0	0.150	0.393
232	8	0.045	0.002	55.2	1.0	10.97	2	0.70	4	0.150	0.393
233	14	0.073	0.011	108	8	9.08	3	0.78	3	0.168	0.405
234	4	0.22	0.01	44.6	1.5	9.84	3	0.87	4	0.043	0.319
235	3	0.15	0.01	60.2	2.5	9.66	2	0.90	2	0.250	0.461
236	7	0.10	0.01	90.5	2.0	9.14	3	0.85	4	0.192	0.421
237	3	0.15	0.01	44.0	1.2	10.22	2	0.79	1	0.250	0.461
238	7	0.032	0.001	156	3	9.11	3	0.73	4	0.507	0.637
239	4	0.054	0.006	43.0	2.5	11.42	2	0.80	0	0.150	0.393
240	3	0.039	0.002	108	3	9.69	3	0.70	2	0.134	0.382
241	1	0.062	0.004	169	5	8.19	3	0.69	4	0.043	0.319
242	2	0.14	0.03	41.5	5.3	10.41	2	0.80	0	0.150	0.393
243	5	0.16	0.03	32.5	3.8	10.83	3	0.81	4	0.203	0.429

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
196	3	0.21	0.37	0.28	0.49	0.0	...1...1.1..111.............1..
197	1	0.49	0.31	0.43	0.69	0.0	...1...1.1..111..1...1......1..
198	3	0.88	0.89	0.72	0.58	0.0	1..1...1....111............11..
199	3	0.50	0.0	0.0	0.0	0.0	...1...1.....11..1.........1...
200	3	0.10	0.43	0.44	0.41	0.0	1..1...1....111.............1..
201	3	0.10	0.18	0.27	0.37	0.0	...1...1....111.............1..
202	3	0.59	0.16	0.13	0.39	0.0	1......1....111................
203	3	0.10	0.25	0.09	0.22	0.0	1..1...1....111.............1..
204	3	0.10	0.96	0.69	0.66	0.0	1..1...1.1.1111................
205	3	0.10	0.24	0.32	0.35	0.0	1..1...1....111.............1..
207	3	0.10	0.09	0.09	0.07	0.0	1..1...1....111.............1..
208	3	0.10	0.0	0.09	0.07	0.0	1..1...1....111.............1..
209	3	1.00	0.44	0.28	2.27	0.0	1..1..11.1..111.............1..
210	2	0.50	0.0	0.0	0.0	0.0	1......1....111................
211	3	0.21	0.69	0.44	0.54	0.0	11.1...1....111..1........111..
212	3	0.10	0.16	0.26	0.10	0.0	...1...1....111................
213	3	0.10	0.10	0.02	0.05	0.0	1..1...1....111.............1..
214	3	0.45	0.0	0.41	0.41	0.0	1..1...1....111.............1..
215	3	0.16	0.82	0.71	0.69	0.0	1..1...1....111.............1..
216	0	0.10	0.19	0.18	0.19	0.0	...1...1....111................
218	3	0.10	0.23	0.21	0.18	0.0	1..1...1....111.............1..
219	3	0.20	0.48	0.34	0.50	0.0	1..1...1....111.............1..
220	3	1.00	0.57	0.35	0.65	0.0	...1...1.1..111.............1..
221	3	0.10	0.24	0.15	0.31	0.0	1..1...1....111.........11111..
222	3	0.83	0.67	0.76	0.87	0.0	11.1...1....111.........1..11..
223	3	0.64	0.63	0.36	0.44	0.0	1..1...1....111.............1..
225	3	0.10	0.35	0.40	0.49	0.0	1..1...1....111.............1..
226	3	0.10	0.0	0.16	0.09	0.0	1......1....111..1...1.........
227	3	0.44	0.25	0.13	0.30	0.0	1..1...1....111.............1..
228	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
229	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
230	3	0.10	0.32	0.26	0.24	0.0	1..1...1....111............11..
231	3	0.10	0.07	0.13	0.24	0.0	...1...1....111..1.........11..
232	3	0.10	0.50	0.50	0.53	0.0	1..1...1.1..111............11..
233	3	1.00	0.95	1.01	0.75	0.0	11.1...1....111.............1..
234	3	0.23	0.28	0.17	0.14	0.0	1..1...1....111.............1..
235	3	0.43	0.23	0.08	0.26	0.0	.1.1...1....111.............1..
236	3	0.10	0.72	0.16	0.41	0.0	1..1...1....111.............1..
237	3	0.10	0.03	0.09	0.22	0.0	.......1....111................
238	3	0.13	0.32	0.42	0.30	0.0	1..1...1...1111.............1..
239	3	0.43	0.49	0.50	0.46	0.0	...1...1....111.............1..
240	3	0.10	0.27	0.17	0.20	0.0	1..1...1....111............11..
241	0	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
242	3	0.95	0.78	0.02	0.43	0.0	...1..11....111.............1..
243	3	1.00	0.15	0.72	0.81	0.0	1......1....111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
244	2	0.10	0.01	13.8	0.5	13.15	2	0.80	0	0.250	0.461
245	3	0.16	0.01	84.8	2.3	8.76	3	0.84	4	0.393	0.559
246	7	0.13	0.01	63.8	4.1	9.73	3	0.99	3	0.400	0.564
247	4	0.059	0.003	137	3	8.69	3	0.69	3	0.073	0.340
248	4	0.057	0.005	52.0	2.3	10.94	2	0.80	0	0.150	0.393
249	5	0.041	0.002	37.2	1.0	12.02	2	0.80	0	0.250	0.461
250	5	0.18	0.03	85.5	9.1	8.52	3	0.72	4	0.705	0.772
251	1	0.17	0.03	31.1	3.0	10.86	2	0.80	0	0.150	0.393
252	4	0.052	0.008	72.1	5.6	10.33	2	0.80	0	0.150	0.393
253	7	0.036	0.002	61.0	2.0	11.10	2	0.80	0	0.150	0.393
254	1	0.13	0.01	14.1	0.8	12.93	2	0.85	2	0.250	0.461
255	2	0.038	0.004	58.3	3.2	11.03	2	0.68	1	0.150	0.393
256	3	0.044	0.003	66.1	1.8	10.70	2	0.80	0	0.150	0.393
257	2	0.070	0.005	73.5	2.6	9.94	2	0.76	1	0.250	0.461
258	4	0.15	0.01	67.7	1.5	9.33	3	0.86	4	0.461	0.605
259	2	0.037	0.003	185	7	8.53	2	0.67	1	0.150	0.393
260	2	0.034	0.005	101	7	9.97	2	0.71	1	0.150	0.393
261	3	0.10	0.01	52.6	1.5	10.19	2	0.69	4	0.250	0.461
263	3	0.14	0.03	28.0	3.2	11.32	2	0.80	0	0.250	0.461
264	3	0.27	0.06	53.5	6.0	9.24	2	0.84	4	0.250	0.461
265	2	0.054	0.005	30.5	1.3	12.16	2	0.80	0	0.250	0.461
266	2	0.054	0.003	113	3	9.23	2	0.71	2	0.150	0.393
267	5	0.034	0.005	53.6	4.2	11.43	2	0.80	1	0.250	0.461
268	2	0.038	0.003	142	5	9.04	2	0.64	4	0.150	0.393
269	4	0.068	0.003	54.7	1.2	10.64	2	0.80	0	0.150	0.393
270	6	0.19	0.02	52.2	3.2	9.66	2	0.87	3	0.250	0.461
271	7	0.058	0.008	61.2	4.0	10.48	2	0.71	1	0.150	0.393
272	4	0.10	0.02	29.0	3.3	11.59	2	0.80	0	0.150	0.393
273	3	0.12	0.01	32.1	1.0	11.11	2	0.76	2	0.150	0.393
274	5	0.17	0.03	30.3	3.0	10.92	2	0.80	0	0.250	0.461
275	2	0.036	0.002	121	4	9.54	2	0.72	4	0.150	0.393
276	8	0.041	0.006	127	9	9.28	3	0.71	4	0.154	0.395
277	5	0.21	0.01	29.5	0.8	10.79	2	0.83	3	0.250	0.461
278	4	0.21	0.02	38.0	2.2	10.18	2	0.80	0	0.150	0.393
279	3	0.030	0.004	135	9	9.52	3	0.75	4	0.520	0.646
280	4	0.033	0.007	48.6	4.7	11.67	2	0.80	0	0.150	0.393
281	3	0.14	0.02	13.1	1.1	13.03	3	0.95	2	0.399	0.563
282	7	0.043	0.002	40.5	1.0	11.61	2	0.63	1	0.250	0.461
283	2	0.025	0.002	150	5	9.44	2	0.71	1	0.150	0.393
284	8	0.055	0.002	55.1	1.1	10.76	2	0.70	3	0.150	0.393
285	3	0.037	0.005	48.3	3.0	11.58	2	0.80	0	0.150	0.393
286	5	0.043	0.003	96.5	2.8	9.77	2	0.67	1	0.150	0.393
287	4	0.16	0.01	70.1	1.5	9.19	3	0.87	3	0.295	0.492
288	1	0.11	0.01	37.5	2.0	10.93	3	0.85	3	0.438	0.590
289	3	0.14	0.01	41.5	2.0	10.65	2	1.05	3	0.400	0.564

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
244	3	0.10	0.0	0.01	0.0	0.0	.......1....11.................
245	3	0.10	0.09	0.25	0.10	0.0	...1...1....111.............1..
246	3	0.94	0.69	0.68	0.67	0.0	11.....1....111................
247	0	0.10	0.12	0.09	0.21	0.0	1......1....111................
248	3	0.53	0.34	0.35	0.31	0.0	1..1...1....111................
249	3	0.10	0.32	0.26	0.19	0.0	...1...1....111..1...1......1..
250	3	0.94	0.25	0.32	0.50	0.0	...1...1...1111.............1..
251	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
252	3	0.70	0.29	0.43	0.26	0.0	11.1...1....111.............1..
253	3	0.26	0.40	0.67	0.55	0.0	1..1...1....111.............1..
254	3	0.50	0.0	0.0	0.0	0.0	1......1....11.................
255	0	0.54	0.25	0.11	0.36	0.0	1..1...1....111.............1..
256	3	0.10	0.09	0.09	0.27	0.0	.......1....111................
257	3	0.10	0.11	0.01	0.33	0.0	1..1...1....111.............1..
258	0	0.10	0.06	0.11	0.17	0.0	...1...1....111.............1..
259	3	0.15	0.41	0.04	0.03	0.0	1..1...1....111...........111..
260	3	0.93	0.49	0.10	0.11	0.0	1......1....111................
261	3	0.10	0.10	0.01	0.21	0.0	...1...1....111.............1..
263	2	0.93	0.0	0.65	0.0	0.0	...1...1.....11............1...
264	0	1.00	0.17	0.30	0.73	0.0	1..1...1....111..1........111..
265	0	0.10	0.0	0.09	0.32	0.0	1..1...1.1..111.............1..
266	3	0.10	0.03	0.08	0.08	0.0	1..1...1....111.............1..
267	3	0.97	0.34	0.45	0.41	0.0	...1...1.1..111.............1..
268	3	0.10	0.01	0.03	0.16	0.0	1..1...1....111.............1..
269	3	0.10	0.30	0.31	0.11	0.0	.1.....1....111................
270	3	0.58	0.50	0.58	0.58	0.0	1..1...1....111............11..
271	3	0.53	0.47	0.61	0.52	0.0	11.1...1....111.............1..
272	3	1.00	0.80	0.45	0.03	0.0	1..1...1....111.............1..
273	0	0.10	0.25	0.22	0.00	0.0	1..1...1...1111.............1..
274	3	1.00	0.45	0.50	0.71	0.0	...1...1....111.............1..
275	3	0.10	0.08	0.19	0.03	0.0	1..1...1....111.............1..
276	3	0.96	0.47	0.42	0.50	0.0	1..1...1....111.............1..
277	3	0.10	0.35	0.75	0.41	0.0	1..1...1....111.............1..
278	2	0.45	0.14	0.07	0.71	0.0	...1..11.1..111.............1..
279	3	0.64	0.41	0.21	0.16	0.0	1..1...1.1..111.........11111..
280	3	0.89	0.66	0.51	0.35	0.0	11.1...1....111..1...1......1..
281	3	0.81	0.08	0.82	0.0	0.0	1..1...1....11..............1..
282	3	0.10	0.28	0.43	0.16	0.0	...1...1.1..111.........1...1..
283	3	0.10	0.12	0.01	0.33	0.0	1......1....111................
284	3	0.10	0.44	0.44	0.41	0.0	1..1...1....111.............1..
285	3	0.42	0.0	0.30	0.65	0.0	...1...1....111.............1..
286	3	0.10	0.15	0.33	0.55	0.0	1..1...1....111............11..
287	3	0.10	0.28	0.26	0.15	0.0	1..1...1....111................
288	3	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
289	3	0.10	0.0	0.44	0.0	0.0	1......1.1...1.................

ID/1	No.	P_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
291	2	0.14	0.01	17.5	1.0	12.28	2	0.80	0	0.250	0.461
292	5	0.11	0.01	35.0	1.0	11.08	2	0.80	0	0.150	0.393
293	7	0.055	0.009	58.0	4.8	10.67	2	0.72	3	0.150	0.393
294	4	0.045	0.003	59.6	1.7	10.91	2	0.80	0	0.150	0.393
295	3	0.15	0.02	30.6	2.1	11.08	2	0.85	2	0.250	0.461
297	3	0.14	0.01	45.8	1.8	10.23	2	0.80	0	0.150	0.393
299	3	0.081	0.008	21.1	1.0	12.52	2	0.80	0	0.250	0.461
300	2	0.033	0.005	79.1	5.3	10.63	2	0.80	0	0.150	0.393
301	3	0.056	0.003	55.5	1.5	10.83	2	0.80	0	0.150	0.393
302	4	0.045	0.006	40.5	2.5	11.59	2	0.65	3	0.150	0.393
303	5	0.047	0.002	103	2	9.68	2	0.80	0	0.150	0.393
304	1	0.047	0.004	68.5	3.0	10.47	3	0.71	3	0.089	0.351
305	8	0.16	0.01	50.7	1.5	9.91	2	0.89	2	0.250	0.461
306	11	0.17	0.01	49.2	2.0	9.91	3	0.86	4	0.509	0.638
307	6	0.053	0.009	58.0	4.8	10.67	2	0.67	1	0.150	0.393
308	4	0.043	0.002	148	4	8.97	3	0.79	4	0.283	0.484
309	5	0.037	0.010	54.7	7.2	11.29	2	0.80	0	0.150	0.393
310	1	0.087	0.010	36.3	2.0	11.27	2	0.80	0	0.150	0.393
311	2	0.20	0.02	27.8	1.5	10.92	2	0.83	1	0.250	0.461
312	4	0.18	0.02	51.0	3.2	9.77	2	0.84	1	0.250	0.461
313	6	0.050	0.002	101	2	9.57	3	0.71	3	0.045	0.321
314	2	0.057	0.004	61.6	2.1	10.57	2	0.80	0	0.150	0.393
316	2	0.018	0.002	49.3	2.0	12.32	2	0.80	0	0.150	0.393
317	1	0.29	0.03	22.6	1.2	10.85	2	0.67	1	0.400	0.564
319	5	0.028	0.005	73.3	6.8	10.97	1	0.80	0	0.150	0.393
321	4	0.15	0.03	31.2	3.2	10.99	2	0.79	2	0.250	0.461
322	10	0.080	0.004	73.8	1.6	9.74	2	0.72	3	0.150	0.393
323	1	0.16	0.01	37.7	1.2	10.57	2	0.90	3	0.250	0.461
324	2	0.057	0.003	242	7	7.52	3	0.70	3	0.104	0.361
325	6	0.073	0.004	78.0	2.0	9.70	2	0.70	1	0.250	0.461
326	2	0.039	0.005	100	7	9.84	3	0.71	4	-0.109	0.215
327	2	0.11	0.02	35.5	4.5	11.03	2	0.80	0	0.150	0.393
328	1	0.028	0.003	120	7	10.00	2	0.89	1	0.250	0.461
329	3	0.037	0.002	80.5	1.8	10.35	2	0.69	3	0.150	0.393
331	4	0.040	0.004	78.5	3.3	10.33	2	0.70	2	0.150	0.393
332	2	0.17	0.02	45.0	2.6	10.04	2	0.80	0	0.150	0.393
333	4	0.042	0.002	81.5	2.0	10.26	2	0.75	1	0.150	0.393
334	3	0.064	0.012	170	16	8.18	3	0.72	3	-0.057	0.251
335	6	0.053	0.003	93.6	2.5	9.57	3	0.62	4	0.140	0.386
336	8	0.042	0.004	72.0	3.1	10.51	3	0.73	2	0.173	0.408
337	2	0.13	0.01	63.2	2.8	9.45	2	0.69	2	0.250	0.461
338	5	0.17	0.07	62.1	13.6	9.24	2	0.70	3	0.250	0.461
339	2	0.16	0.01	43.7	2.5	10.11	3	0.77	4	0.249	0.460
340	3	0.11	0.01	32.5	1.2	11.18	2	0.80	0	0.250	0.461
341	6	0.26	0.01	16.6	0.5	11.88	2	0.92	1	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
291	3	0.10	0.0	0.58	0.0	0.0	...1...1.....1.............11..
292	2	0.10	0.20	0.41	0.33	0.0	...1..11....111.........11111..
293	2	0.92	0.79	0.38	0.61	0.0	...1...1....111..1...1......1..
294	3	0.10	0.0	0.18	0.30	0.0	1..1...1.1..111..1..........1..
295	3	0.53	0.0	0.77	0.0	0.0	...1...1.1..111............1...
297	3	0.10	0.0	0.11	0.12	0.0	...1..11.....11................
299	3	0.15	0.0	0.49	0.0	0.0	...1...1.1..11.................
300	3	0.42	0.16	0.00	0.55	0.0	.......1....111............1...
301	2	0.10	0.07	0.27	0.35	0.0	...1...1....111............11..
302	0	0.56	0.41	0.89	0.70	0.0	1..1...1....111.............1..
303	3	0.10	0.13	0.21	0.18	0.0	1..1...1....111............11..
304	0	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1..
305	3	0.13	0.61	0.45	0.16	0.0	...1...1....111..1...1....111..
306	3	0.46	0.66	0.79	0.74	0.0	1..1..11....111............11..
307	3	0.98	1.04	0.53	0.46	0.0	1..1...1....111.............1..
308	3	0.10	0.17	0.16	0.11	0.0	1..1...1.1..111..1......11111..
309	3	1.00	0.96	0.41	0.0	0.0	1..1...1....111..1...1..11111..
310	2	0.50	0.0	0.0	0.0	0.0	.......1.1.1.1..........1......
311	3	0.10	0.0	0.01	0.0	0.0	1......1.....1...1.............
312	0	0.90	0.67	0.65	0.67	0.0	1..1...1....111............1...
313	3	0.10	0.63	0.71	0.63	0.0	11.1...1....111.............1..
314	3	0.10	0.05	0.07	0.06	0.0	...1...1....111................
316	3	0.10	0.10	0.09	0.11	0.0	...1...1....111................
317	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
319	2	0.95	0.72	0.18	0.57	0.0	...1...1....111..1...1.....11..
321	3	0.94	0.0	0.69	0.14	0.0	.......1.1...11................
322	3	0.10	1.08	0.67	0.84	0.0	1..1...1...1111.........11111..
323	3	0.50	0.0	0.0	0.0	0.0	...1...1....111................
324	3	0.10	0.20	0.03	0.08	0.0	1......1....111................
325	3	0.10	0.26	0.38	0.39	0.0	1..1...1....111.............1..
326	0	0.97	0.42	0.07	0.15	0.0	...1...1....111................
327	3	0.91	0.0	0.40	0.0	0.0	11.....1.....11................
328	0	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
329	0	0.10	0.15	0.15	0.16	0.0	...1...1....111.............1..
331	3	0.68	0.27	0.21	0.26	0.0	1......1....111................
332	2	0.50	0.31	0.02	0.26	0.0	11.1..11....111.............1..
333	3	0.10	0.14	0.19	0.14	0.0	...1...1....111.............1..
334	3	0.75	0.45	0.33	0.66	0.0	1..1...1....111..1......11111..
335	3	0.10	0.23	0.07	0.30	0.0	1..1...1....111.............1..
336	3	0.40	0.43	0.41	0.48	0.0	1......1....111................
337	3	0.10	0.0	0.11	0.0	0.0	.......1....11...1...1..1111...
338	3	1.00	1.03	1.02	1.08	0.0	...1...1.1..111............11..
339	0	0.42	0.09	0.04	0.28	0.0	...1...1....111.............1..
340	3	0.10	0.47	0.50	0.09	0.0	1..1...1....111.............1..
341	2	0.10	0.26	0.87	0.21	0.0	1..1...1....111...........11...

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
342	2	0.036	0.005	65.0	4.1	10.86	2	0.71	2	0.150	0.393
343	1	0.099	0.015	20.6	1.5	12.32	2	0.77	2	0.150	0.393
344	9	0.053	0.002	138	3	8.82	3	0.71	3	0.172	0.408
345	5	0.056	0.007	100	6	9.47	2	0.72	4	0.150	0.393
346	5	0.13	0.01	110	2	8.44	3	0.85	3	0.570	0.680
347	10	0.14	0.02	54.1	4.0	9.71	2	0.68	3	0.250	0.461
348	3	0.036	0.002	88.3	3.0	10.30	2	0.80	0	0.150	0.393
349	6	0.34	0.01	143	3	6.91	3	0.93	4	0.325	0.512
350	11	0.047	0.002	123	3	9.17	2	0.69	4	0.150	0.393
351	4	0.20	0.05	44.3	5.5	9.96	2	0.84	2	0.250	0.461
352	2	0.31	0.08	22.5	2.8	11.01	2	0.90	4	0.250	0.461
354	14	0.19	0.02	162	10	7.27	3	0.95	4	0.321	0.510
355	5	0.16	0.02	25.7	1.6	11.29	2	0.80	0	0.150	0.393
356	7	0.062	0.003	135	4	8.72	3	0.73	3	-0.081	0.235
357	4	0.048	0.002	110	3	9.43	2	0.72	3	0.150	0.393
358	6	0.050	0.003	91.8	2.2	9.86	2	0.80	0	0.150	0.393
359	4	0.15	0.03	47.5	5.1	9.99	2	0.70	2	0.250	0.461
360	6	0.052	0.010	121	12	9.09	2	0.68	3	0.150	0.393
361	5	0.039	0.002	149	4	9.02	2	0.75	4	0.150	0.393
364	7	0.20	0.01	31.0	0.8	10.74	2	0.89	3	0.250	0.461
365	12	0.029	0.001	110	2	9.99	3	0.72	4	0.299	0.495
366	9	0.076	0.004	98.1	2.6	9.26	2	0.80	0	0.150	0.393
367	1	0.14	0.01	22.3	1.0	11.75	2	0.80	0	0.250	0.461
368	3	0.032	0.002	74.5	2.0	10.72	2	0.73	3	0.150	0.393
369	9	0.17	0.01	62.2	1.5	9.26	3	0.71	4	0.219	0.440
371	7	0.16	0.01	56.7	1.2	9.61	2	0.82	1	0.250	0.461
372	6	0.054	0.002	195	4	8.13	1	0.80	0	0.150	0.393
373	7	0.038	0.003	99.6	4.2	9.84	2	0.67	2	0.150	0.393
374	3	0.19	0.01	48.2	1.5	9.80	2	0.85	3	0.250	0.461
376	2	0.22	0.01	37.0	1.1	10.29	2	0.88	3	0.250	0.461
377	3	0.051	0.003	94.5	2.5	9.73	3	0.75	2	0.305	0.499
378	3	0.17	0.04	31.6	4.0	10.83	2	0.84	1	0.250	0.461
379	6	0.045	0.002	96.1	2.0	9.75	2	0.67	1	0.250	0.461
380	11	0.051	0.002	76.3	1.5	10.14	2	0.71	3	0.150	0.393
381	8	0.045	0.003	124	4	9.17	2	0.67	3	0.150	0.393
382	6	0.13	0.01	60.6	1.6	9.55	2	0.69	2	0.250	0.461
383	4	0.072	0.005	49.7	1.6	10.65	3	0.67	2	0.244	0.457
384	6	0.16	0.02	38.5	2.5	10.53	2	0.85	2	0.250	0.461
385	8	0.20	0.01	94.1	1.8	8.36	3	0.90	2	0.184	0.416
386	8	0.063	0.002	173	3	8.16	3	0.74	4	0.228	0.446
387	1	0.16	0.01	106	5	8.36	3	0.88	4	0.237	0.452
388	4	0.053	0.008	120	9	9.13	2	0.72	3	0.150	0.393
389	9	0.20	0.01	81.6	1.7	8.63	3	0.86	4	-0.062	0.248
390	7	0.19	0.04	26.8	2.6	11.04	2	0.79	1	0.150	0.393
392	3	0.051	0.003	64.6	1.6	10.59	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
342	0	0.88	0.38	0.20	0.16	0.0	1..1...1....111.............1..
343	3	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1..
344	3	0.10	0.21	0.31	0.47	0.0	1..1...1....111................
345	0	0.65	0.53	0.47	0.48	0.0	1..1...1....111............11..
346	3	0.10	0.17	0.30	0.34	0.0	...1...1.1..111.............1..
347	3	0.94	1.46	1.31	1.62	0.0	1..1...1....111...........11...
348	0	0.10	0.42	0.35	0.24	0.0	1..1...1...1111.............1..
349	3	0.10	0.30	0.28	0.30	0.0	...1...1....111............1...
350	3	0.10	0.46	0.52	0.36	0.0	1..1...1....111............11..
351	3	0.99	0.34	0.31	0.45	0.0	1..1...1....111.............1..
352	3	1.00	0.17	0.95	0.50	0.0	1..1...1....111............11..
354	3	0.90	1.15	0.99	0.95	0.0	1..1...1....111.............1..
355	2	0.49	0.54	0.63	0.0	0.0	...1..11....111............11..
356	3	0.13	0.57	0.33	0.36	0.0	1..1...1.1..111.............1..
357	3	0.10	0.24	0.31	0.07	0.0	...1...1....111.............1..
358	3	0.10	0.66	0.50	0.81	0.0	1..1...1....111.............1..
359	3	0.91	0.40	0.42	0.44	0.0	...1...1....111..1...1......1..
360	3	1.00	0.24	0.41	0.68	0.0	1..1...1....111.........11111..
361	3	0.24	0.39	0.23	0.32	0.0	1..1...1....111.............1..
364	3	0.11	0.42	0.69	0.51	0.0	.1.1...1....111............11..
365	3	0.10	0.48	0.41	0.41	0.0	11.1...1....111............11..
366	3	0.12	0.73	0.41	0.63	0.0	11.1...1.1..111..1......1..11..
367	3	0.50	0.0	0.0	0.0	0.0	...1...1.....11................
368	3	0.10	0.14	0.21	0.15	0.0	1..1...1....111.............1..
369	3	0.10	0.57	0.60	0.59	0.0	...1...1....111.............1..
371	3	0.10	0.50	0.53	0.37	0.0	1..1...1....111..1...1......1..
372	3	0.10	0.32	0.28	0.35	0.0	1..1...1....111.............1..
373	3	0.40	1.06	0.71	0.60	0.0	1..1...1....111.............1..
374	3	0.10	0.08	0.10	0.14	0.0	...1...1....111............11..
376	3	0.10	0.15	0.14	0.17	0.0	1......1....111................
377	3	0.10	0.13	0.17	0.21	0.0	.......1....111................
378	3	0.98	0.0	0.51	0.73	0.0	1..1...1.....11.............1..
379	3	0.10	0.17	0.19	0.13	0.0	...1...1....111................
380	3	0.10	0.37	0.61	0.66	0.0	...1...1.1..111..1...1......1..
381	3	0.10	0.27	0.48	0.45	0.0	1..1...1....111.............1..
382	3	0.10	0.63	0.57	0.68	0.0	...1...1....111.............1..
383	3	0.10	0.10	0.47	0.37	0.0	1..1...1....111................
384	3	0.95	0.58	0.50	0.58	0.0	1..1...1....111............11..
385	3	0.10	0.63	0.58	0.58	0.0	1..1...1.1..111.............1..
386	3	0.10	0.23	0.23	0.24	0.0	1..1...1.1..111.............1..
387	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
388	3	0.88	0.22	0.35	0.50	0.0	1..1...1....111................
389	3	0.10	0.54	0.50	0.71	0.0	1..1...1....111.............1..
390	3	0.96	0.85	0.51	0.68	0.0	1..1..11.1..111..1...1......1..
392	2	0.10	0.07	0.05	0.08	0.0	...1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
393	3	0.069	0.065	106	50	9.14	2	0.74	3	0.150	0.393
394	3	0.16	0.01	36.2	1.5	10.58	3	0.83	3	0.278	0.480
395	1	0.041	0.004	54.2	2.3	11.15	3	0.73	3	0.259	0.467
396	3	0.17	0.04	34.8	4.0	10.57	2	0.80	0	0.150	0.393
397	9	0.15	0.02	46.0	3.5	10.17	3	0.81	3	0.220	0.440
398	2	0.045	0.007	50.5	3.8	11.26	2	0.80	0	0.150	0.393
399	5	0.14	0.02	52.8	5.2	9.94	2	0.80	0	0.150	0.393
400	3	0.14	0.04	34.3	5.1	10.80	2	0.80	0	0.250	0.461
401	4	0.030	0.001	103	2	10.15	2	0.80	0	0.150	0.393
402	8	0.12	0.01	57.6	1.8	9.86	3	0.80	3	0.163	0.401
403	9	0.12	0.01	51.3	1.0	10.24	2	0.90	1	0.250	0.461
404	9	0.041	0.002	101	2	9.71	3	0.66	3	0.189	0.419
405	5	0.045	0.002	129	3	9.12	3	0.69	4	0.121	0.373
406	4	0.043	0.003	53.8	1.5	11.11	2	0.73	3	0.150	0.393
407	11	0.050	0.006	97.6	6.1	9.62	2	0.70	2	0.150	0.393
408	6	0.12	0.01	45.5	1.5	10.41	2	0.80	0	0.150	0.393
409	3	0.057	0.005	168	8	8.32	3	0.72	3	0.284	0.484
410	21	0.054	0.002	128	2	9.01	3	0.75	2	0.083	0.347
411	7	0.066	0.003	79.6	2.0	9.86	2	0.80	0	0.150	0.393
412	5	0.043	0.003	93.3	2.7	9.99	2	0.80	0	0.150	0.393
413	4	0.12	0.02	34.3	3.5	10.92	2	0.68	1	0.250	0.461
414	6	0.047	0.008	75.2	6.6	10.30	2	0.75	3	0.150	0.393
415	11	0.049	0.006	80.1	5.0	10.09	3	0.71	3	0.315	0.505
416	5	0.15	0.01	89.5	2.0	8.75	3	0.88	4	0.257	0.466
417	2	0.17	0.01	43.3	2.0	10.07	2	0.76	2	0.250	0.461
418	5	0.13	0.03	38.5	4.7	10.53	2	0.69	3	0.250	0.461
419	11	0.044	0.002	133	2	9.03	3	0.64	3	0.145	0.389
420	10	0.038	0.005	146	9	9.04	3	0.69	3	0.042	0.319
423	3	0.038	0.002	217	6	8.15	3	0.67	4	0.681	0.756
424	5	0.030	0.001	90.5	1.8	10.43	2	0.80	0	0.150	0.393
425	5	0.046	0.002	66.8	1.7	10.63	2	0.80	0	0.150	0.393
426	5	0.037	0.002	134	3	9.27	2	0.71	1	0.150	0.393
427	4	0.26	0.03	33.8	2.0	10.21	2	0.80	0	0.150	0.393
428	3	0.067	0.007	21.0	1.0	12.73	2	0.80	0	0.250	0.461
429	7	0.044	0.012	70.3	9.6	10.51	2	0.74	2	0.150	0.393
430	5	0.10	0.01	34.6	1.0	11.20	2	0.80	0	0.150	0.393
431	7	0.048	0.002	97.7	2.1	9.61	2	0.64	3	0.250	0.461
432	9	0.17	0.01	48.6	1.0	9.96	2	0.87	2	0.250	0.461
435	2	0.077	0.005	43.0	1.5	10.93	2	0.70	3	0.150	0.393
436	9	0.048	0.007	63.0	4.7	10.71	2	0.80	0	0.150	0.393
437	3	0.56	0.03	14.3	0.5	11.24	2	0.80	0	0.250	0.461
438	9	0.045	0.005	63.6	3.7	10.58	2	0.61	1	0.150	0.393
439	2	0.036	0.002	79.3	2.2	10.44	2	0.72	1	0.150	0.393
441	1	0.14	0.01	73.2	2.5	9.09	2	0.69	3	0.250	0.461
442	8	0.044	0.004	67.5	3.1	10.56	3	0.69	3	-0.015	0.280

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
393	2	1.00	0.17	0.03	2.07	0.0	...1..11.1..111.............1..
394	3	0.10	0.0	0.12	0.0	0.0	...1...1....11..............1..
395	2	0.50	0.0	0.0	0.0	0.0	.......1....111................
396	0	1.00	0.55	0.54	0.48	0.0	...1..11....111..1.............
397	3	1.00	1.49	0.79	1.07	0.0	1..1...1.1..111.........11111..
398	3	0.33	0.65	0.17	0.25	0.0	1..1...1....111............11..
399	3	1.00	0.83	0.43	0.61	0.0	1..1..11....111.............1..
400	3	1.00	0.0	0.71	0.25	0.0	...1...1.1..111..1...1......1..
401	3	0.10	0.22	0.07	0.16	0.0	1..1...1....111.............1..
402	3	0.31	0.81	0.64	0.71	0.0	1..1...1.1..111.............1..
403	3	0.10	0.41	0.51	0.32	0.0	...1...1....111............11..
404	3	0.10	1.00	0.74	0.74	0.0	1......1....111..1...1.........
405	3	0.10	0.16	0.14	0.15	0.0	1..1...1....111.............1..
406	3	0.10	0.44	0.31	0.18	0.0	...1...1....111.............1..
407	3	0.91	0.59	0.62	0.75	0.0	1..1...1.1..111...........111..
408	3	0.10	0.0	0.52	0.26	0.0	...1..11.1...11..1.........1...
409	0	0.57	0.25	0.32	0.30	0.0	.1.1...1....111............11..
410	3	0.10	1.21	1.18	1.04	0.0	11.1...1.1.1111.........11111..
411	3	0.14	0.29	0.49	0.37	0.0	1..1...1....111.............1..
412	3	0.12	0.33	0.42	0.38	0.0	...1...1....111............11..
413	3	0.98	0.14	0.32	0.50	0.0	.1.1...1....111............11..
414	3	0.74	0.47	0.54	0.48	0.0	...1...1....111..1...1......1..
415	3	1.00	1.39	0.77	0.83	0.0	1..1...1....111.............1..
416	2	0.10	0.53	0.31	0.34	0.0	...1...1....111.............1..
417	3	0.33	0.26	0.20	0.14	0.0	1..1...1....111................
418	3	1.00	1.10	0.79	0.0	0.0	1..1...1....111............11..
419	3	0.10	0.78	0.54	0.49	0.0	1..1...1....111.............1..
420	3	0.94	0.52	0.57	0.35	0.0	1..1...1....111............1...
423	3	0.10	0.02	0.21	0.17	0.0	...1...1....111.............1..
424	0	0.10	0.23	0.39	0.35	0.0	1..1...1....111............11..
425	3	0.10	0.27	0.28	0.42	0.0	1..1..11....111.............1..
426	3	0.10	0.37	0.26	0.19	0.0	...1...1....111.............1..
427	3	0.41	0.39	0.35	0.26	0.0	...1..11.1..111.............1..
428	3	0.10	0.0	0.14	0.0	0.0	.......1.....1.................
429	3	0.97	0.32	0.29	1.20	0.0	1..1...1.1..111.............1..
430	3	0.10	0.34	0.13	0.20	0.0	1..1...1....111.............1..
431	3	0.10	0.26	0.22	0.37	0.0	...1...1....111.............1..
432	3	0.10	0.48	0.68	0.69	0.0	1..1...1....111.............1..
435	0	0.10	0.17	0.16	0.31	0.0	1..1...1....111.............1..
436	3	0.96	0.66	0.32	0.52	0.0	1..1...1....111.............1..
437	0	0.29	0.15	0.44	0.17	0.0	1..1..11.1..111..1...1.........
438	3	0.63	0.39	0.35	0.53	0.0	1..1...1...1111.............1..
439	0	0.10	0.09	0.12	0.20	0.0	1......1....111................
441	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
442	3	0.60	0.18	0.37	0.37	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
443	8	0.17	0.01	28.3	0.7	11.13	2	0.90	3	0.250	0.461
444	4	0.044	0.005	170	10	8.53	3	0.68	4	0.226	0.445
445	2	0.044	0.003	89.8	3.0	9.93	2	0.68	2	0.150	0.393
446	3	0.35	0.08	43.0	5.0	9.60	3	1.03	2	-0.374	0.034
447	13	0.052	0.007	82.0	5.2	10.03	2	0.78	1	0.150	0.393
448	2	0.050	0.003	49.7	1.6	11.05	3	0.66	3	0.243	0.456
449	7	0.031	0.001	88.6	1.6	10.36	2	0.70	2	0.150	0.393
450	4	0.099	0.005	35.6	1.0	11.15	2	0.78	1	0.250	0.461
451	7	0.073	0.013	230	20	7.30	3	0.65	4	0.204	0.430
453	3	0.14	0.01	24.2	0.8	11.61	2	0.80	0	0.250	0.461
454	1	0.059	0.004	84.5	3.1	9.72	2	0.66	2	0.150	0.393
455	6	0.060	0.009	87.5	6.6	9.66	2	0.70	2	0.150	0.393
456	2	0.10	0.01	43.1	1.5	10.70	2	0.80	0	0.150	0.393
458	3	0.17	0.01	40.0	1.0	10.39	2	0.88	1	0.250	0.461
459	1	0.15	0.02	27.5	1.7	11.33	2	0.87	2	0.250	0.461
461	2	0.051	0.011	45.7	4.7	11.15	2	0.61	2	0.150	0.393
462	3	0.30	0.02	38.0	1.2	9.85	3	0.84	4	-0.080	0.235
463	3	0.077	0.006	21.5	0.8	12.44	2	0.71	1	0.250	0.461
464	6	0.046	0.009	76.5	7.5	10.19	2	0.64	1	0.150	0.393
465	6	0.037	0.002	76.6	1.6	10.57	2	0.80	0	0.150	0.393
466	11	0.056	0.003	121	3	9.00	2	0.66	2	0.150	0.393
467	6	0.036	0.007	47.5	4.5	11.66	2	0.80	0	0.150	0.393
468	2	0.050	0.004	71.7	2.8	10.27	2	0.67	3	0.150	0.393
469	7	0.030	0.001	129	3	9.54	2	0.65	3	0.150	0.393
470	8	0.19	0.01	28.5	0.5	10.99	2	0.89	3	0.250	0.461
471	4	0.20	0.01	139	3	7.44	3	0.83	4	0.285	0.485
472	5	0.24	0.03	47.6	3.6	9.64	3	0.88	4	-0.007	0.285
474	5	0.077	0.017	37.5	4.2	11.32	2	0.80	0	0.250	0.461
475	1	0.033	0.005	31.0	2.0	12.56	2	0.70	1	0.150	0.393
476	4	0.039	0.002	121	3	9.42	2	0.71	2	0.150	0.393
477	6	0.21	0.03	25.2	2.0	11.14	2	0.89	3	0.250	0.461
478	7	0.16	0.01	82.0	1.8	8.85	3	0.86	3	0.139	0.385
479	4	0.041	0.002	77.5	1.7	10.43	2	0.80	0	0.150	0.393
480	4	0.17	0.02	58.0	3.5	9.58	3	0.87	4	0.471	0.612
481	1	0.041	0.003	116	4	9.45	2	0.70	1	0.150	0.393
482	2	0.15	0.03	51.6	5.6	9.96	2	0.87	1	0.250	0.461
483	10	0.13	0.01	73.5	1.8	9.31	2	0.86	3	0.250	0.461
485	4	0.12	0.01	68.2	3.1	9.49	2	0.80	0	0.150	0.393
486	2	0.11	0.01	24.5	2.0	11.83	2	0.80	0	0.250	0.461
487	8	0.22	0.01	64.2	1.6	9.06	3	0.85	2	0.078	0.343
488	8	0.052	0.003	158	4	8.53	2	0.70	3	0.150	0.393
489	4	0.038	0.002	144	3	9.05	2	0.69	2	0.150	0.393
490	5	0.057	0.005	121	5	9.07	2	0.75	2	0.150	0.393
491	1	0.052	0.004	101	4	9.61	2	0.80	0	0.150	0.393
492	4	0.047	0.003	54.5	1.5	11.06	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
443	3	0.15	0.63	0.62	0.64	0.0	1..1...1....111.............1..
444	3	0.91	0.30	0.20	0.10	0.0	1..1...1....111............1...
445	0	0.10	0.22	0.10	0.05	0.0	.......1....111................
446	0	0.98	0.97	0.29	0.89	0.0	1..1...1....111.............1..
447	3	0.73	0.93	0.59	0.54	0.0	11.1...1.1..111............11..
448	3	0.10	0.10	0.20	0.12	0.0	1..1...1....111.............1..
449	3	0.10	0.60	0.47	0.63	0.0	1..1...1....111.............1..
450	3	0.10	0.40	0.23	0.30	0.0	.......1....111............1...
451	3	0.98	0.65	0.34	0.19	0.0	1..1...1....111..1.........11..
453	3	0.10	0.0	0.33	0.16	0.0	1..1...1....111................
454	3	0.50	0.0	0.0	0.0	0.0	...1...1....111............1...
455	3	0.98	0.55	0.68	0.40	0.0	1..1...1....111.............1..
456	0	0.10	0.31	0.18	0.38	0.0	.......1....111................
458	3	0.10	0.12	0.14	0.33	0.0	...1...1....111.............1..
459	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
461	3	0.59	0.49	0.05	0.08	0.0	...1...1....111...........11...
462	3	0.10	0.07	0.17	0.24	0.0	...1...1.1..111.............1..
463	3	0.10	0.01	0.35	0.0	0.0	...1...1....11.................
464	3	1.00	0.48	0.37	0.43	0.0	1..1...1....111............11..
465	3	0.10	0.28	0.27	0.43	0.0	...1...1....111.............1..
466	3	0.10	0.46	0.53	0.48	0.0	1..1...1....111..1...1..11111..
467	3	1.00	0.71	0.45	1.11	0.0	...1...1....111..1..........1..
468	3	0.10	0.09	0.01	0.05	0.0	1..1...1....111...........111..
469	3	0.10	0.43	0.35	0.50	0.0	1..1...1....111.............1..
470	3	0.10	0.63	0.74	0.60	0.0	...1...1....111.............1..
471	3	0.10	0.13	0.19	0.46	0.0	11.1...1....111.............1..
472	0	1.00	0.85	0.80	0.76	0.0	1..1...1....111............1...
474	3	1.00	1.07	0.76	0.33	0.0	1..1...1....111.............1..
475	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
476	3	0.10	0.39	0.24	0.11	0.0	1......1....111................
477	3	0.91	0.86	0.20	0.16	0.0	...1...1....111...........111..
478	3	0.10	0.50	0.47	0.40	0.0	1..1...1....111............11..
479	3	0.10	0.32	0.16	0.18	0.0	...1...1....111............11..
480	0	0.91	0.24	0.25	0.06	0.0	1..1...1....111..1......11111..
481	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
482	3	0.91	0.89	0.11	0.31	0.0	1..1...1....111..1...1.....11..
483	3	0.10	0.45	0.54	0.39	0.0	1..1...1....111............11..
485	0	0.64	0.72	0.18	0.27	0.0	1..1..11....111............1...
486	3	0.68	0.0	0.03	0.0	0.0	1..1...1....111................
487	3	0.10	0.49	0.46	0.62	0.0	1..1...1....111.............1..
488	3	0.20	0.52	0.59	0.49	0.0	11.1...1.1..111.............1..
489	3	0.10	0.18	0.31	0.15	0.0	1..1...1....111............11..
490	3	0.38	0.41	0.40	0.69	0.0	1..1...1....111.............1..
491	3	0.50	0.0	0.0	0.0	0.0	1..1...1....111............11..
492	0	0.10	0.14	0.31	0.41	0.0	...1...1....111..1..........1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
493	4	0.036	0.002	52.0	1.5	11.45	1	0.80	0	0.150	0.393
494	6	0.059	0.003	89.1	2.0	9.67	3	0.73	3	0.094	0.354
495	7	0.041	0.004	41.7	1.7	11.77	2	0.80	0	0.250	0.461
496	2	0.10	0.01	17.5	[illegible].0	12.75	2	0.86	3	0.250	0.461
497	1	0.085	0.010	45.3	2.5	10.71	3	0.70	1	0.107	0.363
498	6	0.073	0.005	84.8	2.8	9.57	3	0.75	4	-0.049	0.256
499	3	0.033	0.002	86.0	2.5	10.31	3	0.67	3	0.420	0.577
500	8	0.15	0.01	45.1	1.0	10.17	2	0.80	0	0.150	0.393
501	3	0.068	0.004	80.1	2.5	9.82	2	0.80	0	0.150	0.393
502	1	0.20	0.01	20.7	1.0	11.63	2	0.87	2	0.250	0.461
503	1	0.071	0.005	79.5	2.6	9.70	2	0.72	1	0.150	0.393
504	12	0.16	0.02	31.2	2.6	10.88	2	0.80	0	0.150	0.393
506	5	0.044	0.002	109	2	9.53	3	0.71	4	0.107	0.363
507	9	0.12	0.03	48.5	6.5	10.28	2	0.80	0	0.150	0.393
508	9	0.039	0.001	147	2	9.03	2	0.73	4	0.150	0.393
509	2	0.20	0.01	59.0	2.1	9.33	2	0.82	4	0.250	0.461
510	8	0.065	0.008	59.3	3.5	10.44	2	0.73	2	0.150	0.393
511	8	0.053	0.002	337	5	6.89	3	0.72	4	0.020	0.304
512	1	0.15	0.01	23.3	1.3	11.73	2	0.94	3	0.250	0.461
513	2	0.083	0.006	52.5	1.7	10.53	2	0.81	1	0.250	0.461
514	5	0.029	0.003	110	5	9.90	2	0.65	3	0.150	0.393
515	4	0.031	0.002	43.0	1.5	12.11	2	0.88	2	0.150	0.393
516	2	0.15	0.01	75.7	2.1	8.99	2	0.74	3	0.250	0.461
517	5	0.034	0.002	95.5	2.2	10.09	3	0.71	3	0.221	0.441
518	3	0.15	0.04	17.6	2.3	12.24	2	0.80	0	0.150	0.393
519	2	0.12	0.02	53.1	4.5	10.07	2	0.83	3	0.250	0.461
520	2	0.081	0.022	30.3	4.0	11.67	2	0.74	1	0.250	0.461
521	7	0.036	0.002	121	3	9.52	3	0.71	4	0.536	0.637
522	5	0.027	0.009	113	19	9.95	3	0.67	3	0.364	0.539
523	3	0.18	0.01	36.7	1.3	10.42	2	0.80	0	0.150	0.393
524	1	0.038	0.004	74.1	3.5	10.53	2	0.72	2	0.150	0.393
526	6	0.058	0.010	46.7	3.8	11.00	2	0.64	3	0.250	0.461
527	2	0.043	0.003	55.2	1.7	11.11	2	0.80	0	0.150	0.393
528	2	0.054	0.004	86.2	3.5	9.90	2	0.80	0	0.150	0.393
529	4	0.10	0.01	38.2	3.3	10.94	2	0.79	3	0.250	0.461
530	2	0.043	0.003	89.3	3.3	9.92	2	0.65	3	0.150	0.393
531	2	0.19	0.08	17.8	3.7	11.92	1	0.80	0	0.150	0.393
532	10	0.16	0.01	231	4	6.63	3	0.85	4	0.247	0.459
533	5	0.19	0.04	34.8	4.5	10.58	2	0.87	2	0.250	0.461
534	6	0.14	0.02	37.5	3.2	10.64	2	0.83	2	0.250	0.461
535	8	0.047	0.007	77.0	5.5	10.24	2	0.74	2	0.150	0.393
536	4	0.042	0.005	158	10	8.77	2	0.69	3	0.150	0.393
537	4	0.23	0.05	47.5	5.0	9.61	2	0.82	0	0.150	0.393
538	2	0.051	0.007	77.8	5.2	10.19	2	0.80	0	0.150	0.393
539	5	0.066	0.010	55.3	4.1	10.65	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
493	0	0.10	0.31	0.48	0.36	0.0	...1...1.1..111..............1..
494	3	0.10	0.13	0.12	0.27	0.0	.1.1...1....111..............1..
495	3	0.31	0.53	0.85	0.50	0.0	...1...1....111..............1..
496	3	0.10	0.0	0.27	0.0	0.0	.......1.....1.................
497	3	0.50	0.0	0.0	0.0	0.0	.......1.1.1.1..........11.....
498	3	0.36	1.08	0.82	0.71	0.0	1..1...1....111............11..
499	3	0.10	0.09	0.11	0.22	0.0	1..1...1....111..............1..
500	3	0.10	0.46	0.39	0.66	0.0	...1..11.1..111..1...1.....11..
501	3	0.10	0.48	0.30	0.08	0.0	...1...1....111..............1..
502	0	0.50	0.0	0.0	0.0	0.0	1..1...1....11..............1..
503	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
504	3	0.96	1.32	1.00	1.13	0.0	1..1..11....111................
506	0	0.10	0.17	0.30	0.32	0.0	1..1...1....111..............1..
507	3	1.00	0.73	0.92	1.02	0.0	...1..11.1..111...........11...
508	3	0.10	0.29	0.30	0.32	0.0	1..1...1.1..111..............1..
509	0	0.14	0.26	0.31	0.05	0.0	1..1...1....111..............1..
510	3	0.86	0.78	0.62	0.83	0.0	.......1....111................
511	3	0.10	0.12	0.23	0.14	0.0	1..1...1....111............11..
512	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
513	3	0.16	0.27	0.06	0.27	0.0	.......1....111................
514	3	0.60	0.16	0.22	0.25	0.0	1..1...1.1..111..............1..
515	3	0.10	0.0	0.34	0.24	0.0	1..1...1.....11..............1..
516	3	0.10	0.09	0.00	0.01	0.0	...1...1....111............1...
517	3	0.10	0.17	0.23	0.20	0.0	1..1...1.1.1111..............1..
518	0	1.00	0.0	0.84	0.0	0.0	1..1..11....111............11..
519	3	0.89	0.31	0.01	0.13	0.0	1..1...1....111..............1..
520	0	0.97	0.0	0.47	0.0	0.0	...1...1....111..............1..
521	0	0.10	0.28	0.22	0.34	0.0	1..1...1.1..111............11..
522	3	1.00	1.42	0.53	0.77	0.0	1..1...1....111..1...1..11111..
523	3	0.10	0.0	0.53	0.08	0.0	...1..11....111................
524	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
526	3	0.76	0.25	0.53	0.57	0.0	1..1...1.1..111..............1..
527	3	0.10	0.18	0.05	0.01	0.0	...1...1....111..............1..
528	3	0.10	0.06	0.10	0.25	0.0	...1...1....111..............1..
529	3	0.98	0.43	0.31	0.67	0.0	...1...1.1..111..............1..
530	3	0.10	0.49	0.08	0.04	0.0	...1...1....111..1...1.......1..
531	0	1.00	0.0	1.03	0.0	0.0	...1...1.1...1..............1..
532	3	0.10	1.05	0.78	0.68	0.0	1..1...1...1111..1...1..1111...
533	3	0.97	0.52	1.03	0.24	0.0	1..1...1....111................
534	3	0.95	0.04	0.17	0.01	0.0	1..1...1....111..1...1.......1..
535	3	0.97	0.48	0.38	0.49	0.0	1..1...1....111..1.............
536	3	0.70	0.26	0.11	0.45	0.0	1..1...1....111.........11111..
537	3	0.93	0.52	0.75	0.37	0.0	......11.1..111................
538	3	0.89	0.49	0.16	0.06	0.0	1..1...1....111................
539	3	0.99	0.64	0.52	0.64	0.0	...1...1....111..............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
540	6	0.19	0.04	21.0	2.5	11.66	2	0.91	2	0.250	0.461
541	4	0.041	0.002	59.1	1.6	11.02	2	0.80	0	0.150	0.393
542	5	0.19	0.01	43.5	1.0	10.02	2	0.80	1	0.250	0.461
543	3	0.13	0.01	44.2	2.0	10.37	2	0.80	0	0.150	0.393
544	3	0.22	0.06	26.0	3.8	10.98	2	0.80	0	0.150	0.393
545	4	0.050	0.003	115	3	9.25	3	0.69	2	-0.095	0.225
546	7	0.049	0.002	69.7	1.5	10.45	2	0.77	3	0.150	0.393
547	1	0.042	0.004	73.0	3.1	10.49	2	0.76	1	0.150	0.393
549	4	0.16	0.03	20.5	2.1	11.87	2	0.83	3	0.250	0.461
550	3	0.22	0.04	39.8	3.6	10.06	2	0.85	1	0.250	0.461
551	4	0.041	0.006	81.2	5.7	10.21	2	0.67	3	0.150	0.393
552	1	0.034	0.003	81.0	3.0	10.56	2	0.80	0	0.150	0.393
554	14	0.051	0.002	98.5	1.8	9.55	2	0.66	4	0.150	0.393
555	2	0.060	0.004	42.5	1.2	11.33	2	0.80	0	0.150	0.393
556	5	0.21	0.01	39.5	1.0	10.15	2	0.83	2	0.250	0.461
558	2	0.10	0.01	61.6	1.8	9.80	2	0.73	3	0.250	0.461
559	1	0.046	0.003	80.0	2.5	10.18	2	0.74	4	0.150	0.393
560	8	0.060	0.004	41.0	1.2	11.40	2	0.80	0	0.150	0.393
561	3	0.067	0.006	25.7	1.1	12.24	2	0.75	1	0.250	0.461
562	4	0.13	0.02	35.8	3.6	10.82	3	0.80	3	0.360	0.536
563	9	0.21	0.01	54.8	1.3	9.48	2	0.87	4	0.250	0.461
564	9	0.047	0.012	50.7	6.5	11.15	2	0.73	1	0.150	0.393
565	5	0.076	0.005	29.6	0.8	11.86	2	0.81	3	0.250	0.461
566	1	0.032	0.003	175	8	8.85	3	0.70	4	0.431	0.585
567	5	0.035	0.002	97.0	2.3	9.98	2	0.65	1	0.150	0.393
568	6	0.038	0.002	89.7	2.0	10.20	2	0.80	0	0.150	0.393
569	4	0.028	0.001	75.6	1.6	10.84	3	0.74	2	0.088	0.350
570	2	0.052	0.003	106	3	9.48	3	0.78	4	-0.044	0.260
571	1	0.019	0.002	44.5	2.6	12.56	2	0.87	3	0.250	0.461
572	2	0.080	0.005	30.8	1.0	11.60	2	0.69	2	0.250	0.461
573	5	0.11	0.02	50.5	4.5	10.22	2	0.80	0	0.250	0.461
574	2	0.19	0.05	8.81	1.29	13.44	1	0.80	0	0.250	0.461
575	2	0.10	0.03	23.1	4.0	12.02	2	0.80	0	0.250	0.461
576	6	0.025	0.003	86.8	4.7	10.73	2	0.80	0	0.150	0.393
577	1	0.10	0.01	44.2	3.2	10.64	2	0.80	0	0.150	0.393
578	2	0.054	0.003	71.6	2.0	10.31	2	0.80	0	0.150	0.393
579	7	0.17	0.01	89.6	1.8	8.60	3	0.82	4	0.051	0.325
580	3	0.069	0.004	54.7	1.6	10.63	2	0.80	0	0.150	0.393
581	7	0.058	0.006	67.1	3.1	10.37	2	0.80	0	0.150	0.393
582	10	0.19	0.03	47.0	4.0	9.92	2	0.89	1	0.250	0.461
583	7	0.052	0.006	86.0	5.0	9.82	2	0.66	2	0.150	0.393
584	4	0.17	0.01	56.2	1.7	9.63	3	0.89	4	0.339	0.522
585	7	0.035	0.001	60.3	1.2	11.04	2	0.70	1	0.150	0.393
586	4	0.049	0.002	85.0	2.0	9.90	2	0.66	1	0.150	0.393
588	5	0.030	0.004	147	9	9.36	2	0.77	2	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
540	3	1.00	0.51	0.85	0.0	0.0	1..1...1.1.111...1......11..1..
541	3	0.10	0.10	0.41	0.48	0.0	...1...1...111..............1..
542	3	0.10	0.32	0.43	0.29	0.0	1..1...1...111..............1..
543	3	0.10	0.0	0.26	0.0	0.0	1..1...1....1...........11..1..
544	3	1.00	0.59	0.59	1.16	0.0	...1..11...111..1...1.......1..
545	3	0.10	0.22	0.29	0.34	0.0	1..1...1...111..............1..
546	0	0.10	0.21	0.25	0.42	0.0	1..1...1...111..............1..
547	0	0.50	0.0	0.0	0.0	0.0	.......1...111.................
549	3	0.97	0.38	0.43	0.38	0.0	1..1...1...111..............1..
550	3	0.99	0.87	0.62	0.81	0.0	1..1...1...111.............11..
551	3	0.83	0.45	0.47	0.53	0.0	...1...1...111..............1..
552	0	0.50	0.0	0.0	0.0	0.0	...1...1...111.............1...
554	3	0.10	0.59	0.53	0.61	0.0	11.1...1.1.111..1..........11..
555	3	0.10	0.04	0.09	0.05	0.0	1......1...111.................
556	3	0.10	0.33	0.35	0.35	0.0	...1...1.1.111..1...1..........
558	3	0.10	0.06	0.09	0.25	0.0	1..1...1...111..............1..
559	0	0.50	0.0	0.0	0.0	0.0	.......1...111.................
560	3	0.14	0.55	0.82	0.60	0.0	...1...1...111..1...1.......1..
561	3	0.10	0.03	0.16	0.0	0.0	...1...1.1.11..................
562	3	0.92	0.0	0.60	0.08	0.0	1..1...1.1.111..............1..
563	3	0.10	0.98	0.88	0.92	0.0	...1...1.1.111.................
564	3	1.00	0.80	0.73	0.45	0.0	1......1...111.................
565	3	0.10	0.51	0.78	0.42	0.0	1..1...1...111..1..........1...
566	3	0.50	0.0	0.0	0.0	0.0	...1...1...111.................
567	3	0.10	0.43	0.40	0.14	0.0	.......1.1.111.............1...
568	3	0.10	0.61	0.44	0.49	0.0	1..1...1...111..............1..
569	3	0.10	0.19	0.15	0.19	0.0	...1...1...111..............1..
570	3	0.10	0.08	0.14	0.11	0.0	1..1...1...111..............1..
571	3	0.50	0.0	0.0	0.0	0.0	......11...1.1..........11.....
572	3	0.10	0.12	0.11	0.00	0.0	1......1...111.................
573	3	1.00	1.02	0.36	0.41	0.0	1..1...1...111.............11..
574	3	0.98	0.0	0.38	0.0	0.0	1..1...1.1.111..............1..
575	3	1.00	0.04	0.15	0.09	0.0	.......1...111..1...1......1...
576	3	0.91	0.39	0.46	0.30	0.0	1..1...1.1.111............111..
577	3	0.50	0.0	0.0	0.0	0.0	...1...1...111.................
578	3	0.10	0.06	0.10	0.06	0.0	1..1...1...111..............1..
579	3	0.10	0.37	0.30	0.32	0.0	1..1...1...111..............1..
580	0	0.10	0.0	0.37	0.42	0.0	1..1...1...111..............1..
581	3	0.52	0.58	0.46	0.48	0.0	1..1...1...111..............1..
582	3	1.00	0.94	0.57	0.83	0.0	1..1...1...111..............1..
583	3	0.54	0.50	0.42	0.53	0.0	1..1...1...111..............1..
584	3	0.16	0.20	0.19	0.24	0.0	1..1...1...111..............1..
585	3	0.10	0.16	0.32	0.17	0.0	1..1...1.1.1111.............1..
586	3	0.10	0.25	0.23	0.18	0.0	1..1...1...111..............1..
588	3	0.57	0.05	0.26	0.54	0.0	1..1...1...111..1...1..........

