

THE EVOLUTION OF GALAXIES IN CLUSTERS. III. PHOTOMETRY OF 17 INTERMEDIATE REDSHIFT CLUSTERS

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ABSTRACT

In this paper we present photometry in two bands of 17 rich clusters of galaxies with redshifts between 0.17 and 0.39. Fifteen of the clusters were studied on *J* and *F* (or in one case *N*) plates taken at the prime focus of the KPNO and CTIO 4 m telescopes. Objects were photometered in an area of 55 arcmin² centered on the cluster and in an equal-sized area far from the cluster. Two clusters were observed in *V* and *R* with the KPNO videocamera on the 2.1 m telescope, covering a field of 6.3 arcmin².

Photometry extends to, typically, a red magnitude of 22 mag, although there is some incompleteness near the limit. From internal error indicators, we estimate the colors to be accurate to, typically, 0.13 mag at a red magnitude of 21. Except for bright objects, we have not separated stars from galaxies in the data. A comparison of object counts in the field regions shows very good agreement with the results of Kron, while suggesting that a previous field galaxy density used by Butcher and Oemler was slightly ($\sim 25\%$) too low. This small error is not sufficient to explain the excess of blue objects found by Butcher and Oemler in two distant clusters.

Subject headings: galaxies: clusters of — galaxies: photometry

I. INTRODUCTION

Several years ago we published photometry of two distant clusters of galaxies, Cl 0024 + 1654, at a redshift of 0.39, and the cluster around 3C 295, at a redshift of 0.46 (Butcher and Oemler 1978a, hereafter BOI). Unlike nearby clusters of similar compactness, whose cores are populated almost entirely by E and S0 galaxies with a narrow range of color (Butcher and Oemler 1978b), these distant clusters appeared to contain a large population of blue galaxies.

If such an anomalous population were shown to be a general characteristic of clusters at a redshift of ~ 0.4 , it would require a considerable revision of standard ideas about the nature and speed of evolution of stellar populations in galaxies. It is clearly important to establish whether Cl 0024 + 1654 and 3C 295 are typical and, if so, to determine how galaxy populations have evolved

from the epoch observed at $z \approx 0.4$ to the present. Unfortunately, the published literature contains very few identifications of rich clusters of galaxies with redshifts greater than 0.4. Therefore, in this paper we present photographic and vidicon photometry of 17 somewhat less distant clusters, with $0.17 < z < 0.39$. A preliminary discussion of some of the data has already been published (Butcher, Oemler, and Wells 1980). The application of these data to a study of galaxy populations in clusters will be presented in a subsequent paper.

II. OBSERVATIONS

a) Selection of Clusters

The observations of Cl 0024 + 1654 and 3C 295 were made with the KPNO videocamera on the 2.1 m telescope during two runs in 1975 September and 1976 March. During these same observing runs, observations were also made in the *V* and *R* bands of a number of other distant clusters. Only two of these turned out to be rich enough to be usable for this program. The others were so poor that contamination by background and

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TABLE 1
CLUSTERS STUDIED

Cluster (1)	Richness (2)	b (3)	z (4)	Field Offset (5)	M_0 (6)
A222.....	3	-72°	0.217	22' E	22.1
A223.....	3	-72°	0.207	...	22.1
A370.....	0 ^a	-53°	0.373	16' S	20.7
A520.....	3	-24°	0.203	21' W	20.5
A777.....	4	$+34^\circ$	0.224	20' E	22.4
A963.....	3	$+56^\circ$	0.207	20' S	21.3
A1758.....	3	$+65^\circ$	0.280	14' NE	22.3
A1942.....	3	$+55^\circ$	0.224	19' SW	21.8
A1961.....	3	$+65^\circ$	0.234	29' WNW	21.7
A1963.....	2	$+64^\circ$	21.7
A2111.....	3	$+53^\circ$	0.228	19' SW	21.5
A2125.....	4	$+43^\circ$	0.247	18' W	21.3
A2218.....	4	$+38^\circ$	0.171	18' NNW	21.4
A2397.....	3	-40°	0.222	20' W	22.2
A2645.....	4	-66°	0.246	15' S	21.3
Cl 0949+4409 ...	1 ^b	$+50^\circ$	0.385	...	21.9
Cl 1446+2619 ...	2 ^b	$+63^\circ$	0.369	...	21.9

^aProbably underestimated by Abell 1958.

^bOur estimate.

foreground galaxies would have prevented an unambiguous determination of the cluster population.

The two usable clusters were Cl 0949+4409 and Cl 1446+2619, at redshifts of 0.39 and 0.37, respectively; both have been observed by Gunn and Oke (1975), from whom the quoted redshifts are taken. Cl 0949+4409 is a moderately compact cluster; Cl 1446+2619 is an unconcentrated cluster rather similar in structure to the nearby Hercules cluster. Both are approximately richness class 2 on Abell's (1958) scale. Each cluster was observed for a total of 1 hr in each band in 1976 March. The 256 pixel square array of the videocamera covers a field of ~ 2.5 square at the 2.1 m telescope. A detailed description of the characteristics of the camera can be found in BOI.

In order to survey the variation of galaxy populations between the present epoch and that observed at $z \approx 0.4$, 15 very rich clusters with redshifts between 0.18 and 0.37 were selected from Abell's (1958) catalog. All but one have redshifts measured by Sandage, Kristian, and Westphal (1976, hereafter SKW) or Kristian, Sandage, and Westphal (1978, hereafter KSW). The redshift of Abell 1963 is unknown; it appears to form a binary cluster with A1961, and we shall assume that its redshift is the same as that of the latter.

Red and blue plates were taken of all of the clusters at the prime focus of the KPNO or CTIO 4 m telescopes. Two pairs of clusters, A222+A223 and A1961+A1963, were close enough for both to be obtained on one plate. Blue exposures were obtained on IIIa-J emulsion behind a GG 395 filter. Red exposures of all but three of the clusters were obtained on IIIa-F emulsion behind a RG 610 filter. The red plate of A222 and A223

was a IIIa-F behind a GG 495 filter; that of A370 was a IV-N plate behind a RG 695 filter. Calibration spots were put on all plates at the time of exposure. The clusters observed are listed in Table 1. Columns (1)–(4) contain the cluster's name, richness, galactic latitude, and the redshift, respectively, taken from the sources cited above.

b) Data Reduction

The videocamera data were reduced on an early version of the KPNO interactive picture processing system (IPPS), in much the same way as were the data presented in BOI. Preliminary processing consisted of subtraction of a dark frame from the average cluster frame for each filter, followed by division by an appropriate flat field exposure. As discussed in BOI, signal variations across the flat field frames are due both to variations in the vidicon's sensitivity and to geometrical scale changes caused by pincushion distortion in the tube's electron optics. Application of the flat field frames renders the sky background apparently flat, but does not cure the radial dependence of the projected pixel area on the sky. We have calibrated these distortions by observing a star cluster, both with the vidicon and photographically, and then by comparing the resulting astrometry. We believe we have corrected our magnitudes to ± 0.05 mag everywhere in the field, and to considerably better in the central zone 100 pixels in radius. Finally, we reiterate that this correction applies only to the magnitudes derived from the vidicon data, and not to the colors, because the images remained in the same locations for the different filters.

Galaxies to be photometered in these data were selected from the red intensity arrays. The frames were displayed on the IPPS TV monitor, and all objects which by eye did not appear to be stars were selected. The local sky level was estimated by examining the intensity distribution of the area surrounding each galaxy and choosing by eye the mode of that distribution. The measurement radius for each image was chosen to ensure the most accurate color information and was typically four pixels ($2''.7$) for the vidicon photometry presented here and in BOI. The use of these small apertures means that the magnitudes are considerably fainter than the total galaxy magnitudes, a fact which was not stressed in BOI and which has, regrettably, led to some confusion in the literature. We have measured approximate total magnitudes for a subset of the galaxies and find

$$R_{\text{vid}} - R_{\text{tot}} \approx 0.5. \quad (1)$$

The photographic plates were traced on the KPNO PDS microdensitometer, and the scans converted from density to intensity using the calibration spots on each plate. Each scan was a 1500 square array of $16 \mu\text{m}$ pixels, which at the plate scale of the 4 m prime focus corresponds to $0''.297$ per pixel and a total area of 55.1 arcmin^2 . Four scans were generated for each cluster, one in each color centered on the cluster, and a similar pair as far as possible from the cluster while still within the unvignetted region of the plates. In nearly all cases the positioning of the cluster in the field was identical for the two filters.

The location of the field background scan was chosen to be as representative as possible of the field galaxy distribution away from the cluster or clusters. In particular, attempts were made to avoid obvious extensions to the cluster in question, other foreground or background clusters, as well as regions of lower than average galaxy density. While the choice of background field was therefore clearly subjective, even cursory examination of the environs of these giant clusters shows that some selection of background region is required. We argue below, based on the general agreement of our field results with those of other workers (e.g., Kron 1980), that it is unlikely that any significant bias has been introduced by this procedure. It is, in any case, an acknowledged weakness of the photometric approach to the study of cluster populations. The locations of the field regions, relative to those of the cluster scans, are given in column (5) of Table 1.

In order to eliminate any subjective measurement biases, as well as to maximize the volume of data which could be processed, these photographic data were processed via a suite of computer programs written by Wells and available to KPNO users under the name AUTOPHOT. These programs were developed during

the course of this investigation and another, which was recently reported by Strom *et al.* (1981). Those authors outlined the nature of the procedures employed in some detail, so only a brief account will be given here for the sake of completeness.

Each intensity array first was smoothed with a tapered 3×3 pixel kernel, whose primary function is to eliminate as much as possible the discrete nature of the digitized signal. To remove low frequency variations in the sky background (due primarily to small amounts of geometrical distortion and faint reflections introduced by the corrector lenses), the array was next shrunk a factor of 10 in each dimension by extracting every 10th pixel from every 10th row; it was then smoothed once with a modal filter to remove residual stars, and again with a mean filter to suppress any remaining noise; finally, it was expanded to 1500 pixels square by bicubic interpolation and subtracted from the original array. The result was an array to which a simple, constant-valued threshold could be applied for object detection purposes.

The object detection algorithm we have applied renders a detection when more than five contiguous pixels are found having intensities above a constant (in the first instance, 2.0) times the rms background noise. Objects which are very much too large (e.g., bright stars, bright galaxies, or emulsion scratches) were also eliminated automatically.

The list of candidate objects so produced has two principal defects. It fails to include galaxies near the cluster centers where all objects tend to be on the elevated background of the central galaxy (or in the overlapping halos of the several brightest cluster members), and it contains a significant fraction of spurious, accidental detections. The first problem we have remedied in two steps. First, we reran the detection routines with a threshold 5 times the rms sky noise and merged the resulting list with the initial list. Most of the missing central objects were included at this point. Those very few which by inspection were still missing we measured interactively on the IPPS and appended the results to our final photometric output. The problem of spurious detections we have largely eliminated by requiring objects to be present on both the red and blue plates of each cluster. While in principle this requirement can lead to completeness errors as a function of color, we are confident by careful inspection that any such effect in the present data occurs well below the point at which the color measurements themselves become unreliable. The resulting object lists should be quite reliable. However, because of the very large number of objects with which we have had to deal, it is possible that some errors (duplicates, missing bright objects) remain.

Finally, the resulting object lists were submitted to photometry routines for measurement. The sky level around each image was determined as the mode (ap-

proximated by 3 times the median minus twice the mean) of the distribution of intensity readings in an annulus concentric with the image centroid. Typically the inner and outer radii of the annulus were 17 and 27 pixels, although for A2218 these were increased to 25 and 35 pixels. For those instances in which the computer felt it could not produce a reliable sky estimate, we have again resorted to an interactive, manual measurement. The signal from each object has been taken as the sum of the signals above sky of pixels inside the given circular aperture centered on the object's position centroid. To minimize any noise due to quantization of the data into pixels, we have included by interpolation the fractional contributions of pixels cut by the edge of the aperture.

Because we are attempting here to compare galaxies at different redshifts, we choose to employ metric apertures scaled with redshift, rather than one of the more conventional isophotal schemes. For our cosmological scaling law we have assumed a q_0 value of 0.05. For the combined purposes discussed below, we have performed our photometry through three different apertures, which for $H_0 = 50 \text{ km s}^{-1} \text{ Mpc}^{-1}$ turns out to have metric diameters of 19, 27, and 38 kpc.

The photographic photometry consists, then, at this point, of magnitudes in three concentric apertures. Since color gradients in most galaxies are small, and since we want color measurements as accurate as possible, we calculate colors using the pairs of magnitudes in the smallest apertures. On the other hand, we would like the measured magnitude of each galaxy to refer to as large as possible a fraction of the galaxy's total luminosity. However, the photometry errors in the largest aperture are twice those in the smallest, and, for the fainter galaxies, are quite large. We have, therefore, adopted the following procedure to obtain magnitudes. Plots of $m_{19} - m_{27}$, and $m_{27} - m_{38}$ show that, brighter than some magnitude which varies from cluster to cluster but is typically $F \approx 20$, the differences $m_{19} - m_{27}$ and $m_{27} - m_{38}$ have moderate positive values and a spread which is independent of magnitude. We assume that these represent the true magnitude differences between apertures. Fainter than $F \approx 20$, the scatter in $m_{19} - m_{27}$ and $m_{27} - m_{38}$ rapidly increases, and many values are negative. It appears, then, that the best estimate for the true magnitude within a 38 kpc aperture is, for the brighter galaxies, the measured m_{38} , and, for the fainter galaxies, the best estimate for m_{38} is $m_{19} - \langle \Delta m \rangle$, where $\langle \Delta m \rangle$ is the mean difference between m_{19} and m_{38} for the fainter galaxies. For the range of magnitudes involved, this difference is quite uniformly 0.25 mag, independent of magnitude and cluster.

These are, therefore, the magnitudes we shall use. Since they are metric magnitudes through moderate-sized apertures, they cannot represent the total magnitudes of the brightest galaxies. We have calculated the expected

differences between our magnitudes and the total magnitudes, using the photometry of Coma cluster galaxies in Strom and Strom (1978). For galaxies within the first two magnitudes of the cluster luminosity function, other than the brightest cluster member, we find typical differences of 0.1 to 0.2 mag. The differences for fainter galaxies are negligibly small. The only galaxies for which our magnitudes differ substantially from the total magnitudes are the brightest cluster members. This is particularly true because many of these are cDs, with low central surface brightness. Indeed, inspection of the plates and tables of photometry presented below shows that the cD, although very dominant in the cluster, often has a metric magnitude fainter than that of several other cluster members. Although this effect is of no importance for our purposes, *it should be kept in mind if these data are put to other uses.*

The object-finding routine used with the photographic data does not distinguish between stars and galaxies. We have removed the most obvious stars from the object lists. Somewhat fainter stars may be found using the aperture photometry. A plot of $m_{19} - m_{38}$ versus m_{19} shows two sequences at the bright end. One, at $m_{19} - m_{38} > 0.3$, undoubtedly represents galaxies, and the other, at $m_{19} - m_{38} < 0.1$, is almost surely composed of stars. Over the range of magnitudes where the two sequences are clearly separated—typically down to $F \approx 19$ —we have tentatively identified members of the latter sequence as stars. Data on these objects are printed in italics in the tables.

Since the cluster frames contain many more galaxies than do the field frames but have an equal number of stars, we may use the number of objects designated stars to test whether we have inadvertently included a significant number of galaxies among them. Over the magnitude intervals within which we have separated stars from galaxies, there are 2.44 times as many objects in the cluster frames as in the field frames. The ratio of number of objects called stars in the cluster and field frames is 0.94. It appears, then, that our separation is fairly reliable.

c) Calibration

Calibration of our photometry depends upon photoelectric photometry of cluster members by other workers. Although we could normally calibrate our videocamera photometry using observations of standard star fields made on the same nights, imperfect sky conditions on the nights when Cl 0949 + 4409 and Cl 1446 + 2619 were observed make this a risky procedure. Unfortunately, only 10 of 17 clusters have been observed photoelectrically. For the rest we can only obtain approximate calibrations.

The band passes of the V and R videocamera photometry are described in BOI; they are negligibly different from the standard bands. Using the spectro-

photometry of cluster members of Cl 0949+4409 and Cl 1446+2619 published by Gunn and Oke (1975), we calculate V and R magnitudes of the galaxies. These magnitudes were compared with photometry within the same area on the vidicon frames in order to calibrate the latter. We expect that our calibrations are accurate to ~ 0.07 mag in R and 0.04 mag in $V-R$. SKW and KSW have published BVR photometry of the brightest members of eight of the 15 clusters for which we have photographic photometry. Our blue plate/filter combinations define a band, which we shall call J , which is identical to the J band of Kron (1978) and the photographic J band of Couch and Newell (1980), but differs substantially from the J band of Oemler (1974) and Kirshner, Oemler, and Schechter (1978). Kron (1980) obtained a relation between his J band and the UBV system:

$$J = B - 0.23(B - V). \quad (2)$$

Although obtained for stars, it should also be reasonably accurate for galaxies because it represents a modest interpolation between B and V , and we have used it to calculate J magnitudes from the published BV photometry of bright cluster members.

Our red photometry is in three separate bands. For most of the clusters the band is defined by a combination of IIIa-F emulsion and RG 610 filter. This band, which we shall call F , is identical to the F band of Oemler (1974) and Kirshner, Oemler, and Schechter (1978) and is the same, to within a constant, to the r band of Thuan and Gunn (1976). The band defined by IIIa-F emulsion and a GG 495 filter, used for the plate of A222 and A223, is identical to the F band of Kron (1978); we shall call this band F_{57} . Finally, the band defined by a IV-N emulsion and a RG 695 filter, which was used for A370, we shall call N . Using the stellar spectrophotometry of Gunn and Stryker (1982) and the galaxy spectrophotometry of Gunn and Oke (1976), we have calculated the relations between our three red bands and the BVR system. Over the color range $0.80 < V-R < 1.5$, the following equations are reasonably accurate:

$$F_{57} = R + 0.56(V - R), \quad (3)$$

$$F = R + 0.28(V - R), \quad (4)$$

$$N = R - 0.25(V - R). \quad (5)$$

As with the vidicon photometry, we calibrate the photographic photometry by comparing the JF or JN magnitudes calculated from the photoelectric data with photometry within the same area of the galaxy on the photographic plates. Seven of the clusters have not been observed photoelectrically. To obtain approximate

calibrations for these, we have predicted the expected R magnitude of the brightest cluster member using a mean relation between R in a $12''2$ aperture and redshift obtained from the photometry of SKW and KSW, and we have predicted the $B-V$ and $V-R$ colors at the appropriate redshift using the relations given in SKW. One of the clusters without photoelectric photometry, A520, is at a low galactic latitude and probably suffers from considerable extinction and reddening. To make our magnitudes and colors for this cluster comparable with those for the others, which are not corrected for galactic absorption, we have included an absorption $A_F = 0.17$ and reddening $E(J-F) = 0.12$ in our calculation of the expected magnitude and color of the brightest cluster member. We estimate that the accuracy of these approximate calibrations should be ~ 0.25 mag in the magnitudes and 0.1 mag in the colors. Magnitudes and colors in clusters for which we have made such approximate calibrations are denoted by small letters: f and $j-f$.

The photometry is presented in Tables 2 through 16, and color-magnitude plots of the data are displayed in Figure 1. Columns (1)–(5) of the tables contain an index number for the galaxy, ranking them from brightest to faintest in red magnitude, the X, Y coordinates of the galaxy, in pixels, and the galaxy's red magnitude and color. Objects thought to be stars are printed in italics. Galaxies are listed in order of increasing Y coordinates. Finding charts for the fields are presented in Figures 2–31 (Plates 3–32). The vidicon frames presented are in the R band. As noted in the figure captions, some of the photographic plates are in the J and some in the F band, the choice depending on the relative quality of the computer generated reproductions of each field which were produced automatically and, hence, not always well. The orientation of the fields varies, as noted, but east is always counterclockwise from north.

The completeness limits of the photometry are not uniformly well defined, since they depend on color and seeing differences between plates, as well as on the structure of the individual images. We have estimated the limits by comparing the counts of objects versus magnitude in the fields with Kron's (1980) counts of stars and galaxies. The photometry listed in the tables extends ~ 0.5 mag fainter than the point at which we estimate that the incompleteness reaches 50%.

III. ERROR ESTIMATES

Unfortunately, we do not have independent photometry of known quality of any of our fields with which to estimate the errors in our photometry. However, the videocamera is a linear detector, and even photographic plates can approximate a linear detector for faint images whose surface brightness is less than that of the sky. For such devices, if we assume that the errors are due to a

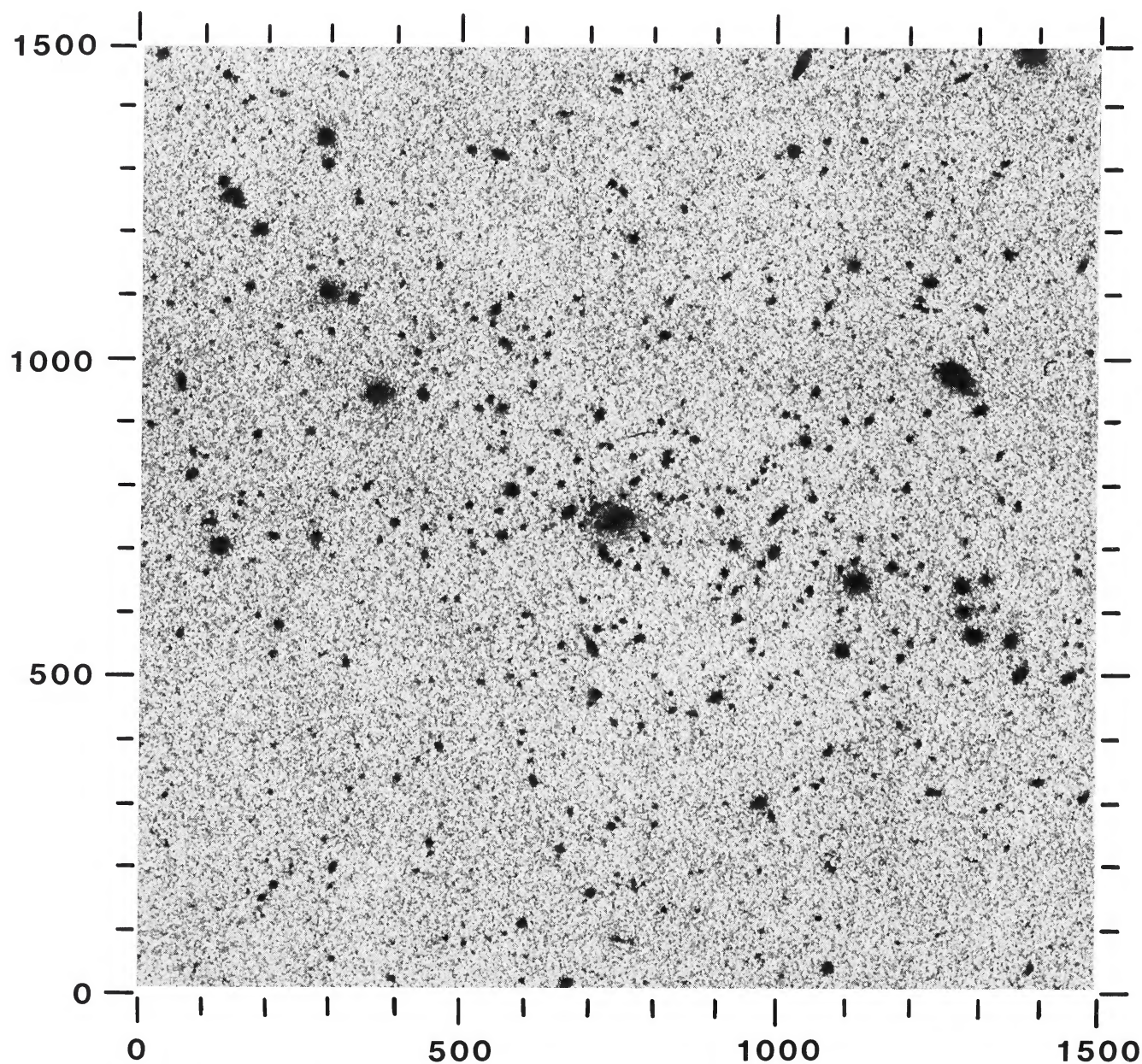


FIG. 2.—Abell 222 cluster center, from a blue plate. North is at the top. As in all the plates, east is counterclockwise from north. BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 4

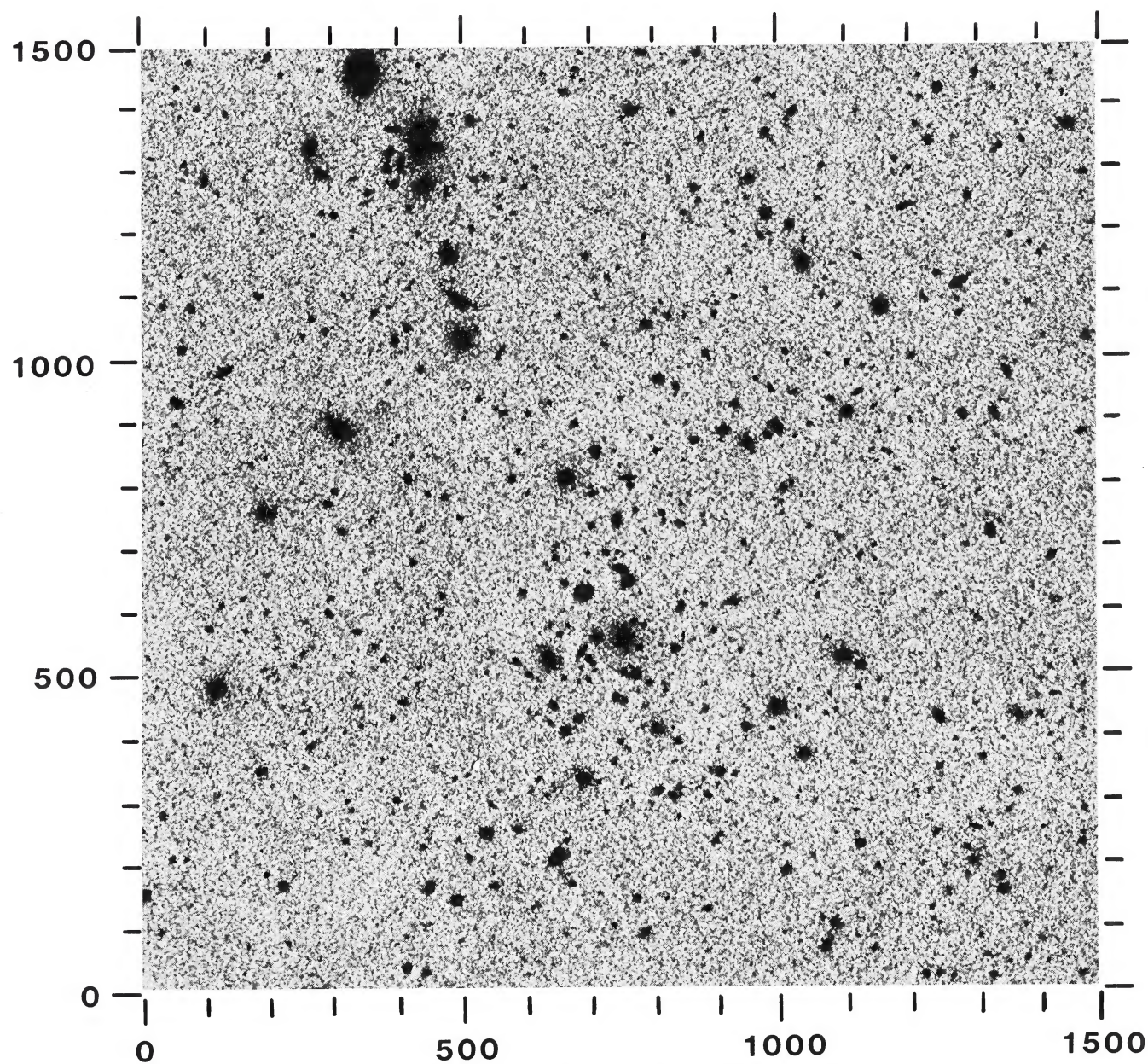


FIG. 3.—Abell 223 cluster center, from a blue plate. North is at the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

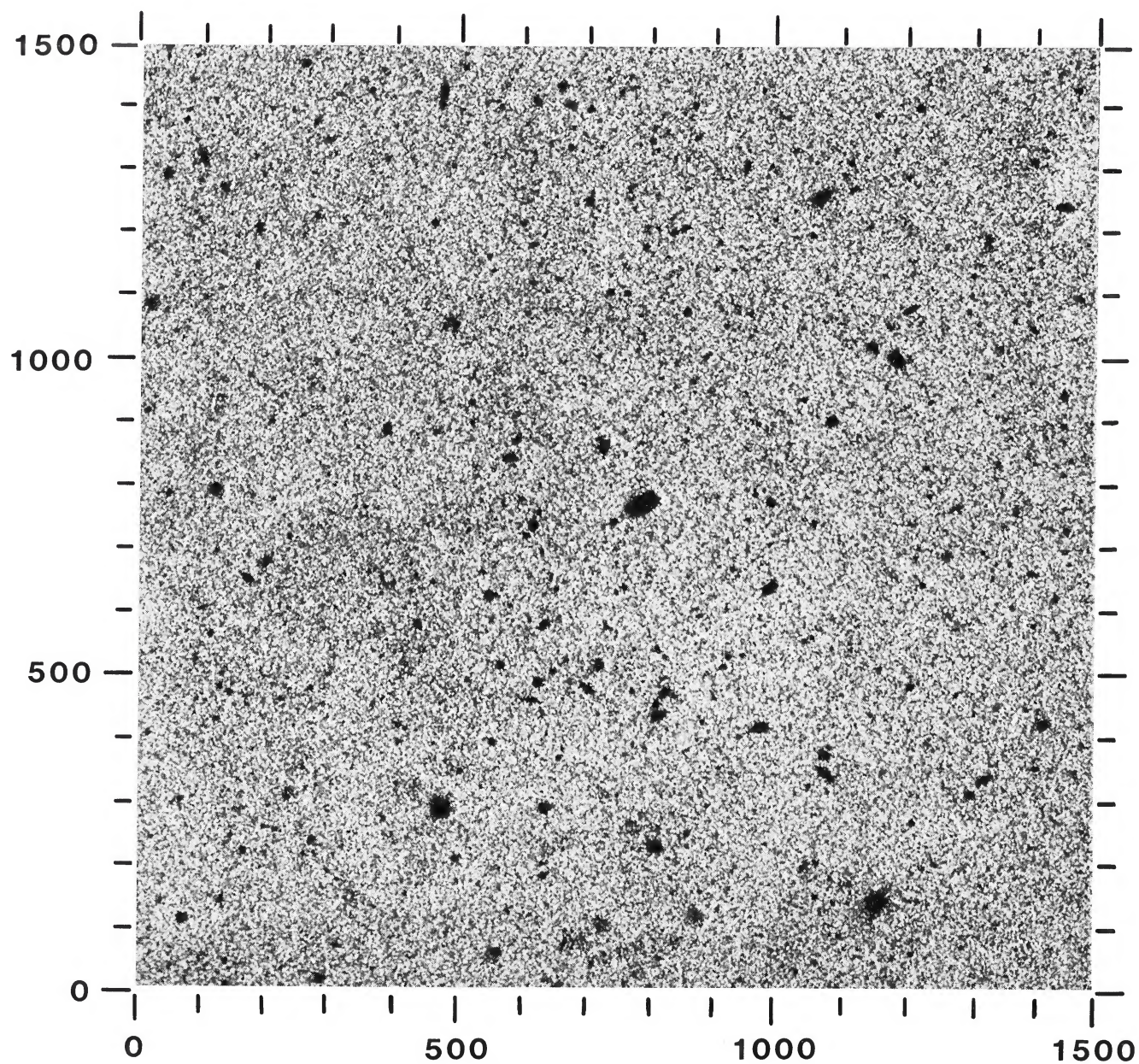


FIG. 4.—Abell 222/223 blank field, from a blue plate. North is at the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 6

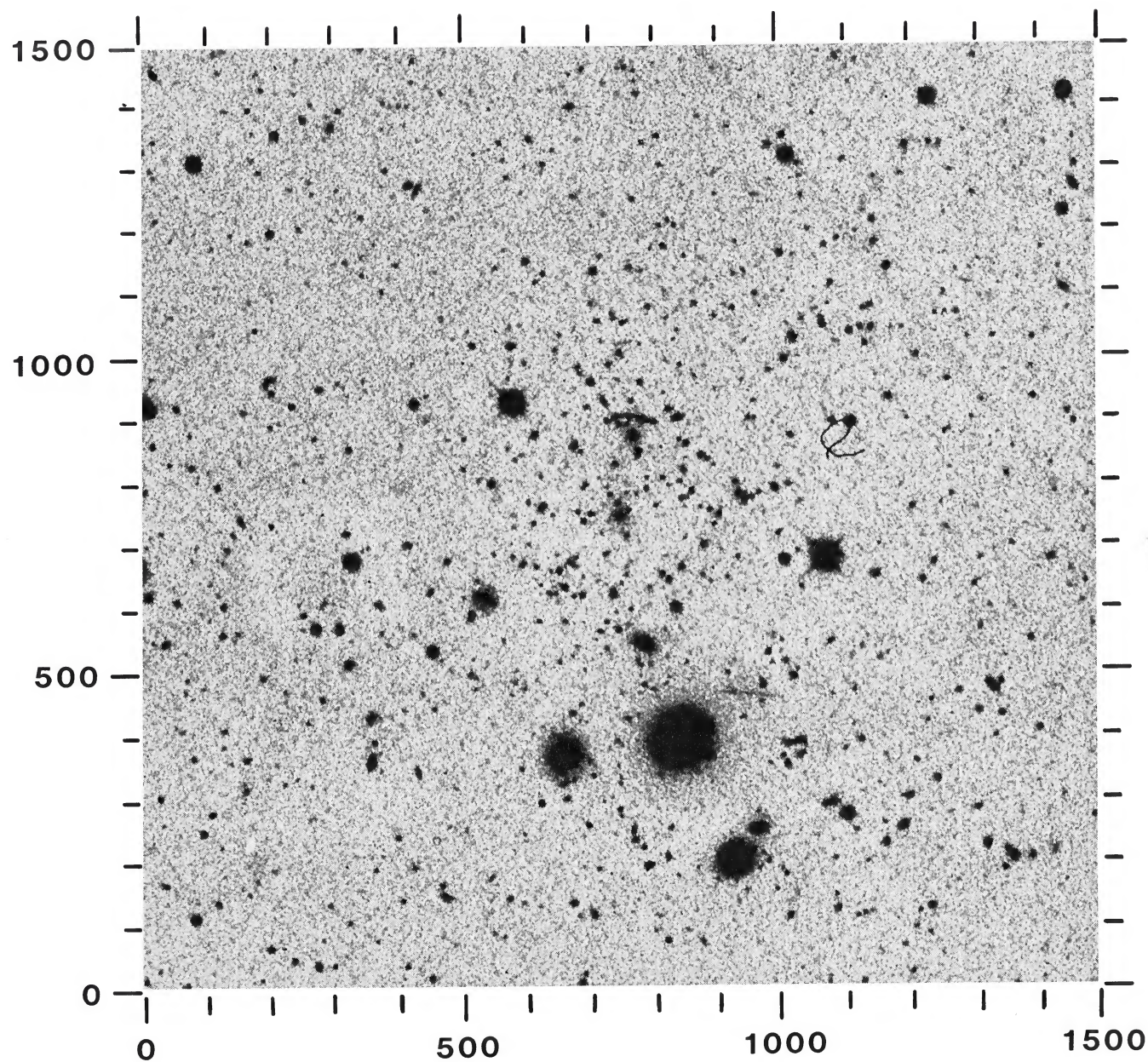


FIG. 5.—Abell 370 cluster center, from a blue plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

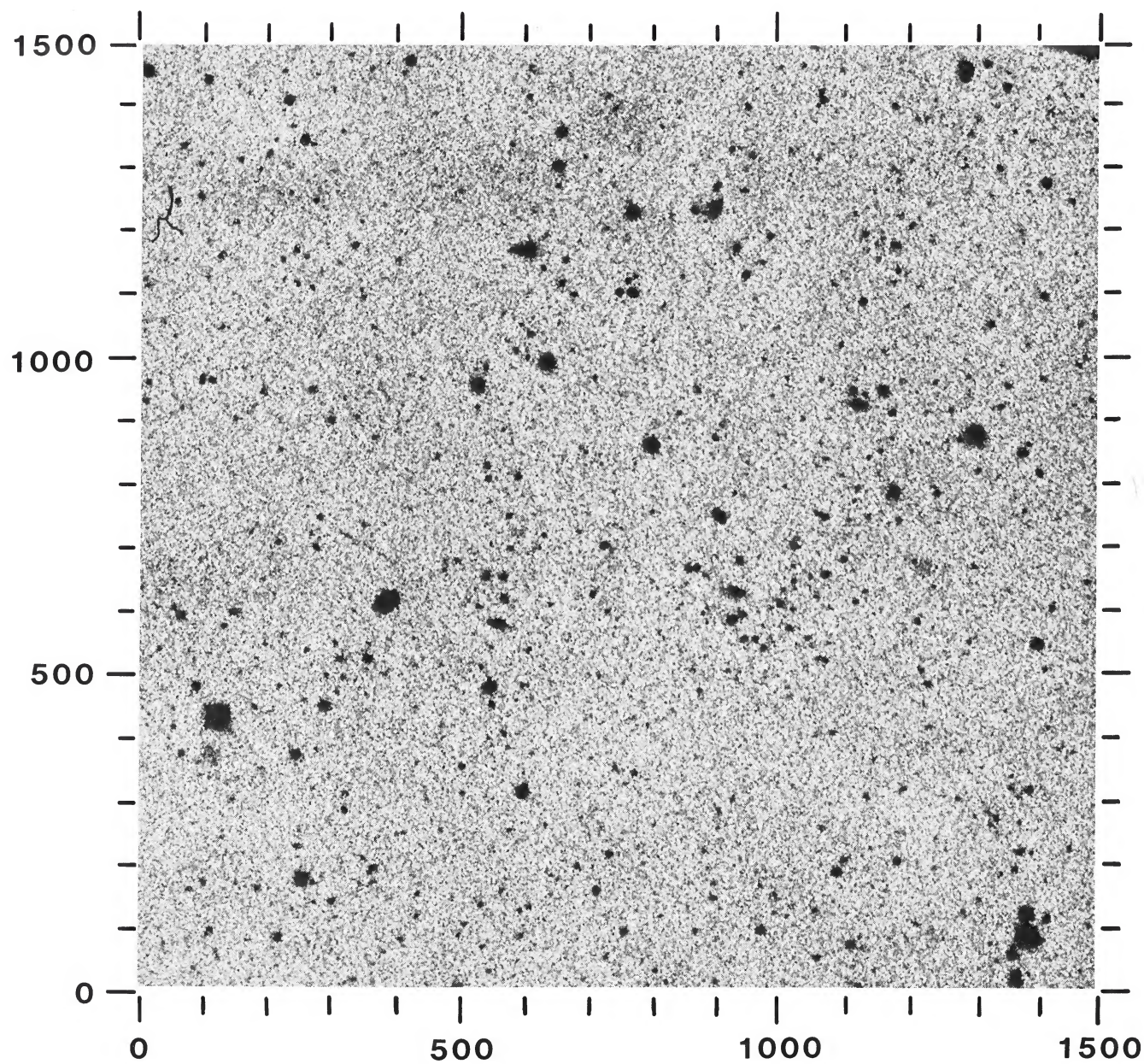


FIG. 6.—Abell 370 blank field, from a blue plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 8

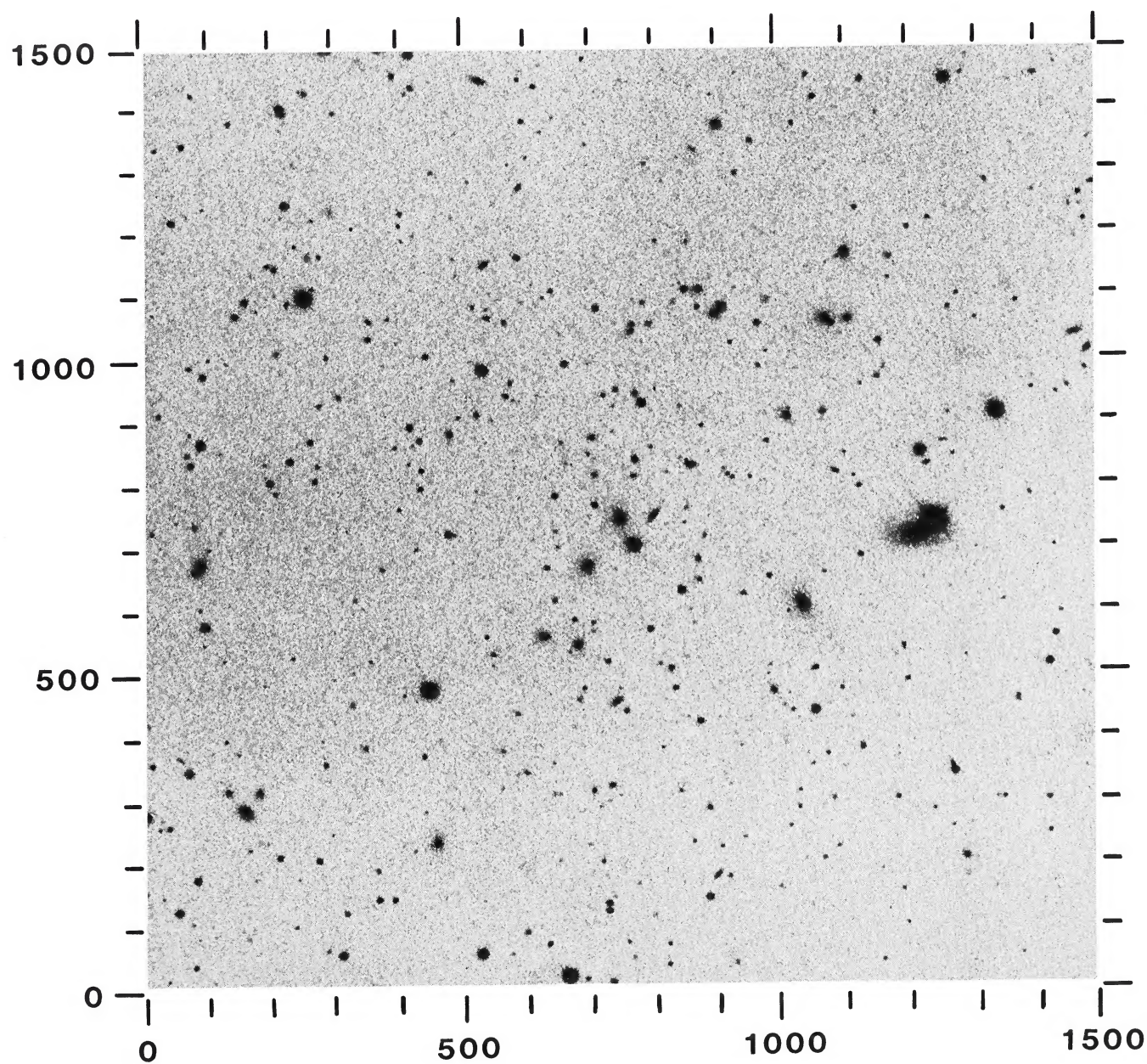


FIG. 7.—Abell 520 cluster center, from a red plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

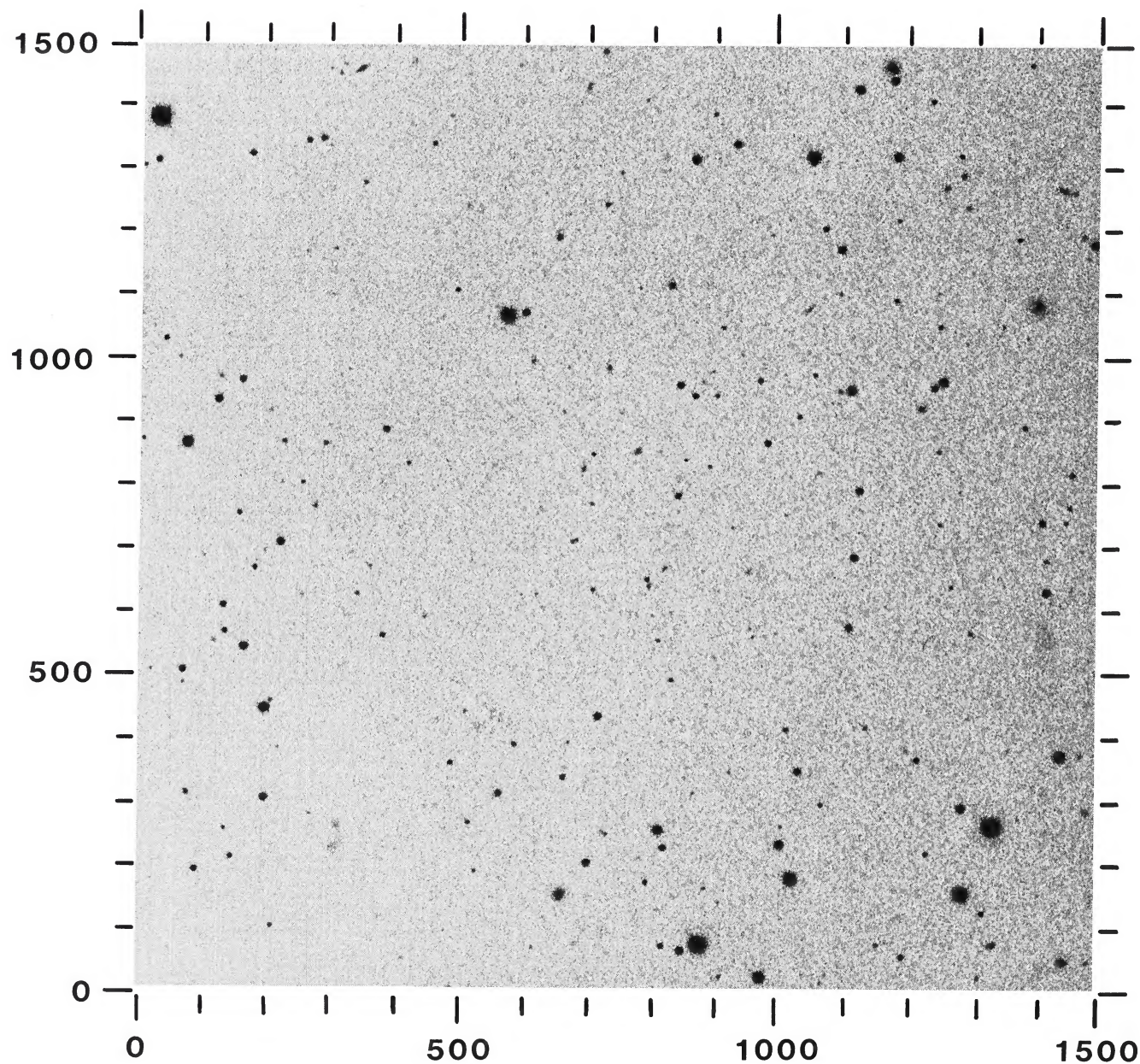


FIG. 8.—Abell 520 blank field, from a red plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

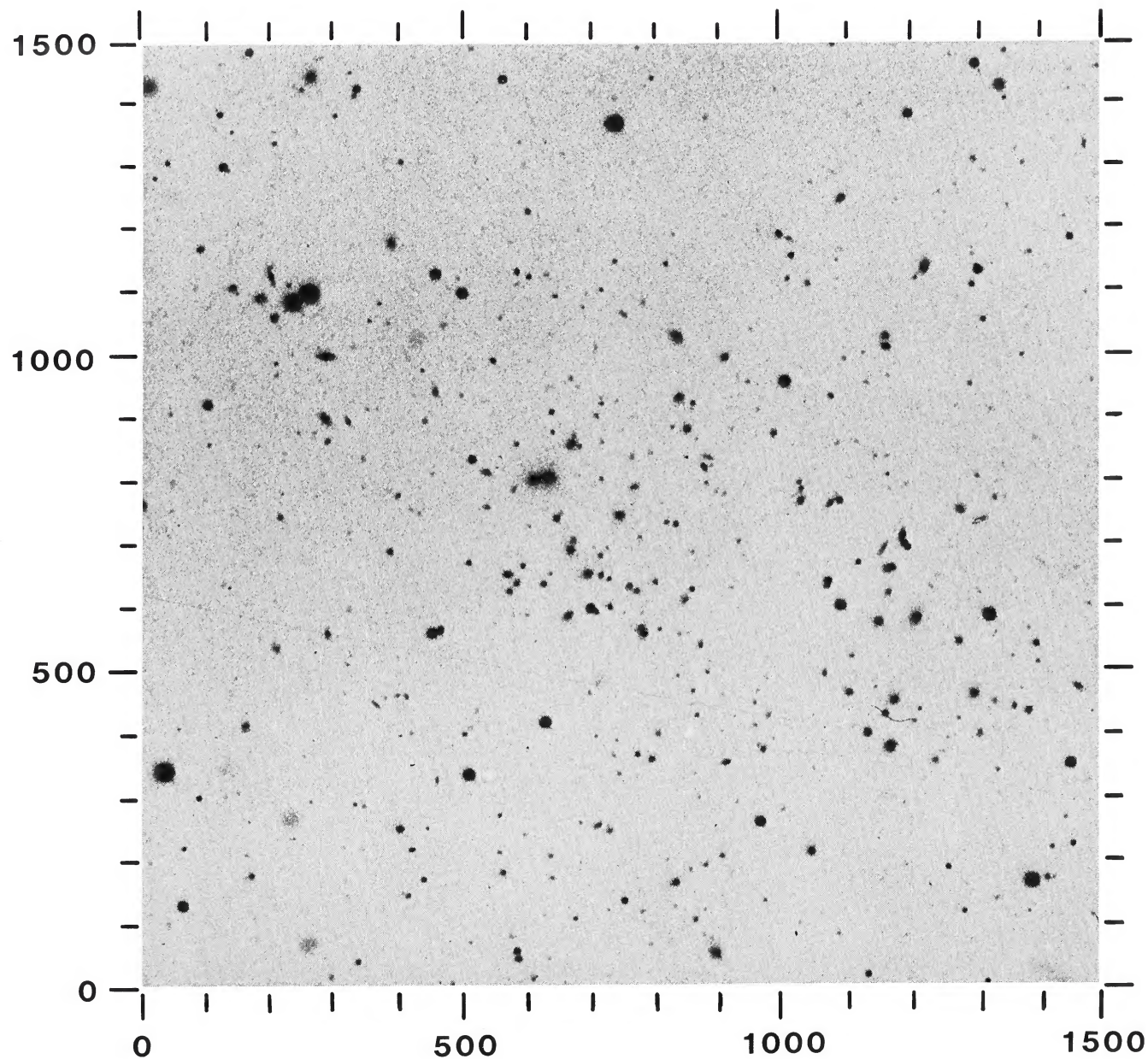


FIG. 9.—Abell 777 cluster center, from a red plate. North is at the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

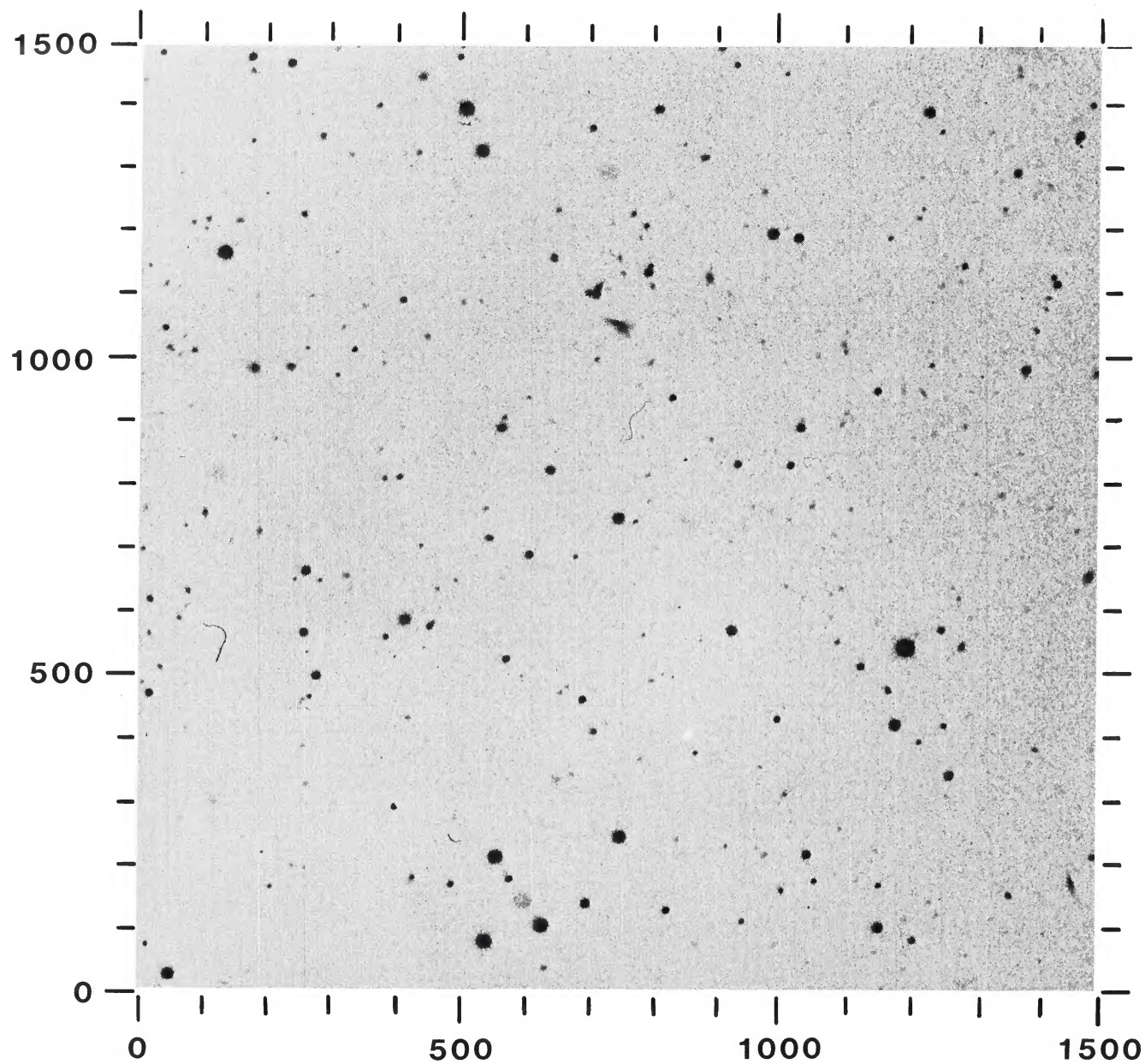


FIG. 10.—Abell 777 blank field, from a red plate. North is at the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 12