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
589	4	0.049	0.003	92.5	2.5	9.78	2	0.72	2	0.150	0.393
590	2	0.095	0.008	40.5	1.5	10.94	3	0.80	0	0.435	0.588
591	8	0.030	0.002	54.7	1.3	11.43	2	0.69	2	0.150	0.393
593	5	0.053	0.005	78.2	3.2	9.98	3	0.65	3	0.067	0.336
594	14	0.15	0.04	10.0	1.2	13.41	1	0.80	0	0.150	0.393
595	4	0.080	0.003	114	2	8.89	2	0.80	0	0.150	0.393
596	5	0.036	0.002	117	3	9.61	2	0.72	2	0.150	0.393
597	4	0.22	0.01	37.7	1.5	10.13	2	0.80	0	0.150	0.393
598	2	0.044	0.005	74.7	4.5	10.39	2	0.74	1	0.150	0.393
599	5	0.14	0.01	69.6	1.7	9.36	2	0.88	3	0.250	0.461
600	6	0.17	0.01	28.3	1.0	11.04	2	0.80	0	0.150	0.393
601	9	0.042	0.002	76.0	1.7	10.32	2	0.66	1	0.150	0.393
602	2	0.045	0.003	130	4	9.11	3	0.70	4	0.308	0.501
603	1	0.049	0.005	15.2	0.7	13.76	2	0.80	0	0.150	0.393
604	4	0.075	0.017	65.3	7.3	10.16	2	0.80	0	0.150	0.393
605	4	0.058	0.003	72.0	1.5	10.22	1	0.80	0	0.150	0.393
606	3	0.076	0.008	40.0	2.1	11.17	2	0.77	1	0.150	0.393
607	3	0.050	0.005	65.5	3.2	10.59	2	0.80	0	0.150	0.393
609	1	0.054	0.006	56.3	3.1	10.84	2	0.80	0	0.150	0.393
611	4	0.091	0.005	59.0	1.6	10.18	2	0.82	2	0.250	0.461
612	6	0.036	0.004	40.5	2.5	11.99	1	0.80	0	0.150	0.393
613	4	0.031	0.002	82.0	2.0	10.47	2	0.64	3	0.150	0.393
614	4	0.089	0.018	29.0	3.0	11.73	2	0.80	0	0.150	0.393
615	3	0.051	0.003	49.5	1.2	11.08	2	0.71	2	0.150	0.393
616	3	0.15	0.03	23.5	2.5	11.63	2	0.88	4	0.250	0.461
617	4	0.043	0.003	149	5	8.87	2	0.70	4	0.150	0.393
618	1	0.058	0.007	124	8	8.94	2	0.70	4	0.150	0.393
621	3	0.10	0.02	31.2	4.2	11.25	2	0.65	1	0.150	0.393
623	2	0.037	0.002	46.0	1.5	11.58	2	0.71	1	0.250	0.461
625	1	0.12	0.01	31.3	1.2	11.20	2	0.80	0	0.150	0.393
626	8	0.041	0.002	104	2	9.69	2	0.70	3	0.150	0.393
627	9	0.062	0.003	51.0	1.2	10.78	2	0.68	1	0.150	0.393
628	5	0.14	0.01	51.2	1.3	10.00	2	0.82	1	0.250	0.461
630	3	0.13	0.01	20.3	0.7	12.08	1	0.80	0	0.150	0.393
631	4	0.12	0.01	60.5	1.2	9.83	3	0.87	4	0.586	0.691
633	3	0.12	0.01	38.8	1.0	10.73	2	0.79	1	0.250	0.461
634	6	0.040	0.002	69.1	1.8	10.71	1	0.80	0	0.150	0.393
635	5	0.042	0.003	100	3	9.74	2	0.68	3	0.150	0.393
636	8	0.039	0.008	78.3	8.0	10.46	2	0.80	0	0.150	0.393
637	2	0.037	0.009	43.5	5.2	11.80	2	0.80	0	0.150	0.393
638	5	0.048	0.002	68.0	1.5	10.55	2	0.80	0	0.150	0.393
639	5	0.14	0.01	74.5	2.0	9.19	3	0.84	4	0.431	0.585
640	4	0.063	0.003	84.8	2.3	9.72	2	0.75	3	0.150	0.393
642	2	0.10	0.01	40.0	1.6	10.94	2	0.88	1	0.250	0.461
643	5	0.036	0.002	76.1	2.0	10.54	3	0.71	3	0.314	0.505

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
589	3	0.10	0.05	0.23	0.36	0.0	1..1...1...1111.............1..
590	0	0.10	0.0	0.04	0.0	0.0	...1...1...1111................
591	3	0.10	0.71	0.42	0.50	0.0	1..1...1....111............11..
593	3	0.41	0.58	0.26	0.19	0.0	1..1...1....111..1...1.....11..
594	3	1.00	0.59	0.98	0.47	0.0	...1..11.1..111..1...1.....1...
595	3	0.10	0.21	0.38	0.40	0.0	1..1...1....111............11..
596	0	0.10	0.32	0.32	0.23	0.0	1..1...1....111................
597	3	0.24	0.24	0.46	0.48	0.0	...1..11....111..1.........1...
598	3	0.75	0.38	0.19	0.06	0.0	1..1...1....111.............1..
599	3	0.10	0.13	0.41	0.22	0.0	...1...1...1111.............1..
600	3	0.19	0.39	0.56	0.44	0.0	.1.1..11.1..111.............1..
601	3	0.10	0.33	0.47	0.39	0.0	1..1...1....111.............1..
602	0	0.10	0.05	0.03	0.18	0.0	...1...1....111................
603	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
604	3	0.95	0.20	0.50	0.82	0.0	1..1...1....111.............1..
605	0	0.10	0.32	0.11	0.13	0.0	...1...1....111.............1..
606	0	0.63	0.41	0.31	0.10	0.0	...1...1....111.............1..
607	0	0.63	0.57	0.09	0.20	0.0	1..1...1....111.............1..
609	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
611	3	0.10	0.08	0.16	0.40	0.0	.......1....111..1...1.........
612	3	0.78	0.23	0.22	0.59	0.0	1..1...1....111.............1..
613	3	0.10	0.37	0.22	0.20	0.0	.1.1...1....111.............1..
614	3	0.85	0.30	0.09	0.35	0.0	...1...1....111................
615	3	0.10	0.23	0.20	0.25	0.0	...1...1....111.............1..
616	3	0.98	0.0	0.52	0.0	0.0	...1...1.1..11..............1..
617	0	0.10	0.0	0.41	0.28	0.0	...1...1.....11.............1..
618	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
621	3	0.95	0.0	0.16	0.29	0.0	1..1...1....111.............1..
623	3	0.10	0.03	0.06	0.30	0.0	...1...1....111.............1..
625	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
626	3	0.10	1.00	0.65	0.75	0.0	1..1...1....111.............1..
627	3	0.11	0.46	0.37	0.63	0.0	1..1...1....111.............1..
628	0	0.10	0.35	0.26	0.23	0.0	.......1....111................
630	3	0.10	0.22	0.20	0.0	0.0	.......1....11.................
631	0	0.10	0.10	0.07	0.12	0.0	11.....1....111................
633	3	0.10	0.13	0.13	0.12	0.0	1..1...1....111.............1..
634	0	0.10	0.52	0.51	0.63	0.0	1..1...1.1..111............11..
635	3	0.15	0.21	0.25	0.59	0.0	...1...1.1..111.............1..
636	3	0.99	0.89	0.75	0.91	0.0	11.1...1....111............11..
637	3	0.79	0.0	0.51	0.0	0.0	...1...1.....1.................
638	2	0.10	0.25	0.34	0.20	0.0	...1...1....111.............1..
639	3	0.10	0.38	0.22	0.30	0.0	...1...1....111................
640	3	0.10	0.27	0.26	0.27	0.0	...1...1....111.............1..
642	0	0.10	0.0	0.17	0.11	0.0	...1...1....111..1.............
643	0	0.10	0.42	0.27	0.25	0.0	...1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
644	1	0.14	0.02	23.2	1.7	11.72	2	0.81	2	0.250	0.461
645	4	0.17	0.02	32.0	1.8	10.86	2	0.86	2	0.250	0.461
648	4	0.046	0.003	70.5	1.8	10.40	2	0.68	1	0.150	0.393
651	3	0.12	0.01	36.8	1.5	10.87	3	0.85	2	0.035	0.314
652	1	0.092	0.012	22.1	1.5	12.27	2	0.80	0	0.250	0.461
653	8	0.17	0.01	43.3	1.2	10.15	2	0.84	3	0.250	0.461
654	5	0.043	0.002	132	3	9.11	3	0.68	4	0.054	0.327
655	4	0.11	0.02	37.2	4.3	10.96	2	0.80	0	0.150	0.393
656	5	0.075	0.016	57.5	6.2	10.44	2	0.80	0	0.250	0.461
657	3	0.040	0.003	43.6	1.5	11.72	2	0.80	0	0.150	0.393
658	2	0.15	0.01	26.0	1.3	11.43	2	0.87	1	0.250	0.461
659	6	0.040	0.006	115	8	9.52	2	0.72	1	0.150	0.393
660	1	0.15	0.01	44.2	1.6	10.30	2	0.85	4	0.250	0.461
661	7	0.091	0.009	52.0	2.6	10.45	2	0.81	4	0.250	0.461
662	1	0.15	0.01	27.2	1.1	11.26	2	0.80	0	0.150	0.393
663	3	0.033	0.002	104	3	9.91	2	0.68	2	0.150	0.393
665	3	0.21	0.01	56.1	2.1	9.32	2	0.80	0	0.150	0.393
666	5	0.095	0.005	29.7	0.7	11.60	2	0.80	0	0.150	0.393
667	5	0.057	0.003	83.5	2.0	9.92	2	0.80	0	0.150	0.393
668	2	0.032	0.002	28.0	0.7	12.93	2	0.80	0	0.150	0.393
669	2	0.10	0.01	36.5	1.5	11.06	2	0.82	1	0.250	0.461
670	6	0.24	0.01	36.5	0.8	10.13	2	0.80	0	0.150	0.393
671	6	0.031	0.007	63.7	6.8	11.15	2	0.80	0	0.150	0.393
672	2	0.040	0.010	34.8	4.3	12.21	2	0.80	0	0.150	0.393
673	5	0.089	0.009	39.3	2.0	11.05	2	0.78	1	0.250	0.461
674	9	0.18	0.01	101	4	8.31	2	0.88	1	0.250	0.461
676	8	0.042	0.002	82.6	1.7	10.26	2	0.80	0	0.150	0.393
677	1	0.25	0.03	29.3	1.7	10.54	2	0.80	0	0.150	0.393
678	3	0.30	0.03	44.0	2.5	9.49	2	0.80	0	0.150	0.393
680	9	0.040	0.002	86.7	1.7	10.10	2	0.69	2	0.150	0.393
682	1	0.082	0.010	15.5	0.8	13.17	1	0.80	0	0.150	0.393
683	1	0.050	0.003	116	3	9.35	2	0.80	0	0.150	0.393
685	2	0.20	0.02	13.0	0.6	12.58	2	0.80	0	0.250	0.461
686	6	0.11	0.02	44.1	4.5	10.59	2	0.84	3	0.250	0.461
688	5	0.057	0.008	44.0	3.1	11.31	2	0.80	0	0.150	0.393
689	2	0.10	0.03	15.0	2.6	12.90	2	0.71	1	0.150	0.393
690	2	0.078	0.005	140	4	8.32	2	0.66	2	0.150	0.393
691	6	0.037	0.002	92.6	2.0	10.09	2	0.74	1	0.150	0.393
692	2	0.18	0.02	47.7	3.0	9.94	2	0.86	4	0.250	0.461
693	5	0.076	0.004	69.1	1.5	9.99	2	0.78	1	0.250	0.461
694	6	0.051	0.006	92.7	5.1	9.73	2	0.72	1	0.150	0.393
695	3	0.16	0.01	51.2	1.7	9.90	2	0.87	2	0.250	0.461
696	3	0.052	0.003	79.3	2.1	10.12	2	0.80	0	0.150	0.393
697	4	0.037	0.002	82.5	1.7	10.34	2	0.73	1	0.150	0.393
700	7	0.16	0.04	17.1	2.2	12.23	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
644	3	0.50	0.0	0.0	0.0	0.0	1..1...1.....11..............1..
645	3	0.35	0.57	0.55	0.42	0.0	...1...1....111.............1..
648	3	0.10	0.10	0.12	0.14	0.0	...1...1....111.............1..
651	3	0.10	0.0	0.09	0.21	0.0	...1...1....111................
652	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
653	3	0.10	0.80	0.55	0.65	0.0	...1...1....111..1...1......1..
654	3	0.10	0.15	0.19	0.21	0.0	1..1...1....111.............1..
655	3	1.00	0.0	0.28	0.0	0.0	1..1..11....111............11..
656	3	0.98	0.21	0.83	0.48	0.0	...1...1.1..111.............1..
657	3	0.10	0.42	0.46	0.03	0.0	1..1...1....111.............1..
658	3	0.10	0.0	0.14	0.0	0.0	1..1...1.....11.............1..
659	3	0.81	0.59	0.45	0.44	0.0	1..1...1....111.............1..
660	0	0.50	0.0	0.0	0.0	0.0	...1...1....111............1...
661	3	0.56	0.67	0.33	0.36	0.0	1..1...1....111..1...1......1..
662	3	0.50	0.0	0.0	0.0	0.0	1......1....11.............1...
663	3	0.10	0.79	0.61	0.13	0.0	.......1....111.........1111...
665	3	0.10	0.06	0.47	0.55	0.0	1..1..11....111..1...1......1..
666	3	0.10	1.15	0.87	0.67	0.0	...1...1....111................
667	0	0.10	0.27	0.16	0.31	0.0	...1...1....111..1...1......1..
668	0	0.10	0.04	0.07	0.17	0.0	.......1....111................
669	3	0.10	0.0	0.22	0.0	0.0	...1...1.1..111................
670	3	0.10	0.61	0.31	0.55	0.0	...1..11....111................
671	3	1.00	0.91	0.41	0.64	0.0	1..1...1....111..1...1..11111..
672	3	0.97	0.0	0.11	0.0	0.0	11.1...1....111................
673	3	0.51	0.40	0.31	0.36	0.0	1..1...1....111.............1..
674	3	0.66	0.75	0.78	0.85	0.0	1..1...1....111.............1..
676	3	0.10	0.23	0.25	0.37	0.0	1..1...1....111............11..
677	0	0.50	0.0	0.0	0.0	0.0	......11.....1.................
678	0	0.94	0.39	0.31	0.16	0.0	...1..11....111............1...
680	3	0.10	0.33	0.39	0.31	0.0	...1...1....111............11..
682	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
683	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
685	0	0.10	0.0	0.26	0.0	0.0	.......1....11.................
686	3	0.96	0.47	0.81	0.68	0.0	...1...1....111.............1..
688	3	0.83	0.27	0.45	0.59	0.0	...1...1.1..111.............1..
689	3	0.94	1.01	0.30	0.0	0.0	1.....11....111................
690	3	0.10	0.09	0.01	0.04	0.0	...1...1....111.............1..
691	3	0.10	0.23	0.36	0.50	0.0	1..1...1....111............11..
692	0	0.72	0.31	0.32	0.19	0.0	.......1....111................
693	0	0.10	0.54	0.56	0.45	0.0	...1...1....111.............1..
694	0	0.80	0.32	0.60	0.57	0.0	1......1....111............1...
695	3	0.36	0.29	0.43	0.34	0.0	...1...1....111............11..
696	3	0.10	0.06	0.13	0.22	0.0	...1...1....111............1...
697	3	0.10	0.13	0.08	0.12	0.0	...1...1....111.............1..
700	3	1.00	1.02	0.91	0.10	0.0	.......1.1..111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
701	7	0.15	0.04	46.0	6.0	9.99	2	0.66	2	0.150	0.393
702	4	0.056	0.003	202	5	7.89	3	0.66	4	0.130	0.379
704	8	0.064	0.002	333	6	6.64	3	0.64	4	0.019	0.303
705	5	0.038	0.002	139	3	9.16	2	0.70	2	0.150	0.393
706	2	0.075	0.009	32.0	1.8	11.70	1	0.80	0	0.150	0.393
708	1	0.15	0.01	25.0	1.5	11.53	2	0.88	2	0.250	0.461
709	4	0.045	0.003	99.6	3.0	9.72	2	0.72	3	0.150	0.393
710	4	0.065	0.014	30.8	3.2	11.94	2	0.80	0	0.150	0.393
712	15	0.046	0.002	132	2	9.08	3	0.73	4	0.064	0.334
713	2	0.041	0.003	109	4	9.56	2	0.66	3	0.150	0.393
714	4	0.24	0.03	41.0	2.5	9.97	2	0.88	3	0.250	0.461
715	5	0.18	0.02	31.5	2.5	10.77	2	0.80	0	0.150	0.393
716	1	0.12	0.01	25.5	1.6	11.67	2	0.86	1	0.250	0.461
717	8	0.051	0.014	36.5	5.1	11.74	2	0.70	1	0.150	0.393
718	7	0.038	0.005	76.5	4.7	10.56	2	0.80	0	0.150	0.393
720	6	0.18	0.01	37.8	1.1	10.34	3	0.81	3	-0.225	0.136
721	1	0.050	0.010	82.6	8.3	10.06	2	0.78	3	0.150	0.393
723	3	0.12	0.01	38.3	2.5	10.79	2	0.80	0	0.150	0.393
725	1	0.037	0.004	31.8	2.0	12.43	2	0.74	1	0.150	0.393
726	4	0.038	0.002	47.2	1.5	11.58	2	0.80	0	0.150	0.393
727	5	0.14	0.01	37.5	2.3	10.65	2	0.78	1	0.150	0.393
729	1	0.11	0.01	53.3	2.7	10.14	2	0.78	1	0.250	0.461
731	4	0.12	0.01	46.6	1.5	10.19	2	0.69	2	0.150	0.393
732	1	0.058	0.004	39.0	1.1	11.56	2	0.80	0	0.250	0.461
733	5	0.049	0.009	92.0	8.3	9.75	2	0.68	3	0.150	0.393
734	5	0.028	0.004	78.6	5.2	10.83	2	0.80	0	0.150	0.393
735	7	0.044	0.002	77.0	1.5	10.27	2	0.70	2	0.150	0.393
736	11	0.11	0.02	19.0	1.7	12.45	2	0.90	1	0.250	0.461
737	2	0.23	0.01	46.3	1.5	9.67	2	0.83	1	0.250	0.461
738	8	0.044	0.002	64.8	1.1	10.72	2	0.76	1	0.150	0.393
739	4	0.030	0.002	110	3	9.91	3	0.71	4	0.935	0.930
740	9	0.049	0.002	94.5	1.7	9.74	2	0.72	3	0.150	0.393
741	2	0.11	0.01	32.5	1.2	11.19	2	0.80	0	0.150	0.393
742	9	0.11	0.03	46.7	5.8	10.43	2	0.84	3	0.250	0.461
743	6	0.046	0.002	55.7	1.1	11.02	2	0.80	0	0.150	0.393
744	9	0.039	0.010	62.0	7.6	10.85	2	0.66	1	0.150	0.393
746	5	0.038	0.002	75.5	1.8	10.50	2	0.73	2	0.150	0.393
747	9	0.047	0.002	178	4	8.39	2	0.71	2	0.150	0.393
748	4	0.039	0.002	107	2	9.68	2	0.69	3	0.150	0.393
750	2	0.043	0.004	24.0	1.1	12.73	2	0.60	3	0.150	0.393
751	6	0.047	0.002	115	2	9.32	2	0.68	4	0.150	0.393
752	5	0.033	0.001	65.7	1.5	11.02	2	0.80	0	0.250	0.461
754	7	0.047	0.007	89.1	6.6	9.88	2	0.70	2	0.150	0.393
755	3	0.11	0.01	41.0	1.7	10.63	3	0.70	4	0.523	0.648
756	5	0.031	0.001	73.8	1.5	10.86	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
701	3	1.00	1.00	0.41	0.15	0.0	1..1..11.1..111..1...1..11111..
702	0	0.10	0.30	0.39	0.45	0.0	.1.1...1....111.............1..
704	0	0.10	0.46	0.44	0.45	0.0	1..1...1....111.............1..
705	0	0.10	0.39	0.55	0.38	0.0	1..1...1....111.............1..
706	0	0.29	0.13	0.52	0.37	0.0	...1...1....111................
708	3	0.50	0.0	0.0	0.0	0.0	...1...1....11..............1..
709	3	0.25	0.46	0.12	0.12	0.0	1..1...1....111.............1..
710	3	0.96	0.39	0.84	0.55	0.0	...1...1....111................
712	3	0.10	0.51	0.55	0.58	0.0	1..1...1....111..1........111..
713	3	0.19	0.21	0.14	0.05	0.0	1..1...1....111............11..
714	3	0.82	0.36	0.35	0.43	0.0	...1...1....111.............1..
715	3	0.84	0.11	0.70	0.56	0.0	...1..11.1.1111..1...1......1..
716	3	0.50	0.0	0.0	0.0	0.0	1......1.....1.................
717	3	1.00	0.90	1.37	0.62	0.0	1..1...1....111.............1..
718	3	0.87	0.75	0.42	0.36	0.0	...1...1....111...........111..
720	3	0.10	0.65	0.40	0.41	0.0	1..1...1.1..111.............1..
721	0	0.50	0.0	0.0	0.0	0.0	.......1.1..111.........1......
723	3	0.62	0.22	0.00	0.55	0.0	1......1....111..1.............
725	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
726	3	0.10	0.50	0.30	0.37	0.0	1..1...1....111..1...1......1..
727	3	0.28	0.32	0.44	0.39	0.0	...1..11.1..111..1..........1..
729	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
731	3	0.10	0.38	0.19	0.50	0.0	...1...1....111.............1..
732	3	0.50	0.0	0.0	0.0	0.0	...1...1....111............1...
733	3	0.99	0.35	0.34	0.70	0.0	1..1...1...1111............11..
734	3	0.91	0.77	0.34	0.24	0.0	...1...1.1.1111..1......11111..
735	3	0.10	0.28	0.34	0.38	0.0	...1...1....111............11..
736	3	0.96	0.40	0.52	0.47	0.0	...1...1.1..111..1...1......1..
737	3	0.10	0.28	0.03	0.04	0.0	1..1...1....111...........111..
738	3	0.10	0.46	0.48	0.21	0.0	11.1...1....111.............1..
739	0	0.10	0.12	0.18	0.25	0.0	1..1...1.1..111..1...1......1..
740	0	0.10	0.70	0.53	0.63	0.0	...1...1....111.............1..
741	3	0.10	0.22	0.31	0.17	0.0	1..1...1....111..1..........1..
742	3	1.00	0.62	0.49	1.09	0.0	1..1...1.1..111.............1..
743	3	0.10	0.17	0.40	0.21	0.0	...1...1....111.............1..
744	3	1.00	1.02	0.68	0.57	0.0	1..1...1.1..111.............1..
746	3	0.10	0.19	0.32	0.10	0.0	.1.1...1...1111............11..
747	3	0.10	1.02	1.08	0.81	0.0	1..1...1....111............11..
748	3	0.10	0.31	0.19	0.29	0.0	1..1...1....111.............1..
750	3	0.10	0.0	0.06	0.0	0.0	...1...1.1..11.................
751	3	0.10	0.39	0.54	0.21	0.0	1..1...1....111..1......1111...
752	3	0.10	0.48	0.33	0.40	0.0	1..1...1....111.........11.....
754	0	0.95	0.51	0.57	0.53	0.0	11.1...1....111.............1..
755	3	0.10	0.38	0.80	0.39	0.0	1..1...1....111..1...1......1..
756	3	0.10	0.18	0.17	0.24	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
757	3	0.11	0.01	34.0	2.1	11.06	2	0.70	2	0.250	0.461
758	5	0.10	0.02	86.5	10.1	9.13	2	0.74	1	0.150	0.393
759	4	0.038	0.003	52.7	1.8	11.35	2	0.80	0	0.150	0.393
760	3	0.16	0.01	74.8	2.0	9.18	2	0.95	1	0.250	0.461
762	4	0.032	0.002	142	4	9.23	3	0.65	2	0.496	0.629
763	1	0.064	0.006	17.3	0.7	13.19	2	0.80	0	0.250	0.461
764	4	0.077	0.004	60.5	1.5	10.21	2	0.72	2	0.150	0.393
766	3	0.12	0.01	37.1	1.3	10.80	2	0.81	1	0.250	0.461
767	1	0.073	0.009	40.6	2.5	11.21	2	0.80	0	0.150	0.393
769	4	0.049	0.016	102	17	9.64	2	0.80	0	0.150	0.393
770	3	0.22	0.01	18.5	0.5	11.81	2	0.88	2	0.250	0.461
771	2	0.14	0.01	30.5	1.2	10.99	2	0.66	1	0.250	0.461
772	8	0.055	0.003	123	3	8.99	2	0.67	2	0.150	0.393
773	6	0.033	0.001	99.1	1.8	10.04	2	0.70	3	0.150	0.393
774	1	0.15	0.01	57.0	2.0	9.66	2	0.80	0	0.150	0.393
775	2	0.096	0.009	35.0	1.6	11.25	2	0.81	2	0.250	0.461
777	5	0.037	0.003	68.7	3.0	10.82	2	0.80	0	0.150	0.393
778	3	0.057	0.003	67.3	2.0	10.20	3	0.62	4	0.008	0.295
779	4	0.12	0.07	72.7	21.7	9.35	1	0.80	0	0.150	0.393
780	3	0.047	0.002	97.1	2.3	9.79	2	0.80	0	0.150	0.393
781	2	0.082	0.017	60.0	6.0	10.24	2	0.80	0	0.150	0.393
782	2	0.23	0.02	13.5	0.5	12.33	2	0.80	0	0.250	0.461
783	5	0.042	0.002	41.3	0.7	11.78	2	0.80	0	0.250	0.461
784	1	0.049	0.004	90.0	3.8	9.93	2	0.80	0	0.150	0.393
785	2	0.13	0.01	52.1	1.7	9.88	3	0.64	4	-0.003	0.288
786	6	0.067	0.012	93.2	8.2	9.40	2	0.69	3	0.150	0.393
787	5	0.15	0.03	30.3	3.0	11.02	1	0.80	0	0.150	0.393
788	2	0.076	0.005	109	4	9.03	2	0.80	0	0.150	0.393
790	8	0.034	0.001	176	3	8.75	2	0.70	3	0.150	0.393
791	6	0.029	0.001	107	2	10.04	2	0.71	3	0.150	0.393
792	5	0.039	0.002	63.5	1.3	10.93	2	0.80	0	0.150	0.393
793	3	0.15	0.01	30.8	0.8	10.99	2	0.82	1	0.150	0.393
794	1	0.035	0.004	41.0	2.5	12.00	2	0.80	0	0.150	0.393
795	2	0.034	0.003	78.7	3.6	10.61	2	0.80	0	0.150	0.393
796	2	0.18	0.01	46.7	1.5	9.81	2	0.70	2	0.150	0.393
798	11	0.11	0.01	46.2	2.5	10.33	3	0.69	0	0.237	0.452
799	7	0.059	0.003	46.5	1.1	11.15	2	0.80	0	0.150	0.393
801	9	0.039	0.006	35.3	2.7	12.12	2	0.73	1	0.150	0.393
803	3	0.087	0.007	51.8	2.0	10.49	2	0.80	0	0.150	0.393
804	9	0.049	0.003	161	5	8.58	3	0.71	4	0.221	0.441
805	3	0.043	0.003	73.0	2.7	10.42	2	0.70	3	0.150	0.393
806	5	0.020	0.001	65.2	1.5	11.61	2	0.80	0	0.150	0.393
807	5	0.10	0.01	31.3	2.5	11.47	3	0.85	2	0.298	0.494
808	2	0.21	0.02	34.3	1.8	10.42	2	0.80	0	0.150	0.393
811	1	0.14	0.01	23.6	1.3	11.68	2	0.86	2	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
757	3	0.40	0.30	0.30	0.34	0.0	.......1....111................
758	3	0.98	0.46	0.53	0.87	0.0	1..1..11....111............11..
759	3	0.10	0.49	0.14	0.20	0.0	...1...1....111.............1..
760	3	0.10	0.01	0.30	0.18	0.0	...1...1....111.............1..
762	3	0.10	0.15	0.30	0.15	0.0	.1.1...1....111.............1..
763	0	0.50	0.0	0.0	0.0	0.0	.......1....11.............1...
764	3	0.10	0.14	0.17	0.17	0.0	...1...1....111............11..
766	3	0.10	0.0	0.38	0.33	0.0	...1...1.1..111..1...1......1..
767	3	0.50	0.0	0.0	0.0	0.0	1......1...1.1.................
769	3	0.99	0.09	0.86	0.32	0.0	...1...1.1..111...........111..
770	3	0.10	0.06	0.24	0.0	0.0	...1...1....111................
771	3	0.10	0.09	0.02	0.12	0.0	.......1....111................
772	3	0.16	0.75	0.71	0.78	0.0	.1.1...1....111............1...
773	3	0.10	0.31	0.30	0.31	0.0	...1...1....111.............1..
774	3	0.50	0.0	0.0	0.0	0.0	1..1..11....111.............1..
775	0	0.10	0.0	0.23	0.0	0.0	...1...1....111.............1..
777	3	0.27	0.18	0.27	0.51	0.0	1..1...1....111................
778	0	0.10	0.11	0.19	0.26	0.0	1..1...1....111..1..........1..
779	0	1.00	0.58	0.41	1.97	0.0	...1...1.1..111............1...
780	0	0.10	0.26	0.25	0.18	0.0	1..1...1....111................
781	0	0.80	0.47	0.28	0.22	0.0	...1...1....111................
782	3	0.22	0.31	0.19	0.0	0.0	.......1....11.................
783	0	0.10	0.15	0.18	0.13	0.0	1..1...1....111.............1..
784	0	0.50	0.0	0.0	0.0	0.0	1..1...1.....11.............1..
785	3	0.30	0.15	0.14	0.24	0.0	.......1....111................
786	3	1.00	0.62	0.41	0.55	0.0	1..1...1....111.............1..
787	3	0.94	0.57	0.65	0.57	0.0	1..1...1....111............11..
788	3	0.10	0.19	0.10	0.02	0.0	1..1...1....111.............1..
790	0	0.10	0.33	0.27	0.37	0.0	1..1...1....111..1......11111..
791	3	0.10	0.31	0.28	0.26	0.0	1..1...1....111..1...1.....11..
792	3	0.10	0.23	0.35	0.32	0.0	...1...1....111.............1..
793	3	0.10	0.10	0.02	0.21	0.0	...1..11....111.............1..
794	2	0.50	0.0	0.0	0.0	0.0	1..1...1.....1.............11..
795	0	0.45	0.38	0.02	0.11	0.0	1..1...1....111............11..
796	0	0.10	0.09	0.32	0.03	0.0	1..1..11....111................
798	3	0.47	0.52	0.70	0.54	0.0	11.1...1....111............11..
799	3	0.10	0.24	0.23	0.43	0.0	11.1...1....111................
801	3	0.94	0.66	0.61	0.58	0.0	...1...1.1..111..1.........11..
803	0	0.10	0.04	0.20	0.21	0.0	.......1....111............1...
804	3	0.26	0.68	0.47	0.61	0.0	1..1...1.1..111.........11111..
805	3	0.10	0.41	0.18	0.36	0.0	...1...1....111.............1..
806	3	0.10	0.26	0.13	0.18	0.0	...1...1....111.............1..
807	3	0.56	0.15	0.59	0.14	0.0	...1...1.1..111..1...1......1..
808	2	0.49	0.41	0.06	0.10	0.0	1..1..11....111................
811	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
813	2	0.084	0.010	16.1	1.0	13.07	2	0.80	0	0.250	0.461
814	2	0.031	0.002	116	3	9.76	3	0.68	3	0.524	0.648
815	1	0.13	0.01	24.5	1.5	11.62	2	0.80	0	0.150	0.393
816	6	0.036	0.002	62.5	1.3	11.05	2	0.80	0	0.150	0.393
817	2	0.13	0.02	25.0	2.2	11.60	2	0.80	0	0.150	0.393
818	2	0.11	0.02	53.0	4.6	10.15	2	0.80	0	0.150	0.393
820	9	0.033	0.003	61.1	2.8	11.18	2	0.80	0	0.150	0.393
823	1	0.11	0.01	20.2	1.2	12.26	2	0.80	0	0.250	0.461
824	2	0.089	0.028	36.0	5.6	11.31	2	0.85	1	0.250	0.461
825	1	0.21	0.01	12.5	0.5	12.70	2	0.91	3	0.250	0.461
826	6	0.085	0.027	21.5	3.3	12.43	2	0.80	0	0.150	0.393
828	7	0.044	0.005	55.8	3.0	10.93	2	0.67	1	0.150	0.393
829	2	0.034	0.002	44.0	1.5	11.87	2	0.80	0	0.150	0.393
830	6	0.14	0.01	47.1	1.5	10.26	2	0.90	2	0.250	0.461
834	11	0.068	0.004	69.2	1.7	10.08	2	0.75	2	0.150	0.393
835	2	0.037	0.009	41.3	5.2	11.92	2	0.80	0	0.150	0.393
838	3	0.039	0.002	63.1	2.0	10.84	2	0.71	3	0.150	0.393
839	7	0.17	0.01	22.3	0.6	11.57	2	0.80	0	0.250	0.461
840	2	0.34	0.07	30.0	3.0	10.20	1	0.80	0	0.150	0.393
842	3	0.054	0.008	43.2	3.3	11.41	1	0.80	0	0.150	0.393
844	2	0.055	0.056	66.1	33.6	10.47	2	0.80	0	0.150	0.393
845	5	0.035	0.005	57.5	3.7	11.26	2	0.80	0	0.150	0.393
846	3	0.039	0.002	54.2	1.3	11.08	2	0.61	1	0.150	0.393
847	3	0.13	0.02	32.1	2.5	11.17	2	0.90	1	0.250	0.461
850	3	0.038	0.002	84.5	2.0	10.33	2	0.80	0	0.150	0.393
851	1	0.17	0.01	14.2	0.6	12.61	2	0.86	2	0.250	0.461
852	3	0.25	0.03	24.6	1.5	10.96	2	0.80	0	0.250	0.461
853	5	0.048	0.002	28.0	0.6	12.41	2	0.73	2	0.250	0.461
856	1	0.037	0.004	52.0	2.8	11.42	2	0.80	0	0.250	0.461
857	5	0.17	0.01	16.5	0.7	12.01	2	0.63	1	0.250	0.461
858	2	0.28	0.03	23.1	1.2	10.97	2	0.80	0	0.250	0.461
859	6	0.032	0.002	77.5	2.0	10.71	2	0.80	0	0.150	0.393
860	1	0.11	0.02	32.8	3.0	11.02	2	0.66	1	0.250	0.461
861	14	0.039	0.002	70.1	1.7	10.71	2	0.80	0	0.150	0.393
862	4	0.18	0.01	29.2	1.0	10.93	1	0.80	0	0.150	0.393
863	2	0.39	0.03	31.5	1.3	10.21	2	1.08	4	0.400	0.564
865	3	0.059	0.005	20.7	0.8	12.90	2	0.80	0	0.250	0.461
866	4	0.036	0.002	91.7	2.0	10.22	2	0.80	0	0.150	0.393
867	2	0.087	0.013	28.5	2.0	11.79	1	0.80	0	0.150	0.393
868	3	0.050	0.003	54.7	1.7	10.88	2	0.71	1	0.150	0.393
869	4	0.057	0.012	21.0	2.1	12.92	1	0.80	0	0.150	0.393
871	1	0.10	0.01	12.2	0.6	13.39	1	0.80	0	0.250	0.461
872	3	0.16	0.03	33.5	4.0	10.68	2	0.73	1	0.250	0.461
873	2	0.044	0.004	33.5	1.5	12.07	2	0.68	2	0.150	0.393
874	5	0.064	0.010	58.3	4.5	10.57	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
813	3	0.10	0.0	0.13	0.0	0.0	.......1.1...1.................
814	3	0.10	0.20	0.02	0.01	0.0	1..1...1....111..............1..
815	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
816	0	0.10	0.19	0.24	0.43	0.0	1......1....111............1...
817	3	0.84	0.03	0.49	0.0	0.0	1..1..11....11...1..........1..
818	3	0.61	0.11	0.40	0.21	0.0	...1...1....111................
820	3	0.55	0.30	0.56	0.63	0.0	1..1...1.1..111..............1..
823	3	0.50	0.0	0.0	0.0	0.0	1..1...1.....1...............1..
824	0	1.00	0.89	0.88	0.23	0.0	1..1...1....111..............1..
825	3	0.50	0.0	0.0	0.0	0.0	.......1....11...1.............
826	3	1.00	0.53	1.26	0.40	0.0	1..1...1.1..111..............1..
828	3	0.60	0.58	0.52	0.49	0.0	1..1...1.1..111.............11..
829	3	0.10	0.05	0.06	0.34	0.0	.......1....111................
830	3	0.10	0.05	0.29	0.29	0.0	1..1...1.1..111...1...1......1..
834	3	0.17	0.96	0.63	0.63	0.0	...1...1....111..............1..
835	3	0.93	0.0	0.51	0.0	0.0	.......1.....11................
838	3	0.10	0.08	0.18	0.29	0.0	1..1...1....111.............11..
839	3	0.10	0.29	0.63	0.0	0.0	1..1...1.1..111.............1...
840	0	0.78	0.0	0.55	0.0	0.0	......11.1....1..1...1.........
842	3	0.55	0.0	0.46	0.07	0.0	...1...1.....11................
844	3	1.00	0.0	2.03	0.0	0.0	.......1.1..111...1......1111...
845	3	0.84	0.50	0.13	0.24	0.0	...1...1....111..............1..
846	3	0.10	0.22	0.20	0.09	0.0	...1...1....111................
847	3	0.63	0.0	0.37	0.0	0.0	...1...1....111..............1..
850	3	0.10	0.12	0.15	0.01	0.0	.......1....111................
851	3	0.50	0.0	0.0	0.0	0.0	.......1.....11.............1...
852	3	0.43	0.0	0.33	0.0	0.0	...1...1.1...11...1...1......1..
853	3	0.10	0.81	0.37	0.41	0.0	1..1...1....111...1...1.........
856	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
857	3	0.13	0.00	0.68	0.0	0.0	11.1...1....111.............11..
858	2	0.10	0.0	0.05	0.0	0.0	1..1...1.....1...............1..
859	3	0.10	0.50	0.47	0.35	0.0	...1...1....111..............1..
860	0	0.50	0.0	0.0	0.0	0.0	.......1.....11................
861	3	0.10	0.50	0.55	0.40	0.0	.1.1...1.1..111..............1..
862	3	0.10	0.03	0.29	0.0	0.0	...1..11....111...1...1......1..
863	3	0.10	0.0	0.06	0.0	0.0	1..1...1.....1...1...1......1..
865	3	0.10	0.0	0.17	0.0	0.0	...1...1.....11................
866	3	0.10	0.08	0.19	0.12	0.0	1..1...1....111..............1..
867	3	0.35	0.0	0.34	0.0	0.0	1..1...1.....1..............11..
868	3	0.15	0.51	0.39	0.31	0.0	...1...1....111..............1..
869	3	0.92	0.40	0.29	0.21	0.0	...1...1....111..............1..
871	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
872	3	1.00	0.70	0.06	0.63	0.0	.......1....111................
873	3	0.10	0.0	0.10	0.0	0.0	1..1...1.....11................
874	3	0.99	0.48	0.46	0.29	0.0	1..1...1....111..............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
875	2	0.15	0.01	14.8	0.5	12.55	2	0.80	0	0.250	0.461
876	1	0.11	0.01	25.8	1.5	11.76	2	0.81	2	0.250	0.461
877	2	0.047	0.004	39.6	1.6	11.58	3	0.64	3	0.398	0.562
880	1	0.036	0.005	36.0	2.5	12.08	2	0.63	2	0.150	0.393
882	1	0.042	0.003	48.8	1.8	11.41	2	0.80	0	0.150	0.393
885	2	0.060	0.018	37.0	5.5	11.63	2	0.80	0	0.150	0.393
886	12	0.079	0.028	93.3	16.7	9.32	2	0.80	0	0.150	0.393
888	7	0.13	0.04	44.8	6.6	10.40	2	0.88	3	0.250	0.461
889	1	0.080	0.011	22.6	1.5	12.38	2	0.80	0	0.250	0.461
890	2	0.095	0.010	30.0	1.5	11.56	2	0.77	1	0.250	0.461
891	3	0.050	0.013	53.6	7.0	11.03	2	0.80	0	0.150	0.393
892	6	0.048	0.002	78.5	1.7	10.25	2	0.80	0	0.150	0.393
893	6	0.036	0.002	78.2	2.0	10.42	2	0.67	1	0.150	0.393
894	2	0.12	0.01	40.8	1.6	10.60	2	0.80	0	0.150	0.393
895	2	0.029	0.002	147	4	9.44	1	0.80	0	0.150	0.393
896	5	0.16	0.02	14.5	1.2	12.59	2	0.80	0	0.250	0.461
897	5	0.21	0.02	24.0	1.3	11.23	2	0.83	3	0.250	0.461
899	7	0.16	0.02	30.0	2.3	10.85	2	0.68	3	0.150	0.393
900	2	0.057	0.015	22.7	2.8	12.74	2	0.80	0	0.250	0.461
903	5	0.056	0.004	65.7	2.5	10.45	1	0.80	0	0.150	0.393
904	3	0.036	0.002	62.5	1.8	11.04	1	0.80	0	0.150	0.393
905	1	0.076	0.007	21.0	1.0	12.60	2	0.80	0	0.250	0.461
907	4	0.057	0.003	65.8	1.7	10.35	2	0.71	3	0.150	0.393
908	3	0.099	0.013	28.0	1.8	11.69	2	0.80	0	0.250	0.461
909	3	0.037	0.002	120	3	9.50	2	0.69	2	0.150	0.393
910	4	0.054	0.009	53.0	4.2	10.97	2	0.80	0	0.150	0.393
911	6	0.041	0.002	175	4	8.65	2	0.77	3	0.150	0.393
912	3	0.053	0.003	86.6	2.3	9.92	2	0.80	0	0.150	0.393
914	3	0.084	0.004	79.0	2.0	9.56	2	0.74	3	0.150	0.393
916	4	0.032	0.005	36.5	2.5	12.35	2	0.80	0	0.250	0.461
917	4	0.047	0.013	30.5	4.3	12.31	2	0.80	0	0.250	0.461
918	1	0.13	0.02	24.5	2.3	11.64	2	0.80	0	0.150	0.393
919	1	0.055	0.004	30.5	1.0	12.13	2	0.80	0	0.150	0.393
920	7	0.082	0.009	26.7	1.3	11.99	2	0.80	1	0.150	0.393
921	2	0.047	0.004	60.5	2.5	10.83	2	0.80	0	0.150	0.393
923	5	0.037	0.002	33.6	0.8	12.35	1	0.80	0	0.150	0.393
924	7	0.040	0.002	87.6	2.0	10.11	2	0.72	2	0.150	0.393
925	12	0.23	0.03	57.0	4.0	9.25	2	0.84	4	0.250	0.461
926	5	0.043	0.003	50.5	1.5	11.31	1	0.80	0	0.150	0.393
927	5	0.068	0.003	70.0	1.7	9.98	2	0.67	1	0.150	0.393
928	5	0.033	0.002	69.7	1.7	10.90	2	0.80	0	0.150	0.393
930	2	0.032	0.002	39.1	1.2	12.19	1	0.80	0	0.250	0.461
931	7	0.12	0.03	52.6	7.0	9.94	2	0.68	3	0.250	0.461
933	1	0.024	0.004	26.0	2.1	13.40	2	0.80	0	0.250	0.461
934	10	0.040	0.008	57.1	5.7	11.13	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
875	3	0.10	0.13	0.05	0.0	0.0	1......1....11.................
876	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
877	3	0.10	0.11	0.03	0.24	0.0	...1...1....111............11..
880	0	0.50	0.0	0.0	0.0	0.0	.......1..1..1.................
882	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
885	3	1.00	0.52	0.69	0.67	0.0	1..1...1....111................
886	3	1.00	1.42	0.82	0.94	0.0	1..1..11.1..111............11..
888	0	1.00	1.06	0.64	1.21	0.0	1..1...1.1..111.............1..
889	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
890	3	0.10	0.0	0.32	0.0	0.0	1..1...1....11..............1..
891	2	1.00	0.62	0.48	0.70	0.0	...1...1....111................
892	3	0.10	0.30	0.32	0.32	0.0	1..1...1....111............1...
893	3	0.10	0.60	0.56	0.64	0.0	...1...1....111.............1..
894	3	0.10	0.0	0.09	0.0	0.0	1......1....111..1...1.........
895	0	0.10	0.08	0.07	0.02	0.0	1..1...1....111................
896	0	0.71	0.36	0.30	0.0	0.0	...1...1.1..111..1.............
897	3	0.55	0.08	0.34	0.22	0.0	...1...1....111................
899	0	0.70	0.31	0.88	0.78	0.0	1..1..11....111..1...1......1..
900	3	0.91	0.0	0.34	0.0	0.0	.......1.....11..1...1.........
903	3	0.46	0.28	0.14	0.17	0.0	1..1...1....111............11..
904	3	0.10	0.38	0.25	0.25	0.0	...1...1....111.............1..
905	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
907	3	0.10	0.12	0.28	0.47	0.0	1..1...1....111.............1..
908	0	0.58	0.31	0.23	0.0	0.0	.......1....111................
909	0	0.10	0.02	0.13	0.12	0.0	1..1...1....111.............1..
910	3	0.68	0.26	0.93	0.28	0.0	...1...1....111............11..
911	3	0.10	0.20	0.27	0.27	0.0	1..1...1....111.............1..
912	3	0.15	0.70	0.61	0.38	0.0	1..1...1....111............11..
914	0	0.10	0.21	0.11	0.13	0.0	1..1...1.1..111.............1..
916	3	0.91	0.29	0.54	0.44	0.0	...1..11....111.............1..
917	3	1.00	0.0	0.48	0.69	0.0	...1...1....111................
918	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
919	3	0.50	0.0	0.0	0.0	0.0	.......1....111...........11...
920	3	0.39	0.60	0.89	0.61	0.0	1..1...1....111..1...1......1..
921	3	0.10	0.04	0.07	0.41	0.0	1..1...1....111................
923	3	0.10	0.29	0.24	0.37	0.0	1..1...1.1..111..1..........1..
924	0	0.10	0.43	0.41	0.35	0.0	.1.1...1....111.............1..
925	3	0.92	0.58	0.86	0.75	0.0	...1...1....111............11..
926	0	0.10	0.90	0.85	0.34	0.0	1......1....111................
927	3	0.10	0.15	0.25	0.22	0.0	1..1...1....111.............1..
928	3	0.10	0.73	0.27	0.29	0.0	1..1...1....111.............1..
930	0	0.10	0.18	0.07	0.13	0.0	1.....11....111..1...1.........
931	3	1.00	0.0	1.01	0.59	0.0	...1...1....111..1...1......1..
933	2	0.50	0.0	0.0	0.0	0.0	.......1....111................
934	3	1.00	0.73	0.90	0.73	0.0	1..1...1.1..111............11..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
935	2	0.11	0.01	8.69	0.51	14.07	2	0.80	0	0.250	0.461
936	6	0.084	0.004	44.1	1.0	10.88	2	0.80	0	0.250	0.461
937	1	0.049	0.005	27.5	1.2	12.64	2	0.94	2	0.250	0.461
938	2	0.072	0.012	28.0	2.2	12.04	1	0.80	0	0.150	0.393
939	1	0.083	0.010	17.8	1.0	12.99	2	0.93	1	0.250	0.461
942	1	0.11	0.01	32.7	1.3	11.18	1	0.80	0	0.150	0.393
943	4	0.044	0.003	72.0	2.5	10.51	2	0.78	1	0.250	0.461
945	1	0.18	0.02	29.5	1.5	10.90	2	0.81	2	0.250	0.461
946	6	0.044	0.013	50.0	7.0	11.17	2	0.66	4	0.150	0.393
947	7	0.19	0.03	27.7	2.2	10.97	2	0.80	0	0.150	0.393
949	6	0.051	0.003	71.0	1.8	10.39	2	0.80	0	0.150	0.393
950	7	0.17	0.04	17.5	2.2	12.11	1	0.80	0	0.250	0.461
951	1	0.15	0.02	15.5	1.0	12.54	2	0.87	1	0.250	0.461
952	4	0.055	0.007	84.5	5.0	9.92	2	0.80	0	0.150	0.393
953	4	0.12	0.01	31.5	1.0	11.20	2	0.80	0	0.150	0.393
954	6	0.052	0.002	59.7	1.1	10.56	2	0.62	2	0.150	0.393
955	5	0.12	0.01	18.7	0.5	12.33	1	0.80	0	0.150	0.393
957	1	0.034	0.002	76.6	2.1	10.65	2	0.80	0	0.150	0.393
958	3	0.031	0.009	53.7	7.5	11.56	2	0.83	0	0.150	0.393
959	7	0.026	0.001	59.1	1.2	11.50	1	0.80	0	0.150	0.393
961	4	0.032	0.002	39.3	1.0	12.19	2	0.80	0	0.150	0.393
962	2	0.026	0.010	39.5	7.5	12.43	2	0.82	3	0.250	0.461
963	1	0.12	0.01	11.5	0.6	13.45	2	0.90	2	0.250	0.461
965	4	0.048	0.003	54.5	1.6	11.03	2	0.80	0	0.150	0.393
966	3	0.23	0.02	27.3	1.5	10.89	2	0.87	3	0.250	0.461
967	2	0.076	0.008	14.7	0.7	13.36	2	0.80	0	0.250	0.461
968	2	0.17	0.05	31.0	4.7	10.92	2	0.87	1	0.250	0.461
969	2	0.038	0.002	20.5	0.6	13.21	2	0.62	2	0.150	0.393
971	4	0.043	0.003	66.7	2.0	10.71	2	0.80	0	0.150	0.393
972	5	0.045	0.002	79.0	2.0	10.30	2	0.80	0	0.150	0.393
973	5	0.067	0.004	54.7	1.5	10.66	2	0.80	0	0.150	0.393
974	3	0.19	0.05	24.8	3.0	11.30	2	0.90	2	0.250	0.461
976	1	0.043	0.004	86.6	4.0	10.09	2	0.74	1	0.150	0.393
977	5	0.050	0.008	67.0	5.5	10.45	2	0.71	2	0.150	0.393
978	6	0.034	0.002	82.5	2.0	10.39	2	0.67	2	0.150	0.393
979	6	0.10	0.01	40.6	2.3	10.83	2	0.80	0	0.150	0.393
980	6	0.17	0.01	89.0	1.6	8.67	3	0.91	4	0.058	0.330
981	2	0.083	0.011	31.2	2.0	11.46	2	0.62	1	0.150	0.393
983	5	0.043	0.002	77.3	1.6	10.32	2	0.74	1	0.150	0.393
984	5	0.31	0.06	33.6	3.3	10.03	2	0.80	0	0.150	0.393
986	4	0.10	0.01	53.0	2.0	10.23	2	0.80	0	0.150	0.393
987	5	0.14	0.01	44.6	1.1	10.26	2	0.80	0	0.150	0.393
988	7	0.064	0.017	29.0	3.8	12.09	1	0.80	0	0.150	0.393
989	1	0.11	0.01	14.3	0.6	13.02	1	0.80	0	0.150	0.393
990	2	0.097	0.014	20.3	1.5	12.41	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
935	0	0.10	0.0	0.45	0.0	0.0	1..1...1.1...1.................
936	3	0.10	0.18	0.34	0.32	0.0	1..1...1....111..1...1.....11..
937	0	0.50	0.0	0.0	0.0	0.0	.......1....111.........1......
938	3	0.50	0.0	0.45	0.0	0.0	.......1.1...1.............1...
939	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
942	3	0.50	0.0	0.0	0.0	0.0	1......1....11...1...1.........
943	3	0.36	0.19	0.43	0.28	0.0	1.....11....111................
945	0	0.50	0.0	0.0	0.0	0.0	.......1....111..1.............
946	3	1.00	0.0	0.22	0.25	0.0	11.1...1....111..1...1.....11..
947	3	0.90	0.56	0.94	0.35	0.0	1..1..11.1..111..1...1.........
949	3	0.10	0.20	0.24	0.53	0.0	...1...1....111.............1..
950	3	0.99	1.11	0.61	0.55	0.0	...1...1....111.............1..
951	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
952	3	0.89	0.40	0.42	0.40	0.0	1..1...1....111.............1..
953	3	0.15	0.21	0.53	0.15	0.0	1..1...1....111............1...
954	3	0.10	0.40	0.41	0.38	0.0	1..1...1....111..1...1......1..
955	3	0.10	0.20	0.44	0.0	0.0	.1....11....111................
957	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
958	3	1.00	0.0	0.64	0.67	0.0	1..1...1....111..1...1.........
959	3	0.10	0.66	0.41	0.55	0.0	1..1...1....111..1..........1..
961	0	0.10	0.36	0.28	0.21	0.0	1......1....111................
962	2	1.00	0.0	0.56	0.0	0.0	......11.1..11.................
963	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
965	3	0.10	0.23	0.35	0.39	0.0	1..1...1....111.............1..
966	3	0.56	0.0	0.15	0.48	0.0	1..1...1....111.............1..
967	3	0.10	0.0	0.37	0.0	0.0	...1...1.1..11..............1..
968	3	1.00	0.0	0.02	0.0	0.0	.......1.1...11................
969	3	0.10	0.10	0.06	0.16	0.0	1..1...1....111................
971	3	0.10	0.17	0.13	0.54	0.0	.......1...1111................
972	3	0.10	0.38	0.33	0.23	0.0	...1...1....111.............1..
973	3	0.10	0.24	0.26	0.42	0.0	1..1...1....111.............1..
974	3	0.94	0.0	0.38	0.0	0.0	1..1...1.1..11...1.............
976	0	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
977	3	0.96	0.63	0.35	0.57	0.0	1..1...1....111............1...
978	3	0.10	0.38	0.26	0.07	0.0	11.1...1....111.............1..
979	3	0.67	0.30	0.55	0.28	0.0	11.1...1....111..1...1......1..
980	0	0.10	0.32	0.24	0.33	0.0	1..1...1....111.............1..
981	3	0.72	0.14	0.36	0.17	0.0	.......1....111................
983	0	0.10	0.28	0.43	0.40	0.0	.......1.1..111............1...
984	3	1.00	0.60	0.59	0.81	0.0	1..1..11.1..111..1...1.........
986	0	0.36	0.22	0.29	0.35	0.0	1..1...1....111.............1..
987	0	0.10	0.35	0.24	0.16	0.0	1..1..11.1..111.............1..
988	3	1.00	0.24	1.07	0.69	0.0	1..1...1....111.............1..
989	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
990	0	0.73	0.78	0.60	0.46	0.0	.......1....111.............1..

ID/1	No.	P_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
991	5	0.043	0.009	34.5	3.5	12.01	2	0.66	1	0.150	0.393
992	4	0.082	0.008	30.8	1.5	11.68	2	0.80	0	0.150	0.393
994	3	0.18	0.03	27.2	2.7	11.08	2	0.80	0	0.150	0.393
995	7	0.11	0.01	32.6	0.5	11.17	2	0.80	0	0.150	0.393
996	6	0.060	0.007	34.1	2.0	11.69	2	0.69	3	0.250	0.461
997	1	0.056	0.007	23.5	1.5	12.69	1	0.80	0	0.150	0.393
998	1	0.057	0.016	35.0	5.0	11.81	1	0.80	0	0.150	0.393
999	1	0.18	0.02	21.2	1.2	11.59	2	0.80	0	0.150	0.393
1000	7	0.051	0.010	54.0	5.0	10.99	1	0.80	0	0.150	0.393
1001	1	0.044	0.005	78.3	4.6	10.25	3	0.70	4	-0.060	0.249
1002	1	0.023	0.002	57.1	2.5	11.74	1	0.80	0	0.150	0.393
1004	2	0.035	0.003	76.6	3.0	10.54	2	0.72	1	0.150	0.393
1005	6	0.057	0.008	62.7	4.3	10.53	2	0.80	0	0.150	0.393
1006	1	0.030	0.004	35.7	2.1	12.44	2	0.80	0	0.150	0.393
1007	1	0.071	0.017	24.6	3.0	12.32	2	0.80	0	0.150	0.393
1008	3	0.063	0.007	41.0	2.3	11.36	2	0.80	0	0.150	0.393
1010	5	0.043	0.002	45.2	1.1	11.56	2	0.80	0	0.150	0.393
1012	3	0.039	0.010	23.0	3.0	12.99	2	0.66	3	0.150	0.393
1013	3	0.16	0.03	35.6	3.7	10.57	2	0.74	1	0.150	0.393
1015	9	0.039	0.002	101	3	9.79	2	0.69	3	0.150	0.393
1017	4	0.043	0.009	39.0	4.1	11.87	1	0.80	0	0.150	0.393
1018	2	0.24	0.02	16.7	0.8	11.81	2	0.80	0	0.150	0.393
1019	2	0.15	0.01	9.55	0.57	13.67	3	0.94	4	0.244	0.457
1021	4	0.046	0.003	103	3	9.55	3	0.66	3	0.039	0.317
1022	1	0.16	0.01	31.1	1.3	10.94	1	0.80	0	0.150	0.393
1023	4	0.062	0.005	60.2	2.5	10.47	2	0.74	2	0.150	0.393
1024	2	0.055	0.004	43.2	1.7	11.38	2	0.80	0	0.150	0.393
1027	3	0.068	0.004	36.1	1.0	11.54	1	0.80	0	0.150	0.393
1028	10	0.052	0.002	76.3	1.6	10.09	2	0.68	1	0.150	0.393
1029	1	0.12	0.01	24.5	1.3	11.74	3	0.79	3	0.342	0.524
1030	4	0.028	0.003	65.5	3.3	11.22	2	0.80	0	0.150	0.393
1031	7	0.043	0.002	78.0	1.7	10.24	2	0.68	1	0.150	0.393
1032	4	0.055	0.006	59.1	3.2	10.70	2	0.80	0	0.150	0.393
1033	2	0.096	0.034	25.5	4.5	11.92	2	0.80	0	0.250	0.461
1034	2	0.21	0.02	8.85	0.40	13.36	1	0.80	0	0.250	0.461
1035	2	0.032	0.003	56.8	2.5	11.39	1	0.80	0	0.150	0.393
1036	1	0.17	0.02	41.0	2.3	10.26	3	0.84	3	0.307	0.500
1040	1	0.097	0.013	42.5	2.7	10.81	2	0.80	0	0.150	0.393
1041	5	0.048	0.003	60.6	1.5	10.81	2	0.80	0	0.150	0.393
1042	6	0.025	0.001	76.7	1.8	11.01	2	0.80	0	0.150	0.393
1043	6	0.14	0.02	37.3	3.2	10.74	2	0.90	1	0.250	0.461
1044	2	0.19	0.03	20.0	2.0	11.67	2	0.80	0	0.150	0.393
1048	3	0.045	0.003	72.5	2.1	10.39	2	0.71	3	0.150	0.393
1049	7	0.029	0.007	58.2	6.6	11.45	1	0.80	0	0.150	0.393
1051	4	0.042	0.002	68.6	1.7	10.67	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
991	3	0.99	0.16	0.47	0.37	0.0	1..1...1....111.............1..
992	0	0.17	0.0	0.83	0.0	0.0	...1...1.1..111.............1..
994	3	0.83	0.0	0.62	0.0	0.0	1..1..11....111.............1..
995	3	0.10	0.60	0.63	0.52	0.0	1..1..11....111..1..........1..
996	0	0.25	0.31	0.48	0.54	0.0	...1...1....111..1..........1..
997	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
998	0	0.50	0.0	0.0	0.0	0.0	.......1.1..11...1.........1...
999	3	0.50	0.0	0.0	0.0	0.0	...1..11.....1.................
1000	3	0.99	0.03	0.75	0.49	0.0	1..1...1....111............11..
1001	3	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1..
1002	2	0.50	0.0	0.0	0.0	0.0	.......1....11...1......1111...
1004	3	0.10	0.0	0.02	0.0	0.0	...1...1...1111................
1005	0	0.61	0.88	0.52	0.63	0.0	1..1...1....111..1...1......1..
1006	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............11..
1007	2	0.50	0.0	0.0	0.0	0.0	.......1.1..11.................
1008	3	0.61	0.39	0.14	0.31	0.0	1..1...1....111..1..........1..
1010	3	0.10	0.42	0.23	0.46	0.0	...1...1.1..111.............1..
1012	3	0.99	0.34	0.58	0.08	0.0	...1...1.1..111.............1..
1013	3	0.87	0.0	0.60	0.10	0.0	1......1.....11................
1015	3	0.19	0.46	0.64	0.45	0.0	1..1...1....111...........111..
1017	3	0.99	0.31	0.60	0.66	0.0	11.1...1....111................
1018	0	0.10	0.0	0.10	0.0	0.0	1..1..11.1...1..............1..
1019	0	0.40	0.0	0.10	0.0	0.0	.......1....11.................
1021	3	0.10	0.22	0.37	0.30	0.0	...1...1....111.............1..
1022	3	0.50	0.0	0.0	0.0	0.0	1..1..11....11..............1..
1023	3	0.45	0.42	0.35	0.31	0.0	11.1...1....111..........11...
1024	2	0.10	0.0	0.16	0.0	0.0	...1...1....111.............1..
1027	3	0.10	0.11	0.04	0.19	0.0	...1...1....111................
1028	3	0.10	0.38	0.63	0.61	0.0	11.1...1....111............11..
1029	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1030	3	0.52	0.19	0.19	0.43	0.0	...1...1....111..1...1....111..
1031	3	0.10	0.35	0.33	0.25	0.0	1..1...1....111................
1032	3	0.53	0.21	0.42	0.56	0.0	...1...1....111............11..
1033	3	0.95	0.0	0.69	0.0	0.0	...1...1....111............11..
1034	0	0.10	0.22	0.08	0.0	0.0	...1...1....11..............1..
1035	3	0.10	0.0	0.33	0.05	0.0	...1...1....111.............1..
1036	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1040	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1041	3	0.10	0.51	0.29	0.17	0.0	...1...1....111.............1..
1042	3	0.19	0.52	0.47	0.40	0.0	1..1...1.1..111.............1..
1043	3	0.95	0.16	0.54	0.38	0.0	1..1...1....111.............1..
1044	3	0.63	0.0	0.46	0.0	0.0	...1...1.....1..............1..
1048	3	0.10	0.17	0.13	0.19	0.0	...1...1....111................
1049	3	1.00	0.84	0.55	0.68	0.0	...1...1.1.1111.............1..
1051	3	0.17	0.42	0.17	0.23	0.0	1..1...1.1..111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1054	7	0.045	0.009	49.6	5.0	11.29	2	0.80	0	0.150	0.393
1057	2	0.027	0.003	49.1	2.5	11.86	2	0.80	0	0.150	0.393
1058	2	0.13	0.02	14.6	1.5	12.79	2	0.80	0	0.250	0.461
1063	3	0.14	0.02	18.0	1.2	12.21	2	0.80	0	0.250	0.461
1064	3	0.15	0.02	19.8	1.3	11.95	1	0.80	0	0.150	0.393
1068	1	0.14	0.01	26.8	1.6	11.38	2	0.80	0	0.150	0.393
1069	2	0.13	0.01	43.2	1.6	10.42	1	0.80	0	0.150	0.393
1070	6	0.048	0.007	40.0	2.7	11.71	2	0.80	0	0.150	0.393
1071	2	0.058	0.003	52.7	1.5	10.90	2	0.80	0	0.150	0.393
1072	10	0.037	0.002	46.5	1.1	11.67	2	0.80	0	0.150	0.393
1074	5	0.052	0.003	53.8	1.7	10.96	2	0.80	0	0.150	0.393
1075	2	0.089	0.021	40.5	4.7	10.97	2	0.76	2	0.250	0.461
1076	1	0.029	0.003	24.5	1.0	13.14	3	0.63	4	0.495	0.629
1079	4	0.099	0.010	23.7	1.1	12.05	2	0.80	1	0.250	0.461
1080	6	0.027	0.007	27.8	3.3	12.94	2	0.62	2	0.150	0.393
1081	8	0.024	0.001	40.3	1.2	12.45	2	0.80	0	0.150	0.393
1082	2	0.055	0.005	47.0	2.0	11.11	2	0.70	2	0.150	0.393
1084	3	0.091	0.026	32.0	4.5	11.49	2	0.80	0	0.150	0.393
1085	7	0.044	0.002	72.3	1.5	10.52	2	0.80	0	0.150	0.393
1086	5	0.054	0.006	70.5	4.1	10.35	2	0.80	0	0.150	0.393
1087	1	0.12	0.01	40.8	2.3	10.60	2	0.80	1	0.250	0.461
1089	4	0.17	0.02	14.1	0.8	12.58	2	0.80	0	0.250	0.461
1091	1	0.067	0.004	36.3	1.1	11.55	1	0.80	0	0.150	0.393
1092	2	0.044	0.004	47.6	2.0	11.41	2	0.80	0	0.150	0.393
1093	3	0.036	0.002	120	3	9.50	2	0.68	2	0.150	0.393
1094	2	0.083	0.010	18.1	1.0	12.82	2	0.80	0	0.150	0.393
1095	3	0.11	0.04	29.5	6.1	11.39	2	0.80	0	0.250	0.461
1096	3	0.069	0.007	46.2	2.3	11.00	2	0.80	0	0.150	0.393
1097	2	0.057	0.005	25.3	1.0	12.51	2	0.80	0	0.150	0.393
1098	2	0.12	0.01	28.5	1.2	11.40	2	0.80	0	0.150	0.393
1099	2	0.13	0.07	35.8	9.5	10.84	2	0.80	0	0.150	0.393
1101	5	0.047	0.003	41.0	1.3	11.68	1	0.80	0	0.150	0.393
1102	4	0.12	0.03	43.5	5.5	10.41	2	0.72	1	0.150	0.393
1104	5	0.033	0.002	24.2	0.6	13.20	1	0.80	0	0.150	0.393
1105	7	0.081	0.018	42.5	4.7	10.97	2	0.77	2	0.250	0.461
1107	1	0.070	0.008	81.0	4.7	9.76	2	0.80	0	0.150	0.393
1109	6	0.035	0.001	69.5	1.3	10.64	2	0.60	2	0.150	0.393
1112	5	0.095	0.006	40.3	1.2	10.93	2	0.78	2	0.250	0.461
1113	1	0.13	0.01	44.7	2.8	10.32	2	0.80	0	0.150	0.393
1114	2	0.057	0.004	63.0	2.3	10.52	2	0.80	0	0.150	0.393
1115	3	0.066	0.004	71.1	2.0	10.11	2	0.80	0	0.150	0.393
1116	6	0.14	0.01	40.7	0.8	10.45	2	0.80	0	0.150	0.393
1118	9	0.033	0.001	80.7	1.5	10.59	2	0.80	0	0.150	0.393
1119	1	0.022	0.003	44.8	3.3	12.31	2	0.80	0	0.150	0.393
1122	1	0.20	0.02	13.8	1.0	12.44	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1054	0	0.99	0.54	0.64	0.81	0.0	...1...1....111..............1..
1057	0	0.16	0.07	0.54	0.0	0.0	...1...1....111..1.............
1058	3	0.69	0.0	0.52	0.0	0.0	.1.....1.1...1.................
1063	3	0.46	0.0	0.52	0.0	0.0	.......1....11.................
1064	3	0.66	0.35	0.53	0.16	0.0	1..1..11....111................
1068	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1069	3	0.10	0.16	0.03	0.10	0.0	...1...1....111..1...1......1..
1070	3	0.66	0.31	0.41	0.49	0.0	1..1...1.1..111..1...1......1..
1071	3	0.10	0.05	0.06	0.22	0.0	1..1...1....111..............1..
1072	3	0.10	0.77	0.50	0.84	0.0	1..1...1....111.............11..
1074	3	0.10	0.37	0.39	0.0	0.0	1..1...1....111.............11..
1075	0	0.99	0.96	0.0	0.29	0.0	...1...1....111................
1076	0	0.50	0.0	0.0	0.0	0.0	1......1....11.............1...
1079	3	0.10	0.0	0.36	0.0	0.0	...1...1.1...1..............1..
1080	3	0.96	0.65	1.05	0.08	0.0	1..1...1....111..1...1.....11..
1081	3	0.17	0.61	0.56	0.68	0.0	...1...1....111..1...1.....11..
1082	3	0.10	0.17	0.06	0.42	0.0	1..1...1....111..............1..
1084	3	0.99	0.0	0.46	0.0	0.0	...1...1....111................
1085	3	0.10	0.29	0.31	0.22	0.0	1..1...1....111..............1..
1086	3	0.76	0.22	0.42	0.58	0.0	...1...1....111..............1..
1087	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1089	3	0.38	0.66	0.81	0.0	0.0	1..1...1....111..1...1......1..
1091	3	0.50	0.0	0.0	0.0	0.0	.......1....111............1...
1092	2	0.10	0.28	0.08	0.09	0.0	...1...1....111.............11..
1093	3	0.10	0.03	0.13	0.09	0.0	...1...1....111..............1..
1094	2	0.32	0.0	0.22	0.0	0.0	...1...1....11...............1..
1095	3	1.00	0.69	0.84	0.0	0.0	...1...1....111..............1..
1096	2	0.67	0.02	0.13	0.16	0.0	1..1...1....111..............1..
1097	2	0.10	0.0	0.15	0.0	0.0	...1...1....111................
1098	0	0.10	0.0	0.01	0.31	0.0	...1...1....111..............1..
1099	3	1.00	0.0	1.57	0.0	0.0	...1...1.....1.............1...
1101	0	0.10	0.0	0.55	0.41	0.0	...1...1....111................
1102	3	0.99	0.0	0.74	0.0	0.0	.1.1..11...1.11.............11..
1104	3	0.10	1.50	1.11	0.54	0.0	1..1...1....111..............1..
1105	3	1.00	0.75	0.50	0.72	0.0	...1...1....111..............1..
1107	0	0.50	0.0	0.0	0.0	0.0	1..1...1....111..............1..
1109	3	0.10	0.17	0.33	0.37	0.0	1..1...1....111..............1..
1112	3	0.10	0.66	0.38	0.20	0.0	...1...1....111..............1..
1113	3	0.50	0.0	0.0	0.0	0.0	1......1.....11................
1114	3	0.10	0.10	0.04	0.03	0.0	1..1...1....111..............1..
1115	3	0.10	0.22	0.19	0.17	0.0	1..1...1....111..............1..
1116	2	0.10	0.25	0.32	0.40	0.0	1..1..11....111..1...1......1..
1118	3	0.10	0.50	0.43	0.75	0.0	1..1...1....111.............11..
1119	0	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1122	3	0.50	0.0	0.0	0.0	0.0	......11....111............1...

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1124	1	0.10	0.01	28.6	2.1	11.49	2	0.70	3	0.150	0.393
1126	1	0.085	0.007	13.7	0.5	13.40	1	0.80	0	0.250	0.461
1127	8	0.030	0.007	50.3	6.0	11.62	2	0.70	2	0.150	0.393
1128	1	0.052	0.004	40.2	1.5	11.59	2	0.80	0	0.150	0.393
1129	2	0.11	0.01	38.3	1.1	10.82	2	0.78	1	0.250	0.461
1132	1	0.056	0.009	34.2	2.5	11.87	2	0.80	0	0.150	0.393
1135	4	0.047	0.006	51.5	3.5	11.17	2	0.80	0	0.150	0.393
1136	1	0.094	0.009	27.2	1.2	11.80	2	0.80	0	0.150	0.393
1137	2	0.089	0.007	26.1	1.0	11.96	2	0.80	0	0.250	0.461
1140	5	0.13	0.01	31.5	1.1	11.24	2	0.91	2	0.250	0.461
1141	1	0.056	0.007	11.6	0.7	14.21	1	0.80	0	0.250	0.461
1143	3	0.041	0.003	135	5	9.23	2	0.80	2	0.150	0.393
1145	4	0.098	0.006	25.5	0.7	11.90	2	0.80	0	0.250	0.461
1146	3	0.17	0.01	34.5	1.2	10.48	2	0.68	3	0.150	0.393
1148	1	0.16	0.01	31.7	1.8	10.96	2	0.86	3	0.250	0.461
1149	8	0.041	0.002	57.3	1.0	11.09	2	0.80	0	0.150	0.393
1151	1	0.012	0.002	22.0	1.5	14.51	1	0.80	0	0.250	0.461
1152	3	0.18	0.01	18.2	0.6	11.93	1	0.80	0	0.250	0.461
1154	7	0.027	0.002	64.3	2.7	11.16	2	0.66	1	0.150	0.393
1155	3	0.14	0.05	15.2	2.6	12.61	2	0.80	0	0.250	0.461
1158	2	0.14	0.02	21.7	1.5	11.83	2	0.80	0	0.250	0.461
1159	6	0.044	0.002	31.0	0.7	12.34	2	0.80	0	0.250	0.461
1161	1	0.040	0.004	39.0	2.0	11.94	2	0.80	0	0.150	0.393
1162	2	0.080	0.012	56.8	4.1	10.35	2	0.77	3	0.250	0.461
1163	3	0.082	0.022	34.8	4.5	11.42	2	0.80	0	0.150	0.393
1165	5	0.032	0.008	54.6	6.6	11.45	2	0.80	0	0.150	0.393
1166	1	0.078	0.008	24.0	1.1	12.28	1	0.80	0	0.150	0.393
1167	3	0.039	0.006	69.0	5.2	10.68	2	0.74	2	0.150	0.393
1168	2	0.12	0.01	12.5	0.6	13.21	2	0.80	0	0.150	0.393
1170	1	0.11	0.01	12.3	0.6	13.38	2	0.86	2	0.250	0.461
1171	4	0.038	0.002	73.6	2.2	10.53	2	0.69	4	0.150	0.393
1172	3	0.038	0.002	151	5	8.99	2	0.73	4	0.150	0.393
1173	4	0.026	0.006	135	16	9.62	2	0.71	2	0.150	0.393
1176	8	0.064	0.003	32.0	0.7	11.88	1	0.80	0	0.150	0.393
1177	4	0.039	0.002	95.5	2.6	9.92	2	0.67	2	0.150	0.393
1178	8	0.070	0.015	21.6	2.3	12.62	2	0.80	0	0.150	0.393
1182	3	0.14	0.03	18.0	2.0	12.24	2	0.80	0	0.250	0.461
1183	3	0.068	0.010	20.6	1.5	12.76	2	0.80	0	0.250	0.461
1186	2	0.18	0.02	39.0	2.5	10.31	2	0.79	1	0.250	0.461
1187	4	0.037	0.004	37.0	2.0	12.15	2	0.80	0	0.150	0.393
1188	6	0.13	0.01	13.8	0.5	12.91	2	0.80	0	0.250	0.461
1189	2	0.053	0.003	58.3	1.7	10.78	2	0.80	0	0.150	0.393
1190	2	0.065	0.006	20.1	0.8	12.87	1	0.80	0	0.250	0.461
1191	4	0.052	0.003	45.6	1.0	11.34	1	0.80	0	0.150	0.393
1194	3	0.031	0.002	56.8	1.3	11.42	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1124	0	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
1126	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1127	2	1.00	0.77	0.80	0.84	0.0	1..1...1....111.............1..
1128	3	0.50	0.0	0.0	0.0	0.0	...1...1....111................
1129	3	0.10	0.02	0.15	0.19	0.0	.......1....111................
1132	2	0.50	0.0	0.0	0.0	0.0	.......1....111................
1135	3	0.53	0.47	0.62	0.49	0.0	.......1....111..1.............
1136	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
1137	3	0.10	0.13	0.13	0.0	0.0	1......1....11.................
1140	3	0.24	0.60	0.49	0.34	0.0	...1...1.1.1111..1...1......1..
1141	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1143	3	0.10	0.0	0.23	0.22	0.0	...1...1....111................
1145	3	0.10	0.21	0.12	0.29	0.0	...1...1....111.............1..
1146	3	0.10	0.08	0.14	0.33	0.0	1..1..11....111.............1..
1148	0	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.............1...
1149	3	0.10	0.43	0.32	0.36	0.0	1..1...1.1..111............1...
1151	0	0.50	0.0	0.0	0.0	0.0	...1...1.11..1...1.............
1152	0	0.10	0.05	0.37	0.0	0.0	...1...1....11..............1..
1154	3	0.28	0.66	0.51	0.43	0.0	1..1...1....111.............1..
1155	3	1.00	0.52	0.11	0.0	0.0	...1...1.1..11.................
1158	0	0.49	0.15	0.48	0.10	0.0	...1...1....111..1...1......1..
1159	3	0.10	0.34	0.43	0.63	0.0	...1..11....111................
1161	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1162	3	0.43	0.0	0.12	0.0	0.0	...1...1.1...11............1...
1163	3	1.00	0.0	0.34	0.74	0.0	...1...1.....11..1...1......1..
1165	0	1.00	0.42	0.68	0.41	0.0	...1...1....111............1...
1166	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
1167	0	0.82	0.57	0.43	0.11	0.0	.1.1...1....111............11..
1168	3	0.10	0.0	0.23	0.0	0.0	......11.....1.................
1170	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1171	3	0.10	0.36	0.42	0.47	0.0	...1...1....111.............1..
1172	0	0.10	0.20	0.12	0.15	0.0	11.1...1....111.............1..
1173	3	1.00	0.30	0.76	0.16	0.0	...1...1.1..111..1...1......1..
1176	3	0.16	0.46	0.50	0.66	0.0	1..1...1.1..111.............1..
1177	3	0.10	0.09	0.10	0.30	0.0	.......1....111.........1111...
1178	3	0.99	0.46	0.69	0.35	0.0	.1.1...1.1..111..1...1.....11..
1182	0	0.92	0.0	0.13	0.10	0.0	1..1...1.1..111.............1..
1183	0	0.64	0.30	0.21	0.0	0.0	1..1...1....111..1.............
1186	2	0.46	0.26	0.39	0.08	0.0	1..1...1....111.............1..
1187	3	0.46	0.32	0.16	0.70	0.0	.1.1...1.1..111..1...1......1..
1188	3	0.10	0.32	0.57	0.0	0.0	.......1.1..111..1...1.....1...
1189	2	0.10	0.20	0.19	0.04	0.0	1..1...1.1..111.............1..
1190	3	0.10	0.14	0.13	0.0	0.0	1......1....111................
1191	0	0.10	0.27	0.32	0.24	0.0	1..1...1....111............11..
1194	2	0.10	0.07	0.18	0.14	0.0	1..1...1....111.............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1196	7	0.11	0.01	33.8	2.5	11.16	2	0.80	0	0.150	0.393
1197	6	0.064	0.011	49.0	4.1	10.95	2	0.80	0	0.150	0.393
1199	4	0.089	0.011	35.5	2.1	11.25	2	0.76	1	0.250	0.461
1200	10	0.054	0.008	42.0	3.2	11.48	2	0.80	0	0.150	0.393
1201	11	0.030	0.006	38.3	3.8	12.30	2	0.80	0	0.150	0.393
1202	2	0.033	0.003	66.3	2.7	11.01	1	0.80	0	0.150	0.393
1203	2	0.017	0.005	44.7	6.6	12.56	2	0.80	0	0.150	0.393
1207	2	0.074	0.007	27.7	1.3	12.02	2	0.80	0	0.250	0.461
1208	3	0.036	0.002	111	4	9.69	2	0.69	1	0.150	0.393
1210	2	0.13	0.01	34.5	2.2	10.91	2	0.83	1	0.250	0.461
1211	2	0.043	0.005	41.6	2.5	11.74	2	0.80	0	0.150	0.393
1212	5	0.038	0.005	90.7	5.5	10.08	2	0.70	4	0.150	0.393
1213	1	0.036	0.010	43.2	5.8	11.84	1	0.80	0	0.150	0.393
1214	9	0.051	0.009	37.0	3.3	11.81	2	0.80	0	0.150	0.393
1219	1	0.14	0.02	13.1	1.0	12.91	2	0.80	0	0.250	0.461
1222	5	0.055	0.012	22.0	2.5	12.86	1	0.80	0	0.150	0.393
1224	6	0.19	0.01	15.5	0.3	12.37	2	0.90	1	0.250	0.461
1226	3	0.074	0.018	18.5	2.2	12.91	1	0.80	0	0.150	0.393
1227	2	0.058	0.008	48.2	3.1	11.08	2	0.80	0	0.150	0.393
1229	3	0.070	0.005	31.0	1.0	11.84	2	0.80	0	0.150	0.393
1231	3	0.084	0.036	22.0	4.6	12.38	1	0.80	0	0.150	0.393
1232	1	0.093	0.020	39.6	4.2	11.01	2	0.80	0	0.150	0.393
1233	7	0.048	0.003	34.5	0.8	12.02	1	0.80	0	0.150	0.393
1234	2	0.10	0.02	28.3	3.0	11.57	2	0.80	0	0.250	0.461
1236	2	0.043	0.004	26.3	1.1	12.68	2	0.76	2	0.250	0.461
1237	7	0.046	0.002	42.0	1.0	11.65	2	0.80	0	0.150	0.393
1238	2	0.059	0.005	22.5	0.8	12.71	1	0.80	0	0.150	0.393
1239	2	0.056	0.010	17.1	1.5	13.37	1	0.80	0	0.150	0.393
1240	4	0.058	0.004	60.5	2.0	10.60	2	0.80	0	0.150	0.393
1241	6	0.039	0.005	86.2	5.3	10.20	2	0.75	1	0.150	0.393
1242	2	0.055	0.005	49.2	2.3	11.11	2	0.80	0	0.150	0.393
1243	8	0.037	0.006	75.5	6.5	10.60	2	0.80	0	0.150	0.393
1244	5	0.049	0.013	31.2	4.1	12.21	2	0.80	0	0.250	0.461
1245	1	0.20	0.02	28.3	1.6	10.88	3	0.83	4	0.488	0.624
1246	5	0.22	0.03	19.8	1.5	11.57	2	0.80	0	0.150	0.393
1247	2	0.059	0.005	40.6	1.5	11.32	2	0.68	2	0.150	0.393
1249	5	0.15	0.03	14.6	1.5	12.65	2	0.88	3	0.250	0.461
1250	1	0.046	0.006	21.7	1.2	13.06	2	0.80	0	0.150	0.393
1253	1	0.027	0.003	30.1	1.7	12.92	1	0.80	0	0.150	0.393
1254	7	0.031	0.007	49.2	5.1	11.72	2	0.80	0	0.150	0.393
1255	4	0.10	0.01	34.6	2.5	11.21	2	0.80	0	0.150	0.393
1256	3	0.039	0.003	78.0	2.5	10.42	2	0.73	3	0.150	0.393
1258	6	0.048	0.006	47.5	3.0	11.33	2	0.80	0	0.150	0.393
1259	6	0.063	0.012	36.2	3.5	11.63	2	0.80	0	0.250	0.461
1261	4	0.077	0.008	34.2	1.8	11.53	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1196	2	0.43	0.30	0.68	0.11	0.0	.1.1...1.1..111............11..
1197	3	1.00	0.54	0.47	0.40	0.0	1..1...1...111..............1..
1199	3	0.61	0.18	0.32	0.57	0.0	1......1...111..1...........1..
1200	3	0.99	0.91	0.87	0.69	0.0	1..1...1...111..1...1.......1..
1201	3	0.99	0.70	0.49	0.89	0.0	1..1...1.1..111..1.........11..
1202	0	0.10	0.0	0.09	0.07	0.0	...1...1....11.................
1203	3	0.97	0.0	0.20	0.0	0.0	...1...1.1..111.............1..
1207	2	0.10	0.09	0.0	0.0	0.0	...1...1...1.1..............1..
1208	0	0.10	0.0	0.15	0.13	0.0	1..1...1...111..............1..
1210	0	0.65	0.17	0.44	0.19	0.0	...1...1...111..............1..
1211	3	0.56	0.0	0.41	0.47	0.0	...1...1...111..1..............
1212	3	0.61	0.41	0.31	0.38	0.0	...1...1...111.................
1213	0	0.50	0.0	0.0	0.0	0.0	...1...1....11..............1..
1214	3	1.00	0.76	0.48	0.59	0.0	1..1...1...111..............1..
1219	3	0.50	0.0	0.0	0.0	0.0	1......1...11..................
1222	0	0.99	0.64	0.85	0.38	0.0	...1...1...111..............1..
1224	3	0.10	0.44	0.57	0.31	0.0	1..1...1...111.................
1226	0	1.00	0.0	0.20	0.0	0.0	.......1...11..............1...
1227	0	0.60	0.04	0.23	0.15	0.0	...1...1...111.............1...
1229	3	0.10	0.22	0.21	0.15	0.0	1..1...1...111.................
1231	3	1.00	0.0	0.87	0.0	0.0	.......1.1...11................
1232	0	0.50	0.0	0.0	0.0	0.0	...1...1....11..1..............
1233	3	0.10	0.40	0.68	0.28	0.0	...1...1...111..1...1.....111..
1234	0	0.76	0.0	0.70	0.09	0.0	...1...1...111..1...........1..
1236	2	0.10	0.0	0.01	0.05	0.0	.......1...111.................
1237	3	0.10	0.41	0.38	0.63	0.0	...1...1...111..1...1.......1..
1238	3	0.10	0.18	0.34	0.01	0.0	1..1...1...111.................
1239	3	0.62	0.00	0.08	0.52	0.0	1......1...111.................
1240	0	0.10	0.29	0.13	0.30	0.0	1..1...1...111..............1..
1241	3	0.91	0.51	0.35	0.28	0.0	1..1...1...111..............1..
1242	3	0.44	0.22	0.24	0.18	0.0	1..1...1...111..............1..
1243	3	0.99	0.41	0.68	0.76	0.0	1..1...1...111..............1..
1244	0	1.00	0.39	0.98	0.33	0.0	1..1...1.1..111.............1..
1245	3	0.50	0.0	0.0	0.0	0.0	...1...1...111.................
1246	3	0.92	0.75	0.54	0.75	0.0	1..1...1...111.................
1247	3	0.10	0.0	0.08	0.04	0.0	...1...1...111..............1..
1249	3	0.89	0.06	0.72	0.0	0.0	.......1...11..................
1250	0	0.50	0.0	0.0	0.0	0.0	1..1...1....1...............1..
1253	2	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1254	3	1.00	0.84	0.64	0.82	0.0	1..1...1...111.................
1255	3	0.86	0.64	0.55	0.71	0.0	1..1...1...111..............1..
1256	3	0.10	0.03	0.14	0.23	0.0	...1...1...111..............1..
1258	3	0.60	0.46	0.35	0.55	0.0	1..1...1...111..............1..
1259	3	0.84	0.48	0.59	0.52	0.0	...1...1...111..............1..
1261	3	0.32	0.49	0.02	0.47	0.0	1..1...1...111.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1262	2	0.043	0.005	58.7	3.6	10.98	2	0.80	0	0.150	0.393
1263	4	0.044	0.002	50.7	1.2	11.21	2	0.73	1	0.150	0.393
1264	6	0.037	0.002	77.5	1.5	10.54	1	0.80	0	0.150	0.393
1266	6	0.060	0.009	76.0	5.7	10.00	3	0.73	3	-0.079	0.236
1267	2	0.030	0.003	26.8	1.3	13.07	2	0.80	0	0.250	0.461
1268	4	0.040	0.002	97.5	2.6	9.83	2	0.66	3	0.150	0.393
1269	6	0.047	0.002	109	2	9.50	2	0.77	3	0.150	0.393
1270	2	0.15	0.01	9.58	0.57	13.53	2	0.80	0	0.250	0.461
1271	5	0.045	0.008	49.5	4.5	11.32	2	0.80	0	0.150	0.393
1273	1	0.011	0.001	30.5	1.6	13.85	2	0.80	0	0.250	0.461
1275	3	0.084	0.029	33.0	5.6	11.42	2	0.70	3	0.150	0.393
1276	2	0.068	0.009	36.2	2.5	11.53	1	0.80	0	0.150	0.393
1277	7	0.070	0.013	30.0	2.7	11.85	2	0.73	3	0.150	0.393
1280	6	0.044	0.006	55.3	3.8	10.97	2	0.67	1	0.150	0.393
1282	6	0.053	0.007	55.7	3.6	10.87	2	0.80	0	0.150	0.393
1283	4	0.093	0.006	29.8	1.0	11.62	1	0.80	0	0.150	0.393
1284	6	0.088	0.005	40.2	1.0	11.00	2	0.77	2	0.150	0.393
1285	6	0.068	0.004	45.5	1.3	11.04	1	0.80	0	0.150	0.393
1286	2	0.083	0.023	33.8	4.6	11.52	2	0.85	1	0.250	0.461
1287	1	0.090	0.011	27.0	1.5	11.86	2	0.80	0	0.250	0.461
1288	1	0.034	0.009	39.2	5.5	12.13	2	0.80	0	0.150	0.393
1293	1	0.059	0.019	8.52	1.36	14.83	1	0.80	0	0.250	0.461
1294	5	0.074	0.011	38.5	2.8	11.31	2	0.80	0	0.150	0.393
1295	2	0.040	0.003	52.0	1.6	11.34	1	0.80	0	0.150	0.393
1296	7	0.061	0.010	26.5	2.2	12.32	1	0.80	0	0.250	0.461
1297	1	0.012	0.001	66.0	3.7	12.08	1	0.80	0	0.150	0.393
1298	3	0.034	0.002	47.3	1.3	11.70	2	0.80	0	0.150	0.393
1300	3	0.061	0.010	32.1	2.6	11.91	2	0.80	0	0.150	0.393
1301	6	0.15	0.01	24.7	1.1	11.48	1	0.80	0	0.150	0.393
1303	3	0.041	0.002	88.8	2.3	10.13	1	0.80	0	0.150	0.393
1304	2	0.16	0.01	47.8	1.7	9.99	2	0.80	0	0.150	0.393
1305	2	0.13	0.01	29.5	2.0	11.29	2	0.80	0	0.150	0.393
1306	6	0.052	0.007	69.5	4.7	10.47	2	0.85	1	0.250	0.461
1308	5	0.043	0.003	45.0	1.3	11.56	2	0.80	0	0.150	0.393
1309	6	0.039	0.005	59.8	3.7	11.04	2	0.80	0	0.150	0.393
1312	2	0.047	0.003	38.3	1.2	11.82	2	0.80	0	0.150	0.393
1314	1	0.071	0.015	14.1	1.5	13.60	2	0.87	1	0.250	0.461
1315	5	0.043	0.002	65.5	1.6	10.75	2	0.80	0	0.150	0.393
1318	8	0.12	0.03	14.5	1.7	12.83	1	0.80	0	0.250	0.461
1320	2	0.041	0.004	45.6	2.2	11.59	1	0.80	0	0.150	0.393
1321	1	0.10	0.01	36.3	2.1	11.09	2	0.80	0	0.150	0.393
1323	2	0.038	0.007	60.1	5.6	11.06	2	0.80	0	0.150	0.393
1325	1	0.16	0.01	12.5	0.5	12.91	1	0.80	0	0.150	0.393
1327	1	0.021	0.003	33.5	2.0	12.97	2	0.80	0	0.150	0.393
1328	7	0.036	0.007	59.6	5.5	11.05	2	0.70	1	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1262	3	0.53	0.06	0.18	0.41	0.0	...1...1....111.............1..
1263	3	0.10	0.23	0.15	0.25	0.0	1..1...1....111.............1..
1264	3	0.10	0.21	0.18	0.28	0.0	1..1...1.1..111.............1..
1266	3	0.85	0.39	0.59	0.41	0.0	11.1...1....111.............1..
1267	3	0.10	0.0	0.04	0.0	0.0	.......1.....11................
1268	3	0.10	0.08	0.15	0.17	0.0	1..1...1....111.............1..
1269	3	0.10	0.56	0.47	0.45	0.0	1..1...1....111............11..
1270	2	0.10	0.0	0.17	0.0	0.0	.......1.1...1.................
1271	3	0.95	0.89	0.41	0.52	0.0	...1...1....111..1...1......1..
1273	0	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1275	0	1.00	1.12	0.64	0.0	0.0	...1...1....111.............1..
1276	3	0.45	0.0	0.23	0.34	0.0	...1...1....111.............1..
1277	0	0.93	0.52	0.67	0.61	0.0	...1...1...1111............11..
1280	3	0.68	0.56	0.27	0.39	0.0	1..1...1....111.............1..
1282	3	0.83	0.62	0.57	0.50	0.0	1..1...1....111................
1283	0	0.10	0.09	0.69	0.33	0.0	1..1...1....111.............1..
1284	3	0.10	0.27	0.54	0.29	0.0	1..1...1....111.............1..
1285	3	0.10	0.33	0.26	0.60	0.0	...1...1....111..1...1......1..
1286	3	0.95	0.0	0.47	0.0	0.0	...1...1.1...11.............1..
1287	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1288	3	0.50	0.0	0.0	0.0	0.0	...1...1....111............1...
1293	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
1294	3	0.77	0.38	0.34	0.62	0.0	...1...1....111.............1..
1295	3	0.10	0.08	0.08	0.06	0.0	1..1...1....111............11..
1296	3	0.96	0.56	0.65	0.73	0.0	1..1...1....111............1...
1297	3	0.50	0.0	0.0	0.0	0.0	...1..11.1...1...1......1111...
1298	3	0.10	0.24	0.04	0.21	0.0	...1...1.1..111.............1..
1300	0	0.96	0.32	0.01	0.17	0.0	1..1...1....111.............1..
1301	0	0.38	0.80	0.76	0.45	0.0	......11....111................
1303	0	0.10	0.22	0.24	0.25	0.0	1..1...1....111.............1..
1304	3	0.10	0.14	0.03	0.24	0.0	...1..11....111................
1305	3	0.19	0.0	0.39	0.0	0.0	...1..11.1...1.................
1306	3	0.87	0.53	0.32	0.13	0.0	...1...1....111................
1308	3	0.10	0.49	0.43	0.83	0.0	1..1...1....111.............1..
1309	3	0.82	0.75	0.70	0.85	0.0	1..1...1....111................
1312	3	0.10	0.00	0.11	0.28	0.0	.......1....111............11...
1314	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1315	3	0.10	0.27	0.19	0.23	0.0	1..1...1....111................
1318	3	0.98	0.63	0.62	0.21	0.0	...1...1....111.............1..
1320	3	0.10	0.0	0.12	0.18	0.0	.......1.....11................
1321	3	0.50	0.0	0.0	0.0	0.0	1..1...1.....1..............1..
1323	3	0.83	0.30	0.26	0.23	0.0	.......1....111................
1325	3	0.50	0.0	0.0	0.0	0.0	1..1..11....11...1...1.....11..
1327	2	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1328	3	0.98	0.27	0.44	0.85	0.0	1..1...1....111............1...

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1329	1	0.11	0.02	27.5	3.0	11.67	2	0.87	2	0.250	0.461
1330	11	0.044	0.008	58.0	5.3	10.85	2	0.67	1	0.150	0.393
1331	6	0.094	0.019	37.0	3.7	10.99	2	0.64	1	0.250	0.461
1332	5	0.059	0.013	49.5	5.3	11.02	1	0.80	0	0.150	0.393
1334	2	0.21	0.09	28.3	6.0	10.81	2	0.80	0	0.150	0.393
1336	1	0.11	0.02	25.1	2.7	11.74	2	0.81	2	0.250	0.461
1337	8	0.042	0.008	41.0	4.1	11.80	2	0.80	0	0.150	0.393
1339	2	0.10	0.01	27.6	1.5	11.63	2	0.79	2	0.250	0.461
1340	1	0.060	0.016	29.5	4.0	12.12	2	0.80	0	0.150	0.393
1341	6	0.10	0.02	30.7	3.0	11.27	2	0.68	2	0.150	0.393
1342	7	0.11	0.03	20.1	2.6	12.16	2	0.71	3	0.250	0.461
1343	2	0.059	0.006	28.3	1.3	12.22	2	0.80	0	0.150	0.393
1345	4	0.036	0.003	79.3	3.1	10.45	2	0.71	2	0.150	0.393
1346	2	0.23	0.02	15.1	0.7	12.09	2	0.80	0	0.150	0.393
1347	6	0.028	0.002	36.0	1.0	12.53	2	0.80	0	0.150	0.393
1350	1	0.14	0.01	26.1	1.3	11.47	2	0.85	3	0.250	0.461
1351	4	0.037	0.005	67.1	4.5	10.85	2	0.80	0	0.150	0.393
1352	1	0.097	0.013	24.0	1.5	12.05	2	0.80	0	0.150	0.393
1353	6	0.12	0.03	37.5	4.5	10.80	2	0.80	0	0.250	0.461
1354	5	0.048	0.012	52.5	6.8	11.12	2	0.80	0	0.150	0.393
1356	4	0.031	0.005	67.2	5.8	11.06	2	0.80	0	0.150	0.393
1357	1	0.033	0.003	45.1	2.0	11.76	2	0.73	1	0.150	0.393
1358	2	0.030	0.004	24.0	1.5	13.32	2	0.80	0	0.250	0.461
1359	7	0.035	0.002	55.5	1.3	11.25	2	0.72	1	0.150	0.393
1360	4	0.054	0.015	31.0	4.2	12.12	1	0.80	0	0.150	0.393
1361	6	0.040	0.010	34.7	4.5	12.20	2	0.80	0	0.150	0.393
1362	2	0.066	0.008	31.1	2.0	11.82	2	0.72	2	0.150	0.393
1364	1	0.084	0.011	29.3	1.8	11.77	2	0.80	0	0.250	0.461
1366	2	0.12	0.01	31.7	1.5	11.19	2	0.80	0	0.150	0.393
1368	4	0.14	0.01	22.3	0.8	11.76	2	0.80	0	0.150	0.393
1369	3	0.045	0.009	45.5	4.7	11.49	2	0.80	0	0.150	0.393
1371	1	0.049	0.012	35.2	4.2	11.96	1	0.80	0	0.150	0.393
1375	1	0.055	0.008	23.7	1.5	12.68	2	0.80	0	0.250	0.461
1379	1	0.16	0.01	21.0	1.0	11.76	2	0.80	0	0.150	0.393
1381	1	0.050	0.006	24.0	1.5	12.76	2	0.80	0	0.250	0.461
1383	7	0.059	0.012	24.2	2.5	12.57	2	0.80	0	0.150	0.393
1384	3	0.045	0.007	29.0	2.2	12.46	1	0.80	0	0.150	0.393
1385	2	0.12	0.01	25.0	1.3	11.72	2	0.80	0	0.150	0.393
1388	1	0.074	0.018	29.3	3.5	11.90	2	0.80	0	0.250	0.461
1389	1	0.049	0.007	28.1	2.0	12.44	2	0.80	0	0.250	0.461
1390	3	0.033	0.002	104	3	9.95	3	0.71	3	-0.221	0.139
1392	3	0.040	0.003	30.0	1.1	12.48	2	0.76	1	0.150	0.393
1395	1	0.095	0.012	20.8	1.2	12.37	1	0.80	0	0.150	0.393
1396	2	0.16	0.06	14.0	2.5	12.67	2	0.80	0	0.250	0.461
1398	1	0.11	0.01	34.5	2.1	11.11	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1329	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1330	3	1.00	0.48	0.66	1.08	0.0	1..1...1....111............11..
1331	3	1.00	0.26	0.32	0.79	0.0	1..1...1....111..1...1......1..
1332	3	0.99	0.76	0.57	0.23	0.0	.1.1...1.1.1111..1...1......1..
1334	0	1.00	0.46	1.13	0.0	0.0	...1..11.1..111................
1336	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1337	3	1.00	0.64	0.79	0.39	0.0	1..1...1....111............11..
1339	3	0.10	0.0	0.07	0.20	0.0	...1...1.....11.............1..
1340	3	0.50	0.0	0.0	0.0	0.0	...1...1.....11................
1341	3	0.91	0.30	0.28	0.40	0.0	1..1...1....111.............1..
1342	0	1.00	0.46	0.62	0.50	0.0	.......1....111..1...1....11...
1343	3	0.10	0.0	0.06	0.0	0.0	1..1...1.1..11..............1..
1345	3	0.21	0.0	0.42	0.40	0.0	...1...1....111................
1346	3	0.10	0.0	0.30	0.0	0.0	...1..11.1..11..............1..
1347	3	0.10	0.37	0.62	0.39	0.0	1..1...1....111.............1..
1350	3	0.50	0.0	0.0	0.0	0.0	...1...1....1...............1..
1351	3	0.64	0.38	0.43	0.47	0.0	1..1...1....111.............1..
1352	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1353	3	1.00	0.70	0.67	0.51	0.0	...1...1.1..111..1...1......1..
1354	3	1.00	1.05	0.52	0.48	0.0	1..1...1.1..111..1...1......1..
1356	3	0.99	0.72	0.28	0.29	0.0	...1...1....111.............1..
1357	0	0.50	0.0	0.0	0.0	0.0	.......1.1..111................
1358	3	0.10	0.0	0.12	0.0	0.0	1..1...1.....1.................
1359	3	0.10	0.22	0.44	0.38	0.0	...1...1....111.............1..
1360	0	1.00	0.78	0.46	0.0	0.0	1..1...1.1..111..1...1......1..
1361	3	1.00	1.15	0.88	0.17	0.0	1......1....111..1...1.....1...
1362	3	0.59	0.37	0.05	0.39	0.0	1......1....111................
1364	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1366	3	0.10	0.0	0.13	0.0	0.0	.......1.1..11.................
1368	3	0.19	0.51	0.30	0.02	0.0	...1..11....111................
1369	0	1.00	0.64	0.26	0.60	0.0	...1...1....111.............1..
1371	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1375	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1379	3	0.50	0.0	0.0	0.0	0.0	.......1.1..11.................
1381	3	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.................
1383	3	0.88	0.40	0.79	0.68	0.0	...1...1....111.............1..
1384	3	0.90	0.63	0.31	0.15	0.0	1..1...1....111.............1..
1385	3	0.10	0.0	0.09	0.0	0.0	...1...1.....11............11..
1388	3	0.50	0.0	0.0	0.0	0.0	...1...1....11.............11..
1389	2	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1390	0	0.10	0.25	0.19	0.16	0.0	1..1...1....111.............1..
1392	3	0.10	0.0	0.24	0.36	0.0	.......1....111................
1395	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1396	3	1.00	0.0	0.69	0.0	0.0	1..1...1.....1..............1..
1398	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1404	6	0.049	0.005	92.0	4.8	9.87	1	0.80	0	0.150	0.393
1406	4	0.054	0.018	31.0	5.0	12.12	1	0.80	0	0.150	0.393
1407	6	0.10	0.02	23.1	2.5	12.02	2	0.80	0	0.150	0.393
1408	1	0.046	0.011	41.0	4.8	11.70	1	0.80	0	0.150	0.393
1409	6	0.077	0.013	36.8	3.0	11.37	2	0.80	0	0.150	0.393
1410	1	0.10	0.01	22.6	1.3	12.12	2	0.80	0	0.250	0.461
1411	8	0.066	0.008	34.3	2.0	11.68	2	0.80	0	0.150	0.393
1413	2	0.077	0.021	25.0	3.5	12.21	2	0.80	0	0.250	0.461
1414	3	0.039	0.012	20.0	3.0	13.44	1	0.80	0	0.150	0.393
1415	1	0.064	0.009	17.0	1.0	13.29	2	0.86	2	0.250	0.461
1418	1	0.22	0.02	11.0	0.5	12.93	2	0.92	1	0.250	0.461
1419	1	0.14	0.01	17.5	1.0	12.27	2	0.80	0	0.250	0.461
1420	3	0.064	0.007	23.8	1.2	12.52	1	0.80	0	0.150	0.393
1423	1	0.056	0.006	31.8	1.7	12.03	2	0.80	0	0.250	0.461
1424	3	0.052	0.003	74.0	2.0	10.28	2	0.80	0	0.150	0.393
1426	5	0.21	0.03	18.5	1.3	11.75	1	0.80	0	0.150	0.393
1427	10	0.059	0.002	39.2	0.6	11.52	2	0.80	0	0.150	0.393
1428	3	0.035	0.007	60.0	5.6	11.16	2	0.80	0	0.150	0.393
1434	2	0.12	0.04	31.0	5.0	11.23	2	0.81	2	0.250	0.461
1435	2	0.035	0.006	20.0	1.6	13.56	2	0.80	0	0.150	0.393
1436	4	0.023	0.001	63.6	1.6	11.50	2	0.80	0	0.150	0.393
1437	6	0.029	0.001	171	4	9.00	2	0.70	2	0.150	0.393
1438	3	0.033	0.002	41.7	1.0	12.02	2	0.80	0	0.150	0.393
1439	4	0.027	0.003	60.1	2.8	11.40	2	0.75	1	0.150	0.393
1441	1	0.035	0.004	17.6	1.0	13.83	1	0.80	0	0.150	0.393
1444	1	0.069	0.008	31.2	1.8	11.84	1	0.80	0	0.150	0.393
1448	2	0.017	0.002	23.0	1.3	13.99	1	0.80	0	0.250	0.461
1450	2	0.11	0.02	17.2	2.0	12.59	2	0.80	0	0.150	0.393
1456	8	0.036	0.001	45.5	0.8	11.61	2	0.69	1	0.150	0.393
1458	6	0.11	0.02	18.7	2.1	12.44	2	0.80	0	0.150	0.393
1459	2	0.079	0.021	33.2	4.2	11.56	1	0.80	0	0.150	0.393
1461	3	0.11	0.01	38.2	1.5	10.78	2	0.71	2	0.250	0.461
1462	3	0.072	0.015	31.5	3.1	11.79	1	0.80	0	0.150	0.393
1463	3	0.028	0.002	51.7	2.0	11.72	1	0.80	0	0.150	0.393
1464	1	0.082	0.011	27.5	1.8	11.94	2	0.80	0	0.250	0.461
1466	4	0.022	0.001	23.5	0.7	13.72	1	0.80	0	0.250	0.461
1467	1	0.054	0.006	112	6	9.27	2	0.72	2	0.150	0.393
1468	1	0.022	0.003	17.7	1.1	14.29	2	0.80	0	0.250	0.461
1469	5	0.060	0.009	60.2	4.3	10.57	2	0.80	0	0.150	0.393
1470	6	0.039	0.002	40.5	1.0	11.89	1	0.80	0	0.150	0.393
1471	6	0.050	0.008	33.1	2.7	12.06	1	0.80	0	0.150	0.393
1473	5	0.052	0.008	19.0	1.5	13.22	1	0.80	0	0.150	0.393
1477	3	0.042	0.003	31.0	1.0	12.31	2	0.72	1	0.150	0.393
1481	2	0.085	0.006	36.6	1.2	11.27	2	0.80	0	0.150	0.393
1484	4	0.029	0.004	46.3	3.2	11.92	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
1404	3	0.47	0.01	0.21	0.26	0.0	1......1....111..1...1.........
1406	0	1.00	0.0	0.48	0.0	0.0	...1...1....111.............1..
1407	3	1.00	0.55	0.48	0.44	0.0	...1..11....111..1...1.....11..
1408	0	0.50	0.0	0.0	0.0	0.0	...1...1.....11............1...
1409	3	0.88	0.38	0.34	0.60	0.0	1..1...1....111.............1..
1410	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1411	3	0.32	0.54	1.22	0.88	0.0	.1.1...1....111..1.........11..
1413	3	0.92	0.0	0.65	0.0	0.0	1..1...1.....1..............1..
1414	0	1.00	0.0	0.29	0.0	0.0	1..1...1.....11............1...
1415	3	0.50	0.0	0.0	0.0	0.0	.......1.....1...1.............
1418	0	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1419	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1420	3	0.10	0.0	0.45	0.0	0.0	.......1.1...1.................
1423	3	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1424	3	0.10	0.05	0.07	0.24	0.0	...1...1....111................
1426	0	0.65	0.97	0.27	0.53	0.0	...1..11.1..111..............1..
1427	3	0.10	0.50	0.44	0.53	0.0	1..1...1....111..1...1......1..
1428	0	0.99	0.65	0.17	0.29	0.0	...1...1....111..............1..
1434	0	1.00	0.0	0.15	0.0	0.0	...1...1....111..1.............
1435	2	0.48	0.0	0.12	0.0	0.0	.......1.....1.................
1436	3	0.10	0.05	0.18	0.24	0.0	.......1....111................
1437	3	0.10	0.23	0.10	0.27	0.0	1..1...1.1..111..............1..
1438	3	0.10	0.16	0.11	0.09	0.0	...1...1....111................
1439	3	0.10	0.0	0.40	0.31	0.0	1..1...1.1...11..............1..
1441	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1444	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1448	2	0.10	0.0	0.36	0.0	0.0	1..1..11.1...1...............1..
1450	3	0.63	0.31	0.0	0.18	0.0	1..1...1....111..............1..
1456	3	0.10	0.30	0.23	0.32	0.0	1......1....111................
1458	3	1.00	0.40	0.65	0.64	0.0	...1...1....111..1...1......1..
1459	0	0.84	0.0	0.71	0.0	0.0	.......1....111.............1...
1461	3	0.10	0.0	0.08	0.0	0.0	...1...1....111................
1462	3	0.61	0.0	0.38	0.0	0.0	.......1....111................
1463	3	0.10	0.26	0.36	0.01	0.0	1..1...1....111..............1..
1464	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1466	0	0.10	0.67	0.35	0.0	0.0	...1..11.1..11...1.............
1467	0	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1...
1468	3	0.50	0.0	0.0	0.0	0.0	......11.....1.................
1469	0	0.87	0.72	0.57	0.68	0.0	1..1...1....111..............1..
1470	0	0.10	0.27	0.20	0.20	0.0	1......1....111................
1471	0	0.98	0.45	0.56	0.99	0.0	1..1...1.1..111..............1..
1473	3	0.82	0.66	0.29	0.74	0.0	.......1....111................
1477	3	0.10	0.15	0.49	0.0	0.0	1..1...1....111..............1..
1481	3	0.10	0.00	0.26	0.0	0.0	1..1...1....111.............1...
1484	3	1.00	0.37	0.45	0.35	0.0	1......1....111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1485	1	0.072	0.009	26.3	1.6	12.17	1	0.80	0	0.150	0.393
1487	1	0.085	0.019	35.6	4.0	11.33	2	0.80	0	0.150	0.393
1489	3	0.046	0.015	31.5	5.0	12.27	2	0.80	0	0.150	0.393
1490	2	0.058	0.014	20.5	2.5	12.95	2	0.80	0	0.250	0.461
1491	2	0.061	0.009	27.3	2.0	12.27	1	0.80	0	0.150	0.393
1492	1	0.051	0.016	15.0	2.2	13.78	2	0.80	0	0.250	0.461
1493	3	0.069	0.014	26.1	2.6	12.07	3	0.64	3	-0.203	0.151
1499	1	0.036	0.004	36.2	2.0	12.24	2	0.80	0	0.150	0.393
1501	1	0.12	0.01	12.2	0.5	13.23	2	0.80	0	0.150	0.393
1502	4	0.033	0.002	34.8	1.0	12.40	1	0.80	0	0.150	0.393
1503	3	0.18	0.02	23.0	1.7	11.44	2	0.80	0	0.150	0.393
1504	1	0.11	0.01	16.5	1.0	12.77	2	0.88	1	0.250	0.461
1505	9	0.086	0.014	23.8	1.8	12.19	2	0.80	0	0.150	0.393
1509	3	0.095	0.028	12.1	1.7	13.63	2	0.89	2	0.250	0.461
1510	6	0.067	0.017	27.0	3.3	12.20	2	0.80	0	0.150	0.393
1511	1	0.020	0.003	23.8	1.5	13.77	1	0.80	0	0.250	0.461
1512	16	0.032	0.001	90.0	2.0	10.31	2	0.72	3	0.150	0.393
1516	2	0.046	0.011	24.2	2.8	12.84	2	0.80	0	0.150	0.393
1517	7	0.046	0.005	38.7	2.0	11.82	1	0.80	0	0.150	0.393
1519	1	0.065	0.009	29.6	2.1	12.03	1	0.80	0	0.150	0.393
1520	6	0.039	0.002	56.5	1.2	11.17	2	0.80	0	0.150	0.393
1524	2	0.043	0.003	45.8	1.6	11.54	2	0.80	0	0.150	0.393
1525	2	0.096	0.023	13.6	1.6	13.27	1	0.80	0	0.150	0.393
1532	1	0.085	0.011	28.5	1.8	11.85	2	0.84	1	0.250	0.461
1533	2	0.072	0.008	32.3	1.7	11.72	2	0.80	1	0.250	0.461
1534	2	0.053	0.004	24.3	0.7	12.68	2	0.80	0	0.150	0.393
1535	5	0.044	0.005	29.0	1.6	12.50	1	0.80	0	0.150	0.393
1537	3	0.12	0.03	15.0	2.0	12.76	1	0.80	0	0.150	0.393
1540	6	0.042	0.002	47.5	1.1	11.49	1	0.80	0	0.150	0.393
1541	1	0.10	0.01	22.2	1.2	12.10	2	0.80	0	0.150	0.393
1542	8	0.049	0.003	50.1	1.2	11.20	2	0.80	0	0.150	0.393
1544	1	0.052	0.004	24.2	1.0	12.69	2	0.80	0	0.250	0.461
1545	2	0.085	0.008	21.7	1.0	12.40	2	0.80	0	0.150	0.393
1548	2	0.043	0.009	29.5	3.0	12.49	1	0.80	0	0.150	0.393
1549	1	0.13	0.02	11.3	0.8	13.30	1	0.80	0	0.250	0.461
1551	1	0.031	0.006	23.3	2.1	13.34	2	0.80	0	0.250	0.461
1552	1	0.093	0.010	21.5	1.1	12.33	1	0.80	0	0.150	0.393
1556	4	0.10	0.03	30.8	5.5	11.28	2	0.71	3	0.150	0.393
1558	2	0.029	0.007	68.1	7.6	11.09	2	0.80	0	0.150	0.393
1560	1	0.075	0.009	21.0	1.2	12.62	2	0.80	0	0.150	0.393
1561	1	0.071	0.015	33.1	3.5	11.68	1	0.80	0	0.150	0.393
1562	2	0.20	0.02	12.8	0.6	12.60	2	0.80	0	0.250	0.461
1567	4	0.052	0.003	71.0	2.1	10.29	2	0.72	2	0.150	0.393
1569	1	0.019	0.003	36.5	2.5	12.89	2	0.80	0	0.150	0.393
1570	1	0.099	0.012	16.2	1.0	12.87	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1485	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1487	3	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
1489	3	1.00	0.0	0.62	0.0	0.0	...1...1....111............1...
1490	0	0.94	0.20	0.64	0.41	0.0	1......1....111..1...1.....1...
1491	0	0.42	0.0	0.23	0.32	0.0	...1...1....111.............1..
1492	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1493	2	0.99	0.82	0.57	0.14	0.0	11.1...1....111..1...1......1..
1499	3	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1501	2	0.50	0.0	0.0	0.0	0.0	.......1....11.............1...
1502	0	0.10	0.52	0.45	0.31	0.0	1..1...1....111.............1..
1503	3	0.39	0.0	0.62	0.0	0.0	...1...1.....1..............1..
1504	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1505	2	0.93	0.62	0.61	0.22	0.0	1..1...1....111..1...1.....11..
1509	0	1.00	0.0	1.02	0.0	0.0	.......1.1..11..........1111...
1510	3	1.00	1.17	0.52	0.0	0.0	1..1...1....111.............1..
1511	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1512	3	0.10	0.49	0.53	0.64	0.0	11.1...1....111..1...1.....11..
1516	3	0.91	0.0	0.32	0.0	0.0	...1...1.....11............11..
1517	3	0.47	0.68	0.47	0.71	0.0	1..1...1....111................
1519	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
1520	0	0.10	0.86	0.72	0.42	0.0	1..1...1....111............11..
1524	0	0.10	0.08	0.03	0.19	0.0	1..1...1....111.............1..
1525	2	0.90	0.11	0.48	0.0	0.0	.......1....11.................
1532	3	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
1533	3	0.10	0.0	0.03	0.0	0.0	...1...1.....11................
1534	0	0.10	0.05	0.09	0.35	0.0	.......1.1..111................
1535	3	0.50	0.66	0.41	0.62	0.0	1......1....111..1...1.........
1537	0	1.00	0.36	0.44	0.28	0.0	1......1....111..1.........1...
1540	3	0.10	0.56	0.22	0.39	0.0	1..1...1.1..111.............1..
1541	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............1...
1542	3	0.10	0.70	0.50	0.45	0.0	...1...1.1..111..1...1......1..
1544	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1545	2	0.10	0.18	0.20	0.25	0.0	1......1....111................
1548	3	0.95	0.0	0.49	0.0	0.0	.......1...1111................
1549	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1551	3	0.50	0.0	0.0	0.0	0.0	...1...1....111..1...1.........
1552	0	0.50	0.0	0.0	0.0	0.0	1..1...1....11..............1..
1556	3	1.00	0.0	0.90	0.0	0.0	1..1...1....111.............1..
1558	3	1.00	0.49	0.48	0.05	0.0	...1...1....111.............1..
1560	3	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.................
1561	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1562	3	0.10	0.0	0.01	0.0	0.0	...1...1.1...1.................
1567	3	0.10	0.13	0.36	0.25	0.0	1..1...1....111.............1..
1569	3	0.50	0.0	0.0	0.0	0.0	...1...1....111............1...
1570	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1571	1	0.023	0.003	34.5	2.2	12.83	1	0.80	0	0.150	0.393
1573	1	0.11	0.01	12.0	0.6	13.40	1	0.80	0	0.250	0.461
1574	6	0.030	0.002	64.2	1.6	11.20	1	0.80	0	0.150	0.393
1576	1	0.065	0.007	31.7	1.7	11.70	2	0.63	1	0.250	0.461
1578	6	0.040	0.002	57.0	1.6	11.12	2	0.79	3	0.150	0.393
1579	4	0.040	0.007	48.5	4.2	11.33	2	0.64	3	0.150	0.393
1581	3	0.049	0.004	40.0	1.6	11.54	2	0.66	1	0.250	0.461
1582	5	0.048	0.007	39.6	2.6	11.73	2	0.80	0	0.150	0.393
1583	10	0.051	0.003	109	3	9.41	2	0.75	4	0.150	0.393
1584	3	0.13	0.02	24.7	2.0	11.70	2	0.89	3	0.250	0.461
1585	2	0.042	0.003	52.1	1.7	11.26	2	0.80	0	0.150	0.393
1586	1	0.074	0.009	16.0	1.0	13.21	1	0.80	0	0.250	0.461
1590	6	0.14	0.01	14.8	0.5	12.67	2	0.80	0	0.250	0.461
1591	1	0.065	0.008	21.5	1.2	12.71	2	0.80	0	0.250	0.461
1592	4	0.16	0.02	15.5	1.1	12.42	2	0.80	0	0.150	0.393
1594	4	0.12	0.01	13.1	0.8	13.08	1	0.80	0	0.250	0.461
1595	3	0.037	0.003	28.0	1.0	12.60	2	0.66	1	0.150	0.393
1596	8	0.037	0.002	51.1	1.2	11.46	1	0.80	0	0.150	0.393
1598	1	0.043	0.005	14.5	0.7	14.02	1	0.80	0	0.250	0.461
1599	3	0.036	0.008	44.0	4.6	11.81	2	0.80	0	0.150	0.393
1602	2	0.11	0.01	12.2	0.5	13.49	2	0.93	1	0.250	0.461
1603	5	0.048	0.010	39.3	4.1	11.74	2	0.80	0	0.150	0.393
1604	3	0.090	0.011	33.8	2.0	11.33	3	0.75	3	0.245	0.458
1605	2	0.098	0.016	38.5	3.0	11.01	2	0.80	0	0.250	0.461
1606	1	0.041	0.005	26.1	1.5	12.72	2	0.73	3	0.150	0.393
1607	1	0.15	0.01	14.8	0.8	12.56	2	0.80	0	0.150	0.393
1609	2	0.087	0.016	32.2	2.8	11.52	2	0.80	0	0.150	0.393
1613	2	0.072	0.005	22.0	0.6	12.55	2	0.80	0	0.150	0.393
1614	3	0.048	0.003	49.5	1.3	11.25	2	0.80	0	0.150	0.393
1615	2	0.048	0.006	32.3	2.0	12.05	2	0.69	3	0.250	0.461
1616	2	0.079	0.008	28.0	1.3	11.94	1	0.80	0	0.150	0.393
1621	1	0.32	0.03	11.0	0.5	12.54	2	0.90	1	0.250	0.461
1623	2	0.081	0.009	34.1	1.8	11.48	1	0.80	0	0.150	0.393
1624	1	0.072	0.009	28.0	1.6	12.04	2	0.80	0	0.150	0.393
1628	4	0.048	0.005	59.1	3.1	10.86	2	0.80	0	0.150	0.393
1629	1	0.10	0.01	11.0	0.5	13.70	1	0.80	0	0.250	0.461
1630	2	0.083	0.008	23.8	1.0	12.22	1	0.80	0	0.150	0.393
1631	2	0.13	0.05	11.5	2.1	13.27	1	0.80	0	0.250	0.461
1632	1	0.046	0.004	30.7	1.3	12.31	1	0.80	0	0.150	0.393
1633	1	0.072	0.014	40.3	3.7	11.24	1	0.80	0	0.150	0.393
1635	1	0.078	0.010	22.5	1.3	12.42	1	0.80	0	0.150	0.393
1636	1	0.14	0.01	12.1	0.6	13.08	1	0.80	0	0.250	0.461
1637	3	0.062	0.004	49.7	1.5	10.96	1	0.80	0	0.150	0.393
1639	2	0.043	0.015	41.0	7.0	11.65	2	0.68	2	0.150	0.393
1641	6	0.11	0.02	29.0	3.3	11.48	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1571	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1573	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1574	0	0.10	0.14	0.48	0.64	0.0	1..1...1.1..111.............1..
1576	3	0.50	0.0	0.0	0.0	0.0	...1...1.....11................
1578	3	0.10	0.68	0.12	0.53	0.0	...1...1....111................
1579	3	0.86	0.0	0.28	0.71	0.0	1..1...1....111................
1581	0	0.16	0.03	0.51	0.15	0.0	...1...1....111..1...1......1..
1582	3	0.88	0.62	0.27	0.18	0.0	1..1...1.1..111.............1..
1583	3	0.10	0.0	0.38	0.22	0.0	1..1...1.1.1111...........111..
1584	3	0.76	0.0	0.20	0.0	0.0	1..1...1....111..1...1.........
1585	3	0.10	0.22	0.09	0.29	0.0	1..1...1....111.............1..
1586	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
1590	3	0.10	0.44	0.67	0.49	0.0	1..1...1.1..111.............1..
1591	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1592	3	0.59	0.34	0.47	0.0	0.0	...1..11....11..............1..
1594	0	0.69	0.51	0.64	0.0	0.0	...1...1....111..1.............
1595	3	0.10	0.20	0.09	0.03	0.0	1..1...1.1..111...........11...
1596	0	0.17	0.52	0.59	0.59	0.0	1..1...1....111.............1..
1598	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1599	0	0.88	0.72	0.42	0.15	0.0	1..1...1....111.............1..
1602	3	0.10	0.0	0.12	0.0	0.0	.......1.1..11.................
1603	3	0.98	0.31	0.64	0.49	0.0	...1...1.1..111................
1604	2	0.26	0.0	0.36	0.0	0.0	.......1.1...1.................
1605	3	0.85	0.0	0.08	0.25	0.0	1..1...1....111..1...1......1..
1606	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1607	0	0.50	0.0	0.0	0.0	0.0	......11.....1.................
1609	0	0.67	0.0	0.10	0.0	0.0	...1...1.....11................
1613	0	0.10	0.06	0.02	0.15	0.0	...1...1....111..1.............
1614	3	0.10	0.07	0.28	0.12	0.0	...1...1....111.............1..
1615	0	0.10	0.0	0.28	0.0	0.0	.......1.....1.................
1616	3	0.10	0.0	0.27	0.0	0.0	1..1...1....11...1...1......1..
1621	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1623	3	0.60	0.51	0.07	0.04	0.0	1......1....111................
1624	2	0.50	0.0	0.0	0.0	0.0	1..1...1.....1..............1..
1628	3	0.57	0.20	0.35	0.27	0.0	...1...1....111.............1..
1629	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1630	3	0.10	0.0	0.02	0.0	0.0	1......1....11.............1...
1631	0	1.00	0.0	0.22	0.30	0.0	.......1.....11................
1632	0	0.50	0.0	0.0	0.0	0.0	1..1...1.....11.............1..
1633	3	0.50	0.0	0.0	0.0	0.0	...1...1....111................
1635	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1636	2	0.50	0.0	0.0	0.0	0.0	.......1.1...1.............1...
1637	3	0.10	0.29	0.06	0.12	0.0	.1.1...1.1..111............1...
1639	3	1.00	0.16	0.25	0.10	0.0	...1...1....111..1.........11..
1641	3	0.99	0.50	1.01	0.58	0.0	1..1...1....111..1...1......1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1642	1	0.085	0.010	26.1	1.5	12.00	1	0.80	0	0.150	0.393
1647	1	0.028	0.004	72.0	5.0	11.00	1	0.80	0	0.150	0.393
1649	1	0.049	0.007	28.7	2.0	12.40	1	0.80	0	0.150	0.393
1650	2	0.042	0.007	31.6	2.6	12.19	2	0.63	4	0.150	0.393
1654	1	0.078	0.008	30.8	1.5	11.74	1	0.80	0	0.150	0.393
1656	2	0.11	0.03	9.31	1.32	13.90	1	0.80	0	0.250	0.461
1657	1	0.14	0.01	9.61	0.56	13.65	2	0.86	1	0.250	0.461
1659	1	0.16	0.01	31.6	1.8	10.88	1	0.80	0	0.150	0.393
1660	1	0.033	0.004	18.1	1.0	13.83	1	0.80	0	0.250	0.461
1661	1	0.058	0.007	14.5	0.8	13.70	1	0.80	0	0.250	0.461
1663	2	0.034	0.005	13.2	0.8	14.48	1	0.80	0	0.250	0.461
1664	1	0.018	0.002	29.7	1.6	13.40	1	0.80	0	0.250	0.461
1669	4	0.051	0.009	41.5	3.7	11.48	2	0.73	1	0.150	0.393
1670	2	0.072	0.029	28.1	5.5	12.02	2	0.80	0	0.150	0.393
1674	3	0.076	0.008	29.6	1.5	11.85	2	0.80	0	0.150	0.393
1675	2	0.15	0.01	13.5	0.6	12.76	1	0.80	0	0.250	0.461
1676	1	0.070	0.010	12.3	0.8	13.83	1	0.80	0	0.250	0.461
1678	4	0.038	0.004	45.2	2.3	11.68	1	0.80	0	0.150	0.393
1680	2	0.19	0.01	16.3	0 5	12.10	1	0.80	0	0.150	0.393
1681	1	0.083	0.013	22.0	1.6	12.48	2	0.88	1	0.250	0.461
1684	1	0.093	0.009	29.5	1.3	11.65	2	0.80	0	0.150	0.393
1685	2	0.030	0.007	12.2	1.3	14.84	3	0.88	2	0.034	0.313
1686	1	0.063	0.008	36.3	2.2	11.62	1	0.80	0	0.150	0.393
1687	1	0.084	0.018	42.6	4.6	10.95	2	0.80	0	0.250	0.461
1690	2	0.071	0.008	36.1	2.0	11.50	1	0.80	0	0.150	0.393
1691	1	0.044	0.006	40.6	2.8	11.63	2	0.68	2	0.150	0.393
1692	4	0.037	0.003	38.5	1.3	12.08	1	0.80	0	0.150	0.393
1693	1	0.044	0.006	39.5	2.6	11.77	2	0.74	2	0.150	0.393
1695	1	0.069	0.005	21.0	0.7	12.70	1	0.80	0	0.150	0.393
1700	5	0.032	0.008	23.5	2.8	13.21	2	0.72	3	0.250	0.461
1701	1	0.13	0.01	29.7	1.7	11.20	1	0.80	0	0.150	0.393
1702	1	0.050	0.005	36.8	1.8	11.77	2	0.74	1	0.150	0.393
1703	3	0.086	0.007	10.8	0.3	13.90	1	0.80	0	0.250	0.461
1705	2	0.071	0.016	12.0	1.3	13.90	1	0.80	0	0.250	0.461
1708	4	0.036	0.009	33.5	4.1	12.40	1	0.80	0	0.150	0.393
1712	2	0.044	0.011	66.2	8.0	10.70	1	0.80	0	0.150	0.393
1714	1	0.10	0.01	19.2	1.2	12.44	1	0.80	0	0.150	0.393
1715	8	0.042	0.002	24.5	0.5	12.90	1	0.80	0	0.250	0.461
1716	5	0.035	0.008	29.3	3.3	12.70	1	0.80	0	0.150	0.393
1719	1	0.10	0.01	21.0	1.0	12.20	1	0.80	0	0.150	0.393
1721	3	0.052	0.004	44.3	1.5	11.40	1	0.80	0	0.150	0.393
1722	2	0.025	0.004	26.2	1.8	13.33	2	0.80	0	0.150	0.393
1723	3	0.13	0.03	35.0	4.5	10.86	2	0.76	1	0.250	0.461
1724	2	0.037	0.002	38.2	1.2	11.98	2	0.69	1	0.150	0.393
1726	2	0.034	0.003	30.0	1.2	12.70	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1642	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1647	0	0.50	0.0	0.0	0.0	0.0	.......1..1..1.............1...
1649	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1650	3	0.62	0.54	0.39	0.10	0.0	1..1...1....111.............1..
1654	3	0.50	0.0	0.0	0.0	0.0	1..1...1....111.............1..
1656	0	1.00	0.0	0.08	0.0	0.0	.......1....111................
1657	0	0.50	0.0	0.0	0.0	0.0	...1...1.1...1..............1..
1659	2	0.50	0.0	0.0	0.0	0.0	......11.....1.................
1660	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1661	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
1663	0	0.36	0.0	0.07	0.0	0.0	.......1....11.................
1664	0	0.50	0.0	0.0	0.0	0.0	......11....1....1...1....11...
1669	1	0.81	0.30	1.01	0.53	0.0	...1...1....111............1...
1670	1	0.99	0.34	0.0	0.0	0.0	.......1....11.................
1674	3	0.10	0.0	0.42	0.0	0.0	...1...1.1..11...1.............
1675	3	0.10	0.0	0.03	0.0	0.0	.......1....11.................
1676	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1678	3	0.18	0.11	0.54	0.10	0.0	...1...1....111.............1..
1680	3	0.10	0.21	0.07	0.0	0.0	......11....11.................
1681	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1684	2	0.50	0.0	0.0	0.0	0.0	...1...1....11...1...1.....1...
1685	0	0.82	0.0	0.0	0.0	0.0	...1..11....11..............1..
1686	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1687	0	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1..
1690	0	0.10	0.0	0.0	0.39	0.0	1..1...1.....11.............1..
1691	3	0.50	0.0	0.0	0.0	0.0	...1...1.1..11...1.........1...
1692	3	0.33	0.37	0.36	0.32	0.0	1..1...1....111.............1..
1693	2	0.50	0.0	0.0	0.0	0.0	11.1...1....111............11..
1695	3	0.50	0.0	0.0	0.0	0.0	.......1....111............1...
1700	0	0.97	0.43	0.73	0.0	0.0	1..1..11....111............11..
1701	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
1702	0	0.50	0.0	0.0	0.0	0.0	.......1....111............1...
1703	0	0.10	0.20	0.27	0.0	0.0	...1...1....11..............1..
1705	0	0.98	0.74	0.41	0.0	0.0	1..1...1....111.............1..
1708	3	0.98	0.23	1.03	0.40	0.0	1..1...1.1..111..1...1......1..
1712	3	1.00	1.07	0.12	0.01	0.0	...1...1....111................
1714	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1715	3	0.10	1.24	1.37	0.86	0.0	1..1...1....111............1...
1716	3	0.99	0.38	0.83	0.0	0.0	...1...1....11...1........111..
1719	0	0.50	0.0	0.0	0.0	0.0	...1...1....111................
1721	2	0.14	0.18	0.27	0.23	0.0	...1...1....111................
1722	2	0.46	0.0	0.0	0.0	0.0	.......1....11.................
1723	2	0.83	0.59	0.53	0.30	0.0	...1...1....111.............1..
1724	0	0.10	0.42	0.39	0.39	0.0	.......1....111................
1726	0	0.10	0.0	0.13	0.0	0.0	.......1....111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1731	5	0.061	0.003	56.2	1.1	10.70	1	0.80	0	0.150	0.393
1732	1	0.14	0.01	24.2	1.5	11.59	1	0.80	0	0.150	0.393
1734	3	0.048	0.003	31.0	1.0	12.25	1	0.80	0	0.150	0.393
1735	3	0.058	0.008	66.0	4.5	10.40	1	0.80	0	0.150	0.393
1736	1	0.026	0.003	30.1	2.0	13.00	1	0.80	0	0.250	0.461
1737	1	0.10	0.01	26.5	1.5	11.80	1	0.80	0	0.150	0.393
1739	1	0.090	0.014	8.71	0.65	14.33	2	0.80	0	0.250	0.461
1741	1	0.064	0.007	26.2	1.5	12.30	1	0.80	0	0.150	0.393
1743	2	0.050	0.018	20.5	3.5	13.11	2	0.80	0	0.250	0.461
1744	1	0.027	0.004	14.1	0.8	14.56	1	0.80	0	0.250	0.461
1747	3	0.11	0.03	8.11	1.04	14.66	2	1.28	0	0.250	0.461
1749	1	0.012	0.001	115	5	10.90	1	0.80	0	0.150	0.393
1751	1	0.11	0.01	14.3	0.8	13.00	1	0.80	0	0.150	0.393
1754	6	0.033	0.002	82.6	2.7	10.41	2	0.67	2	0.150	0.393
1755	3	0.10	0.03	29.0	4.3	11.73	2	0.92	2	0.250	0.461
1758	1	0.11	0.01	29.0	1.6	11.50	1	0.80	0	0.150	0.393
1760	4	0.028	0.005	40.1	3.7	12.30	1	0.80	0	0.150	0.393
1764	3	0.064	0.013	30.1	3.0	12.00	1	0.80	0	0.150	0.393
1765	6	0.090	0.008	45.8	2.0	10.67	2	0.75	2	0.150	0.393
1766	1	0.048	0.004	24.5	1.0	12.77	2	0.80	0	0.150	0.393
1771	5	0.047	0.002	58.7	1.1	10.90	1	0.80	0	0.150	0.393
1776	3	0.044	0.003	39.7	1.5	11.80	1	0.80	0	0.150	0.393
1780	9	0.093	0.020	31.7	3.5	11.49	2	0.80	0	0.250	0.461
1782	1	0.073	0.009	33.1	2.0	11.65	2	0.80	0	0.150	0.393
1783	2	0.043	0.004	26.3	1.2	12.74	2	0.80	0	0.150	0.393
1784	3	0.13	0.04	15.5	2.7	12.61	2	0.80	0	0.250	0.461
1786	1	0.12	0.01	23.5	1.3	11.80	1	0.80	0	0.150	0.393
1787	1	0.060	0.007	29.8	1.8	12.10	1	0.80	0	0.150	0.393
1791	3	0.032	0.003	29.3	1.5	12.80	1	0.80	0	0.150	0.393
1793	1	0.046	0.006	18.6	1.2	13.40	1	0.80	0	0.250	0.461
1794	4	0.035	0.004	43.1	2.3	11.78	2	0.70	2	0.150	0.393
1795	3	0.036	0.002	28.7	0.8	12.73	1	0.80	0	0.150	0.393
1796	2	0.041	0.003	76.5	2.5	10.34	2	0.68	2	0.150	0.393
1799	1	0.067	0.013	28.2	2.6	12.10	1	0.80	0	0.150	0.393
1805	2	0.051	0.020	33.7	6.5	12.00	1	0.80	0	0.150	0.393
1808	5	0.078	0.011	17.0	1.1	13.03	1	0.80	0	0.150	0.393
1812	1	0.056	0.008	26.6	1.7	12.42	1	0.80	0	0.150	0.393
1813	1	0.022	0.003	27.8	2.0	13.32	1	0.80	0	0.150	0.393
1815	2	0.044	0.008	34.0	3.0	11.98	2	0.62	1	0.150	0.393
1817	6	0.081	0.027	17.0	2.8	13.00	1	0.80	0	0.250	0.461
1819	1	0.046	0.006	44.6	2.6	11.50	1	0.80	0	0.150	0.393
1824	1	0.072	0.010	22.6	1.5	12.50	1	0.80	0	0.150	0.393
1826	2	0.042	0.009	27.6	2.8	12.64	2	0.80	0	0.150	0.393
1828	1	0.069	0.007	30.5	1.3	11.90	1	0.80	0	0.150	0.393
1831	1	0.040	0.006	17.8	1.1	13.64	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1731	2	0.10	0.48	0.26	0.19	0.0	1..1...1....111.............1..
1732	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1734	2	0.10	0.34	0.25	0.42	0.0	...1...1....111..1...1.....11..
1735	3	0.57	0.34	0.10	0.48	0.0	1..1...1....111.............1..
1736	0	0.50	0.0	0.0	0.0	0.0	......11....11..........1......
1737	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
1739	3	0.50	0.0	0.0	0.0	0.0	.......1.1..11.................
1741	3	0.50	0.0	0.0	0.0	0.0	.......1....1..................
1743	2	0.99	0.0	0.31	0.0	0.0	1......1....111................
1744	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1747	0	0.93	0.0	0.64	0.0	0.0	.......1.....1.................
1749	0	0.50	0.0	0.0	0.0	0.0	.......1..1..11................
1751	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1754	0	0.20	0.26	0.33	0.45	0.0	1..1...1....111.............1..
1755	0	0.97	0.0	0.54	0.0	0.0	.......1.1..11.................
1758	3	0.50	0.0	0.0	0.0	0.0	1..1...1.....1..............1..
1760	2	0.94	0.39	0.45	0.58	0.0	...1...1....111.............1..
1764	2	0.88	0.40	0.24	0.81	0.0	...1...1....111..1...1......1..
1765	0	0.26	1.03	0.52	0.43	0.0	1..1...1....111...........111..
1766	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1771	0	0.10	0.43	0.37	0.34	0.0	...1...1....111............1...
1776	3	0.24	0.32	0.21	0.30	0.0	.......1....111................
1780	3	1.00	0.42	0.69	0.62	0.0	1..1...1.1..111..1...1......1..
1782	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1783	2	0.10	0.0	0.32	0.0	0.0	...1...1.1..11.................
1784	2	1.00	0.0	0.77	0.0	0.0	...1...1.1...11.............1..
1786	2	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
1787	0	0.50	0.0	0.0	0.0	0.0	...1...1.1...1..............1..
1791	3	0.10	0.0	0.20	0.0	0.0	1..1...1.....1.............11..
1793	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
1794	3	0.26	0.0	0.39	0.40	0.0	.......1.1..111................
1795	3	0.10	0.02	0.24	0.14	0.0	1......1....111................
1796	0	0.10	0.39	0.14	0.12	0.0	...1...1....111................
1799	0	0.50	0.0	0.0	0.0	0.0	.......1.....11................
1805	3	1.00	0.0	0.26	0.22	0.0	.......1.....11................
1808	2	0.60	0.0	0.76	0.0	0.0	...1...1.1..111..1...1......1..
1812	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
1813	2	0.50	0.0	0.0	0.0	0.0	...1...1....111..1.............
1815	2	0.38	0.0	0.07	0.0	0.0	...1...1.1..111.............1..
1817	3	1.00	0.35	0.77	0.16	0.0	.......1.1..111..1...1.........
1819	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............1...
1824	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1826	3	0.53	0.07	0.70	0.0	0.0	...1...1....11.................
1828	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
1831	2	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..