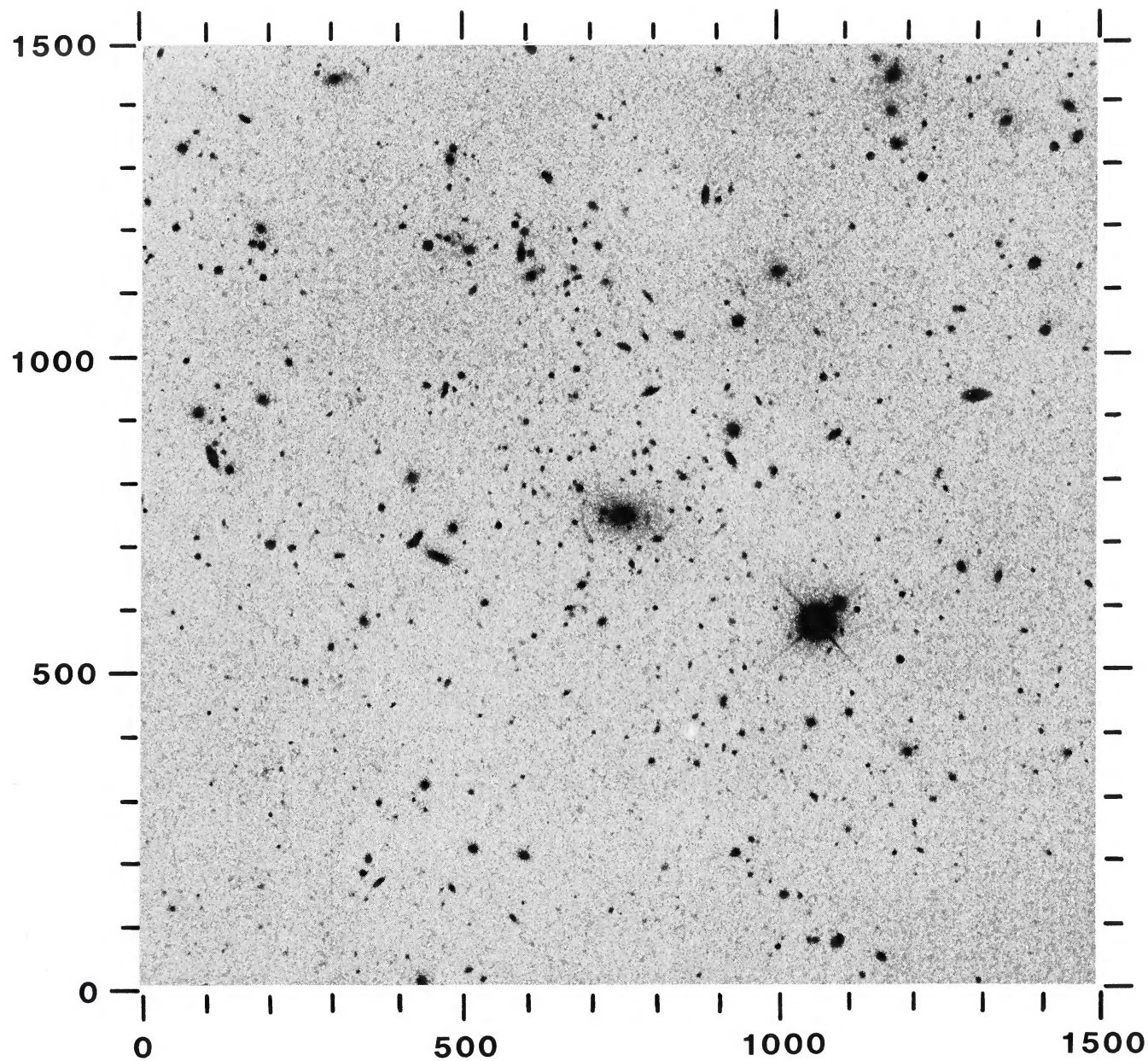


FIG. 11.—Abell 963 cluster center, from a blue plate. North is at the right.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

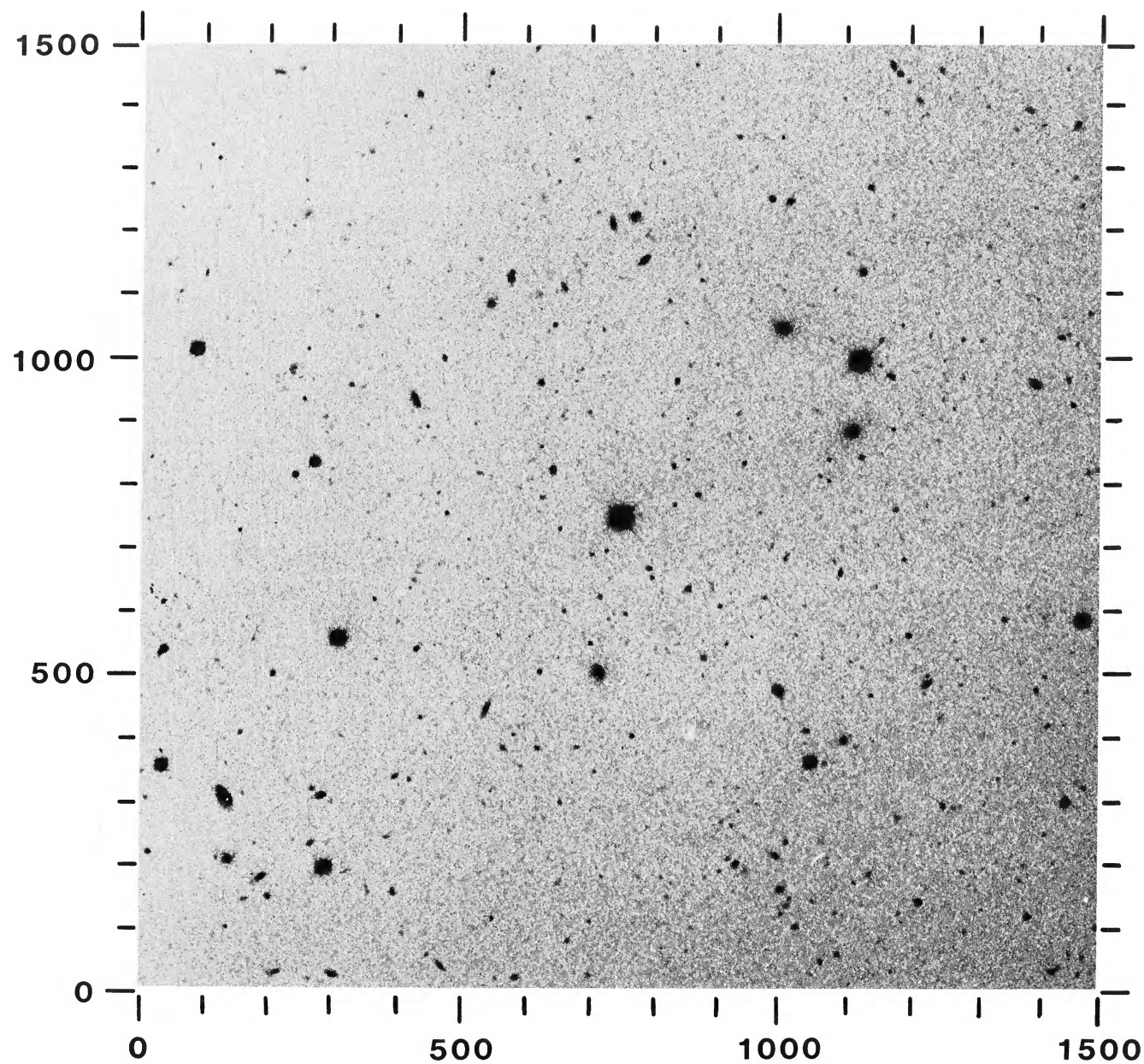


FIG. 12.—Abell 963 blank field, from a blue plate. North is at the right.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 14

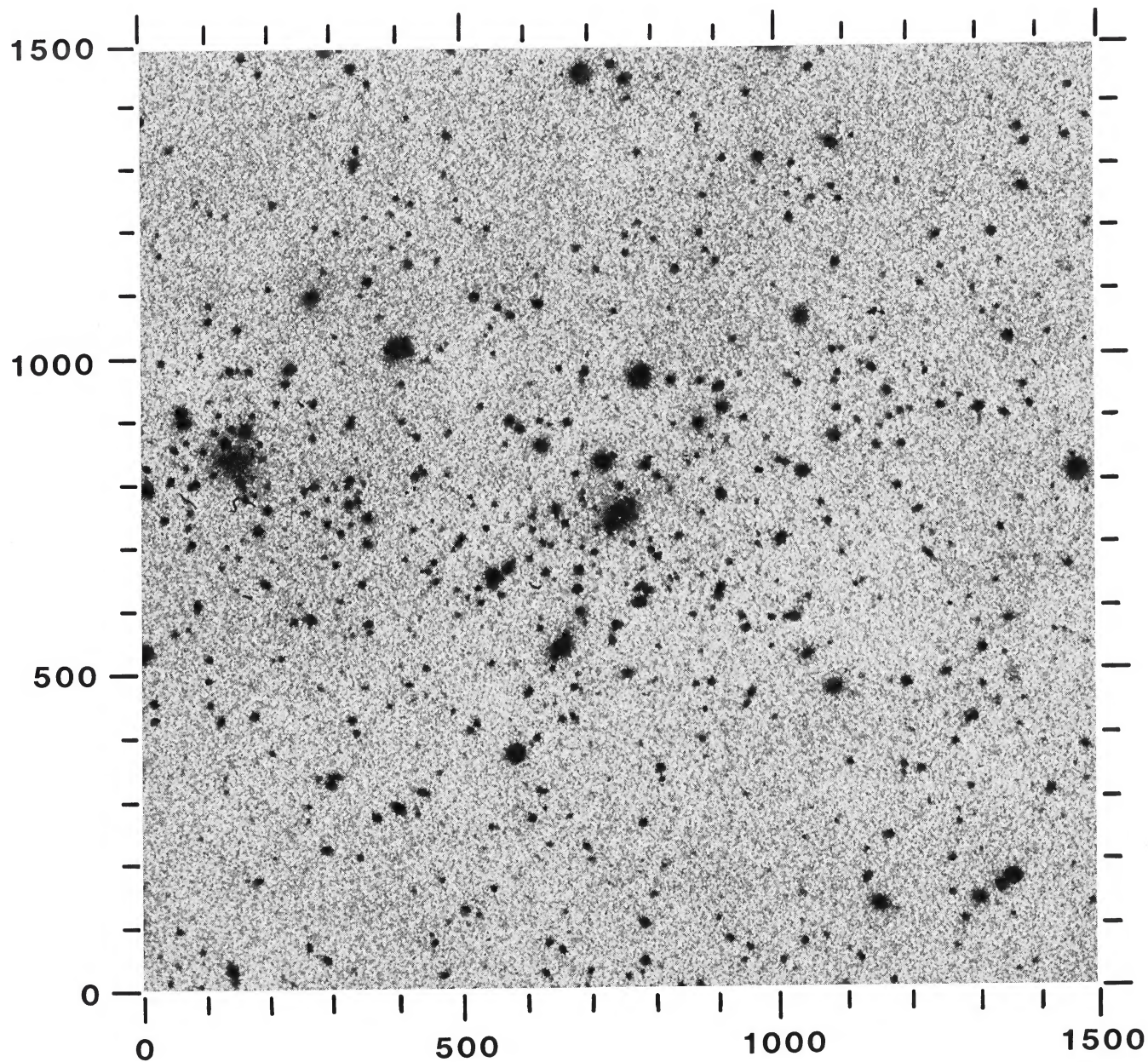


FIG. 13.—Abell 1758 cluster center, from a red plate. North is at the top right corner.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

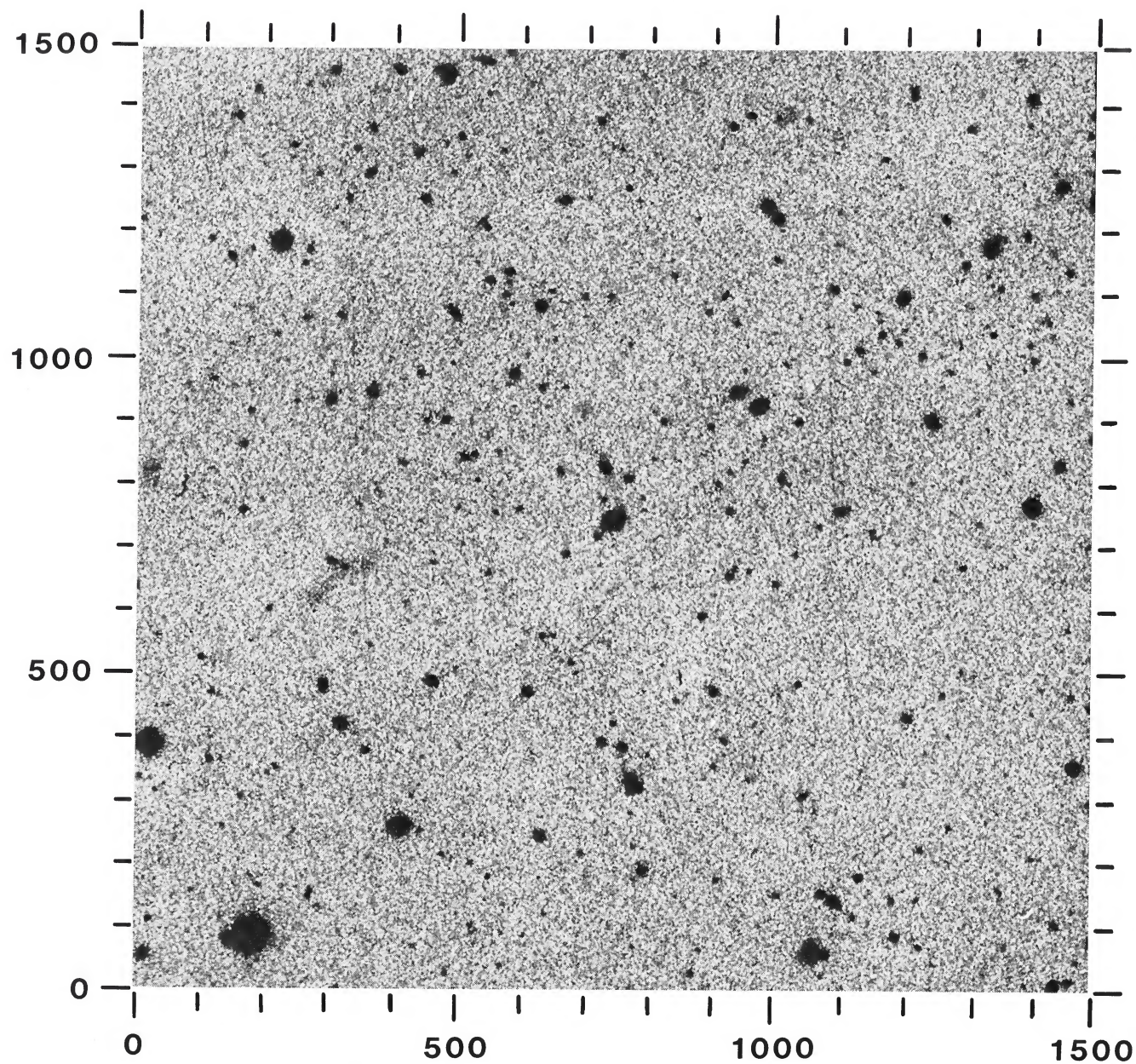


FIG. 14.—Abell 1758 blank field, from a red plate. North is at the top right corner.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 16

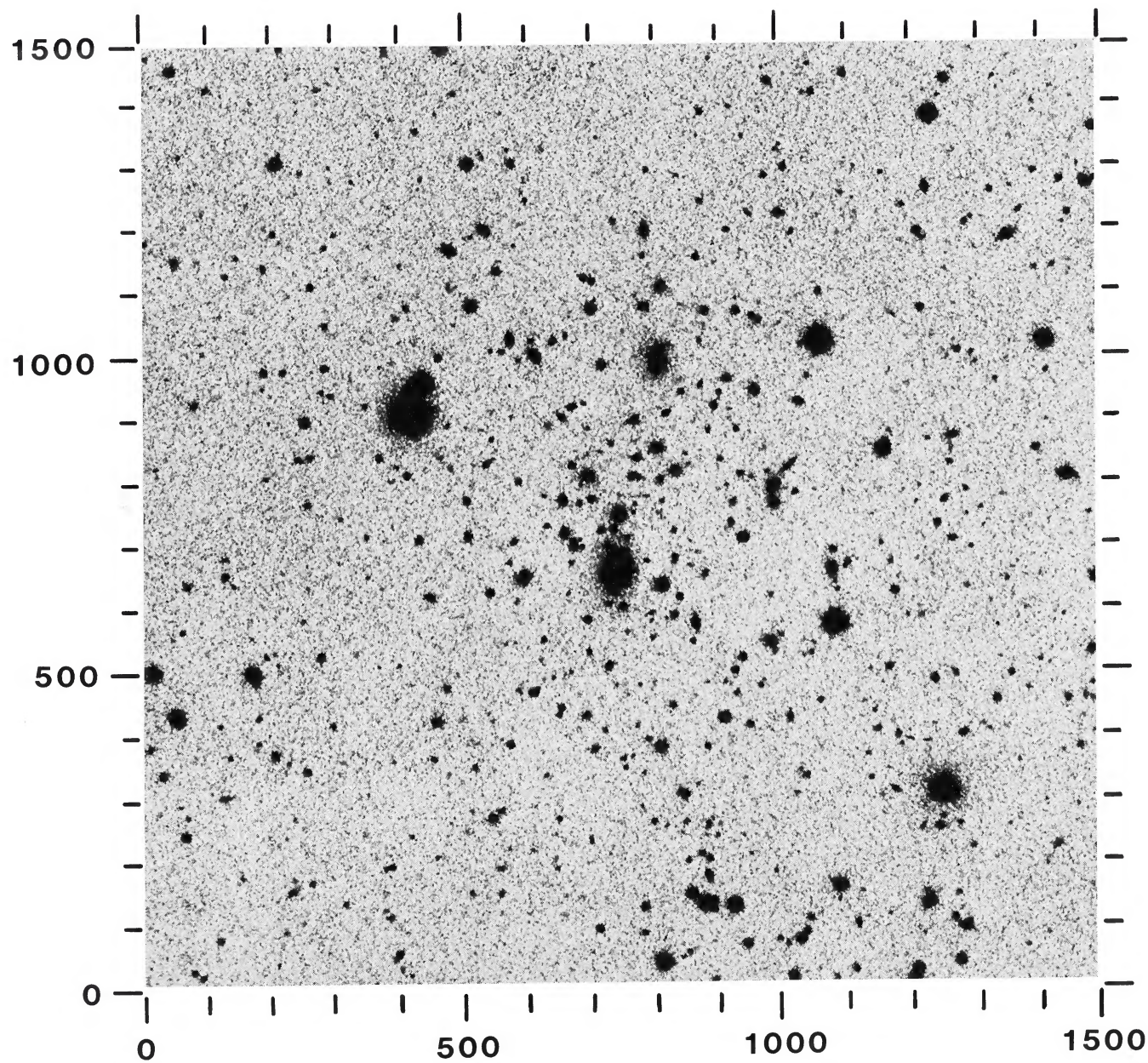


FIG. 15.—Abell 1942 cluster center, from a red plate. North is at the bottom right corner.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

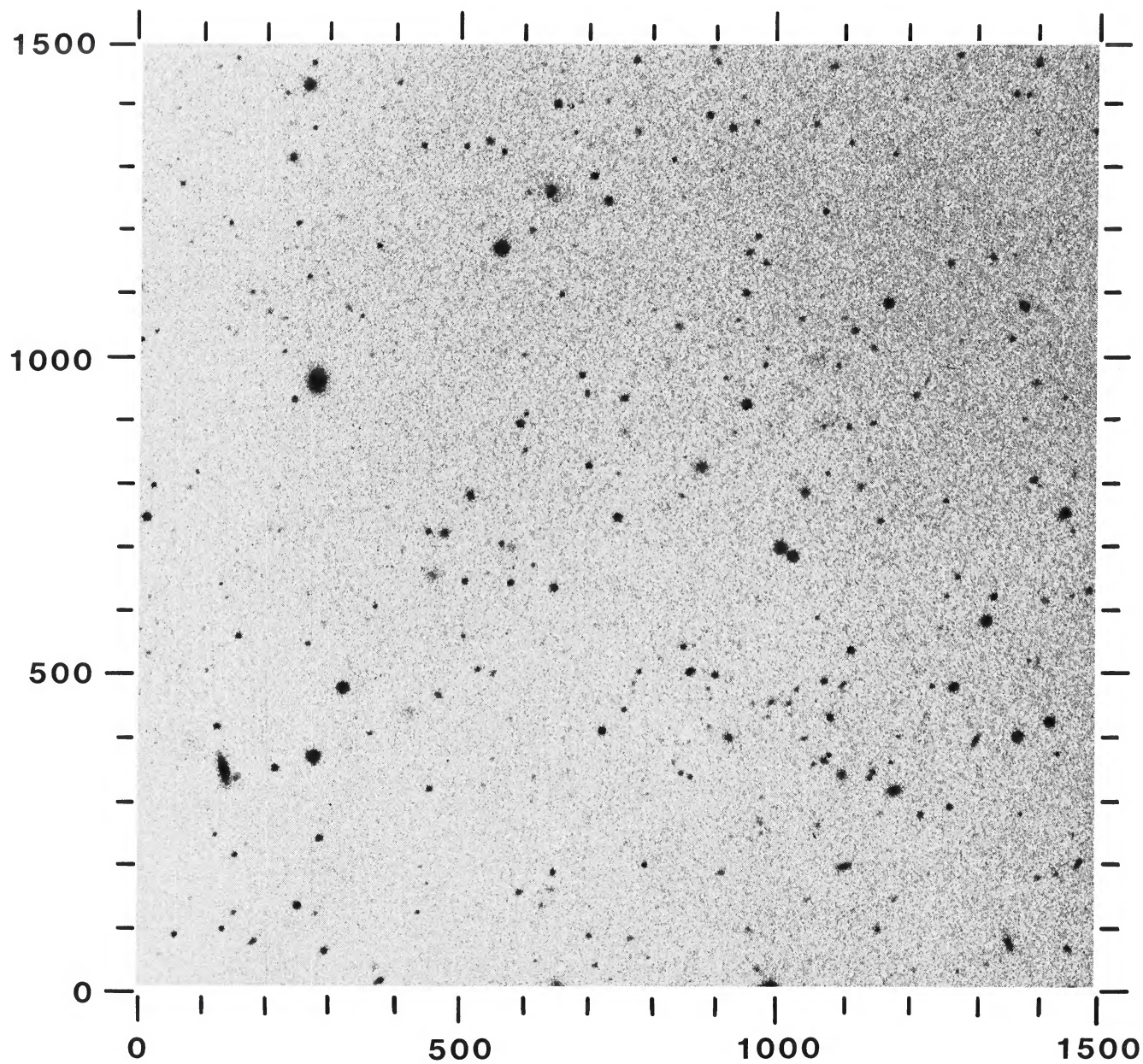


FIG. 16.—Abell 1942 blank field, from a red plate. North is at the bottom right corner.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 18

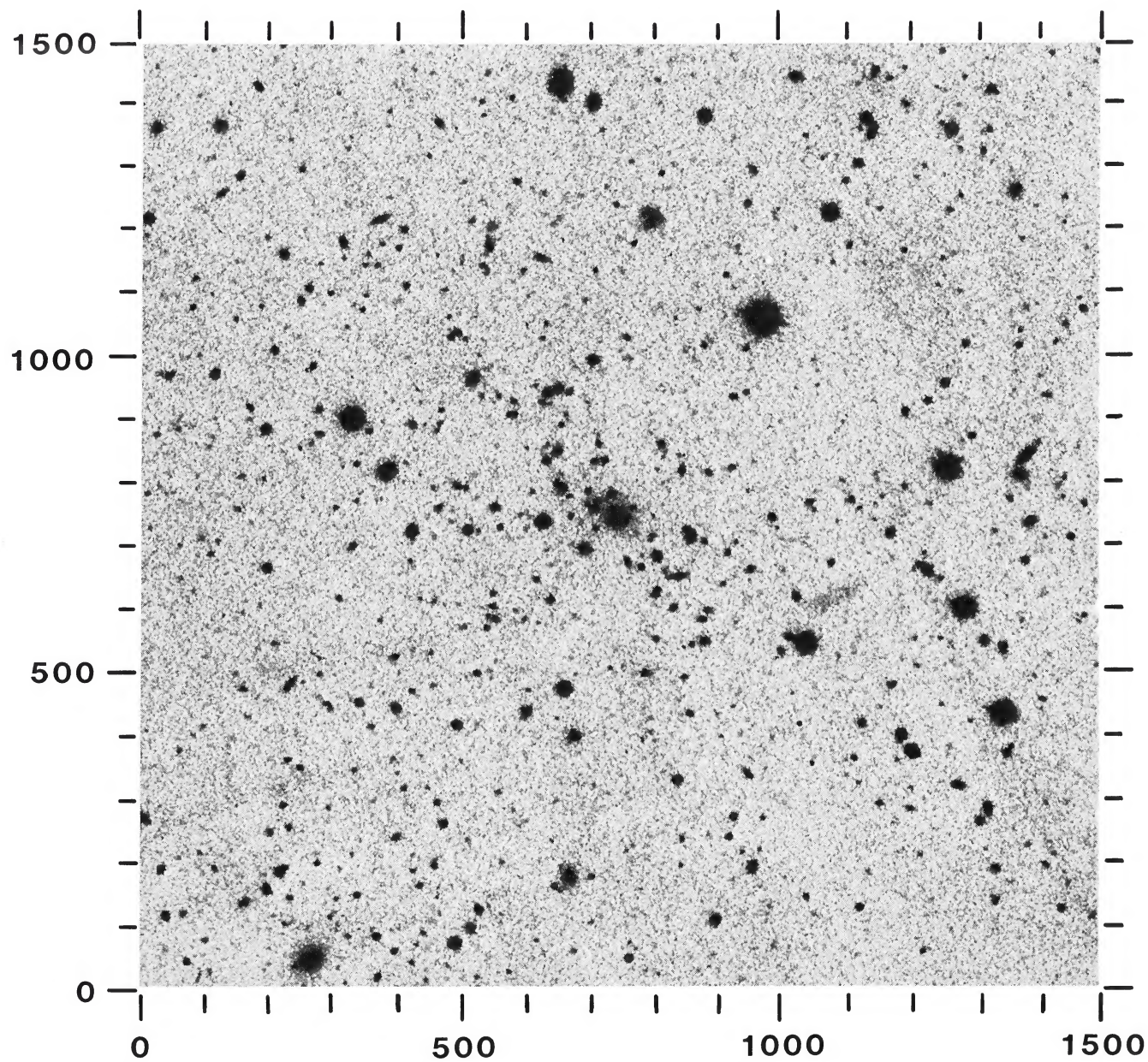


FIG. 17.—Abell 1961 cluster center, from a blue plate. North is $\sim 30^\circ$ to the right of the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

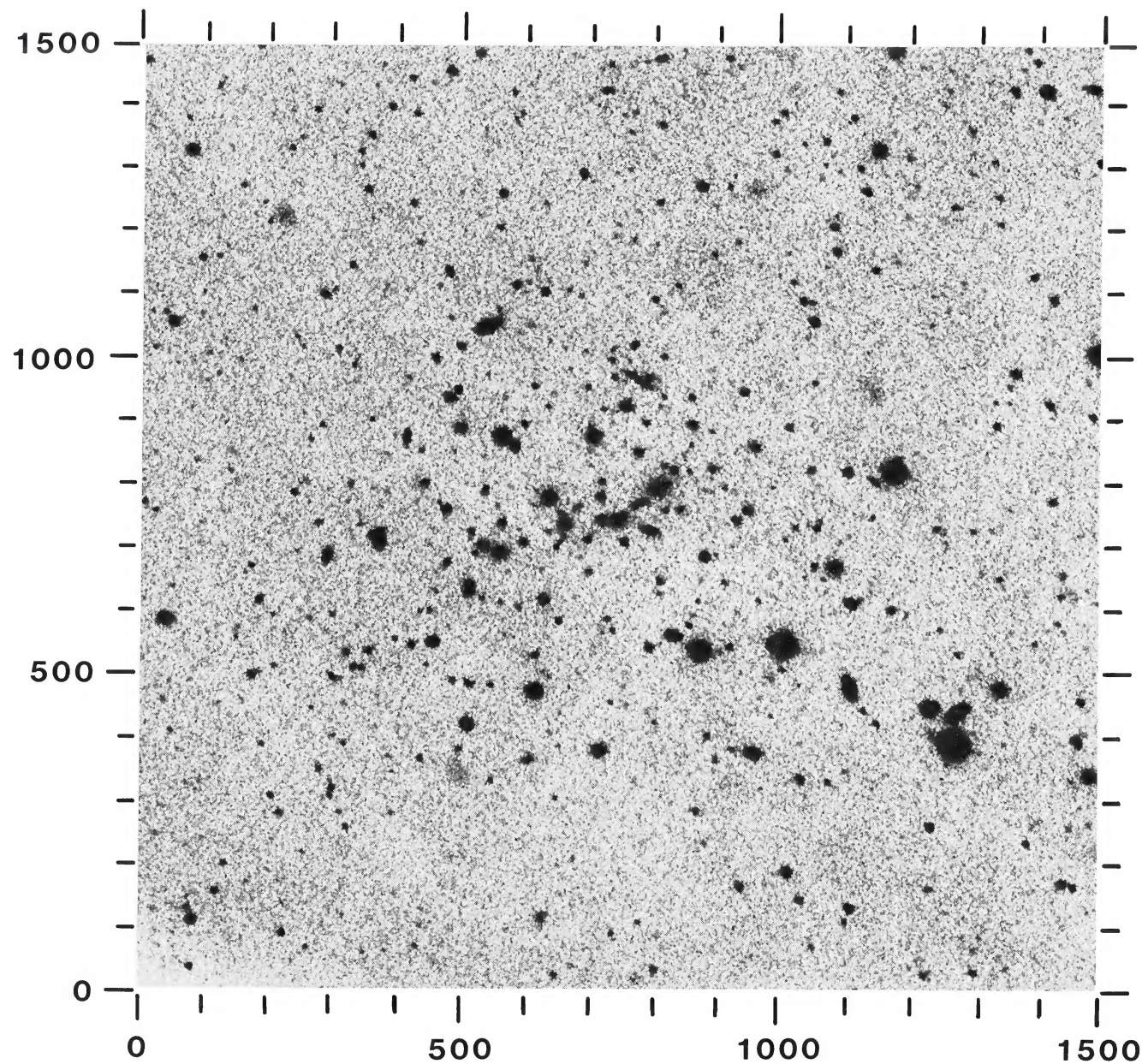


FIG. 18.—Abell 1963 cluster center, from a blue plate. North is $\sim 30^\circ$ to the right of the bottom.
BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 20

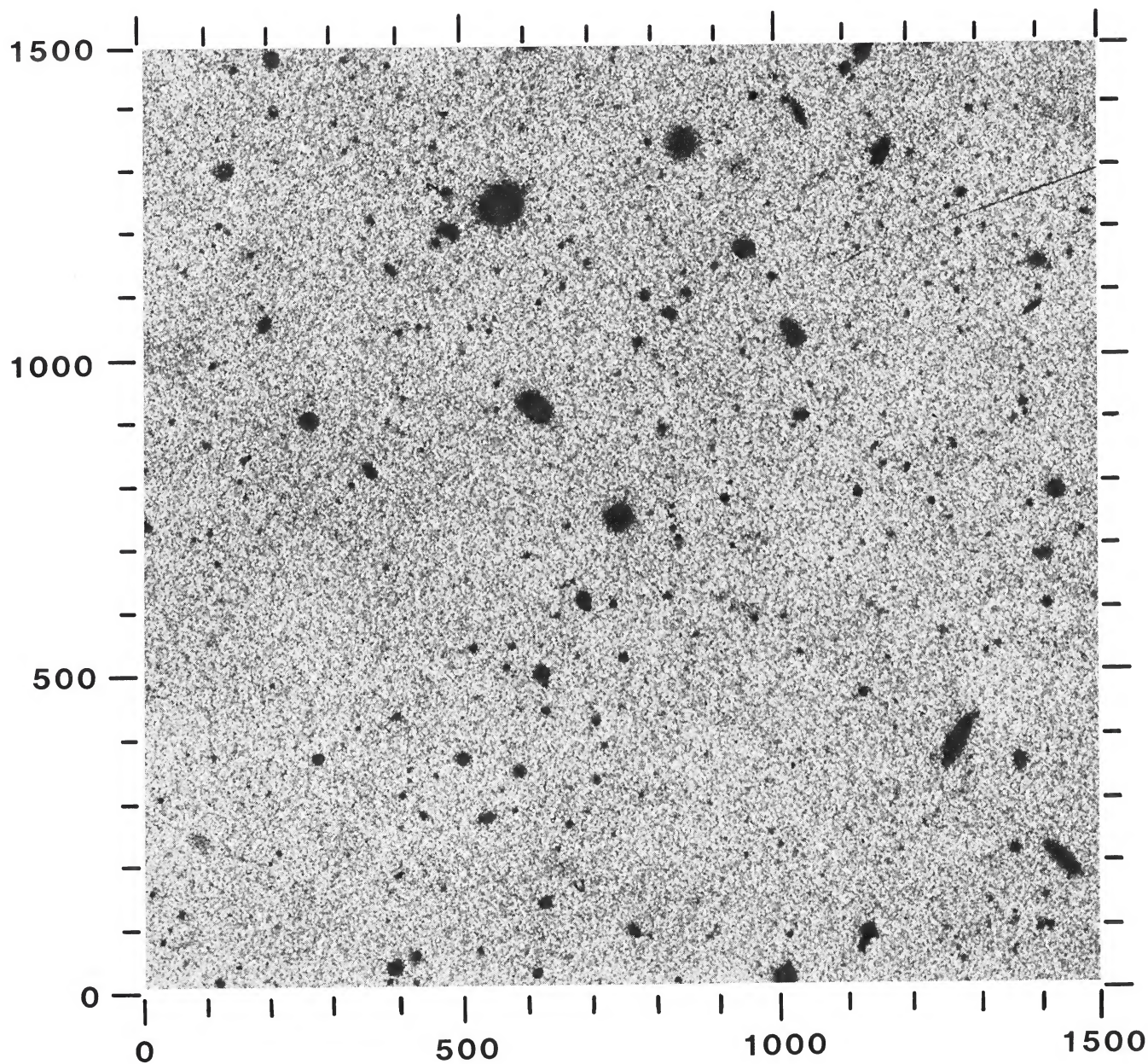


FIG. 19.—Abell 1961/1963 blank field, from a blue plate. North is $\sim 30^\circ$ to the right of the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

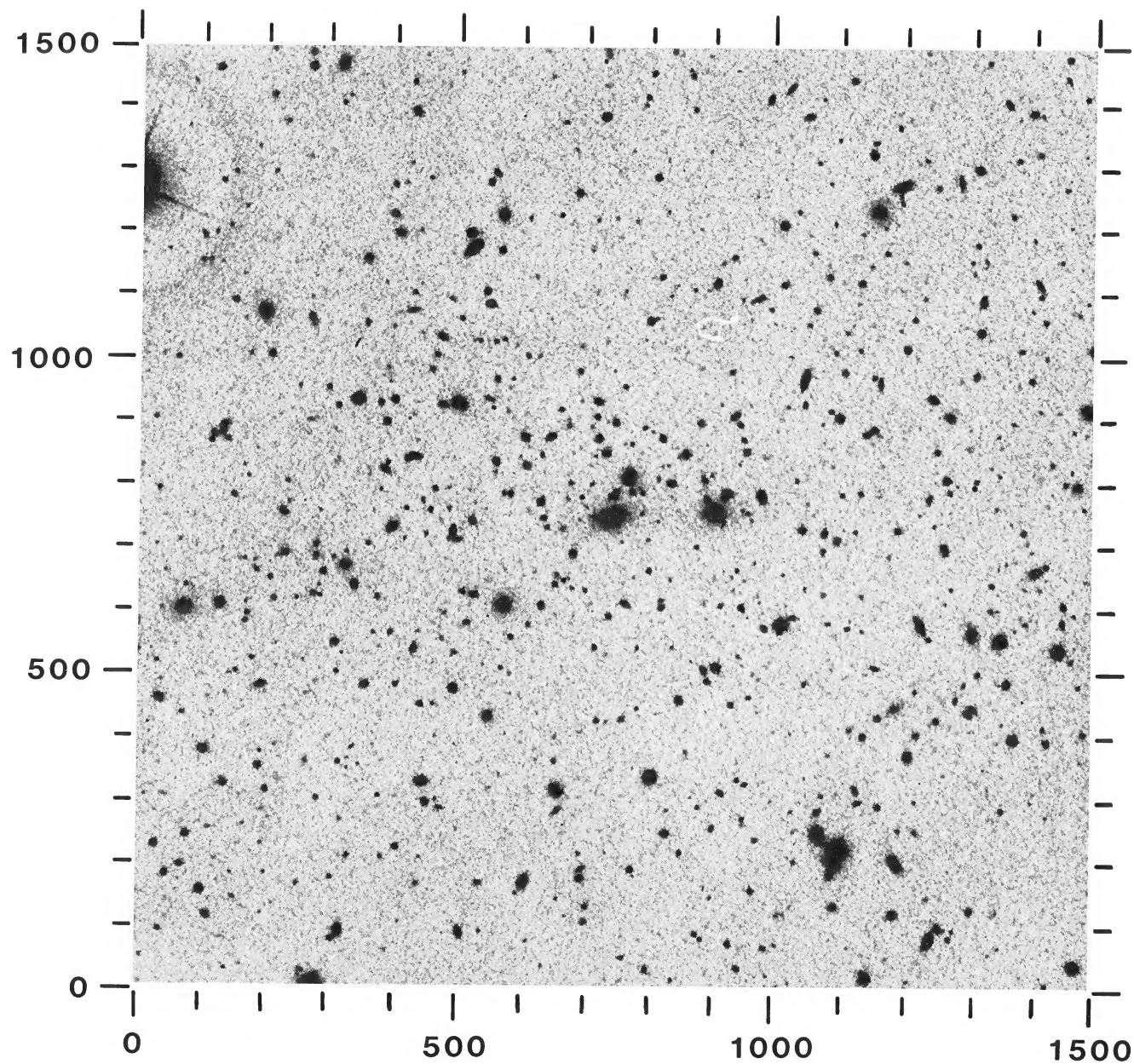


FIG. 20.—Abell 2111 cluster center, from a red plate. North is $\sim 60^\circ$ to the left of the bottom.
BUTCHER, OEMLER, AND WELLS (*see* page 187)

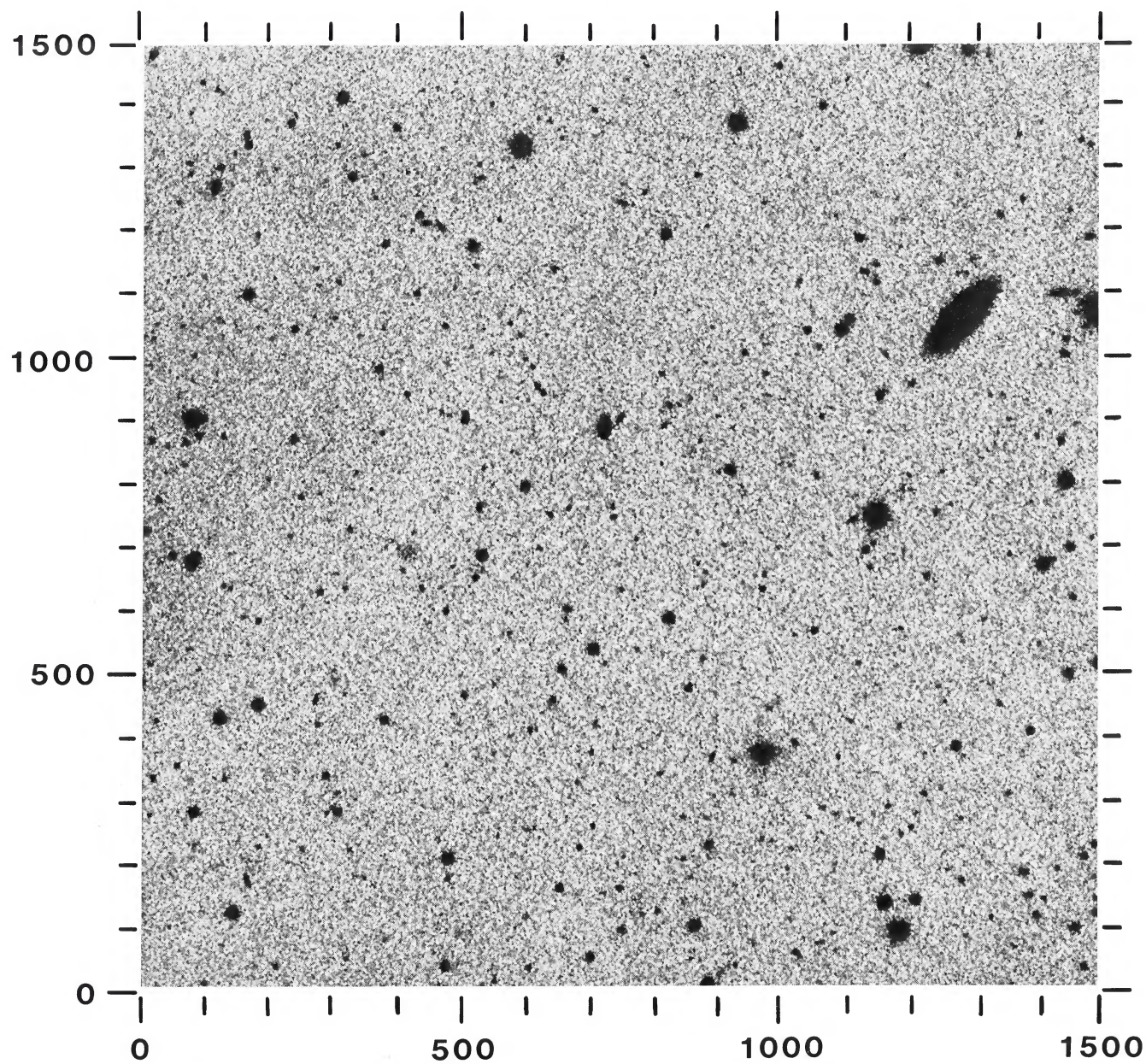


FIG. 21.—Abell 2111 blank field, from a red plate. North is $\sim 60^\circ$ to the left of the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

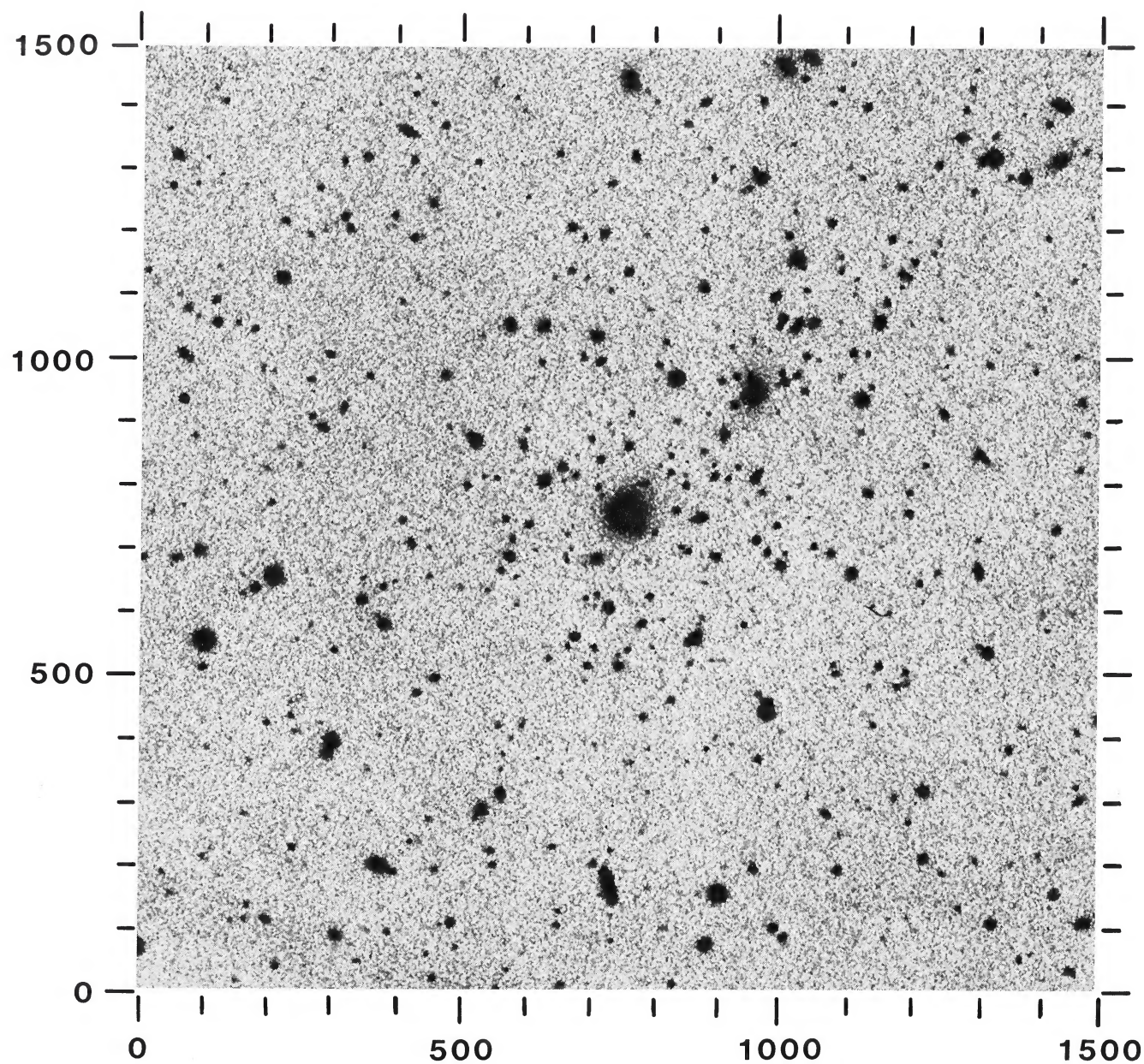


FIG. 22.—Abell 2125 cluster center, from a red plate. North is $\sim 30^\circ$ to the left of the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

PLATE 24

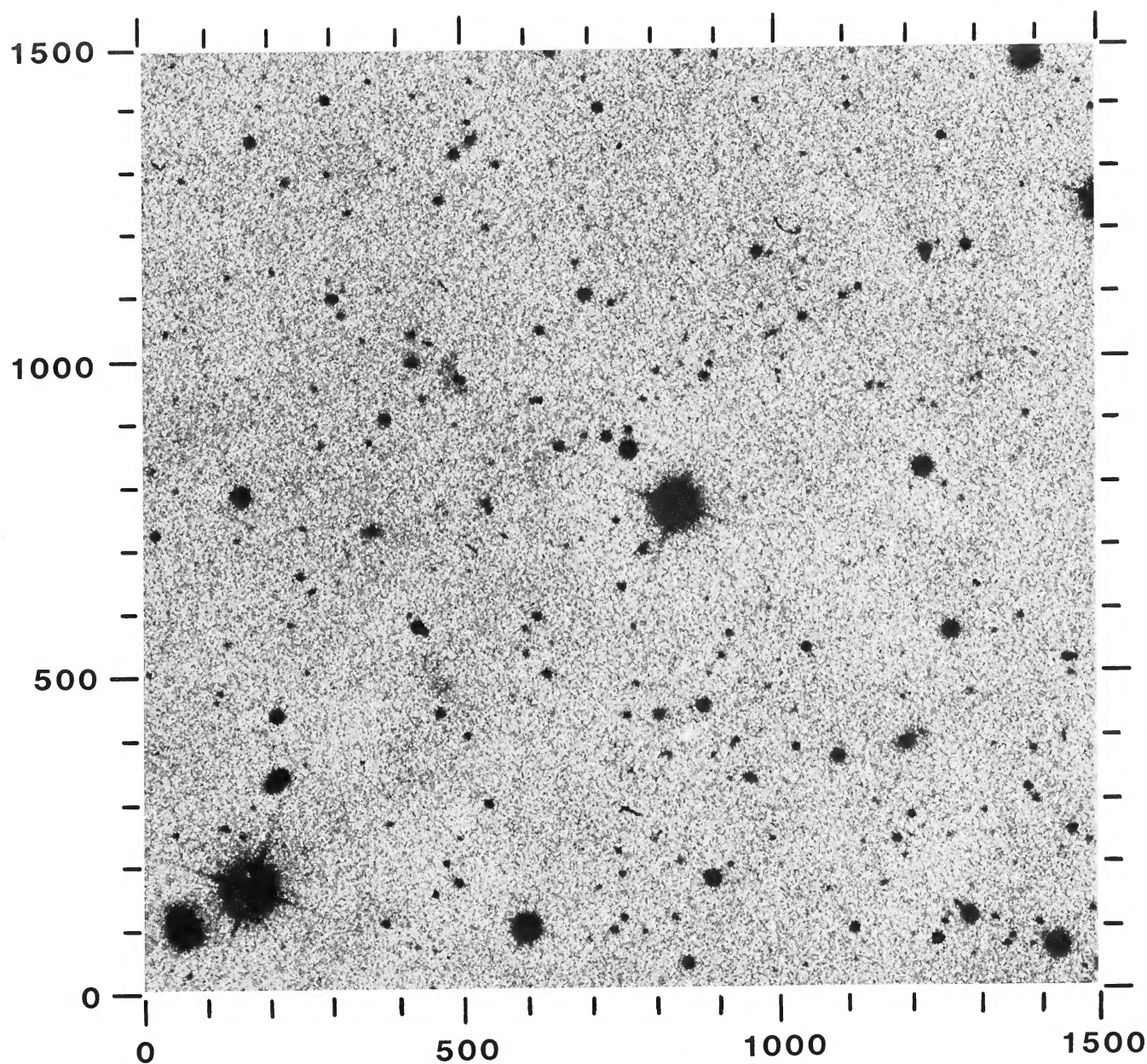


FIG. 23.—Abell 2125 blank field, from a red plate. North is $\sim 30^\circ$ to the left of the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

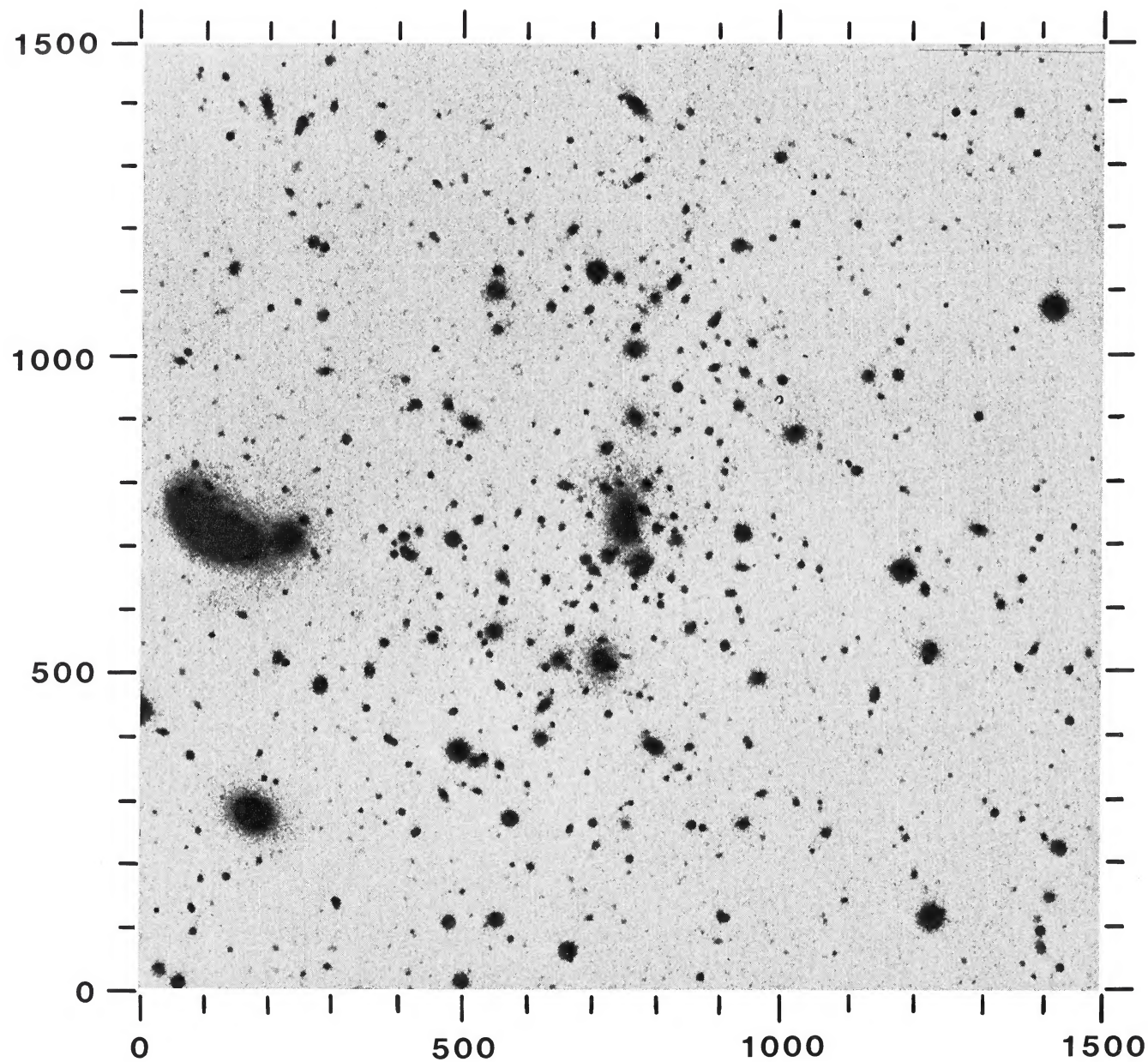


FIG. 24.—Abell 2218 cluster center, from a red plate. North is $\sim 30^\circ$ to the left of the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