ID/1 No.		p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1832	2	0.041	0.010	36.3	4.3	12.08	2	0.80	0	0.150	0.393
1838	2	0.054	0.008	39.5	3.0	11.60	1	0.80	0	0.150	0.393
1841	3	0.018	0.001	53.3	2.0	12.17	2	0.80	0	0.150	0.393
1843	8	0.056	0.003	25.0	0.6	12.30	1	0.80	0	0.150	0.393
1846	1	0.041	0.005	12.7	0.7	14.34	1	0.80	0	0.250	0.461
1847	2	0.13	0.01	26.5	1.0	11.50	1	0.80	0	0.150	0.393
1851	5	0.065	0.031	20.7	5.0	12.80	1	0.80	0	0.150	0.393
1853	4	0.17	0.01	25.3	1.0	11.30	1	0.80	0	0.150	0.393
1859	7	0.034	0.002	48.6	1.3	11.64	2	0.80	0	0.150	0.393
1867	4	0.037	0.002	131	3	9.32	2	0.72	4	0.150	0.393
1873	1	0.024	0.002	64.8	3.2	11.40	1	0.80	0	0.150	0.393
1877	1	0.021	0.003	50.3	3.3	12.10	1	0.80	0	0.150	0.393
1878	1	0.070	0.009	21.0	1.3	12.68	2	0.80	0	0.250	0.461
1880	2	0.036	0.005	26.2	1.7	12.93	2	0.80	0	0.150	0.393
1881	1	0.072	0.011	31.2	2.3	11.80	1	0.80	0	0.150	0.393
1882	1	0.12	0.02	23.8	1.8	11.80	1	0.80	0	0.150	0.393
1884	2	0.059	0.006	12.5	0.6	14.00	1	0.80	0	0.250	0.461
1886	2	0.094	0.017	20.7	1.7	12.40	1	0.80	0	0.150	0.393
1889	1	0.068	0.005	36.8	1.3	11.50	1	0.80	0	0.150	0.393
1890	3	0.060	0.004	31.1	1.0	12.00	1	0.80	0	0.150	0.393
1891	2	0.10	0.01	18.8	1.0	12.50	1	0.80	0	0.150	0.393
1893	1	0.11	0.01	21.2	1.2	12.10	1	0.80	0	0.150	0.393
1895	1	0.048	0.007	20.6	1.3	13.14	2	0.80	0	0.150	0.393
1902	2	0.028	0.002	101	3	10.19	2	0.70	2	0.150	0.393
1903	2	0.10	0.02	29.7	3.5	11.50	1	0.80	0	0.150	0.393
1904	1	0.085	0.019	20.7	2.3	12.50	1	0.80	0	0.150	0.393
1908	2	0.085	0.010	26.1	1.5	12.00	1	0.80	0	0.150	0.393
1909	4	0.056	0.003	19.5	0.5	13.10	1	0.80	0	0.250	0.461
1910	2	0.078	0.006	36.0	1.3	11.40	1	0.80	0	0.150	0.393
1911	4	0.023	0.001	83.0	2.0	10.81	2	0.70	2	0.150	0.393
1923	2	0.026	0.003	16.2	0.7	14.34	1	0.80	0	0.250	0.461
1924	3	0.046	0.004	14.0	0.5	14.04	1	0.80	0	0.250	0.461
1930	4	0.071	0.017	28.6	3.5	12.00	1	0.80	0	0.150	0.393
1934	6	0.27	0.01	7.25	0.22	13.50	1	0.80	0	0.250	0.461
1936	5	0.085	0.012	26.2	1.7	12.00	1	0.80	0	0.150	0.393
1937	3	0.095	0.026	15.5	2.0	13.00	1	0.80	0	0.250	0.461
1939	4	0.074	0.010	35.3	2.2	11.50	1	0.80	0	0.150	0.393
1940	6	0.039	0.006	38.6	3.0	12.00	1	0.80	0	0.150	0.393
1942	1	0.046	0.003	14.8	0.5	13.90	1	0.80	0	0.250	0.461
1947	1	0.12	0.01	35.0	1.7	11.00	1	0.80	0	0.150	0.393
1951	3	0.026	0.009	4.98	0.88	16.90	1	0.80	0	0.250	0.461
1952	3	0.062	0.009	40.5	2.8	11.33	2	0.74	1	0.150	0.393
1958	1	0.039	0.004	42.6	2.0	11.80	1	0.80	0	0.150	0.393
1960	3	0.038	0.005	28.8	1.8	12.65	2	0.80	0	0.150	0.393
1961	3	0.019	0.002	55.5	2.2	12.00	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
1832	3	0.78	0.0	0.55	0.0	0.0	...1...1....111................
1838	3	0.62	0.0	0.12	0.45	0.0	...1...1....111.............1..
1841	3	0.10	0.0	0.06	0.17	0.0	1..1...1....111..1...1......1..
1843	3	0.10	0.64	0.64	0.35	0.0	1..1...1.1..111.............1..
1846	2	0.50	0.0	0.0	0.0	0.0	1......1.....1.................
1847	2	0.10	0.0	0.04	0.0	0.0	.......1.1..111................
1851	0	1.00	1.17	1.18	1.00	0.0	1......1....111................
1853	0	0.10	0.0	0.25	0.23	0.0	1..1..11.....11.............1..
1859	3	0.10	0.18	0.50	0.77	0.0	1..1...1.1..111.............1..
1867	3	0.10	0.20	0.09	0.21	0.0	...1...1.1..111.............1..
1873	0	0.50	0.0	0.0	0.0	0.0	...1...1.....11.............1..
1877	2	0.50	0.0	0.0	0.0	0.0	.......1..1..1.................
1878	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
1880	2	0.10	0.0	0.20	0.0	0.0	.......1.....1.............1...
1881	0	0.50	0.0	0.0	0.0	0.0	.......1.1..11.................
1882	3	0.50	0.0	0.0	0.0	0.0	.......1.1...11................
1884	0	0.13	0.0	0.21	0.0	0.0	.......1....11.................
1886	0	0.76	0.0	0.04	0.0	0.0	.......1....11..............1...
1889	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
1890	2	0.10	0.0	0.31	0.37	0.0	1..1...1....111..1...1......1..
1891	3	0.10	0.0	0.37	0.0	0.0	.......1.1.111.............1...
1893	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
1895	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1902	3	0.10	0.13	0.11	0.10	0.0	1..1...1....111.............1..
1903	3	0.79	0.0	0.37	0.0	0.0	.......1.1...1.............1...
1904	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1908	3	0.10	0.0	0.09	0.0	0.0	1..1...1.....1..............1..
1909	3	0.10	0.22	1.03	0.04	0.0	1......1....111................
1910	2	0.10	0.0	0.02	0.28	0.0	1..1...1....111..1..........1..
1911	3	0.10	0.12	0.11	0.18	0.0	...1...1....111................
1923	0	0.10	0.0	0.44	0.0	0.0	1..1...1....11.................
1924	0	0.26	0.24	0.40	0.0	0.0	...1...1....11..............1..
1930	2	1.00	0.62	1.01	0.17	0.0	...1...1....111..1..........1..
1934	0	0.10	0.26	0.79	0.0	0.0	1..1...1....111.............11..
1936	3	0.44	0.45	0.19	0.28	0.0	.......1....111.............1...
1937	3	1.00	0.18	0.49	0.0	0.0	.......1....111................
1939	3	0.45	0.0	0.58	0.36	0.0	...1...1.1...11..............1..
1940	2	0.88	0.85	0.31	0.16	0.0	...1...1....111..1.........1...
1942	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
1947	0	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
1951	0	1.00	0.34	1.06	0.0	0.0	...1..11.11.11.................
1952	2	0.69	0.27	0.45	0.55	0.0	1..1...1....111..1...1......1..
1958	0	0.50	0.0	0.0	0.0	0.0	.. ....1.....11................
1960	3	0.60	0.16	0.53	0.0	0.0	...1...1....111..1...1......1..
1961	0	0.28	0.03	0.33	0.34	0.0	1..1...1....111..1...1.....11..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
1963	7	0.036	0.002	46.5	1.0	11.63	2	0.74	2	0.150	0.393
1969	1	0.066	0.008	25.8	1.5	12.30	1	0.80	0	0.150	0.393
1970	3	0.029	0.005	28.5	2.3	13.00	2	0.80	0	0.150	0.393
1974	1	0.039	0.005	26.6	1.6	12.80	1	0.80	0	0.150	0.393
1977	1	0.014	0.002	60.8	4.2	12.10	1	0.80	0	0.150	0.393
1980	1	0.024	0.003	13.0	0.8	15.03	2	0.96	1	0.250	0.461
1984	5	0.038	0.007	39.3	3.7	12.00	1	0.80	0	0.150	0.393
1985	2	0.038	0.010	39.3	5.3	12.00	1	0.80	0	0.150	0.393
1986	2	0.011	0.001	49.5	2.7	12.80	1	0.80	0	0.150	0.393
1987	1	0.11	0.01	16.8	1.0	12.60	1	0.80	0	0.250	0.461
1988	1	0.011	0.002	23.6	1.5	14.40	1	0.80	0	0.250	0.461
1994	4	0.035	0.004	26.0	1.5	13.00	1	0.80	0	0.150	0.393
1997	1	0.11	0.01	8.53	0.46	14.10	1	0.80	0	0.250	0.461
1999	1	0.065	0.007	37.6	2.1	11.50	1	0.80	0	0.150	0.393
2002	1	0.068	0.012	18.5	1.5	13.00	1	0.80	0	0.250	0.461
2007	1	0.057	0.005	25.3	1.0	12.50	1	0.80	0	0.250	0.461
2008	5	0.058	0.003	52.5	1.3	10.90	1	0.80	0	0.150	0.393
2009	2	0.043	0.004	40.5	1.8	11.80	1	0.80	0	0.150	0.393
2016	4	0.094	0.006	25.0	0.7	12.00	1	0.80	0	0.150	0.393
2019	1	0.077	0.010	17.3	1.0	13.00	1	0.80	0	0.250	0.461
2020	1	0.068	0.008	25.6	1.5	12.29	2	0.80	0	0.250	0.461
2022	1	0.035	0.004	26.5	1.3	12.94	2	0.80	0	0.150	0.393
2025	2	0.046	0.003	45.0	1.6	11.50	1	0.80	0	0.150	0.393
2032	4	0.023	0.002	42.0	1.5	12.40	1	0.80	0	0.150	0.393
2039	1	0.019	0.002	27.5	1.6	13.50	1	0.80	0	0.150	0.393
2040	2	0.031	0.008	34.3	4.5	12.50	1	0.80	0	0.150	0.393
2043	6	0.029	0.004	49.6	3.2	11.80	1	0.80	0	0.150	0.393
2044	1	0.14	0.01	7.87	0.35	14.00	1	0.80	0	0.250	0.461
2046	1	0.094	0.012	27.3	1.6	11.80	1	0.80	0	0.150	0.393
2051	1	0.057	0.008	25.2	1.6	12.50	1	0.80	0	0.150	0.393
2052	2	0.087	0.010	35.1	1.8	11.36	2	0.83	2	0.250	0.461
2054	2	0.029	0.004	24.5	1.5	13.33	1	0.80	0	0.150	0.393
2058	1	0.092	0.012	31.7	2.0	11.50	1	0.80	0	0.150	0.393
2065	1	0.048	0.006	22.0	1.3	13.00	1	0.80	0	0.150	0.393
2066	1	0.024	0.003	21.6	1.2	13.80	1	0.80	0	0.250	0.461
2067	2	0.044	0.004	50.3	2.0	11.15	2	0.66	2	0.150	0.393
2068	5	0.029	0.001	35.7	0.7	12.50	1	0.80	0	0.150	0.393
2069	3	0.037	0.008	40.0	4.1	12.00	1	0.80	0	0.150	0.393
2081	3	0.036	0.003	26.1	1.0	12.73	2	0.60	3	0.150	0.393
2084	7	0.037	0.009	22.0	2.5	13.30	1	0.80	0	0.250	0.461
2090	1	0.041	0.005	41.2	2.2	11.89	2	0.87	3	0.250	0.461
2091	4	0.077	0.010	34.7	2.2	11.50	1	0.80	0	0.150	0.393
2098	1	0.080	0.011	17.8	1.2	12.90	1	0.80	0	0.250	0.461
2103	2	0.17	0.01	24.0	1.2	11.43	2	0.80	0	0.150	0.393
2105	7	0.034	0.002	24.0	0.7	13.20	1	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
1963	2	0.10	1.07	0.78	0.77	0.0	1..1...1...111.............1..
1969	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1970	3	0.74	0.0	0.34	0.0	0.0	.......1.....11................
1974	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1977	0	0.50	0.0	0.0	0.0	0.0	.......1....11..........1111...
1980	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
1984	3	0.92	0.17	0.31	0.72	0.0	1..1...1...111.............1..
1985	3	0.95	0.41	0.68	0.14	0.0	1..1...1...111.1...1...........
1986	2	0.10	0.0	0.02	0.0	0.0	......11.1...1..........1111...
1987	3	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.................
1988	2	0.50	0.0	0.0	0.0	0.0	......11.....1.................
1994	0	0.67	0.53	0.49	0.42	0.0	1..1...1...111.............1..
1997	0	0.50	0.0	0.0	0.0	0.0	...1...1...11..................
1999	3	0.50	0.0	0.0	0.0	0.0	.......1...111.................
2002	3	0.50	0.0	0.0	0.0	0.0	...1...1...11..................
2007	0	0.50	0.0	0.0	0.0	0.0	...1...1...111.............1...
2008	3	0.10	0.71	0.60	0.32	0.0	1..1...1...111.............1..
2009	2	0.10	0.0	0.36	0.0	0.0	1..1...1...111.................
2016	3	0.10	0.05	0.51	0.05	0.0	1..1...1...111.............1..
2019	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
2020	2	0.50	0.0	0.0	0.0	0.0	1......1.....1.................
2022	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2025	3	0.10	0.12	0.09	0.33	0.0	11.1...1...111.............11..
2032	3	0.10	0.0	0.16	0.27	0.0	...1...1.1.111.................
2039	0	0.50	0.0	0.0	0.0	0.0	.......1..1..1.................
2040	0	1.00	0.91	0.03	0.19	0.0	1..1...1...111.............1..
2043	3	0.56	0.0	0.48	0.55	0.0	...1...1.1.1111.............1..
2044	0	0.50	0.0	0.0	0.0	0.0	.......1...11..............1...
2046	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2051	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2052	0	0.10	0.0	0.30	0.0	0.0	.......1...11..................
2054	2	0.10	0.0	0.10	0.0	0.0	...1...1.....1..............1..
2058	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
2065	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2066	2	0.50	0.0	0.0	0.0	0.0	1..1..11.....1..............1..
2067	3	0.10	0.0	0.34	0.11	0.0	.......1...111.................
2068	0	0.10	0.14	0.27	0.18	0.0	...1...1..1111..............1..
2069	0	1.00	0.30	0.18	0.28	0.0	1..1...1...111.............1..
2081	3	0.10	0.0	0.26	0.0	0.0	...1...1...111..............1..
2084	3	1.00	1.01	0.52	0.45	0.0	1..1..11...111.1...1........1..
2090	3	0.50	0.0	0.0	0.0	0.0	.......1...11..................
2091	3	0.60	0.0	0.31	0.18	0.0	...1...1...111.1...1........1..
2098	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2103	3	0.10	0.0	0.02	0.0	0.0	.......1.1...1.................
2105	2	0.26	0.50	0.47	0.38	0.0	1..1..11...111..............1..

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2107	1	0.11	0.02	17.8	1.5	12.50	1	0.80	0	0.150	0.393
2108	1	0.080	0.016	23.5	2.3	12.30	1	0.80	0	0.250	0.461
2111	2	0.11	0.01	30.1	1.5	11.33	2	0.80	2	0.250	0.461
2114	1	0.055	0.005	32.6	1.5	12.00	1	0.80	0	0.150	0.393
2115	1	0.095	0.013	24.8	1.6	12.00	1	0.80	0	0.150	0.393
2116	5	0.045	0.009	22.8	2.2	13.00	1	0.80	0	0.150	0.393
2120	4	0.055	0.007	43.0	2.7	11.40	1	0.80	0	0.150	0.393
2125	1	0.058	0.006	15.8	0.7	13.51	2	0.80	0	0.150	0.393
2127	6	0.023	0.001	42.5	1.2	12.36	2	0.80	0	0.150	0.393
2130	2	0.018	0.002	18.0	1.0	14.50	1	0.80	0	0.250	0.461
2131	1	0.14	0.01	9.01	0.53	13.84	2	0.87	3	0.400	0.564
2132	3	0.051	0.010	34.0	3.3	12.00	1	0.80	0	0.150	0.393
2137	2	0.029	0.004	44.5	2.7	12.00	1	0.80	0	0.150	0.393
2138	1	0.16	0.02	15.5	1.0	12.40	1	0.80	0	0.150	0.393
2140	3	0.054	0.008	36.0	2.5	11.80	1	0.80	0	0.150	0.393
2141	2	0.081	0.041	26.7	6.7	12.00	1	0.80	0	0.150	0.393
2142	1	0.077	0.009	21.8	1.2	12.50	1	0.80	0	0.150	0.393
2144	1	0.13	0.01	18.0	1.1	12.34	2	0.80	0	0.250	0.461
2145	3	0.081	0.005	37.0	1.1	11.30	1	0.80	0	0.150	0.393
2147	1	0.032	0.006	33.7	3.0	12.50	1	0.80	0	0.150	0.393
2151	1	0.22	0.02	20.2	1.2	11.50	1	0.80	1	0.150	0.393
2152	10	0.024	0.001	49.0	1.0	12.00	1	0.80	0	0.150	0.393
2153	1	0.090	0.011	20.2	1.1	12.50	1	0.80	0	0.150	0.393
2154	1	0.035	0.005	21.5	1.5	13.40	1	0.80	0	0.150	0.393
2155	2	0.022	0.006	29.5	4.2	13.20	1	0.80	0	0.150	0.393
2156	1	0.029	0.007	22.7	2.6	13.59	2	0.92	1	0.250	0.461
2169	2	0.064	0.008	20.0	1.2	12.90	1	0.80	0	0.150	0.393
2179	1	0.069	0.006	23.1	1.0	12.50	1	0.80	0	0.150	0.393
2182	1	0.060	0.010	31.2	2.5	12.00	1	0.80	0	0.150	0.393
2183	1	0.035	0.004	37.5	2.2	12.20	1	0.80	0	0.150	0.393
2184	4	0.10	0.02	29.7	3.5	11.50	1	0.80	0	0.150	0.393
2185	1	0.12	0.01	20.2	1.5	12.14	2	0.80	0	0.150	0.393
2190	1	0.020	0.002	18.0	0.8	14.38	2	0.80	0	0.250	0.461
2191	3	0.12	0.01	21.2	1.3	12.00	1	0.80	0	0.150	0.393
2192	2	0.062	0.016	30.6	4.0	12.00	1	0.80	0	0.150	0.393
2193	2	0.027	0.002	51.5	1.8	11.76	2	0.80	0	0.150	0.393
2196	2	0.036	0.002	62.2	1.8	10.91	2	0.67	1	0.150	0.393
2197	2	0.076	0.009	26.6	1.5	12.08	2	0.80	0	0.150	0.393
2201	4	0.33	0.07	1.90	0.19	16.21	2	0.80	0	0.250	0.461
2204	2	0.018	0.005	27.5	3.5	13.60	2	0.80	0	0.150	0.393
2207	4	0.058	0.004	92.6	3.3	9.60	2	0.73	3	0.150	0.393
2208	3	0.036	0.003	45.2	1.6	11.71	2	0.75	2	0.150	0.393
2209	2	0.15	0.04	19.2	2.5	12.00	1	0.80	0	0.150	0.393
2214	8	0.045	0.003	28.5	0.8	12.50	1	0.80	0	0.150	0.393
2215	1	0.13	0.01	17.2	1.0	12.40	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
2107	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2108	0	0.50	0.0	0.0	0.0	0.0	1..1...1....111..............1..
2111	3	0.10	0.0	0.04	0.0	0.0	...1...1....11...............1..
2114	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2115	3	0.50	0.0	0.0	0.0	0.0	.......1.....1...1.............
2116	3	0.85	0.81	0.32	0.40	0.0	1..1...1....111..............1..
2120	3	0.87	0.33	0.50	0.36	0.0	1..1...1....111..............1..
2125	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2127	3	0.10	0.42	0.56	0.43	0.0	1..1...1....111..............1..
2130	0	0.20	0.0	0.29	0.0	0.0	.......1..1.11.................
2131	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2132	3	0.92	0.0	0.20	0.0	0.0	1......1..1.11.............1...
2137	3	0.48	0.31	0.00	0.18	0.0	1..1...1....111..............1..
2138	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2140	3	0.57	0.0	0.62	0.0	0.0	1......1.....11................
2141	0	1.00	0.0	0.0	0.70	0.0	.......1.....11...........11...
2142	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
2144	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2145	3	0.10	0.23	0.21	0.16	0.0	1..1...1....111..............1..
2147	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2151	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2152	3	0.10	0.88	0.56	0.56	0.0	...1...1....111..............1..
2153	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2154	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1...............1..
2155	0	1.00	0.87	0.02	0.0	0.0	......11....111................
2156	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2169	3	0.14	0.0	0.34	0.0	0.0	...1...1.....1.................
2179	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2182	3	0.50	0.0	0.0	0.0	0.0	.......1....111................
2183	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2184	3	1.00	0.0	0.75	0.0	0.0	1..1...1.1...1...............1..
2185	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2190	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2191	3	0.50	0.34	0.41	0.0	0.0	...1...1.1..11...............1..
2192	0	0.88	0.0	0.62	0.0	0.0	.......1.1...1.................
2193	3	0.11	0.04	0.18	0.25	0.0	...1...1....111..............1..
2196	3	0.10	0.09	0.02	0.05	0.0	1..1...1....111.............1...
2197	3	0.10	0.0	0.19	0.0	0.0	...1...1.....1...............1..
2201	1	0.80	0.24	0.38	0.17	0.0	.......1....111................
2204	2	0.99	0.60	1.39	0.0	0.0	...1...1....111..............1..
2207	3	0.13	0.0	0.39	0.41	0.0	...1...1.1..11...1...1......1..
2208	3	0.10	0.17	0.30	0.0	0.0	1..1...1....111..............1..
2209	3	0.99	0.0	0.03	0.0	0.0	1..1...1....111..............1..
2214	3	0.10	0.32	0.82	0.36	0.0	1..1...1.1..111.............11..
2215	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2216	2	0.12	0.01	21.8	1.2	12.00	1	0.80	0	0.150	0.393
2217	1	0.066	0.011	29.8	2.5	12.00	2	0.80	0	0.150	0.393
2218	3	0.037	0.003	31.5	1.5	12.50	1	0.80	0	0.150	0.393
2219	2	0.046	0.004	45.0	2.0	11.50	1	0.80	0	0.150	0.393
2222	2	0.073	0.019	28.2	3.6	12.00	1	0.80	0	0.150	0.393
2223	3	0.027	0.004	105	8	10.20	2	0.79	3	0.150	0.393
2228	2	0.036	0.005	29.7	1.7	12.65	2	0.80	0	0.150	0.393
2235	2	0.019	0.003	54.6	3.7	12.06	2	0.80	0	0.150	0.393
2237	5	0.10	0.02	23.6	2.3	12.00	1	0.80	0	0.150	0.393
2238	3	0.078	0.018	21.6	2.3	12.50	1	0.80	0	0.150	0.393
2239	5	0.025	0.002	43.1	1.5	12.26	2	0.80	0	0.150	0.393
2240	2	0.048	0.013	27.6	3.7	12.50	1	0.80	0	0.150	0.393
2241	1	0.040	0.003	123	5	9.40	2	0.74	3	0.150	0.393
2244	1	0.026	0.003	29.6	1.8	13.00	1	0.80	0	0.150	0.393
2245	2	0.052	0.011	33.6	3.6	12.00	1	0.80	0	0.150	0.393
2246	3	0.034	0.008	52.1	6.0	11.45	2	0.74	3	0.150	0.393
2248	1	0.074	0.016	30.0	3.3	11.86	2	0.80	0	0.150	0.393
2249	7	0.023	0.004	46.0	4.1	12.20	2	0.80	0	0.150	0.393
2251	3	0.047	0.004	29.5	1.1	12.40	1	0.80	0	0.150	0.393
2255	1	0.071	0.006	28.5	1.1	12.00	1	0.80	0	0.150	0.393
2258	3	0.048	0.004	27.6	1.1	12.50	1	0.80	0	0.150	0.393
2259	1	0.024	0.003	25.0	1.7	13.50	1	0.80	0	0.250	0.461
2260	5	0.064	0.004	85.0	2.8	9.74	2	0.79	0	0.150	0.393
2263	5	0.10	0.03	23.5	3.2	12.00	1	0.80	0	0.150	0.393
2264	5	0.10	0.01	30.8	1.0	11.39	2	0.80	0	0.150	0.393
2266	2	0.029	0.008	53.6	7.7	11.56	2	0.75	3	0.150	0.393
2267	1	0.036	0.005	16.0	1.0	14.00	1	0.80	0	0.250	0.461
2269	5	0.10	0.03	30.2	4.5	11.50	1	0.80	0	0.150	0.393
2271	3	0.079	0.006	34.1	1.2	11.50	1	0.80	0	0.150	0.393
2279	3	0.040	0.008	17.0	1.6	13.59	2	0.62	3	0.150	0.393
2291	4	0.068	0.005	38.5	1.2	11.41	2	0.80	0	0.250	0.461
2297	6	0.069	0.019	29.1	4.0	12.00	1	0.80	0	0.150	0.393
2306	2	0.035	0.006	23.3	1.8	13.22	2	0.80	0	0.150	0.393
2307	4	0.029	0.002	45.1	1.1	11.99	2	0.80	0	0.150	0.393
2308	8	0.081	0.015	19.6	1.8	12.67	2	0.80	0	0.150	0.393
2311	3	0.029	0.005	61.0	5.3	11.30	2	0.75	1	0.150	0.393
2312	4	0.039	0.010	60.0	7.6	10.97	2	0.73	3	0.150	0.393
2313	2	0.032	0.003	17.6	0.8	13.92	2	0.80	0	0.150	0.393
2315	2	0.13	0.01	26.0	1.2	11.50	1	0.80	0	0.150	0.393
2320	7	0.056	0.014	40.5	5.0	11.50	1	0.80	0	0.150	0.393
2321	1	0.075	0.009	22.0	1.2	12.50	1	0.80	0	0.150	0.393
2322	2	0.042	0.004	18.7	0.8	13.50	1	0.80	0	0.250	0.461
2326	11	0.048	0.006	45.6	2.7	11.41	2	0.80	0	0.150	0.393
2328	1	0.073	0.009	14.1	0.8	13.50	1	0.80	0	0.250	0.461
2330	2	0.061	0.012	39.0	3.6	11.50	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
2216	3	0.10	0.0	0.19	0.0	0.0	...1...1.....1...1.........1...
2217	3	0.50	0.0	0.0	0.0	0.0	...1...1....11...1...1.....11..
2218	0	0.10	0.00	0.17	0.0	0.0	.......1.1..111............1...
2219	3	0.10	0.0	0.33	0.39	0.0	1......1....111................
2222	3	1.00	0.57	0.57	0.42	0.0	.......1....111................
2223	0	0.71	0.49	0.38	0.43	0.0	...1...1....111.............1..
2228	2	0.37	0.0	0.20	0.0	0.0	...1...1.1..11.................
2235	3	0.30	0.0	0.52	0.0	0.0	...1...1.1.1111............1...
2237	0	0.91	0.39	0.44	0.26	0.0	1......1.1..111................
2238	3	0.90	0.0	0.62	0.0	0.0	1..1...1....111.............1..
2239	3	0.14	0.53	0.30	0.52	0.0	...1...1....111............11..
2240	0	1.00	0.0	0.24	0.0	0.0	...1...1.1.1111................
2241	0	0.50	0.0	0.0	0.0	0.0	...1...1....111.............1..
2244	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2245	0	1.00	0.73	0.04	0.19	0.0	.......1....111................
2246	3	0.97	0.0	0.38	0.26	0.0	...1...1.1..111................
2248	3	0.50	0.0	0.0	0.0	0.0	1..1...1....11..........1...1..
2249	3	1.00	0.84	0.87	0.29	0.0	1..1...1.1..111..1...1......1..
2251	3	0.10	0.34	0.36	0.0	0.0	...1...1....111................
2255	0	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2258	3	0.10	0.0	0.24	0.0	0.0	1..1...1....111..1...1......1..
2259	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2260	3	0.10	0.0	0.44	0.30	0.0	1..1...1.....11.............11..
2263	3	1.00	0.24	0.69	0.08	0.0	1..1...1....111.............1..
2264	3	0.10	0.47	0.37	0.57	0.0	1..1...1....111..1...1......1..
2266	3	1.00	0.0	0.30	0.27	0.0	...1...1....111.............1..
2267	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2269	3	1.00	0.0	1.09	0.0	0.0	1......1.1..11...1...1.........
2271	3	0.10	0.0	0.44	0.17	0.0	.......1.1..111..1.............
2279	0	0.85	0.0	0.35	0.0	0.0	.......1....11.................
2291	3	0.10	0.38	0.22	0.05	0.0	...1...1....111................
2297	3	1.00	0.27	0.85	0.25	0.0	1..1...1.1..111..1..........1..
2306	3	0.43	0.0	0.36	0.0	0.0	...1...1.....1.................
2307	3	0.10	0.32	0.14	0.24	0.0	...1...1....111.............1..
2308	3	1.00	0.45	1.09	1.13	0.0	1..1...1.1..111..1...1......1..
2311	3	0.97	0.29	0.20	0.88	0.0	1..1...1....111..1...1.....11..
2312	3	1.00	0.0	0.56	0.13	0.0	1..1...1....111.............1..
2313	3	0.10	0.0	0.16	0.0	0.0	.......1....11.................
2315	3	0.43	0.12	0.25	0.0	0.0	.......1....111............1...
2320	3	1.00	0.24	0.43	0.0	0.0	...1...1.1..111..1...1.....11..
2321	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............11..
2322	3	0.10	0.40	0.31	0.0	0.0	.......1....11.............1...
2326	3	0.56	0.62	0.59	0.76	0.0	11.1...1....111............11..
2328	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2330	1	0.91	0.0	0.26	0.41	0.0	...1...1.....11................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2331	1	0.046	0.006	20.7	1.3	13.17	2	0.80	0	0.250	0.461
2332	4	0.083	0.023	34.2	4.7	11.44	2	0.80	0	0.150	0.393
2333	1	0.055	0.005	23.8	1.0	12.68	2	0.80	0	0.150	0.393
2337	1	0.042	0.006	25.2	1.7	12.85	2	0.80	0	0.150	0.393
2345	2	0.067	0.020	35.5	5.3	11.61	2	0.81	2	0.250	0.461
2349	1	0.089	0.011	21.5	1.2	12.38	2	0.80	0	0.150	0.393
2350	1	0.043	0.006	14.7	1.0	14.00	1	0.80	0	0.250	0.461
2355	2	0.11	0.02	22.5	2.3	12.00	1	0.80	0	0.150	0.393
2356	5	0.039	0.005	49.2	3.2	11.47	2	0.80	0	0.150	0.393
2357	2	0.042	0.004	103	4	9.71	2	0.72	2	0.150	0.393
2363	3	0.066	0.023	91.7	15.8	9.50	1	0.75	2	0.150	0.393
2364	1	0.17	0.02	22.3	1.2	11.57	2	0.80	0	0.150	0.393
2370	3	0.44	0.06	18.0	1.1	11.00	1	0.80	0	0.150	0.393
2372	1	0.061	0.007	24.6	1.3	12.50	1	0.80	0	0.150	0.393
2376	5	0.052	0.003	40.6	1.1	11.58	2	0.80	0	0.150	0.393
2378	3	0.072	0.010	37.7	2.5	11.39	2	0.80	0	0.150	0.393
2379	2	0.071	0.013	32.5	3.0	11.58	2	0.65	3	0.150	0.393
2381	2	0.30	0.03	13.8	0.8	12.00	1	0.80	0	0.150	0.393
2386	1	0.15	0.01	15.5	0.8	12.50	1	0.80	0	0.150	0.393
2393	7	0.039	0.006	50.8	3.8	11.40	1	0.80	0	0.150	0.393
2394	2	0.014	0.002	56.0	3.8	12.29	2	0.80	0	0.150	0.393
2405	1	0.030	0.003	29.3	1.3	12.79	2	0.70	1	0.250	0.461
2408	3	0.023	0.003	25.3	1.6	13.50	1	0.80	0	0.150	0.393
2413	3	0.13	0.03	26.6	3.0	11.43	2	0.80	0	0.250	0.461
2414	7	0.068	0.006	33.5	1.3	11.70	1	0.80	0	0.150	0.393
2416	1	0.090	0.012	27.8	1.8	11.80	1	0.80	0	0.150	0.393
2421	5	0.044	0.010	43.3	4.7	11.62	2	0.80	0	0.150	0.393
2426	2	0.053	0.006	28.2	1.5	12.35	2	0.80	0	0.150	0.393
2428	4	0.061	0.004	31.0	0.8	12.00	1	0.80	0	0.150	0.393
2432	1	0.10	0.01	10.0	0.5	13.88	2	0.80	0	0.250	0.461
2439	5	0.10	0.02	23.8	2.2	12.00	1	0.80	0	0.150	0.393
2441	2	0.065	0.007	11.8	0.5	14.00	1	0.80	0	0.250	0.461
2443	2	0.092	0.007	35.1	1.3	11.27	2	0.80	0	0.250	0.461
2448	5	0.073	0.016	33.2	3.5	11.65	2	0.80	0	0.150	0.393
2450	1	0.035	0.005	35.0	2.2	12.35	2	0.80	0	0.150	0.393
2453	2	0.031	0.023	45.7	16.7	11.89	2	0.80	0	0.250	0.461
2456	5	0.035	0.002	103	3	10.00	1	0.80	0	0.150	0.393
2458	3	0.052	0.008	28.0	2.0	12.39	2	0.80	0	0.150	0.393
2459	1	0.062	0.008	24.3	1.5	12.50	1	0.80	0	0.150	0.393
2461	3	0.072	0.014	28.5	2.6	12.00	1	0.80	0	0.150	0.393
2463	2	0.14	0.01	12.6	0.5	13.00	1	0.80	0	0.150	0.393
2464	1	0.075	0.009	20.0	1.1	12.72	2	0.80	0	0.150	0.393
2465	1	0.047	0.006	22.2	1.3	13.00	1	0.80	0	0.150	0.393
2466	1	0.038	0.005	24.6	1.5	13.00	1	0.80	0	0.150	0.393
2468	1	0.16	0.02	9.53	0.62	13.50	1	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status
							1234567890123456789012345678901
2331	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2332	3	1.00	0.30	0.81	0.04	0.0	1..1...1.1..111..1...1......1..
2333	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2337	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2345	3	0.99	0.0	0.32	0.0	0.0	1..1...1....111.............1..
2349	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2350	2	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2355	0	0.72	0.0	0.67	0.0	0.0	.......1....11.................
2356	3	0.50	0.43	0.50	0.17	0.0	...1...1....111............1...
2357	3	0.10	0.0	0.04	0.03	0.0	...1...1.....11..1...1......1..
2363	3	1.00	0.17	0.54	0.58	0.0	...1...1....111.............1..
2364	2	0.50	0.0	0.0	0.0	0.0	.1.1...1.....1..............1..
2370	0	0.71	0.03	0.47	0.0	0.0	...1...1....11.................
2372	0	0.50	0.0	0.0	0.0	0.0	...1...1.....11..1.............
2376	3	0.10	0.24	0.15	0.22	0.0	1..1...1....111..1..........1..
2378	3	0.53	0.58	0.14	0.42	0.0	...1...1....111............1...
2379	0	0.79	0.0	0.27	0.0	0.0	1......1.1..111..1.........1...
2381	0	0.10	0.0	0.33	0.0	0.0	...1.11.....1...............1..
2386	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2393	3	0.92	0.40	0.61	0.55	0.0	1..1...1....111.............1..
2394	3	0.11	0.0	0.37	0.0	0.0	......11.....1..........1......
2405	3	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
2408	3	0.57	0.0	0.18	0.0	0.0	1..1...1....111.............1..
2413	3	0.79	0.0	0.66	0.0	0.0	.......1.1..11.................
2414	0	0.35	0.84	0.83	0.95	0.0	1..1...1.1..111..1...1......1..
2416	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2421	3	1.00	0.58	0.63	0.06	0.0	...1...1.1..111..1...1.....1...
2426	3	0.10	0.0	0.15	0.0	0.0	...1...1....11..............1..
2428	3	0.10	0.06	0.28	0.07	0.0	1..1...1...1111............11..
2432	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2439	3	0.75	0.28	0.40	0.0	0.0	1..1...1....111................
2441	3	0.10	0.0	0.13	0.0	0.0	1..1...1....11..............1..
2443	3	0.10	0.43	0.16	0.05	0.0	...1...1....111.............1..
2448	3	1.00	0.47	0.41	0.45	0.0	1..1...1....111.............1..
2450	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2453	3	1.00	0.0	1.02	0.0	0.0	......11....11..........1111...
2456	3	0.10	0.0	0.30	0.20	0.0	...1...1....111.............1..
2458	3	0.55	0.0	0.11	0.19	0.0	.......1.1..11..............1..
2459	0	0.50	0.0	0.0	0.0	0.0	.1.1...1.....1.............11..
2461	3	0.95	0.0	0.15	0.65	0.0	1..1...1....111................
2463	0	0.10	0.0	0.05	0.0	0.0	.......1....11..............1..
2464	3	0.50	0.0	0.0	0.0	0.0	1..1...1.....1..............1..
2465	0	0.50	0.0	0.0	0.0	0.0	.......1.....1..............1..
2466	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2468	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2474	4	0.082	0.031	21.1	4.0	12.50	1	0.80	0	0.150	0.393
2476	4	0.11	0.02	24.8	2.3	11.79	2	0.80	0	0.250	0.461
2479	1	0.037	0.005	20.0	1.2	13.50	1	0.80	0	0.250	0.461
2483	1	0.021	0.002	53.3	2.5	11.98	2	0.80	0	0.150	0.393
2484	1	0.060	0.006	12.3	0.5	14.00	1	0.80	0	0.250	0.461
2490	1	0.12	0.01	13.6	0.7	12.99	2	0.80	0	0.150	0.393
2492	2	0.086	0.024	26.5	3.6	11.96	2	0.80	0	0.150	0.393
2494	2	0.028	0.002	57.7	2.0	11.50	2	0.80	0	0.150	0.393
2502	5	0.11	0.03	18.8	2.7	12.36	2	0.80	0	0.150	0.393
2511	1	0.041	0.006	18.0	1.1	13.62	2	0.80	0	0.250	0.461
2514	1	0.019	0.003	24.5	1.6	13.75	2	0.80	0	0.150	0.393
2517	1	0.016	0.002	47.5	3.1	12.55	2	0.80	0	0.150	0.393
2523	1	0.073	0.009	23.6	1.5	12.38	2	0.80	0	0.250	0.461
2524	4	0.048	0.006	36.7	2.2	11.88	2	0.80	0	0.150	0.393
2531	1	0.10	0.01	25.6	1.0	11.81	2	0.80	0	0.250	0.461
2534	2	0.081	0.025	34.2	5.2	11.47	2	0.80	0	0.150	0.393
2542	2	0.040	0.008	33.6	3.3	12.28	3	0.80	0	0.137	0.384
2544	3	0.14	0.01	10.1	0.3	13.50	1	0.80	0	0.250	0.461
2546	1	0.070	0.009	18.2	1.1	13.00	1	0.80	0	0.150	0.393
2559	1	0.025	0.004	30.5	2.5	13.00	1	0.80	0	0.150	0.393
2562	1	0.17	0.02	24.5	1.3	11.36	2	0.80	0	0.250	0.461
2563	3	0.041	0.004	34.0	1.5	12.22	2	0.80	0	0.150	0.393
2567	2	0.058	0.021	24.5	4.5	12.55	2	0.80	0	0.150	0.393
2569	4	0.047	0.007	33.0	2.5	12.14	2	0.80	0	0.150	0.393
2570	3	0.026	0.006	30.0	3.2	13.01	2	0.80	0	0.150	0.393
2575	1	0.026	0.003	18.8	1.1	14.00	1	0.80	0	0.250	0.461
2582	4	0.064	0.016	37.8	4.6	11.50	1	0.80	0	0.150	0.393
2583	1	0.028	0.006	18.8	2.0	13.92	2	0.80	0	0.250	0.461
2584	1	0.043	0.006	11.8	0.7	14.45	2	0.80	0	0.250	0.461
2595	1	0.014	0.002	38.2	2.2	13.17	2	0.80	0	0.150	0.393
2601	1	0.10	0.01	22.7	1.3	12.10	2	0.80	0	0.150	0.393
2604	1	0.045	0.006	18.0	1.0	13.50	1	0.80	0	0.250	0.461
2616	1	0.23	0.02	9.01	0.52	13.20	1	0.80	0	0.250	0.461
2617	3	0.027	0.005	59.2	5.8	11.46	2	0.80	0	0.150	0.393
2618	1	0.022	0.007	32.6	5.1	13.00	1	0.80	0	0.150	0.393
2621	8	0.035	0.002	50.1	1.0	11.55	2	0.80	0	0.150	0.393
2631	1	0.029	0.004	34.0	2.0	12.59	2	0.80	0	0.150	0.393
2632	2	0.054	0.007	32.7	2.0	12.00	1	0.80	0	0.150	0.393
2634	2	0.058	0.005	46.5	2.0	11.16	2	0.80	0	0.150	0.393
2637	1	0.024	0.003	19.6	1.2	14.00	1	0.80	0	0.250	0.461
2645	1	0.075	0.009	17.5	1.0	13.00	1	0.80	0	0.250	0.461
2646	1	0.073	0.010	28.2	1.8	12.00	1	0.80	0	0.150	0.393
2649	1	0.031	0.003	33.1	1.5	12.59	2	0.80	0	0.150	0.393
2653	1	0.055	0.008	20.5	1.3	13.00	1	0.80	0	0.250	0.461
2654	2	0.043	0.009	23.1	2.5	13.00	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
2474	2	1.00	0.60	0.32	0.25	0.0	...1...1....111.............1..
2476	3	0.93	0.0	0.44	0.16	0.0	...1...1....111................
2479	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2483	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2484	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2490	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2492	3	0.98	0.0	0.46	0.0	0.0	1..1...1....111................
2494	3	0.10	0.09	0.13	0.05	0.0	1..1...1....111.............1..
2502	3	1.00	0.67	0.87	0.0	0.0	...1..11.1..111.............1..
2511	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2514	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2517	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2523	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2524	3	0.51	0.0	0.13	0.0	0.0	.1.1...1.....11............11..
2531	2	0.50	0.0	0.0	0.0	0.0	...1...1....11..............1..
2534	3	0.97	0.0	0.35	0.0	0.0	.......1.1..11.................
2542	2	0.75	0.0	0.37	0.0	0.0	.......1.....11............1...
2544	0	0.10	0.0	0.32	0.0	0.0	.......1....11.................
2546	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2559	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2562	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2563	3	0.10	0.0	0.57	0.21	0.0	...1...1.....11.............1..
2567	1	1.00	0.0	0.57	0.0	0.0	.......1.....1.................
2569	3	0.70	0.47	0.38	0.08	0.0	...1...1....111..1...1......1..
2570	3	0.80	0.0	0.33	0.19	0.0	...1...1....111.............1..
2575	3	0.50	0.0	0.0	0.0	0.0	.......1.....1..........1111...
2582	3	0.84	0.0	0.64	0.0	0.0	1..1...1.....11..1..........1..
2583	3	0.50	0.0	0.0	0.0	0.0	...1...1....11..............1..
2584	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
2595	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2601	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2604	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2616	3	0.50	0.0	0.0	0.0	0.0	...1...1.1...1..............1..
2617	3	0.82	0.07	0.41	0.28	0.0	...1...1....111.............1..
2618	0	0.50	0.0	0.0	0.0	0.0	......11....11.................
2621	3	0.10	0.71	0.48	0.30	0.0	1..1...1.1..111.............1..
2631	2	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2632	0	0.10	0.0	0.09	0.0	0.0	...1...1.....1..............1..
2634	3	0.10	0.0	0.05	0.01	0.0	1..1...1....111.............1..
2637	0	0.50	0.0	0.0	0.0	0.0	.......1.....1...1.........11...
2645	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2646	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2649	3	0.50	0.0	0.0	0.0	0.0	.......1....11.............11...
2653	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2654	3	0.87	0.0	0.12	0.0	0.0	...1...1....111................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2655	1	0.032	0.009	40.7	5.5	12.10	2	0.80	0	0.150	0.393
2659	2	0.063	0.008	31.0	1.8	11.95	2	0.80	0	0.150	0.393
2660	1	0.14	0.02	13.3	1.1	12.89	2	0.80	0	0.150	0.393
2662	1	0.052	0.006	10.5	0.6	14.50	1	0.80	0	0.250	0.461
2664	1	0.034	0.004	13.1	0.7	14.50	1	0.80	0	0.250	0.461
2666	2	0.024	0.005	39.3	4.2	12.50	1	0.80	0	0.150	0.393
2667	3	0.029	0.006	28.5	3.0	13.00	1	0.80	0	0.150	0.393
2672	3	0.044	0.007	21.5	1.6	13.14	2	0.80	0	0.150	0.393
2674	3	0.041	0.003	102	4	9.81	2	0.76	2	0.150	0.393
2677	1	0.062	0.008	22.5	1.3	12.67	2	0.80	0	0.150	0.393
2688	1	0.069	0.008	21.5	1.2	12.64	2	0.80	0	0.150	0.393
2690	3	0.20	0.02	21.2	1.0	11.50	1	0.80	0	0.150	0.393
2697	5	0.034	0.003	54.0	2.0	11.42	2	0.80	0	0.150	0.393
2705	1	0.062	0.006	9.71	0.44	14.50	1	0.80	0	0.250	0.461
2707	4	0.046	0.012	29.7	4.0	12.40	1	0.80	0	0.150	0.393
2709	1	0.018	0.003	20.2	1.3	14.24	2	0.80	0	0.250	0.461
2715	2	0.098	0.009	15.0	0.6	13.04	2	0.80	0	0.150	0.393
2718	2	0.043	0.005	29.2	1.6	12.50	1	0.80	0	0.150	0.393
2720	1	0.042	0.005	9.39	0.55	15.00	1	0.80	0	0.250	0.461
2724	1	0.022	0.003	30.7	2.0	13.12	2	0.80	0	0.150	0.393
2725	11	0.053	0.003	42.0	1.1	11.49	2	0.80	0	0.150	0.393
2726	1	0.020	0.003	34.0	2.3	13.00	1	0.80	0	0.150	0.393
2728	2	0.048	0.011	18.5	2.1	13.39	2	0.80	0	0.150	0.393
2729	2	0.083	0.011	21.8	1.3	12.42	2	0.80	0	0.250	0.461
2731	3	0.029	0.002	51.1	1.3	11.70	2	0.80	0	0.150	0.393
2734	1	0.081	0.010	26.8	1.5	12.00	1	0.80	0	0.150	0.393
2739	1	0.090	0.012	13.6	0.8	13.35	2	0.80	0	0.250	0.461
2740	1	0.087	0.011	26.0	1.5	12.00	1	0.80	0	0.150	0.393
2742	2	0.062	0.035	21.1	5.8	12.80	1	0.80	0	0.150	0.393
2751	1	0.037	0.005	20.0	1.1	13.50	1	0.80	0	0.250	0.461
2753	2	0.079	0.008	20.5	1.0	12.61	2	0.80	0	0.150	0.393
2759	1	0.041	0.004	73.3	3.5	10.57	2	0.80	0	0.150	0.393
2760	4	0.043	0.003	62.6	2.1	10.76	2	0.72	3	0.150	0.393
2761	1	0.025	0.003	32.3	2.0	12.88	2	0.80	0	0.150	0.393
2765	1	0.017	0.002	46.6	3.0	12.50	1	0.80	0	0.150	0.393
2774	4	0.043	0.006	39.0	2.6	11.88	2	0.80	0	0.150	0.393
2782	1	0.013	0.002	26.8	1.7	14.00	1	0.80	0	0.150	0.393
2793	2	0.087	0.027	32.5	5.0	11.50	1	0.80	0	0.150	0.393
2797	4	0.046	0.003	123	4	9.31	2	0.80	0	0.150	0.393
2799	1	0.011	0.001	18.1	1.1	15.00	1	0.80	0	0.250	0.461
2804	1	0.086	0.019	26.0	3.0	12.00	1	0.80	0	0.150	0.393
2806	1	0.057	0.005	20.1	0.8	13.00	1	0.80	0	0.250	0.461
2813	3	0.036	0.007	36.7	3.3	12.21	3	0.80	0	0.645	0.731
2816	1	0.046	0.006	26.1	1.7	12.67	2	0.80	0	0.150	0.393
2819	1	0.12	0.01	13.3	0.7	13.00	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
2655	3	0.50	0.0	0.0	0.0	0.0	.......1....11.............1...
2659	3	0.10	0.0	0.03	0.0	0.0	.......1....1..................
2660	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2662	0	0.50	0.0	0.0	0.0	0.0	...1...1.1..1...1..............
2664	3	0.50	0.0	0.0	0.0	0.0	.......1....1..................
2666	0	0.77	0.0	0.42	0.0	0.0	...1...1.1..1..................
2667	3	0.94	0.0	0.14	0.23	0.0	1..1...1.....11.............1..
2672	3	0.74	0.61	0.28	0.0	0.0	1..1...1....111.............1..
2674	2	0.10	0.0	0.16	0.28	0.0	...1...1.....11..1..........1..
2677	2	0.50	0.0	0.0	0.0	0.0	1..1...1.....1..............1..
2688	3	0.50	0.0	0.0	0.0	0.0	.......1.1..1..................
2690	0	0.10	0.0	0.31	0.0	0.0	1..1...1.....1..............1..
2697	3	0.29	0.32	0.36	0.61	0.0	1..1...1....111............11..
2705	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2707	3	1.00	0.0	0.47	0.71	0.0	...1...1.1..111.............1...
2709	3	0.50	0.0	0.0	0.0	0.0	......11.....1.................
2715	3	0.10	0.0	0.17	0.0	0.0	1......1....11.................
2718	0	0.56	0.24	0.22	0.0	0.0	...1...1....11.................
2720	0	0.50	0.0	0.0	0.0	0.0	.......1.1..1..............1...
2724	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2725	3	0.10	0.66	0.84	0.94	0.0	1..1...1....111............11..
2726	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2728	3	0.96	0.0	0.07	0.43	0.0	...1...1....111................
2729	3	0.10	0.0	0.03	0.0	0.0	...1...1.1...1...............1..
2731	3	0.10	0.11	0.41	0.16	0.0	1..1...1....111.............1..
2734	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
2739	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2740	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2742	0	1.00	0.0	0.50	0.0	0.0	.......1.1...11................
2751	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2753	3	0.10	0.0	0.09	0.0	0.0	...1...1....11..............1..
2759	3	0.50	0.0	0.0	0.0	0.0	.......1.....11................
2760	3	0.10	0.25	0.30	0.51	0.0	...1...1....111.............1..
2761	3	0.50	0.0	0.0	0.0	0.0	...1...1..1..1.................
2765	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2774	3	0.72	0.21	0.36	0.55	0.0	...1...1....111.............1..
2782	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2793	3	1.00	0.0	0.40	0.0	0.0	.......1.1..11.................
2797	3	0.10	0.0	0.37	0.24	0.0	...1...1.....11................
2799	0	0.50	0.0	0.0	0.0	0.0	.......1..1..1.................
2804	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2806	0	0.50	0.0	0.0	0.0	0.0	.......1....11.............1...
2813	3	0.83	0.46	0.56	0.40	0.0	.......1....111................
2816	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
2819	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
2825	1	0.046	0.006	17.7	1.0	13.50	1	0.80	0	0.250	0.461
2826	7	0.023	0.004	42.0	3.5	12.40	2	0.80	0	0.150	0.393
2829	2	0.029	0.007	47.3	5.5	11.88	2	0.80	0	0.150	0.393
2835	1	0.033	0.007	30.6	3.2	12.70	1	0.80	0	0.150	0.393
2846	6	0.10	0.02	31.6	3.2	11.40	1	0.80	0	0.150	0.393
2848	1	0.070	0.008	25.2	1.5	12.30	2	0.80	0	0.150	0.393
2849	2	0.056	0.007	17.7	1.0	13.30	1	0.80	0	0.150	0.393
2856	5	0.078	0.005	27.2	0.8	12.00	1	0.80	0	0.150	0.393
2864	5	0.042	0.004	18.8	0.7	13.48	2	0.80	0	0.150	0.393
2865	2	0.14	0.02	17.5	1.5	12.30	2	0.80	0	0.250	0.461
2868	1	0.014	0.002	25.3	1.5	14.02	2	0.80	0	0.150	0.393
2871	1	0.036	0.005	19.6	1.1	13.55	2	0.80	0	0.250	0.461
2872	1	0.056	0.005	16.7	0.7	13.42	2	0.80	0	0.150	0.393
2877	2	0.017	0.004	37.0	4.0	13.00	1	0.80	0	0.150	0.393
2879	3	0.057	0.011	32.0	3.0	12.00	1	0.80	0	0.150	0.393
2880	1	0.043	0.005	18.5	1.0	13.50	1	0.80	0	0.250	0.461
2892	3	0.043	0.003	58.5	1.8	11.00	1	0.80	0	0.150	0.393
2893	3	0.055	0.016	92.8	13.5	9.72	2	0.80	0	0.150	0.393
2906	2	0.060	0.010	62.0	5.2	10.50	1	0.80	0	0.150	0.393
2908	4	0.034	0.002	33.7	1.0	12.45	2	0.80	0	0.150	0.393
2909	1	0.066	0.008	26.0	1.5	12.29	2	0.80	0	0.250	0.461
2920	4	0.034	0.007	123	13	9.63	2	0.80	0	0.150	0.393
2922	1	0.065	0.009	12.0	0.7	14.00	1	0.80	0	0.250	0.461
2928	1	0.035	0.005	33.0	2.2	12.47	2	0.80	0	0.250	0.461
2932	1	0.015	0.002	48.7	3.0	12.50	1	0.80	0	0.150	0.393
2933	5	0.068	0.011	24.0	1.8	12.44	2	0.80	0	0.150	0.393
2934	5	0.058	0.011	31.7	3.0	12.00	1	0.80	0	0.150	0.393
2950	1	0.081	0.011	17.8	1.1	12.88	2	0.80	0	0.150	0.393
2951	6	0.054	0.012	52.1	5.5	11.00	1	0.80	0	0.150	0.393
2957	2	0.17	0.03	29.0	3.0	11.00	1	0.80	0	0.150	0.393
2959	3	0.036	0.009	42.1	5.0	11.89	2	0.80	0	0.150	0.393
2967	5	0.047	0.010	35.5	3.8	11.98	2	0.80	0	0.150	0.393
2976	2	0.044	0.006	42.1	2.8	11.68	2	0.80	0	0.150	0.393
2979	1	0.039	0.005	30.0	2.0	12.55	2	0.80	0	0.150	0.393
2983	5	0.055	0.010	33.7	3.0	11.92	2	0.80	0	0.150	0.393
2984	1	0.013	0.002	27.2	1.6	13.96	3	0.80	0	0.178	0.412
2986	4	0.051	0.009	23.0	2.0	12.84	2	0.80	0	0.150	0.393
2989	1	0.050	0.007	14.5	1.0	13.85	2	0.80	0	0.250	0.461
2993	1	0.099	0.008	12.2	0.5	13.47	2	0.80	0	0.150	0.393
2995	2	0.062	0.011	15.3	1.3	13.50	1	0.80	0	0.150	0.393
3003	1	0.061	0.008	28.3	1.7	12.18	2	0.80	0	0.150	0.393
3006	1	0.051	0.006	11.1	0.6	14.41	2	0.80	0	0.250	0.461
3009	1	0.10	0.01	7.10	0.44	14.62	2	0.80	0	0.250	0.461
3012	1	0.022	0.007	64.1	10.5	11.50	1	0.80	0	0.150	0.393
3013	1	0.044	0.004	12.3	0.5	14.34	2	0.80	0	0.250	0.461

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
2825	3	0.50	0.0	0.0	0.0	0.0	.......1....1..............1...
2826	3	0.93	0.61	0.74	0.71	0.0	...1...1.1..111.............1..
2829	3	0.80	0.07	0.07	0.0	0.0	...1...1.1..111...........111..
2835	3	0.50	0.0	0.0	0.0	0.0	...1...1.....11.............1..
2846	0	0.94	0.38	0.63	0.26	0.0	...1...1.1..111.............1..
2848	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.............1...
2849	0	0.10	0.0	0.06	0.0	0.0	.1.1...1.....1.............11..
2856	3	0.10	0.25	0.42	0.10	0.0	...1...1....111.............1..
2864	3	0.10	0.36	0.39	0.0	0.0	...1...1.1..111................
2865	3	0.80	0.0	0.02	0.0	0.0	...1...1.....11.............1..
2868	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2871	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2872	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................
2877	0	0.77	0.0	0.0	0.0	0.0	.......1..1..11................
2879	0	0.98	0.69	0.40	0.02	0.0	.......1....111................
2880	0	0.50	0.0	0.0	0.0	0.0	.......1....1..................
2892	0	0.10	0.19	0.24	0.25	0.0	...1...1....111................
2893	3	0.98	0.0	0.43	0.74	0.0	.......1.....11................
2906	0	0.69	0.71	0.05	0.00	0.0	.......1....111................
2908	3	0.10	0.0	0.14	0.08	0.0	...1...1....111.............1..
2909	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
2920	3	0.99	0.46	0.42	0.57	0.0	...1...1....111............11..
2922	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2928	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2932	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2933	3	0.82	0.62	0.43	0.63	0.0	...1...1.1..111..1...1......1..
2934	3	0.88	0.0	0.65	0.32	0.0	...1...1.....11..1...1.........
2950	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
2951	3	1.00	0.57	0.88	0.66	0.0	1..1...1....111.............1..
2957	0	0.90	0.0	0.49	0.0	0.0	.......1....11...1........11...
2959	3	1.00	0.39	0.07	0.0	0.0	.......1....11.................
2967	3	0.99	0.39	0.52	0.42	0.0	...1...1....111.............1..
2976	3	0.37	0.22	0.17	0.18	0.0	...1...1....111.............1..
2979	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2983	2	0.74	0.35	0.63	0.67	0.0	...1...1....111................
2984	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
2986	3	0.92	0.27	0.73	0.11	0.0	...1...1.1..111.............1..
2989	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............11..
2993	3	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
2995	0	0.85	0.0	0.08	0.0	0.0	...1...1.1..11..............1..
3003	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
3006	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1.............11..
3009	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
3012	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
3013	3	0.50	0.0	0.0	0.0	0.0	.......1....11.................

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
3024	3	0.053	0.010	41.1	3.8	11.54	2	0.80	0	0.150	0.393
3025	1	0.014	0.001	52.1	1.8	12.50	1	0.80	0	0.150	0.393
3026	1	0.062	0.008	21.3	1.2	12.79	2	0.80	0	0.150	0.393
3028	4	0.11	0.01	28.5	1.1	11.50	1	0.80	0	0.150	0.393
3032	2	0.065	0.014	27.5	3.0	12.18	2	0.80	0	0.150	0.393
3036	2	0.11	0.01	44.8	2.0	10.50	1	0.80	0	0.150	0.393
3037	3	0.11	0.01	21.2	0.8	12.13	2	0.80	0	0.150	0.393
3044	3	0.063	0.014	24.2	2.7	12.50	1	0.80	0	0.150	0.393
3046	1	0.056	0.008	20.2	1.5	13.00	1	0.80	0	0.150	0.393
3051	1	0.055	0.007	16.2	1.0	13.50	1	0.80	0	0.150	0.393
3052	2	0.050	0.006	13.6	0.8	14.00	1	0.80	0	0.250	0.461
3054	2	0.059	0.006	28.0	1.3	12.26	3	0.80	0	0.637	0.726
3061	1	0.042	0.005	26.5	1.6	12.72	2	0.80	0	0.150	0.393
3062	4	0.094	0.024	27.7	3.5	11.76	2	0.80	0	0.150	0.393
3063	4	0.037	0.002	125	4	9.50	1	0.80	0	0.150	0.393
3078	4	0.045	0.014	31.6	5.0	12.27	2	0.80	0	0.150	0.393
3089	2	0.058	0.015	39.8	5.0	11.50	1	0.80	0	0.150	0.393
3092	1	0.065	0.008	38.0	2.3	11.48	2	0.80	0	0.150	0.393
3094	2	0.061	0.008	24.5	1.5	12.50	1	0.80	0	0.150	0.393
3097	1	0.034	0.006	25.0	2.3	13.11	2	0.80	0	0.150	0.393
3104	1	0.12	0.01	22.3	1.2	11.97	2	0.80	0	0.150	0.393
3109	1	0.099	0.011	24.2	1.2	12.00	1	0.80	0	0.250	0.461
3115	3	0.14	0.01	20.5	1.0	11.98	3	0.80	0	-0.049	0.256
3118	4	0.048	0.008	37.5	3.0	11.83	2	0.80	0	0.150	0.393
3127	1	0.025	0.004	31.0	2.2	12.96	2	0.80	0	0.150	0.393
3132	2	0.024	0.008	39.0	6.5	12.52	2	0.80	0	0.150	0.393
3134	1	0.041	0.004	55.8	2.6	11.14	2	0.80	0	0.150	0.393
3139	3	0.044	0.003	45.6	1.5	11.50	1	0.80	0	0.150	0.393
3140	4	0.082	0.008	29.7	1.5	11.76	3	0.80	0	0.346	0.527
3141	6	0.078	0.018	43.5	5.0	11.00	1	0.80	0	0.150	0.393
3144	1	0.012	0.001	28.2	1.6	14.00	1	0.80	0	0.250	0.461
3147	1	0.011	0.001	29.0	2.0	14.00	1	0.80	0	0.150	0.393
3148	1	0.014	0.002	51.5	3.0	12.50	1	0.80	0	0.150	0.393
3150	3	0.065	0.019	33.5	4.7	11.77	2	0.80	0	0.150	0.393
3152	8	0.047	0.002	35.1	0.6	12.00	1	0.80	0	0.150	0.393
3156	3	0.040	0.003	32.5	1.2	12.36	2	0.80	0	0.150	0.393
3157	2	0.032	0.005	34.2	2.5	12.47	2	0.80	0	0.150	0.393
3161	5	0.087	0.018	15.6	1.5	13.09	2	0.80	0	0.150	0.393
3164	1	0.090	0.011	19.8	1.1	12.54	2	0.80	0	0.150	0.393
3166	1	0.10	0.01	12.0	0.5	13.50	1	0.80	0	0.250	0.461
3168	2	0.034	0.024	30.3	10.5	12.68	2	0.80	0	0.150	0.393
3171	1	0.041	0.004	47.3	2.0	11.50	1	0.80	0	0.150	0.393
3175	1	0.030	0.003	17.6	1.0	14.00	1	0.80	0	0.250	0.461
3176	3	0.066	0.014	37.3	3.8	11.50	1	0.80	0	0.150	0.393
3182	1	0.031	0.005	27.5	2.3	13.00	1	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
3024	3	0.62	0.0	0.34	0.0	0.0	...1...1....111.............1..
3025	0	0.50	0.0	0.0	0.0	0.0	1..1...1....11..............1..
3026	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1............111..
3028	0	0.10	0.0	0.22	0.0	0.0	...1...1....11.................
3032	3	0.50	0.0	0.0	0.0	0.0	.......1....111............1...
3036	0	0.10	0.08	0.04	0.05	0.0	...1...1....111..1.............
3037	3	0.10	0.22	0.24	0.34	0.0	.......1....111............1...
3044	0	0.97	0.37	0.51	0.25	0.0	...1...1....111.............1..
3046	0	0.50	0.0	0.0	0.0	0.0	.......1....11...1.........1...
3051	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
3052	0	0.10	0.0	0.27	0.0	0.0	.......1.1...1.................
3054	3	0.30	0.0	0.28	0.0	0.0	...1...1....11...1...1.........
3061	3	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
3062	3	0.99	0.0	0.59	0.0	0.0	...1...1....111............11..
3063	0	0.10	0.0	0.09	0.41	0.0	...1...1....111................
3078	3	1.00	0.11	0.90	0.65	0.0	...1...1.1..111.............1..
3089	0	1.00	0.98	0.46	0.28	0.0	...1...1....111................
3092	3	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
3094	0	0.47	0.0	0.17	0.0	0.0	...1...1....111.............1..
3097	3	0.50	0.0	0.0	0.0	0.0	.......1.1..11.................
3104	3	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3109	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
3115	3	0.36	0.32	0.11	0.0	0.0	.......1....11...1...1.........
3118	3	0.86	0.44	0.42	0.80	0.0	...1...1.1..111.............1..
3127	3	0.50	0.0	0.0	0.0	0.0	.......1.....11............1...
3132	3	1.00	0.0	0.68	0.0	0.0	...1...1.1..111..1......11111..
3134	3	0.50	0.0	0.0	0.0	0.0	...1...1....111..1.............
3139	0	0.10	0.09	0.35	0.07	0.0	...1...1....111.............1..
3140	3	0.17	0.0	0.49	0.0	0.0	...1...1....111.............1..
3141	0	0.99	0.0	0.63	0.0	0.0	...1...1.1..11.................
3144	3	0.50	0.0	0.0	0.0	0.0	.......1......1................
3147	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3148	3	0.50	0.0	0.0	0.0	0.0	.......1.....1..........1......
3150	3	1.00	0.48	0.40	0.0	0.0	...1...1....111................
3152	0	0.10	0.63	0.71	0.48	0.0	...1...1....111.............1..
3156	3	0.10	0.0	0.23	0.0	0.0	.......1.1..111................
3157	3	0.38	0.0	0.40	0.0	0.0	...1...1.....1..........1...1..
3161	3	0.90	0.0	0.89	0.0	0.0	...1..11.1..11.................
3164	3	0.50	0.0	0.0	0.0	0.0	.......1.....1..............1..
3166	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
3168	0	1.00	0.0	0.80	0.0	0.0	.......1....11.................
3171	0	0.50	0.0	0.0	0.0	0.0	.......1.....11............1...
3175	0	0.50	0.0	0.0	0.0	0.0	.......1....1..................
3176	0	0.97	0.34	0.51	0.55	0.0	...1...1....111..1..........1..
3182	0	0.50	0.0	0.0	0.0	0.0	.......1....11............11...

ID/1	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
3187	1	0.050	0.006	17.0	1.0	13.50	1	0.80	0	0.250	0.461
3193	1	0.014	0.002	25.2	1.5	14.06	3	0.80	0	0.147	0.391
3194	1	0.10	0.01	18.8	1.0	12.50	1	0.80	0	0.150	0.393
3197	1	0.050	0.009	25.0	2.1	12.68	3	0.80	0	0.332	0.517
3200	6	0.089	0.025	5.23	0.72	15.45	2	0.80	0	0.250	0.461
3201	1	0.011	0.001	22.7	1.5	14.50	1	0.80	0	0.250	0.461
3207	1	0.040	0.005	19.6	1.1	13.44	2	0.80	0	0.150	0.393
3211	1	0.014	0.002	32.5	2.1	13.50	1	0.80	0	0.150	0.393
3214	1	0.10	0.01	29.5	1.7	11.50	1	0.80	0	0.150	0.393
3222	3	0.042	0.003	33.5	1.0	12.22	2	0.80	0	0.150	0.393
3223	1	0.083	0.011	24.5	1.5	12.17	2	0.80	0	0.150	0.393
3224	1	0.042	0.004	34.8	1.7	12.15	2	0.80	0	0.150	0.393
3230	3	0.051	0.005	26.8	1.3	12.50	1	0.80	0	0.150	0.393
3234	1	0.026	0.003	30.0	1.8	13.00	1	0.80	0	0.150	0.393
3237	3	0.061	0.005	31.0	1.2	12.00	1	0.80	0	0.150	0.393
3238	1	0.037	0.005	15.6	1.0	14.00	1	0.80	0	0.150	0.393
3241	1	0.060	0.008	20.6	1.2	12.89	2	0.80	0	0.150	0.393
3247	1	0.035	0.004	17.7	1.0	13.81	2	0.80	0	0.250	0.461
3248	1	0.029	0.006	50.1	5.0	11.77	2	0.80	0	0.150	0.393
3256	1	0.023	0.002	29.0	1.5	13.18	2	0.80	0	0.150	0.393
3259	1	0.10	0.01	37.5	2.5	11.00	1	0.80	0	0.150	0.393
3260	2	0.041	0.013	18.1	2.7	13.59	2	0.80	0	0.250	0.461
3264	1	0.036	0.003	24.1	1.0	13.12	2	0.80	0	0.150	0.393
3273	2	0.045	0.010	35.8	4.0	12.00	1	0.80	0	0.150	0.393
3275	1	0.025	0.003	16.0	1.0	14.39	2	0.80	0	0.250	0.461
3278	1	0.046	0.004	35.6	1.5	12.00	1	0.80	0	0.150	0.393
3283	3	0.061	0.021	15.5	2.5	13.50	1	0.80	0	0.250	0.461
3285	5	0.19	0.02	10.0	0.5	13.19	2	0.80	0	0.150	0.393
3298	1	0.032	0.004	16.8	1.0	14.00	1	0.80	0	0.250	0.461
3307	1	0.038	0.005	13.5	0.7	14.30	1	0.80	0	0.250	0.461
3310	1	0.12	0.01	27.1	1.6	11.50	1	0.80	0	0.150	0.393
3311	1	0.047	0.006	22.3	1.3	13.00	1	0.80	0	0.150	0.393
3312	2	0.034	0.018	32.7	8.5	12.50	1	0.80	0	0.150	0.393
3316	1	0.075	0.009	23.5	1.5	12.37	2	0.80	0	0.150	0.393
3317	3	0.050	0.006	127	8	9.15	2	0.80	0	0.150	0.393

ID/1	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
3187	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
3193	0	0.50	0.0	0.0	0.0	0.0	......11...1.1.................
3194	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3197	0	0.50	0.0	0.0	0.0	0.0	...1...1.....11................
3200	0	0.62	0.46	0.19	0.22	0.0	.......1....111................
3201	0	0.50	0.0	0.0	0.0	0.0	......11.....1...1.............
3207	0	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................
3211	0	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.................
3214	0	0.50	0.0	0.0	0.0	0.0	.......1......1................
3222	0	0.10	0.18	0.40	0.38	0.0	...1...1.1..111..1.............
3223	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
3224	0	0.50	0.0	0.0	0.0	0.0	.......1....111................
3230	0	0.10	0.0	0.86	0.0	0.0	...1...1.....1...1...1.....1...
3234	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3237	0	0.10	0.0	0.29	0.0	0.0	.......1.1..111................
3238	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3241	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3247	0	0.50	0.0	0.0	0.0	0.0	...1...1....11..............1...
3248	0	0.50	0.0	0.0	0.0	0.0	.......1....11..........1111...
3256	0	0.50	0.0	0.0	0.0	0.0	...1...1....111..............1..
3259	0	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
3260	0	0.94	0.0	0.27	0.0	0.0	.......1.1...1.................
3264	0	0.50	0.0	0.0	0.0	0.0	...1...1....11.................
3273	0	0.83	0.0	0.10	0.0	0.0	.......1.....11................
3275	0	0.50	0.0	0.0	0.0	0.0	......11.....1.................
3278	0	0.50	0.0	0.0	0.0	0.0	.......1....11.................
3283	0	0.97	0.0	0.81	0.0	0.0	.......1....11.................
3285	0	0.42	0.18	0.15	0.0	0.0	...1...1....11..............1...
3298	0	0.50	0.0	0.0	0.0	0.0	.......1.....11............1...
3307	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3310	0	0.50	0.0	0.0	0.0	0.0	...1...1.1...1.................
3311	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
3312	0	1.00	0.0	1.06	0.0	0.0	.......1.1...11............1...
3316	0	0.50	0.0	0.0	0.0	0.0	.......1.....1.............1...
3317	0	0.54	0.0	0.32	0.46	0.0	...1...1....111................