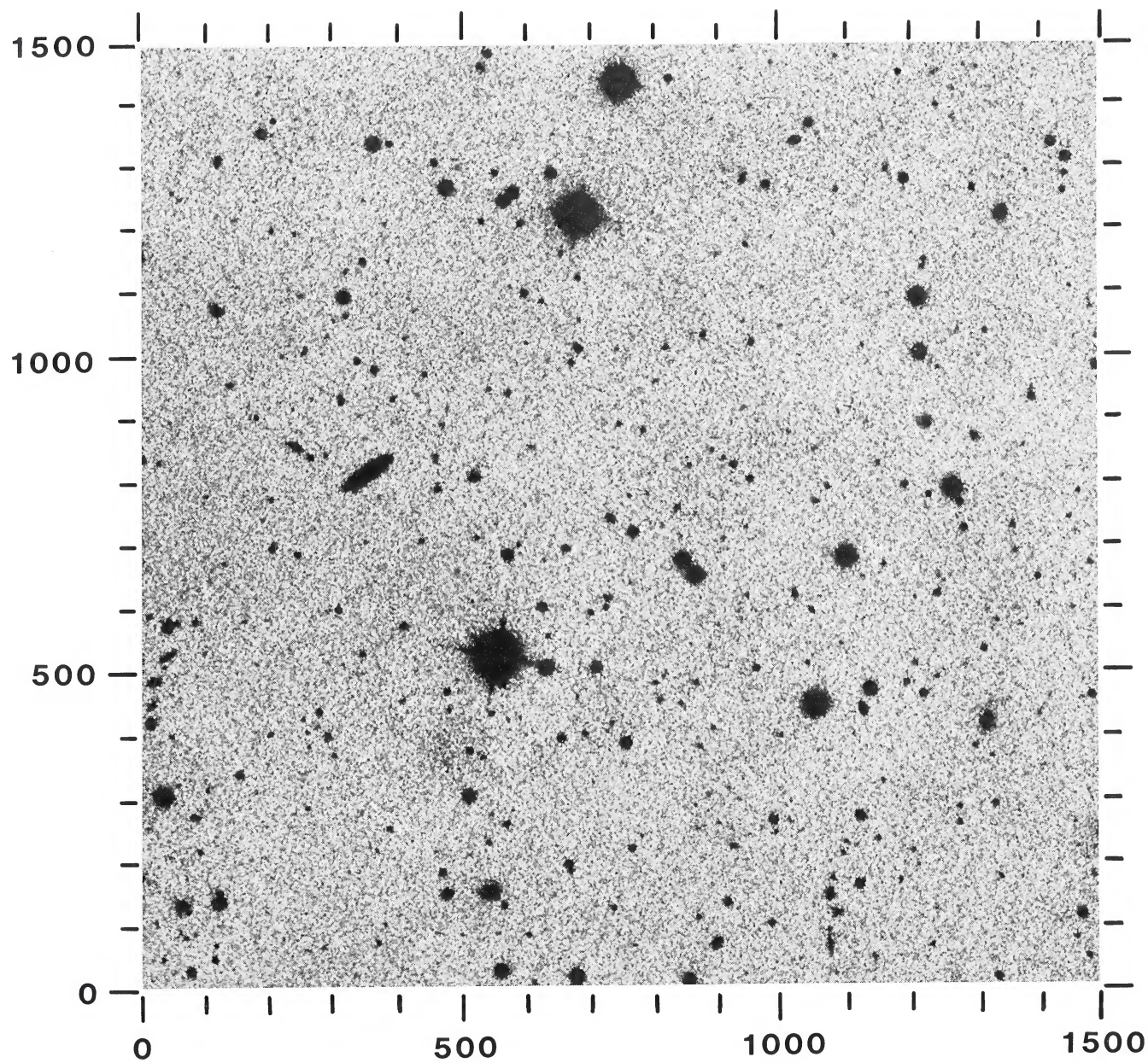


FIG. 25.—Abell 2218 blank field, from a red plate. North is $\sim 30^\circ$ to the left of the top.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

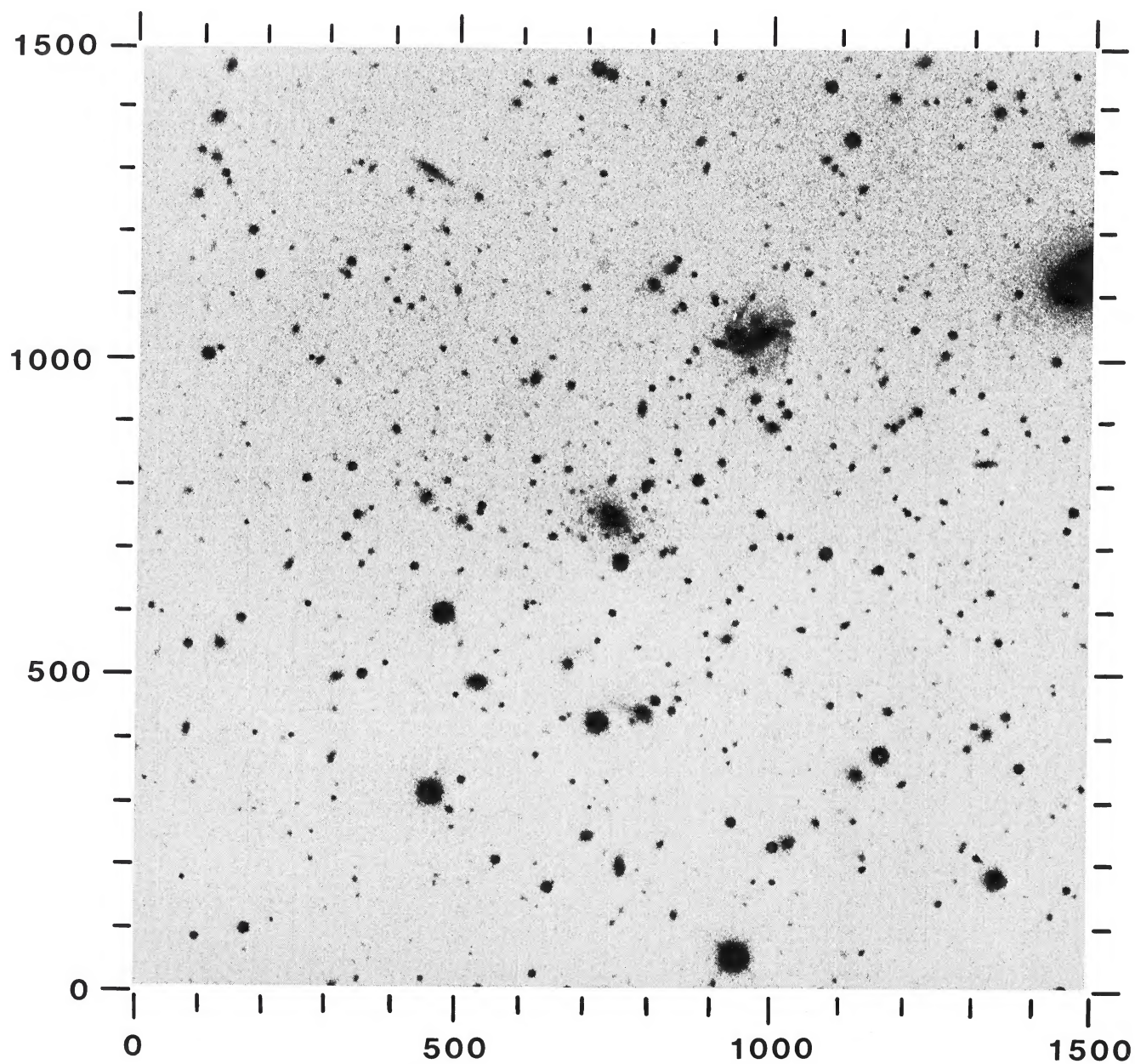


FIG. 26.—Abell 2397 cluster center, from a blue plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

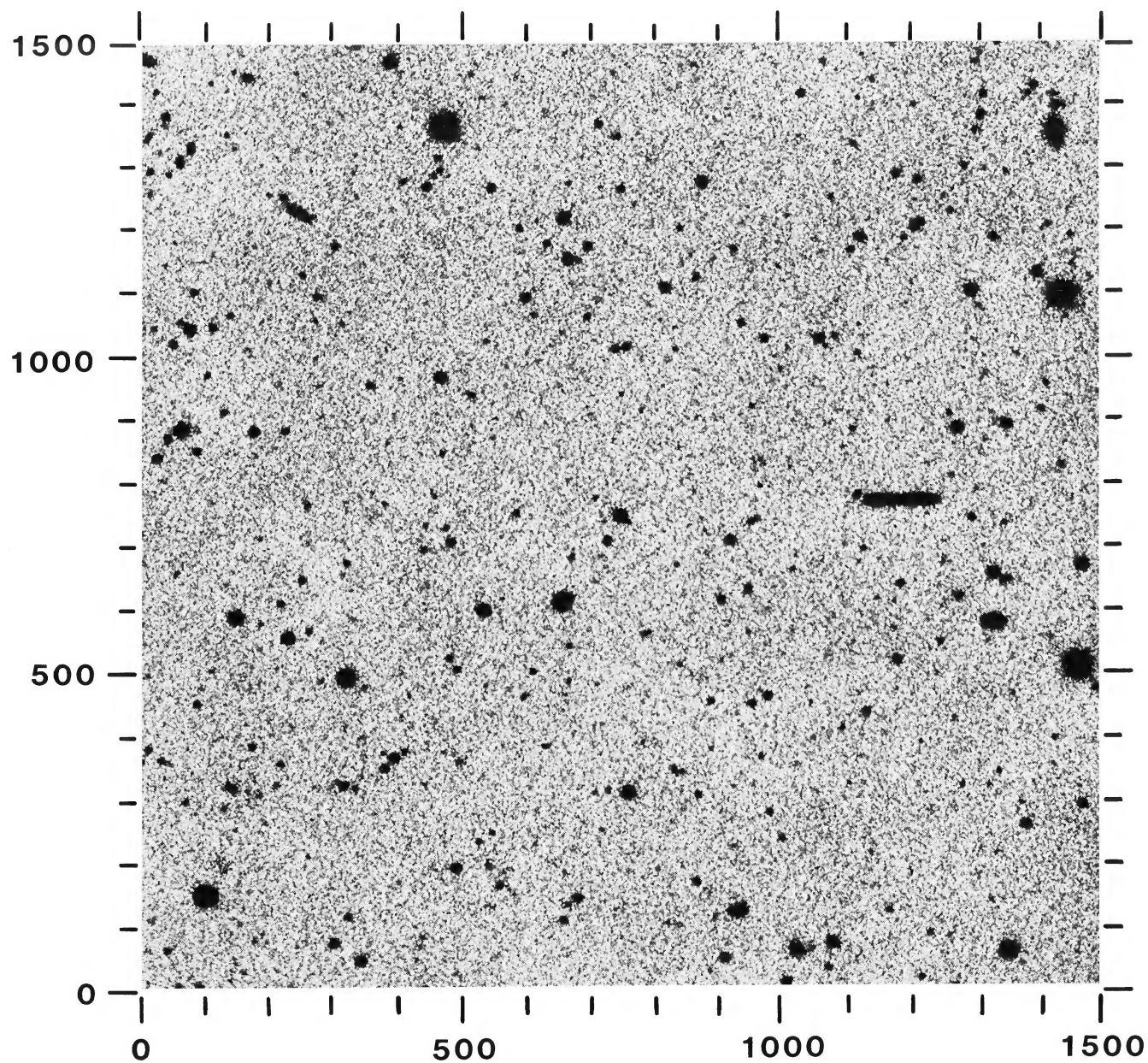


FIG. 27.—Abell 2397 blank field, from a blue plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

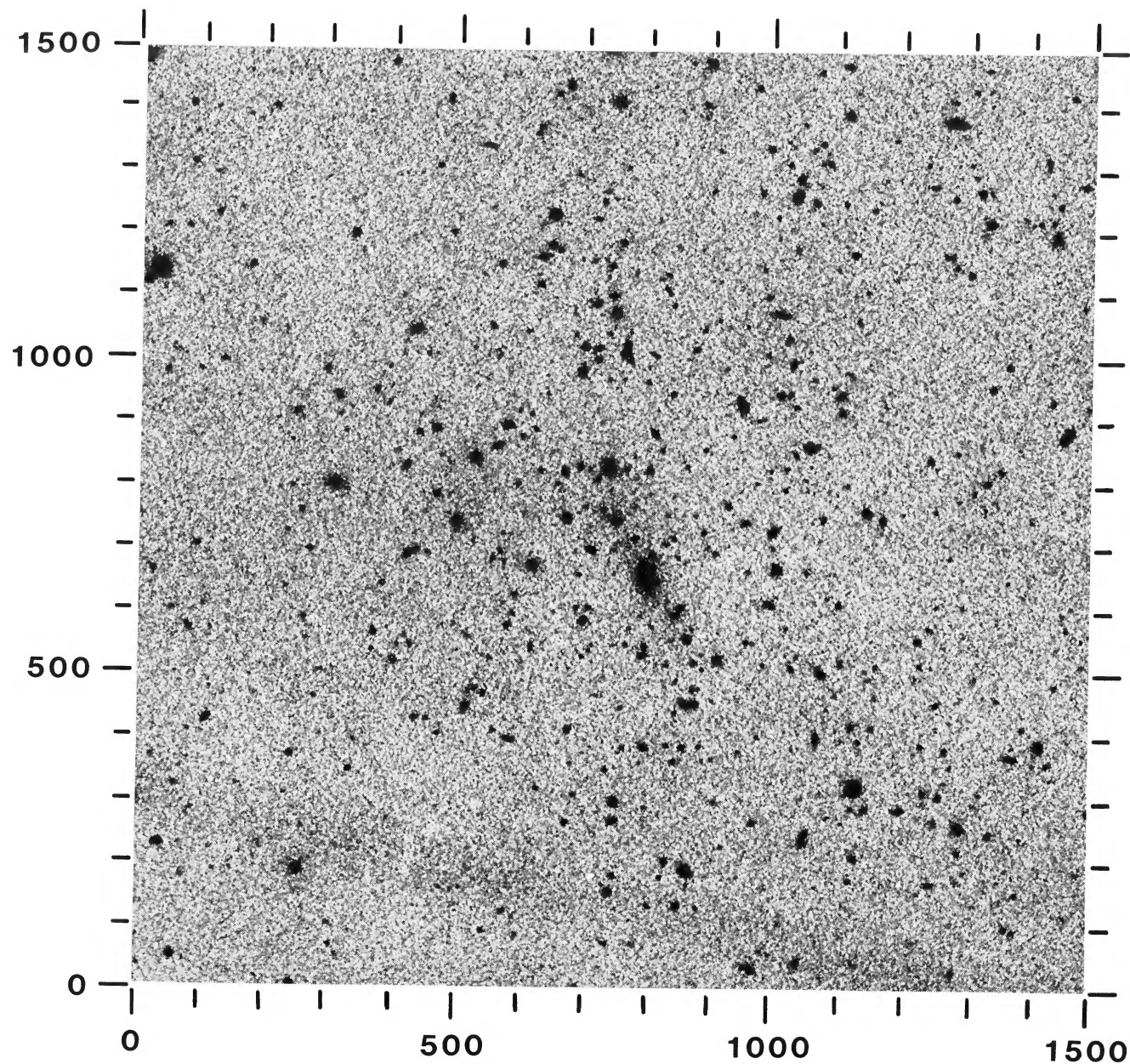


FIG. 28.—Abell 2645 cluster center, from a red plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

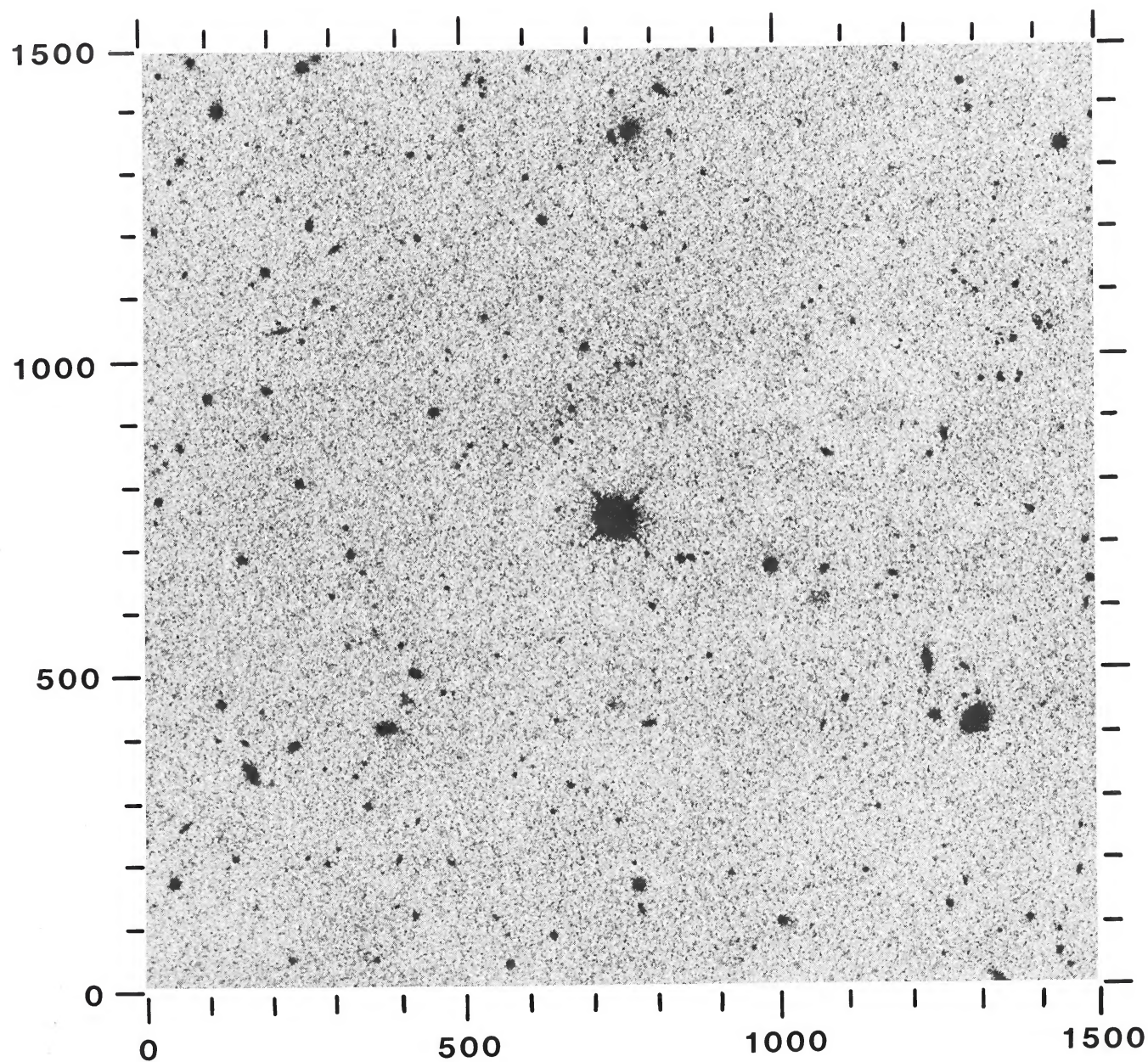


FIG. 29.—Abell 2645 blank field, from a red plate. North is at the bottom.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

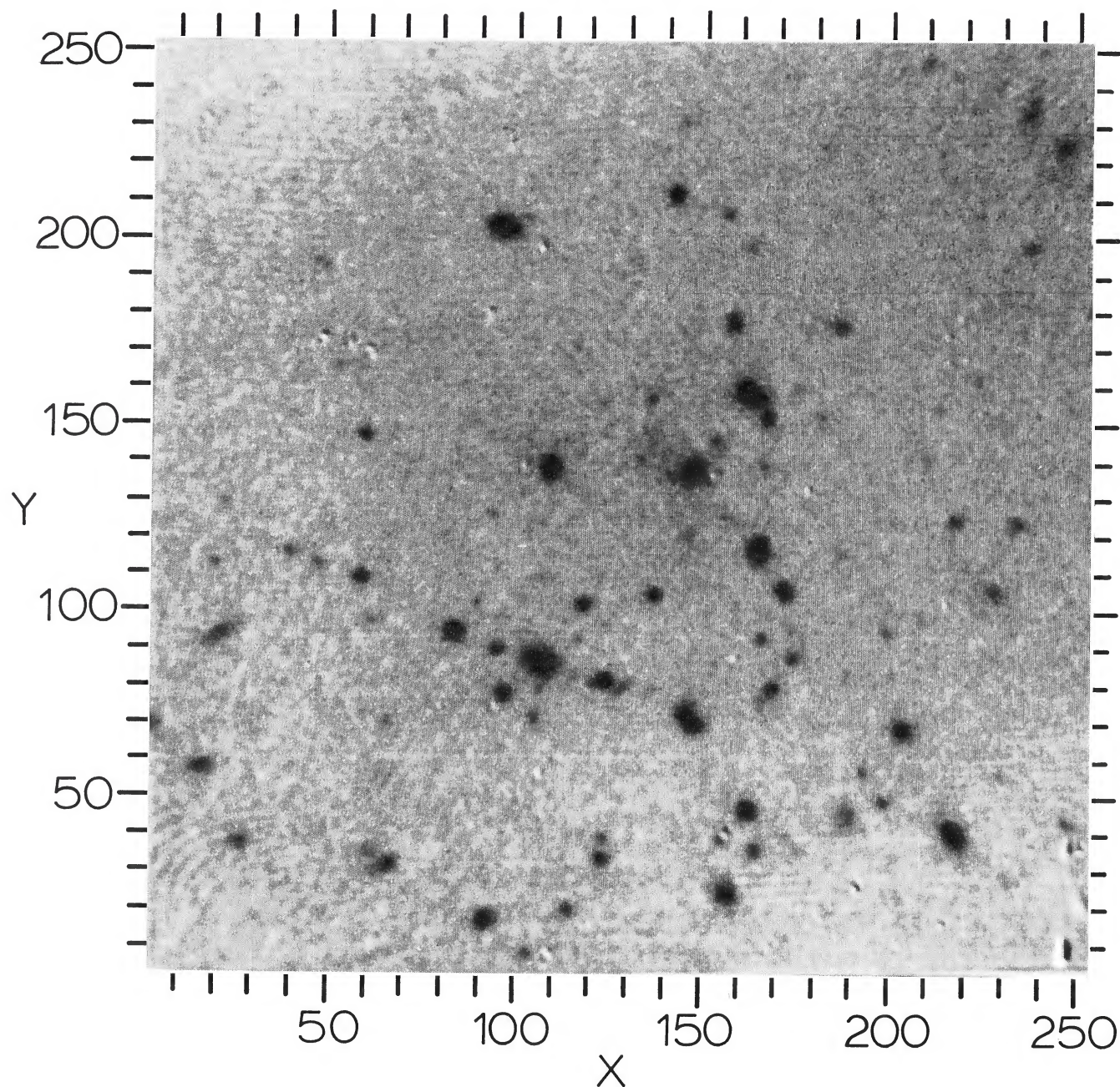


FIG. 30.—Summed red videocamera frames of CI 0949+4409. North is to the left.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

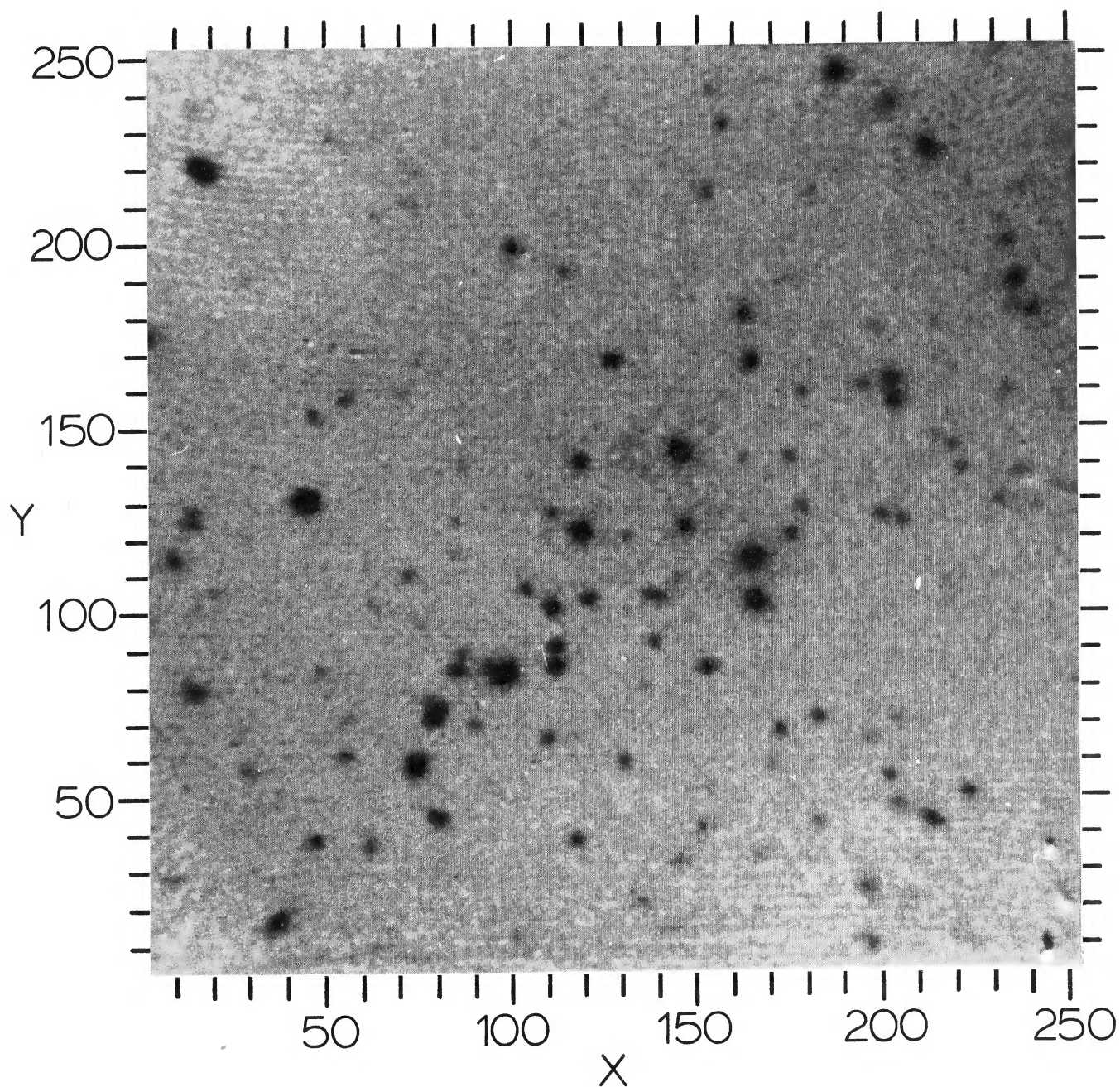


FIG. 31.—Summed red videocamera frames of Cl 1446+2619. North is to the left.

BUTCHER, OEMLER, AND WELLS (*see* page 187)

TABLE 2
ABELL 222/223 PHOTOMETRY

Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57
A 222 Cluster Center																			
472	859	17	22.81	0.87	294	215	319	21.94	0.68	105	963	559	20.29	1.69	267	1184	724	21.77	1.41
383	798	18	22.38	0.95	240	1031	323	21.54	1.04	326	1245	560	22.07	1.14	168	574	725	20.93	0.92
35	675	19	19.21	1.57	379	337	324	22.35	0.59	47	786	563	19.47	1.59	398	1162	725	22.45	1.75
275	606	22	21.81	0.98	117	1063	328	20.42	0.66	7	1308	567	18.33	1.67	374	462	728	22.32	1.44
135	404	26	20.65	1.45	63	1409	335	19.78	1.30	463	1328	569	22.76	0.80	102	760	729	20.25	1.42
224	1010	28	21.46	1.34	128	622	336	20.58	0.85	119	74	571	20.45	1.52	209	524	732	21.36	1.37
440	99	39	22.67	0.97	252	1072	338	21.67	1.33	152	1186	573	20.80	1.49	425	1367	736	22.57	1.58
80	1396	42	19.97	1.63	291	410	342	21.91	0.65	546	523	574	23.19	1.15	427	641	736	22.58	0.64
165	101	46	20.90	1.73	471	842	343	22.80	1.42	465	1129	577	22.77	0.14	203	454	738	21.35	1.02
442	981	52	22.68	0.94	497	356	344	22.93	0.43	107	722	579	20.32	0.61	53	726	739	19.62	1.77
120	311	58	20.47	0.76	276	617	369	21.81	1.61	303	537	579	21.97	1.83	147	607	739	20.75	1.62
490	612	59	22.91	0.81	286	1245	372	21.87	0.98	325	748	582	22.07	0.87	259	696	741	21.73	1.20
359	973	60	22.25	0.99	412	1125	377	22.51	1.21	394	605	582	22.42	1.81	304	654	743	21.97	1.60
380	11	62	22.37	0.97	298	669	378	21.95	1.71	415	787	582	22.52	0.71	539	279	747	23.16	0.37
510	286	76	22.97	1.43	399	1432	378	22.45	1.41	52	227	584	19.59	1.64	210	1086	749	21.37	1.49
364	1448	80	22.28	1.38	124	1082	383	20.53	1.29	255	1013	585	21.72	1.12	1	751	750	17.87	1.83
280	515	81	21.83	0.81	495	620	385	22.92	0.76	158	762	591	20.86	1.00	432	1198	752	22.61	1.28
202	754	86	21.33	0.84	220	1110	387	21.45	1.94	215	1472	591	21.40	0.66	331	493	753	22.10	1.01
453	556	87	22.72	0.77	136	476	392	20.66	0.88	392	1099	591	22.42	1.86	208	161	754	21.36	1.29
271	488	89	21.79	1.05	345	219	394	22.17	0.83	268	195	599	21.78	0.79	11	768	755	18.69	1.63
474	1253	94	22.82	1.11	461	349	394	22.75	0.54	116	611	601	20.41	1.79	543	1296	755	23.19	0.55
541	579	96	23.16	0.50	144	1223	395	20.74	0.61	20	1292	606	18.87	1.77	28	1004	759	19.09	0.94
238	978	99	21.53	1.40	277	601	397	21.81	0.47	299	1099	607	21.96	0.77	232	124	759	21.50	1.57
521	1099	107	23.05	0.42	515	529	403	23.00	0.40	411	1340	607	22.51	0.82	533	1078	759	23.14	-0.14
64	606	112	19.78	1.23	314	281	410	22.02	1.71	481	1028	612	22.87	0.64	17	768	761	18.82	1.60
551	274	117	23.24	0.60	525	884	411	23.07	0.76	288	1322	613	21.87	1.41	51	711	761	19.56	1.66
197	1067	119	21.27	1.34	478	605	415	22.85	0.17	385	1347	614	22.39	1.11	24	677	762	19.01	1.46
538	953	129	23.16	0.86	447	275	418	22.70	1.03	492	356	620	22.91	0.89	41	570	764	19.38	1.55
296	879	131	21.94	1.44	549	685	418	23.22	0.14	529	1038	622	23.11	-0.37	43	911	764	19.38	1.69
123	825	133	20.50	1.70	404	1205	419	22.47	1.18	241	699	624	21.57	0.78	45	716	767	19.45	1.52
437	198	134	22.63	0.94	177	1193	424	21.00	1.42	160	504	626	20.88	1.69	55	750	768	19.66	1.84
512	135	136	22.99	0.91	174	790	425	20.99	0.56	228	484	626	21.49	1.48	81	1376	771	19.99	1.62
327	705	148	22.07	1.99	397	573	426	22.45	0.97	467	907	626	22.79	0.61	454	885	772	22.72	1.43
312	1014	152	22.02	1.41	270	1034	428	21.78	1.14	293	724	628	21.92	1.84	122	523	773	20.49	1.55
157	202	154	20.86	0.90	189	748	429	21.21	1.03	198	934	637	21.28	1.15	402	830	774	22.46	1.03
302	180	163	21.97	1.58	313	411	440	22.02	1.74	57	1053	638	19.71	1.60	214	170	775	21.39	1.58
244	780	165	21.58	1.10	167	869	443	20.91	1.57	142	1233	642	20.71	1.74	182	737	776	21.08	1.25
285	1188	166	21.86	1.99	127	838	449	20.56	1.45	363	910	644	22.28	0.32	315	381	777	22.03	1.24
356	308	171	22.22	0.69	358	141	450	22.24	1.94	441	945	644	22.68	0.65	179	1350	781	21.02	1.30
83	220	174	20.03	1.16	194	930	455	21.24	1.54	22	1290	645	18.98	1.49	263	699	781	21.76	1.31
452	794	174	22.72	0.61	514	189	456	23.00	0.63	542	679	649	23.17	0.35	484	1467	781	22.88	1.51
258	780	176	21.73	1.05	260	712	460	21.75	1.11	2	1127	651	17.91	1.83	217	837	782	21.41	1.83
334	753	189	22.12	0.92	12	907	469	18.74	1.68	42	1326	656	19.38	1.66	169	1056	783	20.93	0.86
451	868	191	22.71	0.84	518	1045	471	23.02	0.61	279	1202	663	21.82	1.44	84	855	786	20.03	1.69
344	975	194	22.17	0.81	29	719	474	19.11	1.10	82	919	667	20.02	1.54	110	817	786	20.35	1.62
185	441	195	21.13	1.37	544	1023	474	23.19	1.22	114	1471	667	20.41	1.55	376	200	788	22.33	1.00
133	1085	200	20.65	1.06	369	1142	475	22.30	0.31	78	827	669	19.94	1.70	322	171	789	22.06	0.54
68	312	203	19.83	1.43	395	836	476	22.44	0.56	553	358	671	23.24	1.32	175	315	790	20.99	1.28
346	247	203	22.18	0.77	424	683	483	22.57	0.83	235	1098	674	21.53	0.68	195	624	790	21.26	1.67
348	1311	211	22.18	1.86	428	69	484	22.58	1.53	46	1181	675	19.47	1.29	457	933	794	22.74	0.31
405	209	211	22.47	1.11	204	1169	486	21.35	1.20	100	783	675	20.22	1.76	511	431	796	22.98	0.98
301	1299	214	21.96	1.87	381	991	486	22.38	0.73	129	1226	678	20.62	1.77	520	892	796	23.04	0.48
458	662	218	22.74	0.60	377	600	490	22.34	0.98	58	976	680	19.73	1.51	38	590	797	19.32	0.82
410	462	222	22.51	0.29	391	1254	490	22.42	1.22	187	753	681	21.17	1.27	488	925	797	22.90	0.04
73	664	229	19.90	1.34	180	541	495	21.04	1.07	265	1061	682	21.77	0.35	85	1202	798	20.04	1.62
503	225	229	22.94	1.49	233	1297	495	21.51	1.63	61	1122	685	19.75	1.71	434	955	800	22.61	1.27
229	1361	232	21.50	0.72	343	464	497	22.16	1.42	446	187	685	22.69	0.43	506	910	801	22.96	0.88
99	461	240	20.19	0.89	261	1002	499	21.75	1.50	153	742	687	20.82	1.17	184	366	802	21.09	0.98
308	1219	241	22.00	1.20	13	1456	500	18.81	1.66	274	58	689	21.80	1.16	101	666	807	20.23	1.68
253	732	242	21.69	1.61	321	917	502	22.05	1.46	118	1468	692	20.44	1.87	176	966	810	20.99	1.44
368	297	246	22.30	0.56	342	587	503	22.16	0.38	289	949	694	21.88	2.12	62	780	811	19.76	1.60
406	1072	247	22.47	0.97	307	809	504	21.99	1.03	354	1298	694	22.21	1.09	339	1044	811	22.14	1.10
545	802	249	23.19	1.24	9	1380	505	18.40	1.68	76	454	695	19.92	1.62	251	1155	815	21.66	1.75
297	1327	251	21.94	1.50	361	623	507	22.27	0.72	23	732	697	18.98	1.79	413	351	818	22.51	1.02
332	31	257	22.10	1.55	329	1033	508	22.08	1.16	156	1074	698	20.84	1.50	30	94	820	19.11	1.49
16	744	265	18.82	1.69	230	1477	513	21.50	1.23	34	996	699	19.17	1.59	388	791	825	22.40	1.84
390	633	266	22.41	1.88	56	331	525	19.69	1.59	316	545	699	22.03	1.12	357	1148	826	22.22	0.92
125	810	267	20.53	1.68	540	1147	525	23.1											

TABLE 2—Continued

Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57
77	96	856	19.92	1.67	317	626	999	22.03	1.00	21	1237	1123	18.90	1.71	5	574	1322	18.20	1.54
548	200	856	23.22	0.33	496	154	1003	22.92	1.79	438	1421	1123	22.63	0.92	489	269	1327	22.90	1.00
378	1290	859	22.35	0.61	330	599	1006	22.08	1.86	254	1431	1127	21.71	2.10	132	529	1330	20.65	0.88
106	1081	862	20.31	1.62	367	645	1010	22.30	0.15	239	989	1128	21.54	0.60	436	803	1333	22.63	0.82
372	554	864	22.31	0.68	97	445	1012	20.17	1.63	309	1170	1128	22.00	1.49	418	1482	1335	22.53	1.31
162	742	865	20.89	1.22	222	1487	1012	21.46	0.94	236	36	1129	21.53	0.84	108	1077	1344	20.32	1.76
290	729	867	21.89	0.43	414	800	1022	22.52	0.74	522	861	1132	23.05	0.53	475	161	1344	22.83	0.42
519	1216	868	23.03	1.04	448	228	1024	22.71	0.65	130	921	1133	20.64	1.31	148	1134	1346	20.76	0.30
37	1045	873	19.30	1.53	508	223	1025	22.97	0.42	469	1077	1142	22.80	0.02	370	498	1348	22.30	2.32
50	873	876	19.52	1.69	72	580	1027	19.89	1.58	328	281	1144	22.08	0.78	341	1456	1349	22.15	0.88
149	1207	877	20.76	1.42	400	125	1028	22.45	1.55	407	981	1145	22.47	1.26	535	876	1354	23.14	0.79
79	196	883	19.95	1.61	523	794	1031	23.06	0.82	10	1120	1149	18.66	1.73	482	149	1356	22.87	1.63
483	1482	886	22.88	1.32	163	865	1035	20.89	1.74	69	1475	1149	19.84	1.41	416	217	1357	22.52	1.23
278	860	887	21.82	1.15	444	1119	1036	22.68	1.37	140	480	1149	20.71	0.65	221	781	1371	21.46	0.83
282	278	887	21.85	0.74	477	624	1036	22.84	0.60	336	87	1149	22.13	0.84	373	241	1372	22.31	1.48
287	576	887	21.87	0.86	256	468	1037	21.72	1.25	139	1205	1151	20.69	1.53	466	624	1373	22.77	0.68
104	660	888	20.27	1.69	527	1303	1037	23.08	0.84	455	572	1153	22.72	1.34	459	481	1375	22.74	1.48
216	841	888	21.40	1.72	213	420	1038	21.39	0.92	205	327	1154	21.35	1.50	134	671	1386	20.65	1.32
516	1047	896	23.02	0.19	103	827	1039	20.27	1.28	499	574	1156	22.93	1.76	507	683	1388	22.96	0.37
143	30	899	20.72	1.46	218	646	1041	21.42	1.25	426	1280	1159	22.58	0.27	183	74	1394	21.08	1.36
126	821	904	20.56	1.41	464	1070	1041	22.76	1.51	433	477	1162	22.61	1.36	318	119	1398	22.03	1.19
25	1106	905	19.02	1.90	227	262	1043	21.48	1.71	266	749	1164	21.77	1.22	387	179	1404	22.40	0.17
92	1143	905	20.11	1.68	121	312	1045	20.47	1.42	250	1369	1168	21.66	1.16	246	188	1411	21.59	1.22
338	1031	912	22.14	0.79	249	1324	1047	21.65	1.29	550	110	1168	23.22	0.93	324	237	1416	22.07	0.66
90	1014	914	20.09	1.59	350	365	1049	22.20	0.96	401	1487	1184	22.46	1.16	504	1160	1417	22.95	0.06
31	725	915	19.13	1.68	190	612	1051	21.21	1.26	524	953	1186	23.06	1.79	537	1201	1418	23.15	1.82
166	1233	917	20.91	1.09	150	231	1053	20.77	1.64	532	318	1188	23.13	0.34	366	1290	1420	22.29	1.10
219	70	917	21.44	1.46	188	1061	1057	21.19	0.99	70	779	1191	19.85	1.51	393	219	1421	22.42	1.65
59	1316	921	19.74	1.26	113	561	1058	20.40	1.60	396	1274	1195	22.44	1.20	164	752	1423	20.90	1.29
420	711	923	22.53	1.20	513	933	1059	22.99	1.03	353	415	1200	22.21	1.16	247	849	1427	21.63	1.19
44	575	925	19.42	1.67	333	796	1061	22.11	0.92	443	732	1208	22.68	1.93	245	839	1428	21.59	1.29
94	540	925	20.11	1.55	360	441	1063	22.26	0.73	528	1048	1213	23.10	1.16	365	791	1438	22.28	1.29
487	332	927	22.89	0.69	170	533	1065	20.96	1.63	431	251	1214	22.60	1.30	351	772	1440	22.20	1.06
382	854	935	22.38	1.06	429	651	1067	22.58	1.47	112	1234	1230	20.40	0.81	237	163	1441	21.53	0.98
430	14	937	22.59	0.39	547	1193	1070	23.21	0.01	389	741	1235	22.41	0.45	65	756	1443	19.78	1.56
138	557	939	20.67	1.39	191	699	1075	21.21	1.78	225	857	1237	21.48	0.43	269	1184	1443	21.78	1.09
234	1178	939	21.52	1.25	340	127	1075	22.14	1.56	362	467	1243	22.27	0.87	95	859	1445	20.13	1.43
421	915	945	22.54	1.76	248	1245	1078	21.63	1.46	470	406	1246	22.80	0.28	111	1286	1445	20.38	1.67
33	453	946	19.16	1.15	417	1254	1079	22.52	1.39	115	356	1250	20.41	1.38	74	150	1447	19.90	1.41
480	271	946	22.87	0.25	32	566	1080	19.13	1.65	450	1271	1252	22.71	0.97	137	330	1448	20.67	0.99
552	264	946	23.24	0.12	154	1315	1081	20.83	1.20	320	259	1258	22.03	1.91	281	351	1453	21.84	1.50
4	383	947	17.98	1.72	172	1223	1083	20.98	0.90	206	354	1262	21.35	1.54	223	843	1456	21.46	1.16
386	619	948	22.39	1.37	88	1079	1085	20.07	1.67	131	763	1266	20.64	1.54	196	1200	1459	21.27	1.04
531	98	955	23.12	1.14	473	101	1086	22.81	1.25	375	1206	1273	22.32	0.99	355	135	1459	22.21	1.22
505	719	958	22.95	1.39	151	62	1088	20.79	1.43	498	1160	1275	22.93	0.83	310	1084	1461	22.00	2.06
264	1030	959	21.76	1.41	352	522	1088	22.20	0.94	272	972	1286	21.79	1.37	8	1036	1464	18.38	0.83
493	1131	959	22.92	0.89	408	660	1091	22.47	1.91	485	1268	1288	22.88	0.98	283	1322	1464	21.85	1.38
292	454	960	21.92	1.14	109	834	1093	20.35	1.49	186	1340	1294	21.14	1.53	305	950	1468	21.98	1.10
89	623	963	20.09	1.60	161	150	1093	20.89	1.07	146	1073	1299	20.75	1.50	530	1270	1469	23.12	0.33
39	79	965	19.34	1.20	145	992	1094	20.75	0.97	509	1224	1300	22.97	0.84	323	209	1471	22.06	1.70
3	1280	970	17.91	0.00	87	1222	1096	20.07	1.48	200	1198	1307	21.29	1.13	500	975	1472	22.94	0.88
306	492	978	21.98	1.45	173	691	1097	20.98	1.47	159	1353	1310	20.86	1.20	445	1134	1474	22.68	2.20
319	943	984	22.03	1.62	226	589	1101	21.48	0.96	231	1258	1311	21.50	1.47	419	1107	1475	22.53	1.87
300	470	986	21.96	1.06	6	310	1106	18.31	1.82	212	1272	1315	21.37	2.51	15	48	1479	18.82	1.43
486	158	988	22.89	1.06	49	186	1115	19.51	1.62	409	1162	1316	22.47	1.80	491	340	1481	22.91	1.14
371	442	994	22.30	1.81	337	364	1116	22.13	1.14	435	1000	1319	22.63	0.24	479	1164	1484	22.86	0.36
335	293	995	22.12	1.39	284	422	1120	21.86	1.05	460	1448	1320	22.74	2.00	476	217	1486	22.83	0.81
456	70	997	22.73	1.90															

A 223 Cluster Center

274	1270	24	22.19	0.78	239	1314	90	21.55	1.44	580	221	167	23.21	-0.16	564	325	224	23.12	1.61
211	1333	26	21.38	0.78	411	420	93	22.36	1.15	95	455	170	20.35	0.62	574	1322	228	23.18	1.06
101	1228	28	20.40	1.26	203	666	95	21.28	1.77	83	556	172	20.17	1.48	238	1294	229	21.55	1.13
125	1249	29	20.62	1.54	36	790	97	19.39	1.57	502	593	172	22.84	0.90	493	156	232	22.80	0.95
156	1473	29	20.84	1.22	368	38	106	22.16	0.79	188	676	175	21.19	0.98	181	445	235	21.09	1.44
497	609	34	22.83	1.57	29	1088	109	19.26	1.60	356	28	181	22.11	1.83	136	1474	238	20.68	1.23
130	449	38	20.64	1.16	228	742	109	21.50	1.52	93	1345	183	20.32	1.30	509	947	238	22.87	1.39
378	998	40	22.21	1.77	353	1241	116	22.11	0.78	357	1294	186	22.12	0.79	195	899	241	21.22	0.96
50	420	46	19.75	0.97	237	1067	117	21.55	1.30	367	747	186	22.15	2.03	214	362	242	21.40	1.50
310	1359	48	21.93	1.59	409	967	118	22.35	2.02	440	671	190	22.56	1.07	173	325	246	21.03	1.24
412	1419	50	22.36	1.17	504	409	130	22.85	2.05	500	244	191	22.84	1.07	208	500	246	21.29	1.62
150	1388	54	20.78	1.67	73	887	133	20.06	1.60	52	1010	194	19.75	1.60	531	454	247	22.97	0.67
317	1333	55	21.95	1.30	300	1238	133	21.86	0.57	248	202	195	21.61	0.57	277	908	250	21.77	0.85
167	1325	58	20.96	1.54	380	615	138	22.22	1.06	345	1155	199	22.08	0.62	302	1121	251	21.89	1.60
492	599	58	22.79	0.40	280	623	143	21.78	1.13	520	1225	203	22.91	0.50	64	1246	252	19.88	1.57
296	1148	69	21.84	0.43	260	824	150	21.66	1.68	521	1225	203	22.91	0.50	39	543	255	19.47	1.32
461	360	71	22.66	1.38	66	777	151	19.89	1.58	41	1304	207	19.47	1.79	207	1307	260	21.29	1.05
19	1072	74	18.88	1.63	543	1154	153	23.04	1.77	570	763	212	23.17	1.29	346	1414	260	22.08	1.48
430	729	79	22.47	1.12	236	1264	159	21.55	0.87	32	653	217	19.31	0.99	89	593	261	20.29	1.09
335	1409	85	22.04	0.85	387	719	160	22.24	1.52	373	1052	217	22.19	0.63	533	450	262	22.98	0.35
462	236	86	22.67	0.47	61	1349	162	19.83	0.93	218	517	218	21.46	0.86	456	1330	264	22.65	0.65
193	1082	88	21.20	1.94	506	598	162	22.86	1.39	140	55	221	20.72	1.54	518	352	265	22.90	0.97
270	503	88	21.74	1.58	559	912	167	23.10	1.46	168	78	221	20.97	1.91	524	1296	273	22.93	0.80

TABLE 2—Continued

Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57
588	357	274	23.24	0.64	264	1405	468	21.68	1.59	273	1062	628	21.76	1.03	90	872	875	20.30	1.28
308	843	281	21.92	0.73	49	747	470	19.73	1.44	340	168	630	22.06	0.97	363	913	876	22.14	1.44
436	1318	285	22.51	0.83	313	1431	470	21.95	0.74	426	1256	630	22.45	0.93	351	805	880	22.10	1.50
192	1358	286	21.20	1.26	446	1272	470	22.58	1.00	318	305	631	21.96	0.66	517	1028	880	22.90	0.95
334	731	288	22.03	1.01	545	1080	472	23.06	0.49	348	478	634	22.09	0.25	225	986	882	21.50	0.34
57	1477	290	19.80	1.54	472	28	476	22.69	1.08	385	843	634	22.23	1.93	120	1475	884	20.57	1.01
88	40	290	20.24	1.66	217	824	481	21.45	1.44	16	697	636	18.66	0.87	331	412	884	22.01	1.33
257	334	295	21.66	1.27	523	1463	481	22.91	1.58	299	856	637	21.85	1.94	31	1002	894	19.31	0.67
534	802	298	22.98	0.53	325	1125	482	22.00	0.62	100	602	638	20.39	1.34	4	323	895	18.07	1.71
258	551	301	21.66	1.08	343	622	485	22.07	1.86	486	1398	640	22.76	1.69	481	1051	900	22.73	0.31
210	994	305	21.35	1.59	3	126	488	18.03	1.73	322	413	646	21.97	1.38	583	1088	901	23.22	0.62
309	327	309	21.92	1.15	376	1380	488	22.20	1.98	478	1054	649	22.72	1.21	182	687	902	21.10	0.92
60	404	310	19.82	1.46	432	1205	488	22.49	1.77	166	669	652	20.96	1.07	541	1208	903	23.03	0.38
122	889	313	20.59	1.47	460	886	491	22.66	0.82	549	1129	653	23.07	0.29	306	66	904	21.90	1.31
295	847	315	21.83	1.22	151	798	493	20.79	1.47	488	359	674	22.77	0.78	33	1343	908	19.31	1.41
542	481	315	23.04	1.10	386	1158	493	22.24	0.96	27	753	676	19.17	1.82	431	131	910	22.48	0.93
219	638	316	21.46	1.56	536	437	494	22.99	0.08	540	958	681	23.03	1.01	45	1289	911	19.63	1.12
98	1372	318	20.36	1.72	468	1412	495	22.69	0.44	133	433	686	20.65	1.34	448	515	912	22.60	1.57
383	1214	318	22.23	1.15	315	689	496	21.95	1.20	143	1427	689	20.74	1.19	132	1337	917	20.65	1.14
585	1237	319	23.24	0.13	160	703	499	20.88	1.67	175	654	692	21.04	1.20	141	576	920	20.74	0.84
138	812	321	20.70	1.12	271	960	502	21.75	1.41	371	1129	692	22.17	0.49	289	1152	925	21.82	1.11
291	128	321	21.82	1.56	23	774	507	19.01	1.67	323	705	699	21.97	1.23	319	565	926	21.96	1.17
366	650	324	22.15	1.43	97	612	507	20.35	1.78	242	733	700	21.57	0.85	548	819	927	23.06	1.08
266	845	326	21.73	0.94	177	759	510	21.06	0.89	382	1294	707	22.23	0.69	547	218	928	23.06	0.98
358	615	326	22.13	1.29	480	545	511	22.72	1.42	490	1151	708	22.78	0.40	94	935	931	20.32	1.49
401	765	328	22.33	1.33	498	216	513	22.84	0.34	254	656	712	21.63	1.13	255	648	935	21.64	1.25
495	647	332	22.82	1.18	314	1425	514	21.95	1.06	185	947	713	21.15	1.16	205	1085	937	21.29	0.67
513	756	335	22.89	1.21	338	714	514	22.05	1.55	364	735	715	22.14	3.03	77	69	938	20.09	0.86
307	718	336	21.91	0.96	410	196	517	22.35	1.57	240	1098	719	21.56	1.31	449	307	938	22.60	1.27
337	624	340	22.04	1.21	332	1464	519	22.02	1.14	283	1101	721	21.79	1.29	117	539	941	20.56	1.33
6	695	341	18.20	1.33	362	202	520	22.14	1.11	74	1333	728	20.07	1.13	261	759	942	21.67	1.16
501	495	344	22.84	0.79	272	441	521	21.76	1.27	458	218	729	22.65	1.57	157	1126	948	20.84	1.23
227	931	348	21.50	0.84	187	712	523	21.16	1.61	114	324	735	20.54	0.97	183	1027	948	21.10	1.26
278	514	349	21.77	1.88	293	246	524	21.83	1.16	403	1049	738	22.34	0.52	555	1188	950	23.09	0.42
37	907	351	19.42	1.63	124	591	529	20.60	1.39	67	711	742	19.91	1.69	577	94	952	23.19	1.07
320	894	353	21.96	0.99	14	642	531	18.58	1.35	324	1347	743	21.98	1.29	137	990	956	20.69	1.59
147	1252	356	20.75	1.46	12	1102	532	18.43	1.67	91	848	745	20.30	1.53	121	845	959	20.57	1.35
269	684	356	21.74	1.09	131	385	534	20.64	1.93	425	823	749	22.45	0.50	259	399	969	21.66	1.20
87	196	358	20.24	0.81	437	971	537	22.54	1.12	11	750	751	18.37	1.68	344	967	970	22.08	0.68
414	263	362	22.37	0.85	466	20	537	22.68	0.81	268	507	756	21.74	1.14	54	818	972	19.79	1.22
575	171	365	23.18	0.92	43	694	543	19.51	0.93	439	886	756	22.56	0.92	129	1358	978	20.63	1.03
355	1439	366	22.11	1.22	550	553	543	23.07	0.37	392	1007	759	22.28	0.78	476	286	980	22.72	1.49
298	744	368	21.85	0.62	202	940	544	21.27	1.31	139	820	761	20.70	1.41	80	144	987	20.11	0.89
169	1318	371	20.98	0.83	393	260	544	22.29	0.67	8	204	764	18.30	1.77	265	450	988	21.70	0.73
24	1038	377	19.02	1.65	82	763	546	20.15	1.81	250	779	766	21.61	1.22	511	1135	988	22.89	0.46
519	904	387	22.90	1.25	58	839	547	19.80	1.65	359	222	773	22.13	1.32	512	1135	988	22.89	0.46
316	766	388	21.95	1.34	59	784	549	19.81	1.89	467	1006	776	22.68	0.85	369	719	992	22.16	1.81
174	272	397	21.04	0.99	565	529	550	23.13	1.19	200	302	778	21.27	0.79	532	1467	994	22.97	1.66
452	1277	399	22.63	0.91	252	628	551	21.62	1.33	424	995	781	22.43	1.26	62	1110	995	19.84	1.64
568	213	399	23.15	0.54	347	817	553	22.08	2.00	571	1037	785	23.18	1.30	474	25	996	22.70	0.85
103	843	400	20.42	1.45	215	371	554	21.41	1.02	142	484	788	20.74	1.07	477	1050	1000	22.72	0.85
162	753	400	20.91	1.41	561	276	554	23.11	0.37	557	834	789	23.09	1.11	422	896	1001	22.41	1.01
581	72	400	23.21	0.42	464	1315	556	22.67	1.69	451	1313	790	22.63	0.61	243	1211	1004	21.58	0.79
552	1351	402	23.07	1.17	26	717	564	19.12	1.58	491	579	790	22.78	1.33	496	293	1007	22.82	1.52
420	1424	405	22.39	1.23	10	758	567	18.33	1.68	213	713	793	21.39	0.83	321	1441	1008	21.96	2.12
326	956	412	22.00	1.18	551	222	570	23.07	0.45	251	458	793	21.62	1.01	417	1080	1009	22.38	0.68
556	1477	415	23.09	0.44	190	660	571	21.19	0.90	529	612	793	22.97	0.46	163	570	1010	20.92	1.48
72	668	417	20.05	1.16	135	900	575	20.65	1.56	544	847	793	23.04	2.70	75	890	1012	20.08	0.67
485	990	418	22.74	1.02	189	344	578	21.19	1.01	46	314	798	19.63	1.43	179	1014	1012	21.08	1.00
390	324	419	22.25	1.64	233	172	580	21.54	0.95	76	1010	799	20.08	1.56	453	416	1016	22.63	0.97
427	260	419	22.46	0.66	104	791	585	20.44	1.95	63	772	804	19.85	1.76	553	1403	1018	23.08	0.82
28	811	420	19.23	1.57	262	673	585	21.67	1.58	563	747	804	23.12	1.15	198	577	1021	21.25	1.53
42	949	421	19.48	1.58	470	1382	585	22.69	0.93	154	1022	807	20.82	1.67	429	306	1029	22.46	1.85
159	350	429	20.85	1.76	487	645	585	22.77	0.34	155	1022	807	20.82	1.67	119	1483	1034	20.56	1.68
287	644	431	21.81	0.98	442	1317	589	22.57	0.83	505	1247	808	22.86	0.36	5	513	1035	18.17	1.70
35	1251	435	19.34	1.57	149	774	592	20.78	0.70	13	673	817	18.44	1.71	70	410	1035	19.96	1.44
85	1376	436	20.23	0.72	253	1310	594	21.63	1.38	47	767	817	19.65	1.18	372	1416	1035	22.18	1.06
48	689	437	19.73	1.51	527	705	596	22.95	1.31	71	428	817	19.99	1.10	546	810	1036	23.06	0.78
194	1409	438	21.21	1.41	384	1000	603												

TABLE 2—Continued

Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57
245	1096	1084	21.59	1.16	284	1365	1195	21.80	0.36	172	536	1286	21.01	0.62	312	842	1390	21.94	0.66
235	93	1085	21.55	0.75	180	977	1196	21.09	1.03	224	581	1286	21.49	1.38	263	1125	1391	21.68	1.36
220	401	1087	21.46	2.03	408	990	1199	22.35	1.12	381	179	1288	22.23	1.24	286	922	1391	21.81	1.15
416	536	1087	22.38	0.78	450	285	1201	22.63	0.34	282	348	1289	21.79	1.30	330	150	1392	22.01	1.03
276	1393	1088	21.77	0.70	178	448	1202	21.07	1.54	419	420	1289	22.38	1.89	454	176	1392	22.63	2.89
209	908	1089	21.29	1.89	165	531	1208	20.95	1.50	459	1385	1290	22.66	0.79	78	779	1393	20.10	0.99
285	48	1089	21.80	0.87	569	206	1208	23.17	0.49	297	553	1291	21.84	0.57	201	790	1397	21.27	1.29
586	822	1091	23.24	0.48	441	348	1209	22.57	0.58	21	299	1295	18.94	1.60	352	105	1400	22.11	0.66
222	1231	1093	21.47	0.95	44	1022	1211	19.59	1.64	223	1207	1300	21.49	0.94	400	66	1407	22.33	1.09
333	1280	1093	22.03	1.17	457	882	1212	22.65	1.43	229	1072	1305	21.52	0.70	292	1224	1412	21.83	0.85
7	509	1097	18.26	1.58	539	208	1231	23.02	0.87	267	632	1305	21.74	1.12	510	458	1412	22.89	0.66
197	936	1099	21.25	1.19	108	318	1232	20.46	1.23	406	85	1313	22.35	0.06	395	998	1414	22.31	0.37
435	1071	1101	22.51	0.43	221	858	1232	21.47	0.38	407	85	1313	22.35	0.06	396	998	1414	22.31	0.37
447	723	1104	22.59	1.30	305	597	1233	21.90	1.19	434	601	1313	22.50	1.26	473	1448	1420	22.70	0.85
106	199	1105	20.45	1.23	226	299	1236	21.50	0.81	230	1185	1314	21.53	0.82	110	675	1423	20.48	1.38
107	199	1105	20.45	1.23	360	1143	1238	22.13	1.26	329	275	1316	22.00	2.07	56	1253	1426	19.80	1.20
275	332	1107	21.76	1.76	92	1200	1240	20.32	1.02	402	592	1319	22.33	1.72	288	1340	1426	21.81	1.54
433	432	1115	22.50	0.93	572	405	1240	23.18	0.67	342	14	1321	22.07	0.79	247	72	1433	21.60	1.19
526	1359	1118	22.95	0.50	164	434	1243	20.94	1.41	528	33	1322	22.96	0.61	567	1433	1438	23.14	0.63
25	1284	1119	19.04	1.47	587	1121	1246	23.24	0.79	232	1341	1326	21.53	1.29	2	370	1440	17.73	0.00
379	1091	1119	22.21	1.69	399	926	1249	22.32	0.96	79	1348	1333	20.10	1.78	134	974	1440	20.65	1.48
423	439	1126	22.42	1.33	327	369	1252	22.00	1.13	17	282	1337	18.83	1.54	535	421	1441	22.98	1.13
388	398	1127	22.25	1.00	438	881	1252	22.56	0.47	573	524	1337	23.18	1.08	584	689	1446	23.23	0.09
444	261	1127	22.57	1.49	576	1067	1253	23.19	-0.12	51	1238	1343	19.75	1.28	304	1223	1447	21.90	1.31
445	1077	1128	22.57	1.41	274	955	1255	21.76	1.24	153	1385	1344	20.81	1.49	68	1312	1450	19.91	1.73
398	718	1130	22.31	1.18	55	1299	1256	19.79	1.53	1	450	1350	17.63	0.00	328	237	1452	22.00	1.08
128	1251	1133	20.63	0.95	354	574	1260	22.11	1.14	99	985	1357	20.37	0.87	397	642	1452	22.31	0.81
415	739	1133	22.38	0.40	479	1036	1261	22.72	1.57	475	1440	1364	22.71	0.49	554	775	1454	23.08	0.85
516	75	1137	22.89	1.02	206	493	1264	21.29	0.96	311	1240	1365	21.93	1.82	84	694	1458	20.21	1.58
365	928	1138	22.15	0.64	484	136	1266	22.74	0.79	176	404	1366	21.05	1.26	443	297	1459	22.57	0.93
204	757	1146	21.28	1.88	96	371	1267	20.35	1.55	428	1016	1367	22.46	0.80	538	574	1461	23.00	0.96
9	1041	1153	18.32	1.62	112	875	1271	20.53	1.30	196	1218	1369	21.22	1.18	171	451	1466	20.99	1.48
562	423	1155	23.12	0.37	113	875	1271	20.53	1.30	413	594	1370	22.36	1.08	234	862	1468	21.54	1.81
170	1129	1161	20.98	1.25	281	493	1273	21.79	1.13	560	1393	1370	23.10	1.92	116	92	1473	20.55	1.69
115	706	1164	20.54	1.55	186	613	1274	21.15	1.33	244	1017	1378	21.58	1.17	508	437	1475	22.87	0.76
361	1411	1165	22.14	0.85	15	457	1275	18.59	1.76	30	531	1379	19.28	1.60	525	192	1476	22.95	0.57
421	51	1178	22.40	1.25	482	947	1275	22.73	0.52	246	765	1381	21.59	1.48	69	215	1479	19.94	1.58
566	951	1180	23.13	1.13	65	412	1279	19.88	1.57	483	77	1387	22.73	1.27	489	1468	1479	22.77	0.94
404	1396	1181	22.34	0.35	34	959	1284	19.33	1.60	38	1025	1388	19.45	1.73	339	490	1481	22.06	1.07
350	796	1194	22.10	0.96	231	836	1285	21.53	1.52	394	503	1388	22.29	1.84	109	795	1484	20.47	1.15

Blank Field

250	807	15	23.06	0.95	41	1330	341	20.87	0.74	63	927	536	21.34	1.34	155	992	713	22.43	1.42
258	1189	17	23.14	0.93	15	1081	349	20.05	1.12	206	1309	536	22.77	1.59	113	248	724	22.07	0.69
70	150	19	21.45	0.63	219	1168	351	22.85	0.86	87	950	539	21.66	2.18	109	614	728	22.04	0.38
172	1138	59	22.54	2.18	209	1467	352	22.79	0.04	174	1120	546	22.55	1.30	17	1455	734	20.06	1.79
152	1215	64	22.42	1.34	153	511	354	22.43	0.43	147	817	549	22.38	0.29	203	525	736	22.77	0.75
230	118	64	22.91	1.19	33	1409	358	20.61	1.62	225	1046	560	22.89	0.22	134	298	737	22.26	2.31
77	673	80	21.53	1.48	178	913	358	22.57	1.85	243	1059	566	23.03	0.53	141	1214	743	22.33	1.12
138	320	80	22.30	0.69	7	1078	380	19.28	1.02	247	1443	569	23.04	0.87	100	1062	746	21.92	0.68
233	1400	81	22.95	1.93	132	1087	391	22.24	1.41	90	124	572	21.73	1.02	32	750	750	20.58	1.75
244	1191	83	23.03	0.77	218	1482	397	22.85	0.58	40	641	587	20.84	0.85	241	691	750	23.01	1.51
75	1103	93	21.52	1.32	110	561	400	22.06	0.30	60	445	587	21.30	1.01	76	1377	763	21.53	0.48
2	81	123	18.92	0.84	180	945	409	22.59	0.68	211	1092	595	22.80	1.68	264	633	763	23.18	0.15
1	1161	145	18.19	1.45	224	26	414	22.88	0.49	140	882	600	22.32	1.17	107	1279	769	22.01	0.86
84	1225	148	21.61	2.30	8	979	423	19.35	1.09	135	1272	602	22.27	0.72	161	1029	771	22.45	1.67
127	1211	149	22.18	2.21	221	1026	425	22.85	1.33	220	879	611	22.85	1.59	13	995	779	19.96	1.55
142	140	152	22.34	0.41	19	1420	427	20.22	0.92	111	925	612	22.06	1.89	160	223	782	22.45	1.07
265	1065	154	23.19	0.08	74	414	428	21.51	1.22	143	112	612	22.34	0.95	201	1477	782	22.76	1.10
156	1118	176	22.44	0.57	133	888	431	22.25	0.94	187	1371	615	22.65	1.11	125	607	784	22.18	0.15
210	1089	183	22.80	0.65	167	133	437	22.52	0.33	231	1486	626	22.92	1.23	124	1243	788	22.17	1.28
82	641	189	21.58	0.80	6	819	442	19.25	0.70	44	1439	627	20.98	1.64	266	969	790	23.20	0.25
197	1233	199	22.71	1.41	226	1151	442	22.89	0.76	24	557	633	20.35	0.71	67	59	792	21.41	1.11
50	1050	204	21.13	1.61	68	816	460	21.42	0.80	195	661	643	22.71	0.53	73	1237	832	21.50	1.38
144	639	207	22.34	1.21	227	856	465	22.89	1.46	14	992	644	20.02	0.78	245	1343	833	23.04	0.33
199	1067	209	22.74	0.49	46	622	467	21.02	1.34	96	766	646	21.84	1.12	168	595	837	22.52	1.42
115	504	215	22.10	0.75	93	844	473	21.79	1.22	59	1232	649	21.28	0.51	176	1348	840	22.57	-0.07
126	269	223	22.18	1.26	158	1285	475	22.44	1.24	108	407	653	22.03	1.46	118	1462	845	22.12	1.47
200	206	226	22.75	1.20	267	153	479	23.21	-0.73	216	808	654	22.84	1.94	16	588	849	20.06	1.09
71	175	229	21.45	0.65	27	709	485	20.41	1.54	102	469	655	21.92	1.25	173	1396	849	22.55	1.00
3	815	234	18.92	1.32	42	1213	488	20.93	0.47	223	1340	657	22.86	1.20	205	1019	852	22.77	1.23
179	328	236	22.58	1.32	99	138	490	21.91	1.01	53	182	659	21.19	1.33	21	734	866	20.23	0.48
10	280	245	19.53	1.76	23	631	495	20.27	1.02	182	651	659	22.60	1.23	208	1024	871	22.78	0.94
56	863	254	21.25	1.55	171	827	500	22.54	0.71	137	444	662	22.29	0.94	239	278	873	22.99	1.06
194	223	262	22.71	0.31	169	307	508	22.53	0.91	164	389	662	22.50	0.96	81	600	876	21.57	0.85
175	154	267	22.56	2.73	191	897	510	22.68	1.00	184	1399	664	22.61	0.48	64	477	889	21.36	1.64
120	1216	272	22.15	0.46	104	655	512	21.96	1.08	242	942	664	23.02	1.30	34	399	892	20.65	0.92
272	971	291	23.25	0.82	157	1165	517	22.44	0.84	163	369	669	22.49	1.20	256	724	896	23.11	1.35
11	643	295	19.74	0.68	166	755	518	22.51	1.80	83	935	675	21.59	1.43	235	532	903	22.98	0.63
112	75	310	22.07	0.64	128	920	520	22.19	0.81	159	1367	683	22.44	1.40	131	601	917	22.23	1.46
54	241	314	21.20	1.01	26	574	522	20.40	0.64	57	212	685	21.26	0.54	151	26	920	22.41	0.44
249	755	315	23.05	1.20	123	426	522	22.17	1.39	91	1269	694	21.75	0.79	92	532	935	21.76	0.92
78	1308	317	21.54	0.63	28	726	524	20.46	1.29	117	1225	706	22.11	1.30	154	1242	936	22.43	0.71

TABLE 2—Continued

Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57	Galaxy	X	Y	f57	j-f57
145	1043	940	22.36	0.60	119	771	1107	22.14	0.58	9	1449	1245	19.37	1.16	122	881	1353	22.17	1.06
35	1451	946	20.66	0.80	36	746	1109	20.67	0.50	149	610	1248	22.39	1.85	186	688	1367	22.65	1.02
189	873	969	22.67	0.30	48	625	1123	21.09	1.74	69	713	1252	21.45	0.62	146	25	1374	22.37	1.42
103	189	976	21.94	1.60	65	665	1129	21.36	1.80	5	1071	1258	19.05	1.43	196	44	1380	22.71	1.52
259	1337	978	23.15	0.68	45	1309	1136	21.01	1.76	148	821	1262	22.39	1.55	246	1021	1386	23.04	0.23
262	291	994	23.17	0.81	263	1397	1149	23.18	0.37	188	775	1270	22.66	0.57	268	826	1386	23.21	0.60
198	668	999	22.73	1.07	202	1321	1153	22.76	1.29	49	148	1272	21.12	1.10	38	1157	1389	20.70	1.69
261	675	999	23.17	0.64	222	1344	1158	22.85	2.23	273	240	1273	23.25	0.57	80	714	1395	21.55	0.81
4	1190	1003	19.00	0.74	136	560	1165	22.28	1.50	260	111	1282	23.17	0.29	252	222	1396	23.07	0.70
116	894	1008	22.11	1.06	105	800	1179	21.98	0.76	237	1207	1289	22.99	0.37	114	577	1398	22.08	1.06
97	789	1019	21.88	1.99	89	626	1184	21.69	1.00	31	58	1292	20.53	0.63	79	685	1402	21.54	0.83
55	1351	1022	21.24	1.49	165	1487	1186	22.51	1.48	253	999	1300	23.08	0.61	236	875	1402	22.99	-0.14
22	1151	1024	20.26	0.77	121	914	1187	22.16	1.09	192	993	1307	22.69	0.69	29	632	1408	20.50	1.44
170	72	1046	22.53	1.00	183	1332	1189	22.61	0.18	232	100	1310	22.92	1.33	269	134	1409	23.22	1.04
240	764	1047	23.00	2.06	190	90	1197	22.67	1.19	39	1118	1313	20.71	1.63	20	488	1419	20.22	1.08
62	1403	1051	21.33	1.55	255	1032	1197	23.10	1.81	95	957	1314	21.81	1.37	85	377	1424	21.63	0.70
207	1180	1053	22.78	0.47	37	1058	1199	20.67	1.36	98	1403	1316	21.89	0.41	204	982	1426	22.77	0.66
139	1373	1063	22.31	0.82	234	644	1199	22.95	1.69	257	403	1318	23.12	0.38	12	1472	1430	19.78	1.69
215	1077	1063	22.83	1.35	181	1332	1200	22.59	0.73	25	114	1319	20.35	1.38	51	671	1432	21.14	0.91
228	793	1072	22.91	1.20	106	843	1204	21.99	0.42	254	865	1319	23.09	0.76	214	96	1441	22.83	0.69
58	962	1075	21.26	1.48	66	202	1209	21.39	0.56	271	198	1321	23.23	0.64	150	743	1443	22.40	1.35
30	864	1076	20.53	0.29	162	861	1210	22.49	0.43	270	320	1324	23.23	0.73	248	28	1449	23.04	1.41
130	1302	1078	22.23	0.98	72	475	1217	21.46	0.47	94	1186	1332	21.79	2.00	129	393	1458	22.22	1.47
43	1211	1082	20.95	0.73	251	1186	1225	23.07	1.33	213	1032	1332	22.83	0.44	52	522	1460	21.17	1.44
18	33	1088	20.21	0.98	101	292	1227	21.92	0.99	88	684	1335	21.68	0.91	212	1325	1464	22.82	0.45
217	1289	1099	22.84	1.10	193	783	1240	22.69	1.25	185	943	1335	22.61	1.83	47	273	1466	21.07	0.53
86	1475	1100	21.65	0.95	177	1064	1244	22.57	0.55	61	312	1346	21.33	1.06	229	308	1473	22.91	1.30
238	1306	1103	22.99	0.64															

TABLE 3
ABELL 370 PHOTOMETRY

Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N
Cluster Center																			
193	1076	9	20.20	2.99	358	558	321	21.15	3.01	390	944	631	21.34	2.95	82	83	827	19.37	2.70
312	1131	9	20.90	1.35	455	268	323	21.99	1.56	411	1454	636	21.47	1.82	203	995	827	20.29	2.78
92	456	17	19.46	2.29	270	749	325	20.65	2.43	392	796	637	21.36	1.72	336	1486	828	21.01	2.74
169	694	22	20.02	2.88	200	1245	332	20.27	1.51	128	663	638	19.79	1.74	311	897	831	20.88	2.53
109	1207	25	19.62	2.72	263	245	333	20.63	2.66	359	1033	638	21.16	1.78	435	1423	831	21.70	1.66
356	1033	30	21.15	2.73	177	433	343	20.10	2.20	448	222	640	21.79	1.93	63	743	832	19.17	3.03
440	29	31	21.74	1.69	319	376	345	20.93	2.56	172	1305	642	20.07	2.34	429	49	832	21.66	1.18
321	417	37	20.96	1.57	155	595	348	19.94	2.90	351	626	642	21.12	2.49	161	887	840	19.98	2.62
27	279	38	18.52	2.28	103	1010	355	19.55	2.23	251	752	645	20.52	2.99	226	877	846	20.41	1.56
237	242	47	20.47	1.81	323	984	357	20.96	2.23	13	1224	649	17.88	3.27	249	597	847	20.52	2.79
453	321	54	21.90	2.08	11	361	361	17.86	1.94	55	826	649	18.98	2.87	176	779	851	20.10	1.39
146	205	66	19.88	1.47	242	166	364	20.49	1.18	257	917	654	20.60	2.81	154	690	852	19.94	2.86
125	1194	67	19.76	2.79	121	83	367	19.74	2.72	303	693	655	20.83	2.94	113	330	855	19.66	2.32
35	823	75	18.68	2.54	283	1101	379	20.74	2.22	153	879	657	19.92	2.85	316	576	856	20.91	2.50
350	286	79	21.11	2.36	265	130	385	20.63	2.70	220	760	657	20.37	2.82	277	1328	858	20.70	3.64
376	568	81	21.25	2.08	300	180	399	20.82	3.04	245	816	659	20.50	1.35	421	407	858	21.56	2.06
162	1234	87	19.98	3.10	173	1338	400	20.07	2.60	228	641	664	20.42	2.61	29	680	861	18.52	2.74
234	804	90	20.45	2.88	430	1251	400	21.66	2.44	34	655	665	18.67	2.98	183	22	861	20.13	2.03
439	1212	96	21.74	1.27	410	614	405	21.46	2.50	43	846	670	18.82	2.86	165	854	865	20.00	1.87
402	328	105	21.41	1.43	42	1406	412	18.82	2.36	366	760	671	21.21	2.21	119	843	871	19.70	3.06
3	86	113	16.70	1.97	446	1114	418	21.79	1.86	45	598	674	18.86	3.05	250	509	871	20.52	2.59
252	1120	113	20.53	2.32	202	262	423	20.28	2.68	116	1241	676	19.69	2.02	413	276	872	21.49	1.23
306	1014	113	20.85	1.30	141	762	428	19.84	2.63	227	767	679	20.41	3.50	9	771	875	17.83	2.90
114	708	117	19.68	2.36	18	361	430	18.21	2.84	231	481	679	20.45	1.46	239	1016	876	20.48	1.55
132	1131	117	19.81	2.75	110	1347	435	19.63	1.78	25	1423	682	18.44	2.88	151	618	878	19.91	1.24
271	1142	120	20.66	2.76	223	675	437	20.39	1.33	388	1314	682	21.34	1.60	374	208	890	21.25	1.08
179	1218	122	20.10	2.79	278	1311	440	20.71	1.21	256	682	684	20.59	2.11	76	1459	897	19.34	2.76
156	1237	128	19.95	1.10	307	412	443	20.85	2.38	149	933	685	19.89	2.94	269	1081	899	20.65	1.09
90	676	135	19.44	2.03	175	459	444	20.09	2.53	99	583	686	19.52	3.11	214	449	901	20.34	2.87
285	599	135	20.75	2.56	295	970	455	20.81	2.19	409	554	690	21.45	1.57	49	784	902	18.92	2.61
209	122	137	20.33	1.73	442	1236	458	21.76	0.89	372	729	691	21.24	1.28	437	1198	903	21.71	1.60
404	822	141	21.42	2.43	387	285	460	21.34	0.98	357	1128	695	21.15	3.17	106	950	904	19.60	2.85
69	577	142	19.25	2.89	264	441	470	20.63	2.65	286	349	696	20.75	2.83	315	959	904	20.91	1.77
65	478	145	19.18	2.36	123	1116	474	19.75	3.38	88	138	697	19.42	3.12	129	841	905	19.80	2.11
229	346	159	20.42	3.44	197	802	475	20.22	2.74	450	12	701	21.80	1.97	335	279	905	21.00	2.76
135	471	162	19.82	2.61	310	601	477	20.88	2.35	145	419	704	19.87	2.17	91	743	908	19.45	2.61
118	39	167	19.70	2.71	352	788	482	21.13	1.41	342	1363	704	21.05	1.94	340	1448	912	21.05	1.54
432	183	172	21.68	1.49	31	971	483	18.57	2.90	26	881	705	18.49	3.07	330	166	913	20.99	1.62
384	547	175	21.29	1.53	182	1346	487	20.13	1.82	170	175	718	20.03	3.85	142	700	921	19.84	2.83
361	839	178	21.16	2.32	395	74	492	21.37	1.57	80	760	719	19.35	2.93	126	242	923	19.77	1.72
288	1008	180	20.76	1.89	85	193	495	19.38	2.88	255	722	722	20.56	3.14	16	431	926	18.08	0.72

TABLE 3—Continued

Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N
371	191	188	21.23	3.07	354	524	495	21.15	1.88	56	324	723	19.02	2.03	94	726	931	19.47	2.52
326	210	189	20.98	2.31	22	1020	496	18.39	2.83	236	998	723	20.46	2.03	136	768	932	19.82	2.68
418	368	189	21.51	1.17	375	1027	506	21.25	2.15	353	1259	731	21.13	1.83	19	1395	936	18.31	3.02
33	1351	190	18.67	2.94	389	695	506	21.34	2.38	53	208	735	18.95	3.14	32	1169	936	18.60	2.96
174	794	194	20.09	1.45	14	326	516	17.95	3.05	213	897	737	20.34	2.47	370	819	943	21.22	2.69
272	1136	200	20.67	2.46	282	655	519	20.74	2.19	166	617	739	20.00	2.50	235	210	944	20.46	0.71
385	870	201	21.30	3.37	107	777	520	19.61	2.53	78	161	742	19.35	2.39	148	285	950	19.89	1.99
322	1086	205	20.96	1.86	360	927	521	21.16	2.37	84	694	743	19.38	2.77	289	899	950	20.76	2.93
5	823	208	17.19	5.20	204	1156	525	20.30	2.60	403	110	745	21.41	2.75	181	783	960	20.12	1.97
46	1394	209	18.87	3.00	346	675	528	21.09	2.55	10	751	750	17.84	3.10	417	1071	960	21.50	2.30
12	1363	210	17.88	2.34	163	729	540	19.99	2.77	308	646	752	20.85	2.37	60	707	961	19.06	2.03
138	1429	219	19.83	2.83	6	787	547	17.20	2.00	41	904	753	18.81	2.93	150	206	962	19.90	1.99
207	786	223	20.32	2.25	112	41	549	19.64	2.00	61	706	753	19.07	3.03	51	1261	964	18.94	3.21
54	1324	228	18.98	0.74	290	1079	552	20.78	1.52	331	974	754	20.99	2.55	244	940	964	20.49	2.79
117	1165	229	19.70	2.04	343	148	554	21.06	2.53	111	891	760	19.63	2.82	393	748	964	21.36	1.92
38	773	235	18.73	2.83	221	1393	555	20.39	1.56	309	1207	763	20.87	1.58	258	1149	971	20.60	3.30
104	402	240	19.56	2.79	297	129	562	20.82	1.07	164	630	764	20.00	1.71	152	690	974	19.92	2.73
160	772	242	19.96	2.75	184	427	563	20.13	2.99	324	851	765	20.97	2.68	452	1351	978	21.88	1.97
422	599	245	21.56	2.08	275	154	565	20.70	2.11	219	806	767	20.37	2.45	96	982	979	19.50	3.01
4	99	248	17.16	3.35	280	719	568	20.72	1.87	58	746	772	19.03	3.17	157	688	979	19.95	2.64
291	1118	250	20.78	1.79	444	820	570	21.78	1.91	431	1030	773	21.67	1.40	407	1096	983	21.43	2.72
8	965	252	17.78	1.53	293	747	571	20.80	0.50	247	846	778	20.51	1.68	130	687	984	19.80	2.83
72	770	252	19.27	2.90	7	275	572	17.45	0.96	190	856	779	20.18	2.88	95	734	988	19.49	2.88
382	508	252	21.27	2.22	158	312	572	19.96	0.80	338	1268	783	21.04	1.78	143	604	990	19.85	3.03
195	828	254	20.21	2.27	248	255	572	20.52	2.65	363	776	785	21.18	2.29	355	583	994	21.15	2.11
23	1192	256	18.42	2.56	317	1490	577	20.92	2.43	369	9	789	21.22	0.93	137	1007	997	19.83	1.62
192	700	258	20.20	1.84	37	624	584	18.72	3.47	232	792	793	20.45	2.03	77	1213	1002	19.34	2.94
339	273	272	21.04	2.61	304	1149	593	20.83	3.37	115	991	794	19.69	1.37	71	751	1006	19.27	2.53
194	750	273	20.20	3.12	211	256	594	20.34	1.40	230	731	795	20.44	3.00	167	652	1011	20.01	2.91
397	971	273	21.37	2.13	386	767	603	21.32	1.61	93	124	796	19.47	2.34	180	583	1017	20.11	1.32
284	1493	274	20.75	0.64	39	837	606	18.79	1.50	124	696	798	19.76	2.81	108	523	1018	19.62	2.37
215	112	278	20.35	1.25	206	132	608	20.32	1.74	378	826	799	21.25	2.39	120	1132	1020	19.73	2.32
328	1268	278	20.98	2.69	320	285	608	20.95	2.14	70	1012	800	19.26	2.91	216	782	1021	20.35	3.22
274	1236	279	20.68	3.23	198	58	614	20.24	1.61	21	551	801	18.36	3.03	420	1091	1023	21.56	2.25
347	850	283	21.09	3.14	15	538	620	18.07	2.67	62	930	803	19.16	2.89	36	1019	1030	18.70	2.51
345	749	284	21.09	1.48	168	678	623	20.01	2.79	133	817	810	19.81	2.88	140	1394	1030	19.84	2.38
87	1309	285	19.41	2.30	66	691	625	19.18	2.85	238	792	810	20.47	2.91	189	658	1035	20.17	3.09
101	666	301	19.54	2.84	24	739	628	18.42	2.87	122	1354	814	19.75	2.76	217	1108	1040	20.36	1.74
139	1200	303	19.84	1.54	131	649	628	19.81	2.81	105	850	823	19.60	2.67	423	185	1042	21.57	0.72
224	31	304	20.40	1.32	201	454	631	20.28	1.38	102	507	824	19.54	3.01	334	840	1043	21.00	2.46
50	1142	1045	18.92	2.88	441	964	1142	21.74	2.56	329	601	1259	20.98	2.64	30	306	1363	18.54	2.83
279	581	1048	20.71	2.58	59	1166	1143	19.04	1.54	425	691	1263	21.58	2.46	436	208	1363	21.70	2.49
20	757	1055	18.33	3.67	412	405	1146	21.49	1.14	83	426	1271	19.38	1.89	302	919	1364	20.83	2.40
377	1282	1055	21.25	2.43	246	327	1150	20.50	1.97	67	1458	1272	19.22	2.45	379	285	1365	21.25	2.55
186	717	1057	20.16	2.24	171	607	1151	20.05	1.42	396	985	1279	21.37	2.35	81	262	1375	19.37	2.63
210	1034	1060	20.33	2.77	266	352	1158	20.63	3.19	332	578	1283	21.00	1.44	428	664	1376	21.61	2.54
433	476	1061	21.69	1.38	449	721	1159	21.80	1.22	365	193	1292	21.21	1.63	427	875	1378	21.59	2.01
400	824	1062	21.38	1.96	454	852	1160	21.97	1.22	301	1265	1295	20.83	2.26	261	1051	1384	20.62	2.66
434	52	1064	21.70	1.71	79	1000	1164	19.35	2.63	445	390	1296	21.79	0.66	48	318	1390	18.90	2.95
134	1242	1068	19.81	3.26	292	820	1175	20.80	0.64	419	815	1303	21.55	1.49	401	176	1391	21.40	0.64
394	1274	1069	21.37	1.44	398	372	1179	21.37	2.59	262	635	1304	20.63	1.57	28	677	1395	18.52	2.95
424	840	1073	21.57	2.05	47	1147	1181	18.88	3.00	144	1028	1305	19.86	2.74	225	412	1397	20.40	2.57
243	926	1077	20.49	2.09	68	174	1182	19.22	3.74	222	1460	1305	20.39	1.54	327	424	1397	20.98	2.38
367	1449	1077	21.21	2.18	276	931	1182	20.70	2.53	305	573	1311	20.84	2.37	254	388	1402	20.56	2.53
75	796	1079	19.31	2.99	368	781	1183	21.21	2.99	127	1098	1312	19.78	2.86	100	779	1415	19.53	3.03
240	1140	1081	20.48	1.99	260	875	1184	20.61	3.78	373	650	1326	21.24	2.01	188	478	1417	20.17	3.13
399	707	1084	21.38	1.33	185	148	1193	20.15	2.89	40	981	1334	18.79	2.93	1	1444	1421	16.58	1.63
408	177	1085	21.44	2.02	86	210	1196	19.40	0.42	57	1194	1334	19.03	2.31	349	523	1421	21.10	2.50
426	428	1091	21.58	2.92	438	1044	1201	21.73	1.20	259	1247	1335	20.61	2.25	191	197	1423	20.19	2.58
415	1312	1094	21.49	2.45	341	255	1203	21.05	1.86	64	1232	1338	19.17	3.11	273	675	1446	20.67	3.06
451	616	1094	21.85	2.09	337	1096	1204	21.03	2.77	314	788	1338	20.91	1.80	73	26	1449	19.28	1.92
298	961	1100	20.82	1.64	196	813	1208	20.22	2.65	344	1220	1338	21.06	3.02	233	128	1451	20.45	2.40
205	1255	1101	20.31	2.64	381	836	1208	21.26	1.71	380	567	1338	21.26	0.97	241	775	1452	20.48	2.85
296	1004	1103	20.81	2.96	97	1144	1216	19.51	2.23	294	1413	1339	20.80	2.58	187	696	1454	20.17	2.53
348	383	1103	21.10	1.81	253	352	1221	20.56	2.10	199	26	1341	20.24	2.70	416	751	1456	21.50	1.92
405	821	1105	21.43	1.95	287	496	1221	20.75	3.24	414	689	1343	21.49	1.87	267	757	1466	20.64	2.75
44	1443	1108	18.84	2.30	74	1442	1231	19.29	1.45	52	613	1344	18.95	2.98	89	432	1468	19.43	3.20
212	1078	1115	20.34	1.71	268	1187	1237	20.64	3.51	98	810	1349	19.52	2.44	318	1118	1469	20.92	2.22

TABLE 3—Continued

Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N	Galaxy	X	Y	N	J-N
110	1063	55	20.64	1.58	199	1424	420	21.58	2.07	198	12	643	21.57	2.39	190	877	953	21.49	1.68
2	1367	61	16.70	2.37	139	1240	421	21.02	2.58	207	1245	644	21.66	2.00	126	1358	958	20.87	1.66
66	1116	75	20.13	2.06	141	60	422	21.03	1.96	39	1483	650	19.47	2.83	133	24	964	20.96	1.81
112	1344	80	20.70	4.64	189	187	454	21.46	1.65	81	547	660	20.34	0.87	22	125	967	18.68	3.06
136	1412	84	20.99	1.67	5	295	456	17.27	1.90	180	1052	660	21.35	2.30	124	108	968	20.84	1.26
147	225	91	21.07	0.99	106	555	458	20.62	1.54	103	574	661	20.59	2.24	56	1014	970	19.91	3.77
78	762	97	20.32	1.80	116	360	475	20.73	3.50	194	888	662	21.55	2.03	125	549	989	20.87	1.26
92	873	97	20.48	2.28	143	314	478	21.04	2.55	95	1074	664	20.52	0.30	175	617	1042	21.34	1.57
188	1236	97	21.45	2.94	128	10	482	20.88	2.75	132	482	670	20.92	2.64	20	1331	1055	18.51	2.97
208	113	97	21.67	1.88	30	552	486	19.20	1.82	91	861	673	20.48	1.45	145	1470	1055	21.06	2.39
89	975	99	20.47	1.11	7	97	487	17.41	2.57	85	875	674	20.40	0.81	61	51	1057	20.05	4.10
129	119	104	20.90	2.09	80	605	488	20.33	2.64	225	59	685	21.94	1.97	149	621	1065	21.07	3.42
43	1421	118	19.58	2.46	77	1235	490	20.29	2.16	193	529	696	21.52	3.23	209	824	1086	21.70	2.03
105	1059	130	20.61	2.26	195	324	501	21.57	1.70	202	741	707	21.62	2.00	70	1132	1091	20.20	1.77
160	614	136	21.18	2.05	171	298	505	21.32	2.22	29	731	709	19.19	2.49	215	963	1096	21.78	2.08
123	1164	138	20.83	3.41	165	1418	513	21.22	1.84	131	1026	709	20.92	1.60	15	1415	1100	18.22	2.99
69	539	141	20.19	2.33	159	540	518	21.17	2.47	214	226	714	21.78	1.10	210	686	1103	21.72	1.37
115	307	148	20.73	1.87	155	1071	528	21.16	1.86	104	1026	718	20.60	2.89	35	776	1106	19.42	1.53
28	900	150	19.06	2.86	21	363	531	18.68	2.93	154	1033	719	21.14	2.56	55	756	1107	19.90	0.91
84	997	154	20.36	2.98	37	319	531	19.45	2.91	98	1125	724	20.53	4.14	48	667	1121	19.78	2.59
67	718	163	20.13	2.10	118	269	544	20.76	2.49	216	691	731	21.80	1.66	203	768	1124	21.63	1.28
137	84	168	21.01	2.68	226	614	545	21.95	1.33	158	290	753	21.17	1.31	26	950	1134	19.03	2.57
182	968	190	21.39	2.68	220	1129	546	21.85	3.08	50	1069	756	19.79	2.73	221	1198	1136	21.86	2.20
4	1093	191	17.07	2.74	113	979	547	20.72	1.93	64	909	756	20.09	0.86	90	1186	1141	20.47	2.27
59	1371	196	20.02	2.61	200	204	553	21.59	1.60	186	583	756	21.44	1.26	134	639	1144	20.98	2.05
122	371	198	20.83	1.26	140	949	561	21.03	0.86	179	430	767	21.35	2.57	170	413	1157	21.27	2.04
218	689	200	21.84	0.75	212	574	575	21.73	1.81	108	1205	772	20.62	4.08	206	235	1157	21.65	1.39
49	1187	208	19.79	0.83	44	1019	578	19.58	2.50	111	1249	790	20.66	1.54	174	673	1158	21.34	0.70
24	1104	210	18.94	2.82	184	584	580	21.41	2.40	11	1180	792	18.01	2.71	224	1156	1159	21.94	1.68
102	739	219	20.58	1.27	54	140	582	19.89	2.77	192	1012	801	21.52	2.35	223	138	1162	21.89	0.67
41	1397	222	19.57	3.61	34	563	587	19.41	1.33	101	552	814	20.58	1.50	36	615	1173	19.42	2.86
58	1379	224	19.98	2.16	27	1218	589	19.06	2.81	164	598	818	21.22	0.96	100	936	1176	20.55	1.74
109	253	234	20.63	2.42	33	929	591	19.40	1.74	65	1408	822	20.09	1.96	204	348	1179	21.64	0.68
217	474	260	21.82	2.14	99	73	600	20.54	2.03	83	550	835	20.35	2.12	60	1182	1180	20.05	2.23
177	727	262	21.34	2.68	38	156	604	19.46	2.51	222	1142	846	21.88	1.71	166	1239	1187	21.22	2.42
121	1334	267	20.81	2.39	228	1266	607	21.98	2.86	12	1381	854	18.06	1.69	23	988	1195	18.69	3.25
51	1342	277	19.83	3.10	157	1429	609	21.17	1.29	71	1391	867	20.20	3.17	138	1136	1198	21.02	1.42
173	455	308	21.33	2.70	94	990	610	20.51	3.14	146	903	878	21.07	1.34	150	737	1207	21.09	2.64
163	327	317	21.21	1.34	176	536	613	21.34	1.49	52	308	905	19.84	2.77	88	1208	1211	20.44	2.47
76	1394	321	20.29	2.12	32	1004	617	19.26	3.07	156	161	907	21.16	2.31	187	299	1213	21.44	3.49
79	1197	322	20.33	2.73	62	1123	620	20.06	2.48	196	1040	908	21.57	1.85	219	1286	1214	21.85	2.12
151	1120	1229	21.11	2.43	87	662	1273	20.43	2.76	68	328	1358	20.17	3.21	47	119	1440	19.77	1.24
10	776	1233	17.94	1.57	16	1417	1278	18.23	1.54	63	1216	1379	20.07	3.18	152	425	1450	21.12	2.22
31	901	1237	19.21	2.73	82	1344	1303	20.34	2.40	191	749	1395	21.51	1.78	201	680	1450	21.61	2.77
117	70	1247	20.74	1.98	42	662	1304	19.58	1.23	130	953	1397	20.91	1.84	135	238	1453	20.98	2.32
205	288	1249	21.65	1.55	142	170	1314	21.04	1.60	169	1062	1400	21.25	2.09	13	22	1455	18.11	1.54
161	108	1256	21.20	1.49	53	961	1320	19.86	2.75	8	246	1408	17.60	2.17	14	1290	1457	18.22	1.76
172	124	1261	21.32	4.01	45	81	1336	19.63	2.67	114	1071	1409	20.73	1.49	96	620	1458	20.52	2.79
144	948	1265	21.06	1.95	3	269	1344	17.07	2.67	40	1356	1430	19.50	1.73	74	1325	1468	20.25	1.05
57	905	1272	19.94	2.67	6	667	1358	17.41	1.58	181	167	1430	21.37	2.64	17	432	1469	18.39	1.11

TABLE 4
ABELL 520 PHOTOMETRY

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
Cluster Center																			
85	737	13	18.86	1.14	189	1032	316	19.72	2.64	239	336	622	20.24	1.24	217	399	861	19.98	1.72
275	43	18	20.45	2.01	93	137	317	18.91	0.99	129	943	630	19.26	2.05	210	799	862	19.93	1.83
90	826	39	18.89	1.04	218	845	317	19.98	1.77	391	1269	640	21.22	1.97	172	659	869	19.57	2.05
79	85	40	18.76	1.14	360	564	320	21.01	0.74	153	873	653	19.43	1.88	212	1256	870	19.94	1.31
186	931	41	19.71	1.79	77	737	325	18.73	2.02	62	984	658	18.65	1.17	33	269	871	17.93	2.17
194	1163	45	19.82	1.96	433	348	325	21.56	1.53	450	1400	661	21.78	1.71	84	980	871	18.85	1.38
366	825	50	21.05	1.39	289	590	344	20.58	1.68	262	1070	663	20.38	1.70	59	708	877	18.59	2.02
293	1381	57	20.61	1.68	305	1102	354	20.69	1.73	177	378	670	19.60	1.16	436	527	877	21.63	1.31
320	580	58	20.78	1.60	265	1052	357	20.38	2.38	418	1406	671	21.41	1.42	51	486	883	18.39	2.03
222	293	64	20.00	1.73	110	289	360	19.06	1.81	138	637	672	19.32	2.07	209	79	883	19.92	2.37
152	826	71	19.43	1.75	284	646	360	20.54	2.51	3	93	674	17.00	1.99	352	739	887	20.97	1.88
69	638	72	18.69	1.52	206	60	369	19.92	1.50	7	699	674	17.17	1.96	440	447	892	21.65	1.02
181	763	75	19.64	2.74	123	442	372	19.22	1.73	83	872	685	18.84	1.93	10	424	894	17.49	1.99
233	168	84	20.17	1.66	150	1075	374	19.41	2.34	57	1128	690	18.51	0.80	162	878	896	19.49	2.09
437	90	85	21.63	1.29	333	153	377	20.85	1.14	303	709	690	20.68	1.97	446	851	902	21.75	1.80
413	117	88	21.38	1.25	198	565	380	19.85	1.61	211	107	700	19.93	2.26	328	551	906	20.82	2.22
419	160	96	21.42	1.62	447	474	380	21.76	1.02	443	830	701	21.70	1.90	216	499	909	19.98	1.02
200	243	103	19.85	2.07	50	1130	384	18.39	2.14	238	432	702	20.23	2.09	36	1012	911	18.04	2.01
272	1201	104	20.45	1.85	331	816	385	20.84	1.81	356	260	703	20.98	1.53	112	528	913	19.07	1.92
355	81	108	20.98	1.87	134	351	386	19.28	2.09	252	652	705	20.33	1.95	136	31	913	19.32	1.35

TABLE 4—Continued

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
277	803	116	20.47	1.38	287	938	388	20.55	2.20	259	1431	706	20.36	1.82	251	1264	913	20.32	1.29
60	322	124	18.63	2.16	397	624	389	21.25	0.97	327	797	712	20.82	1.43	395	347	914	21.24	2.74
2	731	130	16.89	1.21	384	283	397	21.17	3.27	346	615	717	20.95	1.49	80	1068	916	18.77	1.96
399	362	136	21.25	3.43	215	133	398	19.95	2.27	228	882	722	20.12	1.85	245	999	917	20.28	1.93
23	372	145	17.78	2.04	290	468	399	20.58	1.77	456	1023	723	21.98	2.85	148	1014	921	19.38	2.21
52	396	145	18.40	2.27	378	677	418	21.13	1.21	5	483	725	17.03	1.77	257	845	926	20.36	1.64
353	742	146	20.97	2.38	16	874	426	17.62	1.62	184	18	727	19.68	1.51	266	742	927	20.41	1.49
285	33	149	20.54	3.58	385	952	432	21.18	1.63	240	650	729	20.24	1.85	171	283	929	19.56	1.88
193	1194	158	19.80	2.39	405	1113	432	21.30	1.14	377	126	729	21.12	1.91	243	585	937	20.26	2.36
253	1001	161	20.34	1.81	424	856	433	21.44	1.22	135	86	736	19.29	1.92	420	664	938	21.42	3.33
452	848	168	21.82	1.88	108	589	440	19.04	2.28	370	822	740	21.07	2.15	137	313	942	19.32	1.88
390	1431	169	21.21	2.62	49	759	443	18.39	1.24	313	851	743	20.73	1.94	82	574	943	18.82	2.06
389	247	178	21.20	1.12	143	1020	444	19.34	2.08	319	56	744	20.77	1.52	98	726	944	18.93	2.22
170	920	179	19.56	1.83	309	1007	450	20.72	1.96	8	750	751	17.27	2.04	341	621	945	20.89	2.36
430	727	179	21.50	1.13	438	1078	453	21.64	0.94	28	803	754	17.89	1.96	208	1433	946	19.92	2.07
68	902	181	18.68	1.90	173	330	455	19.58	1.21	132	1350	761	19.27	2.19	53	775	947	18.43	1.97
273	1296	182	20.45	1.74	24	744	458	17.83	2.01	197	406	764	19.84	2.17	414	35	949	21.39	1.49
131	370	191	19.27	2.10	106	1375	462	19.04	1.43	202	854	767	19.87	1.98	95	745	953	18.91	2.05
125	722	204	19.24	1.92	169	686	462	19.55	2.02	73	711	771	18.71	2.15	179	1395	953	19.64	2.04
296	654	204	20.64	1.84	241	411	470	20.24	2.57	457	523	777	22.02	0.43	386	805	954	21.18	2.33
124	1070	207	19.22	2.03	445	1015	470	21.72	0.74	276	714	781	20.46	1.84	201	1451	957	19.86	1.29
31	278	208	17.92	0.88	312	427	472	20.73	1.89	38	648	785	18.07	1.79	280	1127	960	20.49	2.85
383	1311	208	21.15	1.44	56	990	476	18.46	1.93	207	1392	787	19.92	1.83	117	581	964	19.13	1.92
55	1292	211	18.46	1.95	118	1097	479	19.17	0.80	409	1325	788	21.35	1.55	246	491	968	20.30	1.69
35	217	213	18.03	2.15	48	837	480	18.37	1.23	165	214	790	19.53	2.08	113	1153	972	19.07	2.20
264	428	223	20.38	2.31	119	693	480	19.19	1.47	350	526	793	20.97	0.95	330	1394	972	20.84	1.85
229	170	224	20.14	1.89	283	749	480	20.52	2.02	107	439	796	19.04	2.05	15	101	974	17.61	2.12
221	1092	226	20.00	1.64	354	194	486	20.98	1.77	160	1124	799	19.48	2.03	411	1131	975	21.35	2.97
223	909	226	20.01	2.37	104	1201	493	19.00	2.43	401	454	808	21.27	0.99	187	1479	984	19.71	1.86
323	700	231	20.79	2.17	423	981	502	21.43	2.02	451	975	808	21.82	0.66	244	1163	987	20.27	1.64
369	410	231	21.07	3.50	388	332	508	21.19	1.66	47	276	809	18.30	0.94	155	80	988	19.44	1.92
21	463	234	17.76	2.00	64	1055	510	18.66	2.05	190	954	814	19.73	1.59	126	967	989	19.24	2.11
180	864	234	19.64	2.15	63	830	512	18.66	1.90	453	634	814	21.84	1.25	415	754	991	21.40	1.03
304	198	237	20.68	1.83	326	1489	512	20.82	0.64	282	1116	815	20.51	1.36	299	703	994	20.66	0.85
242	944	241	20.25	1.85	297	985	516	20.64	3.16	91	922	816	18.89	1.74	379	137	996	21.13	1.61
300	476	246	20.66	2.10	364	551	517	21.03	1.70	133	772	816	19.27	2.67	247	109	1001	20.30	1.93
311	300	249	20.72	2.88	232	813	519	20.16	1.79	70	711	818	18.69	1.95	159	295	1004	19.47	1.97
176	1426	250	19.59	2.40	58	731	523	18.52	1.22	100	1087	823	18.96	2.04	99	449	1006	18.94	1.87
255	469	251	20.35	2.59	226	359	524	20.05	1.87	263	824	823	20.38	1.95	130	217	1010	19.27	1.76
205	29	259	19.91	2.56	342	130	526	20.90	1.52	76	442	826	18.72	2.06	336	979	1012	20.86	2.46
301	1273	259	20.66	1.84	236	238	530	20.20	2.44	406	1349	826	21.30	1.44	42	1482	1014	18.15	2.10
116	44	261	19.11	2.38	393	851	530	21.24	1.62	237	913	827	20.22	1.91	178	924	1026	19.63	1.99
335	1303	263	20.85	1.84	295	1293	532	20.63	2.26	448	759	828	21.77	0.62	20	1155	1027	17.74	2.04
308	31	273	20.72	1.52	142	552	535	19.34	1.89	147	279	832	19.38	1.95	102	360	1033	18.98	1.93
307	445	284	20.71	2.35	120	1195	545	19.19	1.83	17	80	834	17.67	1.06	39	1463	1041	18.12	1.94
220	1244	285	19.99	1.69	30	683	549	17.89	2.00	27	861	834	17.87	2.01	392	658	1042	21.23	1.76
1	163	286	16.48	1.39	316	101	550	20.75	2.25	86	1230	834	18.86	1.95	361	1062	1044	21.01	2.26
71	889	288	18.70	2.03	167	541	562	19.54	1.92	428	337	834	21.49	1.74	45	770	1050	18.29	1.97
204	1030	289	19.91	1.89	12	630	563	17.55	2.03	254	197	835	20.35	1.90	65	966	1056	18.66	2.06
315	503	289	20.75	2.04	25	1434	564	17.83	2.20	306	421	836	20.70	3.09	114	798	1056	19.09	1.11
339	718	290	20.88	1.77	214	709	571	19.95	2.09	318	664	837	20.77	1.50	441	746	1056	21.67	1.75
432	1151	298	21.53	1.17	26	797	574	17.85	1.89	11	237	840	17.52	1.93	101	572	1059	18.98	1.82
78	1424	303	18.76	0.82	149	708	585	19.38	1.95	368	710	842	21.07	1.73	6	1073	1061	17.08	1.94
195	1086	303	19.82	1.89	359	867	585	21.01	1.53	46	774	843	18.29	2.07	122	361	1061	19.22	1.48
105	1354	304	19.04	0.88	161	678	589	19.49	1.97	337	845	845	20.87	2.75	29	1107	1063	17.89	1.98
127	1186	304	19.25	1.87	260	1442	600	20.37	2.44	196	1271	849	19.84	1.76	199	1305	1064	19.85	1.93
288	1343	304	20.57	1.82	231	93	606	20.15	1.96	168	75	850	19.55	1.35	227	391	1065	20.08	2.19
274	655	311	20.45	1.78	348	861	606	20.95	2.50	234	1101	852	20.19	1.52	74	545	1067	18.72	1.89
248	647	312	20.31	2.01	387	1144	610	21.19	1.20	235	702	852	20.20	1.95	61	152	1070	18.64	1.82
41	185	315	18.15	1.88	4	1036	614	17.02	2.03	269	127	853	20.42	1.92	344	23	1072	20.93	2.07
115	708	316	19.09	2.04	146	648	620	19.35	1.88	317	590	856	20.76	2.18	321	186	1077	20.79	1.66
249	544	1079	20.31	2.46	111	285	1164	19.07	0.85	267	1397	1267	20.42	1.66	151	84	1419	19.43	1.30
18	715	1080	17.70	2.10	426	714	1165	21.48	1.33	66	597	1273	18.67	1.98	268	420	1421	20.42	1.76
156	1264	1081	19.45	2.24	9	1101	1167	17.45	1.97	343	517	1282	20.90	2.09	88	262	1422	18.88	1.83
213	523	1083	19.94	2.33	185	247	1181	19.70	1.97	183	1322	1283	19.66	1.76	92	429	1430	18.90	2.14
158	787	1089	19.47	1.74	203	856	1187	19.88	1.36	298	819	1283	20.65	2.54	87	620	1432	18.87	1.94
128	1370	1091	19.25	2.39	394	1323	1187	21.24	2.15	157	931	1294	19.46	1.76	402	862	1432	21.27	2.07
230	836	1091	20.15	1.97	225	807	1188	20.02	1.75	224	460	1297	20.02	1.67	412	73	1433	21.37	1.41
357	599	1091	20.99	1.95	362	414	1188	21.02</											