ID/2	No.	p_V	σ_{pV}	D	σ_D	H_B		B-V		G_B	Q
5	1	0.020	0.003	34.1	2.2	13.00	1	0.80	0	0.150	0.393
21	1	0.042	0.007	18.5	1.5	13.50	1	0.80	0	0.250	0.461
26	1	0.080	0.011	27.0	1.7	12.00	1	0.80	0	0.150	0.393
37	1	0.017	0.002	37.2	2.5	13.00	1	0.80	0	0.250	0.461
46	1	0.031	0.008	27.5	3.5	13.00	1	0.80	0	0.150	0.393
52	3	0.039	0.005	38.7	2.3	12.00	1	0.80	0	0.150	0.393
65	1	0.022	0.003	16.2	1.0	14.50	1	0.80	0	0.250	0.461
72	1	0.014	0.003	25.8	2.5	14.00	1	0.80	0	0.150	0.393
81	1	0.016	0.003	37.6	3.5	13.00	1	0.80	0	0.150	0.393
83	1	0.011	0.002	36.1	2.5	13.50	1	0.80	0	0.150	0.393
98	1	0.011	0.001	29.5	1.8	14.00	1	0.80	0	0.150	0.393
102	1	0.062	0.006	11.0	0.5	14.20	1	0.80	0	0.150	0.393
113	1	0.018	0.002	29.7	1.3	13.40	1	0.80	0	0.150	0.393
114	1	0.021	0.003	20.8	1.3	14.00	1	0.80	0	0.250	0.461
116	1	0.015	0.002	21.5	1.1	14.30	1	0.80	0	0.250	0.461
123	1	0.027	0.004	29.1	2.2	13.00	1	0.80	0	0.150	0.393
125	1	0.011	0.002	14.5	1.0	15.50	1	0.80	0	0.150	0.393
129	3	0.055	0.010	25.7	2.3	12.50	1	0.80	0	0.250	0.461
130	1	0.063	0.008	24.0	1.5	12.50	1	0.80	0	0.150	0.393
131	5	0.052	0.015	16.7	2.3	13.50	1	0.80	0	0.150	0.393
133	1	0.11	0.01	17.6	1.0	12.50	1	0.80	0	0.150	0.393

ID/2	ER	P_{FV}	Δmag_1	Δmag_2	Δmag_3	Δmag_4	Status 1234567890123456789012345678901
5	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
21	1	0.50	0.0	0.0	0.0	0.0	.......1....11.................
26	1	0.50	0.0	0.0	0.0	0.0	......11.....1.................
37	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
46	1	0.50	0.0	0.0	0.0	0.0	.......1....11.............1...
52	1	0.33	0.05	0.40	0.23	0.0	...1...1....111.............1..
65	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
72	1	0.50	0.0	0.0	0.0	0.0	.......1.....11................
81	1	0.50	0.0	0.0	0.0	0.0	.......1....11.................
83	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
98	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
102	1	0.50	0.0	0.0	0.0	0.0	......11....11.............1...
113	1	0.50	0.0	0.0	0.0	0.0	.......1.....11................
114	1	0.50	0.0	0.0	0.0	0.0	.......1.....1.................
116	1	0.50	0.0	0.0	0.0	0.0	.......1....11.................
123	1	0.50	0.0	0.0	0.0	0.0	...1...1.....11.............1..
125	1	0.50	0.0	0.0	0.0	0.0	...1...1.....1.................
129	1	0.98	0.57	0.50	0.67	0.0	...1..11....111............11..
130	1	0.50	0.0	0.0	0.0	0.0	...1...1.....1..............1..
131	1	1.00	0.53	0.63	0.81	0.0	...1..11.1..111..1...1......1..
133	1	0.50	0.0	0.0	0.0	0.0	.......1.1...1.................

SECTION III-2.

Asteroid Statistics [FDP 6]

The Asteroid Statistics Catalog is part of Final Data Product No. 6. This product contains information on the number of times each object was sighted, the number of times it was predicted to be sighted and possible reasons for any failures to be sighted. It is the only Final Data Product which specifically identifies asteroids for which no IRAS sightings exist.

The column headers are:

ID/1	:	the asteroid serial number
P	:	the predicted number of sightings
S	:	the number of sightings realized
F	:	the number of times the source was expected to be too faint to be detected
D	:	the number of times source was not detected and its image crossed over a dead 25 μm detector
N	:	the number of times the asteroid was not detected and its image passed over a noisy 25 μm detector
X	:	the number of times the expected source was not detected and no likely reason for the nondetection could be identified

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
1	6	6	.	.	.	.	46	3	3	.	.	.	.	91	2	2	.	.	.	.
2	11	11	.	.	.	.	47	8	8	.	.	.	.	92	2	2	.	.	.	.
3	9	9	.	.	.	.	48	6	6	.	.	.	.	93	2	2	.	.	.	.
4	2	2	.	.	.	.	49	2	2	.	.	.	.	94	6	6	.	.	.	.
5	3	3	.	.	.	.	50	2	2	.	.	.	.	95	7	7	.	.	.	.
6	9	8	.	1	.	.	51	6	6	.	.	.	.	96	7	7	.	.	.	.
7	7	7	.	.	.	.	52	7	7	.	.	.	.	97	8	8	.	.	.	.
8	7	7	.	.	.	.	53	5	5	.	.	.	.	98	9	9	.	.	.	.
9	.	.	.	.	.	.	54	7	7	.	.	.	.	99	2	2	.	.	.	.
10	9	9	.	.	.	.	55	2	2	.	.	.	.	100	8	8	.	.	.	.
11	4	4	.	.	.	.	56	8	8	.	.	.	.	101	5	5	.	.	.	.
12	2	2	.	.	.	.	57	2	2	.	.	.	.	102	5	5	.	.	.	.
13	3	3	.	.	.	.	58	3	3	.	.	.	.	103	9	9	.	.	.	.
14	.	.	.	.	.	.	59	4	4	.	.	.	.	104	6	6	.	.	.	.
15	7	7	.	.	.	.	60	3	3	.	.	.	.	105	3	3	.	.	.	.
16	10	10	.	.	.	.	61	16	15	.	.	.	1	106	6	6	.	.	.	.
17	4	4	.	.	.	.	62	5	5	.	.	.	.	107	10	10	.	.	.	.
18	4	3	.	1	.	.	63	4	4	.	.	.	.	108	5	5	.	.	.	.
19	.	.	.	.	.	.	64	.	.	.	.	.	.	109	9	9	.	.	.	.
20	3	3	.	.	.	.	65	7	7	.	.	.	.	110	5	5	.	.	.	.
21	5	5	.	.	.	.	66	8	8	.	.	.	.	111	1	1	.	.	.	.
22	8	4	.	2	2	.	67	3	3	.	.	.	.	112	13	13	.	.	.	.
23	6	6	.	.	.	.	68	8	8	.	.	.	.	113	3	3	.	.	.	.
24	.	.	.	.	.	.	69	2	2	.	.	.	.	114	7	7	.	.	.	.
25	8	8	.	.	.	.	70	4	4	.	.	.	.	115	7	7	.	.	.	.
26	7	7	.	.	.	.	71	5	5	.	.	.	.	116	2	2	.	.	.	.
27	.	.	.	.	.	.	72	8	8	.	.	.	.	117	4	4	.	.	.	.
28	8	8	.	.	.	.	73	9	8	.	.	.	1	118	13	13	.	.	.	.
29	5	5	.	.	.	.	74	3	3	.	.	.	.	119	8	6	.	1	1	.
30	7	7	.	.	.	.	75	7	7	.	.	.	.	120	9	9	.	.	.	.
31	8	8	.	.	.	.	76	5	5	.	.	.	.	121	6	6	.	.	.	.
32	12	11	.	1	.	.	77	6	6	.	.	.	.	122	3	3	.	.	.	.
33	.	.	.	.	.	.	78	9	9	.	.	.	.	123	5	5	.	.	.	.
34	7	7	.	.	.	.	79	4	4	.	.	.	.	124	4	4	.	.	.	.
35	2	2	.	.	.	.	80	11	11	.	.	.	.	125	5	5	.	.	.	.
36	3	3	.	.	.	.	81	12	12	.	.	.	.	126	2	2	.	.	.	.
37	8	8	.	.	.	.	82	5	5	.	.	.	.	127	.	.	.	.	.	.
38	9	9	.	.	.	.	83	7	7	.	.	.	.	128	4	4	.	.	.	.
39	3	3	.	.	.	.	84	4	4	.	.	.	.	129	2	2	.	.	.	.
40	6	6	.	.	.	.	85	2	2	.	.	.	.	130	7	7	.	.	.	.
41	3	3	.	.	.	.	86	4	4	.	.	.	.	131	5	5	.	.	.	.
42	3	3	.	.	.	.	87	9	8	.	.	1	.	132	7	7	.	.	.	.
43	2	2	.	.	.	.	88	2	2	.	.	.	.	133	5	5	.	.	.	.
44	6	6	.	.	.	.	89	5	4	.	.	.	1	134	8	8	.	.	.	.
45	7	7	.	.	.	.	90	1	1	.	.	.	.	135	5	5	.	.	.	.

ID/1	P	S	F	D	N	X
136	3	3	.	.	.	.
137	4	4	.	.	.	.
138	2	2	.	.	.	.
139	8	7	.	.	.	1
140	2	2	.	.	.	.
141	3	3	.	.	.	.
142	2	2	.	.	.	.
143	8	8	.	.	.	.
144	7	7	.	.	.	.
145	4	4	.	.	.	.
146	9	9	.	.	.	.
147	4	4	.	.	.	.
148	4	4	.	.	.	.
149	9	9	.	.	.	.
150	6	6	.	.	.	.
151	7	7	.	.	.	.
152	.	.	.	.	.	.
153	7	7	.	.	.	.
154	6	6	.	.	.	.
155	9	7	2	.	.	.
156	7	7	.	.	.	.
157	3	3	.	.	.	.
158	5	4	.	.	.	1
159	7	7	.	.	.	.
160	2	2	.	.	.	.
161	11	11	.	.	.	.
162	4	4	.	.	.	.
163	6	5	.	.	.	1
164	8	8	.	.	.	.
165	2	2	.	.	.	.
166	.	.	.	.	.	.
167	2	2	.	.	.	.
168	2	2	.	.	.	.
169	5	4	.	1	.	.
170	4	4	.	.	.	.
171	4	4	.	.	.	.
172	7	7	.	.	.	.
173	5	5	.	.	.	.
174	8	8	.	.	.	.
175	6	6	.	.	.	.
176	11	11	.	.	.	.
177	5	5	.	.	.	.
178	6	6	.	.	.	.
179	16	15	.	.	.	1
180	6	3	3	1	.	.
181	7	7	.	.	.	.
182	5	5	.	.	.	.
183	9	8	.	.	.	1
184	4	4	.	.	.	.
185	11	10	.	.	.	1
186	3	3	.	.	.	.
187	5	5	.	.	.	.
188	7	7	.	.	.	.
189	6	6	.	.	.	.
190	.	.	.	.	.	.
191	2	2	.	.	.	.
192	6	6	.	.	.	.
193	.	.	.	.	.	.
194	3	3	.	.	.	.
195	10	10	.	.	.	.
196	7	7	.	.	.	.
197	10	9	.	.	.	1
198	11	9	.	.	.	2
199	2	2	.	.	.	.
200	9	9	.	.	.	.
201	5	5	.	.	.	.
202	2	2	.	.	.	.
203	5	5	.	.	.	.
204	11	11	.	.	.	.
205	7	7	.	.	.	.
206	.	.	.	.	.	.
207	3	3	.	.	.	.
208	2	2	.	.	.	.
209	8	8	.	.	.	.
210	2	2	.	.	.	.
211	21	20	.	.	.	1
212	5	5	.	.	.	.
213	2	2	.	.	.	.
214	6	5	1	.	.	.
215	6	6	.	.	.	.
216	7	7	.	.	.	.
217	2	2	.	.	.	.
218	4	4	.	.	.	.
219	8	8	.	.	.	.
220	3	3	.	.	.	.
221	8	8	.	.	.	.
222	14	14	.	.	.	.
223	7	7	.	.	.	.
224	2	2	.	.	.	.
225	7	7	.	.	.	.
226	5	4	.	1	.	.
227	6	5	.	1	.	.
228	10	2	8	2	2	.
229	1	1	.	.	.	.
230	6	6	.	.	.	.
231	3	3	.	.	.	.
232	8	8	.	.	.	.
233	14	14	.	.	.	.
234	4	4	.	.	.	.
235	4	4	.	.	.	.
236	7	7	.	.	.	.
237	4	4	.	.	.	.
238	8	8	.	.	.	.
239	4	4	.	.	.	.
240	3	3	.	.	.	.
241	6	6	.	.	.	.
242	2	2	.	.	.	.
243	7	6	1	.	.	.
244	10	3	7	1	3	.
245	4	4	.	.	.	.
246	7	7	.	.	.	.
247	6	6	.	.	.	.
248	4	4	.	.	.	.
249	5	5	.	.	.	.
250	5	5	.	.	.	.
251	6	4	.	1	.	1
252	4	4	.	.	.	.
253	7	7	.	.	.	.
254	6	2	4	1	.	.
255	4	4	.	.	.	.
256	3	3	.	.	.	.
257	2	2	.	.	.	.
258	8	8	.	.	.	.
259	2	2	.	.	.	.
260	2	2	.	.	.	.
261	3	3	.	.	.	.
262	5	3	2	2	.	.
263	6	6	.	.	.	.
264	11	11	.	.	.	.
265	3	3	.	.	.	.
266	3	2	.	.	.	1
267	5	5	.	.	.	.
268	2	2	.	.	.	.
269	4	4	.	.	.	.
270	6	6	.	.	.	.

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
271	7	7	.	.	.	.	316	2	2	.	.	.	.	361	8	7	.	.	1	.
272	4	4	.	.	.	.	317	6	3	3	1	.	.	362	.	.	.	.	.	.
273	3	3	.	.	.	.	318	.	.	.	.	.	.	363	.	.	.	.	.	.
274	5	5	.	.	.	.	319	9	8	1	.	.	.	364	11	9	.	.	1	1
275	2	2	.	.	.	.	320	4	1	3	2	1	.	365	12	12	.	.	.	.
276	8	8	.	.	.	.	321	10	5	4	.	.	.	366	13	13	.	.	.	.
277	6	6	.	.	.	.	322	12	10	.	.	.	2	367	2	2	.	.	.	.
278	5	5	.	.	.	.	323	2	2	.	.	.	.	368	4	4	.	.	.	.
279	7	7	.	.	.	.	324	2	2	.	.	.	.	369	9	9	.	.	.	.
280	6	6	.	.	.	.	325	6	6	.	.	.	.	370	.	.	.	.	.	.
281	9	5	4	.	.	.	326	4	4	.	.	.	.	371	7	7	.	.	.	.
282	10	10	.	.	.	.	327	3	2	.	.	.	1	372	6	6	.	.	.	.
283	2	2	.	.	.	.	328	3	3	.	.	.	.	373	7	7	.	.	.	.
284	9	8	.	.	.	1	329	5	5	.	.	.	.	374	4	4	.	.	.	.
285	3	3	.	.	.	.	330	.	.	.	.	.	.	375	2	.	.	1	1	.
286	5	5	.	.	.	.	331	4	4	.	.	.	.	376	5	5	.	.	.	.
287	4	4	.	.	.	.	332	2	2	.	.	.	.	377	4	4	.	.	.	.
288	2	1	.	.	.	1	333	4	4	.	.	.	.	378	4	3	1	.	1	.
289	5	3	2	1	.	.	334	7	7	.	.	.	.	379	6	6	.	.	.	.
290	6	1	5	1	.	.	335	6	6	.	.	.	.	380	11	11	.	.	.	.
291	14	4	10	4	.	.	336	9	8	.	1	.	.	381	8	8	.	.	.	.
292	10	10	.	.	.	.	337	8	7	.	1	.	.	382	6	6	.	.	.	.
293	11	11	.	.	.	.	338	6	6	.	.	.	.	383	5	5	.	.	.	.
294	5	4	.	.	.	1	339	6	5	.	1	.	.	384	6	6	.	.	.	.
295	10	7	3	2	.	.	340	3	3	.	.	.	.	385	9	9	.	.	.	.
296	6	2	4	1	1	.	341	16	14	2	.	1	.	386	8	8	.	.	.	.
297	5	5	.	.	.	.	342	2	2	.	.	.	.	387	2	2	.	.	.	.
298	.	.	.	.	.	.	343	2	2	.	.	.	.	388	4	4	.	.	.	.
299	8	4	4	1	.	.	344	10	9	.	.	.	1	389	9	9	.	.	.	.
300	2	2	.	.	.	.	345	9	8	.	1	.	.	390	8	7	.	.	.	1
301	11	9	.	.	1	1	346	5	5	.	.	.	.	391	3	2	1	.	.	.
302	7	7	.	.	.	.	347	10	10	.	.	.	.	392	3	3	.	.	.	.
303	5	5	.	.	.	.	348	7	7	.	.	.	.	393	3	3	.	.	.	.
304	3	3	.	.	.	.	349	6	6	.	.	.	.	394	5	3	2	1	.	.
305	8	8	.	.	.	.	350	13	12	.	.	1	.	395	1	1	.	.	.	.
306	11	11	.	.	.	.	351	4	4	.	.	.	.	396	8	8	.	.	.	.
307	6	6	.	.	.	.	352	2	2	.	.	.	.	397	11	11	.	.	.	.
308	6	6	.	.	.	.	353	.	.	.	.	.	.	398	6	5	.	.	.	1
309	7	7	.	.	.	.	354	15	15	.	.	.	.	399	5	5	.	.	.	.
310	11	10	.	1	.	.	355	15	13	.	2	.	.	400	7	7	.	.	.	.
311	2	2	.	.	.	.	356	7	7	.	.	.	.	401	4	4	.	.	.	.
312	11	11	.	.	.	.	357	4	4	.	.	.	.	402	8	8	.	.	.	.
313	6	6	.	.	.	.	358	6	6	.	.	.	.	403	9	9	.	.	.	.
314	3	3	.	.	.	.	359	4	4	.	.	.	.	404	9	9	.	.	.	.
315	6	.	6	2	.	.	360	7	7	.	.	.	.	405	5	5	.	.	.	.

ID/1	P	S	F	D	N	X
406	4	4	.	.	.	.
407	11	11	.	.	.	.
408	13	7	.	3	.	3
409	5	5	.	.	.	.
410	21	21	.	.	.	.
411	7	7	.	.	.	.
412	5	5	.	.	.	.
413	4	4	.	.	.	.
414	6	6	.	.	.	.
415	11	11	.	.	.	.
416	7	6	.	1	.	.
417	2	2	.	.	.	.
418	11	11	.	.	.	.
419	12	12	.	.	.	.
420	10	10	.	.	.	.
421	4	.	4	1	1	.
422	3	.	3	1	1	.
423	3	3	.	.	.	.
424	6	6	.	.	.	.
425	5	5	.	.	.	.
426	6	6	.	.	.	.
427	9	7	.	.	1	1
428	4	3	1	.	.	.
429	7	7	.	.	.	.
430	5	5	.	.	.	.
431	8	8	.	.	.	.
432	9	9	.	.	.	.
433	.	.	.	.	.	.
434	.	.	.	.	.	.
435	2	2	.	.	.	.
436	9	9	.	.	.	.
437	5	4	.	.	.	1
438	9	9	.	.	.	.
439	2	2	.	.	.	.
440	7	1	6	2	1	.
441	2	2	.	.	.	.
442	8	8	.	.	.	.
443	8	8	.	.	.	.
444	6	6	.	.	.	.
445	9	9	.	.	.	.
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448	2	2	.	.	.	.
449	7	7	.	.	.	.
450	6	6	.	.	.	.
451	8	8	.	.	.	.
452	6	3	3	1	.	.
453	3	3	.	.	.	.
454	2	2	.	.	.	.
455	6	6	.	.	.	.
456	7	7	.	.	.	.
457	4	.	4	1	.	.
458	3	3	.	.	.	.
459	5	2	3	2	.	.
460	2	2	.	.	.	.
461	2	2	.	.	.	.
462	7	5	.	.	.	2
463	10	8	2	1	.	.
464	6	6	.	.	.	.
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466	12	12	.	.	.	.
467	9	8	.	.	1	.
468	2	2	.	.	.	.
469	7	7	.	.	.	.
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471	4	4	.	.	.	.
472	7	6	.	.	1	.
473	.	.	.	.	.	.
474	7	7	.	.	.	.
475	6	4	2	1	.	.
476	4	4	.	.	.	.
477	7	6	.	.	.	1
478	9	9	.	.	.	.
479	6	6	.	.	.	.
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481	1	1	.	.	.	.
482	2	2	.	.	.	.
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487	8	8	.	.	.	.
488	8	8	.	.	.	.
489	4	4	.	.	.	.
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491	2	2	.	.	.	.
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493	10	10	.	.	.	.
494	7	7	.	.	.	.
495	8	8	.	.	.	.
496	6	4	2	2	.	.
497	7	3	2	2	.	1
498	7	7	.	.	.	.
499	4	4	.	.	.	.
500	9	9	.	.	.	.
501	4	4	.	.	.	.
502	4	4	.	.	.	.
503	2	2	.	.	.	.
504	14	14	.	.	.	.
505	.	.	.	.	.	.
506	6	6	.	.	.	.
507	14	13	.	1	.	.
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509	4	4	.	.	.	.
510	8	8	.	.	.	.
511	9	9	.	.	.	.
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526	7	6	.	.	1	.
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528	3	3	.	.	.	.
529	9	7	2	2	.	.
530	4	4	.	.	.	.
531	7	6	1	1	.	.
532	12	12	.	.	.	.
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534	7	7	.	.	.	.
535	8	8	.	.	.	.
536	11	8	.	.	1	2
537	5	4	.	1	.	.
538	2	2	.	.	.	.
539	6	6	.	.	.	.
540	14	7	3	2	4	1

ID/1	P	S	F	D	N	X
541	4	4	.	.	.	.
542	7	7	.	.	.	.
543	6	4	.	1	1	.
544	3	3	.	.	.	.
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550	4	3	.	.	.	1
551	4	4	.	.	.	.
552	2	2	.	.	.	.
553	7	.	7	2	1	.
554	17	15	.	.	.	2
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556	5	5	.	.	.	.
557	.	.	.	.	.	.
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571	9	4	5	1	.	.
572	2	2	.	.	.	.
573	6	6	.	.	.	.
574	6	4	2	1	.	.
575	4	2	2	1	1	.
576	8	7	.	1	.	.
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578	2	2	.	.	.	.
579	7	7	.	.	.	.
580	7	7	.	.	.	.
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591	8	8	.	.	.	.
592	3	3	.	.	.	.
593	5	5	.	.	.	.
594	20	17	3	2	1	.
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604	4	4	.	.	.	.
605	7	7	.	.	.	.
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608	5	2	3	.	1	.
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610	2	.	2	1	1	.
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612	8	8	.	.	.	.
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619	.	.	.	.	.	.
620	1	.	1	.	.	.
621	5	4	.	.	.	1
622	4	2	2	.	1	.
623	3	3	.	.	.	.
624	.	.	.	.	.	.
625	2	1	.	.	.	1
626	8	8	.	.	.	.
627	11	11	.	.	.	.
628	10	10	.	.	.	.
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630	5	4	.	.	.	1
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632	2	.	2	1	.	.
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634	7	7	.	.	.	.
635	5	5	.	.	.	.
636	9	9	.	.	.	.
637	4	3	.	.	1	.
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640	4	4	.	.	.	.
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643	8	8	.	.	.	.
644	2	1	.	.	.	1
645	6	6	.	.	.	.
646	4	2	2	1	1	.
647	8	.	8	3	2	.
648	4	4	.	.	.	.
649	4	1	3	2	1	.
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651	4	4	.	.	.	.
652	6	2	4	2	1	.
653	8	8	.	.	.	.
654	5	5	.	.	.	.
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662	2	2	.	.	.	.
663	8	8	.	.	.	.
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665	5	4	.	1	.	.
666	9	8	.	1	.	.
667	6	6	.	.	.	.
668	3	3	.	.	.	.
669	4	4	.	.	.	.
670	8	8	.	.	.	.
671	7	7	.	.	.	.
672	2	2	.	.	.	.
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674	9	9	.	.	.	.
675	.	.	.	.	.	.

ID/1	P	S	F	D	N	X
676	8	8	.	.	.	.
677	3	3	.	.	.	.
678	5	5	.	.	.	.
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681	4	1	3	1	.	.
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684	4	1	3	1	.	.
685	2	2	.	.	.	.
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703	14	1	13	4	2	.
704	10	10	.	.	.	.
705	8	8	.	.	.	.
706	3	3	.	.	.	.
707	7	1	6	1	3	.
708	4	3	1	.	.	.
709	4	4	.	.	.	.
710	7	6	1	.	.	.
711	4	1	3	.	.	.
712	17	16	.	1	.	.
713	2	2	.	.	.	.
714	5	5	.	.	.	.
715	9	8	.	1	.	.
716	2	2	.	.	.	.
717	10	9	.	.	.	1
718	7	7	.	.	.	.
719	.	.	.	.	.	.
720	8	7	.	.	.	1
721	7	7	.	.	.	.
722	6	1	5	2	2	.
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724	.	.	.	.	.	.
725	4	4	.	.	.	.
726	4	4	.	.	.	.
727	9	8	.	.	.	1
728	6	2	4	1	.	.
729	6	6	.	.	.	.
730	6	.	5	2	1	.
731	5	4	1	1	.	.
732	2	2	.	.	.	.
733	5	5	.	.	.	.
734	11	10	.	1	.	.
735	8	7	.	.	.	1
736	14	12	2	1	.	.
737	2	2	.	.	.	.
738	10	8	.	1	.	1
739	5	5	.	.	.	.
740	9	9	.	.	.	.
741	3	3	.	.	.	.
742	9	9	.	.	.	.
743	6	6	.	.	.	.
744	10	10	.	.	.	.
745	4	1	.	1	1	1
746	6	6	.	.	.	.
747	10	10	.	.	.	.
748	4	4	.	.	.	.
749	7	.	7	2	1	.
750	4	3	1	1	.	.
751	7	7	.	.	.	.
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757	3	3	.	.	.	.
758	7	7	.	.	.	.
759	5	5	.	.	.	.
760	4	3	.	1	.	.
761	6	.	6	2	1	.
762	5	5	.	.	.	.
763	8	6	2	.	1	.
764	5	5	.	.	.	.
765	.	.	.	.	.	.
766	6	5	.	1	.	.
767	5	4	.	.	.	1
768	8	4	.	.	3	1
769	4	4	.	.	.	.
770	3	3	.	.	.	.
771	2	2	.	.	.	.
772	10	10	.	.	.	.
773	6	6	.	.	.	.
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775	6	6	.	.	.	.
776	2	2	.	.	.	.
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778	7	7	.	.	.	.
779	7	7	.	.	.	.
780	6	6	.	.	.	.
781	6	6	.	.	.	.
782	6	5	1	.	.	.
783	5	5	.	.	.	.
784	2	2	.	.	.	.
785	2	2	.	.	.	.
786	7	7	.	.	.	.
787	6	6	.	.	.	.
788	2	2	.	.	.	.
789	4	1	.	1	.	2
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791	7	7	.	.	.	.
792	5	5	.	.	.	.
793	3	3	.	.	.	.
794	7	5	2	1	.	.
795	6	6	.	.	.	.
796	2	2	.	.	.	.
797	2	2	.	.	.	.
798	15	13	.	1	.	1
799	8	8	.	.	.	.
800	6	2	4	1	.	.
801	12	11	.	.	.	1
802	9	2	7	3	3	.
803	5	5	.	.	.	.
804	10	9	.	.	.	1
805	4	4	.	.	.	.
806	5	5	.	.	.	.
807	6	6	.	.	.	.
808	4	4	.	.	.	.
809	7	2	5	2	2	.
810	2	.	2	.	.	.

ID/1	P	S	F	D	N	X
811	6	3	3	2	1	.
812	7	3	.	2	.	2
813	7	4	3	1	.	.
814	2	2	.	.	.	.
815	5	2	.	1	.	1
816	8	8	.	.	.	.
817	6	2	.	.	1	3
818	2	2	.	.	.	.
819	3	.	3	1	1	.
820	10	10	.	.	.	.
821	2	.	2	1	1	.
822	.	.	.	.	.	.
823	11	4	7	2	1	.
824	5	5	.	.	.	.
825	9	6	3	2	1	.
826	7	6	.	1	.	.
827	4	1	3	1	.	.
828	12	8	.	2	.	2
829	2	2	.	.	.	.
830	9	8	.	.	.	1
831	.	.	.	.	.	.
832	7	2	5	2	1	.
833	8	7	1	1	.	.
834	11	11	.	.	.	.
835	6	4	2	.	.	.
836	6	.	6	1	.	.
837	3	.	3	1	.	.
838	4	4	.	.	.	.
839	12	9	2	.	3	.
840	7	3	.	1	.	3
841	8	2	6	3	1	.
842	9	9	.	.	.	.
843	5	2	3	1	.	.
844	8	6	.	1	.	1
845	6	6	.	.	.	.
846	3	3	.	.	.	.
847	5	5	.	.	.	.
848	2	2	.	.	.	.
849	2	2	.	.	.	.
850	4	4	.	.	.	.
851	13	2	11	2	2	.
852	3	3	.	.	.	.
853	6	6	.	.	.	.
854	2	1	1	.	.	.
855	3	.	3	1	.	.

ID/1	P	S	F	D	N	X
856	2	2	.	.	.	.
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858	7	6	1	.	.	.
859	6	6	.	.	.	.
860	4	4	.	.	.	.
861	17	17	.	.	.	.
862	5	5	.	.	.	.
863	4	4	.	.	.	.
864	11	6	5	1	2	.
865	4	3	1	1	.	.
866	4	4	.	.	.	.
867	6	3	2	1	.	1
868	4	4	.	.	.	.
869	5	5	.	.	.	.
870	4	.	4	2	1	.
871	4	1	3	1	.	.
872	3	3	.	.	.	.
873	2	2	.	.	.	.
874	5	5	.	.	.	.
875	2	2	.	.	.	.
876	6	2	4	.	1	.
877	2	2	.	.	.	.
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879	.	.	.	.	.	.
880	4	3	1	.	.	.
881	3	.	3	1	.	.
882	6	4	.	1	1	.
883	5	.	5	1	1	.
884	.	.	.	.	.	.
885	2	2	.	.	.	.
886	14	14	.	.	.	.
887	6	3	3	.	.	.
888	10	10	.	.	.	.
889	7	2	5	2	1	.
890	2	2	.	.	.	.
891	3	3	.	.	.	.
892	6	6	.	.	.	.
893	7	7	.	.	.	.
894	4	3	.	.	.	1
895	2	2	.	.	.	.
896	6	6	.	.	.	.
897	5	5	.	.	.	.
898	16	6	10	5	2	.
899	9	8	.	1	.	.
900	4	4	.	.	.	.

ID/1	P	S	F	D	N	X
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902	5	.	5	2	.	.
903	6	6	.	.	.	.
904	6	6	.	.	.	.
905	8	2	6	3	1	.
906	2	.	.	.	.	2
907	4	4	.	.	.	.
908	7	7	.	.	.	.
909	4	4	.	.	.	.
910	4	4	.	.	.	.
911	7	7	.	.	.	.
912	4	4	.	.	.	.
913	4	1	3	2	.	.
914	6	6	.	.	.	.
915	10	.	10	5	1	.
916	7	7	.	.	.	.
917	7	5	2	2	.	.
918	2	1	.	.	.	1
919	2	2	.	.	.	.
920	7	7	.	.	.	.
921	2	2	.	.	.	.
922	5	.	5	2	1	.
923	5	5	.	.	.	.
924	9	9	.	.	.	.
925	13	13	.	.	.	.
926	9	9	.	.	.	.
927	6	6	.	.	.	.
928	7	7	.	.	.	.
929	5	.	5	3	1	.
930	3	3	.	.	.	.
931	12	11	1	1	.	.
932	.	.	.	.	.	.
933	6	5	1	.	.	.
934	14	14	.	.	.	.
935	8	6	2	1	.	.
936	13	9	2	1	.	1
937	8	7	1	.	1	.
938	3	3	.	.	.	.
939	5	4	1	.	.	.
940	2	2	.	.	.	.
941	5	.	5	1	1	.
942	2	1	.	.	.	1
943	4	4	.	.	.	.
944	12	8	4	.	.	.
945	2	2	.	.	.	.

ID/1	P	S	F	D	N	X
946	16	10	5	2	2	.
947	8	8	.	.	.	.
948	2	.	.	1	.	1
949	6	6	.	.	.	.
950	7	7	.	.	.	.
951	3	1	2	1	.	.
952	4	4	.	.	.	.
953	4	4	.	.	.	.
954	6	6	.	.	.	.
955	7	6	.	.	.	1
956	8	2	6	1	1	.
957	4	4	.	.	.	.
958	4	4	.	.	.	.
959	8	8	.	.	.	.
960	5	.	5	1	.	.
961	7	6	.	.	.	1
962	5	2	3	.	.	.
963	11	3	8	2	1	.
964	11	.	7	3	1	3
965	4	4	.	.	.	.
966	4	4	.	.	.	.
967	7	3	4	1	.	.
968	9	3	6	2	1	.
969	2	2	.	.	.	.
970	3	.	.	1	1	1
971	5	5	.	.	.	.
972	6	6	.	.	.	.
973	5	5	.	.	.	.
974	5	4	1	.	1	.
975	4	2	2	1	1	.
976	2	2	.	.	.	.
977	8	8	.	.	.	.
978	6	6	.	.	.	.
979	12	10	.	.	.	2
980	7	7	.	.	.	.
981	2	2	.	.	.	.
982	2	1	.	.	.	1
983	9	9	.	.	.	.
984	5	5	.	.	.	.
985	4	.	4	.	.	.
986	7	7	.	.	.	.
987	5	5	.	.	.	.
988	9	8	.	1	.	.
989	2	2	.	.	.	.
990	4	4	.	.	.	.
991	6	6	.	.	.	.
992	8	7	.	.	.	1
993	8	2	6	1	1	.
994	4	3	.	.	.	1
995	9	9	.	.	.	.
996	11	9	2	.	.	.
997	4	3	1	.	.	.
998	9	7	.	.	.	2
999	2	2	.	.	.	.
1000	10	10	.	.	.	.
1001	4	2	.	.	.	2
1002	12	7	.	.	2	3
1003	9	4	.	1	3	1
1004	4	4	.	.	.	.
1005	10	10	.	.	.	.
1006	10	5	5	2	2	.
1007	7	3	1	2	.	1
1008	4	4	.	.	.	.
1009	.	.	.	.	.	.
1010	5	5	.	.	.	.
1011	.	.	.	.	.	.
1012	5	4	.	1	.	.
1013	10	8	.	.	.	2
1014	8	1	6	2	1	.
1015	9	9	.	.	.	.
1016	.	.	.	.	.	.
1017	4	4	.	.	.	.
1018	3	3	.	.	.	.
1019	7	4	3	.	1	.
1020	2	1	.	.	.	1
1021	4	4	.	.	.	.
1022	2	1	.	.	.	1
1023	4	4	.	.	.	.
1024	6	6	.	.	.	.
1025	6	3	3	1	1	.
1026	.	.	.	.	.	.
1027	9	7	1	.	2	.
1028	10	10	.	.	.	.
1029	6	1	5	1	.	.
1030	4	4	.	.	.	.
1031	7	7	.	.	.	.
1032	6	6	.	.	.	.
1033	4	4	.	.	.	.
1034	7	6	1	.	1	.
1035	2	2	.	.	.	.
1036	4	2	2	1	.	.
1037	4	.	4	1	1	.
1038	4	2	2	.	.	.
1039	5	5	.	.	.	.
1040	6	1	.	2	1	2
1041	6	6	.	.	.	.
1042	7	7	.	.	.	.
1043	8	7	1	.	1	.
1044	4	4	.	.	.	.
1045	13	2	10	3	1	.
1046	6	2	.	1	.	3
1047	6	.	6	2	1	.
1048	3	3	.	.	.	.
1049	7	7	.	.	.	.
1050	8	3	5	1	1	.
1051	4	4	.	.	.	.
1052	3	1	2	1	.	.
1053	14	4	10	3	2	.
1054	7	7	.	.	.	.
1055	5	.	3	2	2	1
1056	2	1	1	1	.	.
1057	9	8	1	1	.	.
1058	5	3	2	1	1	.
1059	7	2	.	1	2	2
1060	3	.	3	1	1	.
1061	4	.	4	1	.	.
1062	2	2	.	.	.	.
1063	7	5	2	1	.	.
1064	3	3	.	.	.	.
1065	4	2	2	2	.	.
1066	.	.	.	.	.	.
1067	12	.	.	3	2	7
1068	4	2	.	.	.	2
1069	2	2	.	.	.	.
1070	7	7	.	.	.	.
1071	2	2	.	.	.	.
1072	10	10	.	.	.	.
1073	2	1	1	.	.	.
1074	11	8	.	2	1	.
1075	6	6	.	.	.	.
1076	9	7	2	.	1	.
1077	5	3	2	1	.	.
1078	7	1	6	2	2	.
1079	9	5	4	.	2	.
1080	8	8	.	.	.	.

ID/1	P	S	F	D	N	X
1081	8	8	.	.	.	.
1082	2	2	.	.	.	.
1083	4	.	4	1	1	.
1084	4	3	.	1	.	.
1085	8	8	.	.	.	.
1086	6	6	.	.	.	.
1087	6	2	.	1	1	2
1088	2	1	1	.	.	.
1089	7	6	1	1	.	.
1090	10	.	10	3	2	.
1091	2	2	.	.	.	.
1092	4	4	.	.	.	.
1093	3	3	.	.	.	.
1094	6	6	.	.	.	.
1095	6	5	1	.	1	.
1096	6	6	.	.	.	.
1097	6	4	.	.	1	1
1098	7	6	.	.	.	1
1099	11	7	.	1	1	2
1100	2	1	1	.	.	.
1101	9	8	1	1	.	.
1102	5	5	.	.	.	.
1103	3	.	3	1	1	.
1104	8	7	1	1	.	.
1105	7	7	.	.	.	.
1106	4	.	.	1	1	2
1107	4	4	.	.	.	.
1108	2	2	.	.	.	.
1109	6	6	.	.	.	.
1110	6	1	5	1	1	.
1111	5	2	.	1	.	2
1112	5	5	.	.	.	.
1113	2	2	.	.	.	.
1114	3	3	.	.	.	.
1115	3	3	.	.	.	.
1116	8	8	.	.	.	.
1117	4	.	4	1	.	.
1118	11	11	.	.	.	.
1119	3	3	.	.	.	.
1120	4	1	3	.	.	.
1121	5	1	.	1	1	2
1122	2	1	.	1	.	.
1123	6	1	5	1	.	.
1124	4	4	.	.	.	.
1125	6	6	.	.	.	.

ID/1	P	S	F	D	N	X
1126	3	1	2	1	.	.
1127	9	9	.	.	.	.
1128	2	2	.	.	.	.
1129	2	2	.	.	.	.
1130	1	1	.	.	.	.
1131	2	1	1	1	.	.
1132	3	3	.	.	.	.
1133	4	.	4	1	.	.
1134	7	5	2	1	.	.
1135	5	5	.	.	.	.
1136	2	2	.	.	.	.
1137	3	3	.	.	.	.
1138	11	10	.	.	.	1
1139	7	2	5	3	.	.
1140	8	7	1	.	.	.
1141	11	3	8	3	3	.
1142	.	.	.	.	.	.
1143	6	6	.	.	.	.
1144	10	10	.	.	.	.
1145	6	4	.	1	.	1
1146	4	4	.	.	.	.
1147	7	.	7	3	2	.
1148	3	3	.	.	.	.
1149	9	9	.	.	.	.
1150	.	.	.	.	.	.
1151	4	3	1	1	.	.
1152	5	4	1	.	.	.
1153	2	.	2	.	.	.
1154	9	9	.	.	.	.
1155	9	4	5	2	.	.
1156	4	1	3	.	.	.
1157	8	2	.	.	1	5
1158	3	3	.	.	.	.
1159	6	6	.	.	.	.
1160	2	1	1	.	.	.
1161	5	2	3	1	1	.
1162	2	2	.	.	.	.
1163	7	6	.	.	.	1
1164	10	3	7	2	1	.
1165	10	10	.	.	.	.
1166	3	3	.	.	.	.
1167	6	6	.	.	.	.
1168	7	6	.	.	.	1
1169	5	3	1	.	.	.
1170	5	2	3	1	.	.

ID/1	P	S	F	D	N	X
1171	4	4	.	.	.	.
1172	4	4	.	.	.	.
1173	5	4	1	1	.	.
1174	2	2	.	.	.	.
1175	2	1	.	.	.	1
1176	8	8	.	.	.	.
1177	6	6	.	.	.	.
1178	12	12	.	.	.	.
1179	.	.	.	.	.	.
1180	2	1	.	1	.	.
1181	.	.	.	.	.	.
1182	8	7	.	.	.	1
1183	6	6	.	.	.	.
1184	10	3	.	2	2	3
1185	9	8	1	.	1	.
1186	2	2	.	.	.	.
1187	7	5	2	1	.	.
1188	9	6	3	2	.	.
1189	2	2	.	.	.	.
1190	4	3	1	.	.	.
1191	6	6	.	.	.	.
1192	8	.	8	3	2	.
1193	9	5	.	2	1	1
1194	3	3	.	.	.	.
1195	2	1	1	.	1	.
1196	18	16	.	1	.	1
1197	6	6	.	.	.	.
1198	6	6	.	.	.	.
1199	6	6	.	.	.	.
1200	11	10	.	.	.	1
1201	12	11	.	.	.	1
1202	9	8	1	1	.	.
1203	7	2	5	1	.	.
1204	2	2	.	.	.	.
1205	6	2	4	.	.	.
1206	6	5	.	1	.	.
1207	4	4	.	.	.	.
1208	4	4	.	.	.	.
1209	5	1	.	.	1	2
1210	7	7	.	.	.	.
1211	3	3	.	.	.	.
1212	5	5	.	.	.	.
1213	5	4	1	.	.	.
1214	12	10	.	.	.	1
1215	6	.	6	3	1	.

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
1216	6	3	3	.	.	.	1261	4	4	.	.	.	.	1306	6	6	.	.	.	.
1217	15	2	13	5	2	.	1262	3	3	.	.	.	.	1307	7	3	4	2	2	.
1218	9	1	8	2	3	.	1263	4	4	.	.	.	.	1308	5	5	.	.	.	.
1219	4	2	2	1	.	.	1264	7	7	.	.	.	.	1309	6	6	.	.	.	.
1220	2	1	1	1	.	.	1265	10	1	9	1	4	.	1310	.	.	.	.	.	.
1221	5	2	3	.	.	.	1266	6	6	.	.	.	.	1311	12	5	7	4	.	.
1222	8	8	.	.	.	.	1267	6	4	2	1	1	.	1312	2	2	.	.	.	.
1223	7	3	2	1	.	2	1268	4	4	.	.	.	.	1313	4	1	3	1	.	.
1224	6	6	.	.	.	.	1269	6	6	.	.	.	.	1314	10	1	9	4	2	.
1225	5	.	5	.	.	.	1270	7	3	4	1	1	.	1315	5	5	.	.	.	.
1226	9	6	.	1	1	1	1271	5	5	.	.	.	.	1316	7	.	7	2	1	.
1227	6	4	.	.	.	2	1272	2	1	1	.	.	.	1317	4	.	.	1	.	3
1228	3	.	.	1	1	1	1273	7	3	4	2	.	.	1318	10	8	2	1	.	.
1229	4	4	.	.	.	.	1274	11	2	9	3	1	.	1319	6	.	.	1	.	5
1230	6	4	2	2	.	.	1275	9	8	.	1	.	.	1320	3	2	1	.	1	.
1231	5	3	.	1	.	1	1276	3	3	.	.	.	.	1321	4	1	.	.	.	3
1232	2	2	.	.	.	.	1277	8	8	.	.	.	.	1322	10	1	9	4	3	.
1233	13	13	.	.	.	.	1278	2	.	2	1	.	.	1323	2	2	.	.	.	.
1234	9	9	.	.	.	.	1279	6	.	6	1	1	.	1324	7	3	4	1	.	.
1235	12	.	12	5	3	.	1280	6	6	.	.	.	.	1325	6	4	.	1	.	1
1236	7	5	2	2	.	.	1281	2	2	.	.	.	.	1326	2	2	.	.	.	.
1237	7	7	.	.	.	.	1282	6	6	.	.	.	.	1327	4	3	1	.	.	.
1238	3	3	.	.	.	.	1283	7	7	.	.	.	.	1328	7	7	.	.	.	.
1239	3	3	.	.	.	.	1284	6	6	.	.	.	.	1329	4	1	3	.	.	.
1240	5	5	.	.	.	.	1285	7	7	.	.	.	.	1330	12	12	.	.	.	.
1241	6	6	.	.	.	.	1286	5	3	2	.	.	.	1331	6	6	.	.	.	.
1242	2	2	.	.	.	.	1287	4	1	3	1	.	.	1332	5	5	.	.	.	.
1243	8	8	.	.	.	.	1288	2	1	.	1	.	.	1333	4	2	.	.	.	2
1244	5	5	.	.	.	.	1289	2	2	.	.	.	.	1334	8	7	.	.	.	1
1245	2	2	.	.	.	.	1290	9	.	9	4	4	.	1335	5	.	5	3	2	.
1246	6	6	.	.	.	.	1291	4	4	.	.	.	.	1336	2	1	1	.	.	.
1247	2	2	.	.	.	.	1292	.	.	.	.	.	.	1337	12	12	.	.	.	.
1248	.	.	.	.	.	.	1293	7	2	5	.	1	.	1338	7	.	7	1	1	.
1249	7	5	2	.	.	.	1294	5	5	.	.	.	.	1339	7	6	1	.	.	.
1250	6	6	.	.	.	.	1295	2	2	.	.	.	.	1340	4	2	2	1	.	.
1251	.	.	.	.	.	.	1296	8	8	.	.	.	.	1341	7	7	.	.	.	.
1252	4	4	.	.	.	.	1297	11	5	6	3	2	.	1342	11	11	.	.	.	.
1253	2	1	1	1	.	.	1298	3	3	.	.	.	.	1343	3	2	.	.	.	1
1254	7	7	.	.	.	.	1299	6	.	6	1	1	.	1344	4	.	4	2	1	.
1255	5	5	.	.	.	.	1300	8	8	.	.	.	.	1345	6	5	.	1	.	.
1256	6	4	.	1	.	1	1301	11	11	.	.	.	.	1346	2	2	.	.	.	.
1257	.	.	.	.	.	.	1302	6	2	4	1	1	.	1347	9	8	.	.	.	1
1258	7	7	.	.	.	.	1303	4	4	.	.	.	.	1348	2	.	.	.	.	2
1259	8	6	1	1	.	1	1304	3	2	.	.	.	1	1349	2	1	.	.	.	1
1260	.	.	.	.	.	.	1305	6	2	.	.	1	3	1350	2	2	.	.	.	.

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
1351	4	4	.	.	.	.	1396	15	7	8	1	2	.	1441	8	3	5	2	2	.
1352	7	3	.	.	.	4	1397	4	1	3	2	1	.	1442	4	2	2	.	2	.
1353	7	7	.	.	.	.	1398	6	1	5	1	1	.	1443	4	.	.	2	1	1
1354	7	6	1	.	.	.	1399	3	1	2	.	.	.	1444	4	2	.	1	.	1
1355	8	1	7	3	2	.	1400	1	.	1	1	.	.	1445	6	.	6	1	1	.
1356	4	4	.	.	.	.	1401	4	2	2	.	.	.	1446	5	.	5	1	.	.
1357	6	6	.	.	.	.	1402	4	1	3	1	.	.	1447	7	5	1	1	.	.
1358	2	2	.	.	.	.	1403	4	3	1	.	.	.	1448	7	5	2	.	.	.
1359	7	7	.	.	.	.	1404	6	6	.	.	.	.	1449	2	.	2	1	1	.
1360	7	7	.	.	.	.	1405	9	4	5	.	.	.	1450	3	3	.	.	.	.
1361	9	7	.	1	1	.	1406	9	7	1	1	.	1	1451	.	.	.	.	.	.
1362	2	2	.	.	.	.	1407	9	9	.	.	.	.	1452	8	1	7	1	.	.
1363	8	1	7	3	1	.	1408	8	6	.	1	.	1	1453	6	4	2	1	.	.
1364	6	1	5	1	.	.	1409	6	6	.	.	.	.	1454	5	1	4	2	.	.
1365	3	1	2	1	.	.	1410	2	1	1	1	.	.	1455	11	.	11	6	.	.
1366	7	4	.	1	.	2	1411	14	13	.	1	.	.	1456	8	8	.	.	.	.
1367	4	3	1	.	.	.	1412	4	1	3	1	.	.	1457	2	.	.	1	.	1
1368	8	6	.	.	.	2	1413	2	2	.	.	.	.	1458	9	7	.	1	.	1
1369	5	5	.	.	.	.	1414	5	4	1	1	.	.	1459	7	5	.	1	.	1
1370	2	.	2	1	.	.	1415	7	2	5	1	.	.	1460	5	2	3	1	.	.
1371	1	1	.	.	.	.	1416	3	3	.	.	.	.	1461	4	4	.	.	.	.
1372	3	3	.	.	.	.	1417	5	.	.	1	.	4	1462	7	4	3	1	1	.
1373	13	6	7	2	3	.	1418	12	7	5	1	.	.	1463	4	4	.	.	.	.
1374	2	.	2	.	.	.	1419	5	2	3	1	.	.	1464	6	3	3	.	1	.
1375	6	3	3	1	.	.	1420	6	4	2	1	.	.	1465	2	.	.	.	.	2
1376	4	.	4	2	2	.	1421	2	2	.	.	.	.	1466	9	9	.	.	.	.
1377	11	3	8	4	1	.	1422	10	4	6	3	1	.	1467	2	2	.	.	.	.
1378	2	2	.	.	.	.	1423	8	5	3	1	1	.	1468	4	1	3	2	.	.
1379	3	1	.	2	.	.	1424	4	4	.	.	.	.	1469	9	8	.	.	.	1
1380	7	6	1	1	.	.	1425	7	4	.	1	1	1	1470	8	8	.	.	.	.
1381	5	3	2	1	1	.	1426	10	8	.	.	.	2	1471	8	8	.	.	.	.
1382	2	.	2	1	.	.	1427	11	11	.	.	.	.	1472	5	.	5	1	1	.
1383	10	10	.	.	.	.	1428	4	4	.	.	.	.	1473	11	9	.	.	.	2
1384	3	3	.	.	.	.	1429	2	1	1	.	1	.	1474	6	3	3	1	.	.
1385	4	4	.	.	.	.	1430	2	.	.	1	1	.	1475	6	4	2	.	1	.
1386	3	.	3	1	1	.	1431	8	3	.	1	2	2	1476	4	2	2	1	.	.
1387	3	.	3	.	.	.	1432	4	1	3	.	.	.	1477	4	4	.	.	.	.
1388	2	2	.	.	.	.	1433	8	3	2	2	1	1	1478	2	.	2	1	.	.
1389	7	4	3	1	.	.	1434	6	6	.	.	.	.	1479	13	9	3	1	1	1
1390	4	4	.	.	.	.	1435	8	4	4	1	.	.	1480	.	.	.	.	.	.
1391	7	3	4	.	.	.	1436	4	4	.	.	.	.	1481	2	2	.	.	.	.
1392	8	4	4	.	1	.	1437	8	8	.	.	.	.	1482	8	1	7	3	.	.
1393	2	.	2	1	1	.	1438	3	3	.	.	.	.	1483	7	3	.	1	1	2
1394	3	.	3	.	1	.	1439	6	5	1	.	.	.	1484	4	4	.	.	.	.
1395	6	3	3	1	1	.	1440	2	.	2	1	1	.	1485	7	3	4	2	1	.

ID/1	P	S	F	D	N	X
1486	10	.	10	3	1	.
1487	2	2	.	.	.	.
1488	9	9	.	.	.	.
1489	8	4	4	1	.	.
1490	8	7	1	.	.	.
1491	5	4	1	.	.	.
1492	7	1	6	1	1	.
1493	8	6	.	1	.	1
1494	10	1	9	3	1	.
1495	4	3	1	.	1	.
1496	6	1	5	2	1	.
1497	2	.	2	1	1	.
1498	2	1	1	.	.	.
1499	13	3	2	3	2	3
1500	6	.	6	2	2	.
1501	2	1	.	1	.	.
1502	6	6	.	.	.	.
1503	7	4	.	.	.	3
1504	5	3	2	.	1	.
1505	14	12	.	.	.	2
1506	4	.	4	.	.	.
1507	5	1	4	2	1	.
1508	7	.	7	3	2	.
1509	15	9	6	3	2	.
1510	9	7	.	1	.	1
1511	12	11	1	1	.	.
1512	17	17	.	.	.	.
1513	6	4	2	.	.	.
1514	8	1	7	1	.	.
1515	4	1	3	2	.	.
1516	2	2	.	.	.	.
1517	7	7	.	.	.	.
1518	7	.	7	1	1	.
1519	2	2	.	.	.	.
1520	8	8	.	.	.	.
1521	4	.	4	1	.	.
1522	5	.	5	2	1	.
1523	10	.	10	3	2	.
1524	5	5	.	.	.	.
1525	7	5	.	.	.	2
1526	2	1	1	1	.	.
1527	2	.	2	1	1	.
1528	6	2	4	2	.	.
1529	.	.	.	.	.	.
1530	.	.	.	.	.	.
1531	4	2	2	1	1	.
1532	7	5	2	1	.	.
1533	5	4	1	.	.	.
1534	3	3	.	.	.	.
1535	7	6	.	1	.	.
1536	4	.	4	2	1	.
1537	7	6	.	.	.	1
1538	12	6	6	2	1	.
1539	6	1	5	3	.	.
1540	6	6	.	.	.	.
1541	6	5	.	.	.	1
1542	8	8	.	.	.	.
1543	6	.	4	2	2	.
1544	1	1	.	.	.	.
1545	2	2	.	.	.	.
1546	4	3	.	.	.	1
1547	2	2	.	.	.	.
1548	4	4	.	.	.	.
1549	7	4	3	1	.	.
1550	8	5	3	2	1	.
1551	13	4	9	4	3	.
1552	2	2	.	.	.	.
1553	2	1	.	1	.	.
1554	2	1	.	.	.	1
1555	4	.	4	1	.	.
1556	6	5	.	1	.	.
1557	4	.	4	2	.	.
1558	2	2	.	.	.	.
1559	7	1	6	1	1	.
1560	8	4	2	1	1	1
1561	4	2	.	.	1	1
1562	7	3	4	2	2	.
1563	6	.	6	2	.	.
1564	.	.	.	.	.	.
1565	3	.	3	1	.	.
1566	6	1	5	.	.	.
1567	4	4	.	.	.	.
1568	1	.	1	1	.	.
1569	2	2	.	.	.	.
1570	8	1	7	1	1	.
1571	5	5	.	.	.	.
1572	2	1	.	1	.	.
1573	7	3	4	2	.	.
1574	10	10	.	.	.	.
1575	10	3	7	1	2	.
1576	4	2	1	.	1	.
1577	5	3	2	1	.	.
1578	6	6	.	.	.	.
1579	7	5	1	1	.	1
1580	14	4	10	4	2	.
1581	4	4	.	.	.	.
1582	6	6	.	.	.	.
1583	11	11	.	.	.	.
1584	6	4	2	1	.	.
1585	2	2	.	.	.	.
1586	2	1	1	.	.	.
1587	6	1	2	2	.	2
1588	7	1	.	1	1	4
1589	8	.	8	2	.	.
1590	12	9	3	1	.	.
1591	4	3	1	1	.	.
1592	12	6	.	1	1	4
1593	5	1	4	3	.	.
1594	8	7	1	.	.	.
1595	3	3	.	.	.	.
1596	9	9	.	.	.	.
1597	13	9	4	1	1	.
1598	9	2	7	4	2	.
1599	5	5	.	.	.	.
1600	.	.	.	.	.	.
1601	7	.	7	2	2	.
1602	9	4	5	1	.	.
1603	6	6	.	.	.	.
1604	5	4	1	.	.	.
1605	4	3	1	.	.	.
1606	4	1	3	1	.	.
1607	2	2	.	.	.	.
1608	.	.	.	.	.	.
1609	6	6	.	.	.	.
1610	7	5	2	.	1	.
1611	6	1	1	2	.	3
1612	.	.	.	.	.	.
1613	3	3	.	.	.	.
1614	4	4	.	.	.	.
1615	7	6	1	.	1	.
1616	2	2	.	.	.	.
1617	5	1	3	.	1	.
1618	6	2	4	.	1	.
1619	4	.	4	2	.	.
1620	8	.	7	3	3	1

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
1621	2	1	.	.	.	1	1666	.	.	.	.	.	.	1711	4	1	3	1	1	.
1622	6	3	3	1	1	.	1667	2	.	2	1	.	.	1712	2	2	.	.	.	.
1623	2	2	.	.	.	.	1668	2	.	2	.	.	.	1713	5	1	4	2	1	.
1624	3	3	.	.	.	.	1669	7	6	.	1	.	.	1714	6	2	.	.	1	3
1625	2	.	.	.	.	2	1670	8	7	.	.	.	1	1715	10	10	.	.	.	.
1626	6	3	3	2	.	.	1671	5	.	5	1	.	.	1716	8	8	.	.	.	.
1627	2	.	2	.	.	.	1672	7	2	5	2	2	.	1717	6	1	5	1	.	.
1628	4	4	.	.	.	.	1673	7	6	.	.	.	1	1718	2	.	2	1	.	.
1629	7	1	6	3	1	.	1674	5	4	.	.	.	1	1719	2	2	.	.	.	.
1630	11	6	.	.	1	4	1675	6	4	2	1	.	.	1720	.	.	.	.	.	.
1631	2	2	.	.	.	.	1676	6	1	5	2	2	.	1721	4	4	.	.	.	.
1632	2	1	.	.	.	1	1677	.	.	.	.	.	.	1722	8	3	.	.	1	4
1633	2	2	.	.	.	.	1678	6	5	.	.	1	.	1723	5	5	.	.	.	.
1634	3	.	3	1	1	.	1679	2	2	.	.	.	.	1724	6	6	.	.	.	.
1635	7	2	5	1	.	.	1680	7	3	.	.	.	4	1725	8	1	7	2	1	.
1636	9	5	4	4	.	.	1681	5	1	4	2	.	.	1726	7	5	2	1	.	.
1637	9	7	.	1	.	1	1682	2	.	2	1	.	.	1727	9	2	7	3	1	.
1638	5	1	4	3	.	.	1683	2	1	1	.	.	.	1728	5	.	.	1	2	2
1639	8	6	.	.	.	2	1684	9	8	.	.	.	1	1729	3	.	3	1	1	.
1640	2	1	1	.	.	.	1685	12	10	2	1	.	.	1730	2	1	.	1	.	.
1641	7	7	.	.	.	.	1686	5	3	2	.	1	.	1731	6	5	.	.	.	1
1642	6	5	.	.	1	.	1687	3	3	.	.	.	.	1732	3	3	.	.	.	.
1643	3	2	1	.	.	.	1688	2	1	1	.	.	.	1733	.	.	.	.	.	.
1644	2	.	2	1	.	.	1689	17	10	7	2	4	.	1734	7	7	.	.	.	.
1645	3	3	.	.	.	.	1690	10	7	.	.	1	2	1735	3	3	.	.	.	.
1646	4	2	2	.	.	.	1691	6	3	3	1	2	.	1736	9	5	4	1	1	.
1647	4	3	1	.	1	.	1692	4	4	.	.	.	.	1737	4	1	3	.	.	.
1648	3	2	1	1	.	.	1693	2	2	.	.	.	.	1738	4	.	4	1	.	.
1649	6	3	3	1	.	.	1694	2	1	1	.	1	.	1739	9	1	8	4	1	.
1650	2	2	.	.	.	.	1695	2	2	.	.	.	.	1740	4	1	3	1	1	.
1651	.	.	.	.	.	.	1696	5	.	5	1	.	.	1741	4	1	3	1	2	.
1652	2	.	2	1	.	.	1697	11	6	5	3	.	.	1742	6	4	2	.	1	.
1653	10	3	2	3	2	1	1698	2	2	.	.	.	.	1743	4	3	1	.	1	.
1654	2	1	.	1	.	.	1699	7	1	6	2	1	.	1744	11	2	9	3	3	.
1655	7	7	.	.	.	.	1700	8	8	.	.	.	.	1745	8	2	6	3	2	.
1656	8	4	4	1	1	.	1701	2	1	.	1	.	.	1746	3	1	2	.	.	.
1657	14	9	5	2	2	.	1702	2	2	.	.	.	.	1747	8	5	3	1	2	.
1658	2	1	1	1	.	.	1703	8	4	4	.	.	.	1748	2	.	2	1	.	.
1659	4	3	.	.	.	1	1704	3	.	3	1	.	.	1749	8	4	4	1	.	.
1660	18	11	7	2	1	.	1705	6	4	2	.	.	.	1750	.	.	.	.	.	.
1661	10	4	6	1	1	.	1706	7	.	7	4	2	.	1751	6	5	1	.	1	.
1662	2	.	.	1	.	1	1707	9	4	5	4	1	.	1752	7	.	7	3	2	.
1663	9	7	2	.	.	.	1708	8	6	2	1	.	.	1753	2	1	1	.	.	.
1664	6	4	2	.	.	.	1709	9	6	3	1	.	.	1754	7	7	.	.	.	.
1665	7	3	4	2	1	.	1710	14	7	7	1	1	.	1755	14	9	5	1	1	.

ID/1	P	S	F	D	N	X
1756	4	2	2	.	1	.
1757	6	1	5	2	.	.
1758	4	2	2	.	1	.
1759	6	3	3	1	.	.
1760	5	5	.	.	.	.
1761	4	.	4	1	.	.
1762	3	1	2	1	.	.
1763	3	1	2	.	1	.
1764	5	5	.	.	.	.
1765	8	8	.	.	.	.
1766	6	3	2	1	1	.
1767	3	2	.	.	.	.
1768	7	3	4	1	1	.
1769	2	.	2	1	1	.
1770	8	5	3	.	1	.
1771	6	5	.	.	1	.
1772	2	.	.	.	.	2
1773	3	.	3	1	1	.
1774	2	.	2	.	.	.
1775	2	.	2	.	.	.
1776	4	4	.	.	.	.
1777	6	2	.	.	2	2
1778	6	1	5	2	1	.
1779	2	1	1	.	.	.
1780	10	9	1	1	.	.
1781	7	6	1	.	.	.
1782	7	4	3	.	.	.
1783	10	6	.	1	1	2
1784	9	6	3	1	1	.
1785	2	.	2	1	.	.
1786	8	4	4	2	1	.
1787	6	4	2	1	.	.
1788	5	1	4	1	2	.
1789	2	.	2	.	.	.
1790	.	.	.	.	.	.
1791	6	4	2	1	.	.
1792	4	.	4	1	.	.
1793	2	1	1	.	1	.
1794	5	4	1	.	.	.
1795	3	3	.	.	.	.
1796	4	4	.	.	.	.
1797	2	.	2	1	.	.
1798	6	1	5	3	2	.
1799	2	2	.	.	.	.
1800	2	.	2	1	1	.

ID/1	P	S	F	D	N	X
1801	6	4	2	1	.	.
1802	5	.	5	2	1	.
1803	8	4	4	2	.	.
1804	1	.	1	.	.	.
1805	5	2	3	2	.	.
1806	.	.	.	.	.	.
1807	4	2	2	1	.	.
1808	10	8	.	.	.	2
1809	6	.	6	2	1	.
1810	3	.	3	1	.	.
1811	2	2	.	.	.	.
1812	8	4	4	.	2	.
1813	2	2	.	.	.	.
1814	8	.	8	3	1	.
1815	7	5	2	.	.	.
1816	10	3	7	.	2	.
1817	9	9	.	.	.	.
1818	12	2	10	2	2	.
1819	2	2	.	.	.	.
1820	3	.	3	1	1	.
1821	7	5	2	1	.	.
1822	3	.	3	1	1	.
1823	7	6	1	.	.	.
1824	5	3	2	1	.	.
1825	6	1	5	2	.	.
1826	4	2	2	.	.	.
1827	6	6	.	.	.	.
1828	2	2	.	.	.	.
1829	7	.	7	2	1	.
1830	3	1	2	1	1	.
1831	2	1	1	.	1	.
1832	4	3	.	.	1	.
1833	3	.	3	.	.	.
1834	4	.	4	1	.	.
1835	6	2	4	1	.	.
1836	6	3	3	1	2	.
1837	5	1	4	2	.	.
1838	2	2	.	.	.	.
1839	4	1	3	1	1	.
1840	7	2	5	1	2	.
1841	4	4	.	.	.	.
1842	8	4	4	2	1	.
1843	9	9	.	.	.	.
1844	2	.	2	1	1	.
1845	2	.	.	.	.	2

ID/1	P	S	F	D	N	X
1846	5	4	1	.	.	.
1847	5	5	.	.	.	.
1848	1	.	1	.	.	.
1849	1	1	.	.	.	.
1850	9	6	3	1	.	.
1851	6	5	.	1	.	.
1852	5	3	2	.	1	.
1853	5	5	.	.	.	.
1854	10	5	5	1	.	.
1855	2	.	2	1	1	.
1856	2	1	1	1	.	.
1857	7	3	4	1	1	.
1858	7	.	5	2	1	.
1859	7	7	.	.	.	.
1860	4	.	4	1	1	.
1861	4	2	2	1	.	.
1862	6	5	1	.	.	.
1863	3	.	3	1	1	.
1864	4	2	2	1	.	.
1865	4	.	4	2	1	.
1866	.	.	.	.	.	.
1867	5	5	.	.	.	.
1868	.	.	.	.	.	.
1869	6	1	5	3	2	.
1870	4	1	3	1	1	.
1871	4	2	2	1	.	.
1872	4	2	2	1	.	.
1873	5	5	.	.	.	.
1874	4	1	3	1	.	.
1875	4	1	3	.	1	.
1876	.	.	.	.	.	.
1877	2	1	1	.	.	.
1878	10	2	8	1	.	.
1879	.	.	.	.	.	.
1880	13	8	.	1	3	1
1881	5	3	1	1	.	1
1882	2	1	1	1	.	.
1883	4	2	2	.	.	.
1884	7	4	3	1	.	.
1885	.	.	.	.	.	.
1886	15	11	.	3	.	1
1887	4	.	4	1	.	.
1888	10	1	9	5	1	.
1889	2	2	.	.	.	.
1890	6	6	.	.	.	.

ID/1	P	S	F	D	N	X
1891	3	2	.	.	1	.
1892	3	.	3	.	.	.
1893	10	2	.	2	1	5
1894	4	.	4	.	.	.
1895	3	1	.	1	.	1
1896	2	1	1	.	.	.
1897	6	2	4	.	.	.
1898	2	1	1	1	.	.
1899	7	1	6	.	1	.
1900	7	4	3	1	.	.
1901	6	5	1	.	1	.
1902	2	2	.	.	.	.
1903	9	7	2	.	.	.
1904	3	1	.	1	1	.
1905	2	.	2	1	.	.
1906	6	.	6	2	1	.
1907	6	1	2	1	1	1
1908	2	2	.	.	.	.
1909	9	9	.	.	.	.
1910	2	2	.	.	.	.
1911	4	4	.	.	.	.
1912	5	.	5	2	1	.
1913	2	.	2	.	.	.
1914	2	.	2	.	.	.
1915	4	2	2	1	.	.
1916	6	2	4	.	.	.
1917	.	.	.	.	.	.
1918	7	5	2	1	1	.
1919	.	.	.	.	.	.
1920	7	.	7	2	1	.
1921	4	.	4	.	.	.
1922	5	2	3	1	.	.
1923	6	4	2	.	.	.
1924	5	4	1	.	1	.
1925	7	1	.	2	1	3
1926	10	6	2	1	1	1
1927	4	1	.	1	.	2
1928	4	.	4	2	1	.
1929	8	4	4	1	.	.
1930	6	6	.	.	.	.
1931	3	.	3	2	1	.
1932	.	.	.	.	.	.
1933	4	2	2	.	.	.
1934	15	10	5	3	1	.
1935	7	3	4	1	.	.

ID/1	P	S	F	D	N	X
1936	5	5	.	.	.	.
1937	14	5	9	3	2	.
1938	.	.	.	.	.	.
1939	7	6	1	1	.	.
1940	10	10	.	.	.	.
1941	5	1	4	1	1	.
1942	2	1	1	1	.	.
1943	2	.	2	1	.	.
1944	2	1	1	.	1	.
1945	10	4	2	2	1	1
1946	7	5	2	1	.	.
1947	2	2	.	.	.	.
1948	6	.	.	2	2	2
1949	5	2	3	1	.	.
1950	.	.	.	.	.	.
1951	10	6	4	2	1	.
1952	7	6	.	.	.	1
1953	7	2	5	2	2	.
1954	2	.	2	1	.	.
1955	2	1	1	1	.	.
1956	.	.	.	.	.	.
1957	2	2	.	.	.	.
1958	6	5	1	.	1	.
1959	8	3	5	1	.	.
1960	4	4	.	.	.	.
1961	9	9	.	.	.	.
1962	8	7	1	.	.	.
1963	10	10	.	.	.	.
1964	6	2	4	2	1	.
1965	5	1	4	2	1	.
1966	7	2	5	2	.	.
1967	7	1	6	2	1	.
1968	7	.	.	3	.	4
1969	7	2	5	3	2	.
1970	8	5	3	1	.	.
1971	4	.	4	1	.	.
1972	2	.	.	.	.	2
1973	.	.	.	.	.	.
1974	5	4	1	.	.	.
1975	9	2	2	1	3	2
1976	3	.	3	2	.	.
1977	8	7	.	.	.	1
1978	4	.	4	2	2	.
1979	.	.	.	.	.	.
1980	8	4	4	2	1	.