TABLE 4—Continued

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
417	923	1133	21.40	2.23	103	411	1232	19.00	2.40	454	702	1372	21.92	1.39	410	582	1468	21.35	2.72
365	179	1135	21.04	1.60	192	302	1235	19.80	0.97	75	144	1375	18.72	1.90	325	1430	1470	20.81	3.21
94	214	1145	18.91	1.98	382	1260	1239	21.15	1.65	72	602	1377	18.70	2.22	374	340	1479	21.10	2.74
44	541	1150	18.28	1.99	270	102	1240	20.42	2.25	371	233	1378	21.08	1.20	347	1428	1481	20.95	2.72
121	204	1150	19.20	1.83	375	1470	1244	21.11	1.75	351	649	1382	20.97	2.20	310	1292	1483	20.72	2.47
439	1073	1151	21.64	1.94	381	1360	1244	21.14	2.28	292	1152	1389	20.59	1.78	422	86	1484	21.43	1.53
338	1181	1152	20.88	2.23	261	1453	1245	20.38	1.83	219	308	1390	19.98	2.46	459	631	1486	22.08	1.57
279	494	1160	20.49	2.91	404	555	1246	21.29	1.83	322	485	1391	20.79	1.96	154	378	1488	19.44	1.87
89	1171	1161	18.88	2.06	67	1470	1262	18.68	1.09	37	1053	1415	18.05	2.02	400	703	1488	21.26	1.60
14	593	1162	17.59	1.69	416	55	1262	21.40	2.01	458	207	1415	22.06	0.82	19	299	1489	17.72	1.22
164	268	1163	19.52	0.84	396	1106	1265	21.24	2.44	324	894	1418	20.81	1.56					
Blank Field																			
163	1068	16	20.94	2.14	164	1411	319	20.94	4.56	130	623	631	20.44	1.27	17	391	888	18.10	0.98
191	459	18	21.35	1.81	29	665	341	18.68	2.48	98	711	638	19.95	0.99	76	1382	894	19.64	2.51
92	910	26	19.86	0.88	135	923	349	20.59	1.65	148	1458	641	20.76	1.84	63	1031	910	19.36	2.29
115	1313	26	20.17	2.24	10	1031	350	17.71	1.27	110	798	644	20.09	1.47	134	667	917	20.58	2.03
150	1077	30	20.76	2.86	187	1171	358	21.30	1.38	121	1269	644	20.28	2.39	161	211	917	20.92	1.58
125	1484	52	20.35	1.65	211	1430	361	21.55	0.72	232	539	647	21.88	1.48	46	1221	924	18.98	2.25
19	1445	53	18.21	2.08	38	490	364	18.85	1.16	47	795	655	18.99	2.31	216	1093	932	21.58	0.77
175	416	56	21.09	1.86	25	1217	369	18.50	0.97	128	951	666	20.40	1.61	4	131	934	17.29	2.09
21	1195	59	18.30	2.30	122	1471	377	20.30	2.16	51	186	670	19.06	2.40	26	869	942	18.51	1.13
210	54	70	21.52	0.73	127	1199	384	20.39	1.99	141	365	674	20.71	1.52	108	903	943	20.07	2.42
219	1201	71	21.64	1.56	151	1358	385	20.77	2.59	80	1417	685	19.65	1.59	73	1094	950	19.56	2.29
27	820	74	18.54	1.93	153	221	388	20.79	2.33	6	1118	689	17.41	2.09	9	846	959	17.62	1.11
79	1156	77	19.65	1.27	44	589	393	18.92	1.47	173	338	694	21.06	2.48	32	970	967	18.74	2.10
45	1335	79	18.97	1.31	144	674	396	20.74	2.20	217	201	697	21.59	1.45	114	135	969	20.16	0.82
146	685	80	20.75	1.55	205	1010	398	21.46	2.36	235	622	705	22.01	1.48	233	319	971	21.92	0.97
206	1170	80	21.47	1.91	81	1013	417	19.68	2.24	1	226	710	17.15	1.40	72	1055	975	19.55	2.49
234	371	83	21.97	1.01	103	1137	421	20.03	1.16	75	681	714	19.63	2.25	188	994	978	21.30	1.93
64	213	107	19.39	1.21	126	535	421	20.38	1.45	229	306	729	21.78	2.84	157	898	981	20.89	0.96
215	636	121	21.57	0.71	228	408	431	21.78	1.07	159	927	737	20.91	1.33	236	334	981	22.03	0.55
53	1319	128	19.08	2.41	184	1297	434	21.27	1.85	116	1251	742	20.20	1.60	169	673	985	21.02	3.14
200	635	128	21.42	1.32	221	802	435	21.68	2.44	13	1410	745	17.94	1.88	69	736	986	19.50	1.49
165	908	142	20.97	2.10	209	554	436	21.52	0.49	97	1447	745	19.95	1.18	100	618	995	19.97	2.15
12	661	155	17.84	1.39	124	512	444	20.34	1.29	50	163	757	19.05	2.43	152	70	1001	20.79	1.77
207	1407	157	21.48	1.71	189	1248	471	21.35	1.18	170	1012	757	21.03	1.30	176	942	1006	21.12	1.24
133	886	166	20.54	2.13	183	1429	478	21.25	2.20	181	631	765	21.18	2.37	196	1046	1011	21.37	1.39
52	795	175	19.07	2.01	226	1487	483	21.76	2.22	90	281	767	19.83	2.02	182	1290	1025	21.24	1.83
203	1139	190	21.42	2.21	123	74	490	20.32	1.80	93	1452	769	19.88	2.53	42	48	1029	18.87	2.21
107	528	193	20.07	2.38	223	1020	492	21.72	0.92	117	709	773	20.20	2.42	178	1114	1036	21.16	1.90
204	1294	194	21.43	3.12	74	833	495	19.56	2.42	43	842	786	18.91	0.95	179	1385	1036	21.17	2.20
14	93	196	17.97	2.29	11	73	510	17.72	0.94	8	1125	794	17.60	2.01	199	1340	1039	21.41	2.30
3	703	206	17.27	1.92	139	23	511	20.65	2.33	94	261	804	19.90	2.41	109	912	1049	20.08	1.47
195	383	209	21.37	1.30	162	900	532	20.93	1.53	36	1456	820	18.80	2.35	55	1249	1051	19.14	2.43
58	149	216	19.21	2.26	138	122	555	20.65	1.11	118	1060	821	20.24	1.92	137	1347	1053	20.63	2.00
54	1232	222	19.13	2.31	102	812	558	20.02	1.68	87	697	828	19.77	2.32	172	975	1055	21.05	2.34
213	208	222	21.55	2.99	194	960	563	21.37	1.58	89	892	832	19.83	1.35	5	607	1072	17.35	2.05
16	821	230	18.05	0.85	31	384	566	18.72	1.91	140	559	833	20.66	2.10	99	1045	1079	19.96	1.48
96	309	233	19.94	1.02	220	996	570	21.67	2.50	101	425	835	20.01	2.33	37	1402	1083	18.85	1.13
84	729	253	19.71	1.87	33	139	571	18.75	1.89	111	712	851	20.10	2.08	66	1180	1093	19.44	2.01
160	481	259	20.91	2.67	202	954	578	21.42	1.65	171	814	854	21.04	1.75	214	164	1095	21.56	1.54
112	138	261	20.12	1.93	40	1111	579	18.86	1.53	68	780	856	19.49	1.25	180	311	1098	21.17	1.89
91	313	263	19.85	1.32	240	176	589	22.08	1.34	120	1249	856	20.28	0.99	136	1094	1103	20.63	1.20
67	518	270	19.44	2.40	132	449	595	20.48	1.37	224	367	856	21.73	0.89	168	1246	1105	21.00	2.00
177	271	283	21.14	3.05	20	137	612	18.25	2.16	174	1256	864	21.08	1.98	65	502	1108	19.40	1.18
71	1481	289	19.55	1.09	231	1166	613	21.82	1.36	57	297	866	19.19	2.23	237	1134	1110	22.05	1.04
34	565	315	18.76	1.29	218	744	624	21.60	1.41	15	982	868	18.05	0.84	201	784	1112	21.42	1.05
149	867	316	20.76	1.98	131	259	629	20.45	1.26	60	233	869	19.25	2.36	28	832	1116	18.64	2.13
62	80	317	19.30	1.89	106	345	630	20.06	2.04	105	12	872	20.05	2.12	222	315	1138	21.71	1.49
230	1120	1150	21.79	1.98	145	538	1230	20.74	2.13	18	36	1310	18.15	1.43	49	1236	1408	19.02	2.30
166	1480	1163	20.99	2.15	119	517	1239	20.27	2.88	158	824	1316	20.90	2.42	186	950	1409	21.29	2.81
192	269	1167	21.35	2.68	104	1291	1240	20.03	1.83	22	183	1321	18.35	1.93	239	223	1431	22.07	0.30
143	313	1171	20.74	1.55	156	1268	1240	20.86	1.95	56	1281	1322	19.16	2.24	208	824	1444	21.51	3.03
2	1096	1173	17.18	1.40	61	732	1243	19.25	2.46	212	305	1332	21.55	1.07	129	319	1446	20.41	2.55
238	1161	1173	22.05	0.81	86	1457	1264	19.74	1.25	59	466	1336	19.23	2.19	147	518	1447	20.75	1.83
85	1371	1190	19.74	1.05	48	1440	1268	19.01	1.94	7	932	1338	17.47	1.30	41	350	1454	18.87	1.74
23	659	1191	18.41	1.30	78	1257	1271	19.65	1.33	30	271	1341	18.72	0.68	190	1214	1458	21.35	1.24
95	1472	1195	19.93	1.50	83	359	1275	19.70	2.14	35	293	1344	18.76	1.90	198	327	1460	21.38	2.63
167	988	1196	20.99	2.96	88	1283	1290	19.80	1.48										

TABLE 5
ABELL 777 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
83	1323	12	20.49	2.23	277	517	414	22.38	1.42	249	731	699	22.15	1.59	225	221	971	21.94	1.94
152	616	16	21.29	1.55	191	961	416	21.68	1.21	4	1195	706	18.34	2.20	196	446	979	21.72	2.02
39	1138	21	19.59	1.11	68	168	418	20.25	1.51	200	935	709	21.73	2.10	169	220	989	21.40	1.02
178	303	24	21.49	1.74	199	1279	427	21.73	1.51	207	781	716	21.81	2.75	81	556	994	20.47	1.94
118	344	45	20.88	1.38	157	870	433	21.30	1.36	295	331	724	22.48	0.62	58	914	998	20.05	1.98
288	640	48	22.43	2.15	171	981	433	21.40	1.85	284	611	733	22.41	2.07	8	298	1001	18.56	2.17
32	899	57	19.43	1.55	56	1388	440	20.00	1.43	87	837	736	20.55	1.83	182	1376	1001	21.55	2.39
10	590	59	18.72	0.82	159	1218	441	21.31	2.21	148	823	740	21.27	1.84	312	246	1004	22.61	1.82
322	799	70	22.66	0.99	275	528	442	22.36	0.98	50	653	747	19.81	1.82	289	1129	1005	22.44	1.31
271	518	74	22.31	1.57	108	1366	447	20.81	1.10	120	225	748	20.89	2.48	211	715	1014	21.85	1.69
278	582	83	22.38	1.62	218	960	453	21.88	1.34	22	751	750	19.29	2.17	268	340	1015	22.30	1.72
311	1029	104	22.61	1.60	151	370	454	21.28	1.58	258	442	756	22.24	1.03	15	1164	1022	18.96	1.89
241	51	106	22.10	2.35	160	1335	454	21.32	1.31	59	1282	757	20.05	1.86	324	76	1023	22.67	0.85
132	867	108	21.07	2.40	28	1178	457	19.39	2.08	272	54	757	22.31	1.87	18	840	1030	19.11	2.10
149	680	111	21.27	2.11	37	1303	466	19.51	2.32	266	428	760	22.29	2.19	25	1163	1030	19.33	1.73
262	1488	118	22.27	0.43	166	416	466	21.37	2.24	129	545	764	21.04	1.88	300	953	1041	22.53	1.80
115	1287	122	20.83	2.59	190	403	468	21.67	2.61	13	1091	772	18.88	0.93	158	480	1049	21.30	1.97
259	1389	123	22.25	1.65	72	1108	469	20.31	1.70	53	1032	772	19.93	2.43	213	393	1053	21.86	1.95
280	835	131	22.39	1.35	242	702	470	22.10	2.11	143	1334	776	21.21	1.21	85	1314	1057	20.51	2.33
31	757	139	19.42	2.23	286	964	470	22.43	1.41	139	407	782	21.14	1.90	214	365	1057	21.86	2.59
223	976	139	21.92	1.61	174	863	472	21.43	1.72	308	183	783	22.59	1.46	42	219	1061	19.72	1.63
216	1338	143	21.88	1.08	281	1480	476	22.39	1.59	105	1031	784	20.79	2.25	131	758	1066	21.07	1.12
133	420	149	21.08	1.86	285	1149	477	22.42	2.24	240	913	785	22.09	1.32	239	696	1077	22.07	2.05
49	838	168	19.80	2.58	62	1466	478	20.13	2.05	155	585	791	21.29	1.90	186	381	1083	21.61	1.62
76	445	174	20.42	0.97	325	978	492	22.68	1.12	98	773	794	20.68	1.32	202	788	1084	21.75	1.57
193	645	176	21.70	2.14	234	840	497	22.03	2.25	181	886	801	21.55	2.27	33	197	1092	19.46	1.82
100	177	182	20.69	1.72	124	1069	499	21.00	2.09	231	57	802	22.00	1.75	163	653	1095	21.33	1.50
94	568	184	20.65	2.22	195	886	502	21.71	1.07	12	619	806	18.82	2.15	165	724	1105	21.35	0.86
233	860	188	22.01	1.48	187	1403	517	21.62	0.95	180	722	808	21.53	2.19	43	154	1108	19.73	2.23
89	1262	192	20.56	2.14	185	1111	526	21.59	1.97	177	1306	810	21.47	1.69	263	96	1108	22.27	1.83
150	883	195	21.27	2.34	297	1364	526	22.48	1.92	7	640	811	18.49	2.19	65	1297	1111	20.21	0.92
306	1197	195	22.58	1.10	102	218	542	20.71	1.07	203	1167	813	21.75	1.99	112	1042	1114	20.83	1.82
274	20	203	22.33	1.75	319	368	543	22.64	1.87	287	462	817	22.43	1.89	224	594	1114	21.93	1.66
138	910	209	21.12	2.31	71	1400	546	20.29	1.92	61	544	819	20.10	1.98	146	1011	1121	21.24	1.10
162	642	211	21.33	1.40	126	876	547	21.01	1.40	60	882	826	20.08	2.01	184	1209	1122	21.59	1.52
313	171	215	22.62	1.39	54	1279	550	19.96	2.01	6	522	839	18.49	1.45	212	639	1128	21.85	1.78
209	563	216	21.83	1.91	232	841	563	22.00	2.00	201	354	840	21.75	1.34	52	213	1130	19.87	2.19
38	1049	217	19.57	1.98	291	1337	564	22.45	1.20	117	888	842	20.88	1.43	78	594	1133	20.42	2.00
315	1098	218	22.64	1.24	74	296	565	20.37	1.95	170	770	842	21.40	1.75	2	1307	1135	17.95	1.72
93	426	222	20.64	1.00	21	786	566	19.25	2.13	273	1167	842	22.31	1.79	24	1223	1139	19.33	1.76
144	1425	224	21.21	2.13	194	813	570	21.71	0.87	254	800	848	22.22	1.83	125	823	1146	21.00	2.22
153	73	226	21.29	2.26	252	1388	570	22.19	1.67	192	115	861	21.70	1.91	130	745	1150	21.04	2.54
66	1457	229	20.22	1.26	35	1154	580	19.50	1.91	244	1088	861	22.11	1.60	293	1087	1150	22.46	1.07
303	600	243	22.57	2.02	16	1212	587	18.99	1.41	137	591	863	21.11	1.98	55	1017	1158	19.98	2.48
128	734	251	21.03	1.22	41	669	593	19.70	2.26	17	678	864	19.06	2.11	261	1297	1161	22.26	0.52
44	407	254	19.73	2.54	243	605	594	22.11	1.33	237	724	866	22.05	1.58	156	1386	1162	21.30	1.19
235	450	256	22.05	1.83	265	330	602	22.29	1.38	276	1120	866	22.38	1.30	69	104	1169	20.25	2.18
95	715	258	20.66	1.47	1	705	604	17.59	1.73	107	299	867	20.80	2.05	316	1295	1170	22.64	1.36
318	687	263	22.64	1.71	101	734	607	20.70	2.07	304	1404	867	22.57	1.78	27	400	1179	19.38	2.09
221	1445	271	21.91	2.55	247	1481	607	22.13	2.76	90	990	878	20.56	1.96	134	1013	1185	21.08	2.03
175	563	275	21.44	1.84	110	852	617	20.82	1.39	236	254	880	22.05	1.66	19	1450	1187	19.14	2.14
142	239	276	21.19	3.75	106	1168	627	20.79	2.48	161	647	881	21.33	1.05	40	1002	1190	19.69	2.28
238	1004	281	22.06	2.51	103	777	631	20.76	2.33	51	855	886	19.81	2.06	282	835	1190	22.41	0.44
220	352	292	21.91	1.64	80	577	632	20.46	1.99	298	925	887	22.49	0.71	45	998	1192	19.76	2.29
183	339	294	21.56	1.99	92	862	634	20.62	2.23	217	833	889	21.88	1.18	279	1439	1219	22.38	2.52
305	932	295	22.58	1.01	296	1235	637	22.48	1.43	97	331	899	20.67	1.94	70	611	1228	20.26	2.22
260	269	298	22.25	3.00	57	765	639	20.01	2.01	145	450	899	21.23	1.94	215	1352	1236	21.87	1.07
283	871	303	22.41	1.58	82	631	643	20.47	2.52	36	296	903	19.51	1.71	47	1094	1248	19.77	1.68
73	97	305	20.32	2.31	255	137	643	22.22	1.70	321	774	904	22.66	1.17	267	1245	1257	22.30	1.12
164	465	332	21.34	1.07	3	1074	644	18.34	2.15	168	715	907	21.39	1.49	299	1046	1274	22.53	1.03
206	750	341	21.80	1.97	99	590	645	20.68	2.28	245	55	910	22.12	1.29	179	32	1280	21.52	2.22
188	1341	345	21.62	1.87	135	806	645	21.10	1.63	96	646	913	20.66	2.29	292	1081	1290	22.45	2.17
75	915	358	20.41	1.95	141	733	651	21.16	1.83	264	964	915	22.29	1.21	256	1316	1292	22.23	1.66
113	1243	360	20.83	2.22	91	721	657	20.57	1.97	270	361	917	22.31	1.34	317	605	1303	22.64	1.97
64	800	364	20.17	2.58	30	701	659	19.41	1.89	119	864	923	20.88	1.77	204	1376	1304	21.77	1.35
250	740	370	22.15	1.63	48	576	659	19.79	0.96	176	723	926	21.47	1.46	121	53	1305	20.96	1.19
114	777	371	20.83	2.26	219	643	660	21.89	1.96	46	844	935	19.77	1.01	122	415	1306	20.99	1.80
309	1257	376	22.59	2.08	29	1170	665	19											

TABLE 5—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
98	1348	1406	21.73	0.88	326	1447	1422	22.68	1.39	222	336	1447	21.91	2.38	9	180	1479	18.62	0.69
253	745	1406	22.20	1.08	23	1341	1426	19.31	1.43	294	1451	1452	22.46	1.45	109	1347	1482	20.81	2.14
269	992	1419	22.30	1.86	5	573	1436	18.44	2.29	310	136	1461	22.60	1.38	208	525	1484	21.83	1.11
14	347	1420	18.93	1.03	154	802	1437	21.29	2.26	290	1262	1475	22.44	1.95	228	781	1485	21.98	1.15
172	262	1420	21.41	2.01	20	276	1440	19.18	2.02										
Blank Field																			
211	39	16	22.62	1.51	93	40	515	21.34	1.83	27	1018	834	19.39	0.95	9	798	1139	18.41	1.78
205	182	36	22.54	2.13	20	1129	518	19.20	1.45	23	936	836	19.34	1.66	152	25	1146	22.05	1.48
87	638	40	21.23	1.28	24	576	530	19.34	2.26	209	1375	853	22.60	1.13	43	1286	1148	20.27	2.29
191	1293	61	22.46	1.38	49	1286	549	20.38	0.94	197	384	858	22.48	1.04	112	753	1158	21.54	0.84
184	1149	67	22.42	2.63	91	1091	556	21.32	1.93	165	221	873	22.14	1.40	40	652	1159	20.05	1.72
168	872	77	22.17	1.26	50	389	564	20.43	0.86	160	894	875	22.11	1.42	213	1038	1163	22.64	0.99
65	17	81	20.69	1.74	149	789	567	22.02	1.25	193	156	877	22.46	1.92	2	1029	1190	18.00	1.10
30	1209	84	19.52	2.21	115	22	569	21.59	1.52	178	1241	883	22.33	1.53	198	785	1190	22.48	2.14
64	944	114	20.62	1.76	14	263	571	18.60	1.89	26	571	892	19.37	1.46	88	1171	1191	21.23	2.18
176	1197	117	22.28	1.82	1	927	574	17.59	2.06	11	1033	893	18.58	1.95	142	113	1204	21.98	2.53
187	1247	126	22.44	0.97	34	1254	575	19.64	1.17	138	1287	894	21.90	2.81	72	794	1209	20.85	1.92
28	826	131	19.43	1.51	32	458	581	19.63	1.95	141	1098	898	21.98	1.29	199	948	1209	22.50	1.08
217	1235	146	22.67	1.40	19	419	592	19.01	1.94	97	575	908	21.35	1.23	108	94	1213	21.45	1.66
66	1360	157	20.72	1.75	98	69	593	21.35	1.98	161	1105	915	22.11	1.49	84	166	1215	21.15	1.14
74	1004	162	20.92	1.94	201	1083	596	22.50	1.64	37	834	939	19.76	0.98	85	118	1218	21.19	1.81
56	1157	171	20.53	2.20	179	1387	609	22.35	1.01	167	612	940	22.16	1.99	128	1216	1222	21.73	1.23
102	211	171	21.37	2.21	172	82	613	22.23	1.54	118	1223	947	21.60	1.27	70	266	1225	20.74	1.73
42	491	173	20.14	2.17	51	24	623	20.45	1.66	29	1152	950	19.50	2.17	79	774	1229	21.05	2.19
61	1457	175	20.59	1.31	139	1281	625	21.91	0.55	157	1193	951	22.09	1.33	86	659	1234	21.20	2.52
63	1057	177	20.61	2.20	76	83	636	21.00	1.87	121	317	974	21.63	2.05	117	1348	1237	21.60	1.11
68	430	181	20.73	1.92	164	469	640	22.13	2.26	4	1382	983	18.22	2.25	148	1222	1237	22.02	1.25
31	581	182	19.57	2.32	143	1011	644	21.99	1.85	33	188	984	19.63	2.23	190	209	1257	22.46	0.93
206	264	199	22.55	1.20	127	288	653	21.72	2.11	47	246	986	20.28	2.08	214	144	1258	22.64	1.81
158	245	203	22.09	1.29	169	498	653	22.19	2.13	83	1236	991	21.10	2.18	216	1393	1260	22.66	1.62
119	979	217	21.61	1.39	140	249	654	21.98	0.69	175	389	994	22.28	2.04	105	977	1264	21.40	1.45
6	1044	219	18.33	1.67	21	1483	659	19.31	1.86	111	801	995	21.50	1.07	163	1420	1273	22.12	2.85
208	1152	227	22.58	1.70	101	330	661	21.37	1.13	106	717	1000	21.42	2.85	181	1219	1286	22.38	1.20
150	917	233	22.03	1.11	3	267	668	18.20	2.23	202	1060	1004	22.51	1.40	192	73	1290	22.46	1.46
147	842	242	22.02	0.98	99	684	690	21.36	1.11	75	95	1012	20.94	2.07	38	1368	1294	20.04	1.15
182	1097	259	22.40	1.32	15	612	693	18.76	0.97	62	344	1015	20.59	2.20	57	884	1317	20.54	1.45
210	606	285	22.60	1.74	95	13	702	21.34	2.24	77	56	1015	21.00	2.11	126	339	1319	21.70	1.57
144	125	304	22.00	1.69	131	445	708	21.75	2.28	133	270	1016	21.80	2.08	103	444	1323	21.39	2.06
159	266	332	22.10	1.55	180	151	714	22.37	1.06	100	1102	1019	21.36	1.26	173	853	1337	22.25	1.40
125	656	338	21.68	1.56	204	925	715	22.53	1.50	154	973	1028	22.05	2.46	67	295	1348	20.72	2.00
7	1266	345	18.35	2.16	185	1173	716	22.43	0.56	90	456	1034	21.28	1.44	8	1465	1353	18.40	1.80
183	679	346	22.41	1.62	45	550	719	20.28	1.17	73	1398	1046	20.91	2.10	92	1251	1359	21.34	1.18
195	973	357	22.47	1.02	203	1088	722	22.51	1.83	59	49	1047	20.55	1.59	194	1330	1360	22.46	2.52
170	783	369	22.20	0.68	80	195	728	21.07	0.99	155	326	1049	22.06	2.63	39	712	1363	20.04	2.35
104	870	380	21.39	2.16	135	1464	731	21.82	1.46	207	906	1064	22.55	1.70	188	532	1376	22.44	1.40
196	1488	385	22.47	1.71	156	81	738	22.07	0.96	153	1413	1079	22.05	1.98	10	814	1392	18.57	0.79
96	1401	386	21.35	0.74	107	777	746	21.43	1.10	186	359	1082	22.43	1.63	81	383	1396	21.09	1.13
166	261	391	22.15	1.65	218	1017	748	22.68	1.30	136	510	1089	21.85	2.24	58	1485	1402	20.54	2.18
78	1220	397	21.03	0.91	60	111	757	20.55	1.70	212	539	1090	22.62	2.26	134	14	1436	21.81	1.90
69	713	414	20.74	1.25	151	1112	765	22.05	1.27	41	419	1092	20.08	2.14	52	450	1442	20.51	1.92
55	1258	423	20.53	2.20	120	545	766	21.63	1.24	171	276	1096	22.21	2.01	113	1010	1449	21.59	0.66
35	998	433	19.69	1.61	146	19	766	22.00	2.11	116	1417	1097	21.60	0.86	94	187	1451	21.34	2.27
124	422	436	21.67	2.55	174	1423	767	22.27	0.85	13	716	1103	18.59	0.97	132	1372	1458	21.78	1.06
22	695	465	19.33	2.23	189	958	769	22.44	1.27	215	923	1103	22.66	1.06	12	247	1463	18.59	1.11
130	261	465	21.75	2.28	110	1052	770	21.48	2.31	109	803	1114	21.47	1.80	54	933	1463	20.52	2.26
82	271	470	21.10	2.13	114	1346	786	21.59	1.28	177	1252	1116	22.29	1.60	16	186	1473	18.87	0.93
18	22	476	18.98	2.21	89	389	813	21.26	2.35	123	51	1117	21.67	2.53	48	508	1473	20.34	0.93
162	661	476	22.11	1.62	71	412	815	20.80	1.72	17	1429	1121	18.92	1.42	44	44	1480	20.27	2.23
53	1171	480	20.52	1.35	137	797	818	21.89	1.26	46	891	1128	20.28	1.44	25	910	1490	19.34	2.27
129	802	495	21.73	1.45	200	1306	820	22.50	1.35	122	758	1135	21.67	1.54	145	511	1490	22.00	2.05
5	282	503	18.25	0.79	36	645	826	19.71	1.46										

TABLE 6
ABELL 963 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
17	443	16	18.10	1.92	357	426	312	21.45	2.11	471	583	526	21.93	1.11	246	91	714	20.78	1.44
152	1308	19	19.95	1.48	187	517	313	20.33	1.45	584	878	535	22.47	1.23	96	805	715	19.33	1.48
157	538	19	20.03	1.84	411	917	316	21.68	1.62	350	578	540	21.38	1.74	561	544	715	22.34	1.48
282	873	24	20.98	1.64	341	335	320	21.34	1.85	132	299	543	19.78	1.24	278	379	718	20.97	2.01
120	1127	25	19.71	1.95	301	583	323	21.15	1.67	294	337	543	21.09	1.86	199	278	723	20.41	2.05
336	345	31	21.33	1.40	28	445	325	18.31	1.91	386	745	544	21.57	1.50	455	897	725	21.86	1.33
113	516	33	19.61	1.93	372	114	327	21.49	1.61	498	1358	545	22.04	1.34	558	669	726	22.32	1.42
438	290	43	21.79	1.49	78	1267	338	19.12	1.92	483	245	549	21.97	0.77	27	488	731	18.29	2.03
36	1156	54	18.49	1.03	290	597	338	21.07	1.12	401	595	550	21.64	1.57	421	821	731	21.72	1.74
349	421	54	21.38	1.41	337	494	341	21.33	2.20	179	614	562	20.25	1.60	50	762	732	18.68	2.12
381	984	55	21.54	1.97	302	1140	344	21.15	2.17	458	1210	569	21.87	1.05	7	559	735	17.82	2.11
465	341	59	21.92	0.88	221	200	345	20.57	2.00	178	1378	570	20.25	1.43	326	907	735	21.28	1.32
518	695	62	22.13	1.19	582	1227	345	22.46	1.82	291	67	573	21.07	1.40	331	602	739	21.30	1.99
568	1389	62	22.37	1.98	353	1000	346	21.41	1.52	163	873	577	20.09	2.12	403	227	739	21.64	2.70
339	135	65	21.34	2.00	399	1160	346	21.63	1.52	296	663	579	21.11	1.46	124	678	740	19.73	1.94
106	995	69	19.50	1.24	288	1397	347	21.03	1.45	329	529	579	21.29	1.58	461	1257	742	21.89	2.10
19	1088	78	18.13	1.02	436	707	347	21.79	1.55	361	423	583	21.46	1.00	55	717	743	18.77	2.15
131	1050	79	19.77	1.30	257	222	350	20.83	1.98	32	350	584	18.39	2.03	463	872	744	21.91	0.88
433	1003	83	21.76	1.44	579	152	354	22.46	1.14	58	720	584	18.80	1.93	364	637	746	21.46	2.36
513	454	84	22.12	1.49	176	1135	356	20.23	1.58	227	921	585	20.62	1.41	550	1398	747	22.29	1.48
557	1055	97	22.32	1.02	208	1379	356	20.46	2.50	450	91	587	21.83	3.31	383	876	748	21.56	1.74
279	193	102	20.97	2.14	88	867	359	19.26	2.10	562	513	589	22.34	1.89	168	1086	751	20.15	1.38
460	516	105	21.89	1.53	580	986	359	22.46	0.90	442	1481	590	21.80	1.58	1	750	752	17.00	2.09
475	205	106	21.94	1.74	118	797	363	19.69	1.90	289	1249	591	21.05	1.28	4	764	754	17.47	2.19
84	584	114	19.18	2.04	508	1476	365	22.10	1.50	285	372	593	21.00	1.36	43	722	757	18.56	2.03
448	865	117	21.82	1.73	573	89	372	22.42	2.44	446	53	596	21.82	0.87	180	827	759	20.25	1.80
502	1044	123	22.07	1.27	387	247	374	21.58	1.59	101	670	604	19.37	1.81	244	902	760	20.76	1.75
308	736	126	21.18	1.06	177	926	376	20.24	1.71	354	158	604	21.42	1.38	77	378	762	19.11	1.82
116	54	130	19.67	2.22	182	1446	377	20.29	1.05	366	989	605	21.47	1.17	143	854	762	19.88	2.07
547	839	130	22.26	1.88	29	1197	379	18.31	1.97	497	691	605	22.04	0.54	453	252	766	21.85	1.01
474	100	131	21.94	1.72	263	910	384	20.90	1.31	92	802	606	19.30	2.19	464	548	767	21.92	1.31
391	474	136	21.60	1.34	164	1036	385	20.11	2.25	451	317	612	21.84	1.46	444	1216	773	21.81	1.61
390	356	145	21.59	1.45	198	1210	385	20.40	1.81	73	537	614	18.98	1.92	239	1126	781	20.70	2.81
195	1029	149	20.40	1.59	274	883	387	20.95	1.88	560	992	617	22.34	1.58	432	360	782	21.75	2.85
63	1004	151	18.84	1.65	342	237	392	21.35	1.95	567	1167	618	22.37	2.19	510	28	782	22.10	2.37
417	95	151	21.71	1.58	397	758	400	21.62	1.47	231	892	619	20.64	1.62	407	637	783	21.66	1.25
426	334	152	21.74	1.05	519	1097	401	22.13	1.47	105	1188	628	19.44	1.96	425	145	783	21.73	1.98
378	767	153	21.53	1.50	102	937	407	19.38	2.05	482	1274	632	21.95	1.45	130	614	787	19.76	2.10
330	42	156	21.30	1.63	258	707	409	20.83	1.95	415	1009	633	21.71	1.46	370	1032	792	21.48	1.90
347	472	159	21.37	1.83	127	1405	412	19.75	2.06	189	329	640	20.35	1.57	161	1254	794	20.07	1.77
90	488	162	19.29	1.95	181	969	413	20.25	2.25	64	688	642	18.85	1.91	229	669	794	20.63	1.84
472	413	163	21.93	1.48	201	806	415	20.43	1.36	95	1478	645	19.32	1.85	413	627	795	21.70	1.86
219	193	165	20.54	1.98	525	1317	416	22.16	1.80	499	761	647	22.04	1.62	454	807	795	21.85	1.67
71	375	171	18.96	1.52	309	807	423	21.20	1.39	271	1178	648	20.94	1.13	39	684	796	18.52	2.03
218	983	172	20.53	2.48	40	1045	424	18.53	1.92	334	915	652	21.31	1.92	256	877	796	20.83	1.98
261	1274	174	20.87	2.47	287	579	424	21.03	1.46	514	557	655	22.12	1.52	212	599	798	20.48	1.78
571	810	177	22.41	1.53	449	1468	426	21.82	2.10	45	1337	656	18.59	1.96	503	348	799	22.08	1.89
241	952	183	20.74	1.14	267	1202	428	20.92	1.57	306	948	658	21.17	1.38	91	962	800	19.30	2.03
300	1210	184	21.14	2.44	452	668	429	21.84	1.98	311	698	659	21.20	1.42	110	677	804	19.58	1.71
104	351	186	19.41	1.60	537	583	432	22.22	1.05	504	735	659	22.08	2.40	414	808	804	21.71	1.11
215	819	194	20.49	1.68	135	865	433	19.81	1.62	367	509	662	21.47	1.51	543	1152	805	22.25	1.51
495	1273	199	22.03	0.97	420	530	435	21.72	0.73	404	1463	662	21.64	2.58	293	751	807	21.09	1.96
193	948	205	20.37	2.58	48	1105	440	18.64	1.99	225	778	663	20.60	2.01	24	426	808	18.25	2.06
147	359	208	19.92	1.17	384	152	444	21.56	1.57	346	765	663	21.37	1.28	54	844	813	18.77	2.08
25	599	213	18.26	1.89	512	358	451	22.12	0.51	469	1391	666	21.93	0.86	375	1153	817	21.51	2.08
439	1280	215	21.79	1.76	435	782	452	21.78	1.59	396	1254	670	21.62	1.48	496	501	817	22.03	1.54
49	928	217	18.66	1.63	67	909	457	18.88	1.92	44	1279	671	18.56	1.91	165	1243	818	20.12	1.64
144	1177	218	19.90	2.00	477	199	462	21.95	1.35	303	109	671	21.16	1.44	114	769	819	19.62	2.05
202	1417	220	20.43	1.75	137	665	471	19.83	1.92	213	245	672	20.48	1.93	356	1179	819	21.45	1.36
150	1217	222	19.93	1.86	226	1110	471	20.61	1.01	521	1067	672	22.15	1.12	31	142	821	18.36	1.99
46	521	224	18.61	1.56	89	1372	476	19.28	1.99	79	766	673	19.14	1.98	52	986	821	18.72	2.04
374	220	228	21.51	1.21	575	283	476	22.44	1.82	277	805	680	20.97	1.80	323	889	825	21.26	2.38
476	1086	231	21.95	1.25	237	1429	484	20.68	1.76	368	1048	680	21.47	1.59	398	571	825	21.63	1.03
94	953	238	19.32	1.27	126	480	487	19.75	1.79	159	858	681	20.04	1.88	456	627	825	21.87	0.47
551	1209	249	22.29	1.56	173	259	487	20.19	1.44	47	92	684	18.64	1.83	186	795	826	20.32	1.92
109	1104	255	19.57	2.29	402	63	489	21.64	2.24	33	466	685	18.42	1.09	526	849	834	22.16	1.87
149	1208	265	19.93	1.73	228	467	492	20.62	1.93	87	312	686	19.20	1.97	169	880	838	20.15	1.99
581	781	270	22.46	1.22	251	241	492	20.82	1.68	129	940	688							

TABLE 6—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
125	706	857	19.74	1.94	242	1256	988	20.74	2.31	524	675	1164	22.15	2.42	30	70	1326	18.32	1.97
196	566	857	20.40	1.76	76	236	990	19.09	2.23	18	515	1167	18.11	2.01	392	380	1327	21.61	1.27
298	561	857	21.13	1.54	154	75	991	19.98	1.23	69	193	1172	18.93	1.62	467	1233	1330	21.92	1.08
175	120	862	20.21	1.45	376	231	1013	21.52	1.67	351	429	1172	21.38	2.38	427	377	1332	21.75	0.67
563	1372	865	22.34	1.58	250	1470	1014	20.80	1.35	542	1285	1172	22.24	2.31	121	1420	1333	19.72	1.20
128	799	866	19.76	1.89	81	754	1016	19.15	1.68	162	556	1173	20.08	2.10	564	464	1335	22.36	0.71
343	370	866	21.35	1.73	262	601	1017	20.89	1.92	423	641	1173	21.72	2.42	60	1175	1336	18.83	1.11
223	1102	867	20.60	1.68	317	1166	1017	21.23	1.85	501	132	1173	22.06	1.64	313	771	1344	21.20	1.92
511	364	875	22.11	3.03	230	685	1020	20.63	1.74	74	714	1174	19.00	1.93	9	1456	1350	17.89	1.62
332	884	877	21.30	2.47	505	959	1025	22.09	1.38	51	179	1178	18.71	1.99	160	91	1351	20.04	1.86
500	677	877	22.04	2.26	190	1352	1030	20.35	2.60	151	491	1178	19.94	2.28	252	922	1354	20.82	2.17
21	1081	879	18.22	1.58	134	786	1032	19.79	1.79	107	1334	1179	19.51	2.25	325	1343	1357	21.27	2.27
388	730	880	21.58	1.46	37	839	1035	18.51	2.00	191	678	1182	20.36	1.55	380	1129	1359	21.54	1.32
377	694	881	21.52	1.66	441	1126	1036	21.80	1.94	59	479	1185	18.81	1.88	406	1358	1359	21.65	1.88
3	923	885	17.40	1.95	66	1227	1037	18.88	1.91	295	1260	1192	21.11	0.94	249	709	1361	20.79	1.64
210	777	896	20.47	1.98	167	1053	1040	20.14	1.63	57	600	1196	18.80	1.50	115	1217	1367	19.62	1.99
108	602	898	19.52	1.97	22	1408	1043	18.24	1.36	437	1041	1196	21.79	1.77	515	429	1367	22.12	2.04
184	133	899	20.30	1.78	393	675	1044	21.61	1.38	527	1303	1196	22.16	2.37	56	167	1371	18.78	1.82
462	737	906	21.89	2.65	83	1261	1045	19.18	2.10	34	191	1199	18.42	2.01	35	1345	1373	18.43	2.02
197	299	908	20.40	1.91	556	1463	1046	22.31	1.19	72	59	1201	18.98	1.95	487	250	1373	21.99	1.71
286	1415	908	21.00	1.99	253	299	1048	20.82	2.29	209	670	1201	20.46	2.45	292	732	1375	21.08	2.04
528	895	908	22.17	1.13	493	593	1052	22.02	1.46	430	645	1203	21.75	1.78	97	717	1378	19.35	1.95
14	94	909	18.05	2.00	216	1413	1055	20.53	1.80	86	412	1204	19.19	2.03	194	1289	1381	20.38	1.80
338	454	911	21.34	1.40	546	660	1058	22.26	1.49	111	1106	1206	19.59	1.96	355	1042	1381	21.44	1.41
494	476	915	22.02	2.72	583	784	1065	22.47	1.48	192	694	1208	20.37	1.88	248	1346	1389	20.78	2.14
146	862	916	19.91	2.01	382	694	1072	21.55	2.39	204	508	1215	20.44	1.91	429	1008	1389	21.75	1.94
522	330	917	22.15	1.30	172	681	1074	20.18	2.11	358	1354	1216	21.45	1.53	41	1443	1397	18.54	1.71
549	1375	917	22.28	2.73	82	1273	1076	19.16	1.76	344	84	1218	21.35	1.97	548	879	1398	22.27	2.36
572	240	918	22.42	2.03	491	1318	1078	22.00	2.93	217	590	1221	20.53	1.70	299	753	1399	21.13	1.55
480	704	919	21.95	1.38	319	1091	1082	21.24	1.91	333	1003	1223	21.31	1.65	569	1192	1400	22.37	2.03
523	773	922	22.15	1.69	352	1142	1082	21.40	1.40	315	757	1232	21.23	1.28	578	1219	1413	22.46	0.91
466	519	924	21.92	1.08	340	745	1083	21.34	1.87	486	1224	1233	21.98	1.53	533	751	1415	22.20	1.81
405	705	925	21.65	1.71	365	481	1083	21.46	2.69	171	416	1234	20.17	2.12	566	543	1417	22.37	1.21
545	285	925	22.26	2.66	207	912	1085	20.46	0.90	103	706	1237	19.39	1.87	247	118	1418	20.78	1.62
304	331	927	21.16	1.84	490	424	1092	22.00	2.42	100	14	1241	19.37	1.84	478	395	1426	21.95	1.29
240	981	928	20.72	1.89	156	791	1095	20.03	1.57	536	161	1243	22.22	0.93	335	1076	1436	21.33	1.24
424	625	929	21.73	0.93	559	135	1097	22.33	0.91	531	211	1244	22.20	1.36	440	989	1436	21.79	2.20
544	809	929	22.25	1.88	235	666	1098	20.67	1.63	394	1330	1246	21.61	2.35	133	1287	1437	19.78	1.93
42	195	930	18.56	1.92	275	258	1099	20.96	1.23	473	1011	1251	21.94	2.08	245	1301	1442	20.76	1.55
214	1151	931	20.49	1.41	266	938	1101	20.92	1.85	369	162	1252	21.47	1.95	2	1168	1445	17.26	1.96
270	962	931	20.93	0.90	577	272	1101	22.45	2.01	53	879	1254	18.74	1.45	205	1445	1447	20.45	1.72
470	589	936	21.93	1.69	99	521	1104	19.36	1.80	419	851	1254	21.71	2.17	479	1332	1448	21.95	1.09
185	676	938	20.31	1.32	260	400	1107	20.87	2.48	408	89	1260	21.67	1.62	264	358	1450	20.90	2.02
539	921	939	22.24	0.74	379	651	1109	21.53	1.67	139	918	1263	19.84	1.93	148	898	1452	19.92	1.81
15	1298	940	18.07	0.00	535	932	1115	22.22	0.83	359	1174	1264	21.45	2.17	324	352	1458	21.27	1.71
283	1389	945	20.98	1.95	98	727	1117	19.36	1.81	243	484	1265	20.75	1.19	188	1343	1461	20.33	1.66
23	794	946	18.24	1.92	412	878	1117	21.69	2.38	586	1164	1272	22.48	1.83	574	237	1461	22.43	1.42
85	477	947	19.19	1.25	489	915	1120	22.00	1.51	362	350	1276	21.46	1.55	520	1051	1464	22.14	1.96
431	1053	947	21.75	2.65	20	196	1123	18.13	1.40	395	513	1278	21.62	1.54	310	1480	1465	21.20	1.40
516	343	947	22.13	0.79	488	248	1125	22.00	1.33	61	635	1283	18.83	1.22	265	1243	1466	20.91	2.18
123	124	951	19.72	2.08	13	612	1128	18.03	2.02	80	1215	1284	19.15	1.23	224	673	1468	20.60	1.83
576	526	952	22.45	0.91	320	1204	1133	21.24	2.16	532	163	1290	22.20	1.32	534	1098	1468	22.21	1.37
155	914	953	19.98	1.58	70	125	1134	18.93	1.75	553	817	1291	22.30	1.86	481	289	1469	21.95	1.63
428	606	958	21.75	1.40	554	776	1134	22.31	1.52	322	778	1293	21.26	1.90	360	1377	1470	21.45	2.31
418	1221	964	21.71	1.97	16	991	1135	18.09	1.97	316	833	1298	21.23	1.85	400	439	1470	21.64	1.53
422	1021	964	21.72	2.28	65	676	1139	18.85	2.39	457	1075	1300	21.87	0.89	234	1243	1471	20.66	2.10
10	1062	969	17.94	1.48	174	98	1139	20.20	1.82	529	1184	1309	22.18	0.95	565	1452	1472	22.36	0.88
447	1259	969	21.82	1.13	509	1177	1139	22.10	2.27	254	117	1313	20.83	0.97	269	1244	1474	20.92	2.04
38	502	970	18.52	1.20	443	1352	1144	21.81	0.83	468	19	1313	21.92	2.02	538	585	1475	22.23	1.39
138	642	971	19.83	1.99	136	1460	1145	19.82	1.82	434	521	1314	21.77	1.24	145	33	1476	19.91	1.32
314	300	972	21.21	2.00	255	515	1145	20.83	1.33	11	487	1315	18.01	2.21	506	1014	1478	22.09	2.57
166	1084	973	20.13	2.01	280	176	1147	20.97	1.67	312	97	1315	21.20	1.62	222	1351	1481	20.60	1.47
585	987	978	22.47	1.39	6	1390	1149	17.79	1.35	272	1022	1316	20.94	1.62	507	785	1481	22.10	1.50
371	805	979	21.49	1.58	183	17	1153	20.29	1.30	492	186	1317	22.01	1.40	363	1042	1482	21.46	2.03
142	680	981	19.88	1.15	459	1340	1159	21.88	0.70	373	820	1322	21.50	1.91	62	610	1483	18.84	1.36
540	23	981	22.24	1.49	318	215	1163	21.24	1.20										

Blank Field

171	560	24	21.43	2.02	235	1450	69	21.80	1.66	279	1185	127	22.14	1.20	221	655	174	21.71	1.18
215	270	24	21.66	1.63	298	910	79	22.24	1.66	345	1408	133	22.46	1.39	196	1374	181	21.58	1.46
32	591	25	19.52	1.89	118	671	82	20.97	1.58	48	1011	138	19.95	2.23	18	194	182	18.97	1.77
106	704	29	20.77	1.86	253	939	83	21.97	2.08	53	1012	142	20.02	2.12	273	816	183	22.11	1.39
28	307	31	19.43	1.61	260	414	95	22.03	1.03	186	1051	145	21.52	1.94	304	780	183	22.25	1.25
164	1049	31	21.38	3.07	153	1317	100	21.25	2.72	12	1216	146	18.48	1.04	116	1139	188	20.96	1.40
124	208	32	21.01	1.54	209	1289	100	21.65	1.34	112	170	148	20.87	1.46	207	906	192	21.64	1.45
58	219	34	20.11	1.44	60	1025	105	20.12	1.48	127	1016	150	21.03	1.86	256	616	192	21.99	2.19
189	1174	36	21.53	1.35	135	142	105	21.08	1.67	248	825	151	21.96	1.34	336	1284	193	22.41	0.73
259	1467	36	22.02	1.27	166	705	113	21.40	1.89	44	206	153	19.91	1.52	20	931	203	19.02	1.99
26	1426	39	19.32	1.95	262	1189	114	22.03	2.31	73	399	159	20.35	1.32	289	1075	204	22.19	1.37
37	475	43	19.69	1.95	173	554	118	21.44	1.10	179	361	159	21.46	1.48	8	142	211	18.28	2.00
70	1065	51	20.26	1.90	7	1386	125	18.12	1.90	17	1001	164	18.89	1.98	182	919	212	21.49	1.01
75	1472	62	20.36	2.53	126	1002	126	21.03	1.35	294	950	167	22.20	2.83	22	993	217	19.16	1.89
101	1091	62	20.74	0.99	121	1087	127	20.99	2.12	247	831	173	21.95	1.84	280	1361	220	22.14	2.48

TABLE 6—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
46	19	222	19.94	1.64	274	822	544	22.12	1.56	240	437	868	21.89	1.73	199	695	1147	21.59	1.51
64	271	236	20.19	1.69	230	1487	549	21.78	2.31	325	398	868	22.34	2.42	19	786	1154	19.01	1.52
188	185	236	21.52	2.44	85	704	553	20.55	1.56	226	1242	873	21.73	1.91	170	534	1154	21.43	1.55
270	1249	238	22.07	1.94	266	915	553	22.06	0.85	210	918	882	21.65	2.04	329	1303	1162	22.38	1.24
63	1009	239	20.18	1.25	268	841	553	22.06	1.95	3	1108	886	17.55	2.00	312	1109	1164	22.28	1.25
103	245	241	20.75	3.32	195	182	558	21.58	1.18	67	1172	890	20.23	2.14	313	238	1165	22.28	1.28
120	389	245	20.99	1.73	69	1199	566	20.26	1.36	229	452	891	21.77	1.25	308	1101	1166	22.26	1.04
293	1205	253	22.20	1.71	307	1024	567	22.26	1.23	331	859	897	22.40	1.15	177	1319	1178	21.45	1.47
237	925	264	21.87	1.08	223	67	576	21.71	1.70	161	1256	902	21.37	2.83	286	324	1178	22.18	1.28
197	909	270	21.58	1.45	291	104	586	22.19	1.79	310	483	903	22.27	1.66	152	798	1187	21.25	2.34
140	1183	278	21.11	1.30	154	731	591	21.27	2.60	328	294	905	22.38	0.72	204	854	1193	21.63	2.17
218	1343	282	21.68	2.17	2	1469	592	17.31	1.59	303	660	909	22.25	0.85	333	794	1201	22.40	1.35
193	935	288	21.55	2.41	123	1349	593	21.01	1.29	255	815	911	21.99	1.32	236	246	1205	21.83	2.34
344	1270	295	22.46	0.50	194	1412	598	21.57	1.34	134	703	914	21.06	1.62	238	862	1205	21.87	2.07
78	1254	297	20.40	1.60	133	758	600	21.06	1.42	163	933	914	21.38	1.40	269	330	1207	22.07	1.00
258	1464	297	22.01	2.17	165	662	604	21.39	1.04	183	1053	920	21.49	1.59	338	1456	1208	22.42	1.71
285	539	298	22.17	1.06	296	81	606	22.22	1.22	254	1267	923	21.98	1.74	31	737	1212	19.51	1.39
151	658	300	21.22	1.44	160	905	612	21.35	1.18	107	1451	929	20.81	1.27	21	772	1222	19.06	1.73
323	413	303	22.33	1.30	341	1387	614	22.44	1.33	14	433	933	18.53	1.84	94	267	1223	20.68	1.54
111	15	307	20.86	1.72	66	369	621	20.22	2.01	113	262	933	20.92	1.52	287	716	1229	22.18	1.36
6	137	309	18.05	1.38	225	61	624	21.73	1.20	290	1249	937	22.19	1.39	252	72	1233	21.97	1.31
16	287	311	18.79	1.64	76	718	626	20.38	1.78	249	650	947	21.96	1.54	342	1391	1239	22.44	1.65
159	165	314	21.34	2.08	176	974	626	21.45	1.22	92	334	956	20.65	1.49	271	1464	1242	22.08	0.71
105	273	322	20.77	1.28	211	424	639	21.65	1.74	198	219	959	21.58	2.32	23	1010	1247	19.26	1.87
97	1473	328	20.73	1.71	41	855	640	19.89	1.69	33	627	961	19.57	1.75	29	982	1250	19.49	1.43
136	423	336	21.09	1.44	326	573	641	22.36	2.00	34	837	964	19.59	1.98	251	630	1251	21.97	1.09
79	401	341	20.42	1.39	158	430	651	21.32	1.42	208	682	964	21.64	2.23	275	1433	1254	22.12	2.16
157	711	349	21.30	2.08	322	544	654	22.33	1.12	318	1254	967	22.30	1.18	38	1135	1269	19.75	1.90
192	596	358	21.55	1.97	27	799	657	19.38	2.23	144	1443	969	21.16	1.29	167	24	1269	21.41	1.40
187	140	361	21.52	2.36	178	436	663	21.45	2.04	309	1281	972	22.27	1.04	276	265	1276	22.13	1.04
131	1069	363	21.04	1.53	59	1092	665	20.11	1.38	30	1168	973	19.49	2.07	277	655	1276	22.13	1.48
283	448	378	22.16	1.13	42	794	671	19.90	1.97	284	659	978	22.16	1.81	202	1381	1282	21.62	2.10
98	39	380	20.73	2.01	219	1082	683	21.70	1.27	314	683	979	22.29	1.31	340	638	1287	22.43	1.24
61	569	386	20.13	1.98	145	1191	687	21.17	1.57	84	245	980	20.54	1.12	301	824	1288	22.24	2.21
137	622	387	21.10	1.01	206	706	692	21.64	1.02	220	690	982	21.70	1.58	321	1452	1288	22.31	0.68
119	683	388	20.99	1.50	228	931	695	21.76	2.34	343	346	990	22.45	2.20	128	815	1307	21.03	2.27
300	1038	395	22.24	1.92	138	728	699	21.10	1.20	315	900	991	22.29	1.23	156	1353	1308	21.30	2.28
305	1145	399	22.25	2.31	319	1095	704	22.30	1.00	327	1251	998	22.36	2.96	104	130	1310	20.76	1.17
15	1099	400	18.75	1.91	139	984	705	21.10	1.80	56	478	999	20.07	1.48	147	682	1310	21.18	1.33
306	620	403	22.25	2.29	346	782	715	22.46	2.10	213	604	1000	21.65	2.70	265	32	1321	22.05	1.47
234	317	405	21.80	1.39	302	578	721	22.24	2.60	267	1457	1024	22.06	1.28	142	366	1322	21.14	1.32
71	769	406	20.30	1.51	184	161	727	21.52	0.78	175	75	1025	21.44	2.13	125	119	1331	21.01	2.19
88	585	408	20.62	2.39	108	656	733	20.82	1.76	114	1153	1029	20.93	1.31	324	502	1335	22.34	2.09
162	162	410	21.38	0.92	81	481	756	20.44	1.21	168	1075	1030	21.41	2.25	149	972	1346	21.18	1.95
337	1318	411	22.42	0.96	217	1465	758	21.68	1.50	232	1308	1030	21.79	1.99	96	999	1347	20.71	2.15
62	1039	415	20.14	1.63	241	966	759	21.90	1.10	93	1280	1031	20.67	1.99	122	932	1348	21.00	1.32
288	720	429	22.19	2.23	72	1177	765	20.33	1.63	65	1432	1035	20.22	1.28	257	456	1358	22.00	1.27
347	1007	434	22.47	1.64	169	155	766	21.42	2.37	243	1229	1037	21.91	1.64	185	1359	1363	21.52	1.70
57	441	435	20.09	2.37	146	834	771	21.18	1.19	4	1001	1048	17.59	1.94	36	1455	1369	19.68	1.60
43	542	448	19.91	1.18	216	628	782	21.67	0.86	231	348	1048	21.79	1.23	99	1402	1369	20.73	2.30
205	1097	468	21.63	2.90	261	1381	783	22.03	0.78	95	649	1052	20.71	1.22	181	699	1376	21.48	1.24
11	997	478	18.47	1.82	68	870	787	20.24	1.30	155	1186	1053	21.28	2.09	330	1190	1382	22.39	1.86
141	1399	481	21.13	1.27	115	1074	809	20.95	2.11	203	374	1064	21.63	1.49	282	1221	1385	22.16	1.09
39	1228	492	19.83	1.41	339	1428	814	22.42	2.02	83	1478	1073	20.50	2.19	317	1158	1387	22.30	1.29
233	879	502	21.80	1.67	5	247	815	17.84	2.10	13	550	1085	18.52	2.06	214	593	1390	21.66	1.85
52	212	503	20.01	1.45	335	550	815	22.40	1.84	89	825	1089	20.63	2.01	50	1380	1393	19.99	1.85
263	1411	503	22.04	1.31	190	1060	817	21.53	1.61	90	559	1093	20.63	2.14	45	1209	1406	19.92	2.12
239	1229	504	21.88	0.91	80	532	819	20.42	2.07	295	1395	1095	22.22	1.54	54	440	1411	20.05	1.47
292	915	507	22.19	2.09	110	1476	823	20.85	1.73	102	70	1100	20.75	2.00	191	546	1424	21.54	1.73
77	625	508	20.40	1.03	311	93	824	22.27	2.12	201	282	1101	21.62	2.19	100	1192	1437	20.73	2.40
212	510	512	21.65	2.16	24	645	825	19.28	1.32	222	835	1102	21.71	2.08	281	382	1443	22.15	1.82
250	109	512	21.96	2.22	117	1490	827	20.96	1.80	332	1081	1108	22.40	0.99	82	223	1445	20.48	1.27
150	698	516	21.18	2.33	74	832	832	20.35	1.82	55	663	1111	20.07	1.71	40	551	1446	19.86	2.40
320	896	518	22.30	2.01	132	613	840	21.05	2.22	278	1411	1120	22.13	2.11	10	1178	1448	18.43	2.12
174	126	522	21.44	1.45	299	178	840	22.24	1.72	91	875	1123	20.63	2.05	180	259	1450	21.47	1.26
200	1109	525	21.59	1.97	87	24	841	20.60	2.34	246	1333	1124	21.94	1.73	9	1175	1453	18.29	1.91
316	371	527	22.30	1.26	148	1074	843	21.18	1.29	1	581	1125	17.14	2.16	86	1244	1454	20.57	1.81
224	730	529	21.72	2.72	47	1124	846	19.95	1.90	109	110	1130	20.83	1.51	129	865	1460	21.03	2.13
297	1065	530</																	

TABLE 7
ABELL 1758 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
221	1175	11	20.93	1.08	341	670	275	21.58	1.24	455	589	518	22.10	1.72	286	923	677	21.27	1.10
378	96	12	21.74	0.79	511	175	275	22.45	1.31	524	1432	518	22.51	0.87	473	854	679	22.18	2.30
416	239	14	21.92	1.43	96	370	276	20.04	1.83	259	550	520	21.12	1.54	163	463	680	20.49	2.14
271	761	20	21.22	1.10	469	1277	281	22.17	1.26	111	112	529	20.12	1.95	480	1402	680	22.26	1.29
136	474	26	20.30	1.93	327	433	282	21.52	1.48	253	224	530	21.09	1.79	242	612	685	21.02	0.98
349	782	27	21.63	0.82	512	835	284	22.46	1.11	347	1352	530	21.61	2.04	324	418	685	21.51	2.06
198	632	28	20.75	0.99	459	632	288	22.12	1.31	58	1043	531	19.60	2.18	107	810	687	20.09	1.96
438	1371	28	22.04	1.19	34	404	290	19.23	1.98	67	1317	538	19.77	1.88	130	1233	687	20.26	1.15
240	702	29	21.01	2.42	69	1423	313	19.79	1.25	405	987	543	21.87	1.67	317	293	689	21.47	0.79
485	1021	30	22.29	1.18	100	442	315	20.06	1.80	2	659	544	18.09	1.51	364	160	689	21.69	1.76
23	146	34	19.02	1.41	152	628	316	20.45	0.89	355	811	544	21.66	1.31	353	1098	691	21.64	2.29
479	333	37	22.24	1.47	262	1298	317	21.15	1.35	5	661	546	18.32	1.54	214	712	694	20.88	1.98
516	535	38	22.48	0.74	388	136	320	21.78	1.87	472	1483	546	22.18	1.68	200	801	697	20.76	1.80
338	1396	39	21.57	0.88	528	600	328	22.53	0.92	97	739	555	20.04	1.92	430	493	700	21.98	2.06
22	787	44	18.92	2.02	360	1479	329	21.68	1.08	433	1446	565	22.00	1.68	420	1267	702	21.93	2.13
186	1002	44	20.68	1.29	20	301	332	18.83	1.76	470	431	565	22.17	1.80	467	693	702	22.14	2.00
322	941	44	21.51	1.23	235	814	332	20.99	1.19	418	1430	567	21.92	2.10	291	966	705	21.29	1.12
391	61	44	21.79	1.42	487	732	333	22.30	0.88	441	335	568	22.05	1.39	273	644	706	21.22	1.83
201	1124	47	20.79	1.24	339	278	336	21.57	0.96	230	59	570	20.97	1.96	425	142	706	21.96	1.15
117	293	51	20.16	1.18	329	1192	338	21.53	1.51	278	362	570	21.25	1.87	162	87	709	20.49	1.81
478	31	61	22.24	0.69	436	134	341	22.01	1.79	78	947	573	19.87	1.92	85	360	710	19.93	1.96
196	658	64	20.73	0.89	124	1220	346	20.20	2.25	207	627	575	20.83	1.68	264	632	710	21.16	1.39
191	950	65	20.69	2.03	344	468	346	21.59	1.84	488	423	576	22.30	1.60	419	799	712	21.93	1.33
359	1274	65	21.67	1.36	80	813	351	19.88	1.98	50	746	579	19.49	1.87	11	1002	713	18.62	1.65
381	99	66	21.76	1.05	206	1193	353	20.82	1.81	65	359	584	19.76	1.09	77	504	713	19.86	1.84
210	265	71	20.87	2.04	548	1462	353	22.70	0.77	116	1359	584	20.15	2.29	165	844	719	20.51	1.78
517	1454	73	22.48	1.22	145	1108	358	20.37	1.73	356	696	584	21.67	0.77	442	968	721	22.05	1.10
109	1036	74	20.11	2.07	229	209	379	20.97	1.75	160	245	588	20.49	1.12	205	319	726	20.81	1.93
81	637	76	19.90	0.60	138	1478	384	20.31	1.61	192	987	588	20.70	1.81	141	1346	728	20.35	1.99
197	459	76	20.74	1.71	447	611	389	22.07	1.84	51	1021	590	19.49	1.73	45	192	731	19.44	2.08
181	919	79	20.62	1.20	481	1413	389	22.28	0.59	42	270	591	19.37	1.88	224	617	731	20.94	1.84
379	1069	81	21.75	1.18	184	1273	390	20.64	2.36	209	940	592	20.87	1.48	296	431	732	21.31	2.09
496	454	90	22.37	1.03	450	433	390	22.07	1.82	244	864	595	21.04	1.73	475	477	732	22.20	1.40
189	62	99	20.68	2.03	518	656	390	22.48	2.03	342	499	597	21.58	2.04	179	545	733	20.61	1.03
55	786	105	19.52	2.08	195	878	396	20.71	1.85	66	690	600	19.76	1.76	247	81	736	21.05	1.91
527	1031	106	22.53	0.58	164	620	400	20.51	1.80	437	1034	603	22.03	1.60	38	736	737	19.30	2.02
170	1287	108	20.56	1.83	482	1207	406	22.28	1.28	389	896	604	21.79	1.05	484	602	739	22.28	2.45
410	480	109	21.88	1.94	180	339	411	20.61	2.03	445	1267	607	22.07	0.69	127	667	740	20.23	2.07
316	902	112	21.46	1.75	112	516	413	20.13	1.98	68	94	612	19.79	1.12	134	1076	740	20.29	1.98
385	1362	114	21.77	1.46	446	1374	416	22.07	1.45	508	1030	613	22.45	0.77	131	299	741	20.27	1.80
326	528	120	21.52	1.11	132	526	424	20.28	1.31	24	781	615	19.03	1.97	155	45	749	20.46	1.75
426	663	123	21.96	1.46	17	1302	429	18.77	1.00	27	782	616	19.14	2.00	7	750	750	18.36	2.17
448	1181	123	22.07	1.72	159	659	430	20.48	1.81	212	535	616	20.88	1.16	49	361	750	19.47	2.00
123	507	129	20.20	1.86	373	991	430	21.71	1.66	458	253	616	22.12	1.38	277	617	751	21.25	1.36
12	1154	132	18.63	1.94	106	129	431	20.09	1.79	461	1157	616	22.13	1.25	343	655	751	21.59	1.53
216	1487	136	20.90	0.89	156	333	431	20.46	1.79	468	1296	618	22.15	1.20	525	1122	752	22.52	0.71
29	1310	141	19.17	1.80	167	25	433	20.53	1.69	334	318	620	21.55	1.33	351	881	755	21.63	1.35
227	1268	149	20.96	1.35	243	678	433	21.02	1.75	256	1044	621	21.11	1.88	169	1216	757	20.56	1.37
312	801	150	21.44	1.04	32	181	438	19.22	1.97	404	514	624	21.86	1.16	270	267	758	21.21	1.69
392	1033	150	21.80	0.81	288	882	443	21.27	1.82	52	904	627	19.50	1.85	269	85	759	21.21	1.09
529	44	157	22.55	1.09	393	490	444	21.80	2.05	263	567	629	21.16	1.10	48	654	761	19.45	2.00
406	427	159	21.87	1.64	268	947	451	21.20	1.88	26	793	635	19.07	1.93	118	207	763	20.16	1.91
194	551	162	20.71	1.78	520	633	452	22.49	1.28	35	794	635	19.25	2.01	444	620	763	22.06	0.43
60	1134	174	19.69	1.66	535	1211	452	22.58	1.84	241	776	636	21.01	1.77	476	698	767	22.21	1.26
320	472	176	21.50	1.12	289	391	453	21.28	1.84	423	828	636	21.94	1.35	231	1065	770	20.97	2.08
120	185	177	20.17	1.81	494	648	455	22.34	1.95	57	685	637	19.60	1.95	429	525	770	21.98	1.36
543	169	178	22.62	2.45	208	112	457	20.85	1.90	368	498	637	21.70	1.38	500	1435	770	22.39	0.80
522	981	186	22.50	1.39	386	1381	457	21.77	1.66	502	157	637	22.40	1.39	56	333	771	19.60	1.86
449	1458	192	22.07	1.78	93	25	460	20.01	1.74	70	910	639	19.80	0.90	313	559	771	21.44	1.80
370	817	195	21.70	1.86	113	954	469	20.14	1.71	362	1119	640	21.68	1.58	354	966	771	21.65	1.24
204	1268	203	20.81	1.25	532	448	470	22.57	1.08	129	786	643	20.23	1.84	47	768	772	19.45	1.79
350	704	206	21.63	1.22	86	607	474	19.96	1.15	515	761	644	22.47	1.57	346	1378	773	21.61	1.45
171	344	213	20.56	1.95	15	1084	477	18.75	1.95	323	1338	645	21.51	1.82	305	695	777	21.36	1.54
396	1133	217	21.81	1.79	295	1317	480	21.31	1.29	146	351	646	20.39	2.05	279	299	779	21.25	1.94
539	1313	217	22.61	-0.01	190	679	481	20.69	1.50	371	1129	646	21.70	1.95	414	246	779	21.90	1.50
110	292	225	20.12	1.71	407	284	481	21.87	2.37	483	997	646	22.28	2.08	95	170	780	20.03	2.17
498	538	226	22.38	1.39	328	353	483	21.53	1.64	108	201	647	20.11	1.80	6	910	783	18.32	1.93
176	696	227	20.60	1.26	293	868	484	21.30	1.39	166	465	650	20.52	1.12					

TABLE 7—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
76	435	815	19.85	1.67	101	1253	920	20.06	1.99	290	747	1073	21.28	1.74	248	435	1244	21.06	0.60
411	485	817	21.89	1.23	137	1392	922	20.30	2.34	345	1342	1074	21.59	1.99	443	100	1246	22.05	1.07
1	1038	818	17.49	1.63	203	539	924	20.80	1.73	531	833	1077	22.56	0.82	173	1096	1247	20.57	1.21
220	685	818	20.92	2.06	98	279	930	20.05	1.96	153	568	1080	20.46	0.91	178	1054	1249	20.61	0.66
232	449	822	20.98	1.80	182	222	932	20.63	0.57	299	118	1084	21.32	1.55	308	413	1253	21.38	0.85
147	18	829	20.41	0.85	369	1282	935	21.70	1.62	72	631	1085	19.82	1.86	274	887	1254	21.23	1.09
281	445	829	21.26	1.86	380	117	935	21.75	1.60	18	278	1096	18.77	1.98	394	1016	1255	21.81	0.95
331	80	830	21.54	0.98	540	630	939	22.61	1.70	16	531	1097	18.76	0.46	43	1383	1265	19.39	1.90
40	793	831	19.36	2.02	114	1170	943	20.15	1.34	456	355	1100	22.11	0.71	151	1085	1266	20.44	1.25
102	1011	833	20.07	0.65	462	1257	951	22.13	0.98	336	1304	1105	21.56	1.28	357	1188	1275	21.67	0.88
398	860	834	21.83	1.43	53	907	952	19.52	1.90	252	212	1111	21.08	2.01	403	1036	1277	21.85	2.08
4	729	837	18.26	2.01	219	1381	952	20.91	1.43	507	994	1111	22.44	0.32	549	902	1285	22.70	0.65
489	63	837	22.30	1.55	139	1030	958	20.31	1.94	530	578	1111	22.55	2.37	375	488	1290	21.72	0.80
237	797	840	21.00	1.84	239	416	960	21.01	1.91	298	1221	1113	21.32	0.99	255	1023	1303	21.11	1.74
9	158	841	18.51	2.02	249	1088	960	21.06	1.87	83	367	1122	19.93	1.91	534	1323	1308	22.58	1.34
46	158	841	19.45	-0.29	499	616	960	22.39	0.51	464	1165	1125	22.14	0.77	542	333	1311	22.62	0.81
282	873	845	21.26	2.10	143	238	962	20.37	1.21	428	628	1128	21.97	1.40	177	917	1312	20.60	1.86
172	62	859	20.56	2.00	185	879	962	20.67	1.49	536	891	1133	22.59	1.33	36	972	1313	19.29	1.90
233	1153	859	20.99	0.84	94	834	964	20.02	1.83	526	697	1136	22.52	1.83	217	786	1322	20.90	1.85
490	696	859	22.30	1.79	301	1016	969	21.33	1.83	348	298	1138	21.62	1.55	161	351	1328	20.49	1.58
142	1191	861	20.37	0.83	395	940	972	21.81	1.67	121	843	1139	20.17	1.94	261	59	1331	21.15	1.20
21	632	862	18.88	2.05	149	1093	973	20.43	0.82	258	721	1139	21.12	1.01	31	1084	1336	19.19	1.99
306	576	865	21.36	1.97	283	1229	974	21.26	2.30	267	1254	1139	21.20	1.36	90	1387	1337	19.99	1.69
383	920	869	21.76	1.75	435	137	976	22.01	1.06	537	378	1144	22.60	0.47	175	1450	1347	20.58	1.42
307	81	870	21.37	1.93	61	700	978	19.69	2.01	103	1089	1147	20.07	0.90	71	1375	1360	19.81	1.98
400	983	872	21.84	1.34	91	180	980	19.99	1.94	122	430	1149	20.18	1.58	332	881	1364	21.54	1.33
452	25	873	22.09	0.99	144	1145	981	20.37	1.17	234	905	1150	20.99	1.04	188	14	1376	20.68	1.71
451	895	875	22.09	0.87	125	152	982	20.21	1.89	376	1346	1150	21.72	0.88	236	1483	1378	21.00	1.48
545	1439	876	22.64	0.72	493	69	982	22.34	2.63	352	475	1154	21.64	1.56	333	874	1379	21.54	1.76
148	438	877	20.42	0.81	226	661	983	20.95	1.84	202	766	1164	20.79	1.75	335	430	1379	21.55	1.74
272	279	877	21.22	1.44	30	245	984	19.19	1.54	304	41	1164	21.35	2.45	276	285	1383	21.24	2.68
321	488	883	21.50	1.47	510	1225	986	22.45	0.97	486	1291	1165	22.30	1.06	421	1334	1405	21.94	0.66
417	1158	888	21.92	1.73	415	1130	987	21.90	1.48	300	890	1168	21.33	1.39	367	770	1407	21.69	1.51
64	599	890	19.74	1.99	223	43	995	20.94	1.85	260	691	1172	21.13	1.52	238	954	1415	21.00	2.23
28	876	895	19.15	1.99	292	105	1007	21.29	1.42	377	406	1175	21.72	1.51	501	716	1418	22.40	1.28
401	837	895	21.84	1.40	440	560	1008	22.04	1.78	311	810	1185	21.43	0.92	546	765	1423	22.65	1.72
453	645	896	22.09	1.71	115	1084	1009	20.15	1.94	523	958	1188	22.51	0.18	187	1456	1426	20.68	1.75
310	1123	898	21.40	1.31	257	1099	1010	21.11	1.87	218	1246	1189	20.91	1.04	225	370	1432	20.95	1.60
474	1313	898	22.20	0.74	13	415	1015	18.66	1.90	297	766	1192	21.31	1.82	492	317	1433	22.33	1.45
82	337	899	19.91	1.59	325	479	1015	21.52	0.75	14	1334	1194	18.69	2.17	37	767	1437	19.30	1.66
158	673	899	20.47	1.65	432	1146	1025	22.00	0.84	168	880	1196	20.53	1.95	427	818	1440	21.97	0.70
503	273	899	22.40	1.52	491	487	1025	22.33	0.71	294	432	1197	21.31	0.53	541	672	1445	22.61	1.60
284	417	901	21.27	0.92	3	1359	1027	18.19	2.02	495	39	1198	22.36	2.14	254	200	1448	21.10	0.90
54	584	902	19.52	1.95	287	931	1027	21.27	1.36	266	319	1199	21.19	1.54	408	511	1450	21.88	1.13
215	630	902	20.89	1.85	318	1422	1034	21.47	1.96	302	552	1204	21.34	0.99	105	1051	1455	20.09	0.90
211	946	903	20.87	1.86	439	315	1035	22.04	1.16	319	287	1207	21.49	0.92	73	344	1456	19.83	2.02
275	1173	903	21.23	1.46	265	158	1040	21.18	2.34	538	528	1208	22.60	1.53	87	746	1461	19.96	1.79
92	1353	907	20.00	1.81	128	163	1047	20.23	1.98	315	787	1212	21.45	1.90	509	640	1464	22.45	1.15
10	75	909	18.56	1.88	372	556	1048	21.71	1.68	434	1487	1212	22.01	1.00	84	174	1475	19.93	1.84
245	184	912	21.04	1.97	519	1335	1053	22.48	2.38	88	1019	1217	19.98	0.67	402	1072	1480	21.84	1.50
251	1190	912	21.07	2.21	19	1036	1060	18.81	1.95	314	509	1218	21.45	1.67	44	304	1483	19.40	1.96
303	132	913	21.35	1.35	135	118	1060	20.29	2.03	384	364	1223	21.77	1.53	183	501	1483	20.64	2.04
361	1206	915	21.68	1.70	424	1318	1065	21.95	1.83	399	147	1226	21.84	1.19	454	1020	1484	22.10	0.92
59	1312	917	19.65	1.95	390	386	1066	21.79	0.99	382	406	1227	21.76	1.87	340	976	1487	21.57	2.59
193	1091	917	20.71	1.77	544	1203	1066	22.63	1.14	330	123	1230	21.53	1.80	154	553	1489	20.46	1.41
521	750	919	22.49	1.94	89	588	1067	19.98	1.62	228	221	1243	20.96	2.50	477	1420	1489	22.23	1.80
25	913	920	19.07	1.99															

Blank Field

149	329	11	21.81	1.29	165	1228	148	21.94	1.44	176	175	311	22.02	1.85	67	1043	492	20.61	1.95
20	1445	14	19.11	0.94	93	1011	155	21.06	1.52	57	1051	313	20.32	1.61	24	471	496	19.21	1.71
221	1399	15	22.40	1.01	15	1081	158	18.91	0.63	190	42	322	22.16	1.44	230	697	509	22.51	1.11
46	1467	20	20.04	0.80	96	283	159	21.11	0.97	211	965	338	22.30	0.68	189	1298	511	22.15	0.68
109	877	31	21.30	1.51	148	1358	164	21.78	1.27	125	911	359	21.50	0.83	175	509	517	22.02	0.76
134	496	33	21.65	1.42	242	99	165	22.61	0.36	145	229	359	21.75	1.42	88	115	532	21.02	1.07
147	580	45	21.77	2.36	164	204	173	21.94	1.06	64	126	370	20.55	1.49	218	738	557	22.37	1.54
224	1254	47	22.44	0.92	146	916	181	21.75	1.29	228	809	378	22.51	0.55	208	46	567	22.29	1.03
206	1481	49	22.25	1.24	32	1138	184	19.61	1.89	42	368	385	19.90	1.27	170	661	568	21.99	1.28
8	1065	65	18.06	1.69	120	561	184	21.46	1.93	28	769	390	19.45	1.43	173	1464	578	22.00	1.55
177	890	69	22.03	2.08	210	193	186	22.29	1.34	18	737	399	19.03	0.93	38	892	599	19.83	1.87
174	1366	74	22.01	2.71	34	801	195	19.67	1.80	87	927	401	21.02	0.84	122	219	609	21.49	0.99
197	446	76	22.20	1.01	154	533	207	21.85	1.58	25	331	427	19.34	1.79	185	432	618	22.12	0.74
16	1195	91	18.91	1.98	166	1409	215	21.94	1.90	133	754	428	21.65	1.18	194	13	644	22.19	0.51
234	538	96	22.54	0.39	160	489	220	21.87	1.40	39	1213	437	19.84	0.77	108	1007	650	21.30	0.82
207	534	107	22.26	1.04	117	706	222	21.42	1.94	141	852	465	21.73	1.05	62	933	662	20.51	0.75
81	1446	111	20.84	2.12	77	1235	228	20.80	1.95	75	1471	472	20.77	1.05	123	560	667	21.49	1.53
74	32	118	20.74	0.53	192	786	231	22.17	1.30	112	1269	474	21.34	0.97	152	965	670	21.83	1.00
140	1130	122	21.71	1.13	9	641	248	18.14	1.84	205	869	475	22.25	1.22	163	942	673	21.92	0.50
213	548	125	22.31	1.21	157	454	258	21.86	0.82	36	911	478	19.75	1.58	115	336	675	21.36	2.25
201	296	140	22.24	0.88	225	443	261	22.47	0.94	105	130	478	21.27	2.38	98	1300	676	21.13	1.74
246	585	140	22.65	1.22	130	1279	263	21.61	1.85	41	621	479	19.90	1.21	111	314	684	21.31	1.97
13	1100	146	18.58	1.73	181	147	266	22.07	0.92	220	1423	484	22.39	1.91	171	473	684	21.99	1.24
97	1191	147	21.13	1.07	227	782	286	22.51	0.14	23	302	488	19.21	1.51	91	680	697	21.05	1.34

TABLE 7—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
233	148	713	22.53	1.08	71	193	919	20.71	1.11	40	508	1075	19.84	1.72	127	345	1256	21.52	0.65
199	1163	722	22.23	0.85	226	1323	923	22.48	1.19	101	901	1076	21.24	0.78	94	777	1272	21.07	2.06
126	1157	731	21.51	1.18	12	980	929	18.54	1.71	247	586	1077	22.65	1.37	21	1450	1278	19.14	2.40
119	1075	740	21.46	0.64	188	263	935	22.13	1.48	2	642	1086	17.70	0.90	168	298	1294	21.96	1.28
223	455	748	22.43	1.21	33	316	938	19.67	1.06	182	1131	1087	22.08	1.46	53	378	1295	20.25	1.26
6	753	750	17.91	1.35	237	1043	942	22.58	2.09	252	597	1089	22.70	0.77	144	508	1296	21.75	0.93
151	571	762	21.82	2.38	4	381	949	17.82	1.62	95	750	1101	21.09	1.38	219	1439	1299	22.39	0.72
37	180	764	19.80	2.06	19	948	952	19.03	1.67	106	709	1101	21.28	1.25	238	259	1318	22.59	1.63
17	1109	765	18.95	1.73	85	644	959	20.96	2.25	102	1408	1105	21.25	2.03	113	1173	1319	21.35	1.20
68	935	765	20.68	0.87	183	680	959	22.10	1.21	143	588	1105	21.74	1.47	229	527	1322	22.51	0.65
136	609	768	21.67	1.65	217	592	963	22.36	0.81	200	658	1111	22.23	1.68	214	152	1325	22.31	2.05
180	514	769	22.05	1.48	135	135	969	21.65	2.13	58	1096	1114	20.38	0.83	52	454	1327	20.21	0.48
196	358	774	22.20	0.59	11	601	979	18.34	1.72	99	1355	1116	21.21	1.93	172	585	1330	22.00	0.39
250	208	781	22.68	0.57	92	456	980	21.05	1.38	153	593	1124	21.84	2.08	186	767	1333	22.12	0.97
198	800	785	22.23	0.80	240	317	980	22.60	1.30	60	564	1127	20.42	0.94	79	260	1338	20.82	0.62
169	916	807	21.97	0.63	162	1279	983	21.91	2.45	137	848	1135	21.68	1.16	216	496	1341	22.34	1.23
244	1219	810	22.63	1.12	236	957	984	22.56	0.87	243	1335	1136	22.62	0.88	82	519	1353	20.86	1.57
239	1296	812	22.60	1.04	222	1338	994	22.42	1.66	22	594	1140	19.15	1.42	59	382	1365	20.40	1.09
179	543	813	22.05	0.61	191	1021	996	22.17	1.05	73	1463	1142	20.73	1.48	83	938	1369	20.90	1.23
48	777	816	20.10	0.96	159	1115	1000	21.86	1.22	29	1301	1152	19.45	1.76	104	1308	1369	21.27	0.75
84	1016	816	20.94	1.87	76	1408	1003	20.80	0.81	89	277	1152	21.03	1.02	187	1400	1376	22.13	1.22
167	935	826	21.95	1.23	44	1233	1009	20.01	0.49	116	1008	1159	21.42	1.41	49	735	1377	20.21	2.04
114	672	827	21.36	1.06	66	1136	1018	20.61	1.91	61	163	1163	20.42	1.76	138	1055	1380	21.70	1.36
249	1054	829	22.67	1.77	139	1402	1026	21.70	2.38	248	1441	1167	22.67	1.19	27	1017	1384	19.42	3.34
31	742	833	19.50	1.32	195	779	1026	22.19	1.65	107	285	1175	21.29	1.49	69	174	1384	20.68	0.93
10	1449	836	18.21	1.25	142	1195	1029	21.73	1.20	193	195	1175	22.17	1.18	45	965	1387	20.03	0.34
158	959	844	21.86	0.90	203	663	1032	22.24	1.36	241	1439	1175	22.60	1.41	5	1404	1416	17.83	1.49
204	817	846	22.25	1.02	155	233	1040	21.85	1.55	215	1101	1184	22.33	1.24	55	1219	1421	20.28	2.16
50	523	849	20.13	0.62	184	1437	1041	22.11	2.29	128	132	1191	21.55	1.10	178	562	1421	22.05	0.48
51	539	853	20.14	1.79	56	1170	1042	20.30	0.70	63	1396	1199	20.55	1.08	110	202	1426	21.31	1.11
161	575	856	21.89	2.69	70	1344	1043	20.69	2.21	90	559	1210	21.04	1.01	118	1221	1433	21.45	2.16
86	181	866	21.01	2.59	245	1006	1045	22.65	1.14	103	549	1218	21.26	0.72	14	495	1452	18.84	1.24
150	989	878	21.82	0.48	212	1206	1050	22.30	0.98	7	1007	1225	17.94	0.98	72	324	1455	20.73	1.37
124	904	898	21.49	2.40	251	1335	1056	22.68	0.62	54	1269	1225	20.26	1.42	26	424	1457	19.42	1.12
80	1042	904	20.82	1.54	132	944	1060	21.64	1.08	235	30	1243	22.54	1.41	30	556	1472	19.46	1.81
43	494	906	19.93	1.89	156	1431	1063	21.85	1.95	1	992	1244	17.07	1.78	232	1390	1476	22.52	1.34
100	831	906	21.23	1.02	231	1421	1064	22.51	0.99	35	679	1252	19.69	0.62	209	1381	1478	22.29	1.32
131	464	906	21.62	1.33	121	279	1066	21.49	0.41	202	794	1252	22.24	0.86	129	766	1480	21.57	1.60
3	1247	908	17.72	0.77	78	332	1070	20.81	1.19	47	463	1255	20.08	1.32	65	595	1484	20.58	1.72

TABLE 8
ABELL 1942 PHOTOMETRY

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
Cluster Center																			
4	1019	16	17.42	1.26	207	133	304	20.77	2.24	77	1172	507	19.49	1.15	106	514	717	19.83	1.84
154	99	20	20.39	1.67	331	1025	305	21.58	1.27	61	732	511	19.29	2.04	70	664	722	19.41	2.11
352	425	20	21.76	0.91	35	849	306	18.79	2.03	340	405	514	21.66	1.87	216	836	725	20.85	1.74
181	1117	27	20.64	1.51	451	356	308	22.38	1.36	423	218	516	22.21	0.94	114	721	727	20.00	2.02
140	85	29	20.26	2.05	2	1257	311	17.35	1.79	310	1408	517	21.46	1.89	67	740	728	19.38	2.01
348	408	30	21.72	0.79	142	1181	311	20.27	1.50	362	626	521	21.81	1.22	166	638	733	20.56	2.16
3	1281	40	17.41	0.91	399	870	320	22.07	1.92	463	1154	521	22.48	1.76	137	1248	734	20.19	1.17
430	219	42	22.23	0.98	229	1142	330	20.96	2.26	461	1346	522	22.46	1.39	158	925	737	20.42	1.60
320	846	47	21.51	1.98	198	1039	334	20.73	1.36	86	941	523	19.61	1.99	323	317	744	21.53	1.31
104	403	52	19.82	1.96	263	634	337	21.20	2.34	107	285	527	19.88	1.76	413	1292	747	22.17	1.30
211	857	54	20.80	1.07	366	789	339	21.82	1.27	291	199	527	21.35	1.07	322	1483	749	21.52	1.66
351	1386	65	21.76	1.52	99	36	341	19.76	2.09	437	1039	528	22.29	1.65	12	751	750	18.21	2.02
246	1011	67	21.11	1.31	53	261	345	19.17	2.06	250	1049	530	21.13	1.94	339	773	754	21.66	1.52
10	947	68	18.06	1.67	329	1033	345	21.57	1.28	385	212	532	22.00	2.30	336	1315	758	21.61	1.70
220	998	75	20.91	1.54	438	1171	345	22.29	2.43	58	1489	533	19.22	2.01	206	266	767	20.76	1.29
46	1033	77	19.05	1.16	226	759	349	20.93	1.92	165	701	533	20.56	1.71	417	1215	767	22.19	1.46
201	125	78	20.74	1.32	371	1377	358	21.89	1.27	444	1053	545	22.33	1.42	33	991	768	18.79	1.92
436	1420	84	22.29	0.58	365	233	359	21.82	1.11	388	572	546	22.03	1.51	157	927	769	20.40	1.76
141	787	85	20.27	0.92	446	315	361	22.35	1.07	28	986	547	18.75	1.94	175	688	769	20.60	1.97
327	228	91	21.57	1.37	159	459	363	20.43	2.13	425	587	549	22.22	0.77	120	1258	772	20.04	2.30
45	717	92	19.02	1.28	264	754	363	21.21	2.01	186	864	550	20.66	0.98	283	818	772	21.28	2.55
31	1290	95	18.77	1.88	210	141	368	20.79	1.87	184	631	553	20.65	1.45	29	662	773	18.76	2.01
118	1121	100	20.04	1.67	288	1136	369	21.32	1.81	256	800	556	21.15	1.48	97	513	773	19.71	1.87
468	257	105	22.53	1.28	84	212	371	19.56	1.84	262	1001	558	21.20	1.63	48	707	775	19.08	1.99
138	1046	107	20.20	1.79	384	1443	373	22.00	2.27	311	763	564	21.46	2.07	386	790	780	22.01	1.42
123	1273	108	20.08	1.56	180	709	377	20.63	1.34	452	438	564	22.39	0.94	356	635	781	21.78	1.89
189	390	113	20.66	1.98	143	1471	380	20.27	2.64	214	68	566	20.82	0.81	192	1024	784	20.68	1.53
396	1170	115	22.06	1.63	20	813	381	18.54	2.09	449	512	572	22.35	2.43	480	1099	785	22.69	0.95
95	788	126	19.68	2.10	133	887	381	20.17	0.69	448	1341	574	22.35	1.76	240	1291	788	21.07	1.25
8	1233	133	17.97	1.77	212	17	382	20.80	1.84	43	868	578	18.97	1.95	419	1218	792	22.19	2.81
170	322	136	20.57	2.11	368	1189	382	21.83	0.40	410	799	582	22.16	0.89	330	918	797	21.57	1.95
343	1092	136	21.67	1.51	223	186	389	20.92	2.11	335	256	584	21.60	1.77	113	594	803	19.98	2.06

TABLE 8—Continued

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
458	73	137	22.45	0.46	222	794	393	20.92	1.81	39	700	585	18.92	0.80	381	396	803	21.98	1.64
265	1279	147	21.22	1.91	188	1186	398	20.66	1.70	360	823	586	21.80	1.25	119	815	805	20.04	1.76
221	1230	149	20.92	1.69	82	1288	401	19.55	1.68	300	1222	589	21.39	1.19	317	202	808	21.50	1.66
247	518	150	21.11	1.65	156	1152	407	20.40	1.94	409	1200	589	22.15	1.35	19	1451	809	18.53	1.64
382	1128	150	21.99	0.75	302	725	408	21.42	0.90	89	835	591	19.64	0.80	277	955	810	21.27	1.56
131	238	154	20.13	1.69	376	1329	408	21.96	2.41	293	798	594	21.35	1.63	15	702	811	18.34	2.07
16	1093	159	18.34	2.00	394	1318	415	22.05	1.41	109	753	604	19.88	1.98	80	774	811	19.52	1.88
176	269	168	20.61	2.36	401	1241	415	22.09	1.21	178	733	609	20.61	1.84	110	421	813	19.89	2.11
364	242	173	21.82	1.03	68	952	416	19.39	2.27	63	844	620	19.32	2.17	169	940	813	20.57	1.76
66	887	175	19.36	1.76	217	302	417	20.86	1.86	62	454	621	19.29	2.01	40	839	819	18.94	1.37
282	160	177	21.28	1.34	324	776	417	21.53	2.11	290	985	622	21.35	0.77	307	488	822	21.43	2.00
346	992	182	21.69	2.30	312	126	418	21.47	1.90	25	1181	628	18.67	1.88	342	28	823	21.67	1.32
179	563	189	20.62	1.86	47	462	423	19.07	1.96	75	547	628	19.48	1.63	105	1015	826	19.83	1.14
275	651	189	21.26	1.26	363	550	423	21.81	1.41	355	669	628	21.78	1.00	315	404	826	21.49	2.32
377	1419	194	21.97	1.08	126	1016	426	20.09	1.73	280	1089	630	21.27	1.98	132	678	828	20.14	1.99
193	855	200	20.68	2.10	370	505	429	21.88	1.48	42	738	633	18.96	2.07	215	1267	829	20.83	1.81
108	888	202	19.88	1.65	422	1475	429	22.21	1.10	416	380	634	22.18	1.69	111	544	830	19.92	0.82
296	464	207	21.37	1.50	177	186	430	20.61	2.26	306	1293	635	21.43	1.34	472	525	831	22.60	0.61
96	877	211	19.70	1.76	325	1147	436	21.54	1.88	136	76	639	20.18	1.92	146	254	837	20.31	1.44
344	952	211	21.67	2.83	445	543	437	22.33	1.77	318	149	640	21.50	1.61	74	778	839	19.46	2.09
374	576	220	21.92	1.26	76	658	442	19.49	0.47	278	1086	643	21.27	1.50	248	909	839	21.13	1.45
257	1302	222	21.15	1.45	473	14	446	22.60	0.85	242	1357	646	21.08	2.07	200	270	840	20.73	1.86
155	1435	224	20.40	1.05	125	832	447	20.08	1.88	11	601	652	18.09	1.69	60	378	841	19.29	0.18
239	703	233	21.06	1.37	418	1132	452	22.19	1.29	390	357	653	22.04	0.70	304	473	841	21.42	1.35
298	901	239	21.38	0.48	147	1063	455	20.35	2.01	94	136	654	19.68	1.31	450	722	849	22.36	1.79
476	227	240	22.64	1.16	145	1451	457	20.30	2.27	393	1407	654	22.04	1.84	38	810	856	18.91	2.23
345	423	241	21.68	2.06	244	1478	460	21.09	1.73	209	884	655	20.79	1.51	225	738	863	20.93	1.57
102	71	243	19.79	2.27	411	762	464	22.16	2.08	14	1082	662	18.29	2.04	297	1232	867	21.37	1.94
405	846	243	22.11	1.85	287	933	467	21.32	1.64	5	747	666	17.48	2.08	253	552	869	21.14	2.01
349	511	247	21.74	1.22	65	617	471	19.36	1.39	103	1107	672	19.80	1.98	92	1271	872	19.65	1.18
260	1224	252	21.18	1.17	482	252	472	22.70	0.95	234	1174	673	21.02	1.55	354	1174	880	21.77	1.06
128	1250	253	20.11	1.12	274	591	473	21.26	1.12	281	675	675	21.27	2.02	237	890	882	21.05	1.10
149	887	257	20.38	1.24	243	970	477	21.09	1.46	259	578	676	21.17	1.08	194	933	884	20.68	1.84
228	1281	257	20.93	2.26	152	479	478	20.38	1.85	294	792	677	21.35	2.02	333	701	887	21.58	1.54
391	823	257	22.04	1.64	375	744	480	21.92	2.71	27	763	679	18.73	2.09	245	640	890	21.10	1.99
173	802	262	20.59	1.59	402	800	482	22.09	2.02	279	136	681	21.27	2.30	6	263	897	17.54	0.85
303	853	262	21.42	1.21	459	781	482	22.45	1.54	130	836	682	20.12	2.09	59	775	899	19.24	1.93
197	655	267	20.71	2.01	469	424	483	22.55	1.58	22	759	687	18.60	2.10	85	662	904	19.60	2.03
64	550	269	19.35	2.05	347	915	485	21.70	1.57	36	753	693	18.81	2.05	115	825	910	20.01	1.03
397	242	270	22.06	2.49	453	886	485	22.40	1.51	44	1084	693	19.00	2.11	477	923	917	22.64	1.43
475	985	270	22.62	0.80	81	1243	487	19.55	1.74	270	1300	695	21.23	1.92	88	899	921	19.63	2.01
295	74	273	21.36	2.64	379	975	487	21.97	1.30	41	684	702	18.96	1.73	129	678	921	20.12	1.48
424	518	279	22.21	1.19	464	631	489	22.49	0.76	161	731	703	20.45	1.58	251	357	922	21.13	2.56
172	563	280	20.58	1.67	337	647	493	21.61	2.12	122	585	708	20.07	1.82	121	89	923	20.05	1.91
467	616	286	22.53	0.15	167	1363	497	20.57	1.57	139	1270	708	20.22	1.86	308	697	925	21.44	1.90
427	1466	288	22.22	1.51	224	1275	497	20.93	1.72	100	438	712	19.77	1.86	79	1031	927	19.52	1.99
400	64	290	22.09	1.41	32	22	501	18.78	2.21	1	943	714	17.33	1.34	182	303	938	20.64	1.99
442	1416	293	22.33	0.71	372	673	501	21.89	1.55	255	356	715	21.15	1.55	174	907	943	20.60	2.07
367	1162	299	21.82	2.10	90	929	503	19.64	1.38	231	761	716	20.98	1.63	203	848	943	20.74	1.94
241	289	945	21.07	2.34	37	933	1070	18.89	0.70	56	792	1198	19.19	1.83	319	68	1314	21.51	0.75
34	961	946	18.79	2.04	83	885	1071	19.55	2.03	171	920	1198	20.58	1.18	353	541	1314	21.77	0.58
395	198	949	22.06	0.66	52	1221	1073	19.13	2.17	21	545	1199	18.55	2.07	465	1300	1316	22.51	1.12
236	877	954	21.04	1.15	168	422	1076	20.57	1.30	478	204	1200	22.66	0.82	305	228	1319	21.42	2.18
407	1201	955	22.14	1.75	51	791	1078	19.12	1.99	183	1290	1208	20.65	1.47	299	997	1324	21.39	0.17
301	1338	959	21.39	1.63	435	970	1082	22.27	1.28	389	1442	1208	22.04	0.50	383	580	1325	22.00	0.67
124	919	964	20.08	1.88	284	715	1088	21.29	1.20	219	745	1212	20.91	1.58	357	1001	1332	21.79	1.09
429	335	965	22.23	0.53	443	240	1095	22.33	1.18	334	1300	1215	21.60	0.85	441	1361	1343	22.30	1.65
285	1043	967	21.31	1.22	151	1062	1101	20.38	1.90	71	1003	1223	19.43	1.40	350	380	1349	21.74	1.98
233	1416	973	21.00	1.64	276	488	1108	21.26	1.77	447	105	1223	22.35	1.30	195	440	1355	20.68	2.10
50	200	975	19.11	1.43	49	817	1109	19.10	1.92	187	1451	1224	20.66	1.52	398	400	1374	22.07	1.20
127	230	976	20.10	1.56	69	274	1110	19.40	1.90	199	952	1224	20.73	1.53	387	471	1381	22.03	0.71
57	295	982	19.21	0.73	98	711	1119	19.75	1.81	359	1117	1224	21.79	1.99	160	881	1385	20.45	1.66
13	725	986	18.23	1.16	72	698	1124	19.45	1.90	205	1374	1228	20.75	1.39	332	924	1391	21.58	1.32
314	1305	987	21.49	1.93	261	141	1126	21.18	1.15	227	1190	1236	20.93	2.74	455	183	1400	22.40	1.92
439	399	990	22.30	1.17	73	563	1134	19.46	1.89	408	176	1239	22.15	0.53	420	1249	1408	22.20	1.90
440	1355	991	22.30	1.37	380	1260	1135	21.97	1.74	235	879	1243	21.03	1.82	286	498	1412	21.31	1.47
414	1262	992	22.18	1.11	252	1400	1136	21.13	2.49	272	608	1246	21.24	2.80	369	1039	1413	21.85	1.68
164	472	998	20.56	0.81	232	1426	1140	20.99	1.66	313	1098	1255	21.48	1.33	135	1051	1415	20.18	1.82
30	621	1001	18.77	1.69	163	201													

TABLE 8—Continued

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
426	1000	1050	22.22	0.78	266	311	1191	21.22	1.94	457	305	1296	22.44	0.85	273	17	1470	21.25	1.78
78	963	1058	19.49	1.70	153	216	1193	20.38	2.15	190	1008	1297	20.67	1.62	456	1358	1471	22.41	1.10
238	405	1059	21.05	1.58	433	1093	1193	22.26	0.52	421	1466	1300	22.21	0.44	117	229	1484	20.04	0.92
326	1176	1063	21.56	1.44	17	1216	1194	18.39	1.64	116	586	1304	20.02	2.12	93	392	1485	19.66	1.37
434	132	1064	22.26	1.08	213	1020	1194	20.80	1.84										
Blank Field																			
64	658	12	20.34	1.20	139	126	250	21.12	1.78	266	1019	439	22.29	1.39	179	1061	592	21.50	2.23
25	385	20	19.51	2.05	296	1460	250	22.59	0.58	187	424	440	21.59	1.02	154	374	610	21.23	1.27
227	742	22	22.02	1.04	159	1064	265	21.27	1.16	114	760	447	20.82	2.15	106	1416	620	20.79	1.39
214	1281	35	21.89	1.00	157	973	268	21.26	1.40	206	961	455	21.80	1.45	249	146	623	22.18	1.80
241	1214	36	22.15	1.37	85	1223	280	20.62	1.52	138	1018	457	21.11	2.23	235	24	624	22.11	0.81
141	718	43	21.13	2.26	200	1158	282	21.75	1.49	113	990	458	20.82	2.09	39	1336	626	19.77	0.77
247	1324	45	22.18	1.19	185	1378	283	21.55	2.48	301	1305	462	22.62	0.95	135	1263	626	21.10	0.81
26	298	67	19.52	0.81	288	1037	286	22.49	0.47	72	471	470	20.48	1.28	228	966	626	22.02	1.37
40	1452	71	19.82	1.85	57	1269	294	20.19	1.95	280	772	473	22.42	0.56	198	1458	629	21.74	1.56
33	1360	79	19.67	2.04	236	973	307	22.12	1.54	164	1029	479	21.34	1.36	44	1485	636	19.88	1.55
75	187	82	20.50	1.89	278	798	313	22.40	2.88	213	891	480	21.88	1.15	10	652	640	18.67	1.14
130	772	85	21.08	1.57	13	1182	318	18.89	1.95	6	1274	484	18.22	2.13	196	136	644	21.73	0.58
127	708	89	21.01	1.37	53	458	321	20.08	2.09	137	1241	486	21.11	1.79	46	584	648	19.91	1.28
55	64	93	20.15	2.03	197	542	327	21.74	1.48	104	1101	487	20.78	1.68	49	513	650	19.99	2.00
148	955	98	21.17	1.37	99	864	339	20.71	0.19	182	775	489	21.52	1.51	101	464	659	20.72	1.10
84	1157	100	20.59	1.94	23	1100	344	19.47	1.95	45	1073	492	19.89	2.14	297	549	663	22.61	2.03
80	139	102	20.58	2.17	118	849	345	20.87	1.43	37	902	501	19.69	2.07	189	619	674	21.61	1.69
305	350	107	22.67	1.31	19	219	355	19.22	2.13	128	557	505	21.01	1.63	239	415	694	22.14	1.09
168	284	126	21.38	1.74	276	1144	360	22.38	2.08	42	862	507	19.83	1.60	156	586	702	21.24	1.22
115	157	127	20.84	1.04	147	1057	361	21.17	1.11	109	784	507	20.79	2.14	88	570	707	20.64	1.27
186	442	127	21.57	1.33	190	837	363	21.62	1.37	217	111	507	21.89	1.78	299	886	710	22.62	0.87
284	1118	128	22.46	0.72	173	1177	364	21.45	0.93	111	533	510	20.81	1.39	27	481	724	19.54	2.09
184	634	137	21.53	1.65	36	1072	366	19.69	1.93	271	522	512	22.32	0.95	246	61	726	22.17	1.55
11	255	138	18.78	0.67	96	1080	374	20.70	1.01	231	73	515	22.06	1.30	61	456	728	20.29	1.95
191	1046	146	21.64	1.18	151	1436	378	21.19	2.28	293	121	515	22.55	1.38	205	226	728	21.78	1.23
177	1183	147	21.50	1.18	298	861	396	22.61	0.70	170	1405	522	21.39	0.77	169	1457	729	21.38	1.48
93	598	158	20.68	2.01	255	820	397	22.21	1.62	193	1391	525	21.68	2.26	263	211	730	22.26	1.12
162	647	162	21.31	1.99	47	1309	398	19.98	0.71	244	815	528	22.16	1.35	92	1159	744	20.66	2.04
248	454	172	22.18	0.84	161	1041	401	21.29	1.08	15	1114	541	18.97	2.07	5	20	748	18.16	1.40
123	1406	184	20.96	1.26	41	923	403	19.82	2.07	73	852	547	20.49	2.35	8	750	750	18.46	1.61
71	651	189	20.47	2.29	204	1189	404	21.78	0.86	291	941	548	22.52	0.99	18	1445	756	19.17	1.22
117	912	189	20.85	1.86	1	1375	405	17.08	1.39	254	869	549	22.21	1.63	251	392	766	22.19	2.53
163	1435	189	21.33	1.46	146	365	408	21.17	0.77	125	270	551	20.96	2.13	134	1260	777	21.10	0.79
28	1105	198	19.56	1.84	14	727	413	18.94	1.04	265	634	552	22.29	1.61	175	850	783	21.48	1.64
290	444	198	22.52	0.44	287	677	416	22.48	1.54	54	163	562	20.11	2.10	35	523	784	19.69	1.63
70	793	201	20.46	2.03	62	130	419	20.30	1.17	279	1251	562	22.41	1.05	43	1040	789	19.83	2.25
52	1469	206	20.04	2.25	220	893	419	21.93	0.82	144	510	563	21.15	2.34	199	89	795	21.75	1.42
60	157	218	20.27	2.20	3	1424	428	17.67	2.02	295	1103	574	22.57	0.79	100	1128	797	20.71	2.22
242	766	235	22.15	1.65	269	582	432	22.31	1.86	224	1253	575	22.00	1.41	68	32	798	20.37	1.59
257	173	236	22.23	0.83	38	1082	435	19.70	1.90	245	109	575	22.17	1.12	261	1384	798	22.25	1.90
22	289	243	19.38	1.05	303	1452	435	22.63	1.21	211	294	582	21.86	2.22	203	1405	800	21.78	1.41
207	1135	804	21.82	2.62	183	235	1007	21.52	2.32	208	1365	1162	21.83	1.03	212	686	1353	21.87	1.86
58	1397	809	20.21	1.09	285	405	1009	22.46	1.96	78	953	1164	20.57	1.85	108	783	1355	20.79	1.81
219	751	818	21.91	0.58	237	982	1014	22.13	0.91	308	236	1171	22.70	1.25	195	1401	1356	21.69	1.92
165	1077	819	21.36	1.36	105	1146	1015	20.78	2.08	292	646	1173	22.53	1.35	136	284	1359	21.10	1.87
172	1457	819	21.42	1.92	302	893	1017	22.62	1.38	87	383	1174	20.63	0.72	20	927	1361	19.27	2.20
188	99	819	21.59	1.12	289	1396	1022	22.51	0.48	232	683	1175	22.07	1.16	97	1058	1367	20.70	1.23
24	880	830	19.50	1.57	259	1418	1024	22.24	2.60	226	91	1178	22.00	1.98	112	965	1371	20.81	2.24
31	705	832	19.63	2.05	67	12	1026	20.37	1.17	277	1419	1186	22.40	1.55	30	892	1381	19.62	1.05
218	1140	841	21.90	2.01	234	1283	1027	22.11	0.87	86	968	1191	20.63	0.65	286	61	1381	22.48	1.06
155	608	855	21.23	1.67	107	1361	1030	20.79	2.15	98	620	1200	20.70	2.10	252	390	1391	22.20	1.35
300	339	858	22.62	0.70	225	158	1038	22.00	2.21	230	542	1207	22.05	1.79	126	679	1396	20.97	3.35
174	932	884	21.47	1.40	171	37	1039	21.42	0.33	102	259	1209	20.72	1.43	140	674	1396	21.12	3.01
181	763	884	21.51	1.40	50	1118	1042	20.02	0.37	122	154	1209	20.94	1.61	283	773	1396	22.45	1.31
119	1109	892	20.87	2.38	253	150	1044	22.21	1.29	268	1341	1214	22.31	1.53	304	414	1398	22.63	2.02
129	1071	893	21.08	0.87	95	845	1049	20.69	2.24	221	325	1220	21.93	1.25	275	694	1401	22.37	1.26
233	987	893	22.10	1.83	209	936	1059	21.84	2.18	59	1071	1230	20.26	1.74	215	736	1403	21.89	1.49
12	600	897	18.84	2.17	281	237	1060	22.42	1.17	7	737	1246	18.28	0.89	216	944	1408	21.89	1.46
133	1147	898	21.09	1.82	132	1036	1062	21.08	3.48	258	852	1253	22.24	1.91	243	1264	1408	22.15	1.38
306	63	898	22.68	1.69	192	1102	1063	21.66	1.43	176	614	1257	21.48	1.92	160	241	1414	21.27	1.95
238	1381	904	22.14	1.22	178	356	1064	21.50	1.63	307	1471	1257	22.69	1.32	149	1386	1415	21.17	1.35
150	610	912	21.17	2.35	145	336	1075	21.16	1.39	21	648	1260	19.28	2.17	66	1367	1417	20.34	1.73
4	950	927	17.90																