ID/1	P	S	F	D	N	X
1981	2	1	1	.	1	.
1982	2	.	2	1	1	.
1983	7	.	7	2	.	.
1984	5	5	.	.	.	.
1985	2	2	.	.	.	.
1986	7	6	1	.	.	.
1987	4	2	2	1	1	.
1988	10	2	8	2	2	.
1989	.	.	.	.	.	.
1990	4	1	3	1	1	.
1991	6	1	5	1	.	.
1992	16	1	15	2	1	.
1993	9	4	5	2	1	.
1994	7	7	.	.	.	.
1995	6	2	4	1	1	.
1996	3	.	3	1	1	.
1997	2	2	.	.	.	.
1998	4	.	4	1	1	.
1999	2	2	.	.	.	.
2000	.	.	.	.	.	.
2001	.	.	.	.	.	.
2002	2	2	.	.	.	.
2003	3	2	.	1	.	.
2004	2	.	2	.	.	.
2005	4	.	2	3	.	1
2006	7	7	.	.	.	.
2007	4	4	.	.	.	.
2008	7	7	.	.	.	.
2009	7	5	2	.	1	.
2010	4	.	4	.	.	.
2011	6	.	6	3	2	.
2012	.	.	.	.	.	.
2013	6	1	5	.	.	.
2014	5	2	3	2	1	.
2015	4	3	1	1	.	.
2016	7	6	.	.	.	1
2017	4	.	4	.	.	.
2018	3	.	3	1	.	.
2019	2	2	.	.	.	.
2020	5	2	3	1	1	.
2021	2	.	2	.	.	.
2022	4	2	.	1	.	1
2023	5	3	1	.	1	1
2024	6	2	4	2	1	.
2025	2	2	.	.	.	.

ID/1	P	S	F	D	N	X
2026	3	.	3	1	2	.
2027	5	1	4	2	.	.
2028	2	2	.	.	.	.
2029	9	2	7	.	.	.
2030	3	.	3	1	1	.
2031	2	.	2	1	1	.
2032	6	4	2	1	.	.
2033	4	.	4	1	1	.
2034	2	.	2	.	.	.
2035	9	4	5	1	2	.
2036	6	1	5	3	.	.
2037	13	3	10	2	3	.
2038	17	12	5	2	1	.
2039	4	3	1	.	.	.
2040	2	2	.	.	.	.
2041	3	3	.	.	.	.
2042	4	.	4	2	.	.
2043	6	6	.	.	.	.
2044	3	2	1	.	.	.
2045	2	1	1	.	1	.
2046	8	3	.	1	.	4
2047	12	1	11	3	1	.
2048	4	.	4	1	1	.
2049	7	3	4	1	.	.
2050	2	1	1	.	.	.
2051	4	2	2	.	.	.
2052	4	3	1	.	1	.
2053	11	6	5	2	2	.
2054	5	2	3	1	.	.
2055	3	.	3	1	1	.
2056	7	3	4	2	2	.
2057	7	4	3	.	.	.
2058	6	6	.	.	.	.
2059	3	2	1	.	1	.
2060	2	1	1	.	.	.
2061	4	1	3	.	1	.
2062	.	.	.	.	.	.
2063	.	.	.	.	.	.
2064	6	1	5	2	1	.
2065	6	1	5	3	1	.
2066	4	3	1	.	.	.
2067	4	4	.	.	.	.
2068	6	6	.	.	.	.
2069	6	6	.	.	.	.
2070	3	2	1	1	.	.

ID/1	P	S	F	D	N	X
2071	5	2	3	1	.	.
2072	4	.	4	1	1	.
2073	.	.	.	.	.	.
2074	11	2	9	2	4	.
2075	8	1	7	1	2	.
2076	7	4	3	.	1	.
2077	4	1	3	.	1	.
2078	4	.	4	.	.	.
2079	3	1	.	1	1	.
2080	5	3	2	.	.	.
2081	6	5	1	1	.	.
2082	4	2	1	1	.	.
2083	5	2	3	1	.	.
2084	8	7	1	.	.	.
2085	2	.	.	1	1	.
2086	7	.	7	2	1	.
2087	.	.	.	.	.	.
2088	8	.	8	3	1	.
2089	5	2	3	1	.	.
2090	4	1	3	2	.	.
2091	10	7	3	.	1	.
2092	5	2	3	1	.	.
2093	2	2	.	.	.	.
2094	7	2	5	3	1	.
2095	2	1	1	.	.	.
2096	5	.	5	2	1	.
2097	4	1	3	2	1	.
2098	8	5	3	1	.	.
2099	6	.	6	.	.	.
2100	.	.	.	.	.	.
2101	5	3	2	1	.	.
2102	.	.	.	.	.	.
2103	7	5	1	.	2	.
2104	.	.	.	.	.	.
2105	8	8	.	.	.	.
2106	5	.	5	1	1	.
2107	8	3	.	1	.	4
2108	3	3	.	.	.	.
2109	4	.	4	1	1	.
2110	7	.	6	2	2	.
2111	4	2	2	.	.	.
2112	2	1	1	1	.	.
2113	7	.	7	1	.	.
2114	4	2	2	.	.	.
2115	6	3	3	.	1	.

ID/1	P	S	F	D	N	X
2116	6	6	.	.	.	.
2117	8	.	8	4	2	.
2118	2	.	.	1	1	.
2119	7	4	3	1	.	.
2120	4	4	.	.	.	.
2121	6	.	6	3	2	.
2122	2	.	2	1	1	.
2123	4	3	1	.	.	.
2124	4	.	4	2	1	.
2125	5	1	.	2	.	2
2126	6	3	3	.	2	.
2127	6	6	.	.	.	.
2128	3	1	2	2	.	.
2129	2	1	1	.	.	.
2130	7	2	5	2	2	.
2131	4	3	1	.	.	.
2132	8	6	.	.	.	2
2133	9	1	8	2	2	.
2134	8	1	7	3	2	.
2135	23	5	18	2	8	.
2136	4	.	4	2	2	.
2137	2	2	.	.	.	.
2138	6	5	.	.	1	.
2139	2	.	2	1	.	.
2140	4	4	.	.	.	.
2141	9	6	.	1	.	2
2142	5	1	4	1	1	.
2143	8	5	3	.	1	.
2144	3	1	2	.	.	.
2145	4	4	.	.	.	.
2146	7	3	4	2	1	.
2147	6	2	4	2	2	.
2148	6	.	6	3	3	.
2149	2	2	.	.	.	.
2150	.	.	.	.	.	.
2151	4	2	2	1	1	.
2152	10	10	.	.	.	.
2153	2	2	.	.	.	.
2154	6	2	4	2	1	.
2155	5	2	3	1	1	.
2156	7	5	2	.	.	.
2157	2	2	.	.	.	.
2158	2	1	1	.	.	.
2159	8	1	7	1	.	.
2160	4	1	3	1	.	.

ID/1	P	S	F	D	N	X
2161	4	.	4	2	2	.
2162	8	1	7	1	1	.
2163	2	2	.	.	.	.
2164	5	2	3	2	.	.
2165	7	7	.	.	.	.
2166	10	3	7	.	1	.
2167	10	5	.	2	3	.
2168	2	2	.	.	.	.
2169	2	2	.	.	.	.
2170	2	1	1	1	.	.
2171	10	3	7	2	2	.
2172	4	2	.	1	.	1
2173	4	2	1	.	.	.
2174	10	6	1	2	.	1
2175	6	.	6	4	2	.
2176	3	.	3	.	1	.
2177	4	1	3	1	1	.
2178	2	.	2	1	1	.
2179	2	1	1	.	.	.
2180	2	.	2	1	.	.
2181	4	1	3	.	.	.
2182	6	2	4	1	.	.
2183	5	3	2	1	.	.
2184	7	7	.	.	.	.
2185	3	2	.	.	.	1
2186	6	.	3	1	.	3
2187	4	2	2	.	.	.
2188	4	2	2	.	.	.
2189	3	1	2	.	1	.
2190	5	3	2	.	.	.
2191	7	4	3	.	.	.
2192	7	3	4	.	.	.
2193	2	2	.	.	.	.
2194	9	.	9	3	1	.
2195	9	2	7	2	1	.
2196	2	2	.	.	.	.
2197	4	3	.	.	.	1
2198	7	4	3	.	1	.
2199	2	1	1	.	1	.
2200	4	1	3	1	.	.
2201	8	7	1	.	.	.
2202	.	.	.	.	.	.
2203	4	1	3	2	1	.
2204	5	4	1	.	1	.
2205	4	2	.	.	.	2

ID/1	P	S	F	D	N	X
2206	5	.	5	1	2	.
2207	6	6	.	.	.	.
2208	6	6	.	.	.	.
2209	4	2	2	1	.	.
2210	3	2	1	.	.	.
2211	8	5	3	2	.	.
2212	2	1	1	.	.	.
2213	7	2	5	3	2	.
2214	8	8	.	.	.	.
2215	2	2	.	.	.	.
2216	6	3	3	1	1	.
2217	2	2	.	.	.	.
2218	11	10	1	1	.	.
2219	2	2	.	.	.	.
2220	4	1	3	2	1	.
2221	8	4	4	.	3	.
2222	2	2	.	.	.	.
2223	4	4	.	.	.	.
2224	8	4	4	.	.	.
2225	7	3	4	.	1	.
2226	5	1	4	2	2	.
2227	5	1	4	.	.	.
2228	5	4	.	.	.	1
2229	4	3	1	.	.	.
2230	2	.	2	1	1	.
2231	7	3	4	1	.	.
2232	2	1	1	.	1	.
2233	.	.	.	.	.	.
2234	2	.	2	1	1	.
2235	7	6	.	.	.	1
2236	6	1	5	1	1	.
2237	6	5	.	.	.	1
2238	6	5	.	.	.	1
2239	9	8	1	.	.	.
2240	7	6	1	1	.	.
2241	4	2	.	1	1	.
2242	.	.	.	.	.	.
2243	7	.	7	2	1	.
2244	4	2	2	1	.	.
2245	7	7	.	.	.	.
2246	8	6	2	1	.	.
2247	6	2	4	.	1	.
2248	10	3	5	4	2	.
2249	8	8	.	.	.	.
2250	4	.	4	.	.	.

ID/1	P	S	F	D	N	X
2251	4	4	.	.	.	.
2252	2	.	.	1	.	1
2253	4	2	2	1	.	.
2254	5	.	5	2	.	.
2255	2	2	.	.	.	.
2256	2	1	1	.	.	.
2257	3	2	1	.	.	.
2258	3	3	.	.	.	.
2259	3	2	1	.	.	.
2260	7	7	.	.	.	.
2261	3	.	3	.	1	.
2262	2	.	2	.	.	.
2263	7	7	.	.	.	.
2264	5	5	.	.	.	.
2265	.	.	.	.	.	.
2266	4	4	.	.	.	.
2267	10	1	9	2	1	.
2268	2	.	2	1	.	.
2269	8	5	.	1	.	2
2270	4	.	2	2	1	.
2271	5	4	.	.	1	.
2272	3	1	2	1	1	.
2273	10	1	9	3	3	.
2274	6	.	6	3	1	.
2275	6	2	4	1	.	.
2276	6	4	2	1	.	.
2277	6	3	3	2	1	.
2278	6	4	2	1	1	.
2279	6	6	.	.	.	.
2280	7	.	7	3	2	.
2281	7	.	7	2	2	.
2282	.	.	.	.	.	.
2283	5	.	5	1	1	.
2284	5	2	3	.	2	.
2285	2	.	2	.	.	.
2286	11	6	5	.	3	.
2287	6	.	6	2	.	.
2288	5	2	.	1	.	2
2289	2	1	1	.	.	.
2290	9	.	9	3	3	.
2291	4	4	.	.	.	.
2292	5	3	2	1	.	.
2293	7	1	.	2	1	3
2294	5	1	.	.	.	3
2295	2	2	.	.	.	.

ID/1	P	S	F	D	N	X
2296	11	3	8	4	2	.
2297	9	9	.	.	.	.
2298	2	.	2	1	.	.
2299	2	.	2	1	.	.
2300	2	1	1	1	.	.
2301	5	2	.	.	2	1
2302	5	1	4	2	.	.
2303	2	1	1	.	.	.
2304	11	1	5	3	3	1
2305	5	1	.	2	.	2
2306	7	3	4	3	1	.
2307	5	5	.	.	.	.
2308	10	9	.	.	.	1
2309	2	1	1	1	.	.
2310	11	8	3	1	.	.
2311	5	4	.	1	.	.
2312	4	4	.	.	.	.
2313	5	4	1	1	.	.
2314	6	1	5	2	.	.
2315	2	2	.	.	.	.
2316	5	.	5	2	2	.
2317	13	1	12	3	2	.
2318	19	2	17	3	3	.
2319	4	.	4	2	1	.
2320	12	10	.	.	.	1
2321	3	3	.	.	.	.
2322	6	4	2	.	1	.
2323	.	.	.	.	.	.
2324	5	1	3	2	.	.
2325	9	1	8	3	1	.
2326	15	15	.	.	.	.
2327	7	2	5	2	1	.
2328	9	3	6	3	1	.
2329	4	2	2	.	.	.
2330	5	4	.	.	.	1
2331	8	2	6	2	2	.
2332	5	4	.	.	.	1
2333	6	3	3	1	.	.
2334	9	.	9	2	1	.
2335	5	2	3	.	2	.
2336	4	2	2	.	.	.
2337	11	1	3	4	2	4
2338	3	.	3	1	.	.
2339	7	5	2	.	1	.
2340	1	.	1	.	1	.
2341	.	.	.	.	.	.
2342	9	1	8	2	2	.
2343	8	1	7	2	3	.
2344	9	2	1	3	1	2
2345	6	3	3	.	.	.
2346	12	6	6	1	1	.
2347	11	1	10	5	2	.
2348	.	.	.	.	.	.
2349	8	5	.	1	.	2
2350	5	2	3	1	1	.
2351	11	3	8	1	1	.
2352	.	.	.	.	.	.
2353	7	.	7	2	1	.
2354	6	3	.	1	2	.
2355	8	7	.	.	1	.
2356	7	7	.	.	.	.
2357	4	3	.	1	.	.
2358	2	.	2	.	.	.
2359	12	5	7	3	1	.
2360	9	2	7	.	.	.
2361	6	.	6	1	.	.
2362	3	.	3	1	1	.
2363	4	4	.	.	.	.
2364	6	2	.	.	.	3
2365	4	1	3	1	.	.
2366	6	.	6	2	.	.
2367	6	1	5	2	3	.
2368	7	.	7	2	1	.
2369	2	.	2	1	1	.
2370	7	6	.	.	.	1
2371	2	.	2	1	.	.
2372	3	3	.	.	.	.
2373	6	2	4	1	1	.
2374	4	1	3	1	2	.
2375	.	.	.	.	.	.
2376	6	6	.	.	.	.
2377	4	.	4	2	2	.
2378	3	3	.	.	.	.
2379	11	8	3	1	.	.
2380	3	.	3	1	1	.
2381	7	3	.	2	1	1
2382	2	2	.	.	.	.
2383	2	.	2	1	.	.
2384	6	.	6	2	.	.
2385	2	.	2	.	.	.
2386	7	2	5	2	1	.
2387	5	.	5	1	1	.
2388	2	.	2	1	.	.
2389	4	4	.	.	.	.
2390	5	3	2	.	1	.
2391	.	.	.	.	.	.
2392	4	2	2	1	1	.
2393	7	7	.	.	.	.
2394	7	2	5	1	1	.
2395	6	2	4	.	3	.
2396	6	.	.	1	1	4
2397	6	1	.	2	.	3
2398	.	.	.	.	.	.
2399	4	.	4	1	.	.
2400	9	2	7	3	2	.
2401	5	.	5	1	2	.
2402	4	2	2	1	1	.
2403	2	.	.	.	.	1
2404	7	1	6	1	1	.
2405	4	2	2	1	.	.
2406	2	.	2	1	1	.
2407	4	2	.	.	.	2
2408	4	3	1	.	.	.
2409	2	.	2	.	.	.
2410	2	.	2	.	.	.
2411	.	.	.	.	.	.
2412	2	.	2	1	1	.
2413	5	3	2	1	.	.
2414	9	8	.	.	.	1
2415	2	1	1	.	.	.
2416	8	5	3	1	.	.
2417	6	4	2	1	1	.
2418	2	.	2	2	.	.
2419	5	.	5	2	2	.
2420	.	.	.	.	.	.
2421	9	7	.	.	1	1
2422	6	2	4	2	.	.
2423	6	.	6	.	.	.
2424	8	.	8	2	2	.
2425	2	.	2	.	.	.
2426	2	2	.	.	.	.
2427	9	1	8	3	1	.
2428	7	7	.	.	.	.
2429	4	.	4	.	.	.
2430	6	3	3	1	1	.

ID/1	P	S	F	D	N	X
2431	2	.	2	.	.	.
2432	2	1	1	1	.	.
2433	2	1	1	1	.	.
2434	2	1	.	.	1	.
2435	7	3	4	1	.	.
2436	6	3	3	3	.	.
2437	6	1	5	2	1	.
2438	.	.	.	.	.	.
2439	7	6	.	.	.	1
2440	6	3	3	1	1	.
2441	4	3	1	.	.	.
2442	13	1	12	5	.	.
2443	3	3	.	.	.	.
2444	.	.	.	.	.	.
2445	10	1	9	4	3	.
2446	2	.	2	1	.	.
2447	4	.	4	1	1	.
2448	5	5	.	.	.	.
2449	4	.	4	2	2	.
2450	7	1	4	2	2	.
2451	7	.	7	2	1	.
2452	7	.	7	2	2	.
2453	10	3	7	2	.	.
2454	4	.	4	2	1	.
2455	4	3	.	.	1	.
2456	7	7	.	.	.	.
2457	6	.	6	2	1	.
2458	8	4	4	1	.	.
2459	11	9	2	.	1	.
2460	7	1	6	2	1	.
2461	4	4	.	.	.	.
2462	2	.	2	1	.	.
2463	3	3	.	.	.	.
2464	2	1	.	.	.	1
2465	6	6	.	.	.	.
2466	4	1	3	1	.	.
2467	2	.	2	1	.	.
2468	4	1	3	.	.	.
2469	2	1	1	.	.	.
2470	4	.	4	2	.	.
2471	4	.	4	1	1	.
2472	4	2	2	.	1	.
2473	8	.	8	4	2	.
2474	8	8	.	.	.	.
2475	2	1	1	.	1	.

ID/1	P	S	F	D	N	X
2476	7	5	2	1	1	.
2477	4	.	4	2	.	.
2478	.	.	.	.	.	.
2479	10	7	3	.	.	.
2480	2	.	2	2	.	.
2481	4	1	3	1	.	.
2482	4	.	.	2	1	1
2483	7	5	2	.	2	.
2484	7	3	4	2	.	.
2485	4	1	3	.	.	.
2486	7	.	7	.	1	.
2487	4	1	3	2	1	.
2488	3	2	1	.	.	.
2489	7	3	4	2	2	.
2490	3	1	.	1	1	.
2491	9	1	8	2	3	.
2492	4	4	.	.	.	.
2493	1	1	.	.	.	.
2494	2	2	.	.	.	.
2495	2	.	2	.	.	.
2496	.	.	.	.	.	.
2497	4	.	4	2	2	.
2498	2	.	2	1	1	.
2499	6	.	6	3	2	.
2500	11	2	9	3	2	.
2501	6	1	5	2	1	.
2502	7	5	.	1	1	.
2503	5	2	3	2	.	.
2504	2	.	2	.	.	.
2505	4	1	3	.	.	.
2506	5	.	5	1	2	.
2507	7	.	5	3	1	1
2508	.	.	.	.	.	.
2509	7	.	7	3	3	.
2510	2	.	2	1	1	.
2511	6	1	5	2	.	.
2512	8	1	7	3	1	.
2513	4	1	3	.	.	.
2514	5	4	1	.	.	.
2515	4	.	4	2	1	.
2516	7	1	6	2	1	.
2517	4	2	2	1	.	.
2518	2	.	2	1	.	.
2519	5	1	4	2	.	.
2520	2	2	.	.	.	.

ID/1	P	S	F	D	N	X
2521	10	6	2	3	.	1
2522	8	4	4	2	.	.
2523	4	3	1	.	.	.
2524	12	10	2	2	.	.
2525	5	1	2	.	1	2
2526	3	.	3	1	.	.
2527	4	.	4	.	.	.
2528	4	1	3	1	.	.
2529	7	6	1	1	.	.
2530	13	3	10	2	1	.
2531	4	4	.	.	.	.
2532	7	3	4	1	.	.
2533	6	1	2	.	.	3
2534	5	3	2	2	.	.
2535	7	1	6	.	1	.
2536	4	.	4	2	.	.
2537	7	2	5	2	1	.
2538	9	2	7	2	1	.
2539	6	2	4	1	.	.
2540	7	1	6	2	3	.
2541	4	1	3	1	1	.
2542	5	5	.	.	.	.
2543	3	1	2	1	1	.
2544	11	8	3	.	1	.
2545	6	.	6	.	.	.
2546	4	2	.	.	.	2
2547	2	.	2	.	.	.
2548	4	.	4	2	2	.
2549	7	5	2	1	.	.
2550	2	.	2	1	1	.
2551	4	1	3	1	1	.
2552	6	.	6	3	1	.
2553	4	1	3	1	1	.
2554	2	.	2	1	1	.
2555	6	.	6	2	1	.
2556	2	.	2	2	.	.
2557	2	.	2	.	.	.
2558	7	1	6	2	3	.
2559	2	1	1	.	1	.
2560	10	3	7	2	1	.
2561	15	2	13	2	2	.
2562	4	1	3	2	1	.
2563	7	3	4	.	.	.
2564	9	2	7	3	2	.
2565	4	2	2	1	.	.

ID/1	P	S	F	D	N	X
2566	7	.	7	3	2	.
2567	10	5	.	2	.	3
2568	5	.	5	1	.	.
2569	5	5	.	.	.	.
2570	5	3	2	2	.	.
2571	4	.	4	1	1	.
2572	4	.	4	2	1	.
2573	2	.	.	1	1	.
2574	2	1	1	.	1	.
2575	6	1	5	2	.	.
2576	.	.	.	.	.	.
2577	12	6	6	2	1	.
2578	4	.	4	2	2	.
2579	9	2	7	2	1	.
2580	9	.	9	4	1	.
2581	7	1	6	2	2	.
2582	7	5	.	.	.	2
2583	6	1	5	1	1	.
2584	10	3	7	3	2	.
2585	7	1	6	2	1	.
2586	3	.	3	1	1	.
2587	6	4	2	1	.	.
2588	6	1	5	.	.	.
2589	10	1	9	1	3	.
2590	4	.	4	.	.	.
2591	7	1	3	2	.	2
2592	4	1	.	1	2	.
2593	6	.	6	2	3	.
2594	4	.	4	2	2	.
2595	7	1	6	.	1	.
2596	4	1	3	2	.	.
2597	5	.	5	1	1	.
2598	6	.	6	2	1	.
2599	7	.	.	2	1	4
2600	4	1	3	1	1	.
2601	8	2	.	1	1	4
2602	10	1	9	5	1	.
2603	13	.	9	6	1	1
2604	10	6	4	1	1	.
2605	4	2	2	.	.	.
2606	6	.	4	3	2	1
2607	4	.	4	2	2	.
2608	5	3	2	.	.	.
2609	2	.	2	1	.	.
2610	4	3	1	.	.	.
2611	6	1	3	1	1	.
2612	.	.	.	.	.	.
2613	6	3	.	1	.	2
2614	8	4	4	2	1	.
2615	4	2	2	2	.	.
2616	8	3	5	2	.	.
2617	4	4	.	.	.	.
2618	6	5	1	.	.	.
2619	4	3	1	.	.	.
2620	8	1	7	2	2	.
2621	9	9	.	.	.	.
2622	8	.	8	3	1	.
2623	6	5	1	.	1	.
2624	4	3	1	.	.	.
2625	5	.	5	2	1	.
2626	7	2	5	1	.	.
2627	6	.	6	4	1	.
2628	9	7	2	1	.	.
2629	2	.	2	.	1	.
2630	4	.	4	2	2	.
2631	6	2	4	1	.	.
2632	5	4	1	.	.	.
2633	7	1	6	2	3	.
2634	5	2	.	.	1	2
2635	2	.	2	1	.	.
2636	6	1	.	2	1	2
2637	15	10	5	1	.	.
2638	9	6	3	1	1	.
2639	4	.	4	2	1	.
2640	4	.	4	1	1	.
2641	4	1	3	1	.	.
2642	11	.	11	6	3	.
2643	14	10	4	1	.	.
2644	2	.	2	.	.	.
2645	8	4	4	2	.	.
2646	11	5	6	2	3	.
2647	7	.	7	3	2	.
2648	8	.	8	2	.	.
2649	13	2	11	2	1	.
2650	6	.	.	3	1	2
2651	4	3	1	1	.	.
2652	4	1	3	1	1	.
2653	6	4	2	.	.	.
2654	8	4	4	2	.	.
2655	6	1	5	1	.	.
2656	6	1	5	2	1	.
2657	7	2	5	.	.	.
2658	4	4	.	.	.	.
2659	6	2	4	1	1	.
2660	9	3	.	2	.	4
2661	17	14	3	1	.	.
2662	9	9	.	.	.	.
2663	8	1	7	1	1	.
2664	5	1	4	2	.	.
2665	4	.	4	2	1	.
2666	12	6	6	2	1	.
2667	7	3	4	1	.	.
2668	5	.	5	2	3	.
2669	5	.	5	2	1	.
2670	4	1	.	.	1	2
2671	6	2	4	2	1	.
2672	6	4	2	1	.	.
2673	2	.	2	1	1	.
2674	6	6	.	.	.	.
2675	2	.	2	.	.	.
2676	2	.	2	1	1	.
2677	6	3	.	.	.	3
2678	9	1	8	2	2	.
2679	5	3	.	1	.	1
2680	10	.	10	2	3	.
2681	7	.	7	4	2	.
2682	4	.	4	1	1	.
2683	6	1	5	.	.	.
2684	8	2	6	2	.	.
2685	2	.	.	1	.	1
2686	4	1	3	2	1	.
2687	8	5	.	1	2	.
2688	4	2	1	1	.	1
2689	4	.	4	1	1	.
2690	6	6	.	.	.	.
2691	4	.	4	1	1	.
2692	4	1	3	2	1	.
2693	7	3	4	1	2	.
2694	6	.	6	3	1	.
2695	4	3	.	1	.	.
2696	2	2	.	.	.	.
2697	6	6	.	.	.	.
2698	7	1	6	1	2	.
2699	9	4	5	1	1	.
2700	5	.	5	.	.	.

ID/1	P	S	F	D	N	X
2701	7	2	5	1	.	.
2702	9	8	1	.	.	.
2703	2	.	2	1	1	.
2704	2	.	2	1	1	.
2705	11	3	8	2	1	.
2706	6	3	3	.	.	.
2707	6	6	.	.	.	.
2708	4	.	4	.	.	.
2709	4	1	3	1	1	.
2710	.	.	.	.	.	.
2711	7	2	5	.	1	.
2712	7	3	4	2	.	.
2713	7	.	7	1	.	.
2714	2	.	2	1	.	.
2715	6	3	.	1	.	2
2716	2	.	2	1	.	.
2717	3	.	3	1	.	.
2718	8	6	2	.	1	.
2719	8	1	7	1	3	.
2720	2	1	1	1	.	.
2721	8	5	3	1	.	.
2722	.	.	.	.	.	.
2723	6	1	5	2	2	.
2724	4	2	.	1	.	1
2725	12	12	.	.	.	.
2726	7	5	2	.	.	.
2727	5	1	4	2	2	.
2728	11	5	.	1	1	4
2729	9	5	4	2	1	.
2730	4	.	4	1	.	.
2731	4	4	.	.	.	.
2732	4	.	2	2	2	.
2733	7	.	7	3	2	.
2734	6	2	4	1	.	.
2735	.	.	.	.	.	.
2736	6	.	6	3	2	.
2737	6	1	.	2	2	1
2738	2	1	1	1	.	.
2739	2	1	1	1	.	.
2740	9	4	5	1	1	.
2741	3	1	.	1	1	.
2742	7	4	3	1	1	.
2743	2	.	2	1	.	.
2744	.	.	.	.	.	.
2745	6	.	6	2	2	.
2746	3	.	3	1	1	.
2747	2	2	.	.	.	.
2748	2	1	1	.	.	.
2749	3	.	.	1	1	1
2750	2	.	2	1	.	.
2751	10	4	6	1	.	.
2752	3	.	3	1	.	.
2753	2	2	.	.	.	.
2754	2	2	.	.	.	.
2755	2	.	.	.	.	2
2756	2	.	2	.	.	.
2757	2	2	.	.	.	.
2758	.	.	.	.	.	.
2759	6	4	2	1	.	.
2760	5	5	.	.	.	.
2761	7	4	3	2	.	.
2762	6	.	6	1	1	.
2763	2	.	2	1	.	.
2764	2	1	1	1	.	.
2765	6	1	5	.	1	.
2766	6	4	2	.	2	.
2767	2	.	2	.	.	.
2768	.	.	.	.	.	.
2769	6	2	4	1	2	.
2770	6	.	6	2	1	.
2771	3	.	3	.	.	.
2772	.	.	.	.	.	.
2773	.	.	.	.	.	.
2774	4	4	.	.	.	.
2775	3	2	1	.	.	.
2776	.	.	.	.	.	.
2777	2	.	2	1	1	.
2778	.	.	.	.	.	.
2779	2	.	2	.	.	.
2780	2	.	2	1	1	.
2781	2	.	.	.	.	2
2782	2	1	1	.	.	.
2783	3	2	1	.	.	.
2784	3	2	1	.	.	.
2785	5	.	5	2	1	.
2786	2	1	.	.	.	1
2787	5	3	2	1	1	.
2788	6	1	5	1	2	.
2789	2	2	.	.	.	.
2790	2	.	.	1	.	1
2791	8	3	5	1	1	.
2792	.	.	.	.	.	.
2793	5	4	.	.	.	1
2794	.	.	.	.	.	.
2795	1	.	1	1	.	.
2796	3	.	3	1	.	.
2797	7	7	.	.	.	.
2798	2	.	2	.	.	.
2799	2	2	.	.	.	.
2800	6	1	5	1	1	.
2801	2	.	2	1	.	.
2802	4	2	.	.	.	2
2803	9	7	2	.	.	.
2804	8	3	5	1	1	.
2805	4	1	3	1	1	.
2806	8	3	5	1	1	.
2807	6	1	5	2	1	.
2808	9	1	8	2	2	.
2809	3	.	3	.	.	.
2810	2	.	2	1	1	.
2811	2	.	2	.	.	.
2812	2	.	2	.	.	.
2813	3	3	.	.	.	.
2814	7	4	3	1	.	.
2815	.	.	.	.	.	.
2816	2	2	.	.	.	.
2817	1	.	1	.	.	.
2818	2	.	2	1	.	.
2819	9	2	5	.	2	1
2820	.	.	.	.	.	.
2821	.	.	.	.	.	.
2822	.	.	.	.	.	.
2823	2	.	2	.	.	.
2824	.	.	.	.	.	.
2825	6	1	4	.	.	.
2826	10	10	.	.	.	.
2827	3	.	3	1	1	.
2828	9	4	5	2	1	.
2829	7	4	3	.	.	.
2830	4	.	4	1	.	.
2831	6	.	6	2	1	.
2832	8	4	4	.	.	.
2833	4	.	4	2	1	.
2834	8	2	6	3	.	.
2835	3	1	2	.	1	.

ID/1	P	S	F	D	N	X
2836	2	.	2	1	1	.
2837	4	1	3	2	.	.
2838	7	1	6	3	1	.
2839	11	3	8	3	1	.
2840	.	.	.	.	.	.
2841	3	.	3	1	.	.
2842	14	8	1	1	4	1
2843	8	2	6	2	1	.
2844	3	.	3	1	1	.
2845	4	.	4	2	1	.
2846	8	8	.	.	.	.
2847	2	.	2	1	1	.
2848	5	2	.	.	.	3
2849	8	4	4	1	.	.
2850	2	1	1	1	.	.
2851	4	.	3	1	2	.
2852	5	1	4	2	1	.
2853	8	1	7	3	2	.
2854	7	3	4	.	.	.
2855	4	3	1	.	.	.
2856	9	5	.	1	.	3
2857	4	.	4	.	.	.
2858	6	5	1	.	.	.
2859	6	2	4	1	2	.
2860	6	1	5	2	1	.
2861	4	.	4	2	2	.
2862	7	1	6	1	2	.
2863	6	.	6	2	1	.
2864	8	6	2	.	.	.
2865	2	2	.	.	.	.
2866	4	1	3	1	.	.
2867	7	3	4	1	1	.
2868	6	1	5	1	2	.
2869	4	.	.	1	.	3
2870	4	1	3	.	1	.
2871	6	2	4	2	1	.
2872	6	3	3	.	.	.
2873	6	2	4	1	1	.
2874	.	.	.	.	.	.
2875	6	1	.	1	.	4
2876	4	.	4	1	1	.
2877	4	2	2	.	.	.
2878	5	.	5	1	1	.
2879	7	7	.	.	.	.
2880	6	4	2	1	.	.

ID/1	P	S	F	D	N	X
2881	4	2	2	1	1	.
2882	1	.	1	.	.	.
2883	5	1	4	1	.	.
2884	8	2	6	1	1	.
2885	3	.	3	.	1	.
2886	6	1	5	2	.	.
2887	2	1	1	.	.	.
2888	.	.	.	.	.	.
2889	6	.	6	1	.	.
2890	6	.	6	2	2	.
2891	2	1	1	.	1	.
2892	4	4	.	.	.	.
2893	4	3	1	.	1	.
2894	4	.	4	1	.	.
2895	5	2	3	.	.	.
2896	2	.	2	.	.	.
2897	7	2	5	2	.	.
2898	5	4	.	.	1	.
2899	6	1	5	1	.	.
2900	4	1	3	1	1	.
2901	4	.	4	2	1	.
2902	5	.	5	.	1	.
2903	.	.	.	.	.	.
2904	7	3	4	1	1	.
2905	6	.	2	1	2	3
2906	5	5	.	.	.	.
2907	4	2	2	.	.	.
2908	7	5	2	1	1	.
2909	8	1	7	2	2	.
2910	11	4	7	.	2	.
2911	2	1	1	1	.	.
2912	2	1	1	.	.	.
2913	14	6	8	.	2	.
2914	1	.	1	.	1	.
2915	6	.	6	1	.	.
2916	.	.	.	.	.	.
2917	4	.	4	2	.	.
2918	4	1	3	.	1	.
2919	4	.	.	1	.	3
2920	7	7	.	.	.	.
2921	7	1	6	3	1	.
2922	4	3	1	1	.	.
2923	7	3	4	1	.	.
2924	9	.	9	4	3	.
2925	7	1	6	1	1	.

ID/1	P	S	F	D	N	X
2926	5	3	2	1	.	.
2927	6	.	6	1	1	.
2928	4	2	2	.	1	.
2929	13	1	4	6	2	4
2930	4	1	3	.	1	.
2931	4	.	4	.	.	.
2932	5	3	2	.	2	.
2933	10	7	3	1	1	.
2934	9	8	1	.	.	.
2935	4	1	3	.	.	.
2936	9	1	7	1	1	1
2937	6	.	6	1	1	.
2938	7	.	7	2	2	.
2939	7	.	7	2	2	.
2940	5	3	2	1	.	.
2941	8	.	8	2	1	.
2942	10	1	9	4	.	.
2943	8	1	7	3	1	.
2944	2	.	2	1	.	.
2945	5	3	.	1	.	1
2946	4	.	4	1	.	.
2947	5	2	3	1	1	.
2948	2	1	1	.	.	.
2949	9	2	7	4	.	.
2950	7	3	3	2	1	.
2951	6	6	.	.	.	.
2952	2	2	.	.	.	.
2953	10	.	6	3	1	2
2954	5	1	4	1	.	.
2955	5	.	5	2	1	.
2956	4	1	3	1	.	.
2957	8	7	1	.	.	.
2958	4	.	4	1	.	.
2959	4	3	1	.	.	.
2960	.	.	.	.	.	.
2961	2	.	2	1	.	.
2962	6	3	.	1	.	2
2963	8	1	7	2	1	.
2964	7	2	.	2	1	2
2965	12	9	3	2	1	.
2966	3	.	3	1	1	.
2967	6	6	.	.	.	.
2968	2	.	2	1	.	.
2969	4	1	3	1	2	.
2970	3	1	.	.	1	1

ID/1	P	S	F	D	N	X
2971	4	.	4	2	2	.
2972	9	.	9	3	1	.
2973	8	1	7	3	1	.
2974	6	1	5	2	.	.
2975	.	.	.	.	.	.
2976	4	3	.	.	1	.
2977	8	1	4	4	1	2
2978	6	2	2	1	1	2
2979	7	3	.	1	.	3
2980	4	2	2	1	.	.
2981	4	1	3	1	.	.
2982	6	.	6	1	1	.
2983	8	8	.	.	.	.
2984	12	7	5	1	1	.
2985	9	.	9	3	1	.
2986	9	7	2	.	.	.
2987	9	2	7	1	2	.
2988	6	3	2	1	1	1
2989	2	1	1	.	1	.
2990	6	3	3	1	.	.
2991	2	.	2	1	1	.
2992	12	5	7	4	1	.
2993	8	5	.	2	.	1
2994	3	2	1	.	.	.
2995	3	3	.	.	.	.
2996	2	1	1	1	.	.
2997	2	.	2	1	.	.
2998	3	1	2	1	.	.
2999	2	.	2	1	.	.
3000	2	1	1	.	1	.
3001	9	1	8	2	3	.
3002	1	1	.	.	.	.
3003	2	2	.	.	.	.
3004	2	.	2	1	.	.
3005	4	1	3	2	.	.
3006	2	1	1	.	.	.
3007	2	.	2	.	.	.
3008	2	.	2	1	1	.
3009	10	2	8	3	1	.
3010	8	2	6	4	.	.
3011	6	5	1	.	1	.
3012	9	3	.	.	.	6
3013	3	1	2	.	.	.
3014	2	.	2	.	.	.
3015	4	.	4	1	.	.

ID/1	P	S	F	D	N	X
3016	.	.	.	.	.	.
3017	5	3	2	1	.	.
3018	2	.	2	1	1	.
3019	.	.	.	.	.	.
3020	11	1	10	2	1	.
3021	.	.	.	.	.	.
3022	2	1	1	.	.	.
3023	.	.	.	.	.	.
3024	4	4	.	.	.	.
3025	2	2	.	.	.	.
3026	2	1	1	.	.	.
3027	2	2	.	.	.	.
3028	6	6	.	.	.	.
3029	3	2	1	.	1	.
3030	3	2	1	.	1	.
3031	1	.	1	.	1	.
3032	6	2	.	2	.	2
3033	.	.	.	.	.	.
3034	5	.	5	2	1	.
3035	4	1	3	1	.	.
3036	4	4	.	.	.	.
3037	4	3	.	.	1	.
3038	1	.	1	.	.	.
3039	2	.	2	1	.	.
3040	.	.	.	.	.	.
3041	2	.	.	.	.	2
3042	2	1	1	.	.	.
3043	.	.	.	.	.	.
3044	3	3	.	.	.	.
3045	2	2	.	.	.	.
3046	2	2	.	.	.	.
3047	2	.	2	1	.	.
3048	2	.	2	1	.	.
3049	6	.	6	1	1	.
3050	2	.	2	1	.	.
3051	4	2	2	.	1	.
3052	7	5	2	.	1	.
3053	6	1	5	1	.	.
3054	2	2	.	.	.	.
3055	3	2	.	.	.	1
3056	10	3	7	.	1	.
3057	2	.	2	.	.	.
3058	3	2	1	.	.	.
3059	3	.	3	1	.	.
3060	2	2	.	.	.	.

ID/1	P	S	F	D	N	X
3061	2	1	1	.	.	.
3062	5	5	.	.	.	.
3063	6	6	.	.	.	.
3064	2	.	2	1	1	.
3065	.	.	.	.	.	.
3066	.	.	.	.	.	.
3067	.	.	.	.	.	.
3068	6	3	3	1	.	.
3069	.	.	.	.	.	.
3070	.	.	.	.	.	.
3071	2	2	.	.	.	.
3072	4	2	2	1	.	.
3073	.	.	.	.	.	.
3074	.	.	.	.	.	.
3075	3	1	2	.	1	.
3076	.	.	.	.	.	.
3077	.	.	.	.	.	.
3078	5	5	.	.	.	.
3079	.	.	.	.	.	.
3080	4	.	.	2	1	1
3081	2	.	2	.	.	.
3082	4	2	2	.	1	.
3083	4	.	4	1	1	.
3084	4	.	4	2	1	.
3085	.	.	.	.	.	.
3086	.	.	.	.	.	.
3087	2	1	1	.	.	.
3088	5	1	2	.	.	2
3089	4	4	.	.	.	.
3090	4	2	2	2	.	.
3091	2	.	2	.	.	.
3092	4	2	2	1	.	.
3093	5	2	.	1	1	1
3094	4	4	.	.	.	.
3095	6	1	5	2	.	.
3096	4	.	4	.	.	.
3097	4	2	2	1	.	.
3098	4	1	3	1	1	.
3099	2	.	.	1	.	1
3100	.	.	.	.	.	.
3101	5	1	4	1	1	.
3102	6	1	5	2	1	.
3103	.	.	.	.	.	.
3104	9	3	3	2	.	2
3105	2	1	1	1	.	.

ID/1	P	S	F	D	N	X
3106	6	1	5	1	1	.
3107	5	4	1	.	1	.
3108	.	.	.	.	.	.
3109	4	4	.	.	.	.
3110	2	.	2	.	.	.
3111	.	.	.	.	.	.
3112	6	1	5	.	1	.
3113	.	.	.	.	.	.
3114	4	.	4	1	1	.
3115	6	6	.	.	.	.
3116	7	1	6	1	1	.
3117	4	.	4	2	1	.
3118	5	5	.	.	.	.
3119	1	.	1	1	.	.
3120	9	1	8	1	2	.
3121	2	.	2	1	.	.
3122	5	2	3	2	.	.
3123	4	.	4	2	2	.
3124	4	3	1	.	1	.
3125	7	2	5	1	1	.
3126	6	.	6	2	1	.
3127	5	1	4	1	1	.
3128	9	3	6	3	1	.
3129	8	1	6	3	1	.
3130	7	.	7	1	1	.
3131	7	.	7	1	1	.
3132	8	6	2	.	.	.
3133	5	.	5	2	1	.
3134	4	1	.	1	1	1
3135	6	.	6	3	1	.
3136	5	1	4	.	1	.
3137	.	.	.	.	.	.
3138	6	.	6	1	.	.
3139	6	6	.	.	.	.
3140	4	4	.	.	.	.
3141	9	9	.	.	.	.
3142	10	.	10	3	2	.
3143	8	3	5	.	.	.
3144	6	1	5	2	1	.
3145	6	.	6	2	1	.
3146	7	.	7	1	1	.
3147	7	3	4	1	1	.
3148	6	3	3	1	.	.
3149	5	1	4	1	.	.
3150	4	3	.	.	1	.

ID/1	P	S	F	D	N	X
3151	7	1	.	1	1	4
3152	9	9	.	.	.	.
3153	10	.	10	3	3	.
3154	8	1	7	1	1	.
3155	6	.	6	1	.	.
3156	8	7	1	.	.	.
3157	10	3	.	2	2	3
3158	12	1	11	3	3	.
3159	10	1	9	3	1	.
3160	6	1	5	1	1	.
3161	11	9	.	.	.	2
3162	7	.	7	2	.	.
3163	4	3	1	1	.	.
3164	5	2	3	.	.	.
3165	5	4	1	.	.	.
3166	7	1	6	.	1	.
3167	8	7	.	.	.	1
3168	8	8	.	.	.	.
3169	5	2	.	.	1	2
3170	4	2	2	.	2	.
3171	7	6	.	.	.	1
3172	2	1	1	1	.	.
3173	7	2	5	2	1	.
3174	6	1	4	.	.	.
3175	3	3	.	.	.	.
3176	9	8	.	.	.	1
3177	8	7	1	.	.	.
3178	9	4	5	2	1	.
3179	4	1	3	1	1	.
3180	.	.	.	.	.	.
3181	2	1	1	1	.	.
3182	7	3	4	2	2	.
3183	6	3	.	1	2	.
3184	8	5	3	1	.	.
3185	.	.	.	.	.	.
3186	7	6	1	.	1	.
3187	10	6	4	1	.	.
3188	2	1	1	.	.	.
3189	7	2	4	.	.	.
3190	4	3	1	.	.	.
3191	7	.	7	1	1	.
3192	7	6	1	.	.	.
3193	9	5	4	1	1	.
3194	4	2	.	1	1	.
3195	3	1	2	1	.	.

ID/1	P	S	F	D	N	X
3196	2	1	1	.	.	.
3197	8	3	5	2	1	.
3198	8	3	5	.	1	.
3199	9	2	7	2	.	.
3200	7	7	.	.	.	.
3201	13	3	10	2	4	.
3202	8	3	5	2	1	.
3203	4	2	2	.	.	.
3204	6	3	3	1	.	.
3205	9	6	3	1	2	.
3206	7	5	2	1	.	.
3207	5	4	1	.	.	.
3208	5	1	4	1	1	.
3209	8	2	6	2	.	.
3210	4	3	.	.	.	1
3211	7	3	4	1	.	.
3212	8	4	4	2	1	.
3213	.	.	.	.	.	.
3214	6	5	.	.	.	1
3215	6	5	1	.	.	.
3216	5	1	4	.	1	.
3217	8	2	6	2	1	.
3218	9	4	5	1	.	.
3219	10	10	.	.	.	.
3220	11	3	8	2	1	.
3221	4	2	2	1	.	.
3222	9	9	.	.	.	.
3223	9	7	1	.	1	.
3224	3	3	.	.	.	.
3225	.	.	.	.	.	.
3226	10	5	5	1	.	.
3227	11	5	6	2	1	.
3228	2	2	.	.	.	.
3229	9	5	4	2	.	.
3230	12	7	.	2	2	1
3231	9	7	2	.	.	.
3232	9	6	3	1	.	.
3233	6	6	.	.	.	.
3234	7	3	4	3	.	.
3235	4	1	3	.	.	.
3236	9	8	1	.	.	.
3237	8	8	.	.	.	.
3238	9	3	6	1	2	.
3239	5	3	2	.	.	.
3240	5	3	2	1	.	.

ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X	ID/1	P	S	F	D	N	X
3241	6	5	1	1	.	.	3267	11	5	6	2	1	.	3293	2	1	1	.	.	.
3242	5	1	4	1	1	.	3268	2	.	2	1	.	.	3294	3	.	3	.	.	.
3243	2	.	.	.	.	2	3269	5	2	3	2	1	.	3295	9	4	5	1	2	.
3244	7	6	1	1	.	.	3270	8	4	4	1	1	.	3296	7	6	1	1	.	.
3245	7	5	2	2	.	.	3271	3	1	2	1	1	.	3297	4	2	2	.	1	.
3246	7	4	3	.	2	.	3272	.	.	.	.	.	.	3298	10	7	3	1	.	.
3247	9	8	1	.	.	.	3273	9	8	1	1	.	.	3299	8	4	4	.	1	.
3248	9	9	.	.	.	.	3274	2	1	1	.	.	.	3300	4	4	.	.	.	.
3249	2	1	1	.	1	.	3275	7	4	3	1	.	.	3301	2	1	1	.	.	.
3250	4	1	.	.	.	2	3276	2	.	2	.	.	.	3302	5	4	1	.	1	.
3251	5	4	1	.	1	.	3277	2	1	.	.	1	.	3303	4	2	.	.	.	2
3252	5	2	3	1	1	.	3278	2	2	.	.	.	.	3304	10	4	6	2	.	.
3253	2	2	.	.	.	.	3279	7	1	6	2	.	.	3305	2	1	1	.	1	.
3254	2	2	.	.	.	.	3280	5	4	.	.	.	1	3306	2	.	2	1	1	.
3255	7	5	2	1	1	.	3281	4	1	3	1	1	.	3307	3	1	2	1	.	.
3256	4	3	.	.	.	.	3282	9	5	4	.	.	.	3308	8	6	2	1	.	.
3257	6	2	4	1	1	.	3283	7	5	2	.	1	.	3309	6	2	4	2	.	.
3258	6	3	3	1	.	.	3284	4	3	1	1	.	.	3310	5	3	.	1	.	.
3259	7	4	.	1	1	1	3285	8	7	.	1	.	.	3311	4	3	1	.	.	.
3260	12	7	5	3	1	.	3286	2	.	2	.	.	.	3312	12	10	2	1	.	.
3261	6	3	.	1	1	1	3287	2	.	2	1	1	.	3313	2	1	1	.	.	.
3262	3	1	.	1	.	1	3288	6	3	3	1	.	.	3314	2	1	1	.	1	.
3263	2	.	2	.	.	.	3289	12	9	3	1	1	.	3315	.	.	.	.	.	.
3264	2	2	.	.	.	.	3290	3	2	1	.	1	.	3316	4	3	1	.	.	.
3265	2	1	1	.	.	.	3291	2	2	.	.	.	.	3317	4	4	.	.	.	.
3266	8	6	2	1	.	.	3292	2	.	.	1	1	.	3318	2	2	.	.	.	.

ID/2	P	S	F	D	N	X
1	2	.	2	1	.	.
2	16	5	11	4	3	.
3	2	1	1	.	1	.
4	2	1	1	.	1	.
5	7	4	.	1	.	2
6	2	.	2	1	1	.
7	10	7	3	.	.	.
8	8	2	6	3	1	.
9	2	2	.	.	.	.
10	4	4	.	.	.	.
11	6	4	2	1	.	.
12	2	1	.	.	.	1
13	5	3	.	1	.	1
14	6	5	1	.	1	.
15	6	6	.	.	.	.
16	11	8	3	.	.	.
17	11	11	.	.	.	.
18	5	3	.	.	.	2
19	.	.	.	.	.	.
20	4	2	.	.	.	2
21	7	4	.	.	.	3
22	2	.	.	1	.	1
23	4	2	.	1	.	1
24	3	.	.	1	1	1
25	13	4	.	2	2	5
26	8	7	.	.	.	1
27	5	3	.	.	.	2
28	4	.	.	1	1	2
29	.	.	.	.	.	.
30	6	2	.	2	1	1
31	6	1	5	1	.	.
32	7	4	.	2	1	.
33	4	3	1	1	.	.
34	3	2	1	.	.	.
35	9	6	.	1	.	2
36	4	.	4	1	.	.
37	4	2	.	1	1	.
38	6	2	.	1	2	1
39	6	1	5	2	1	.
40	.	.	.	.	.	.
41	4	1	3	2	1	.
42	8	1	.	4	3	.
43	.	.	.	.	.	.
44	.	.	.	.	.	.
45	19	9	10	2	2	.
46	13	4	.	2	1	6
47	8	5	.	.	1	2
48	4	2	2	.	1	.
49	8	4	4	1	1	.
50	7	3	4	1	2	.
51	3	.	3	1	1	.
52	5	5	.	.	.	.
53	8	3	.	1	1	3
54	.	.	.	.	.	.
55	6	6	.	.	.	.
56	6	1	5	2	2	.
57	4	1	.	2	.	1
58	8	5	3	1	.	.
59	4	2	.	1	1	.
60	2	1	1	.	1	.
61	5	.	.	1	1	3
62	5	1	.	1	.	3
63	5	3	2	.	1	.
64	3	2	1	.	.	.
65	7	2	3	2	2	.
66	4	2	2	1	.	.
67	3	1	2	.	.	.
68	5	1	4	1	2	.
69	4	2	.	2	.	.
70	2	.	2	1	.	.
71	4	3	1	1	.	.
72	15	9	3	3	1	1
73	10	3	7	3	1	.
74	8	2	6	1	4	.
75	8	1	7	2	1	.
76	9	5	4	2	.	.
77	3	1	2	2	.	.
78	2	1	.	1	.	.
79	2	2	.	.	.	.
80	4	2	2	.	.	.
81	8	7	.	1	.	.
82	8	6	.	1	1	.
83	9	5	4	1	1	.
84	7	3	.	.	2	2
85	6	2	1	3	.	.
86	8	6	2	.	.	.
87	6	3	3	.	1	.
88	2	.	.	1	1	.
89	11	9	2	.	.	.
90	9	5	.	2	.	2
91	4	.	4	.	.	.
92	16	9	.	2	2	3
93	5	1	4	1	.	.
94	.	.	.	.	.	.
95	15	4	11	2	2	.
96	9	3	4	3	2	.
97	4	1	3	1	2	.
98	9	4	5	1	.	.
99	6	5	1	1	.	.
100	4	2	.	.	.	2
101	9	3	6	3	.	.
102	6	2	.	1	1	2
103	3	1	2	1	1	.
104	2	.	2	1	.	.
105	4	3	.	.	.	1
106	.	.	.	.	.	.
107	4	2	2	1	.	.
108	2	.	.	.	.	2
109	.	.	.	.	.	.
110	7	2	4	1	2	.
111	5	3	2	1	.	.
112	6	4	.	.	.	2
113	4	1	1	1	1	.
114	4	4	.	.	.	.
115	3	2	.	.	.	1
116	8	5	3	.	.	.
117	4	.	.	2	.	2
118	7	6	.	.	.	1
119	8	5	3	.	1	.
120	7	1	6	3	2	.
121	10	7	.	1	.	2
122	.	.	.	.	.	.
123	2	1	.	.	.	1
124	.	.	.	.	.	.
125	20	5	1	5	1	8
126	.	.	.	.	.	.
127	4	2	.	.	1	1
128	7	2	5	1	.	.
129	5	5	.	.	.	.
130	4	2	.	2	.	.
131	9	7	.	.	.	2
132	8	3	.	2	1	2
133	6	5	.	.	1	.
134	2	1	.	.	.	1
135	5	2	.	.	.	3

SECTION III-3. IRAS LRS SPECTRA OF SELECTED ASTEROIDS

Preprint No. 1

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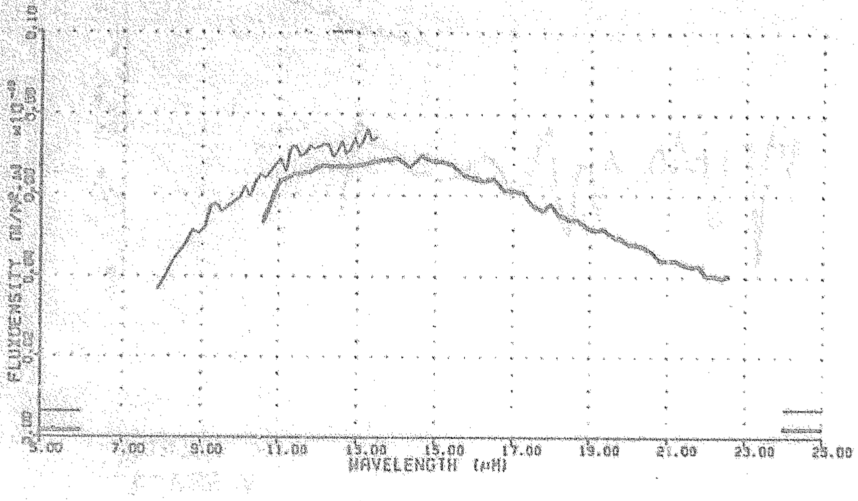
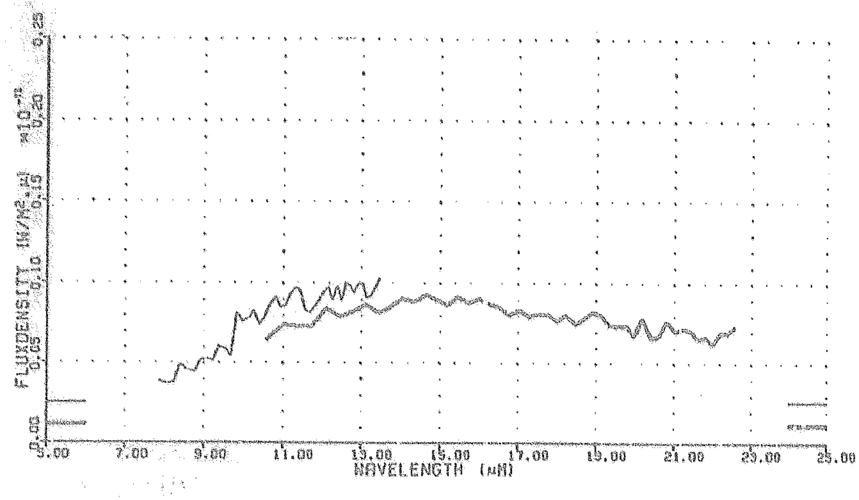
The IRAS LRS spectra of Selected Asteroids is Final Data product No. 9. The ordinates for the plots are in flux density (W m^{-2} μ^{-1}). The abcissae are wavelength in microns. The data plotted are observed instrumental values. The sets of bars on the right and left of each plot frame show the calculated zero flux density levels.

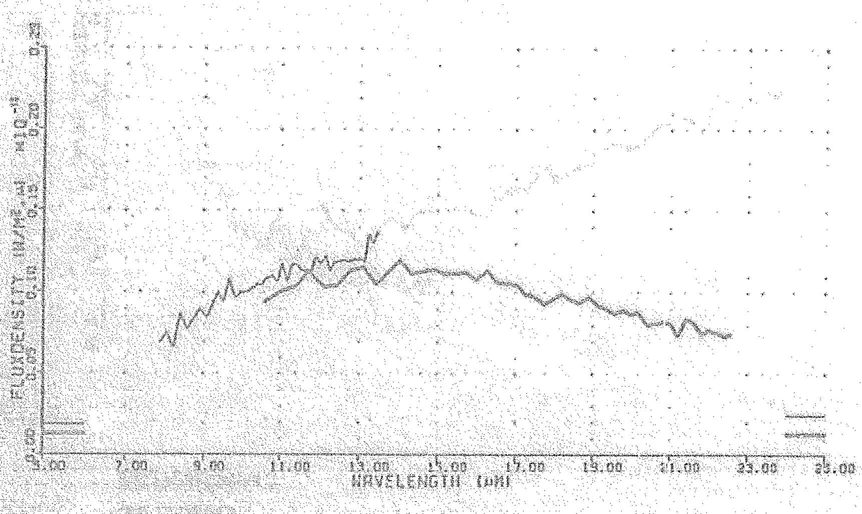
1 - CERES
56,747261128



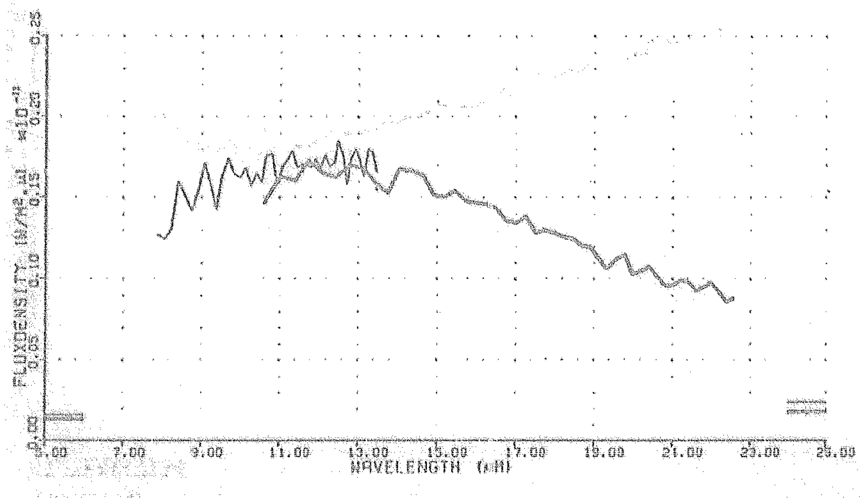
2 - PALLAS
60,875485608



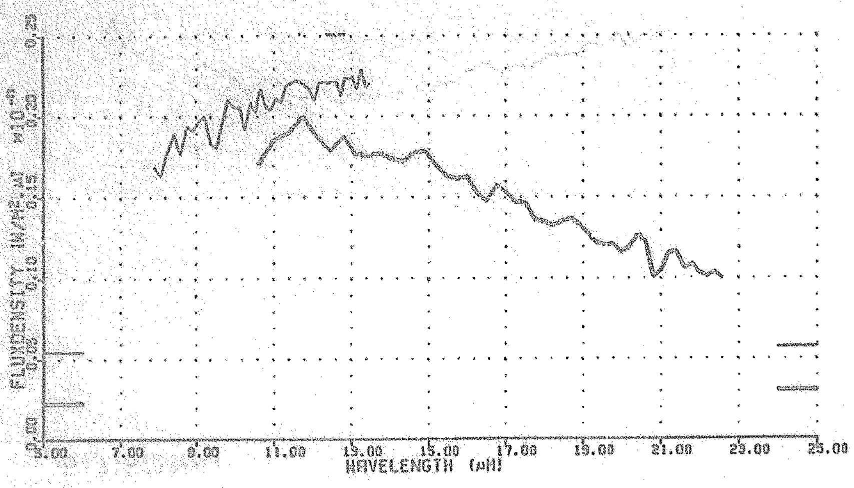
2 - PALLAS
57,718753669



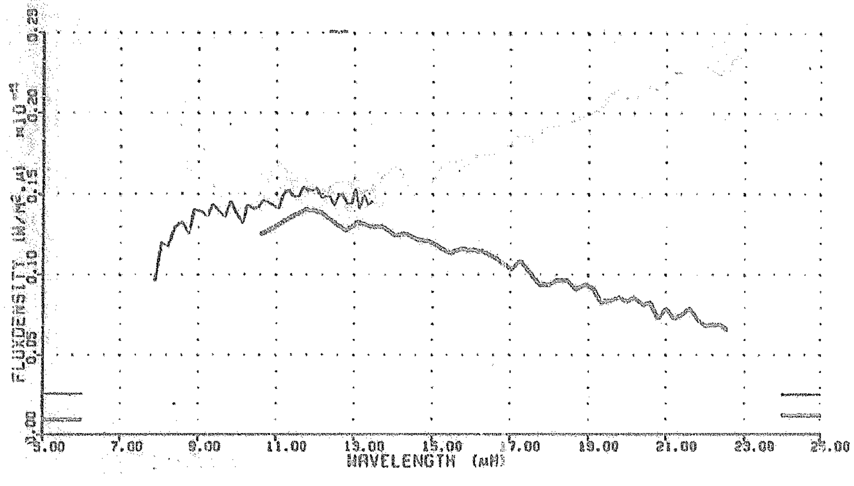
3 - JUNO
59,817828059



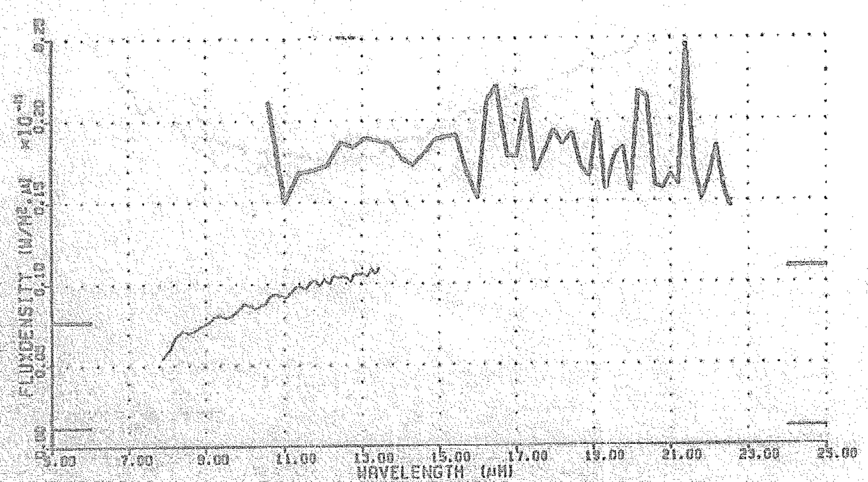
3 - JUNO
60,807004942



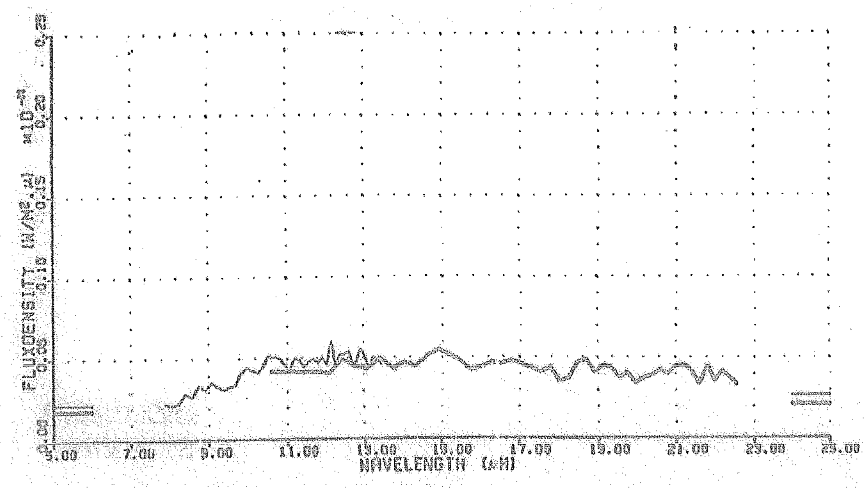
3 - JUNO
57,799833734



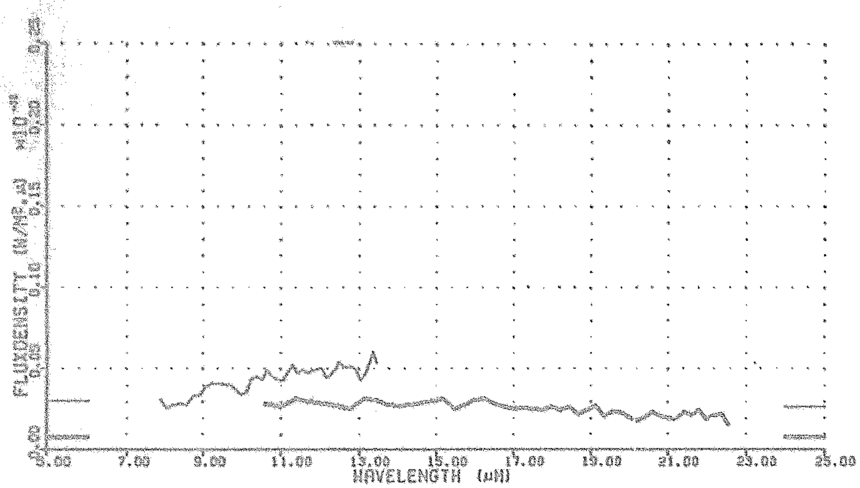
4 - VESTA
60,869151763



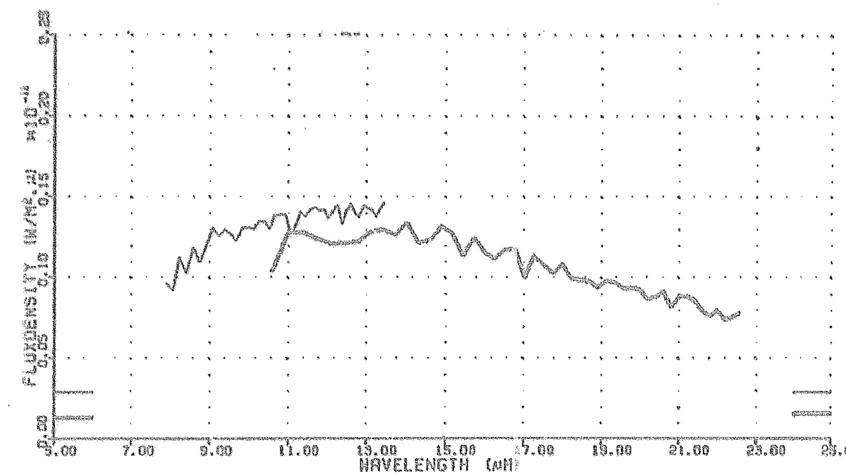
6 - HEBE
57,706623979



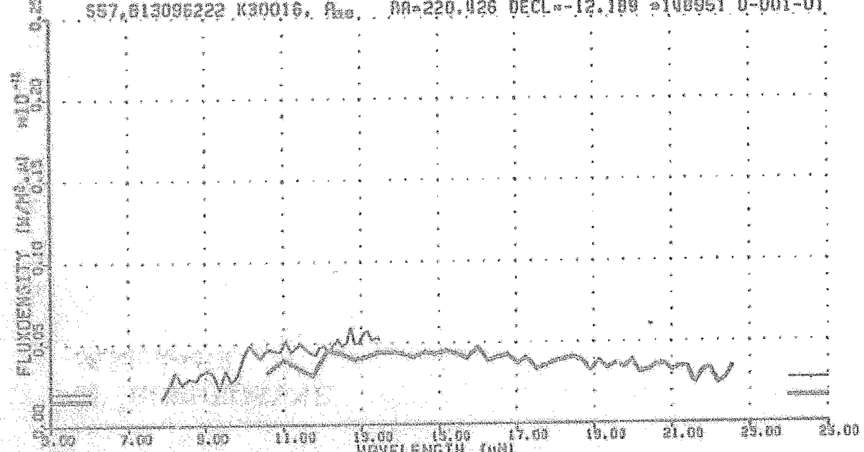
7 - IRIS
60,865782584



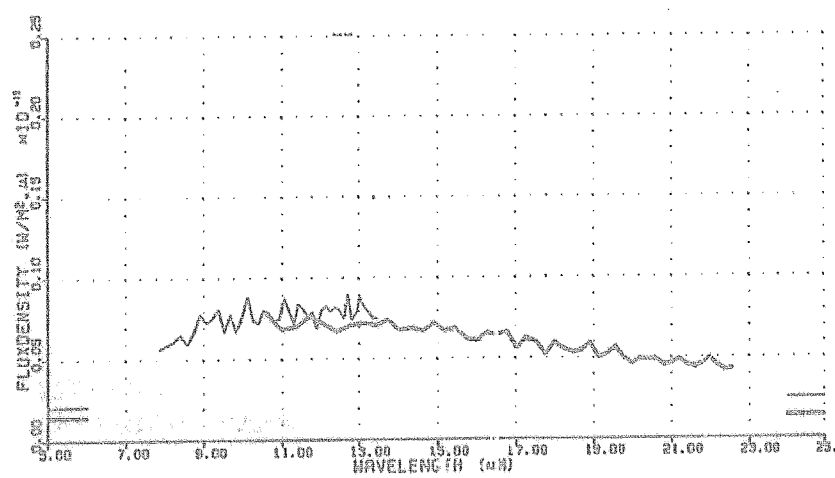
10 - HYGIEA
57,838515034



16 - PSYCHE
57,813096222



29 - AMPHITRITE
56,8922214804



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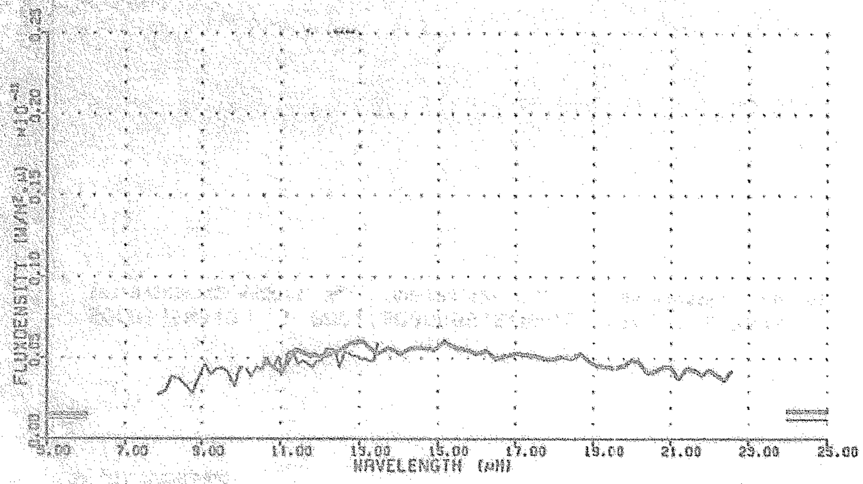
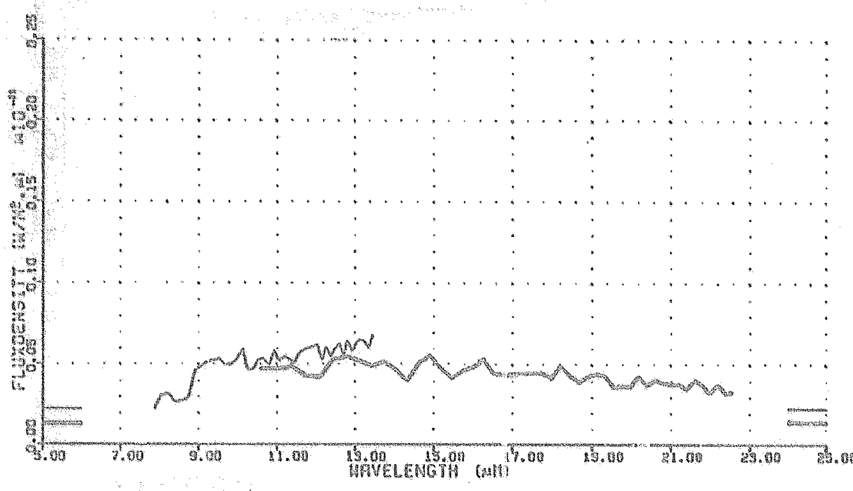
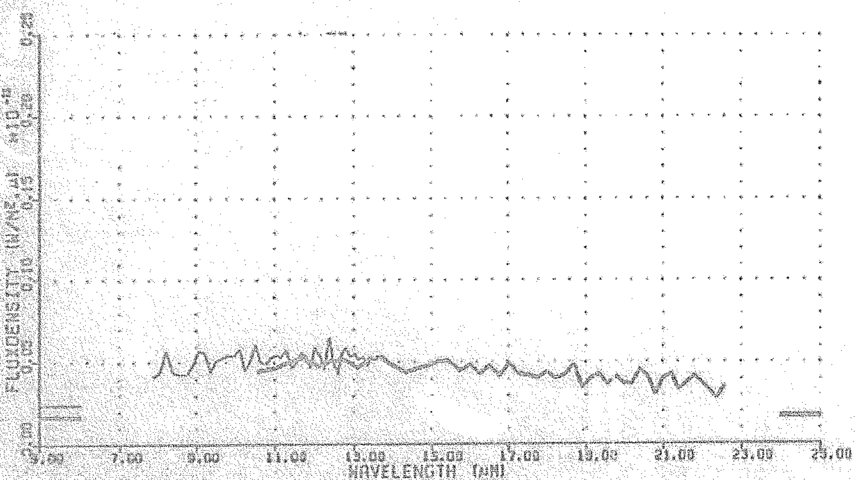
31 - EUPHROSYNE
56,820484472



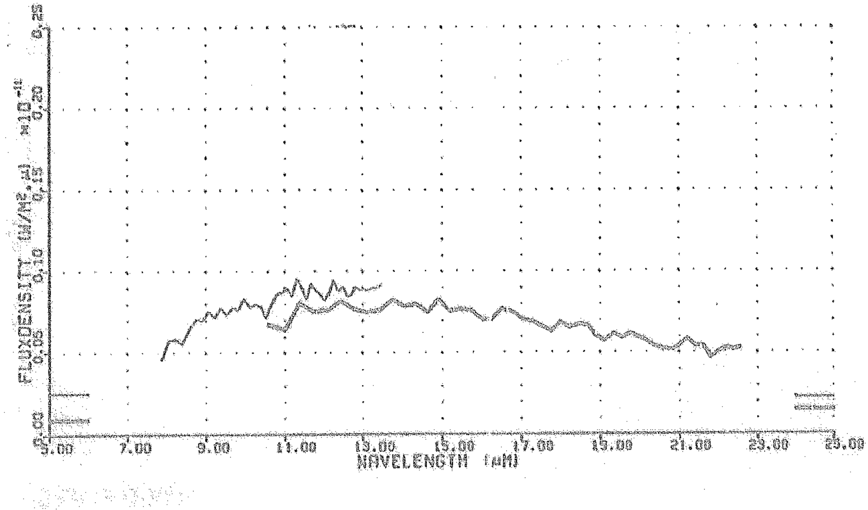
31 - EUPHROSYNE
57,810407638



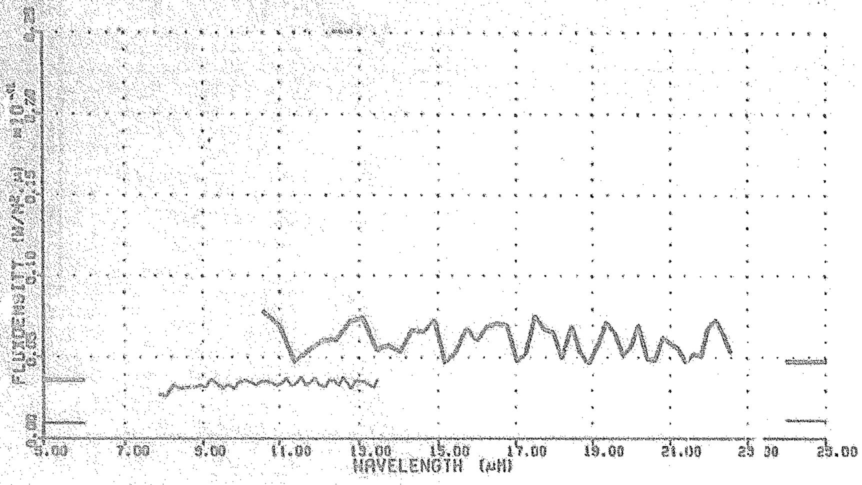
51 - NEMAUSA
59,779423072



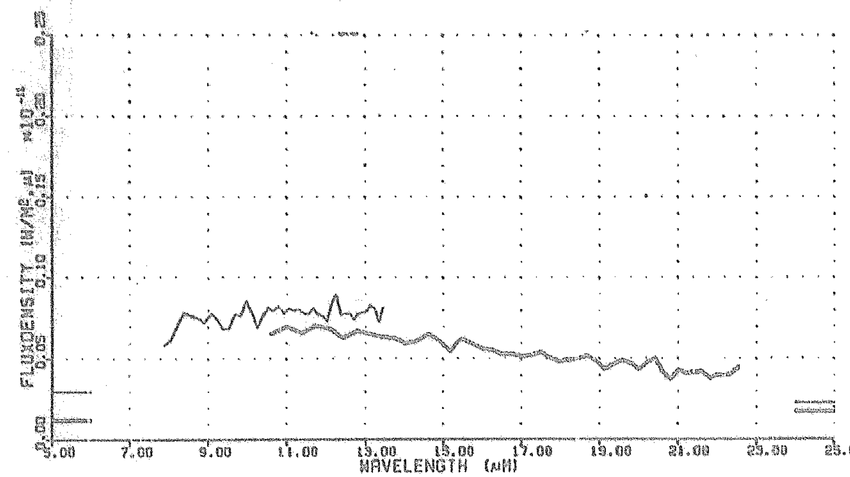
52 - EUROPA
57,718033032



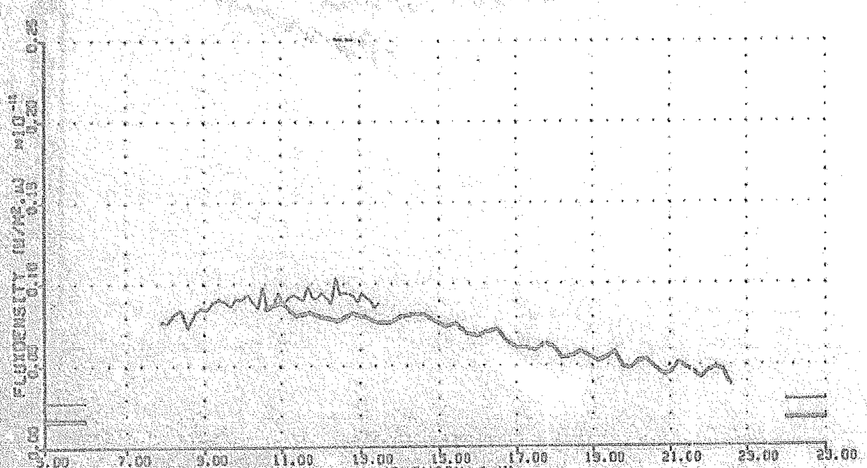
54 - ALEXANDRA
60,747447350



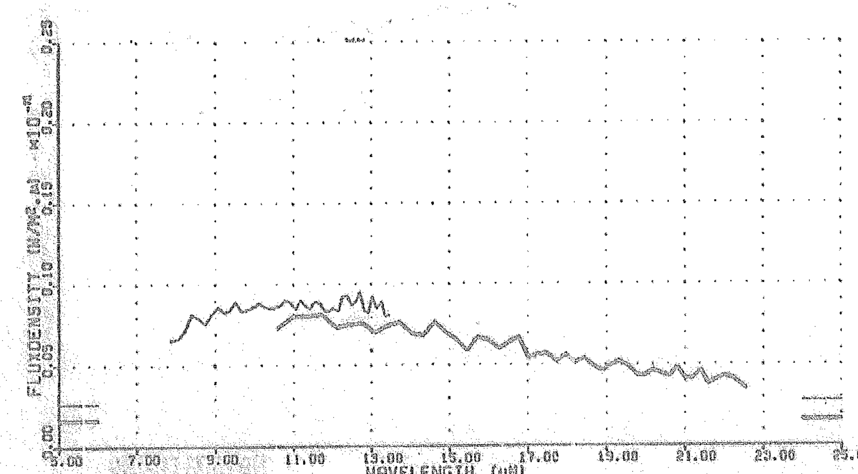
54 - ALEXANDRA
57,747822658



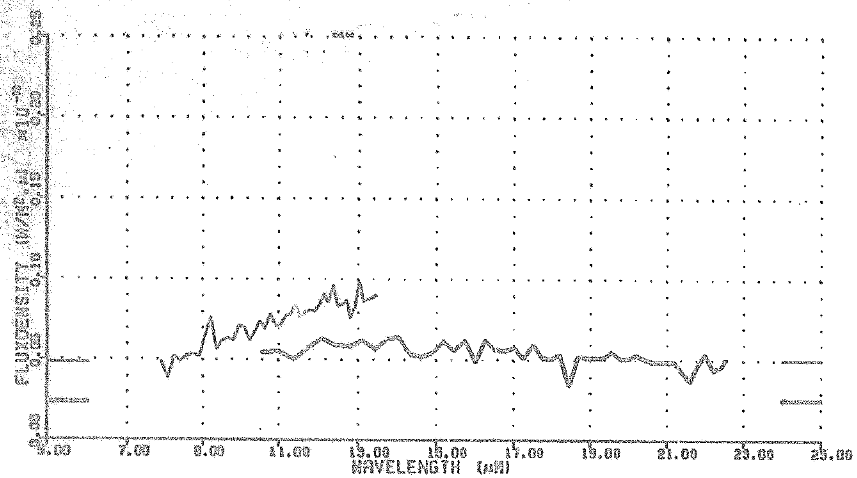
54 - ALEXANDRA
59,759380188



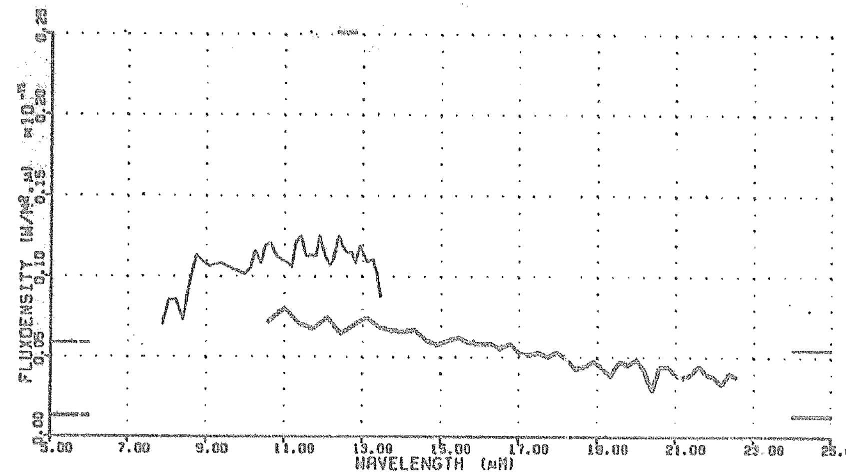
54 - ALEXANDRA
59,754928908



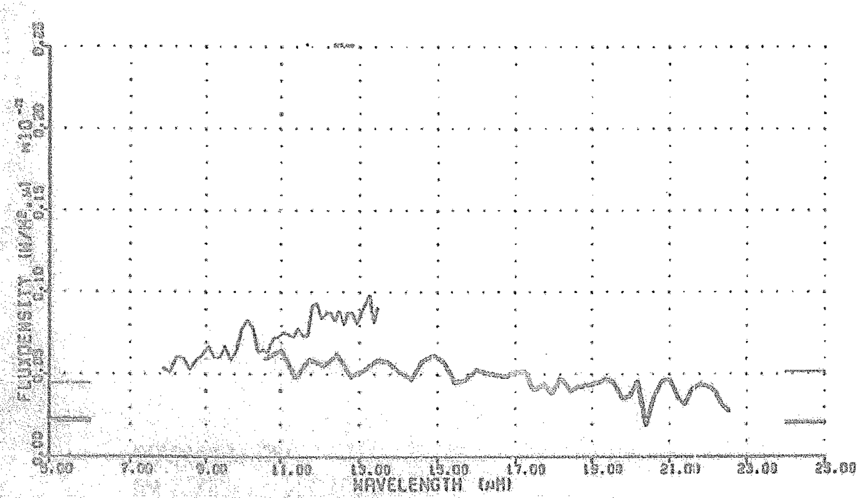
65 - CYBELE
60,740208258



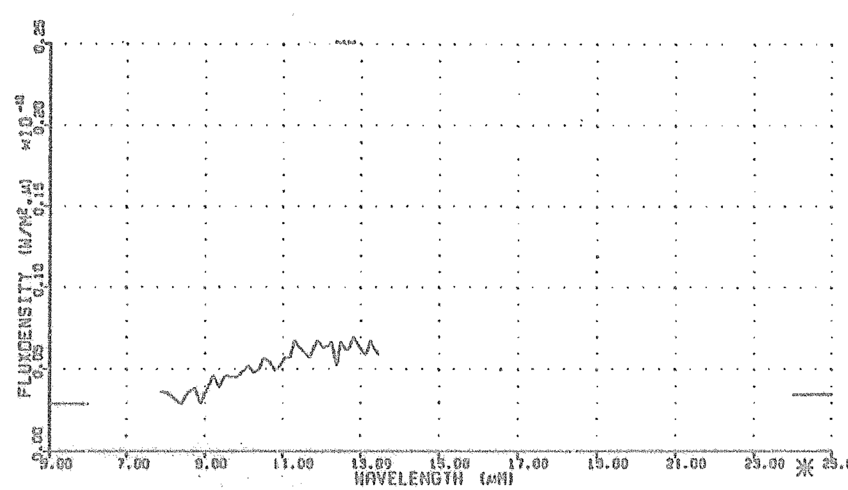
80 - SAPPHO
56,841266168



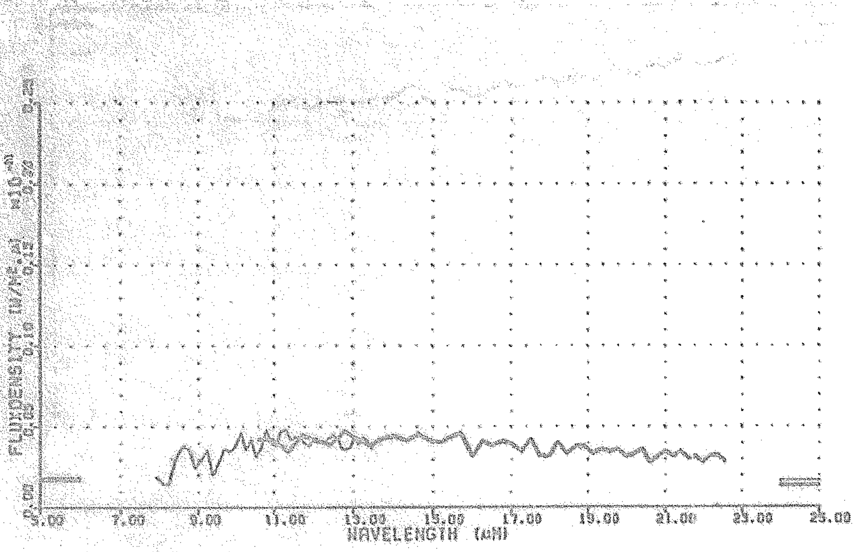
68 - LETO
60,807623089



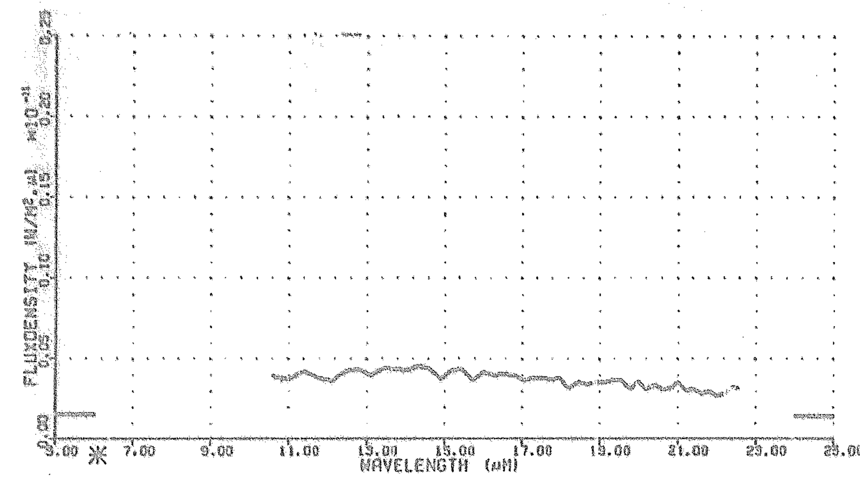
121 - HERMIONE
60,825001496



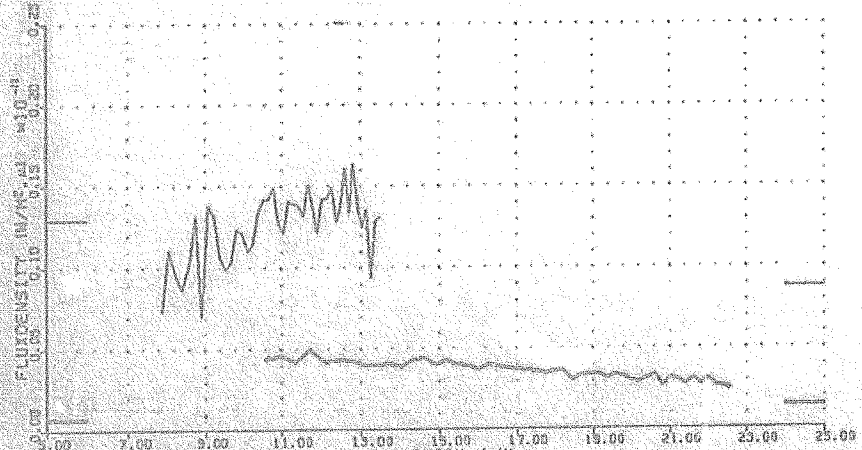
121 - HERMIONE
56,831801563



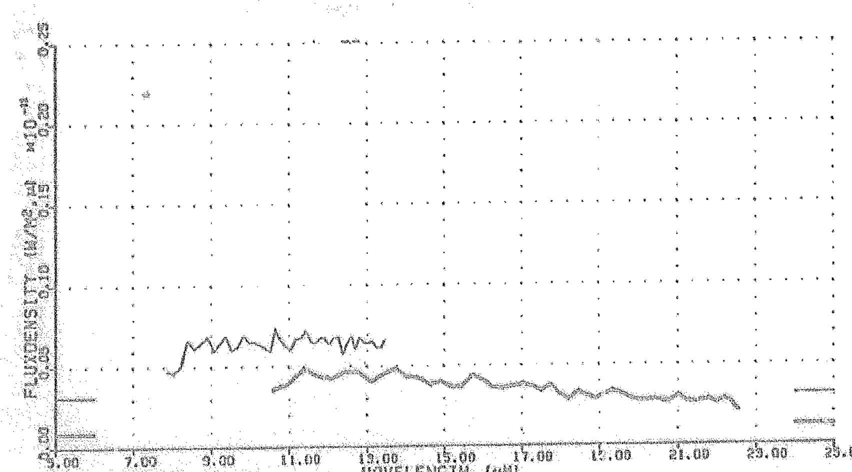
121 - HERMIONE
56,847386311



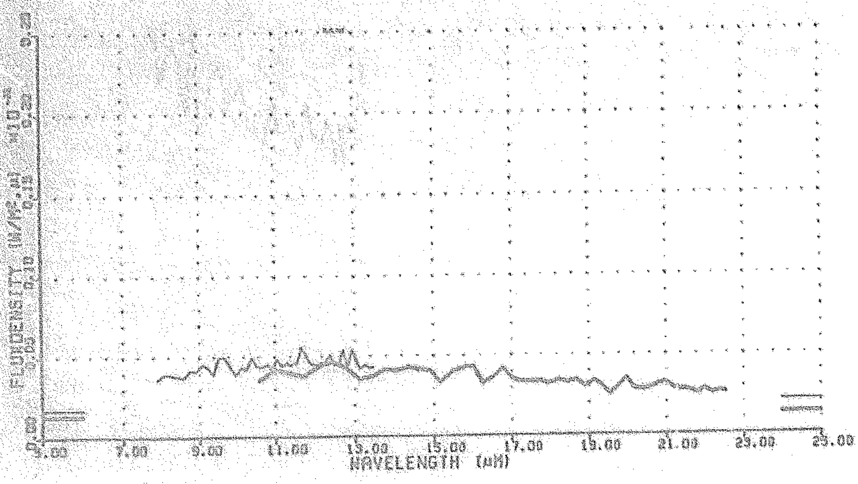
139 - JUEWA
60,758856615



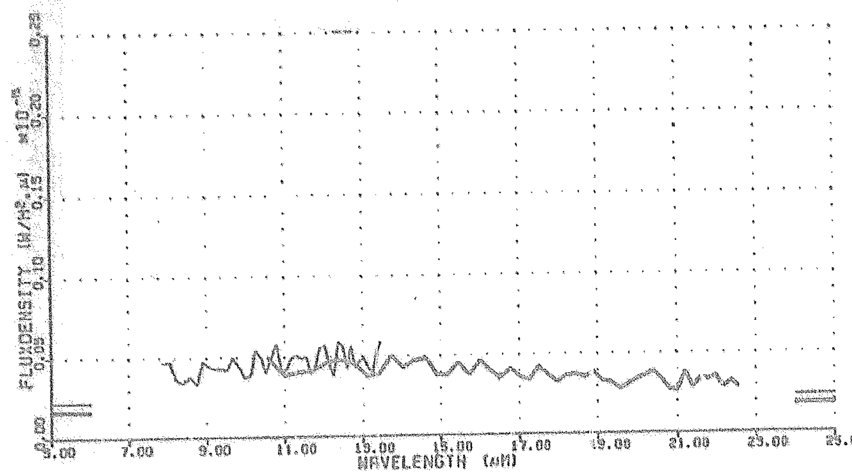
164 - EVA
60,871845551



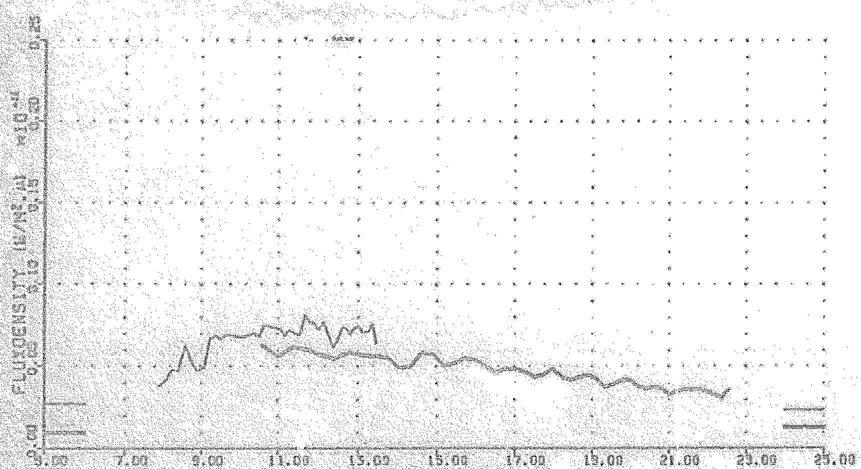
173 - INO
57,670657499



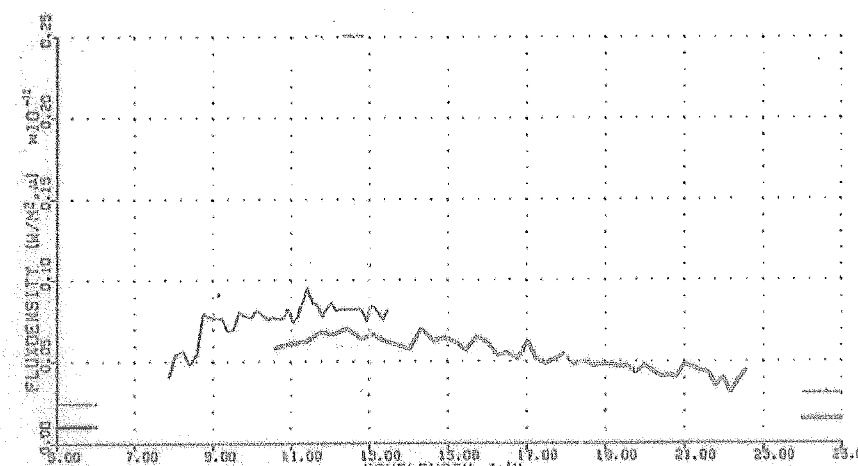
173 - INO
59,680987789



247 - EUKRATE
60,826550967



247 - EUKRATE
60,833783714



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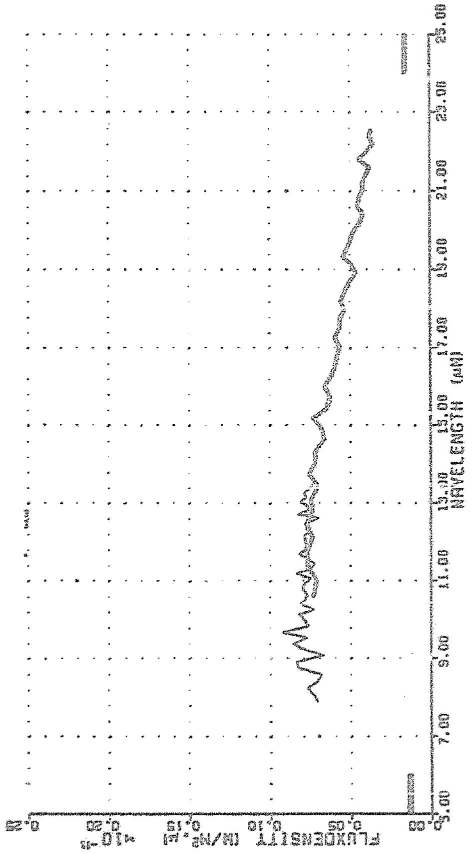
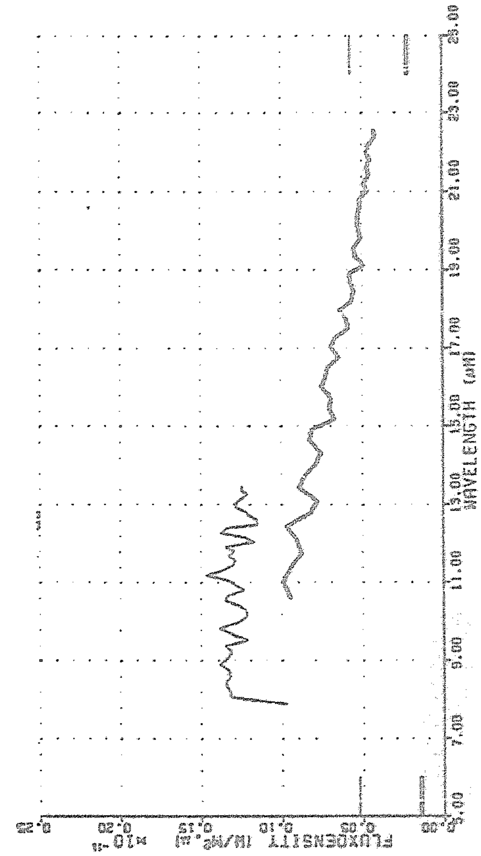
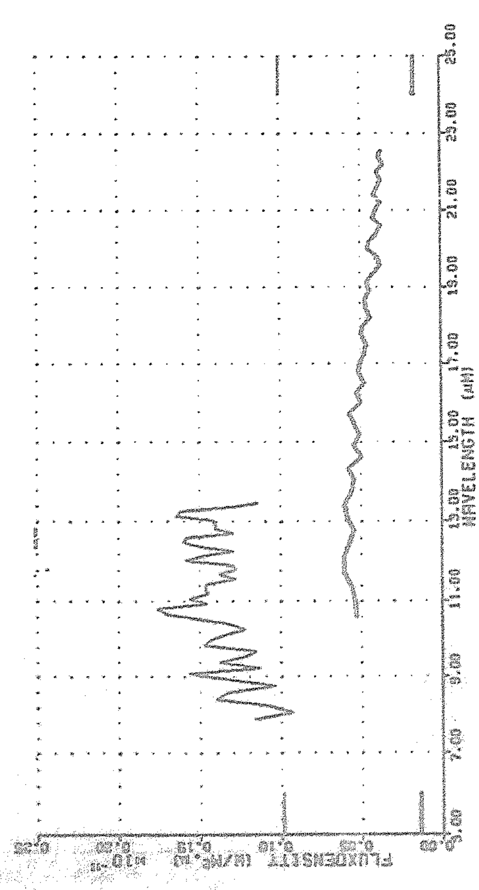
344 - DESIDERATA
56,795904662



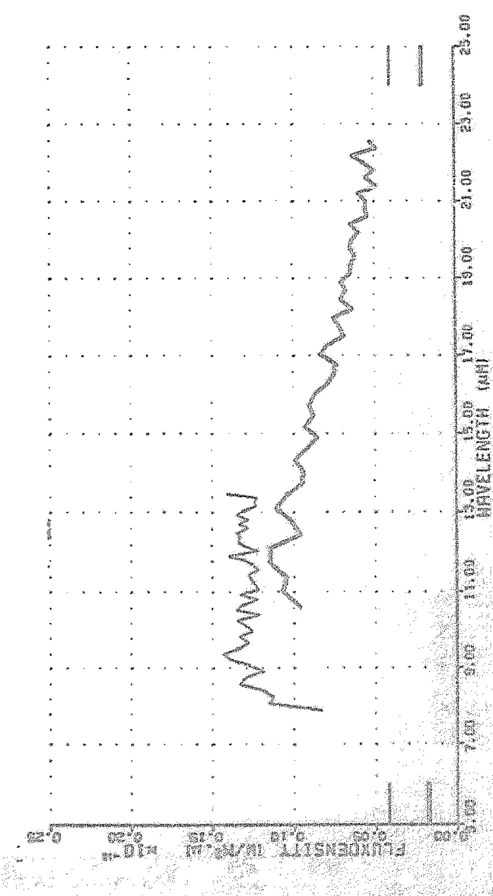
344 - DESIDERATA
56,842473063



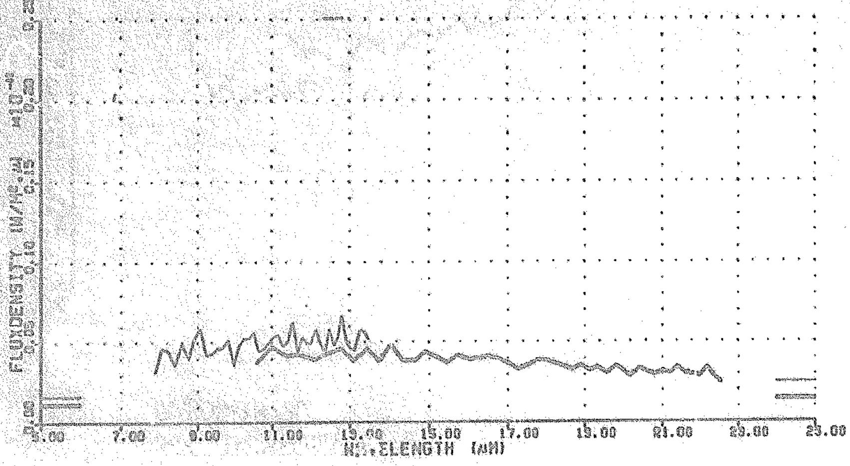
324 - BAMBERGA
56,900127810



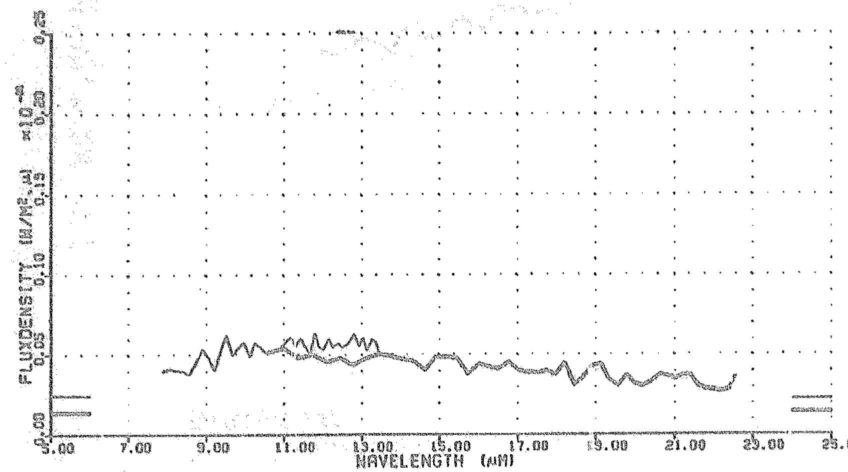
344 - DESIDERATA
60,806418726



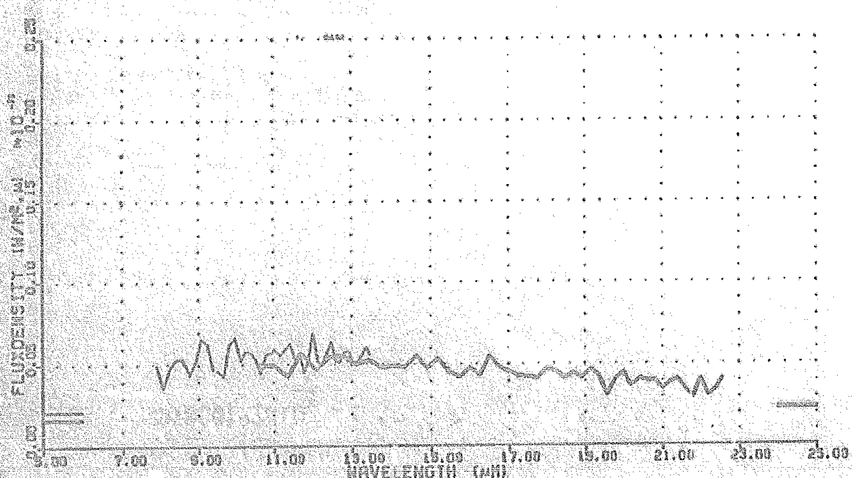
356 - LIGURIA
56,817456413



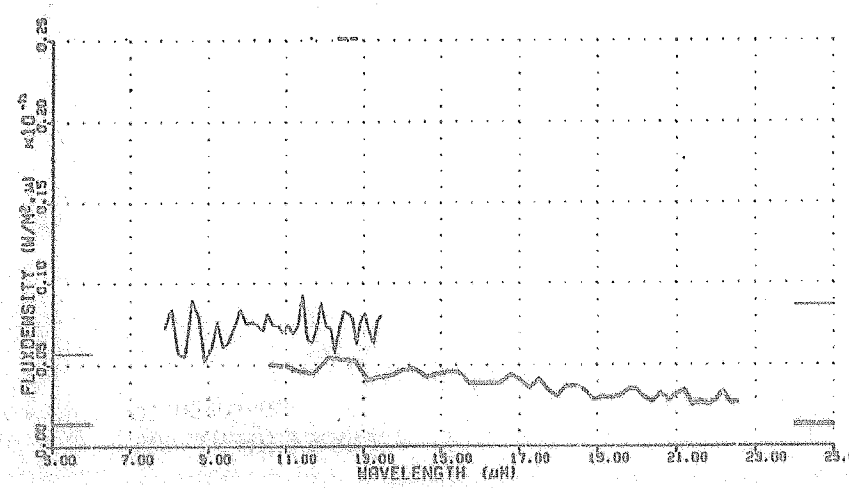
356 - LIGURIA
57,817828870



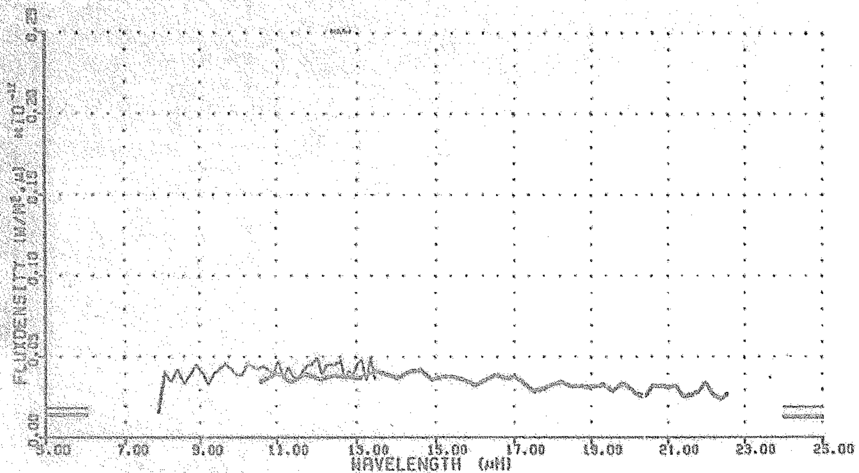
410 - CHLORIS
48,670071622



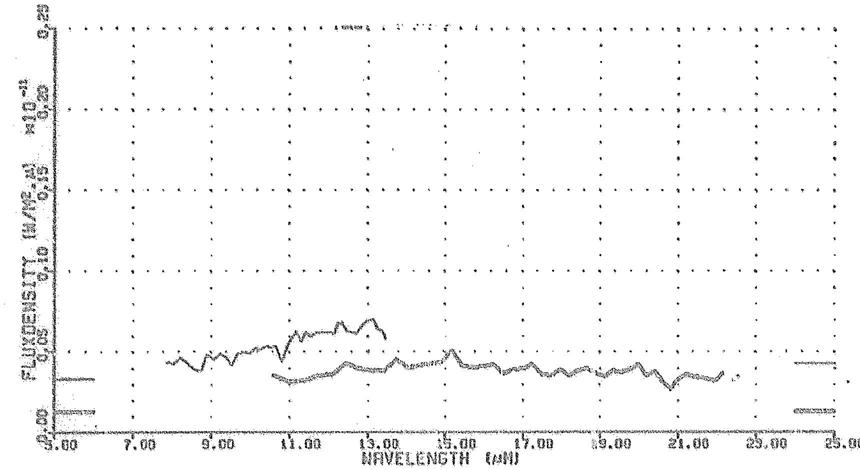
410 - CHLORIS
56,690974971



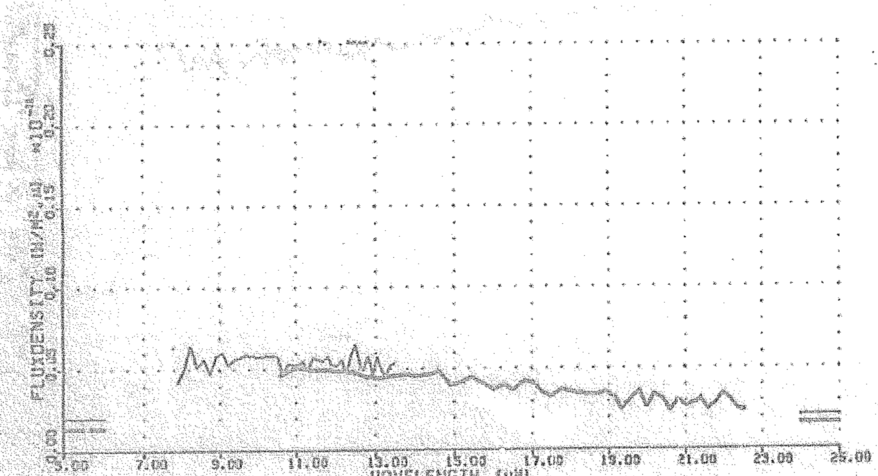
444 - GYPTIS
56,715964638



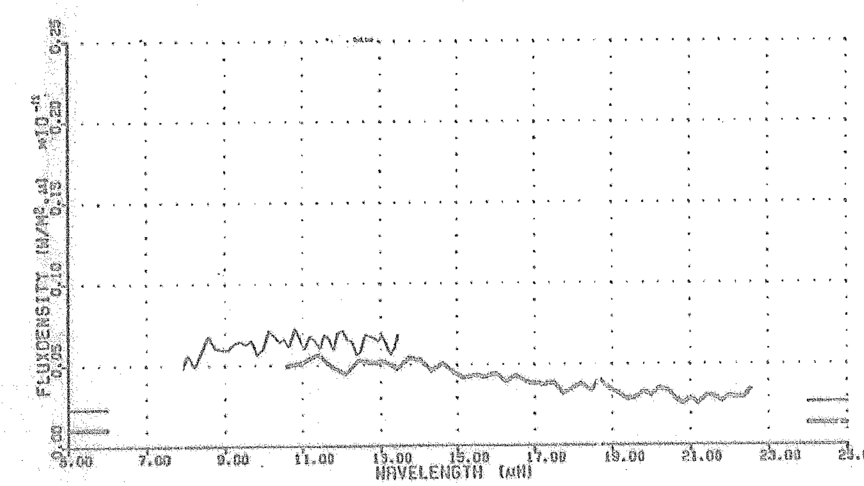
511 - DAVIDA
60,724991917



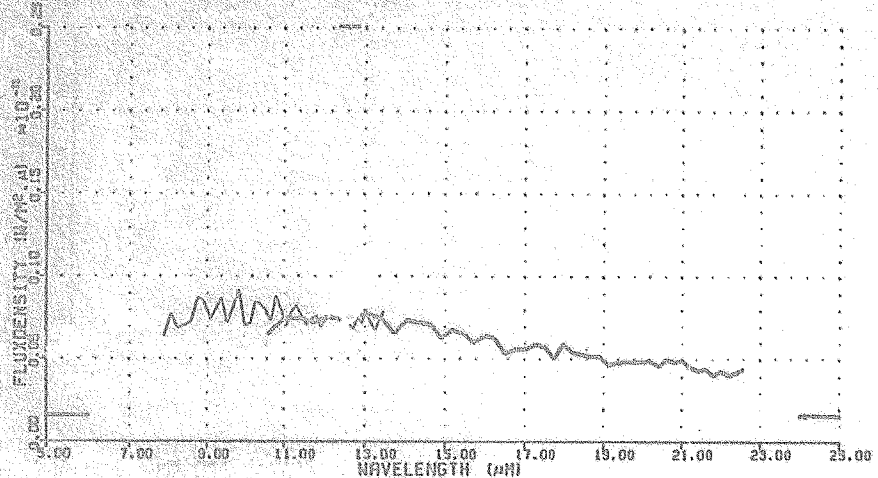
694 - EKARD
57,772375360



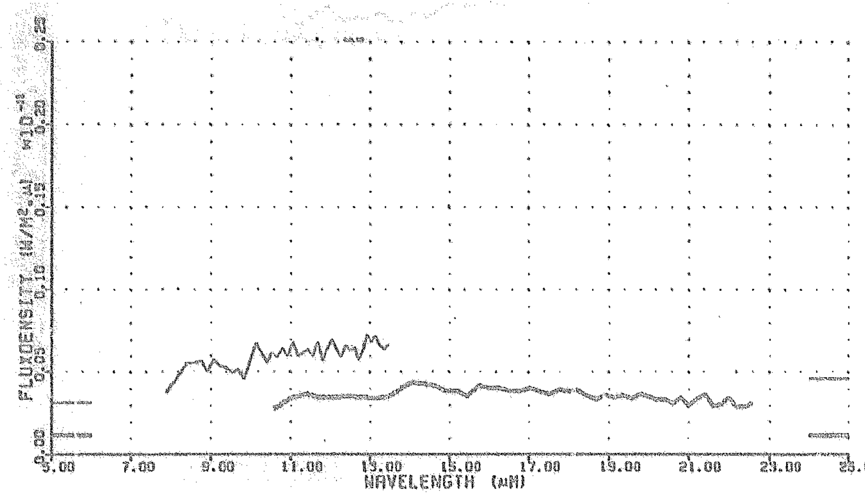
694 - EKARD
57,780786997



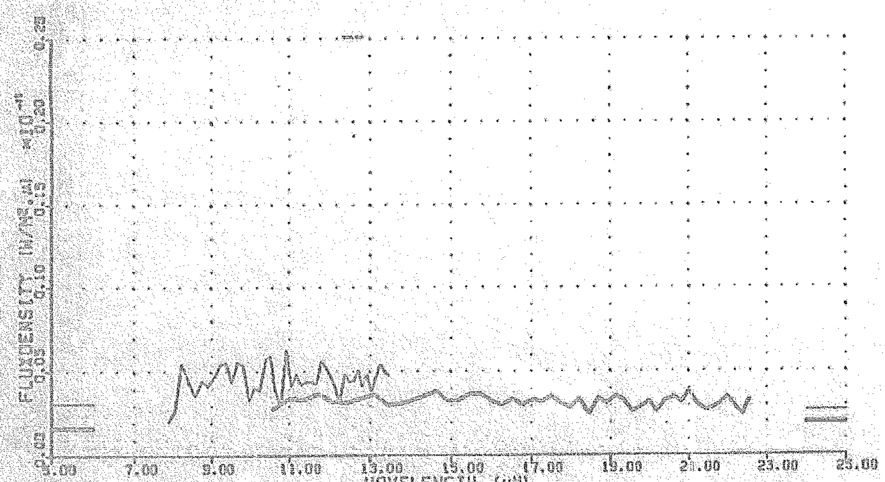
694 - EKARD
56,792478717



704 - INTERAMNIA
60,797700390



790 - PRETORIA
59,714979879



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SECTION III-4.

IRAS COMET CATALOG [FDP No. 7]

Each set of detections is preceded by the comet's common name followed by its sighting statistics enclosed in parenthesis. For example, the heading "Tempel-Swift (3,8,2d,1n)" is interpreted to read that comet Tempel-Swift had 3 detections associated with its position which was scanned 8 times, twice with a dead (d) detector, and once with an excessively noisy (n) detector. Another example, the heading "Arend (0,2,0)" is read that there was no source detected at the position of comet Arend, although it was scanned twice, and no excuses are given for the missed detections.

Immediately following the comet heading there is a one line entry of the data pertaining to the source detected. The following data are listed:

Table 3-7

ID	identifying number of the orbital elements used
JD 244	the number to be appended to 244 to give the Julian date of the detection
DN	the IRAS detector number of the first detector in the array to detect the source (It is particularly important to know the track of extended sources across the array.)
r	the heliocentric distance of the comet at the time of detection (in AU)
Δ	the geocentric distance of the comet at the time of detection (in AU)
PHASE	the phase angle (degrees) of the comet at the time of detection
F_{12}	the flux density in the IRAS 12 micron band (Jy)
UN	the flux uncertainty expressed as a percent of the flux density in the 12 μm band
S	the flux status (FSTAT) of the 12 micron detection as defined in the IRAS Explanatory Supplement
SNR	the signal to noise ratio of the 12 micron detection, a value of 100 is to be interpreted as equal to or greater than 100

F_{25}	the flux density in the IRAS 25 μm band (Jy)
UN	the flux density uncertainty expressed as a percent of the flux density in the 25 μm band
S	the flux status (FSTAT) of the 25 micron detection as defined in the IRAS Explanatory Supplement
SNR	the signal to noise ratio of the 25 micron detection, a value of 100 is to be interpreted as equal to or greater than 100
F_{60}	the flux density in the IRAS 60 μm band (Jy)
UN	the flux density uncertainty expressed as a percent of the flux density in the 60 μm band
S	the flux status (FSTAT) of the 60 μm detection as defined in the IRAS Explanatory Supplement
SNR	the signal to noise ratio of the 60 μm detection, a value of 100 is to be interpreted as equal to or greater than 100
F_{100}	the flux density in the IRAS 100 μm band (Jy)
UN	the flux density uncertainty expressed as a percent of the flux density in the 100 μm band
S	the flux status (FSTAT) of the 100 micron detection as defined in the IRAS Explanatory Supplement
SNR	the signal to noise ratio of the 100 micron detection, a value of 100 is to be interpreted as equal to or greater than 100
IRAS PSC	the IRAS name of the fixed point source within 4 arc minutes of the comet's position
RA	the right ascension (1950.0) of the detected source in hours, minutes, and seconds of time
DEC	the declination (1950.0) of the detected source in degrees, minutes, and seconds

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The IRAS Comet Catalog (FDP No. 7) consists of two tables. The data for the more reliable sightings are listed in Table 1. All of the available observations are listed in Table 2.

ID	JD 244	DN	ρ	Δ	PHASE	F_{12}	UN	S	SNR	F_{25}	UN	S	SNR
Churyumov-Gerasimenko (6,6,0)													
6	5451.7	54	2.22	1.93	26.99	0.90	16	5	10	2.71	18	5	23
6	5451.7	49	2.22	1.94	26.99	0.98	17	5	10	2.14	20	5	17
6	5451.8	51	2.22	1.94	26.98	0.85	18	5	8	2.30	19	5	19
6	5469.1	50	2.34	2.26	25.28	0.61	16	5	6	1.85	19	5	18
6	5469.6	53	2.35	2.27	25.23	0.55	16	5	7	1.57	19	5	14
6	5469.6	48	2.35	2.27	25.22	0.68	18	5	4	1.90	20	5	16
du Toit-Neujmin-Delporte (6,6,0)													
13	5495.4	39	1.71	1.32	36.34	0.27	0	1	0	0.54	21	5	6
13	5495.4	44	1.71	1.32	36.34	0.31	19	3	4	0.74	23	4	5
13	5495.5	22	1.71	1.32	36.34	0.23	0	1	0	1.05	24	5	9
13	5504.6	39	1.72	1.25	35.93	0.26	20	3	3	0.85	23	5	8
13	5505.1	49	1.72	1.25	35.90	0.41	16	5	5	0.93	22	4	9
13	5505.2	42	1.72	1.25	35.89	0.41	17	3	6	0.83	22	5	8
Gunn (2,2,0)													
20	5484.2	60	2.70	2.50	22.09	0.46	20	4	5	2.48	19	4	22
20	5484.3	58	2.70	2.50	22.09	0.72	16	5	10	3.05	20	5	16
Harrington-Abel (2,2,0)													
23	5645.5	52	1.80	1.56	33.34	0.33	16	5	4	0.68	23	4	7
Johnson 1983 XIX (9,9,0)													
27	5418.3	52	2.83	2.67	20.63	22.58	11	5	34	24.94	15	4	35
27	5418.4	54	2.83	2.67	20.63	21.73	9	5	44	24.62	16	5	46
27	5426.4	51	2.80	2.54	20.82	2.25	16	5	13	1.90	21	5	13
27	5426.5	49	2.80	2.54	20.82	2.58	14	5	12	1.75	20	5	9
27	5618.9	46	2.33	2.20	25.26	0.31	0	1	0	0.80	21	5	7
27	5619.0	44	2.33	2.20	25.26	0.31	19	3	3	0.77	22	5	6
27	5619.1	43	2.33	2.20	25.26	0.26	0	1	0	0.96	22	5	4
Kopff (5,5,0)													
31	5561.0	60	1.58	0.95	37.85	17.96	14	5	0	39.12	10	5	100
31	5627.1	62	1.72	1.52	35.03	4.00	11	5	54	9.88	16	5	65
31	5627.7	58	1.73	1.53	34.95	0.76	20	4	10	10.27	15	5	75
31	5627.8	60	1.73	1.53	34.93	5.00	10	5	67	10.80	16	4	92
31	5627.9	59	1.73	1.53	34.92	4.46	9	5	51	9.83	17	5	66
Pons-Winnecke (8,8,0)													
37	5513.3	52	1.58	1.25	40.03	1.38	15	5	19	3.16	16	5	35
37	5513.4	58	1.58	1.25	40.01	1.55	16	5	16	3.44	21	5	13
37	5526.4	51	1.67	1.24	37.33	1.27	17	5	12	2.90	14	5	40
37	5526.5	44	1.67	1.24	37.32	0.17	0	1	0	2.49	16	5	36
37	5526.6	50	1.67	1.24	37.30	1.45	17	5	13	3.84	16	5	42
37	5535.2	51	1.73	1.24	35.23	1.07	16	5	12	2.55	15	5	44
37	5535.3	49	1.73	1.24	35.21	1.19	17	5	13	2.58	16	5	39
37	5535.4	54	1.74	1.24	35.19	0.93	14	5	17	2.22	18	5	26
Schwassmann-Wachmann 1 (4,4,0)													
41	5524.8	45	6.29	6.18	9.31	0.20	0	1	0	0.48	21	5	4
41	5524.8	40	6.29	6.18	9.31	0.24	0	1	0	0.52	21	5	5
41	5535.6	44	6.28	6.35	9.21	0.28	0	1	0	0.63	22	4	6

ID	JD 244	F_{60}	UN	S	SNR	F_{100}	UN	S	SNR	IRAS PSC	RA	DEC
Churyumov-Gerasimenko (6,6,0)												
6	5451.7	1.83	23	5	14	0.76	21	3	3.		85132.5	+254841
6	5451.7	1.95	23	5	19	1.11	0	1	0		85137.5	+2548 7
6	5451.8	1.79	23	5	15	1.13	20	3	3		85144.2	+254719
6	5469.1	1.34	21	5	11	0.84	20	3	4		91755.7	+23 113
6	5469.6	1.33	22	5	13	0.67	0	1	0	09188+2258	91831.9	+225715
6	5469.6	1.51	21	5	10	1.00	22	3	4	09188+2258	91838.6	+225627
du Toit-Neujmin-Delporte (6,6,0)												
13	5495.4	0.46	21	3	3	0.67	0	1	0		225834.6	- 3 441
13	5495.4	0.42	21	4	3	0.92	0	1	0		225836.1	- 3 427
13	5495.5	0.28	0	1	0	0.49	0	1	0		225833.6	- 3 4 7
13	5504.6	0.34	0	1	0	0.63	0	1	0		231516.1	- 11946
13	5505.1	0.34	0	1	0	1.09	0	1	0		2316 9.8	- 11412
13	5505.2	0.40	21	3	3	0.72	0	1	0		231618.4	- 11322
Gunn (2,2,0)												
20	5484.2	1.36	24	5	10	1.57	19	5	3		225255.8	-181938
20	5484.3	2.70	23	5	32	1.09	16	5	6		2253 5.4	-181857
Harrington-Abel (2,2,0)												
23	5645.5	0.29	0	1	0	0.94	0	1	0		92942.8	+244751
Johnson 1983 XIX (9,9,0)												
27	5418.3	19.54	20	4	4	94.09	0	1	0	18180-1318	1818 2.2	-131835
27	5418.4	12.14	20	3	4	85.03	0	1	0	18180-1318	1818 2.3	-131838
27	5426.4	2.47	0	1	0	22.27	0	1	0	18262-1312	182615.4	-1312 2
27	5426.5	3.40	0	1	0	29.42	0	1	0	18262-1312	182613.5	-1312 1
27	5618.9	0.39	22	3	4	1.63	0	1	0		185329.3	-253558
27	5619.0	0.48	17	5	4	1.50	0	1	0		185324.2	-253624
27	5619.1	0.53	18	5	5	1.48	0	1	0		185331.2	-253635
Kopff (5,5,0)												
31	5561.0	16.76	23	5	0	9.95	16	5	6		162558.6	-1941 4
31	5627.1	6.43	[illegible]	5	58	4.03	22	5	17		192314.9	-241428
31	5627.7	7.59	21	5	56	2.76	24	5	8		192452.5	-241229
31	5627.8	6.38	24	5	40	4.74	28	5	14		192514.1	-241158
31	5627.9	9.49	24	5	82	5.02	27	5	16		192526.5	-241144
Pons-Winnecke (8,8,0)												
37	5513.3	1.34	23	4	11	0.60	0	1	0		1 446.2	-18 542
37	5513.4	1.34	24	5	11	0.79	17	5	4		1 456.6	-18 555
37	5526.4	1.60	22	5	13	1.20	18	3	4		12733.1	-193843
37	5526.5	0.31	0	1	0	0.93	0	1	0		12742.7	-1939 1
37	5526.6	1.83	23	5	21	1.01	0	1	0		12746.5	-193957
37	5535.2	1.47	23	5	16	0.85	0	1	0		13919.2	-205943
37	5535.3	1.44	23	5	15	2.44	24	3	5		13925.0	-21 024
37	5535.4	1.16	20	5	15	1.07	0	1	0		13930.0	-21 1 7
Schwassmann-Wachmann 1 (4,4,0)												
41	5524.8	1.13	20	5	12	0.64	0	1	0		124936.5	-151714
41	5524.8	1.05	23	5	8	0.59	0	1	0		124937.3	-151721
41	5535.6	1.03	19	5	8	1.03	0	1	0		125254.5	-152335

ID	JD 244	DN	ρ	Δ	PHASE	F_{12}	UN	S	SNR	F_{25}	UN	S	SNR
Tempel 1 (18,19,0)													
46	5529.7	62	1.49	0.98	42.56	8.74	10	5	0	19.72	10	5	100
46	5529.8	57	1.49	0.98	42.57	11.89	10	5	0	21.35	13	5	100
46	5529.8	59	1.49	0.98	42.57	12.34	9	5	0	21.22	12	5	100
46	5544.5	62	1.50	1.06	42.42	8.47	10	5	0	18.39	12	5	100
46	5544.6	57	1.50	1.06	42.41	9.38	9	5	0	17.67	15	5	100
46	5544.7	59	1.50	1.07	42.41	10.01	9	5	0	17.50	14	5	100
46	5555.0	61	1.52	1.14	41.80	8.62	12	5	33	15.02	16	5	100
46	5555.1	60	1.52	1.14	41.80	8.15	10	5	94	15.68	15	5	100
46	5555.5	60	1.52	1.14	41.76	8.05	9	5	97	12.56	16	5	91
46	5555.6	59	1.52	1.14	41.76	7.58	9	5	94	15.70	16	5	100
46	5570.9	62	1.56	1.26	40.25	5.86	10	5	64	12.96	16	5	94
46	5571.0	49	1.56	1.26	40.24	6.55	9	5	76	10.42	15	5	92
46	5571.1	59	1.56	1.27	40.24	6.86	9	5	74	12.61	16	5	100
46	5571.6	47	1.56	1.27	40.18	0.61	17	5	6	1.50	18	5	19
46	5606.1	54	1.69	1.62	35.13	4.75	13	5	29	7.89	14	5	45
46	5606.6	50	1.70	1.63	35.03	3.13	13	5	25	8.26	16	5	52
46	5606.8	49	1.70	1.63	35.01	3.52	12	5	23	6.43	16	5	29
46	5606.8	51	1.70	1.63	34.99	3.48	14	5	17	8.09	17	5	27
Tempel 2 (8,8,0)													
47	5533.4	49	1.47	1.11	43.75	1.10	17	5	13	1.37	20	5	10
47	5533.4	61	1.47	1.11	43.74	10.69	10	5	0	18.69	14	5	100
47	5543.2	48	1.51	1.09	42.41	0.38	18	4	4	1.91	20	5	17
47	5543.3	61	1.51	1.09	42.40	10.24	10	5	0	18.83	14	5	100
47	5556.4	48	1.56	1.06	39.96	3.15	14	5	24	15.26	13	5	100
47	5556.5	53	1.56	1.06	39.94	7.53	10	5	71	16.54	15	5	100
47	5584.3	56	1.71	1.01	31.84	4.79	10	5	74	11.91	14	4	100
47	5584.3	61	1.71	1.01	31.81	6.22	14	5	23	11.79	14	5	100
Smirnova-Chernykh (6,6,0)													
76	5421.7	42	3.73	3.50	15.45	0.24	0	1	0	1.56	23	5	4
76	5421.7	44	3.73	3.50	15.45	0.22	0	1	0	0.66	22	5	5
76	5429.5	42	3.72	3.61	15.59	0.24	0	1	0	1.05	23	5	4
76	5437.1	45	3.71	3.71	15.52	0.21	0	1	0	0.99	22	5	7
76	5437.6	44	3.71	3.72	15.51	0.24	0	1	0	0.67	23	4	7
IRAS j (8,8,0)													
84	5514.3	52	1.80	1.55	34.24	1.71	12	5	22	3.89	16	4	47
84	5514.4	50	1.80	1.55	34.25	1.81	14	5	21	4.62	15	5	45
84	5527.7	59	1.76	1.38	35.22	2.56	13	5	28	5.74	15	5	77
84	5528.1	52	1.76	1.37	35.23	3.26	11	5	40	5.29	16	5	61
84	5528.2	61	1.76	1.37	35.24	2.61	13	5	32	5.83	16	5	79
84	5536.5	52	1.74	1.27	35.36	4.90	11	5	41	6.75	16	5	73
84	5536.6	61	1.74	1.27	35.36	3.22	16	5	17	6.82	15	5	91
84	5537.0	62	1.74	1.26	35.35	2.91	10	5	42	7.13	14	5	90
Hartley-IRAS (6,11,2d,1n)													
86	5585.3	42	2.05	1.40	26.20	0.20	0	1	0	0.42	24	5	7
Kowal-Vavrova (4,5,1n)													
87	5565.0	42	2.84	2.57	20.84	0.28	0	1	0	0.76	22	5	3
87	5599.0	44	2.95	3.11	18.83	0.24	0	1	0	1.03	24	5	5
87	5599.0	52	2.95	3.11	18.83	0.23	20	4	3	0.85	22	5	4

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ID	JD 244	F_{60}	UN	S	SNR	F_{100}	UN	S	SNR	IRAS PSC	RA	DEC
Tempel 1 (18,19,0)												
46	5529.7	10.84	23	5	87	6.69	22	5	18		1342 5.1	-111053
46	5529.8	14.01	22	5	0	8.07	24	5	15		134214.0	-111237
46	5529.8	14.69	23	5	0	7.15	24	5	18		134222.9	-111417
46	5544.5	10.62	24	5	72	6.77	24	5	31		141622.0	-165242
46	5544.6	11.75	23	5	94	6.05	22	5	12		141632.3	-165415
46	5544.7	13.28	23	5	95	4.92	20	5	21		141642.3	-165549
46	5555.0	9.34	22	5	77	5.42	22	5	13		144334.7	-203333
46	5555.1	8.45	24	5	65	4.55	21	5	12		144346.5	-2035 0
46	5555.5	9.94	21	5	92	4.13	19	5	15		144455.6	-204341
46	5555.6	11.43	23	5	0	3.49	22	5	14		1445 7.6	-204458
46	5570.9	7.14	24	5	56	3.43	18	5	7		152829.0	-2518 8
46	5571.0	8.49	24	5	50	5.49	19	3	5		152843.3	-251921
46	5571.1	9.60	22	5	79	7.16	21	5	7		152853.8	-252025
46	5571.6	1.29	19	5	6	3.73	0	1	0		153025.0	-252829
46	5606.1	4.79	24	5	17	14.74	0	1	0	17174-3121	171712.2	-312040
46	5606.6	3.90	20	5	11	13.38	0	1	0	17188-3121	171859.9	-312328
46	5606.8	6.19	21	5	15	11.65	0	1	0		171925.5	-3124 8
46	5606.8	7.05	23	5	10	16.41	0	1	0		171939.5	-312429
Tempel 2 (8,8,0)												
47	5533.4	0.73	19	3	4	0.65	21	3	3		15732.1	- 01325
47	5533.4	9.79	23	5	83	5.02	25	5	31		158 5.4	- 01115
47	5543.2	0.67	21	3	5	0.82	0	1	0		21943.0	- 0 846
47	5543.3	11.05	23	5	85	5.01	24	5	24		21935.0	- 01029
47	5556.4	6.79	22	5	74	1.66	21	3	5	02438-0042	24344.4	- 04021
47	5556.5	5.64	23	3	42	2.20	23	3	7	02438-0042	24352.5	- 04032
47	5584.3	8.00	24	5	86	3.90	23	5	7		313 2.7	- 32913
47	5584.3	7.52	23	5	84	4.56	25	5	23		313 2.7	- 32950
Smirnova-Chernykh (6,6,0)												
76	5421.7	0.66	23	5	6	0.61	0	1	0		65341.8	+272919
76	5421.7	0.75	21	4	6	1.31	0	1	0		65353.9	+2729 5
76	5429.5	0.77	18	5	7	0.53	0	1	0		65810.1	+272057
76	5437.1	0.79	19	5	9	0.67	0	1	0		7 316.2	+2711 9
76	5437.6	0.62	19	4	3	1.81	0	1	0		7 336.6	+271038
IRAS j (8,8,0)												
84	5514.3	1.81	23	4	16	1.34	19	3	3		12230.5	-215746
84	5514.4	2.30	23	5	22	0.90	18	3	5		12236.8	-2156 1
84	5527.7	3.12	23	5	24	1.22	17	5	6		135 7.7	-165937
84	5528.1	2.33	23	5	15	1.04	21	3	4		13525.0	-1651 8
84	5528.2	2.71	23	5	33	1.12	17	5	7		13525.6	-164944
84	5536.5	3.32	23	4	27	1.04	0	1	0		14054.1	-132217
84	5536.6	3.50	23	5	28	1.50	18	5	6		14056.4	-132028
84	5537.0	3.12	23	5	27	1.64	19	5	7		141 9.8	-13 913
Hartley-IRAS (6,11,2d,1n)												
86	5585.3	0.29	21	3	3	0.53	0	1	0		3 9 5.4	-372520
Kowal-Vavrona (4,5,1n)												
87	5565.0	0.50	20	5	3	1.09	0	1	0		1550 0.3	-1558 9
87	5599.0	0.43	0	1	0	3.33	0	1	0		163048.0	-18 335
87	5599.0	0.57	0	1	0	3.00	0	1	0		163128.5	-18 627