TABLE 9
ABELL 1961/1963 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
A 1961 Cluster Center																			
268	330	15	21.06	2.45	501	970	222	22.41	0.62	237	170	478	20.96	1.44	495	132	710	22.37	0.52
351	944	16	21.58	1.72	451	1324	223	22.08	2.35	285	464	484	21.16	1.71	72	884	711	19.36	2.74
404	455	19	21.83	1.13	503	1389	231	22.42	0.31	87	242	486	19.59	1.59	419	801	713	21.92	0.96
244	533	23	20.98	1.96	186	850	239	20.72	1.82	520	368	486	22.51	1.03	160	108	715	20.36	2.29
167	381	24	20.50	1.13	300	517	239	21.27	1.97	522	263	490	22.51	1.57	182	1455	716	20.71	0.81
388	814	26	21.73	1.87	173	923	242	20.60	1.42	445	553	495	22.07	2.11	512	1415	717	22.46	1.14
291	582	31	21.21	1.82	85	407	243	19.54	2.01	260	853	496	21.03	1.45	309	803	718	21.33	1.14
348	120	33	21.56	1.34	466	891	246	22.18	1.28	457	1399	498	22.12	1.21	353	468	719	21.58	1.67
514	894	39	22.47	1.87	298	212	252	21.26	0.91	301	288	502	21.28	1.46	22	863	720	18.53	1.40
328	488	41	21.44	1.90	140	241	260	20.07	1.95	90	532	503	19.60	2.01	323	804	721	21.43	1.20
234	433	46	20.94	1.74	63	480	264	19.20	0.95	162	794	503	20.42	1.45	34	1174	723	18.70	2.10
53	84	49	19.10	2.23	41	1314	268	18.90	1.96	377	158	503	21.70	1.36	16	432	725	18.24	1.16
1	277	51	17.15	2.21	403	608	269	21.82	1.78	203	739	511	20.80	2.38	342	1336	726	21.53	1.43
70	768	51	19.35	0.81	221	976	273	20.89	1.76	436	758	513	22.03	2.05	250	535	728	21.00	1.98
545	1122	55	22.78	0.92	39	15	275	18.84	2.01	389	1216	514	21.74	1.09	48	519	729	19.01	0.42
209	898	56	20.83	2.62	76	930	275	19.41	2.07	414	1271	520	21.89	1.62	136	715	730	20.03	2.46
139	1225	62	20.06	2.33	27	1321	276	18.58	1.76	489	288	527	22.29	1.14	544	997	732	22.77	1.01
112	405	64	19.83	2.04	49	1327	287	19.02	1.53	448	1095	528	22.08	1.43	215	569	733	20.86	0.73
446	780	66	22.08	1.38	155	1206	287	20.27	1.84	181	404	529	20.70	1.11	111	1391	740	19.83	1.21
355	440	74	21.59	1.62	248	302	290	20.99	1.95	491	278	535	22.31	1.36	390	1090	741	21.75	1.80
299	770	76	21.26	2.09	188	232	295	20.74	1.47	311	460	536	21.36	1.51	551	1150	743	22.84	0.77
464	625	79	22.17	1.29	295	1417	297	21.22	2.06	113	1003	537	19.84	1.89	18	740	746	18.25	2.14
553	1215	82	22.85	1.65	172	470	298	20.59	1.52	444	193	542	22.07	1.64	83	990	748	19.51	1.98
335	112	83	21.51	0.95	483	23	299	22.26	1.39	561	435	543	22.93	0.77	2	750	750	17.46	2.18
133	378	87	20.03	0.40	509	654	299	22.45	1.11	6	1349	544	17.89	2.23	480	678	750	22.26	0.44
515	334	88	22.49	0.17	382	736	312	21.71	2.12	543	853	544	22.77	1.04	533	805	752	22.59	1.33
278	450	93	21.11	1.86	411	565	314	21.88	0.68	330	865	548	21.49	1.06	246	600	753	20.99	1.95
488	400	98	22.28	2.03	168	419	320	20.50	1.84	372	220	550	21.68	0.92	385	612	757	21.72	1.69
513	371	98	22.47	0.87	222	1207	320	20.90	2.20	29	1321	553	18.58	2.17	232	1055	760	20.93	2.13
511	412	99	22.46	1.27	352	455	321	21.58	1.73	35	885	553	18.70	2.13	245	163	761	20.99	1.56
40	523	100	18.87	2.08	78	1281	324	19.43	1.31	159	809	557	20.35	1.95	82	713	762	19.49	1.53
550	317	106	22.83	0.57	217	1124	328	20.87	2.26	272	1214	557	21.10	1.89	274	1125	762	21.11	1.75
306	710	108	21.31	1.97	26	843	334	18.55	1.09	319	1253	557	21.41	1.63	219	474	763	20.89	1.15
467	569	108	22.18	2.09	472	757	340	22.22	2.38	170	548	575	20.55	1.75	270	315	763	21.08	1.98
538	236	108	22.70	0.17	391	1105	341	21.75	1.94	303	513	577	21.31	1.47	81	561	764	19.49	1.35
434	245	110	22.03	1.11	476	691	341	22.23	2.03	535	627	583	22.61	0.95	88	774	764	19.59	2.42
469	463	110	22.20	1.22	110	952	343	19.82	1.39	195	1379	584	20.75	2.32	241	1475	769	20.98	0.99
64	902	111	19.22	1.27	115	342	349	19.85	2.69	313	1467	585	21.38	1.71	371	1234	769	21.67	1.18
315	306	118	21.40	1.40	145	259	354	20.14	2.01	265	382	587	21.04	2.09	396	1151	769	21.77	2.01
350	1056	119	21.57	1.72	169	1052	360	20.51	2.59	152	881	588	20.26	1.30	142	703	771	20.12	1.78
96	50	121	19.67	1.49	361	1185	364	21.64	1.33	247	605	588	20.99	1.88	146	1048	772	20.18	1.34
547	476	121	22.79	0.88	505	507	364	22.42	1.11	126	561	589	19.93	1.92	52	719	774	19.09	2.02
147	78	124	20.19	2.36	238	239	366	20.96	1.38	102	558	590	19.75	1.87	193	347	774	20.75	1.99
475	313	126	22.23	1.50	117	1117	367	19.86	1.98	279	1476	593	21.12	1.34	109	1113	775	19.81	1.98
67	535	129	19.27	1.80	288	402	368	21.17	1.60	124	549	594	19.92	2.03	156	1359	776	20.29	1.97
91	1441	131	19.64	1.98	539	691	377	22.73	1.48	331	683	595	21.49	1.85	453	532	778	22.11	1.66
129	1127	131	19.96	1.67	14	1209	378	18.23	1.42	346	170	598	21.55	1.82	349	1442	779	21.57	1.57
154	173	142	20.27	1.15	412	71	381	21.88	0.87	97	890	602	19.68	2.11	462	1161	780	22.14	1.19
165	1338	143	20.45	1.37	428	1266	387	22.00	1.23	406	592	603	21.83	1.76	243	676	782	20.98	1.90
527	1240	144	22.55	1.15	549	156	394	22.81	1.43	71	837	606	19.36	2.11	242	23	785	20.98	1.91
130	1043	147	19.97	1.96	420	788	398	21.92	1.64	327	197	609	21.44	1.83	552	63	785	22.84	0.75
339	316	147	21.52	1.49	374	990	400	21.69	1.60	220	466	617	20.89	2.03	42	741	786	18.91	2.08
196	244	149	20.77	1.55	7	683	403	17.94	2.13	118	646	619	19.87	1.20	418	619	789	21.92	0.93
206	347	153	20.83	1.12	3	1192	405	17.68	1.05	537	445	621	22.66	0.61	183	704	790	20.71	1.37
65	208	163	19.24	1.90	540	92	406	22.74	0.92	125	320	622	19.92	2.08	357	99	792	21.61	3.59
326	971	163	21.43	2.73	455	800	409	22.12	1.15	50	1027	623	19.02	2.00	45	664	794	18.98	1.74
138	444	167	20.06	1.94	392	750	410	21.75	2.89	171	557	630	20.55	1.86	459	466	794	22.13	0.84
257	1361	171	21.02	2.35	284	369	418	21.16	1.28	46	811	632	18.98	1.98	308	516	795	21.33	0.88
267	265	171	21.06	2.54	461	108	419	22.14	0.84	524	94	632	22.53	1.06	225	1196	796	20.91	1.62
422	752	172	21.94	2.98	66	501	421	19.25	1.22	322	914	644	21.42	1.36	481	42	796	22.26	1.07
13	675	180	18.18	2.16	236	1032	421	20.95	1.84	143	1253	652	20.12	2.09	120	502	798	19.88	1.83
153	710	180	20.26	1.88	529	532	422	22.57	0.74	150	624	652	20.23	2.02	332	1435	798	21.50	1.25
37	229	191	18.74	1.63	68	1130	423	19.27	2.08	408	75	652	21.86	1.44	546	421	802	22.78	1.27
470	433	191	22.21	0.62	262	1300	426	21.03	2.05	21	844	656	18.41	2.19	266	1098	806	21.05	1.97
86	1338	193	19.58	1.90	297	656	431	21.24	2.43	62	956	666	19.19	2.11	532	829	806	22.58	1.13
89	43	194	19.60	1.31	79	862	438	19.43	2.12	362	1210	667	21.64	1.25	189	205	807	20.74	2.36
479	986	194	22.25	2.99	25	609	441	18.54	2.13	94	1082	676	19.66	2.04	370	1444	809	21.67	1.08
43	959	195	18.95	1.48	494	1410	446	22.37	1.10	121	766	678	19.90	1.98</					

TABLE 9—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
386	822	843	21.72	1.71	318	45	971	21.41	1.47	555	14	1122	22.87	0.45	177	1103	1275	20.63	1.23
269	823	851	21.08	1.86	534	1368	975	22.60	0.98	240	919	1128	20.97	1.20	103	170	1281	19.76	1.44
433	1025	851	22.02	1.95	557	577	979	22.91	0.70	440	550	1130	22.06	0.72	175	820	1287	20.61	1.97
31	658	852	18.59	2.09	305	547	981	21.31	2.10	344	760	1131	21.55	1.76	105	267	1292	19.77	2.15
358	1465	856	21.62	1.65	122	282	984	19.90	2.09	202	607	1134	20.80	1.88	127	960	1292	19.95	1.88
498	261	856	22.38	1.17	60	714	994	19.18	1.51	179	717	1135	20.68	1.96	178	1225	1299	20.66	2.42
316	611	857	21.40	1.97	304	1055	995	21.31	1.94	201	545	1142	20.80	1.42	271	270	1302	21.09	2.29
365	562	861	21.64	2.00	337	761	995	21.51	2.28	190	383	1143	20.75	1.95	59	1122	1303	19.16	1.54
55	818	862	19.14	1.99	397	88	998	21.77	2.13	554	363	1143	22.87	0.09	366	774	1305	21.65	1.35
450	1436	863	22.08	1.88	61	223	1009	19.18	2.10	343	294	1145	21.53	1.78	432	1330	1307	22.02	1.95
161	722	864	20.40	1.80	519	756	1009	22.50	1.78	478	1132	1145	22.25	1.29	487	1067	1311	22.28	0.96
180	279	864	20.68	2.10	325	949	1013	21.43	1.12	317	512	1147	21.40	1.93	439	463	1313	22.05	0.97
465	1403	865	22.18	0.44	233	1372	1017	20.94	0.80	368	1084	1148	21.66	1.37	564	1089	1315	22.95	0.64
435	1286	867	22.03	1.82	205	884	1018	20.82	1.53	398	1057	1151	21.77	2.28	282	1316	1322	21.15	0.95
456	126	872	22.12	1.24	93	1289	1019	19.65	1.97	99	635	1154	19.70	1.37	340	338	1325	21.52	1.72
235	1300	875	20.95	0.46	359	896	1022	21.63	1.49	132	1253	1154	20.02	2.69	437	1281	1326	22.04	0.96
184	38	877	20.71	1.92	504	1429	1022	22.42	0.58	223	330	1154	20.90	2.32	452	1044	1326	22.09	1.70
185	292	878	20.72	1.37	438	517	1028	22.05	0.84	256	475	1158	21.01	3.02	492	342	1343	22.34	1.35
378	803	881	21.70	1.86	187	636	1029	20.73	2.30	360	368	1159	21.63	1.41	413	1041	1346	21.89	0.78
107	368	883	19.79	2.01	200	766	1030	20.80	1.37	38	238	1160	18.79	2.03	32	1144	1353	18.60	1.77
341	472	884	21.53	1.17	468	260	1031	22.19	1.41	421	1271	1161	21.94	1.22	176	729	1354	20.62	2.24
9	208	885	18.04	0.68	123	502	1035	19.92	0.86	151	1194	1166	20.23	2.10	249	1326	1356	21.00	1.28
497	95	890	22.38	1.02	336	1374	1040	21.51	1.46	199	415	1170	20.80	1.12	19	39	1357	18.33	1.98
474	84	891	22.23	1.89	506	239	1044	22.42	1.54	381	936	1171	21.71	1.39	30	1266	1357	18.59	1.63
58	434	893	19.15	2.08	484	335	1046	22.27	0.98	415	1478	1171	21.90	1.59	24	140	1359	18.54	1.94
166	664	893	20.46	1.94	541	24	1047	22.74	1.60	73	554	1174	19.37	1.68	273	1252	1366	21.11	1.32
226	478	896	20.91	1.83	128	1444	1050	19.95	2.26	197	1109	1174	20.78	1.70	510	1452	1367	22.45	1.64
239	70	897	20.96	2.36	252	641	1051	21.00	1.98	405	390	1176	21.83	1.00	379	546	1377	21.70	1.64
394	1099	898	21.76	1.99	530	1317	1055	22.57	1.28	141	777	1177	20.11	2.18	400	1247	1381	21.78	2.17
427	673	901	22.00	1.48	320	163	1057	21.42	1.50	47	330	1178	18.99	2.00	548	402	1383	22.81	0.00
443	183	901	22.07	1.14	426	840	1060	21.98	1.58	409	1377	1185	21.86	1.21	77	1196	1396	19.42	2.60
558	129	902	22.91	0.73	329	492	1061	21.45	1.63	174	212	1186	20.60	2.24	562	818	1397	22.94	0.47
283	75	903	21.15	2.30	425	532	1062	21.98	1.54	310	755	1187	21.33	2.14	17	715	1398	18.25	2.00
100	589	909	19.70	1.92	157	359	1073	20.33	2.20	454	23	1189	22.12	1.04	207	544	1398	20.83	1.69
399	671	909	21.78	1.19	119	1473	1074	19.87	1.50	148	424	1198	20.20	1.82	259	590	1404	21.03	1.19
101	1196	913	19.75	1.68	473	876	1074	22.23	0.85	131	559	1203	20.02	1.81	431	106	1409	22.02	1.34
559	801	913	22.91	1.63	230	95	1075	20.93	0.94	281	653	1208	21.14	1.89	523	323	1411	22.53	0.83
98	291	916	19.69	2.07	458	813	1075	22.12	1.54	277	1443	1211	21.11	2.08	69	1329	1420	19.32	1.41
194	479	916	20.75	1.93	556	1383	1076	22.90	-0.07	212	528	1212	20.85	1.84	508	1244	1423	22.44	1.59
218	184	919	20.89	0.95	229	203	1078	20.92	1.99	4	27	1214	17.70	0.86	364	1122	1427	21.64	1.69
542	902	921	22.75	1.93	485	672	1081	22.27	1.71	116	387	1214	19.86	1.35	276	814	1433	21.11	1.65
430	447	928	22.01	1.54	486	1181	1081	22.27	2.32	36	805	1216	18.71	2.28	54	1026	1438	19.14	1.51
528	559	928	22.56	2.06	490	347	1081	22.30	1.11	280	662	1218	21.14	1.89	135	1131	1438	20.03	2.85
286	704	929	21.16	2.14	518	1400	1082	22.50	1.70	163	1265	1230	20.43	2.14	363	1288	1439	21.64	1.41
33	1231	930	18.63	2.20	106	264	1086	19.78	1.71	251	1157	1232	21.00	2.22	416	1181	1439	21.90	1.85
158	591	930	20.35	1.79	380	417	1088	21.71	1.57	563	112	1234	22.94	0.77	449	866	1441	22.08	1.53
104	929	937	19.76	1.87	441	702	1088	22.06	1.27	367	1398	1237	21.65	1.87	387	467	1443	21.73	1.55
164	1416	938	20.44	1.64	216	1466	1091	20.86	2.44	255	750	1238	21.01	1.01	417	553	1443	21.92	0.85
294	567	939	21.22	1.50	565	70	1092	22.95	1.10	493	585	1238	22.36	1.31	56	1148	1447	19.14	1.96
292	701	940	21.21	2.34	477	614	1094	22.25	1.34	114	951	1239	19.84	1.93	395	441	1448	21.77	1.74
213	950	944	20.85	1.71	393	364	1095	21.76	1.32	423	1135	1242	21.97	1.89	314	1194	1453	21.39	1.54
531	1365	946	22.58	0.89	496	126	1097	22.37	1.60	502	544	1244	22.41	1.09	376	39	1454	21.70	1.57
384	443	948	21.71	2.51	293	310	1099	21.22	1.06	442	401	1248	22.06	1.58	264	833	1464	21.04	2.36
560	1027	951	22.92	1.15	500	1369	1101	22.40	1.84	261	1443	1250	21.03	1.56	447	927	1473	22.08	1.39
231	626	955	20.93	1.98	208	486	1105	20.83	2.09	253	698	1252	21.00	2.54	517	421	1476	22.50	1.20
333	1060	955	21.50	1.86	149	277	1106	20.21	1.37	263	1281	1252	21.04	1.50	296	1424	1478	21.23	0.88
334	819	955	21.50	2.52	410	876	1109	21.87	1.61	137	141	1254	20.04	1.82	429	783	1478	22.01	1.33
5	1258	958	17.77	2.17	134	426	1110	20.03	2.07	338	639	1256	21.52	1.36	198	128	1479	20.79	2.04
10	528	965	18.09	2.04	463	874	1116	22.14	1.66	15	1367	1260	18.23	2.12	210	1253	1480	20.84	1.28
92	58	969	19.65	1.15	424	100	1121	21.98	0.61	84	597	1273	19.54	1.96	211	236	1486	20.84	1.75
57	129	971	19.15	1.15															

A 1963 Cluster Center

349	779	27	22.25	0.82	42	92	121	19.09	1.37	227	1483	275	21.34	2.04	21	722	386	18.40	1.21
358	655	34	22.35	0.12	105	634	122	20.01	1.77	233	400	288	21.38	1.64	316	504	389	22.02	0.33
81	1228	36	19.62	2.41	353	326	128	22.29	1.23	219	227	289	21.30	0.85	305	660	395	21.94	1.72
107	1305	41	20.03	1.90	335	449	136	22.15	1.89	274	319	290	21.75	1.19	173	325	397	20.88	2.00
178	809	42	20.90	0.88	304	33	137	21.94	1.32	123	872	292	20.36	1.43	380	199	397	22.65	-0.01
44	91	48	19.15	2.16	229	87	139	21.36	1.19	166	654	312	20.80	2.41	387	1352	397	22.71	1.09
395	1203	50	22.85	1.72	22	1112	140	18.40	1.51	128	213	315	20.41	1.86	32	1465	404	18.84	1.84
336	249	57	22.16	1.55	163	1035	152	20.80	0.95	189	305	316	21.01	1.52	234	889	409	21.40	1.02
192	359	71	21.05	2.65	311	86	157	21.98	2.01	96	307	328	19.95	1.45	216	309	410	21.27	1.88
391	392	73	22.79	1.22	64	941	173	19.43	1.95	298	775	338	21.88	1.98	203	58	418	21.14	1.64
240	1305	76	21.42	1.78	80	1459	176	19.62	1.67	230	554	340	21.36	1.13	263	644	418	21.66	1.81
210	271	78	21.19	1.67	67	1442	180	19.45	1.57	150	1034	342	20.61	0.98	180	1153	430	20.93	1.34
251	1054	79	21.53	1.36	49	1014	195	19.22	1.54	236	1456	342	21.40	1.63	310	807	431	21.98	1.05
237	439	80	21.42	1.50	162	142	210	20.77	1.63	9	1485	350	18.01	2.06	131	1133	450	20.47	1.89
306	1285	94	21.95	1.80	364	683	217	22.43	0.85	259	1104	355	21.64	1.46	132	1133	450	20.47	1.89
381	1314	95	22.66	1.20	357	263	227	22.33	0.99	138	288	358	20.51	1.98	261	276	454	21.65	1.56
174	743	99	20.88	2.10	143	1387	243	20.59	1.43	119	611	373	20.25	1.08	4	1236	455	17.54	1.54
103	233	101	20.00	1.27	155	330	266	20.72	1.85	212	444	375	21.22	0.48	231	765	460	21.36	1.79
154	783	117	20.66	2.32	360	1452	267	22.37	0.63	309	394	378	21.97	1.29	377	326	461	22.61	0.76
198	1105	118	21.08	1.54	65	1237	268	19.44	0.92	70	960	383	19.49	0.54	382	133	461	22.67	1.10

TABLE 9—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
268	739	464	21.71	1.12	146	524	731	20.60	1.25	187	820	944	20.99	1.96	193	1087	1226	21.06	1.97
79	1470	467	19.60	1.89	15	799	734	18.19	2.00	386	648	947	22.69	1.04	379	191	1227	22.64	1.66
152	46	469	20.63	2.48	199	1302	734	21.10	1.54	55	945	951	19.35	2.02	396	537	1227	22.91	1.20
8	1345	486	17.98	2.02	333	1331	737	22.14	1.31	348	425	951	22.24	2.49	334	782	1234	22.14	1.71
246	553	491	21.47	1.00	147	1245	738	20.60	1.66	40	504	953	19.07	0.92	145	1268	1242	20.59	1.82
99	520	493	19.96	1.78	243	1026	739	21.46	1.07	191	704	958	21.04	1.88	315	900	1243	22.01	1.49
153	494	498	20.66	1.67	256	352	742	21.60	1.73	169	621	960	20.83	1.06	181	436	1245	20.94	1.19
293	987	501	21.85	0.98	20	667	744	18.35	1.83	211	1356	960	21.20	1.62	339	206	1245	22.18	1.49
113	308	503	20.16	1.70	200	288	744	21.11	1.08	182	1054	965	20.95	1.59	342	639	1246	22.21	1.02
76	185	506	19.56	1.92	362	107	744	22.41	1.27	282	1479	965	21.78	1.48	170	814	1248	20.86	0.72
292	689	510	21.84	2.11	83	571	745	19.64	1.89	363	761	967	22.42	0.89	165	1337	1258	20.80	1.71
385	941	510	22.68	1.53	1	725	750	17.31	1.44	28	787	971	18.77	1.76	91	574	1261	19.79	0.83
50	353	518	19.22	2.18	19	750	750	18.32	1.96	324	429	971	22.05	1.19	307	509	1264	21.95	2.11
74	340	519	19.52	1.77	75	933	750	19.56	0.76	375	245	971	22.59	0.97	77	1132	1266	19.57	1.64
286	218	520	21.80	1.03	185	1064	750	20.96	1.80	118	745	974	20.23	1.93	161	365	1266	20.77	1.33
228	453	523	21.35	2.00	186	1064	750	20.96	1.80	331	134	977	22.13	1.35	120	173	1272	20.26	2.37
126	621	528	20.40	1.33	195	1037	761	21.06	4.17	63	1366	981	19.42	1.46	302	922	1272	21.92	1.02
176	1279	541	20.89	1.58	290	35	762	21.84	0.86	327	677	986	22.06	1.53	35	878	1273	18.87	1.91
106	329	542	20.02	1.87	52	951	766	19.29	1.94	323	343	990	22.04	0.96	351	1212	1275	22.27	1.11
58	364	545	19.37	2.31	86	485	766	19.75	1.41	318	169	998	22.02	1.17	95	697	1292	19.84	1.36
54	799	551	19.34	1.91	156	823	767	20.73	1.71	225	741	1001	21.34	0.98	269	747	1294	21.71	2.29
111	924	552	20.13	1.81	345	1359	767	22.22	1.33	267	820	1006	21.70	0.90	280	1295	1295	21.77	1.63
68	808	554	19.45	2.29	130	846	768	20.44	1.56	297	121	1008	21.87	1.42	390	1090	1297	22.76	0.89
124	430	554	20.37	1.19	140	685	769	20.52	1.53	235	320	1016	21.40	1.02	258	769	1299	21.61	1.73
26	463	559	18.63	1.39	90	775	773	19.77	1.90	328	35	1017	22.09	0.81	350	1010	1300	22.25	1.04
139	405	563	20.52	2.15	312	564	775	22.00	1.35	352	668	1017	22.28	1.32	157	1123	1302	20.74	1.65
30	837	570	18.81	1.18	202	18	776	21.14	1.42	393	265	1019	22.81	0.74	332	356	1304	22.14	0.87
301	575	570	21.91	1.84	369	475	776	22.50	0.64	101	508	1021	19.99	1.59	281	1331	1313	21.78	1.04
394	727	573	22.82	0.95	84	785	780	19.64	2.06	66	776	1024	19.44	1.83	359	444	1313	22.36	1.77
278	158	575	21.77	1.47	92	1424	780	19.82	1.78	242	646	1029	21.45	2.26	397	312	1316	22.94	0.69
183	742	577	20.96	1.38	5	643	785	17.59	2.00	284	256	1034	21.79	1.24	264	1198	1319	21.67	0.99
171	1251	580	20.87	1.89	48	723	787	19.19	1.87	294	619	1054	21.86	1.31	122	992	1324	20.34	1.40
321	163	581	22.03	1.33	60	250	792	19.40	2.22	253	1235	1056	21.56	1.88	151	355	1325	20.62	1.90
372	346	582	22.54	1.43	272	893	794	21.74	1.73	23	64	1057	18.44	0.86	3	93	1326	17.51	0.62
322	486	585	22.03	2.27	313	98	794	22.00	1.86	33	1052	1061	18.85	0.55	13	1151	1330	18.13	2.02
144	860	586	20.59	1.62	78	546	796	19.60	2.00	196	493	1065	21.07	1.75	232	248	1331	21.38	0.91
317	1435	589	22.02	0.70	314	883	796	22.01	1.39	288	108	1071	21.82	1.80	167	1036	1340	20.81	2.40
56	50	592	19.36	0.97	12	812	802	18.09	2.05	344	53	1072	22.22	0.45	177	1070	1345	20.90	0.96
110	658	593	20.13	1.80	384	261	806	22.68	0.98	340	32	1074	22.20	1.48	245	264	1346	21.46	1.65
136	733	595	20.50	1.73	108	452	807	20.07	1.77	291	567	1078	21.84	1.04	93	371	1351	19.83	1.37
270	273	595	21.72	1.30	373	17	810	22.56	2.54	325	190	1078	22.06	1.04	343	547	1361	22.21	1.60
287	743	598	21.80	2.80	109	725	811	20.07	1.89	320	818	1085	22.02	1.99	141	817	1369	20.55	1.75
159	216	600	20.76	2.18	275	267	811	21.75	1.46	53	1038	1093	19.34	2.02	249	991	1375	21.51	1.11
303	1197	600	21.93	1.69	262	1203	821	21.66	1.40	133	807	1096	20.48	1.10	238	87	1376	21.42	1.38
172	308	601	20.87	1.91	194	152	825	21.06	2.01	59	1424	1097	19.39	1.84	265	593	1377	21.67	1.35
347	867	601	22.23	0.84	2	1106	827	17.41	2.01	367	764	1099	22.47	1.44	217	1112	1382	21.28	0.87
221	444	607	21.31	2.05	184	860	827	20.96	1.97	87	299	1101	19.75	1.69	330	1440	1385	22.13	1.35
149	459	609	20.60	1.91	102	1049	829	19.99	1.72	197	694	1101	21.07	1.93	366	603	1386	22.45	0.48
98	1175	610	19.96	1.69	45	836	830	19.16	2.05	374	12	1101	22.57	0.90	355	776	1388	22.31	0.87
248	595	613	21.51	1.23	134	896	830	20.49	1.09	276	698	1107	21.75	2.08	125	1005	1389	20.39	1.77
24	1113	620	18.54	1.08	254	821	835	21.58	0.65	18	637	1108	18.31	2.12	142	287	1390	20.56	1.84
214	568	622	21.25	1.84	361	101	839	22.37	0.95	341	313	1109	22.21	0.72	127	403	1395	20.40	1.73
112	196	624	20.16	1.52	46	1187	848	19.17	2.04	160	675	1111	20.76	2.39	207	1254	1402	21.17	2.06
296	874	624	21.86	1.18	354	852	852	22.30	1.15	61	594	1118	19.41	1.80	329	1175	1414	22.10	1.98
378	17	625	22.62	1.26	47	782	856	19.18	1.93	148	842	1118	20.60	2.01	279	590	1419	21.77	0.78
37	635	626	18.95	1.88	295	498	857	21.86	1.67	365	613	1122	22.44	1.10	104	732	1422	20.00	1.56
205	540	629	21.15	1.69	300	447	859	21.91	0.90	215	1020	1124	21.26	1.41	188	1090	1422	21.00	1.43
277	813	636	21.76	1.25	34	962	865	18.85	1.93	338	1282	1125	22.18	1.54	51	1361	1425	19.29	1.87
392	1143	639	22.79	0.96	244	863	869	21.46	1.69	250	643	1126	21.51	2.32	25	1411	1426	18.60	1.25
14	520	643	18.14	2.02	337	761	873	22.17	1.65	116	1392	1133	20.22	1.70	179	135	1428	20.91	1.87
158	915	653	20.76	1.74	289	277	875	21.83	0.92	39	491	1138	18.99	1.98	356	1257	1428	22.31	1.29
100	815	655	19.97	1.87	41	424	878	19.08	1.67	368	627	1146	22.48	0.90	38	1485	1430	18.99	1.68
222	1343	660	21.32	1.29	10	712	881	18.02	2.01	220	341	1148	21.31	0.91	271	378	1430	21.72	2.03
252	1040	663	21.55	2.19	27	508	893	18.72	1.99	257	700	1153	21.61	1.50	89	434	1440	19.77	2.17
260	1441	665	21.65	0.92	97	1015	896	19.96	1.66	204	1180	1156	21.14	2.22	346	881	1450	22.22	1.37
164	705	669	20.80	1.67	226	293	897	21.34	1.55	388	881	1156	22.72	1.66	94	494	1451	19.84	0.87
266	631	674	21.68	2.01	121	606	899	20.27	1.74	137	109	1157	20.51	0.85	371	1375	1461	22.51	1.24
223	183	676	21.32	1.25	135	1336	899	20.49	1.47	241	617	1158	21.45	1.36	209	739	1462	21.19	1.42
7	1087	677																	

TABLE 9—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Blank Field																			
47	837	18	20.40	2.37	1	504	371	17.39	1.05	16	365	827	19.28	1.35	120	185	1166	21.45	0.99
72	432	18	20.93	2.43	69	117	376	20.92	1.60	58	1162	832	20.74	2.19	8	946	1171	18.95	0.72
110	127	20	21.30	0.84	254	77	381	22.77	1.12	133	644	834	21.66	2.05	138	1123	1172	21.71	1.28
3	1004	21	17.79	1.84	194	1029	382	22.23	1.70	210	170	843	22.35	0.00	167	1392	1178	22.02	1.56
68	391	21	20.92	1.59	157	725	391	21.93	1.03	150	173	845	21.84	0.77	140	665	1179	21.72	1.33
4	620	31	18.01	1.94	119	342	422	21.44	1.83	93	1146	857	21.14	1.95	50	472	1184	20.55	1.21
144	1283	50	21.75	0.99	19	712	429	19.32	1.52	253	896	858	22.77	0.74	245	1205	1186	22.63	1.32
18	432	59	19.30	2.37	122	1304	434	21.50	0.90	142	1271	859	21.73	1.08	247	900	1187	22.65	1.85
248	601	61	22.68	1.91	55	402	439	20.64	1.79	189	1151	863	22.18	0.90	265	679	1187	22.95	0.28
202	1275	66	22.26	1.10	43	633	447	20.33	0.95	135	110	868	21.69	0.97	193	1424	1188	22.21	1.38
102	531	67	21.18	1.39	252	751	452	22.73	0.89	206	1267	869	22.30	1.05	264	361	1192	22.94	1.28
39	37	85	20.18	2.53	41	1129	472	20.23	1.17	213	416	885	22.36	1.21	145	1279	1196	21.75	1.12
129	889	85	21.60	1.63	201	633	488	22.26	0.51	231	1061	890	22.52	1.88	24	493	1202	19.56	0.67
158	794	87	21.93	1.49	71	210	490	20.93	2.12	27	819	891	19.59	2.36	46	1108	1206	20.37	2.61
51	1012	88	22.06	2.01	125	853	510	21.53	2.27	70	1022	893	20.92	2.37	139	1161	1206	21.72	1.62
256	1306	88	22.81	1.11	61	573	515	20.79	1.06	63	1364	902	20.79	2.11	159	1320	1207	21.94	1.38
208	1257	94	22.32	1.28	236	1472	527	22.56	1.54	154	57	906	21.88	0.94	101	135	1213	21.18	1.09
25	770	95	19.58	1.35	251	1167	527	22.73	0.71	26	1034	909	19.58	1.77	52	372	1221	20.61	1.74
85	1403	99	21.09	0.44	11	755	529	19.05	1.17	175	1164	909	22.07	1.43	262	648	1223	22.91	0.68
169	1256	99	22.04	1.51	87	684	532	21.09	2.14	212	1383	911	22.36	0.85	32	1478	1228	19.91	2.23
79	1419	102	21.02	0.45	255	76	532	22.80	1.09	94	935	920	21.14	2.18	161	1263	1237	21.94	1.35
128	49	104	21.56	2.07	104	1322	538	21.21	1.66	67	562	922	20.88	2.14	227	1032	1237	22.45	1.86
259	1367	108	22.90	0.01	66	522	547	20.83	0.50	57	1379	928	20.70	1.42	180	881	1255	22.12	1.19
207	387	116	22.30	1.53	28	582	549	19.60	2.23	191	418	939	22.20	0.65	9	1284	1258	19.00	1.09
241	642	122	22.60	1.68	130	1339	549	21.61	1.18	160	1049	957	21.94	1.29	30	489	1263	19.74	1.81
118	67	129	21.44	1.19	115	1253	571	21.41	1.47	117	564	963	21.43	1.43	223	444	1263	22.43	3.29
184	1327	140	22.13	1.23	80	960	591	21.06	1.08	230	1421	969	22.52	0.94	246	1127	1263	22.65	0.97
2	632	141	17.76	0.89	89	652	597	21.12	1.76	195	749	977	22.24	1.26	214	1139	1271	22.36	1.66
132	869	143	21.65	2.05	192	925	607	22.20	1.37	228	842	977	22.46	1.73	258	1214	1275	22.88	0.90
73	1413	150	20.95	1.41	12	1417	612	19.08	1.42	105	1378	980	21.21	1.98	218	401	1280	22.40	1.47
215	474	165	22.37	1.07	49	740	615	20.50	1.37	222	28	988	22.43	2.11	232	1068	1285	22.54	0.70
96	404	187	21.15	1.49	244	907	624	22.63	0.82	88	123	993	21.11	1.21	190	822	1289	22.19	1.30
147	1409	188	21.76	2.68	100	823	627	21.18	1.05	111	944	1009	21.30	1.41	162	415	1295	21.95	1.94
219	994	203	22.40	1.49	98	677	651	21.15	2.16	187	1393	1016	22.15	1.87	200	1360	1309	22.25	1.65
203	944	215	22.27	1.25	163	426	662	21.96	2.59	36	782	1026	20.05	0.94	204	787	1312	22.28	1.25
185	324	218	22.13	1.75	166	388	675	22.01	0.83	196	940	1030	22.24	1.50	257	226	1313	22.84	0.93
224	1022	218	22.44	1.20	54	126	681	20.63	2.14	22	414	1043	19.47	2.09	77	1205	1320	20.97	1.69
10	1365	223	19.04	0.71	198	1079	681	22.25	1.12	44	552	1045	20.33	2.27	261	1332	1321	22.90	1.57
152	218	224	21.87	0.90	13	1412	689	19.12	1.52	171	1108	1048	22.04	1.27	146	1137	1324	21.76	2.54
64	651	227	20.81	2.25	114	607	692	21.40	1.35	56	444	1051	20.69	2.29	116	332	1329	21.41	1.83
106	999	231	21.23	1.65	131	926	705	21.63	1.44	177	458	1051	22.08	1.26	20	854	1338	19.44	1.16
238	738	248	22.58	1.06	226	843	705	22.45	0.73	5	205	1056	18.10	1.50	234	910	1339	22.54	1.28
250	982	251	22.72	0.53	249	398	708	22.70	1.35	237	546	1063	22.57	1.76	123	800	1340	21.50	0.74
156	1103	255	21.90	1.56	53	842	718	20.63	1.44	260	562	1065	22.90	1.01	176	350	1346	22.08	1.04
183	1224	264	22.13	1.21	151	1462	718	21.84	1.68	174	1201	1068	22.07	1.21	103	133	1348	21.18	2.42
235	409	264	22.56	1.03	173	1325	718	22.06	1.39	33	1395	1077	19.92	1.64	168	159	1354	22.02	2.07
21	669	265	19.46	1.92	99	90	719	21.17	2.18	242	1341	1081	22.60	1.51	233	608	1369	22.54	1.08
40	541	276	20.23	0.98	143	1174	720	21.74	1.41	95	201	1083	21.14	2.35	97	317	1372	21.15	1.92
165	834	276	21.99	2.09	45	1471	729	20.36	2.22	199	1287	1088	22.25	1.55	178	1142	1380	22.11	1.15
82	442	282	21.07	1.30	112	116	730	21.35	1.20	113	629	1090	21.40	1.38	62	486	1385	20.79	2.05
197	1243	282	22.24	1.90	91	834	733	21.14	1.02	14	794	1099	19.20	1.67	60	222	1388	20.77	1.26
263	1454	282	22.91	1.71	221	670	738	22.43	0.66	81	1278	1106	21.06	1.53	15	1297	1391	19.27	2.16
59	585	289	20.75	2.17	172	1263	746	22.05	1.48	78	1404	1108	20.98	1.82	42	1012	1404	20.26	1.25
109	34	310	21.29	1.56	186	832	753	22.15	1.09	164	667	1114	21.99	0.58	38	963	1411	20.15	1.08
209	781	311	22.33	0.89	134	988	765	21.67	2.40	243	1233	1114	22.62	0.57	179	1018	1412	22.12	1.50
86	410	312	21.09	1.78	83	1389	767	21.07	1.31	34	990	1128	20.01	1.86	170	1117	1439	22.04	1.23
148	665	325	21.79	2.17	126	833	767	21.55	1.77	181	925	1131	22.12	1.90	205	346	1444	22.29	1.58
124	976	332	21.52	2.39	29	1237	772	19.68	2.12	137	1285	1132	21.70	2.19	229	692	1444	22.49	2.09
216	1441	333	22.38	1.73	31	914	780	19.89	1.23	136	854	1135	21.70	1.61	220	512	1449	22.43	0.75
76	713	335	20.97	1.09	240	1467	781	22.59	1.53	211	566	1140	22.36	0.25	17	1105	1454	19.28	1.35
182	422	338	22.12	1.82	121	171	786	21.49	1.75	65	401	1142	20.82	0.96	48	159	1457	20.48	1.67
225	463	345	22.45	0.82	23	1122	788	19.55	1.46	217	79	1142	22.39	1.06	107	399	1462	21.26	1.64
35	592	350	20.03	1.59	37	337	805	20.10	2.48	84	901	1144	21.07	1.47	75	901	1468	20.96	1.96
149	420	355	21.81	1.48	141	923	805	21.72	2.02	6	1404	1151	18.44	1.55	153	747	1471	21.87	1.11
7	1374	361	18.66	0.84	188	1248	813	22.17	1.30	108	704	1152	21.27	1.16	90	331	1472	21.13	1.43
127	1296	366	21.56	2.17	92	1199	826	21.14	1.53	74	1454	1163	20.96	1.41	155	790	1479	21.88	2.18
239	1234	366	22.59	1.06															

TABLE 10
ABELL 2111 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
550	766	13	22.16	1.18	412	954	261	21.48	1.52	513	147	468	21.94	1.58	278	294	625	20.70	1.80
586	17	13	22.30	1.92	472	177	261	21.82	1.87	1	502	477	16.84	2.43	395	1140	625	21.40	1.68
509	1214	14	21.92	1.04	272	955	268	20.67	1.69	63	202	482	18.89	1.93	123	533	627	19.44	1.87
365	846	15	21.23	2.08	393	326	268	21.39	1.67	162	364	483	19.90	1.33	202	284	627	20.17	1.97
612	743	16	22.46	0.84	565	1350	271	22.22	0.95	334	1480	483	21.04	1.49	518	977	627	21.97	1.28
23	1150	19	18.13	2.07	584	1342	273	22.30	0.74	203	411	484	20.17	2.32	381	1080	628	21.33	1.09
314	266	22	20.93	1.26	145	1072	282	19.66	2.03	281	1050	486	20.72	2.45	204	516	632	20.18	1.07
577	995	22	22.28	1.08	205	666	283	20.19	1.50	343	1302	487	21.08	2.47	349	708	634	21.12	1.93
436	814	25	21.63	1.85	454	837	284	21.73	1.69	66	1368	488	18.95	2.23	527	939	635	22.02	1.15
177	806	31	20.07	1.97	459	204	284	21.75	1.59	460	285	488	21.75	2.09	413	1280	637	21.50	1.01
457	151	33	21.74	1.12	219	1360	286	20.27	1.96	138	899	489	19.57	1.91	422	1419	637	21.55	1.90
211	948	34	20.21	1.24	283	480	288	20.73	1.72	535	590	501	22.06	1.33	588	1395	637	22.31	0.71
479	643	37	21.83	1.35	333	886	288	21.03	2.78	556	969	502	22.17	1.41	462	686	638	21.76	1.97
29	1474	40	18.29	1.47	136	1168	291	19.56	2.57	292	1322	503	20.80	1.48	440	1051	639	21.65	3.10
306	768	50	20.86	1.23	115	459	296	19.40	1.93	597	1150	503	22.35	1.01	378	87	640	21.32	1.89
481	16	54	21.84	1.09	197	1136	297	20.15	0.93	253	319	504	20.54	2.35	466	293	640	21.78	2.18
254	990	66	20.56	1.87	578	999	298	22.28	1.03	320	164	504	20.96	1.78	89	347	641	19.15	2.01
629	1122	67	22.58	1.31	469	1225	299	21.80	0.99	98	893	507	19.26	2.05	155	660	644	19.76	2.12
642	1435	69	22.67	1.42	635	1407	299	22.63	0.88	54	912	511	18.72	2.03	309	1343	644	20.87	2.00
124	935	73	19.44	2.16	493	476	301	21.87	1.13	176	1160	512	20.07	1.65	275	674	650	20.69	1.96
477	619	75	21.83	1.12	232	290	302	20.39	2.16	366	576	512	21.24	2.13	490	840	650	21.87	1.10
33	1249	80	18.32	2.11	643	412	305	22.68	0.88	605	548	517	22.43	0.92	603	956	650	22.42	1.18
184	1279	82	20.10	1.01	610	170	306	22.44	1.52	345	41	519	21.11	1.61	210	218	652	20.21	1.03
607	768	84	22.43	1.47	300	386	307	20.84	2.06	325	1468	523	20.99	1.89	581	911	657	22.29	0.76
49	515	90	18.66	2.10	371	1080	308	21.27	2.67	296	190	524	20.81	1.90	326	663	658	20.99	2.80
38	325	91	18.42	1.91	158	921	312	19.85	1.80	614	416	525	22.47	1.30	498	55	660	21.88	2.65
476	547	91	21.83	0.87	26	663	316	18.23	1.64	630	1091	526	22.59	1.42	523	1017	660	22.00	1.12
321	1285	95	20.97	0.89	174	1133	316	20.06	1.13	389	948	529	21.38	1.55	545	630	663	22.13	1.72
200	46	96	20.17	0.70	192	210	316	20.14	1.91	594	328	533	22.33	0.58	30	1411	664	18.29	2.15
91	1263	98	19.15	2.07	537	558	319	22.07	0.94	315	504	535	20.93	1.64	271	196	664	20.65	1.69
234	709	106	20.41	2.36	107	144	326	19.35	1.97	591	1357	536	22.32	0.31	167	807	666	19.97	1.04
152	121	117	19.75	1.45	257	959	326	20.58	1.08	111	440	540	19.38	2.03	344	945	666	21.09	2.40
373	1012	118	21.29	1.06	39	453	329	18.43	1.77	223	723	543	20.30	1.33	44	333	672	18.55	2.08
390	1021	118	21.39	1.17	512	229	331	21.92	1.58	442	843	543	21.66	1.28	118	1428	674	19.41	2.21
57	1192	120	18.77	1.97	221	947	332	20.28	0.65	646	226	549	22.69	0.97	500	1366	678	21.89	1.21
408	1353	124	21.46	2.21	619	227	341	22.51	1.22	125	317	550	19.45	1.95	599	607	679	22.37	2.65
51	1311	127	18.68	2.36	547	575	343	22.13	2.38	352	484	557	21.13	1.56	410	179	680	21.47	1.81
108	1099	131	19.36	1.96	640	1271	343	22.65	1.13	185	1245	558	20.10	1.98	519	194	680	21.97	2.12
241	711	131	20.47	2.52	542	337	350	22.12	1.25	226	591	560	20.32	1.98	368	317	683	21.27	1.58
536	222	136	22.06	2.06	165	198	353	19.93	1.59	17	1313	566	17.99	2.06	227	289	686	20.34	0.85
540	666	143	22.09	1.08	561	355	356	22.19	2.41	404	377	566	21.45	0.92	357	230	686	21.15	1.45
592	57	143	22.32	0.95	196	323	360	20.15	0.80	264	404	567	20.61	2.13	415	1182	688	21.50	1.38
551	906	145	22.16	0.95	342	272	361	21.08	2.32	502	446	568	21.89	1.71	117	239	690	19.41	1.98
346	161	146	21.11	2.39	299	661	362	20.83	1.49	492	1140	570	21.87	1.34	78	688	691	19.06	2.10
394	1245	146	21.40	1.36	516	632	364	21.96	2.14	103	987	574	19.30	1.93	358	336	692	21.15	1.64
398	603	153	21.43	1.47	583	1485	364	22.29	2.10	248	1118	575	20.52	1.62	256	1079	697	20.56	1.83
235	969	156	20.42	1.41	595	338	366	22.34	0.39	14	1013	580	17.79	2.17	86	1269	701	19.11	1.99
628	74	156	22.58	1.45	45	1214	371	18.56	1.94	21	1232	580	18.11	2.14	622	103	701	22.54	1.16
4	111	158	17.31	0.95	613	22	373	22.47	0.46	312	618	580	20.89	1.94	311	881	703	20.89	1.75
376	261	166	21.31	2.03	473	202	375	21.82	1.88	249	179	582	20.52	1.89	263	369	706	20.60	2.04
327	448	168	20.99	2.77	55	114	379	18.73	2.05	348	1086	582	21.12	2.27	247	290	707	20.51	2.49
59	614	169	18.79	1.26	364	345	384	21.22	1.38	372	12	582	21.28	1.40	471	1398	709	21.81	1.19
188	544	169	20.12	1.99	549	226	385	22.15	1.56	171	522	583	20.02	1.89	451	77	712	21.71	1.76
79	703	175	19.07	1.98	582	376	386	22.29	1.43	213	1454	584	20.22	0.77	126	1101	713	19.45	1.95
324	313	177	20.98	1.68	156	1431	395	19.79	1.98	351	1397	584	21.13	1.84	470	425	714	21.80	1.75
137	55	183	19.57	1.89	135	1144	402	19.56	2.13	409	736	586	21.47	2.13	495	805	714	21.87	1.72
501	158	184	21.89	2.02	570	474	402	22.23	1.70	147	1032	591	19.68	1.88	621	20	717	22.54	0.92
491	211	185	21.87	1.38	169	1227	405	19.98	2.07	524	1390	591	22.00	1.90	48	503	721	18.64	1.62
67	780	189	18.97	0.45	559	1029	406	22.19	1.70	175	744	593	20.06	1.50	639	163	721	22.64	1.22
100	704	190	19.28	1.34	463	700	409	21.77	1.20	228	181	596	20.34	2.11	380	459	722	21.32	2.09
214	78	197	20.23	1.47	356	1122	412	21.15	1.51	416	1472	597	21.51	0.96	141	1081	725	19.63	1.64
10	1195	201	17.67	2.03	350	1426	416	21.12	1.92	437	481	599	21.63	1.78	285	1392	726	20.75	1.88
318	1037	202	20.96	1.30	560	26	422	22.19	2.12	20	83	603	18.06	2.08	347	1130	728	21.12	1.47
521	132	207	22.00	1.14	258	727	426	20.58	1.99	385	49	603	21.36	1.31	109	1046	730	19.38	1.99
526	452	209	22.02	0.17	487	742	426	21.86	1.77	444	1353	603	21.68	1.76	201	1196	730	20.17	1.32
277	339	210	20.70	1.78	161	1257	427	19.88	2.00	287	1343	604	20.76	2.23	331	672	731	21.03	1.55
379	390	210	21.32	1.91	216	766	429	20.26	2.11	157	952	607	19.81	2.02	35	406	732	18.39	2.04
261	857	216	20.60	1.37	73	1166	432	19.02	1.96	11	579								