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ID	JD 244	DN	ρ	Δ	PHASE	F_{12}	UN	S	SNR	F_{25}	UN	S	SNR
Russell 3 (9,9,0)													
88	5450.6	48	2.69	2.50	21.98	0.69	18	4	9	3.27	14	5	42
88	5450.6	53	2.69	2.50	21.97	0.88	15	5	9	3.19	15	5	35
88	5451.1	54	2.69	2.40	21.97	0.63	17	4	10	3.09	15	5	26
88	5463.0	51	2.72	2.37	21.52	0.84	16	5	8	3.29	14	5	44
88	5463.1	49	2.72	2.37	21.52	0.94	15	5	14	3.04	16	5	33
88	5463.2	62	2.72	2.37	21.51	0.93	15	5	11	3.68	16	5	33
88	5636.7	54	3.21	3.07	18.01	0.51	16	5	7	1.29	22	5	12
88	5636.8	49	3.21	3.07	18.00	0.56	16	5	6	0.95	23	5	10
88	5636.8	51	3.21	3.07	18.00	0.55	16	5	5	1.22	19	5	14
Bradfield (3,6,1d)													
90	5427.1	40	3.61	3.53	16.04	0.22	0	1	0	0.50	22	5	5
IRAS f (11,12,1d)													
95	5409.5	53	1.63	1.14	37.18	4.74	10	5	49	8.67	17	5	81
95	5467.6	53	2.12	1.78	28.31	0.93	20	5	9	2.57	18	5	28
95	5467.7	51	2.12	1.78	28.30	0.85	16	5	10	2.36	15	5	39
95	5477.5	54	2.22	2.07	27.03	0.52	16	5	11	1.87	17	5	28
95	5477.5	54	2.22	2.07	27.02	0.49	17	5	8	1.89	17	5	24
95	5477.6	44	2.22	2.07	27.01	0.19	0	1	0	1.45	21	5	17
95	5477.6	47	2.22	2.07	27.00	0.52	17	5	6	1.55	18	5	21
IRAS-Araki-Alcock (4,4,0)													
96	5450.4	56	1.08	0.39	68.42	24.02	10	5	99	41.97	10	5	99
96	5450.4	57	1.08	0.39	68.49	29.01	11	5	99	38.00	10	5	99
96	5463.7	58	1.01	0.06	85.51	569.95	9	5	99	610.65	10	5	99
96	5463.8	56	1.01	0.06	85.73	741.84	12	5	99	728.87	11	4	99
IRAS k (6,7,0)													
97	5450.2	39	2.42	2.19	24.57	0.29	19	3	4	1.12	18	5	22
97	5450.3	44	2.42	2.19	24.57	0.15	0	1	0	0.88	21	5	11
97	5450.3	46	2.42	2.19	24.57	0.18	0	1	0	1.06	19	5	15
97	5527.0	54	2.54	2.25	23.55	0.51	19	5	4	1.35	19	5	21
97	5537.6	45	2.57	2.47	23.12	0.17	0	1	0	1.13	18	5	19
IRAS o (11,11,0)													
98	5472.1	40	3.12	2.98	18.91	0.17	0	1	0	0.43	21	5	9
98	5472.2	45	3.12	2.98	18.91	0.17	0	1	0	0.32	21	5	5
98	5481.3	45	3.05	2.82	19.34	0.71	0	1	0	0.68	22	5	13
98	5543.0	42	2.65	2.43	22.52	0.25	0	1	0	1.25	20	5	11
98	5543.1	44	2.65	2.43	22.52	0.24	19	3	3	1.14	21	5	12
98	5543.2	39	2.65	2.43	22.53	0.26	0	1	0	1.10	18	5	20
98	5551.7	45	2.60	2.48	22.87	0.69	0	1	0	1.28	22	5	11
98	5578.9	53	2.46	2.73	21.67	2.07	13	5	30	0.88	20	5	11
98	5579.0	43	2.46	2.73	21.66	0.44	19	3	4	1.20	19	5	14

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ID	JD 244	F_{60}	UN	S	SNR	F_{100}	UN	S	SNR	IRAS PSC	RA	DEC
Russell 3 (9,9,0)												
88	5450.6	2.55	23	5	21	1.28	20	3	3		202049.4	-102857
88	5450.6	2.23	21	5	24	1.25	19	3	5		202052.2	-102812
88	5451.1	1.95	23	5	17	1.13	0	1	0		202114.1	-102422
88	5463.0	2.72	23	5	22	1.24	20	3	3		202949.2	- 837 5
88	5463.1	2.76	23	5	24	1.33	19	3	4		202953.2	- 83628
88	5463.2	2.50	21	5	31	1.06	16	5	3		202953.4	- 836 0
88	5636.7	1.41	23	5	15	1.00	23	3	3	20121-0521	201210.4	- 52056
88	5636.8	1.14	19	5	8	1.09	0	1	0	20121-0521	201212.3	- 52114
88	5636.8	1.37	19	5	10	0.95	0	1	0	20121-0521	201213.0	- 52115
Bradfield (3,6,1d)												
90	5427.1	0.33	0	1	0	1.17	0	1	0		65511.8	+705934
IRAS f (11,12,1d)												
95	5409.5	5.50	22	5	46	2.11	20	3	4		155852.3	-631110
95	5467.6	1.88	24	5	23	1.17	21	3	4		91653.9	-151941
95	5467.7	1.83	21	5	19	0.83	0	1	0		91652.5	-151720
95	5477.5	0.95	22	3	10	0.89	0	1	0		91542.4	-104841
95	5477.5	1.19	21	5	8	1.01	0	1	0		91543.3	-104837
95	5477.6	0.32	0	1	0	0.85	0	1	0		91536.5	-104621
95	5477.6	1.05	24	5	9	0.69	0	1	0		91544.5	-104533
IRAS-Araki-Alcock (4,4,0)												
96	5450.4	19.42	22	5	99	9.77	25	5	24		19 616.6	+483831
96	5450.4	18.16	20	5	99	4.19	22	5	10		19 612.8	+483942
96	5463.7	250.38	14	5	99	141.78	18	5	99		171532.6	+684532
96	5463.8	354.71	17	5	99	156.14	19	5	99		17 847.4	+691548
IRAS k (6,7,0)												
97	5450.2	1.11	20	3	5	3.72	0	1	0		215125.3	-625925
97	5450.3	0.66	18	5	4	1.30	0	1	0		215121.5	-63 219
97	5450.3	0.96	22	5	7	1.01	22	3	4		215115.3	-63 5 7
97	5527.0	1.07	22	5	11	0.96	0	1	0	11572-4859	115744.7	-485915
97	5537.6	0.68	18	5	7	0.94	0	1	0		12 216.9	-431757
IRAS o (11,11,0)												
98	5472.1	0.44	20	3	3	0.93	0	1	0		12922.5	-661512
98	5472.2	0.45	22	3	5	0.55	0	1	0		12932.6	-6617 8
98	5481.3	0.33	21	3	3	0.51	0	1	0		2 032.9	-691850
98	5543.0	0.77	18	5	7	2.39	0	1	0		105449.0	-672326
98	5543.1	0.87	18	5	6	1.97	0	1	0		1055 5.8	-672049
98	5543.2	0.82	18	5	6	2.51	0	1	0		105526.0	-671822
98	5551.7	1.65	0	1	0	28.67	0	1	0	11283-6254	1128 6.5	-625419
98	5578.9	0.33	0	1	0	1.17	0	1	0	12348-5044	123452.0	-504419
98	5579.0	0.95	19	5	10	1.39	0	1	0	12348-5044	123425.0	-504025

ID	JD 244	DN	ρ	Δ	PHASE	F_{12}	UN	S	SNR	F_{25}	UN	S	SNR
Shoemaker 1983 p (5,5,0)													
100	5533.2	54	3.56	3.45	16.59	0.36	17	5	4	2.37	15	5	27
100	5540.0	39	3.54	3.30	16.64	0.22	0	1	0	2.52	14	5	41
100	5540.1	49	3.54	3.30	16.64	0.40	16	5	5	2.51	16	5	37
100	5540.2	38	3.53	3.30	16.64	0.31	0	1	0	0.57	24	4	6
Austin (2,5,1d,1n)													
101	5451.6	45	3.77	3.59	15.48	0.18	0	1	0	0.50	22	5	8
Cernis (4,4,0)													
102	5547.1	56	3.32	3.22	17.78	5.00	13	5	27	16.15	15	4	99
102	5556.6	59	3.32	3.04	17.61	3.73	11	5	50	18.65	14	5	99
102	5556.7	61	3.32	3.04	17.60	3.66	12	5	45	19.44	14	5	99
102	5573.6	56	3.34	2.74	15.52	2.85	12	5	36	19.42	12	4	99
Bowell (4,6,1d)													
109	5482.1	40	5.28	5.14	11.06	0.18	0	1	0	1.25	22	5	10
109	5482.1	61	5.28	5.14	11.06	0.23	0	1	0	1.84	19	5	17
109	5493.1	62	5.35	5.04	10.68	0.29	0	1	0	1.09	19	5	11
109	5656.7	40	6.46	6.36	8.80	0.25	0	1	0	0.58	21	5	3

ID	JD 244	F_{60}	UN	S	SNR	F_{100}	UN	S	SNR	IRAS PSC	RA	DEC
Shoemaker 1983 p (5,5,0)												
100	5533.2	2.50	21	5	28	1.78	22	3	6		1 329.2	+302239
100	5540.0	3.03	23	5	20	1.36	21	3	4		05847.5	+295259
100	5540.1	3.00	21	5	30	1.18	16	3	3		05843.6	+295224
100	5540.2	1.25	22	5	11	0.77	20	3	3		05833.2	+295140
Austin (2,5,1d,1n)												
101	5451.6	0.29	0	1	0	0.75	0	1	0		9 031.0	+333112
Cernis (4,4,0)												
102	5547.1	17.81	22	5	99	12.34	23	5	18		241 1.0	+ 9 312
102	5556.6	21.29	22	5	99	11.70	24	5	31		23714.1	+ 63348
102	5556.7	19.86	27	5	99	11.81	25	5	36	02371+0628	237 9.1	+ 631 6
102	5573.6	19.43	23	5	99	12.73	25	5	34		22425.9	+ 05610
Bowell (4,6,1d)												
109	5482.1	0.27	0	1	0	0.79	0	1	0		222027.8	-111140
109	5482.1	4.09	23	5	39	2.14	22	5	11		222023.8	-111210
109	5493.1	2.60	23	5	26	1.53	18	5	8		222250.9	-11 137
109	5656.7	1.72	20	5	16	2.16	22	5	5		215540.9	-134751

ID	JD 244	DN	ρ	Δ	PHASE	F_{12}	UN	S	SNR	F_{25}	UN	S	SNR
Shoemaker 1983 p (5,5,0)													
100	5533.2	44	3.56	3.45	16.59	0.32	18	3	4	2.21	18	4	26
100	5533.2	54	3.56	3.45	16.59	0.36	17	5	4	2.37	15	5	27
100	5540.0	39	3.54	3.30	16.64	0.22	0	1	0	2.52	14	5	41
100	5540.1	49	3.54	3.30	16.64	0.40	16	5	5	2.51	16	5	37
100	5540.2	38	3.53	3.30	16.64	0.31	0	1	0	0.57	24	4	6
Austin (2,5,1d,1n)													
101	5451.6	45	3.77	3.59	15.48	0.18	0	1	0	0.50	22	5	8
101	5451.7	41	3.77	3.60	15.47	0.26	0	1	0	0.44	23	4	4
Cernis (4,4,0)													
102	5547.1	56	3.32	3.22	17.78	5.00	13	5	27	16.15	15	4	99
102	5556.6	59	3.32	3.04	17.61	3.73	11	5	50	18.65	14	5	99
102	5556.7	61	3.32	3.04	17.60	3.66	12	5	45	19.44	14	5	99
102	5573.6	56	3.34	2.74	15.52	2.85	12	5	36	19.42	12	4	99
Shoemaker 1984 f (1,6, 1d)													
103	5425.6	40	8.29	8.14	6.88	0.45	0	1	0	0.18	24	4	3
Austin 1984 g (1,2,0)													
104	5643.9	40	4.44	4.26	12.86	0.45	0	1	0	1.18	24	4	9
Meier 1984 o (1,4,1d)													
105	5553.5	41	1.16	0.61	60.93	0.25	0	1	0	0.67	25	4	9
Shoemaker 1984 r (4,6,1d,1n)													
106	5418.9	41	6.68	6.56	8.58	0.22	0	1	0	0.37	24	4	3
106	5418.9	40	6.68	6.56	8.58	0.50	0	1	0	0.39	23	4	3
106	5618.2	44	5.99	5.76	9.49	0.50	0	1	0	0.35	23	4	3
106	5618.3	44	5.99	5.75	9.49	0.39	0	1	0	0.91	24	4	7
Shoemaker 1984 s (5,8,1d)													
107	5481.1	18	6.57	6.42	8.86	0.86	0	1	0	0.36	24	4	3
107	5485.4	43	6.53	6.32	8.85	0.26	0	1	0	0.50	21	5	4
107	5485.5	48	6.53	6.32	8.85	0.53	20	5	3	0.69	22	5	6
107	5485.6	22	6.53	6.32	8.85	1.18	0	1	0	0.30	23	4	3
107	5644.9	22	5.16	4.99	11.03	0.25	0	1	0	0.74	24	4	6
Levy-Rudenko 1984 t (5,9,2d)													
108	5453.4	18	6.98	6.97	8.28	0.67	0	1	0	0.47	26	4	6
108	5453.5	18	6.98	6.96	8.28	0.65	0	1	0	0.22	23	4	3
108	5466.4	44	6.87	6.71	8.43	0.49	0	1	0	0.54	26	4	8
108	5466.5	22	6.87	6.71	8.43	1.38	0	1	0	0.23	24	4	4
108	5475.4	18	6.79	6.54	8.44	0.65	0	1	0	0.82	25	4	9
Bowell (4,6,1d)													
109	5482.1	40	5.28	5.14	11.06	0.18	0	1	0	1.25	22	5	10
109	5482.1	61	5.28	5.14	11.06	0.23	0	1	0	1.84	19	5	17
109	5493.1	62	5.35	5.04	10.68	0.29	0	1	0	1.09	19	5	11
109	5656.7	40	6.46	6.36	8.80	0.25	0	1	0	0.58	21	5	3

ID	JD 244	F_{60}	UN	S	SNR	F_{100}	UN	S	SNR	IRAS PSC	RA	DEC
Shoemaker 1983 p (5,5,0)												
100	5533.2	2.71	23	4	25	1.25	19	3	3		1 334.7	+302312
100	5533.2	2.50	21	5	28	1.78	22	3	6		1 329.2	+302239
100	5540.0	3.03	23	5	20	1.36	21	3	4		05847.5	+295259
100	5540.1	3.00	21	5	30	1.18	16	3	3		05843.6	+295224
100	5540.2	1.25	22	5	11	0.77	20	3	3		05833.2	+295140
Austin (2,5,1d,1n)												
101	5451.6	0.29	0	1	0	0.75	0	1	0		9 031.0	+333112
101	5451.7	0.35	0	1	0	1.05	0	1	0		9 112.3	+3322 6
Cernis (4,4,0)												
102	5547.1	17.81	22	5	99	12.34	23	5	18		241 1.0	+ 9 312
102	5556.6	21.29	22	5	99	11.70	24	5	31		23714.1	+ 63348
102	5556.7	19.86	27	5	99	11.81	25	5	36	02371+0628	237 9.1	+ 631 6
102	5573.6	19.43	23	5	99	12.73	25	5	34		22425.9	+ 05610
Shoemaker 1984 f (1,6, 1d)												
103	5425.6	0.38	0	1	0	1.19	0	1	0		18 557.3	+245216
Austin 1984 g (1,2,0)												
104	5643.9	0.50	0	1	0	0.91	0	1	0		212127.4	-22 8 7
Meier 1984 o (1,4,1d)												
105	5553.5	0.40	0	1	0	1.86	0	1	0		165523.3	+62 659
Shoemaker 1984 r (4,6,1d,1n)												
106	5418.9	0.34	0	1	0	1.85	0	1	0		62639.6	+2353 5
106	5418.9	0.46	0	1	0	1.37	0	1	0		627 4.1	+235253
106	5618.2	0.42	0	1	0	2.05	0	1	0		63328.5	+233946
106	5618.3	0.37	0	1	0	1.69	0	1	0	06348+2338	63430.2	+234042
Shoemaker 1984 s (5,8,1d)												
107	5481.1	0.34	0	1	0	0.75	0	1	0		215056.8	+ 153 7
107	5485.4	0.37	0	1	0	1.10	0	1	0		215042.1	+ 2 138
107	5485.5	0.34	0	1	0	1.10	0	1	0		215118.4	+ 2 933
107	5485.6	0.30	0	1	0	0.77	0	1	0		2151 5.7	+ 2 145
107	5644.9	0.30	0	1	0	0.95	0	1	0		21 450.3	- 21550
Levy-Rudenko 1984 t (5,9,2d)												
108	5453.4	0.34	0	1	0	0.58	0	1	0		2243 7.6	-614252
108	5453.5	0.36	0	1	0	0.71	0	1	0		224440.4	-613620
108	5466.4	0.32	0	1	0	1.61	0	1	0		225133.9	-622527
108	5466.5	0.32	0	1	0	0.81	0	1	0		225226.9	-621457
108	5475.4	0.30	0	1	0	0.38	0	1	0		225650.2	-625513
Bowell (4,6,1d)												
109	5482.1	0.27	0	1	0	0.79	0	1	0		222027.8	-111140
109	5482.1	4.09	23	5	39	2.14	22	5	11		222023.8	-111210
109	5493.1	2.60	23	5	26	1.53	18	5	8		222250.9	-11 137
109	5656.7	1.72	20	5	16	2.16	22	5	5		215540.9	-134751

Section III-5

IRAS Reject Catalog [FDP No. 15]

The Asteroid Reject Catalog is part of Final Data Product No. 15. This product contains information on the number of times each object was rejected and reasons for rejection. It is the only Final Data Product which specifically identifies rejected IRAS sightings.

The column headers are:

ID/1	:	the asteroid serial number
R	:	the number of rejected sightings
M	:	the number of sightings weeks confirmed [MCON]
O	:	the number of non-solo matches
C	:	the number of color failures
T	:	the number of 25 μm only sightings rejected
X	:	the number of rejections for other reasons

ID/1	R	M	O	C	T	X
1	2	.	2	2	.	.
2	3	.	1	3	.	.
3	1	.	.	1	.	.
4	1	.	1	1	.	.
5	.	.	.	.	.	.
6	1	.	.	1	.	.
7	4	.	4	4	.	.
8	1	.	1	1	.	.
9	.	.	.	.	.	.
10	1	.	1	1	.	.
11	.	.	.	.	.	.
12	.	.	.	.	.	.
13	2	.	1	1	.	.
14	.	.	.	.	.	.
15	1	.	1	1	.	.
16	.	.	.	.	.	.
17	1	.	1	.	.	.
18	.	.	.	.	.	.
19	.	.	.	.	.	.
20	.	.	.	.	.	.
21	.	.	.	.	.	.
22	1	.	.	1	.	.
23	.	.	.	.	.	.
24	.	.	.	.	.	.
25	2	.	.	1	1	.
26	3	.	.	3	.	.
27	.	.	.	.	.	.
28	1	.	.	1	.	.
29	.	.	.	.	.	.
30	2	.	.	2	.	.
31	.	.	.	.	.	.
32	2	.	.	1	1	.
33	.	.	.	.	.	.
34	.	.	.	.	.	.
35	.	.	.	.	.	.
36	1	.	.	1	.	.
37	.	.	.	.	.	.
38	.	.	.	.	.	.
39	1	.	.	1	.	.
40	.	.	.	.	.	.
41	1	.	.	1	.	.
42	.	.	.	.	.	.
43	.	.	.	.	.	.
44	.	.	.	.	.	.
45	6	.	.	6	.	.
46	.	.	.	.	.	.
47	1	.	.	1	.	.
48	2	.	.	2	.	.
49	1	.	.	.	.	1
50	2	.	.	1	.	1
51	.	.	.	.	.	.
52	.	.	.	.	.	.
53	1	.	.	1	.	.
54	1	.	.	1	.	.
55	1	.	.	1	.	.
56	.	.	.	.	.	.
57	1	.	.	1	.	.
58	.	.	.	.	.	.
59	.	.	.	.	.	.
60	1	.	.	1	.	.
61	7	.	.	6	.	1
62	.	.	.	.	.	.
63	1	.	.	.	.	1
64	.	.	.	.	.	.
65	.	.	.	.	.	.
66	1	.	.	1	.	.
67	.	.	.	.	.	.
68	2	.	.	2	.	.
69	1	.	.	1	.	.
70	2	.	.	2	.	.
71	.	.	.	.	.	.
72	.	.	.	.	.	.
73	2	.	.	1	.	1
74	.	.	.	.	.	.
75	.	.	.	.	.	.
76	1	.	.	1	.	.
77	3	.	.	3	.	.
78	.	.	.	.	.	.
79	.	.	.	.	.	.
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81	1	.	.	1	.	.
82	.	.	.	.	.	.
83	.	.	.	.	.	.
84	1	.	.	1	.	.
85	.	.	.	.	.	.
86	.	.	.	.	.	.
87	1	.	.	.	.	1
88	2	.	.	2	.	.
89	.	.	.	.	.	.
90	.	.	.	.	.	.
91	.	.	.	.	.	.
92	.	.	.	.	.	.
93	.	.	.	.	.	.
94	.	.	.	.	.	.
95	3	.	.	2	.	1
96	.	.	.	.	.	.
97	.	.	.	.	.	.
98	1	.	.	1	.	.
99	2	.	.	2	.	.
100	.	.	.	.	.	.
101	.	.	.	.	.	.
102	.	.	.	.	.	.
103	.	.	.	.	.	.
104	.	.	.	.	.	.
105	.	.	.	.	.	.
106	.	.	.	.	.	.
107	2	.	.	2	.	.
108	1	.	.	1	.	.
109	3	.	.	1	1	1
110	.	.	.	.	.	.
111	.	.	.	.	.	.
112	.	.	.	.	.	.
113	.	.	.	.	.	.
114	.	.	.	.	.	.
115	.	.	.	.	.	.
116	.	.	.	.	.	.
117	.	.	.	.	.	.
118	3	.	.	3	.	.
119	.	.	.	.	.	.
120	1	.	.	1	.	.
121	.	.	.	.	.	.
122	.	.	.	.	.	.
123	.	.	.	.	.	.
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125	.	.	.	.	.	.
126	.	.	.	.	.	.
127	.	.	.	.	.	.
128	1	.	.	1	.	.
129	.	.	.	.	.	.
130	.	.	.	.	.	.
131	3	.	.	3	.	.
132	5	.	.	3	.	2
133	2	.	.	2	.	.
134	1	.	.	1	.	.
135	.	.	.	.	.	.

ID/1	R	M	O	C	T	X
136	.	.	.	.	.	.
137	.	.	.	.	.	.
138	.	.	.	.	.	.
139	.	.	.	.	.	.
140	.	.	.	.	.	.
141	.	.	.	.	.	.
142	.	.	.	.	.	.
143	.	.	.	.	.	.
144	1	.	.	1	.	.
145	1	.	.	1	.	.
146	4	.	.	4	.	.
147	.	.	.	.	.	.
148	.	.	.	.	.	.
149	3	.	.	1	.	2
150	.	.	.	.	.	.
151	.	.	.	.	.	.
152	.	.	.	.	.	.
153	1	.	.	1	.	.
154	1	.	.	1	.	.
155	4	.	.	2	1	1
156	3	.	.	3	.	.
157	1	.	.	.	.	1
158	1	.	.	1	.	.
159	1	.	.	1	.	.
160	.	.	.	.	.	.
161	2	.	.	1	.	1
162	1	.	.	1	.	.
163	.	.	.	.	.	.
164	4	.	.	3	1	.
165	.	.	.	.	.	.
166	.	.	.	.	.	.
167	.	.	.	.	.	.
168	.	.	.	.	.	.
169	.	.	.	.	.	.
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171	.	.	.	.	.	.
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174	.	.	.	.	.	.
175	.	.	.	.	.	.
176	.	.	.	.	.	.
177	3	.	.	3	.	.
178	.	.	.	.	.	.
179	4	.	.	3	1	.
180	2	.	.	.	.	2

ID/1	R	M	O	C	T	X
181	1	.	.	.	1	.
182	.	.	.	.	.	.
183	5	.	.	.	2	3
184	1	.	.	1	.	.
185	.	.	.	.	.	.
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ID/1	R	M	O	C	T	X
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ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
271	.	.	.	.	.	.	316	.	.	.	.	.	.	361	2	.	.	2	.	.
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ID/1	R	M	O	C	T	X
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ID/1	R	M	O	C	T	X
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543	1	.	.	.	.	1
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ID/1	R	M	O	C	T	X
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588	2	.	.	2	.	.
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628	5	.	.	5	.	.
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ID/1	R	M	O	C	T	X
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674	.	.	.	.	.	.
675	.	.	.	.	.	.

ID/1	R	M	O	C	T	X
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720	1	.	.	1	.	.
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810	.	.	.	.	.	.

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
811	2	.	.	.	.	2	856	1	.	.	1	.	.	901	4	.	.	.	.	4
812	3	.	.	.	1	2	857	3	.	.	.	.	3	902	.	.	.	.	.	.
813	2	.	.	.	.	2	858	4	.	.	.	2	2	903	1	.	.	.	.	1
814	.	.	.	.	.	.	859	.	.	.	.	.	.	904	3	.	.	3	.	.
815	2	.	.	.	1	1	860	3	.	.	3	.	.	905	1	.	.	1	.	.
816	2	.	.	2	.	.	861	3	.	.	3	.	.	906	.	.	.	.	.	.
817	.	.	.	.	.	.	862	1	.	.	.	.	1	907	.	.	.	.	.	.
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820	1	.	.	1	.	.	865	.	.	.	.	.	.	910	.	.	.	.	.	.
821	.	.	.	.	.	.	866	.	.	.	.	.	.	911	1	.	.	1	.	.
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825	5	.	.	.	1	4	870	.	.	.	.	.	.	915	.	.	.	.	.	.
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829	.	.	.	.	.	.	874	.	.	.	.	.	.	919	1	.	.	1	.	.
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832	2	.	.	.	.	2	877	.	.	.	.	.	.	922	.	.	.	.	.	.
833	7	.	.	.	1	6	878	.	.	.	.	.	.	923	.	.	.	.	.	.
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836	.	.	.	.	.	.	881	.	.	.	.	.	.	926	4	.	.	3	.	1
837	.	.	.	.	.	.	882	3	.	.	1	.	2	927	1	.	.	1	.	.
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841	2	.	.	2	.	.	886	2	.	.	2	.	.	931	4	.	.	1	.	3
842	6	.	.	3	1	2	887	3	.	.	2	.	1	932	.	.	.	.	.	.
843	2	.	.	.	1	1	888	3	.	.	3	.	.	933	4	.	.	.	.	4
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846	.	.	.	.	.	.	891	.	.	.	.	.	.	936	3	.	.	1	2	.
847	2	.	.	1	.	1	892	.	.	.	.	.	.	937	6	.	.	.	2	4
848	2	.	.	2	.	.	893	1	.	.	1	.	.	938	1	.	.	.	.	1
849	2	.	.	2	.	.	894	1	.	.	.	.	1	939	3	.	.	.	.	3
850	1	.	.	1	.	.	895	.	.	.	.	.	.	940	2	.	.	2	.	.
851	1	.	.	.	.	1	896	1	.	.	1	.	.	941	.	.	.	.	.	.
852	.	.	.	.	.	.	897	.	.	.	.	.	.	942	.	.	.	.	.	.
853	1	.	.	.	.	1	898	6	.	.	1	.	5	943	.	.	.	.	.	.
854	1	.	.	.	.	1	899	1	.	.	.	.	1	944	8	.	.	3	1	4
855	.	.	.	.	.	.	900	2	.	.	.	1	1	945	1	.	.	1	.	.

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
946	5	.	.	3	.	2	991	1	.	.	1	.	.	1036	1	.	.	.	.	1
947	1	.	.	1	.	.	992	3	.	.	.	2	1	1037	.	.	.	.	.	.
948	.	.	.	.	.	.	993	2	.	.	.	.	2	1038	2	.	.	.	1	1
949	.	.	.	.	.	.	994	.	.	.	.	.	.	1039	5	.	.	2	1	2
950	.	.	.	.	.	.	995	2	.	.	2	.	.	1040	.	.	.	.	.	.
951	.	.	.	.	.	.	996	3	.	.	1	1	1	1041	1	.	.	1	.	.
952	.	.	.	.	.	.	997	2	.	.	.	.	2	1042	1	.	.	1	.	.
953	.	.	.	.	.	.	998	6	.	.	2	1	3	1043	1	.	.	.	.	1
954	.	.	.	.	.	.	999	1	.	.	1	.	.	1044	2	.	.	.	.	2
955	1	.	.	1	.	.	1000	3	.	.	.	2	1	1045	3	.	.	.	2	1
956	2	.	.	.	.	2	1001	1	.	.	1	.	.	1046	2	.	.	.	.	2
957	3	.	.	3	.	.	1002	6	.	.	3	1	2	1047	.	.	.	.	.	.
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960	.	.	.	.	.	.	1005	4	.	.	4	.	.	1050	3	.	.	.	.	3
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969	.	.	.	.	.	.	1014	2	.	.	.	1	1	1059	2	.	.	.	.	2
970	.	.	.	.	.	.	1015	.	.	.	.	.	.	1060	.	.	.	.	.	.
971	1	.	.	1	.	.	1016	.	.	.	.	.	.	1061	.	.	.	.	.	.
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980	1	.	.	1	.	.	1025	3	.	.	1	1	1	1070	1	.	.	.	.	1
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987	.	.	.	.	.	.	1032	2	.	.	2	.	.	1077	3	.	.	.	.	3
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989	1	.	.	.	.	1	1034	4	.	.	1	.	3	1079	1	.	.	.	.	1
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ID/1	R	M	O	C	T	X
1081	.	.	.	.	.	.
1082	.	.	.	.	.	.
1083	.	.	.	.	.	.
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1090	.	.	.	.	.	.
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1095	2	.	.	1	.	1
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1097	2	.	.	.	1	1
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1100	1	.	.	.	.	1
1101	3	.	.	1	1	1
1102	1	.	.	1	.	.
1103	.	.	.	.	.	.
1104	2	.	.	2	.	.
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1107	3	.	.	3	.	.
1108	2	.	.	2	.	.
1109	.	.	.	.	.	.
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1111	2	.	.	.	.	2
1112	.	.	.	.	.	.
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1116	2	.	.	2	.	.
1117	.	.	.	.	.	.
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1119	2	.	.	.	1	1
1120	1	.	.	.	.	1
1121	1	.	.	.	.	1
1122	.	.	.	.	.	.
1123	1	.	.	.	.	1
1124	3	.	.	2	1	.
1125	6	.	.	2	1	3

ID/1	R	M	O	C	T	X
1126	.	.	.	.	.	.
1127	1	.	.	1	.	.
1128	1	.	.	1	.	.
1129	.	.	.	.	.	.
1130	1	.	.	.	.	1
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1137	1	.	.	1	.	.
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1167	3	.	.	3	.	.
1168	4	.	.	.	.	4
1169	4	.	.	.	2	2
1170	1	.	.	.	1	.

ID/1	R	M	O	C	T	X
1171	.	.	.	.	.	.
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1173	.	.	.	.	.	.
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1200	.	.	.	.	.	.
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1208	1	.	.	1	.	.
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1211	1	.	.	.	.	1
1212	.	.	.	.	.	.
1213	3	.	.	.	1	2
1214	2	.	.	1	.	1
1215	.	.	.	.	.	.

ID/1	R	M	O	C	T	X
1216	3	.	.	.	.	3
1217	2	.	.	.	.	2
1218	1	.	.	.	.	1
1219	1	.	.	1	.	.
1220	1	.	.	.	.	1
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1222	3	.	.	1	.	2
1223	3	.	.	2	.	1
1224	.	.	.	.	.	.
1225	.	.	.	.	.	.
1226	3	.	.	.	2	1
1227	2	.	.	1	.	1
1228	.	.	.	.	.	.
1229	1	.	.	.	1	.
1230	4	.	.	.	1	3
1231	.	.	.	.	.	.
1232	1	.	.	.	1	.
1233	6	.	.	5	.	1
1234	7	.	.	3	.	4
1235	.	.	.	.	.	.
1236	3	.	.	.	1	2
1237	.	.	.	.	.	.
1238	1	.	.	1	.	.
1239	1	.	.	.	.	1
1240	1	.	.	1	.	.
1241	.	.	.	.	.	.
1242	.	.	.	.	.	.
1243	.	.	.	.	.	.
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1613	1	.	.	1	.	.
1614	1	.	.	1	.	.
1615	4	.	.	.	1	3
1616	.	.	.	.	.	.
1617	2	.	.	.	1	1
1618	2	.	.	.	.	2
1619	.	.	.	.	.	.
1620	.	.	.	.	.	.

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
1621	.	.	.	.	.	.	1666	.	.	.	.	.	.	1711	1	.	.	.	.	1
1622	3	.	.	.	.	3	1667	.	.	.	.	.	.	1712	.	.	.	.	.	.
1623	.	.	.	.	.	.	1668	.	.	.	.	.	.	1713	1	.	.	.	.	1
1624	2	.	.	.	2	.	1669	2	.	.	2	.	.	1714	1	.	.	.	.	1
1625	.	.	.	.	.	.	1670	5	.	.	1	.	4	1715	2	.	.	.	.	2
1626	3	.	.	1	.	2	1671	.	.	.	.	.	.	1716	3	.	.	3	.	.
1627	.	.	.	.	.	.	1672	2	.	.	.	.	2	1717	1	.	.	1	.	.
1628	.	.	.	.	.	.	1673	6	.	.	.	.	6	1718	.	.	.	.	.	.
1629	.	.	.	.	.	.	1674	1	.	.	.	.	1	1719	1	.	.	.	.	1
1630	4	.	.	.	1	3	1675	2	.	.	.	.	2	1720	.	.	.	.	.	.
1631	.	.	.	.	.	.	1676	.	.	.	.	.	.	1721	1	.	.	1	.	.
1632	.	.	.	.	.	.	1677	.	.	.	.	.	.	1722	1	.	.	.	.	1
1633	1	.	.	1	.	.	1678	1	.	.	.	.	1	1723	2	.	.	1	.	1
1634	.	.	.	.	.	.	1679	2	.	.	1	.	1	1724	4	.	.	4	.	.
1635	1	.	.	.	.	1	1680	1	.	.	.	.	1	1725	1	.	.	.	.	1
1636	4	.	.	.	.	4	1681	.	.	.	.	.	.	1726	3	.	.	1	1	1
1637	4	.	.	2	.	2	1682	.	.	.	.	.	.	1727	2	.	.	.	.	2
1638	1	.	.	.	.	1	1683	1	.	.	.	.	1	1728	.	.	.	.	.	.
1639	4	.	.	.	1	3	1684	7	.	.	3	3	1	1729	.	.	.	.	.	.
1640	1	.	.	.	1	.	1685	8	.	.	.	.	8	1730	1	.	.	.	.	1
1641	1	.	.	.	1	.	1686	2	.	.	.	.	2	1731	.	.	.	.	.	.
1642	4	.	.	.	.	4	1687	2	.	.	1	.	1	1732	2	.	.	.	1	1
1643	2	.	.	.	.	2	1688	1	.	.	.	.	1	1733	.	.	.	.	.	.
1644	.	.	.	.	.	.	1689	10	.	.	1	1	8	1734	4	.	.	4	.	.
1645	3	.	.	1	1	1	1690	5	.	.	1	1	3	1735	.	.	.	.	.	.
1646	2	.	.	.	.	2	1691	2	.	.	.	.	2	1736	4	.	.	2	.	2
1647	2	.	.	.	.	2	1692	.	.	.	.	.	.	1737	.	.	.	.	.	.
1648	2	.	.	.	.	2	1693	1	.	.	1	.	.	1738	.	.	.	.	.	.
1649	2	.	.	.	.	2	1694	1	.	.	.	.	1	1739	.	.	.	.	.	.
1650	.	.	.	.	.	.	1695	1	.	.	1	.	.	1740	1	.	.	.	.	1
1651	.	.	.	.	.	.	1696	.	.	.	.	.	.	1741	.	.	.	.	.	.
1652	.	.	.	.	.	.	1697	6	.	.	.	.	6	1742	4	.	.	.	1	3
1653	3	.	.	.	1	2	1698	2	.	.	1	1	.	1743	1	.	.	.	1	.
1654	.	.	.	.	.	.	1699	1	.	.	.	.	1	1744	1	.	.	.	.	1
1655	7	.	.	2	2	3	1700	3	.	.	2	.	1	1745	2	.	.	.	.	2
1656	2	.	.	.	1	1	1701	.	.	.	.	.	.	1746	1	.	.	.	1	.
1657	8	.	.	2	1	5	1702	1	.	.	1	.	.	1747	2	.	.	.	.	2
1658	1	.	.	.	.	1	1703	1	.	.	.	.	1	1748	.	.	.	.	.	.
1659	2	.	.	1	.	1	1704	.	.	.	.	.	.	1749	3	.	.	.	1	2
1660	10	.	.	2	1	7	1705	2	.	.	1	.	1	1750	.	.	.	.	.	.
1661	3	.	.	1	1	1	1706	.	.	.	.	.	.	1751	4	.	.	.	.	4
1662	.	.	.	.	.	.	1707	4	.	.	.	.	4	1752	.	.	.	.	.	.
1663	5	.	.	.	1	4	1708	2	.	.	.	1	1	1753	1	.	.	.	.	1
1664	3	.	.	.	.	3	1709	6	.	.	.	.	6	1754	1	.	.	1	.	.
1665	3	.	.	.	.	3	1710	7	.	.	1	.	6	1755	6	.	.	.	2	4

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
1756	2	.	.	.	.	2	1801	4	.	.	.	1	3	1846	3	.	.	.	.	3
1757	1	.	.	.	.	1	1802	.	.	.	.	.	.	1847	3	.	.	1	.	2
1758	1	.	.	.	.	1	1803	4	.	.	.	.	4	1848	.	.	.	.	.	.
1759	3	.	.	.	.	3	1804	.	.	.	.	.	.	1849	1	.	.	.	1	.
1760	1	.	.	.	.	1	1805	.	.	.	.	.	.	1850	6	.	.	1	2	3
1761	.	.	.	.	.	.	1806	.	.	.	.	.	.	1851	.	.	.	.	.	.
1762	1	.	.	.	.	1	1807	2	.	.	.	.	2	1852	3	.	.	.	.	3
1763	1	.	.	.	.	1	1808	3	.	.	.	1	2	1853	1	.	.	.	.	1
1764	2	.	.	1	1	.	1809	.	.	.	.	.	.	1854	5	.	.	3	.	2
1765	2	.	.	1	.	1	1810	.	.	.	.	.	.	1855	.	.	.	.	.	.
1766	3	.	.	.	1	2	1811	2	.	.	2	.	.	1856	1	.	.	.	.	1
1767	3	.	.	.	1	2	1812	3	.	.	.	.	3	1857	3	.	.	.	.	3
1768	3	.	.	.	.	3	1813	1	.	.	.	.	1	1858	.	.	.	.	.	.
1769	.	.	.	.	.	.	1814	.	.	.	.	.	.	1859	.	.	.	.	.	.
1770	5	.	.	.	.	5	1815	3	.	.	.	1	2	1860	.	.	.	.	.	.
1771	.	.	.	.	.	.	1816	3	.	.	.	.	3	1861	2	.	.	.	1	1
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1773	.	.	.	.	.	.	1818	2	.	.	.	.	2	1863	.	.	.	.	.	.
1774	.	.	.	.	.	.	1819	1	.	.	1	.	.	1864	2	.	.	.	.	2
1775	.	.	.	.	.	.	1820	.	.	.	.	.	.	1865	.	.	.	.	.	.
1776	1	.	.	1	.	.	1821	5	.	.	.	.	5	1866	.	.	.	.	.	.
1777	2	.	.	.	.	2	1822	.	.	.	.	.	.	1867	1	.	.	1	.	.
1778	1	.	.	.	.	1	1823	6	.	.	.	.	6	1868	.	.	.	.	.	.
1779	1	.	.	.	.	1	1824	2	.	.	.	.	2	1869	1	.	.	.	1	.
1780	.	.	.	.	.	.	1825	1	.	.	.	.	1	1870	1	.	.	.	.	1
1781	6	.	.	1	2	3	1826	.	.	.	.	.	.	1871	2	.	.	.	.	2
1782	3	.	.	.	.	3	1827	6	.	.	2	.	4	1872	2	.	.	.	.	2
1783	4	.	.	.	1	3	1828	1	.	.	1	.	.	1873	4	.	.	.	1	3
1784	3	.	.	.	.	3	1829	.	.	.	.	.	.	1874	1	.	.	.	.	1
1785	.	.	.	.	.	.	1830	1	.	.	.	.	1	1875	1	.	.	.	.	1
1786	3	.	.	.	.	3	1831	.	.	.	.	.	.	1876	.	.	.	.	.	.
1787	3	.	.	.	.	3	1832	1	.	.	1	.	.	1877	.	.	.	.	.	.
1788	1	.	.	.	.	1	1833	.	.	.	.	.	.	1878	1	.	.	.	.	1
1789	.	.	.	.	.	.	1834	.	.	.	.	.	.	1879	.	.	.	.	.	.
1790	.	.	.	.	.	.	1835	2	.	.	.	.	2	1880	6	.	.	.	.	6
1791	1	.	.	.	.	1	1836	3	.	.	.	.	3	1881	2	.	.	.	1	1
1792	.	.	.	.	.	.	1837	1	.	.	.	.	1	1882	.	.	.	.	.	.
1793	.	.	.	.	.	.	1838	.	.	.	.	.	.	1883	2	.	.	.	.	2
1794	.	.	.	.	.	.	1839	1	.	.	.	.	1	1884	2	.	.	.	1	1
1795	.	.	.	.	.	.	1840	2	.	.	.	.	2	1885	.	.	.	.	.	.
1796	2	.	.	2	.	.	1841	1	.	.	.	.	1	1886	9	.	.	2	1	6
1797	.	.	.	.	.	.	1842	4	.	.	.	.	4	1887	.	.	.	.	.	.
1798	1	.	.	.	.	1	1843	1	.	.	1	.	.	1888	1	.	.	.	.	1
1799	1	.	.	.	.	1	1844	.	.	.	.	.	.	1889	1	.	.	1	.	.
1800	.	.	.	.	.	.	1845	.	.	.	.	.	.	1890	3	.	.	1	1	1

ID/1	R	M	O	C	T	X
1891	.	.	.	.	.	.
1892	.	.	.	.	.	.
1893	1	.	.	.	.	1
1894	.	.	.	.	.	.
1895	.	.	.	.	.	.
1896	1	.	.	.	.	1
1897	2	.	.	.	.	2
1898	1	.	.	.	.	1
1899	1	.	.	.	.	1
1900	4	.	.	1	.	3
1901	5	.	.	2	.	3
1902	.	.	.	.	.	.
1903	5	.	.	1	2	2
1904	.	.	.	.	.	.
1905	.	.	.	.	.	.
1906	.	.	.	.	.	.
1907	1	.	.	.	.	1
1908	.	.	.	.	.	.
1909	5	.	.	3	.	2
1910	.	.	.	.	.	.
1911	.	.	.	.	.	.
1912	.	.	.	.	.	.
1913	.	.	.	.	.	.
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1915	2	.	.	.	.	2
1916	2	.	.	.	.	2
1917	.	.	.	.	.	.
1918	5	.	.	.	.	5
1919	.	.	.	.	.	.
1920	.	.	.	.	.	.
1921	.	.	.	.	.	.
1922	2	.	.	1	.	1
1923	2	.	.	1	.	1
1924	1	.	.	.	.	1
1925	1	.	.	.	.	1
1926	6	.	.	.	.	6
1927	1	.	.	.	.	1
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1929	4	.	.	.	2	2
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1931	.	.	.	.	.	.
1932	.	.	.	.	.	.
1933	2	.	.	.	.	2
1934	4	.	.	.	1	3
1935	3	.	.	.	.	3
1936	.	.	.	.	.	.
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1949	2	.	.	.	.	2
1950	.	.	.	.	.	.
1951	3	.	.	.	.	3
1952	3	.	.	1	1	1
1953	2	.	.	.	.	2
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1956	.	.	.	.	.	.
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1958	4	.	.	1	1	2
1959	3	.	.	.	.	3
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1961	6	.	.	5	1	.
1962	7	.	.	.	1	6
1963	3	.	.	2	.	1
1964	2	.	.	.	.	2
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1966	2	.	.	.	.	2
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1968	.	.	.	.	.	.
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1971	.	.	.	.	.	.
1972	.	.	.	.	.	.
1973	.	.	.	.	.	.
1974	3	.	.	.	.	3
1975	2	.	.	.	.	2
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1977	6	.	.	1	.	5
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1980	3	.	.	.	.	3
1981	1	.	.	.	.	1
1982	.	.	.	.	.	.
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1984	.	.	.	.	.	.
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1987	1	.	.	1	.	.
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1989	.	.	.	.	.	.
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1992	1	.	.	.	.	1
1993	4	.	.	1	.	3
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1995	2	.	.	.	.	2
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2003	2	.	.	.	.	2
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2006	7	.	.	3	2	2
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2008	2	.	.	1	1	.
2009	3	.	.	.	.	3
2010	.	.	.	.	.	.
2011	.	.	.	.	.	.
2012	.	.	.	.	.	.
2013	1	.	.	.	.	1
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2015	3	.	.	.	2	1
2016	2	.	.	.	1	1
2017	.	.	.	.	.	.
2018	.	.	.	.	.	.
2019	1	.	.	.	.	1
2020	1	.	.	.	.	1
2021	.	.	.	.	.	.
2022	1	.	.	.	.	1
2023	3	.	.	.	1	2
2024	2	.	.	.	1	1
2025	.	.	.	.	.	.

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
2026	.	.	.	.	.	.	2071	2	.	.	.	.	2	2116	1	.	.	.	.	1
2027	1	.	.	.	.	1	2072	.	.	.	.	.	.	2117	.	.	.	.	.	.
2028	2	.	.	.	.	2	2073	.	.	.	.	.	.	2118	.	.	.	.	.	.
2029	2	.	.	.	.	2	2074	2	.	.	.	.	2	2119	4	.	.	.	.	4
2030	.	.	.	.	.	.	2075	1	.	.	.	.	1	2120	.	.	.	.	.	.
2031	.	.	.	.	.	.	2076	4	.	.	.	.	4	2121	.	.	.	.	.	.
2032	.	.	.	.	.	.	2077	1	.	.	.	.	1	2122	.	.	.	.	.	.
2033	.	.	.	.	.	.	2078	.	.	.	.	.	.	2123	3	.	.	.	1	2
2034	.	.	.	.	.	.	2079	1	.	.	1	.	.	2124	.	.	.	.	.	.
2035	4	.	.	1	2	1	2080	3	.	.	.	.	3	2125	.	.	.	.	.	.
2036	1	.	.	.	.	1	2081	2	.	.	.	1	1	2126	3	.	.	.	.	3
2037	3	.	.	.	.	3	2082	3	.	.	.	1	2	2127	.	.	.	.	.	.
2038	12	.	.	2	1	9	2083	2	.	.	.	.	2	2128	1	.	.	.	.	1
2039	2	.	.	.	.	2	2084	.	.	.	.	.	.	2129	1	.	.	.	.	1
2040	.	.	.	.	.	.	2085	.	.	.	.	.	.	2130	.	.	.	.	.	.
2041	3	.	.	.	2	1	2086	.	.	.	.	.	.	2131	2	.	.	.	.	2
2042	.	.	.	.	.	.	2087	.	.	.	.	.	.	2132	3	.	.	.	.	3
2043	.	.	.	.	.	.	2088	.	.	.	.	.	.	2133	1	.	.	.	.	1
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2045	1	.	.	.	.	1	2090	.	.	.	.	.	.	2135	5	.	.	.	.	5
2046	2	.	.	1	.	1	2091	3	.	.	3	.	.	2136	.	.	.	.	.	.
2047	1	.	.	.	1	.	2092	2	.	.	.	.	2	2137	.	.	.	.	.	.
2048	.	.	.	.	.	.	2093	2	.	.	.	.	2	2138	4	.	.	.	.	4
2049	3	.	.	1	.	2	2094	2	.	.	.	.	2	2139	.	.	.	.	.	.
2050	1	.	.	.	.	1	2095	1	.	.	.	.	1	2140	1	.	.	.	.	1
2051	1	.	.	.	.	1	2096	.	.	.	.	.	.	2141	4	.	.	.	2	2
2052	1	.	.	.	.	1	2097	1	.	.	.	.	1	2142	.	.	.	.	.	.
2053	6	.	.	.	.	6	2098	4	.	.	.	.	4	2143	5	.	.	3	.	2
2054	.	.	.	.	.	.	2099	.	.	.	.	.	.	2144	.	.	.	.	.	.
2055	.	.	.	.	.	.	2100	.	.	.	.	.	.	2145	1	.	.	.	.	1
2056	3	.	.	.	.	3	2101	3	.	.	2	.	1	2146	3	.	.	.	.	3
2057	4	.	.	1	1	2	2102	.	.	.	.	.	.	2147	1	.	.	.	.	1
2058	5	.	.	.	.	5	2103	3	.	.	.	.	3	2148	.	.	.	.	.	.
2059	2	.	.	.	.	2	2104	.	.	.	.	.	.	2149	2	.	.	.	1	1
2060	1	.	.	1	.	.	2105	1	.	.	1	.	.	2150	.	.	.	.	.	.
2061	1	.	.	.	.	1	2106	.	.	.	.	.	.	2151	1	.	.	.	.	1
2062	.	.	.	.	.	.	2107	2	.	.	.	.	2	2152	.	.	.	.	.	.
2063	.	.	.	.	.	.	2108	2	.	.	.	1	1	2153	1	.	.	.	.	1
2064	1	.	.	.	.	1	2109	.	.	.	.	.	.	2154	1	.	.	.	.	1
2065	.	.	.	.	.	.	2110	1	.	.	1	.	.	2155	.	.	.	.	.	.
2066	2	.	.	.	.	2	2111	.	.	.	.	.	.	2156	4	.	.	.	.	4
2067	2	.	.	2	.	.	2112	1	.	.	.	.	1	2157	2	.	.	.	.	2
2068	1	.	.	1	.	.	2113	.	.	.	.	.	.	2158	1	.	.	.	.	1
2069	3	.	.	3	.	.	2114	1	.	.	.	.	1	2159	1	.	.	.	.	1
2070	2	.	.	.	.	2	2115	2	.	.	.	.	2	2160	1	.	.	.	.	1

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
2161	.	.	.	.	.	.	2206	.	.	.	.	.	.	2251	1	.	.	.	.	1
2162	1	.	.	.	.	1	2207	2	.	.	1	.	1	2252	.	.	.	.	.	.
2163	2	.	.	.	1	1	2208	3	.	.	2	1	.	2253	2	.	.	.	.	2
2164	2	.	.	.	.	2	2209	.	.	.	.	.	.	2254	.	.	.	.	.	.
2165	7	.	.	2	1	4	2210	2	.	.	.	.	2	2255	1	.	.	1	.	.
2166	3	.	.	.	.	3	2211	5	.	.	.	1	4	2256	1	.	.	1	.	.
2167	5	.	.	.	.	5	2212	1	.	.	.	.	1	2257	2	.	.	.	.	2
2168	2	.	.	.	.	2	2213	2	.	.	.	.	2	2258	.	.	.	.	.	.
2169	.	.	.	.	.	.	2214	.	.	.	.	.	.	2259	1	.	.	.	.	1
2170	1	.	.	.	.	1	2215	1	.	.	.	.	1	2260	2	.	.	1	1	.
2171	3	.	.	.	.	3	2216	1	.	.	.	.	1	2261	.	.	.	.	.	.
2172	2	.	.	.	.	2	2217	1	.	.	1	.	.	2262	.	.	.	.	.	.
2173	3	.	.	.	1	2	2218	7	.	.	2	3	2	2263	2	.	.	.	2	.
2174	6	.	.	.	.	6	2219	.	.	.	.	.	.	2264	.	.	.	.	.	.
2175	.	.	.	.	.	.	2220	1	.	.	.	.	1	2265	.	.	.	.	.	.
2176	.	.	.	.	.	.	2221	4	.	.	.	.	4	2266	2	.	.	.	.	2
2177	1	.	.	.	.	1	2222	.	.	.	.	.	.	2267	.	.	.	.	.	.
2178	.	.	.	.	.	.	2223	1	.	.	1	.	.	2268	.	.	.	.	.	.
2179	.	.	.	.	.	.	2224	4	.	.	1	.	3	2269	.	.	.	.	.	.
2180	.	.	.	.	.	.	2225	3	.	.	1	.	2	2270	.	.	.	.	.	.
2181	1	.	.	.	.	1	2226	1	.	.	.	.	1	2271	1	.	.	1	.	.
2182	1	.	.	.	.	1	2227	1	.	.	.	.	1	2272	1	.	.	.	.	1
2183	2	.	.	.	.	2	2228	2	.	.	.	.	2	2273	1	.	.	.	.	1
2184	3	.	.	.	1	2	2229	3	.	.	.	.	3	2274	.	.	.	.	.	.
2185	1	.	.	.	.	1	2230	.	.	.	.	.	.	2275	2	.	.	.	.	2
2186	.	.	.	.	.	.	2231	3	.	.	.	.	3	2276	4	.	.	.	1	3
2187	2	.	.	1	.	1	2232	1	.	.	.	.	1	2277	3	.	.	.	.	3
2188	2	.	.	.	.	2	2233	.	.	.	.	.	.	2278	4	.	.	.	.	4
2189	1	.	.	.	.	1	2234	.	.	.	.	.	.	2279	3	.	.	.	.	3
2190	2	.	.	.	.	2	2235	4	.	.	1	2	1	2280	.	.	.	.	.	.
2191	1	.	.	.	.	1	2236	1	.	.	.	.	1	2281	.	.	.	.	.	.
2192	1	.	.	.	1	.	2237	.	.	.	.	.	.	2282	.	.	.	.	.	.
2193	.	.	.	.	.	.	2238	2	.	.	1	1	.	2283	.	.	.	.	.	.
2194	.	.	.	.	.	.	2239	3	.	.	3	.	.	2284	2	.	.	.	.	2
2195	2	.	.	.	1	1	2240	4	.	.	.	1	3	2285	.	.	.	.	.	.
2196	.	.	.	.	.	.	2241	1	.	.	1	.	.	2286	6	.	.	.	.	6
2197	1	.	.	.	.	1	2242	.	.	.	.	.	.	2287	.	.	.	.	.	.
2198	4	.	.	.	.	4	2243	.	.	.	.	.	.	2288	2	.	.	.	.	2
2199	1	.	.	.	.	1	2244	1	.	.	.	.	1	2289	1	.	.	.	.	1
2200	1	.	.	.	.	1	2245	5	.	.	5	.	.	2290	.	.	.	.	.	.
2201	3	.	.	.	.	3	2246	3	.	.	.	.	3	2291	.	.	.	.	.	.
2202	.	.	.	.	.	.	2247	2	.	.	.	.	2	2292	3	.	.	.	.	3
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2204	2	.	.	2	.	.	2249	1	.	.	1	.	.	2294	2	.	.	1	1	.
2205	2	.	.	.	.	2	2250	.	.	.	.	.	.	2295	2	.	.	.	.	2

ID/1	R	M	O	C	T	X
2296	3	.	.	.	.	3
2297	3	.	.	.	.	3
2298	.	.	.	.	.	.
2299	.	.	.	.	.	.
2300	1	.	.	.	.	1
2301	2	.	.	.	.	2
2302	1	.	.	.	1	.
2303	1	.	.	.	.	1
2304	1	.	.	.	.	1
2305	1	.	.	.	.	1
2306	1	.	.	.	.	1
2307	1	.	.	1	.	.
2308	1	.	.	1	.	.
2309	1	.	.	.	.	1
2310	8	.	.	3	1	4
2311	1	.	.	.	1	.
2312	.	.	.	.	.	.
2313	2	.	.	.	1	1
2314	1	.	.	.	.	1
2315	.	.	.	.	.	.
2316	.	.	.	.	.	.
2317	1	.	.	.	.	1
2318	2	.	.	1	.	1
2319	.	.	.	.	.	.
2320	4	.	.	1	3	.
2321	2	.	.	.	1	1
2322	2	.	.	.	1	1
2323	.	.	.	.	.	.
2324	1	.	.	.	.	1
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2327	2	.	.	.	.	2
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2333	2	.	.	.	.	2
2334	.	.	.	.	.	.
2335	2	.	.	1	.	1
2336	2	.	.	.	.	2
2337	.	.	.	.	.	.
2338	.	.	.	.	.	.
2339	5	.	.	.	1	4
2340	.	.	.	.	.	.

ID/1	R	M	O	C	T	X
2341	.	.	.	.	.	.
2342	1	.	.	.	.	1
2343	1	.	.	.	.	1
2344	2	.	.	.	.	2
2345	1	.	.	.	.	1
2346	6	.	.	.	1	5
2347	1	.	.	.	1	.
2348	.	.	.	.	.	.
2349	4	.	.	.	1	3
2350	1	.	.	.	.	1
2351	3	.	.	.	.	3
2352	.	.	.	.	.	.
2353	.	.	.	.	.	.
2354	3	.	.	.	1	2
2355	5	.	.	.	2	3
2356	2	.	.	2	.	.
2357	1	.	.	.	.	1
2358	.	.	.	.	.	.
2359	5	.	.	.	.	5
2360	2	.	.	.	.	2
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2362	.	.	.	.	.	.
2363	1	.	.	1	.	.
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2365	1	.	.	.	1	.
2366	.	.	.	.	.	.
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2369	.	.	.	.	.	.
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2371	.	.	.	.	.	.
2372	2	.	.	.	2	.
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2374	1	.	.	.	.	1
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2376	1	.	.	1	.	.
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2379	6	.	.	.	1	5
2380	.	.	.	.	.	.
2381	1	.	.	.	.	1
2382	2	.	.	2	.	.
2383	.	.	.	.	.	.
2384	.	.	.	.	.	.
2385	.	.	.	.	.	.

ID/1	R	M	O	C	T	X
2386	1	.	.	.	.	1
2387	.	.	.	.	.	.
2388	.	.	.	.	.	.
2389	4	.	.	.	.	4
2390	3	.	.	.	.	3
2391	.	.	.	.	.	.
2392	2	.	.	.	1	1
2393	.	.	.	.	.	.
2394	.	.	.	.	.	.
2395	2	.	.	.	.	2
2396	.	.	.	.	.	.
2397	1	.	.	.	.	1
2398	.	.	.	.	.	.
2399	.	.	.	.	.	.
2400	2	.	.	.	.	2
2401	.	.	.	.	.	.
2402	2	.	.	.	.	2
2403	1	.	.	.	1	.
2404	1	.	.	.	.	1
2405	1	.	.	.	1	.
2406	.	.	.	.	.	.
2407	2	.	.	.	.	2
2408	.	.	.	.	.	.
2409	.	.	.	.	.	.
2410	.	.	.	.	.	.
2411	.	.	.	.	.	.
2412	.	.	.	.	.	.
2413	.	.	.	.	.	.
2414	1	.	.	.	.	1
2415	1	.	.	.	.	1
2416	4	.	.	.	1	3
2417	4	.	.	3	.	1
2418	.	.	.	.	.	.
2419	.	.	.	.	.	.
2420	.	.	.	.	.	.
2421	2	.	.	1	.	1
2422	2	.	.	.	.	2
2423	.	.	.	.	.	.
2424	.	.	.	.	.	.
2425	.	.	.	.	.	.
2426	.	.	.	.	.	.
2427	1	.	.	.	1	.
2428	3	.	.	1	1	1
2429	.	.	.	.	.	.
2430	3	.	.	.	.	3

ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
2431	.	.	.	.	.	.	2476	1	.	.	1	.	.	2521	6	.	.	.	.	6
2432	.	.	.	.	.	.	2477	.	.	.	.	.	.	2522	4	.	.	.	.	4
2433	1	.	.	.	.	1	2478	.	.	.	.	.	.	2523	2	.	.	.	.	2
2434	1	.	.	.	.	1	2479	6	.	.	.	1	5	2524	6	.	.	1	1	4
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2436	3	.	.	.	.	3	2481	1	.	.	.	.	1	2526	.	.	.	.	.	.
2437	1	.	.	.	.	1	2482	.	.	.	.	.	.	2527	.	.	.	.	.	.
2438	.	.	.	.	.	.	2483	4	.	.	.	.	4	2528	1	.	.	.	.	1
2439	1	.	.	.	.	1	2484	2	.	.	.	.	2	2529	6	.	.	.	.	6
2440	3	.	.	.	.	3	2485	1	.	.	.	.	1	2530	3	.	.	1	.	2
2441	1	.	.	.	.	1	2486	.	.	.	.	.	.	2531	3	.	.	.	1	2
2442	1	.	.	1	.	.	2487	1	.	.	.	.	1	2532	3	.	.	1	.	2
2443	1	.	.	.	.	1	2488	2	.	.	.	.	2	2533	1	.	.	.	.	1
2444	.	.	.	.	.	.	2489	3	.	.	.	.	3	2534	1	.	.	.	.	1
2445	1	.	.	.	1	.	2490	.	.	.	.	.	.	2535	1	.	.	.	.	1
2446	.	.	.	.	.	.	2491	1	.	.	.	.	1	2536	.	.	.	.	.	.
2447	.	.	.	.	.	.	2492	2	.	.	.	.	2	2537	2	.	.	.	.	2
2448	.	.	.	.	.	.	2493	1	.	.	.	.	1	2538	2	.	.	.	.	2
2449	.	.	.	.	.	.	2494	.	.	.	.	.	.	2539	2	.	.	.	.	2
2450	.	.	.	.	.	.	2495	.	.	.	.	.	.	2540	1	.	.	.	.	1
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2452	.	.	.	.	.	.	2497	.	.	.	.	.	.	2542	3	.	.	.	.	3
2453	1	.	.	.	.	1	2498	.	.	.	.	.	.	2543	1	.	.	.	.	1
2454	.	.	.	.	.	.	2499	.	.	.	.	.	.	2544	5	.	.	1	1	3
2455	3	.	.	1	1	1	2500	2	.	.	.	.	2	2545	.	.	.	.	.	.
2456	2	.	.	.	1	1	2501	1	.	.	.	.	1	2546	1	.	.	.	.	1
2457	.	.	.	.	.	.	2502	.	.	.	.	.	.	2547	.	.	.	.	.	.
2458	1	.	.	.	.	1	2503	2	.	.	.	.	2	2548	.	.	.	.	.	.
2459	8	.	.	.	3	5	2504	.	.	.	.	.	.	2549	5	.	.	.	.	5
2460	1	.	.	.	.	1	2505	1	.	.	.	.	1	2550	.	.	.	.	.	.
2461	1	.	.	1	.	.	2506	.	.	.	.	.	.	2551	1	.	.	.	.	1
2462	.	.	.	.	.	.	2507	.	.	.	.	.	.	2552	.	.	.	.	.	.
2463	1	.	.	.	.	1	2508	.	.	.	.	.	.	2553	1	.	.	.	.	1
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2465	5	.	.	1	2	2	2510	.	.	.	.	.	.	2555	.	.	.	.	.	.
2466	.	.	.	.	.	.	2511	.	.	.	.	.	.	2556	.	.	.	.	.	.
2467	.	.	.	.	.	.	2512	1	.	.	1	.	.	2557	.	.	.	.	.	.
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2470	.	.	.	.	.	.	2515	.	.	.	.	.	.	2560	3	.	.	.	1	2
2471	.	.	.	.	.	.	2516	1	.	.	.	1	.	2561	2	.	.	.	.	2
2472	2	.	.	.	.	2	2517	1	.	.	.	.	1	2562	.	.	.	.	.	.
2473	.	.	.	.	.	.	2518	.	.	.	.	.	.	2563	.	.	.	.	.	.
2474	4	.	.	3	1	.	2519	1	.	.	.	.	1	2564	2	.	.	.	.	2
2475	1	.	.	1	.	.	2520	2	.	.	.	.	2	2565	2	.	.	.	1	1

ID/1	R	M	O	C	T	X
2566	.	.	.	.	.	.
2567	3	.	.	.	.	3
2568	.	.	.	.	.	.
2569	1	.	.	.	.	1
2570	.	.	.	.	.	.
2571	.	.	.	.	.	.
2572	.	.	.	.	.	.
2573	.	.	.	.	.	.
2574	1	.	.	.	.	1
2575	.	.	.	.	.	.
2576	.	.	.	.	.	.
2577	6	.	.	.	.	6
2578	.	.	.	.	.	.
2579	2	.	.	.	.	2
2580	.	.	.	.	.	.
2581	1	.	.	.	.	1
2582	1	.	.	.	.	1
2583	.	.	.	.	.	.
2584	2	.	.	1	.	1
2585	1	.	.	.	.	1
2586	.	.	.	.	.	.
2587	4	.	.	.	.	4
2588	1	.	.	.	.	1
2589	1	.	.	.	.	1
2590	.	.	.	.	.	.
2591	1	.	.	.	.	1
2592	1	.	.	.	.	1
2593	.	.	.	.	.	.
2594	.	.	.	.	.	.
2595	.	.	.	.	.	.
2596	1	.	.	.	.	1
2597	.	.	.	.	.	.
2598	.	.	.	.	.	.
2599	.	.	.	.	.	.
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2608	3	.	.	.	.	3
2609	.	.	.	.	.	.
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2612	.	.	.	.	.	.
2613	3	.	.	.	.	3
2614	4	.	.	.	.	4
2615	2	.	.	.	.	2
2616	2	.	.	.	.	2
2617	1	.	.	.	.	1
2618	4	.	.	.	.	4
2619	3	.	.	.	.	3
2620	1	.	.	.	.	1
2621	1	.	.	1	.	.
2622	.	.	.	.	.	.
2623	5	.	.	.	.	5
2624	3	.	.	.	.	3
2625	.	.	.	.	.	.
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2627	.	.	.	.	.	.
2628	7	.	.	.	.	7
2629	.	.	.	.	.	.
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2635	.	.	.	.	.	.
2636	1	.	.	.	.	1
2637	9	.	.	1	.	8
2638	6	.	.	.	1	5
2639	.	.	.	.	.	.
2640	.	.	.	.	.	.
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ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X	ID/1	R	M	O	C	T	X
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ID/2	R	M	O	C	T	X	ID/2	R	M	O	C	T	X	ID/2	R	M	O	C	T	X
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45	9	.	.	.	3	6	90	5	.	.	3	.	2	135	2	.	.	.	.	2

ACKNOWLEDGEMENTS

[The acknowledgements section will appear in Preprint No. 2].

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[The index will appear in Preprint No. 2, after Chapter 4 has been written].