TABLE 10—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
307	428	762	20.86	1.93	179	886	897	20.08	1.38	116	285	1057	19.41	2.04	274	1037	1231	20.67	2.26
411	496	762	21.48	1.08	37	399	898	18.41	2.35	25	808	1059	18.21	2.19	483	181	1235	21.85	0.58
532	619	762	22.05	1.33	168	755	898	19.97	1.97	217	1423	1059	20.26	2.18	585	971	1256	22.30	0.71
456	1350	764	21.74	0.95	414	1375	898	21.50	1.15	623	655	1060	22.54	1.26	27	697	1259	18.25	2.20
439	248	769	21.65	1.57	557	1078	898	22.18	0.37	190	516	1061	20.13	2.20	392	1454	1269	21.39	1.61
552	1055	771	22.16	1.26	355	282	900	21.15	1.54	539	965	1061	22.09	1.67	198	412	1271	20.15	1.61
75	638	773	19.03	2.21	340	40	903	21.07	1.41	562	179	1061	22.20	1.85	293	1254	1271	20.80	2.11
377	455	774	21.32	1.51	438	683	903	21.64	1.29	230	1219	1062	20.37	2.62	32	1198	1273	18.32	1.97
450	679	777	21.71	1.20	151	726	907	19.74	2.18	9	210	1069	17.66	2.07	525	429	1274	22.01	1.51
122	896	778	19.43	2.10	62	1275	908	18.87	1.94	374	1477	1070	21.30	1.28	64	560	1276	18.91	1.33
238	1245	780	20.46	1.46	101	940	909	19.29	1.44	154	440	1073	19.75	1.76	209	145	1276	20.21	0.52
181	162	781	20.08	2.10	40	1489	918	18.46	2.06	510	1403	1075	21.92	1.36	467	1086	1276	21.79	1.32
16	983	783	17.92	1.65	449	1416	918	21.71	1.08	182	1066	1077	20.09	2.00	144	1290	1279	19.65	1.35
61	751	783	18.84	1.98	245	671	919	20.50	2.25	353	996	1077	21.14	1.47	382	468	1281	21.33	1.76
140	591	785	19.62	2.00	508	564	921	21.92	1.27	72	560	1084	19.01	2.03	50	818	1285	18.67	0.88
575	1166	785	22.26	1.82	173	324	922	20.05	2.15	150	164	1088	19.74	1.89	367	163	1290	21.25	2.81
56	927	786	18.74	2.06	447	1022	923	21.70	1.85	504	1490	1090	21.90	0.71	129	569	1291	19.46	2.00
316	1109	786	20.94	1.93	69	486	925	18.98	1.91	94	1325	1091	19.19	1.58	375	228	1291	21.30	1.17
279	581	787	20.71	1.42	598	919	926	22.36	0.33	391	952	1092	21.39	1.32	579	760	1294	22.28	1.06
282	1137	787	20.73	1.23	12	511	927	17.74	2.20	339	501	1093	21.06	1.58	7	1317	1300	17.59	2.30
60	755	788	18.81	1.95	172	1049	927	20.03	2.08	132	975	1094	19.54	1.86	488	439	1305	21.86	1.76
236	1276	790	20.42	1.83	609	964	927	22.44	0.78	420	1236	1095	21.53	1.65	370	1067	1310	21.27	2.26
267	45	792	20.64	1.40	208	390	928	20.20	1.57	530	286	1095	22.03	2.06	601	639	1311	22.39	0.87
468	390	792	21.79	1.72	97	728	931	19.25	2.13	505	839	1098	21.90	1.35	627	834	1312	22.58	1.18
195	474	793	20.14	2.06	618	702	931	22.51	0.90	568	726	1101	22.23	1.59	369	1235	1314	21.27	1.71
534	496	794	22.05	2.10	36	412	933	18.40	2.37	301	441	1102	20.84	2.21	458	279	1314	21.75	1.36
250	1315	797	20.53	0.94	218	559	935	20.27	0.67	42	555	1104	18.47	1.58	265	1380	1315	20.62	0.78
92	1476	799	19.16	2.02	52	1248	936	18.69	1.87	400	770	1106	21.43	1.33	18	1153	1323	18.00	0.99
424	719	802	21.56	1.06	222	309	951	20.28	1.90	387	876	1108	21.37	1.55	302	1412	1324	20.85	1.31
82	842	803	19.09	2.12	434	265	954	21.62	1.81	638	898	1108	22.64	0.27	611	1002	1326	22.46	0.44
255	1456	804	20.56	1.92	244	769	955	20.50	1.95	617	1198	1109	22.49	0.94	452	693	1327	21.72	1.29
298	245	804	20.81	2.07	548	407	960	22.14	2.25	186	1016	1116	20.10	1.89	587	781	1327	22.31	0.77
335	685	804	21.04	2.19	580	1383	960	22.28	2.02	153	1414	1117	19.75	1.65	485	201	1332	21.85	1.91
295	1318	808	20.81	1.87	149	1166	961	19.73	1.84	81	911	1118	19.09	1.35	590	944	1339	22.31	2.90
310	1038	808	20.88	1.98	119	1402	966	19.42	0.85	70	1136	1120	18.99	2.31	290	1155	1341	20.77	1.81
105	1271	809	19.32	2.05	212	571	966	20.21	1.98	224	826	1128	20.31	1.90	482	1099	1346	21.84	1.46
461	185	811	21.76	1.63	417	595	966	21.51	1.05	233	1086	1130	20.40	1.10	616	91	1364	22.49	0.78
494	1418	811	21.87	1.23	511	1294	966	21.92	1.28	522	178	1130	22.00	1.26	251	1193	1366	20.53	1.16
13	776	813	17.77	2.04	19	1049	968	18.06	1.79	435	1312	1135	21.62	2.11	288	245	1369	20.77	1.31
520	372	814	21.99	1.10	270	1157	971	20.65	1.77	448	1151	1145	21.71	0.86	280	676	1371	20.71	2.33
430	904	816	21.59	1.97	533	1327	973	22.05	1.27	606	1329	1147	22.43	0.73	3	737	1379	17.30	1.55
475	1354	816	21.82	2.27	139	1316	974	19.59	2.03	541	1086	1149	22.09	1.64	608	1381	1380	22.43	1.67
406	568	818	21.45	1.58	517	403	975	21.97	1.18	407	920	1150	21.45	1.79	110	1051	1382	19.38	2.10
71	396	824	19.00	2.01	170	1111	978	20.00	1.61	317	113	1151	20.95	1.65	68	445	1385	18.97	2.09
506	19	827	21.90	1.71	183	935	978	20.10	0.81	361	124	1151	21.20	1.98	636	30	1386	22.63	0.64
564	178	828	22.22	0.42	229	699	979	20.35	2.04	421	1204	1152	21.53	1.90	388	1416	1387	21.38	1.49
529	827	830	22.03	0.97	624	753	980	22.56	1.24	397	1308	1154	21.41	1.37	131	1402	1390	19.53	1.83
566	1092	830	22.23	0.64	268	470	981	20.64	2.58	80	370	1155	19.07	2.08	641	1196	1391	22.67	1.51
112	616	831	19.39	2.14	429	401	984	21.59	1.23	338	1330	1155	21.05	2.05	289	875	1392	20.77	1.67
546	1341	831	22.13	1.51	484	889	984	21.85	1.23	396	1448	1155	21.40	2.06	441	800	1398	21.66	1.36
600	717	831	22.38	1.06	644	438	988	22.68	0.80	273	937	1158	20.67	1.72	294	332	1399	20.80	2.45
363	1437	834	21.21	2.08	187	75	998	20.10	2.01	243	1174	1167	20.50	0.94	146	1363	1404	19.67	1.54
87	568	836	19.14	1.86	445	1425	1001	21.70	0.91	330	1062	1168	21.03	1.56	134	992	1408	19.56	1.98
41	439	842	18.46	2.08	401	636	1002	21.43	1.77	47	578	1169	18.63	2.21	464	1075	1409	21.77	1.57
455	989	843	21.73	2.09	631	1221	1002	22.60	1.60	558	60	1169	22.19	1.22	191	803	1410	20.13	2.41
489	723	845	21.86	2.09	142	221	1003	19.63	1.95	569	719	1170	22.23	1.74	276	223	1410	20.70	1.64
308	641	847	20.86	2.00	207	477	1003	20.19	1.76	260	1316	1180	20.59	1.64	231	1487	1413	20.39	2.23
99	863	848	19.27	2.05	297	618	1003	20.81	1.90	571	22	1181	22.23	2.14	589	497	1426	22.31	1.86
104	740	851	19.31	2.11	426	188	1005	21.56	1.49	567	978	1188	22.23	0.94	193	1023	1427	20.14	1.95
159	959	853	19.85	2.00	496	53	1005	21.88	1.65	478	1405	1189	21.83	1.30	486	738	1430	21.86	0.96
206	1256	855	20.19	1.91	604	134	1005	22.43	0.77	262	116	1190	20.60	1.55	178	441	1432	20.07	2.29
544	619	861	22.13	1.59	602	865	1007	22.42	0.84	633	764	1190	22.62	0.68	180	1120	1440	20.08	1.89
383	780	864	21.35	1.91	341	1097	1008	21.07	2.05	443	134	1193	21.66	1.79	284	1456	1443	20.75	1.61
225	127	866	20.32	1.85	291	1386	1013	20.80	1.35	88	420	1195	19.14	2.14	246	870	1446	20.51	1.18
538	1156	867	22.08	2.52	360	1135	1013	21.19	1.81	543	1054	1196	22.12	1.43	432	517	1447	21.60	2.29
615	447	868	22.48	1.16	34	1207	1015	18.38	2.00	427	453	1200	21.56	1.65	239	811	1449	20.47	0.95
102	151	869	19.29	1.95	634	25	1016	22.62	0.83	637	884	1204	22.63	1.22	359	867	1453	21.19	1.60
237	954	872	20.42	1.82	431	703	1017	21.60	1.98	563	247								

TABLE 10—Continued

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Blank Field																			
89	1473	35	20.75	2.70	75	60	361	20.58	1.19	137	1145	705	21.37	1.27	85	1043	1041	20.71	1.33
112	607	37	21.03	2.26	189	926	361	21.87	1.38	203	914	705	21.95	0.94	21	1097	1042	18.56	1.95
164	927	40	21.63	1.30	105	893	368	20.97	1.54	246	1488	712	22.20	2.07	39	252	1047	19.62	2.33
31	478	42	19.11	1.28	174	1091	369	21.73	0.90	231	395	714	22.12	1.29	234	388	1050	22.14	1.84
172	214	46	21.68	1.41	287	1227	373	22.60	1.06	198	776	716	21.93	0.84	84	484	1051	20.68	2.50
124	1028	51	21.21	1.81	13	972	375	17.70	2.06	173	241	721	21.71	1.29	196	586	1054	21.91	1.26
20	703	53	18.52	2.14	141	705	379	21.39	1.20	56	15	732	20.17	1.92	66	1109	1058	20.34	1.42
184	323	54	21.83	1.95	281	553	379	22.57	0.97	77	333	732	20.61	1.41	176	313	1065	21.75	1.63
53	1022	58	20.11	1.00	16	1274	384	18.11	1.21	223	1107	741	22.08	1.57	30	1438	1098	19.10	1.62
285	1085	63	22.59	1.32	116	1022	391	21.07	1.38	45	1116	745	19.94	2.28	266	428	1100	22.38	0.81
230	957	72	22.12	1.30	29	1390	408	19.10	1.33	67	743	750	20.35	2.15	7	179	1101	16.92	2.15
216	1056	73	22.04	0.87	145	610	414	21.45	1.51	78	643	755	20.61	2.01	93	442	1102	20.78	0.84
197	1064	75	21.92	1.02	251	620	414	22.25	0.65	130	1243	756	21.26	1.55	273	500	1111	22.44	1.02
293	131	78	22.64	0.72	149	1185	416	21.52	2.49	170	673	765	21.66	1.13	161	1031	1117	21.61	2.98
235	1288	83	22.15	0.93	128	280	425	21.25	2.42	79	533	767	20.65	1.55	134	320	1122	21.34	1.61
265	383	84	22.37	1.26	221	1109	425	22.06	1.11	81	34	779	20.67	3.24	238	112	1128	22.16	0.91
224	1081	88	22.08	2.66	23	383	431	18.68	2.20	118	258	783	21.10	1.96	72	1133	1134	20.45	2.81
210	498	93	22.00	1.48	186	983	446	21.86	0.54	279	288	789	22.56	1.50	109	654	1141	21.01	1.54
69	751	96	20.36	2.21	162	1345	453	21.62	2.12	191	1192	793	21.89	1.79	229	287	1143	22.10	1.78
51	1458	98	20.07	2.56	2	187	456	16.61	2.52	14	605	798	17.82	1.01	125	1149	1144	21.24	2.36
6	866	102	16.90	2.27	250	1257	456	22.25	0.32	219	206	812	22.04	2.05	150	532	1146	21.53	0.99
163	1329	114	21.62	2.35	92	645	460	20.77	1.57	195	1201	813	21.91	1.27	71	1249	1150	20.45	1.41
64	1399	116	20.32	1.41	292	1134	464	22.62	1.47	183	1254	818	21.82	0.90	155	1301	1152	21.57	1.29
220	604	117	22.06	1.19	111	278	465	21.02	1.92	237	906	819	22.16	1.02	42	527	1176	19.80	2.00
153	808	125	21.56	1.85	88	507	472	20.75	1.78	193	344	821	21.90	1.24	97	393	1180	20.84	1.05
1	148	129	16.20	2.34	290	322	473	22.62	0.98	11	923	823	17.52	1.06	24	1125	1186	18.71	2.15
133	1410	143	21.32	3.16	54	856	479	20.12	1.60	242	541	826	22.18	1.24	101	1484	1187	20.86	2.20
91	1386	148	20.77	1.61	179	1248	480	21.77	2.15	258	1017	829	22.31	1.56	12	827	1194	17.57	1.12
269	725	152	22.38	1.43	185	309	497	21.85	1.06	192	77	834	21.90	1.03	284	435	1202	22.58	1.36
52	748	162	20.09	1.15	15	1450	499	17.88	2.30	62	1438	865	20.28	1.67	114	478	1207	21.05	1.84
26	654	163	18.85	2.31	267	306	509	22.38	1.47	291	877	868	22.62	1.33	206	20	1207	21.96	1.19
136	1283	170	21.37	1.05	58	659	512	20.18	1.31	90	77	870	20.76	2.39	98	457	1213	20.84	1.20
110	169	176	21.01	1.90	121	1122	517	21.16	1.98	103	26	872	20.92	3.36	169	569	1219	21.65	2.42
211	1490	178	22.01	1.17	228	728	518	22.10	0.91	34	249	874	19.34	2.01	104	1345	1222	20.94	1.26
154	481	179	21.57	1.01	171	878	526	21.66	1.40	262	1447	874	22.35	1.04	44	447	1226	19.87	0.77
157	353	181	21.60	2.81	8	709	542	16.95	1.93	178	1401	875	21.76	1.78	236	1453	1228	22.15	1.91
47	1379	184	19.97	1.17	218	777	542	22.04	1.72	80	100	879	20.65	2.97	76	760	1244	20.59	1.74
283	1259	189	22.57	1.37	260	79	544	22.32	1.09	135	138	879	21.36	2.90	143	72	1246	21.43	1.48
132	1431	192	21.32	0.88	243	1404	546	22.18	1.49	131	385	884	21.29	1.95	117	1379	1247	21.07	1.39
280	1087	198	22.56	1.80	282	1287	551	22.57	0.71	272	927	888	22.43	2.13	215	379	1254	22.03	1.34
55	1473	210	20.16	2.43	248	1284	558	22.24	1.44	17	729	890	18.14	1.48	27	130	1270	18.99	1.85
3	482	211	16.67	2.36	268	1024	564	22.38	1.38	152	821	892	21.56	1.76	142	541	1284	21.42	0.99
10	1155	213	17.16	2.11	38	1053	569	19.56	1.26	212	1358	900	22.02	0.99	19	343	1287	18.52	2.14
208	329	223	21.97	1.80	182	578	569	21.79	1.82	25	513	905	18.84	2.15	108	875	1287	21.00	2.23
82	686	226	20.68	1.79	213	1189	572	22.02	1.62	94	754	906	20.78	1.48	181	92	1291	21.79	1.23
46	888	229	19.94	2.65	241	1319	583	22.17	0.83	139	1065	906	21.37	1.21	288	430	1293	22.60	1.20
175	187	231	21.74	0.80	65	188	588	20.33	2.06	226	1421	910	22.09	1.14	217	224	1299	22.04	0.91
146	86	236	21.46	1.26	207	667	589	21.96	1.41	225	489	911	22.09	1.21	96	137	1300	20.83	1.21
277	559	247	22.53	0.98	36	826	590	19.47	1.25	240	478	916	22.16	1.82	209	539	1305	21.99	1.15
99	1204	255	20.84	2.02	202	166	595	21.94	1.66	107	831	925	21.00	1.50	127	89	1308	21.25	2.41
194	606	255	21.90	1.49	129	479	603	21.26	1.42	244	1348	937	22.19	2.02	274	158	1323	22.45	1.35
255	616	260	22.29	1.19	60	668	606	20.22	2.48	41	1157	939	19.79	1.42	100	1486	1333	20.84	1.77
252	1122	262	22.26	1.25	70	1457	620	20.40	1.19	276	1329	941	22.50	0.74	40	182	1335	19.73	1.25
222	1111	268	22.08	0.93	48	288	636	20.02	2.20	74	424	945	20.50	0.70	166	321	1335	21.64	2.05
257	1281	270	22.31	2.14	59	972	636	20.19	2.20	126	636	945	21.25	1.46	115	1471	1341	21.07	1.08
270	1042	274	22.39	1.71	160	753	636	21.61	2.11	275	724	950	22.47	1.15	156	1375	1349	21.60	1.53
271	884	274	22.40	1.40	188	324	639	21.87	1.28	120	1207	956	21.15	1.92	61	178	1351	20.26	1.58
187	1088	277	21.86	1.04	144	146	641	21.45	1.12	122	626	956	21.20	1.51	102	412	1362	20.88	0.85
190	1213	279	21.88	0.96	148	442	641	21.51	1.11	296	601	961	22.65	1.41	35	249	1370	19.45	0.76
249	17	283	22.24	1.90	204	136	646	21.95	1.53	253	569	970	22.28	1.56	233	648	1376	22.14	1.47
199	294	285	21.93	1.95	43	1230	654	19.81	1.00	113	979	974	21.03	2.31	256	256	1381	22.30	0.96
9	87	287	17.08	1.12	73	526	657	20.49	1.82	83	819	975	20.68	2.12	263	93	1387	22.36	0.47
22	309	287	18.60	2.16	165	978	661	21.63	2.08	63	381	983	20.30	1.07	106	719	1390	20.99	2.21
158	1065	287	21.61	0.55	278	883	663	22.55	0.72	200	487	991	21.93	2.91	37	1069	1395	19.47	1.70
95	1168	289	20.82	1.24	151	1140	669	21.54	1.84	245	608	998	22.20	1.60	259	560	1399	22.32	0.79
167	1357	310	21.65	1.55	295	873	675	22.65	0.66	32	1444	1002	19.12	2.25	4	329	1410	16.79	2.34
261	923	312	22.32	1.59	28	88	683	19.00	1.99	201	95	1006	21.94	1.50	177	134	1423	21.76	1.23
205	309	316	21.96	1.04	5	537	690	16.85	2.23	123									

TABLE 11
ABELL 2125 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
215	565	11	20.77	1.62	217	887	391	20.79	1.77	98	66	687	19.66	1.80	340	732	903	21.70	1.49
152	664	17	20.25	1.83	116	1357	392	19.90	1.81	266	668	687	21.11	2.03	236	837	907	20.87	1.07
160	836	19	20.32	1.58	391	1040	399	22.21	1.41	96	12	688	19.62	1.77	163	276	909	20.34	1.51
275	163	22	21.21	2.18	406	927	399	22.45	1.49	39	714	690	18.75	1.93	192	768	918	20.62	1.15
103	466	28	19.71	1.68	403	423	404	22.40	0.57	47	579	693	18.83	1.93	82	1251	920	19.49	2.01
392	384	28	22.22	1.27	331	585	407	21.64	0.96	63	900	695	19.21	2.02	109	323	923	19.84	1.46
394	397	36	22.25	1.47	305	901	410	21.44	1.73	283	666	697	21.30	2.85	376	993	923	22.00	1.37
299	579	42	21.41	0.93	358	380	410	21.87	1.30	372	1422	697	21.98	0.83	352	1294	932	21.80	1.59
154	223	47	20.26	1.74	277	248	415	21.23	1.44	43	101	699	18.79	1.96	71	925	933	19.37	2.08
258	350	54	20.99	1.71	233	1466	420	20.85	1.45	265	1007	699	21.11	1.65	14	76	936	18.17	1.97
237	1376	62	20.88	0.90	408	410	420	22.47	0.63	137	1078	700	20.10	1.69	108	1466	939	19.81	2.12
274	456	66	21.20	2.05	230	1463	423	20.84	1.09	125	979	702	20.04	1.84	6	956	955	17.41	2.11
366	1396	72	21.93	1.46	204	565	426	20.70	1.86	133	856	703	20.06	2.04	147	1035	955	20.20	2.08
272	501	77	21.19	1.01	250	599	426	20.96	2.05	307	455	705	21.46	1.70	404	726	956	22.42	0.92
259	742	88	21.00	2.21	256	1379	428	20.99	1.36	251	845	710	20.97	1.09	228	1138	961	20.82	1.60
66	1009	94	19.29	1.31	139	206	429	20.12	1.58	100	428	712	19.68	1.33	178	275	967	20.51	2.00
349	1165	94	21.79	1.02	145	1145	430	20.19	0.78	190	1051	713	20.60	1.79	64	1002	969	19.26	1.95
41	315	96	18.77	1.97	151	788	440	20.25	1.03	381	1156	714	22.09	1.42	136	907	969	20.09	2.11
206	396	100	20.72	1.69	135	830	468	20.08	1.72	32	961	721	18.55	0.94	46	952	972	18.81	1.99
15	993	109	18.17	2.00	81	437	478	19.44	2.42	170	584	721	20.43	1.96	399	1250	973	22.32	0.74
194	657	111	20.63	0.84	241	968	479	20.92	1.19	249	1307	722	20.96	1.47	117	365	974	19.94	1.91
364	476	112	21.92	1.10	132	1183	492	20.06	2.22	300	669	730	21.42	1.91	397	617	974	22.28	1.23
87	492	115	19.54	1.28	313	1140	493	21.54	1.23	411	454	733	22.63	1.66	72	481	975	19.38	1.97
7	1332	118	17.51	0.97	76	464	501	19.41	1.88	208	806	734	20.72	3.30	345	215	980	21.76	0.86
286	153	118	21.34	0.74	129	1088	513	20.06	1.84	85	1428	739	19.51	1.93	102	1000	982	19.69	1.04
19	1476	120	18.27	0.83	370	1146	513	21.96	0.93	70	610	743	19.37	1.24	263	200	985	21.06	1.33
105	206	120	19.73	1.20	138	105	517	20.11	1.98	114	993	744	19.90	0.81	195	1392	989	20.63	1.10
219	174	121	20.79	1.98	80	749	522	19.42	1.72	165	414	748	20.35	1.92	176	810	993	20.49	1.88
326	1199	126	21.62	1.07	146	701	522	20.19	1.98	10	750	751	17.79	2.07	375	1254	994	21.99	1.73
247	659	133	20.94	1.44	124	1154	523	20.02	1.78	104	573	752	19.71	1.79	243	86	995	20.92	2.01
211	177	142	20.75	1.32	222	1083	526	20.81	0.75	3	770	753	17.16	2.14	158	1320	997	20.29	1.95
212	1280	142	20.76	0.74	396	1426	529	22.28	0.78	33	872	755	18.63	1.29	166	629	997	20.36	2.32
382	1125	148	22.09	1.83	337	892	531	21.67	0.79	385	1044	757	22.13	0.86	65	720	999	19.28	2.11
289	59	161	21.35	1.73	210	640	533	20.74	2.03	56	1199	764	19.13	2.09	339	1056	1004	21.68	1.11
338	875	161	21.68	1.09	314	747	538	21.54	1.31	159	837	767	20.31	1.93	140	303	1006	20.13	1.39
401	1156	176	22.37	1.00	199	309	543	20.65	1.22	5	753	770	17.37	2.13	40	75	1007	18.76	1.93
262	1255	196	21.05	0.77	184	763	547	20.56	0.81	79	733	772	19.41	2.19	223	694	1008	20.81	1.62
201	467	199	20.67	1.86	175	711	550	20.49	1.32	186	212	774	20.57	1.69	161	1037	1009	20.33	2.02
97	1092	201	19.65	1.29	355	801	551	21.83	1.20	371	947	779	21.97	1.36	240	1457	1011	20.89	1.88
77	961	202	19.41	1.89	252	671	553	20.97	1.36	317	1011	787	21.56	1.39	255	1132	1014	20.98	1.55
23	382	203	18.31	2.09	198	1309	556	20.65	0.62	86	1134	796	19.52	1.50	59	1110	1015	19.20	1.11
148	557	206	20.22	1.23	368	252	560	21.96	0.28	203	1199	796	20.68	1.92	168	1259	1019	20.42	1.91
127	712	209	20.04	1.93	8	866	566	17.70	2.02	141	970	797	20.13	2.02	301	956	1034	21.43	1.14
226	1307	216	20.82	1.20	12	681	568	18.14	2.02	218	717	803	20.79	1.96	319	537	1038	21.57	1.07
44	1226	219	18.81	1.36	285	1415	581	21.33	2.84	92	514	804	19.57	2.09	24	715	1039	18.36	2.05
260	107	219	21.02	1.23	28	385	586	18.49	1.79	169	851	806	20.43	2.07	128	187	1045	20.04	2.40
269	1403	227	21.17	1.37	316	874	588	21.55	1.67	253	791	810	20.97	1.52	29	632	1054	18.52	2.04
118	553	228	19.96	1.78	73	785	589	19.38	2.12	30	633	813	18.52	2.04	395	563	1054	22.26	1.09
273	739	229	21.20	1.21	180	944	589	20.53	1.87	248	560	816	20.95	2.40	25	580	1055	18.43	1.62
130	246	233	20.06	1.99	357	816	595	21.87	1.05	330	540	818	21.63	1.64	182	160	1055	20.54	1.98
164	649	236	20.34	2.01	267	881	598	21.16	1.59	49	959	820	18.93	1.81	356	899	1055	21.84	0.92
235	427	242	20.86	1.69	327	1454	609	21.62	1.32	106	896	821	19.78	1.93	27	128	1056	18.47	1.87
346	788	258	21.77	1.30	37	733	614	18.71	2.02	179	679	821	20.51	1.94	384	1199	1061	22.11	0.99
409	917	258	22.49	0.90	315	592	618	21.54	1.80	209	829	826	20.73	2.11	42	1047	1062	18.77	2.01
196	1202	276	20.63	2.16	378	703	620	22.07	1.94	276	206	829	21.22	1.43	17	1150	1063	18.18	1.51
245	456	278	20.93	1.72	50	352	624	18.95	2.03	325	256	831	21.62	0.99	365	1090	1064	21.92	1.16
333	297	278	21.64	1.34	393	1222	626	22.24	1.31	213	1463	833	20.76	1.83	16	1000	1068	18.17	2.10
280	170	287	21.24	2.57	246	698	630	20.93	2.14	54	660	834	19.09	1.97	334	1245	1069	21.65	1.94
101	1073	290	19.68	1.83	95	798	632	19.60	1.51	261	933	836	21.03	2.15	122	82	1077	19.98	3.01
26	539	293	18.45	2.04	197	169	632	20.64	1.87	173	1224	839	20.48	2.06	143	126	1090	20.16	1.25
362	1142	298	21.88	1.96	200	715	634	20.65	1.70	310	895	839	21.52	1.49	232	415	1090	20.84	1.85
84	1467	313	19.50	1.29	405	142	634	22.45	0.92	142	720	847	20.14	1.14	131	1161	1093	20.06	1.89
189	1180	315	20.60	0.95	51	187	641	19.02	2.02	377	684	851	22.06	1.29	323	69	1101	21.61	1.94
324	1045	316	21.62	1.16	270	545	641	21.17	1.75	188	829	853	20.59	2.15	36	989	1102	18.70	2.07
48	567	319	18.85	2.05	113	384	644	19.89	2.03	53	1309	854	19.09	1.75	288	482	1104	21.35	1.48
343	796	321	21.74	1.19	291	505	645	21.36	2.11	214	880	859	20.77	1.84	332	1110	1106	21.64	1.16
38	1226	326	18.75	1.89	374	957	646	21.98	1.37	268	227	860	21.17	1.25	348	1393	1110	21.78	1.31
388	1101	330	22.15	1.66	344	402	654	21.76	0.										

TABLE 11—*Continued*

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
257	1090	1167	20.99	1.46	298	1018	1237	21.41	0.76	162	324	1309	20.33	1.90	295	462	1400	21.39	1.33
281	1234	1172	21.27	1.02	410	1196	1243	22.57	0.70	187	530	1310	20.58	2.01	55	1128	1401	19.12	0.59
294	1242	1189	21.38	1.95	90	461	1244	19.56	2.15	107	432	1311	19.79	2.22	183	139	1403	20.54	1.92
67	432	1190	19.29	1.99	363	214	1249	21.90	1.91	157	1238	1311	20.29	1.80	18	1430	1406	18.21	1.86
119	1167	1193	19.97	0.96	296	607	1257	21.40	1.05	74	360	1316	19.40	1.45	69	878	1407	19.34	2.00
207	272	1194	20.72	2.03	400	467	1266	22.35	1.21	35	65	1318	18.70	1.86	231	1077	1408	20.84	1.78
221	695	1195	20.80	1.36	171	287	1268	20.45	2.00	11	1426	1319	18.02	2.10	318	804	1408	21.56	2.11
61	1009	1199	19.20	2.05	290	936	1268	21.36	1.34	88	772	1320	19.54	1.33	149	968	1409	20.24	1.51
242	1410	1199	20.92	1.67	380	709	1268	22.08	0.93	134	656	1323	20.07	1.20	172	435	1416	20.48	1.83
78	725	1200	19.41	1.75	110	58	1269	19.86	1.90	303	886	1334	21.44	1.61	322	125	1424	21.58	0.68
320	295	1201	21.57	0.84	202	1294	1270	20.68	0.84	238	1469	1335	20.88	1.91	225	1089	1429	20.81	2.10
121	333	1205	19.98	1.25	216	947	1272	20.78	1.69	336	1016	1343	21.66	1.38	407	158	1438	22.46	1.90
402	169	1206	22.39	1.39	279	96	1273	21.24	0.88	52	1274	1355	19.05	1.96	9	762	1439	17.77	2.07
155	878	1207	20.27	1.14	144	1183	1276	20.17	1.68	34	421	1357	18.66	1.97	278	436	1442	21.23	1.31
89	675	1210	19.55	1.19	156	736	1278	20.27	1.13	244	1326	1357	20.93	0.85	120	1031	1445	19.97	2.04
350	399	1211	21.79	1.03	193	892	1288	20.62	1.35	284	52	1358	21.33	1.96	383	286	1452	22.10	1.22
115	233	1216	19.90	1.44	359	135	1288	21.87	1.54	361	296	1362	21.88	1.12	398	1402	1454	22.31	1.29
62	1074	1218	19.21	2.11	21	962	1290	18.29	1.95	99	479	1367	19.68	0.87	20	1001	1463	18.28	1.85
83	326	1222	19.49	2.38	234	1121	1290	20.85	1.94	351	1173	1367	21.79	1.63	312	1105	1469	21.53	1.87
150	402	1226	20.24	2.55	2	1373	1292	17.02	1.83	185	852	1373	20.57	1.37	13	1039	1479	18.14	2.11
387	561	1227	22.15	0.98	167	1350	1293	20.39	1.20	93	1409	1378	19.57	2.31	341	1470	1491	21.73	1.39
379	952	1233	22.08	0.58	293	919	1304	21.38	1.54	367	317	1390	21.93	1.23					
Blank Field																			
82	82	35	21.03	1.35	39	1391	325	19.97	1.44	25	369	734	19.43	1.11	21	1041	1069	19.13	0.97
185	994	35	22.37	1.26	181	925	338	22.29	1.08	158	184	740	21.97	1.55	43	326	1074	20.14	1.93
143	1479	43	21.78	1.68	123	770	352	21.50	0.81	59	750	750	20.59	1.83	136	975	1085	21.71	1.40
140	1042	44	21.75	0.62	1	1094	375	16.72	1.70	57	554	766	20.56	2.56	66	745	1091	20.66	2.24
18	859	48	18.96	1.93	126	900	377	21.51	1.15	38	549	779	19.94	2.19	170	839	1097	22.07	1.90
166	1120	53	22.03	1.20	118	820	378	21.43	1.01	128	1289	779	21.58	1.93	11	314	1100	18.16	2.18
72	1359	77	20.78	2.02	83	830	380	21.05	1.05	153	949	785	21.92	2.37	67	1103	1100	20.71	2.32
177	232	81	22.19	1.90	61	1400	386	20.61	1.54	176	1049	794	22.14	1.67	3	704	1105	16.94	0.73
78	1367	91	20.99	1.22	44	1028	390	20.22	1.69	127	1260	803	21.53	1.25	187	141	1106	22.38	0.79
28	744	101	19.50	1.46	172	1340	393	22.09	0.46	106	31	831	21.25	1.73	144	329	1114	21.79	1.35
13	1120	103	18.31	2.02	9	1202	397	18.14	1.98	171	1370	846	22.08	0.95	46	1128	1116	20.34	2.24
70	1260	112	20.78	1.15	69	932	398	20.75	0.83	14	663	866	18.80	1.53	173	308	1130	22.09	1.21
68	1409	113	20.72	2.02	55	515	410	20.55	1.52	101	291	868	21.21	1.14	107	150	1134	21.30	1.63
35	390	115	19.75	1.79	98	1226	413	21.19	1.90	112	293	871	21.34	1.27	109	218	1141	21.31	1.30
100	1338	119	21.21	0.81	64	765	442	20.62	2.28	71	368	872	20.78	2.09	151	1310	1148	21.89	0.86
86	838	121	21.06	1.57	7	816	443	18.02	2.04	8	736	882	18.08	0.85	150	1041	1159	21.88	1.48
54	760	122	20.55	1.15	17	474	446	18.90	0.59	74	702	882	20.82	0.65	6	970	1171	17.85	2.00
89	1280	141	21.09	1.16	146	864	452	21.80	0.61	34	771	893	19.68	2.28	138	1251	1183	21.74	1.14
139	1078	166	21.74	1.74	2	884	456	16.84	1.30	178	283	900	22.21	1.25	174	629	1196	22.11	1.07
152	719	171	21.91	1.25	115	1196	469	21.39	1.69	5	393	911	17.66	0.99	134	711	1209	21.67	2.60
87	1165	173	21.08	2.23	175	226	472	22.13	1.41	186	595	914	22.37	1.19	77	551	1212	20.97	1.76
31	503	177	19.58	1.96	154	586	474	21.93	1.23	50	1389	915	20.48	1.93	162	543	1235	22.01	0.65
60	756	190	20.59	2.07	80	132	479	20.99	2.09	132	1245	928	21.65	1.24	19	480	1254	19.01	1.17
193	267	193	22.49	0.69	102	779	492	21.23	1.16	169	1223	934	22.06	1.71	190	221	1264	22.40	1.53
183	1370	203	22.33	0.88	84	1460	506	21.05	1.18	85	451	940	21.06	0.99	97	307	1296	21.17	2.56
79	925	204	20.99	1.20	142	893	507	21.77	1.24	111	793	941	21.33	0.93	141	1255	1300	21.76	1.04
56	484	208	20.56	0.49	29	640	509	19.55	1.28	160	67	943	21.99	0.97	147	410	1301	21.81	1.08
124	1199	217	21.50	1.11	117	20	510	21.42	2.00	105	517	954	21.25	1.41	10	505	1327	18.15	2.24
62	751	227	20.61	2.33	108	268	513	21.30	1.65	92	284	957	21.12	1.43	130	1129	1330	21.61	0.45
191	1444	228	22.44	0.31	192	1002	529	22.45	1.36	90	1162	959	21.09	1.54	4	187	1347	17.60	1.97
157	1132	238	21.97	1.01	22	1456	530	19.17	1.79	164	1004	969	22.02	0.73	32	530	1348	19.58	2.08
165	203	239	22.02	1.33	63	1466	530	20.62	1.56	179	1072	971	22.24	1.07	27	1258	1353	19.47	0.63
26	1186	243	19.43	2.17	75	912	536	20.84	1.17	33	509	973	19.67	2.21	58	525	1377	20.58	2.02
96	991	245	21.16	1.74	159	649	557	21.99	0.94	113	1317	974	21.36	1.46	12	726	1399	18.24	1.81
163	206	247	22.01	1.76	48	924	571	20.47	1.86	167	164	974	22.04	1.35	51	1111	1402	20.52	0.34
119	504	248	21.44	1.32	155	1338	573	21.95	0.77	42	888	977	20.14	0.77	133	202	1404	21.65	1.26
122	1266	248	21.49	2.16	81	609	582	21.01	2.65	121	1002	982	21.49	0.84	196	346	1405	22.64	0.04
94	168	253	21.15	0.78	125	776	582	21.51	1.03	65	815	986	20.66	1.01	76	968	1410	20.96	2.18
180	816	255	22.27	0.77	49	1381	596	20.47	2.14	149	497	989	21.86	2.52	15	304	1412	18.84	0.67
88	62	256	21.09	0.97	145	640	596	21.79	2.76	53	897	996	20.53	1.83	114	441	1419	21.36	1.86
189	587	257	22.39	0.47	37	628	600	19.87	2.44	16	436	1000	18.84	1.90	103	1472	1440	21.23	2.00
24	1461	259	19.41	1.59	40	758	646	20.01	1.64	182	1008	1007	22.31	1.18	99	528	1441	21.20	1.57
73	139	267	20.81	1.48	41	258	664	20.02	1.56	94	1389	1015	22.51	1.44	93	371	1442	21.12	1.48
91	395	271	21.09	1.90	195	93	683	22.56	1.44	95	462	1028	21.16	1.10	135	1109	1444	21.69	1.43
30	1209	282	19.57	1.00	36	792	705	19.77	1.39	120	858	1034	21.45	1.78	161	1307	1448	22.00	

TABLE 12
ABELL 2218 PHOTOMETRY

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
Cluster Center																			
69	873	26	18.61	1.20	334	28	285	20.92	1.53	179	667	516	19.85	1.55	339	1452	701	20.95	1.47
291	1393	31	20.69	2.20	139	409	286	19.43	1.95	428	1328	516	21.56	1.79	226	1207	702	20.18	1.83
258	260	32	20.43	2.38	257	346	287	20.43	0.80	89	1366	517	18.88	1.94	165	569	703	19.74	2.15
309	423	32	20.76	1.65	45	1329	288	18.18	2.23	485	1484	518	22.07	1.41	235	505	703	20.31	2.22
71	37	40	18.62	1.81	316	1371	289	20.81	1.93	465	515	522	21.83	1.35	243	1385	703	20.36	1.55
186	297	43	19.92	1.31	330	1058	293	20.89	1.81	3	721	524	17.12	2.15	211	397	709	20.11	1.62
58	1432	45	18.39	2.18	432	1442	299	21.58	1.90	29	222	526	17.78	2.07	231	1032	711	20.26	1.73
490	1333	48	22.12	1.45	202	763	300	20.03	2.12	30	654	526	17.85	2.06	52	831	718	18.27	1.94
294	1375	52	20.70	1.75	451	1397	300	21.72	1.06	352	1063	530	21.03	1.63	344	350	718	20.98	1.00
325	1282	54	20.87	1.01	166	1021	301	19.75	1.08	185	544	535	19.89	1.95	363	993	718	21.13	1.88
321	1081	65	20.83	2.55	491	299	302	22.18	1.11	405	921	537	21.38	1.25	60	412	720	18.41	1.78
479	1007	65	21.93	1.06	266	1058	303	20.50	1.94	10	1227	541	17.35	2.01	110	1395	722	19.16	2.06
14	669	67	17.49	1.48	275	1313	306	20.55	1.71	164	1474	541	19.74	1.83	20	763	724	17.60	2.00
268	147	70	20.51	1.81	281	374	309	20.59	1.63	198	1095	544	20.02	1.64	397	983	725	21.32	2.11
306	218	71	20.75	1.29	88	474	313	18.87	1.92	98	1389	547	18.99	1.24	34	1301	733	18.06	1.94
458	548	72	21.78	1.04	146	966	316	19.50	1.31	381	473	548	21.25	1.32	78	802	734	18.74	1.55
454	393	76	21.74	1.30	147	526	319	19.51	1.50	90	908	550	18.88	1.86	196	655	735	19.99	2.30
482	603	76	21.98	1.49	199	603	330	20.02	1.93	111	381	553	19.16	1.90	247	627	735	20.38	2.53
86	1402	78	18.84	0.97	416	1186	336	21.46	1.51	162	536	554	19.73	1.84	373	846	736	21.18	2.08
246	901	81	20.38	1.69	457	356	337	21.77	1.64	181	607	555	19.87	2.02	163	1449	739	19.73	1.97
171	580	86	19.79	1.95	245	819	340	20.37	2.05	206	547	555	20.06	2.28	468	553	739	21.86	1.77
365	893	88	21.15	2.36	311	854	340	20.79	0.97	455	814	555	21.75	1.75	94	527	746	18.92	1.97
329	427	97	20.88	1.79	323	559	342	20.85	1.82	472	60	555	21.88	2.11	121	624	746	19.32	1.94
133	90	98	19.38	1.88	338	638	345	20.94	2.02	117	716	558	19.29	1.89	392	893	748	21.30	1.83
5	1401	103	17.24	0.99	382	1259	346	21.25	1.60	36	456	561	18.07	2.01	8	749	749	17.30	1.95
469	870	105	21.87	1.34	167	697	348	19.75	2.47	209	798	561	20.07	1.97	289	983	753	20.68	1.52
395	756	113	21.31	1.79	384	436	348	21.25	1.80	336	1115	563	20.92	2.15	143	828	754	19.48	2.00
214	701	120	20.13	1.37	460	979	348	21.78	1.42	184	116	564	19.88	2.15	177	698	755	19.83	1.49
65	907	121	18.51	1.60	477	783	351	21.91	1.70	176	529	567	19.83	1.98	183	588	757	19.88	1.82
259	1397	121	20.45	1.86	136	837	357	19.39	2.02	19	551	572	17.58	1.99	225	296	758	20.17	1.91
414	1065	125	21.41	2.61	79	561	359	18.75	2.00	64	667	575	18.50	2.08	42	782	762	18.16	1.90
223	32	132	20.16	2.10	187	419	361	19.93	1.20	219	465	575	20.15	1.40	152	489	771	19.61	1.84
93	86	135	18.92	1.09	408	1417	362	21.38	2.72	421	443	575	21.49	2.33	250	879	771	20.39	2.08
429	738	137	21.57	1.00	96	82	375	18.97	1.95	441	989	575	21.65	2.13	425	657	776	21.53	2.38
426	118	142	21.54	0.94	203	190	378	20.04	1.93	68	855	577	18.57	1.96	476	544	786	21.90	1.20
102	309	144	19.01	2.16	444	864	379	21.67	2.60	430	266	582	21.58	1.31	242	229	791	20.36	1.77
213	1097	148	20.11	1.94	328	1151	383	20.88	1.67	156	415	585	19.69	2.06	376	903	794	21.20	1.71
101	1415	155	19.00	1.90	442	1435	385	21.65	2.26	409	879	585	21.39	1.68	48	723	797	18.23	1.30
270	504	160	20.52	1.23	108	854	389	19.09	2.03	241	934	589	20.35	1.92	193	1183	797	19.97	2.07
404	1223	161	21.36	1.71	351	772	389	21.02	2.25	144	163	595	19.49	1.59	487	294	797	22.08	1.42
412	695	163	21.40	2.06	488	1222	389	22.10	1.78	360	333	597	21.11	1.99	173	1390	798	19.80	1.98
461	1096	167	21.79	1.08	9	798	391	17.31	2.04	489	1092	601	22.10	2.39	280	821	798	20.58	1.18
399	1361	168	21.34	1.93	132	945	397	19.37	1.68	427	653	606	21.54	2.29	452	546	798	21.73	1.10
453	840	173	21.73	1.72	77	392	399	18.70	2.03	189	928	607	19.94	1.81	57	661	800	18.37	1.96
216	100	182	20.13	1.93	26	624	401	17.76	2.05	127	706	610	19.34	1.82	66	785	803	18.51	1.64
367	672	182	21.16	1.37	292	333	401	20.69	2.32	443	1185	611	21.67	0.88	126	744	805	19.34	1.63
76	139	184	18.69	1.97	148	39	411	19.51	1.67	140	808	614	19.43	1.91	267	612	806	20.51	1.12
182	1204	190	19.88	1.41	208	786	411	20.07	1.83	85	1336	617	18.78	2.01	486	399	806	22.08	1.15
422	763	191	21.52	1.48	434	1294	412	21.61	1.69	279	662	617	20.58	1.81	293	707	811	20.70	0.95
153	609	200	19.62	1.89	343	275	417	20.97	2.42	473	733	618	21.89	1.54	142	453	815	19.47	1.47
274	581	202	20.54	2.35	207	585	419	20.06	2.42	326	1368	622	20.87	1.76	154	907	823	19.64	1.87
391	426	205	21.29	1.67	470	311	420	21.88	1.43	192	786	623	19.96	1.79	273	278	823	20.54	1.85
483	851	205	22.04	1.65	232	642	424	20.27	2.32	175	467	628	19.81	1.92	220	805	824	20.15	1.65
82	762	212	18.77	1.09	32	1445	434	18.01	0.83	269	1329	631	20.51	1.87	59	1109	827	18.40	1.10
419	1138	212	21.48	1.56	335	1057	434	20.92	1.93	106	917	633	19.05	2.00	369	741	829	21.17	0.72
290	901	217	20.68	1.62	288	875	439	20.67	1.78	276	523	633	20.56	1.64	406	357	830	21.38	1.91
312	1046	225	20.80	0.97	305	215	439	20.74	2.22	212	844	638	20.11	1.78	169	1099	836	19.77	1.79
459	77	230	21.78	1.20	123	729	441	19.32	1.98	55	1219	641	18.35	1.91	361	1085	839	21.12	2.38
172	709	233	19.80	1.66	114	488	444	19.26	1.82	234	697	642	20.29	0.58	237	170	841	20.32	1.66
38	1429	234	18.11	1.40	295	1136	444	20.70	1.98	347	1016	642	21.00	1.94	249	909	841	20.39	1.90
449	1173	234	21.69	2.00	445	1425	449	21.68	1.73	135	767	643	19.38	1.05	205	512	843	20.06	1.77
438	329	244	21.63	1.03	74	353	450	18.66	2.25	87	631	654	18.86	1.80	39	724	859	18.11	2.01
332	969	246	20.92	1.36	240	93	453	20.34	1.32	47	563	657	18.20	1.96	238	1053	863	20.32	2.28
157	1190	247	19.69	2.51	28	629	456	17.76	2.06	115	1370	658	19.27	1.93	314	168	868	20.81	1.69
463	560	249	21.81	0.84	377	847	457	21.20	1.77	31	770	664	17.95	2.01	210	899	869	20.10	1.82
160	1407	250	19.72	1.78	355	20	466	21.09	1.10	159	450	665	19.71	2.03	23	324	870	17.68	0.98
72	431	254	18.62	1.97	310	793	467	20.76	1.98	100	704	668	18.99	1.85	402	505	877	21.35	1.78
80	1068	254	18.76	1.96	303	591	471	20.74	1.01	158	1054	671	19.70						

TABLE 12—*Continued*

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
262	693	915	20.47	2.03	333	124	1067	20.92	1.18	413	713	1197	21.41	1.80	342	1283	1341	20.97	2.05
356	410	918	21.09	1.49	307	134	1069	20.75	1.50	97	672	1200	18.98	2.23	284	776	1342	20.62	2.46
44	430	926	18.18	2.03	423	991	1072	21.52	1.30	320	1243	1206	20.83	1.05	353	1096	1342	21.05	2.43
63	928	926	18.48	1.99	228	781	1074	20.20	1.89	403	423	1208	21.35	2.31	1	376	1344	16.90	1.95
67	481	926	18.52	1.97	116	697	1075	19.29	2.01	191	1111	1211	19.95	1.84	43	144	1344	18.17	2.29
390	120	928	21.29	1.50	118	207	1075	19.30	2.35	104	1014	1212	19.02	1.88	359	1476	1349	21.10	1.82
319	872	932	20.82	2.03	478	1069	1076	21.92	1.86	201	578	1213	20.03	1.48	178	1242	1350	19.85	2.15
481	344	939	21.96	1.03	107	639	1079	19.09	1.65	255	603	1216	20.42	1.68	424	1074	1350	21.52	1.83
233	1147	942	20.29	1.94	467	123	1083	21.86	1.50	380	1265	1221	21.22	1.90	264	1230	1352	20.48	1.90
450	926	948	21.70	1.52	322	1247	1084	20.85	0.96	277	607	1222	20.57	1.61	393	1187	1352	21.30	1.77
439	218	951	21.63	1.34	194	249	1085	19.98	1.87	244	242	1223	20.37	1.73	251	543	1360	20.40	1.68
4	833	955	17.19	2.24	366	967	1092	21.16	0.93	383	571	1228	21.25	1.71	229	836	1362	20.22	1.84
168	415	964	19.76	1.59	75	799	1093	18.68	2.07	122	845	1233	19.32	1.89	431	213	1366	21.58	1.44
308	960	964	20.76	1.47	236	1123	1104	20.31	2.02	411	865	1239	21.40	1.19	415	955	1373	21.44	1.78
331	895	965	20.90	2.04	6	555	1105	17.25	2.02	368	789	1253	21.16	2.05	271	270	1378	20.53	1.38
7	995	967	17.27	2.20	137	661	1109	19.40	2.49	145	237	1256	19.49	1.93	304	467	1378	20.74	1.31
218	784	969	20.14	1.64	435	308	1112	21.61	1.56	287	540	1257	20.67	1.14	466	599	1380	21.84	0.52
40	1128	973	18.13	2.00	364	37	1113	21.14	1.56	358	1086	1259	21.10	1.71	161	851	1387	19.72	2.57
81	291	977	18.76	1.86	401	890	1122	21.34	2.59	230	1041	1260	20.25	1.00	61	1260	1388	18.43	1.28
109	937	978	19.11	1.75	83	744	1126	18.77	1.86	446	357	1265	21.68	1.63	200	1289	1388	20.02	2.37
296	123	982	20.70	2.19	340	1102	1126	20.95	1.79	378	486	1270	21.21	1.93	348	100	1388	21.01	1.58
103	890	985	19.02	1.78	2	558	1136	16.97	1.41	149	464	1271	19.52	1.81	12	1359	1389	17.40	2.23
84	67	991	18.78	1.74	56	151	1137	18.37	1.95	239	507	1280	20.33	1.59	99	305	1390	18.99	1.78
130	79	1005	19.36	1.88	471	1117	1140	21.88	1.49	62	772	1282	18.43	1.93	41	202	1392	18.15	1.66
389	296	1012	21.27	1.94	263	665	1141	20.48	1.87	354	1044	1286	21.07	2.26	204	379	1393	20.05	1.80
124	461	1013	19.32	2.41	327	1082	1142	20.88	1.30	379	1064	1286	21.22	1.37	227	162	1395	20.20	1.65
253	837	1013	20.40	2.29	300	901	1152	20.72	1.88	299	715	1289	20.72	2.04	16	767	1396	17.53	1.67
13	767	1014	17.42	2.04	278	839	1153	20.57	2.47	385	1282	1291	21.25	1.79	285	1465	1397	20.64	1.21
298	1351	1018	20.71	2.17	222	780	1155	20.15	2.74	141	602	1292	19.44	1.41	447	695	1432	21.68	1.43
215	873	1022	20.13	1.75	345	1080	1158	20.99	1.83	484	413	1295	22.07	1.24	474	402	1436	21.89	1.19
120	948	1025	19.32	1.88	283	108	1159	20.62	1.92	420	1316	1298	21.48	1.30	138	136	1438	19.42	1.84
73	1176	1028	18.65	1.96	297	593	1164	20.71	1.38	370	676	1300	21.17	1.33	221	95	1440	20.15	2.66
394	725	1029	21.31	1.52	448	145	1166	21.69	1.33	302	871	1307	20.73	2.04	301	676	1446	20.73	1.93
350	896	1033	21.01	2.27	272	945	1173	20.54	1.86	396	421	1308	21.32	1.83	224	98	1449	20.16	2.55
91	557	1043	18.91	2.30	33	929	1177	18.01	1.95	217	786	1311	20.13	2.65	440	1295	1450	21.63	2.10
195	1356	1047	19.98	2.13	346	437	1177	20.99	2.77	433	403	1321	21.61	1.18	374	226	1456	21.19	0.97
388	668	1049	21.27	1.63	341	1166	1180	20.97	1.62	462	24	1322	21.80	0.66	131	297	1463	19.37	1.30
349	1188	1050	21.01	1.48	248	464	1184	20.39	1.72	129	1387	1325	19.34	2.29	337	1391	1471	20.94	1.57
387	574	1054	21.26	1.67	150	459	1189	19.59	1.85	265	1282	1327	20.50	1.69	362	355	1477	21.13	1.69
410	701	1055	21.40	1.30	155	979	1189	19.66	1.87	180	1480	1334	19.87	2.28	417	1328	1480	21.46	1.61
50	891	1060	18.23	2.05	261	1173	1189	20.46	2.06	317	1008	1335	20.81	1.89	324	772	1487	20.85	1.90
92	288	1064	18.92	0.94	254	849	1197	20.41	1.58	134	668	1340	19.38	2.17					
Blank Field																			
138	615	15	21.17	1.99	223	513	218	22.00	2.31	25	1128	445	18.83	2.17	80	1401	653	20.29	2.08
1	854	17	16.71	1.64	177	1205	220	21.52	1.21	74	282	446	20.16	2.56	144	1162	674	21.24	1.89
28	1338	19	18.95	2.12	47	767	225	19.44	0.95	168	482	448	21.47	1.96	155	1482	674	21.36	1.28
10	83	36	17.89	1.22	102	924	228	20.71	1.21	135	844	456	21.14	1.19	166	137	679	21.46	3.05
146	1144	48	21.25	1.79	117	544	237	20.86	2.08	120	811	461	20.90	2.62	143	1366	693	21.22	1.54
92	1480	53	20.54	2.09	200	783	245	21.74	0.91	33	1486	466	19.21	2.27	5	576	694	17.34	2.28
65	120	56	20.02	2.12	186	990	249	21.56	2.34	21	1223	469	18.73	2.25	61	252	695	19.87	2.33
176	39	56	21.52	1.17	123	389	260	20.94	3.09	67	480	477	20.03	1.98	44	667	703	19.40	2.35
216	289	71	21.91	1.73	133	1278	262	21.07	2.21	84	1196	486	20.37	3.45	46	215	707	19.43	2.38
88	1075	72	20.47	2.16	195	17	263	21.72	1.66	97	867	488	20.64	2.58	167	594	708	21.47	1.30
54	898	73	19.71	1.10	96	571	266	20.62	1.16	161	804	489	21.38	2.56	132	444	714	21.06	1.44
230	769	73	22.11	1.44	209	1013	268	21.81	1.22	137	1244	495	21.15	1.83	193	912	716	21.68	0.60
172	373	77	21.48	1.75	15	986	269	18.44	1.47	52	25	496	19.64	2.05	148	529	720	21.27	1.65
183	122	77	21.56	1.02	14	1122	275	18.36	2.17	37	961	510	19.28	2.04	204	1460	723	21.78	1.88
178	1460	83	21.52	1.60	64	89	280	19.92	1.62	38	713	513	19.31	1.35	4	771	728	17.33	2.20
154	75	91	21.35	1.88	153	1279	287	21.34	1.67	214	656	514	21.91	1.31	43	1285	731	19.40	2.04
163	1073	94	21.40	1.79	129	1335	293	21.01	2.06	142	1212	516	21.21	1.86	128	1362	732	21.00	2.91
225	89	95	22.03	0.95	201	889	309	21.75	1.57	182	1041	518	21.55	1.08	48	737	750	19.46	1.79
217	66	99	21.93	1.37	184	109	324	21.56	1.00	55	48	536	19.71	1.15	100	840	765	20.70	1.49
86	982	105	20.47	1.19	180	1160	330	21.54	1.44	103	350	538	20.71	1.68	42	1279	771	19.40	1.78
229	384	108	22.10	1.40	231	63	332	22.18	1.14	87	1317	539	20.47	1.99	98	1056	774	20.68	0.99
141	870	115	21.20	2.81	29	159	347	19.05	2.28	211	106	541	21.84	1.49	162	214	780	21.40	2.52
32	1468	118	19.18	1.68	227	477	362	22.06	2.21	181	1094	547	21.54	2.28	82	1231	782	20.34	2.20
91	738	130	20.54	1.52	151	536	372	21.33	2.44	78	416	581	20.25	2.32	203	767	785	21.78	1.34
76	568	136	20.23	0.98	51	515	383	19.59	2.28	3	49	583	17.18	2.41	174	1465	786	21.49	1.88
70	915	139	20.11																

TABLE 12—*Continued*

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
171	1053	855	21.48	1.18	36	375	985	19.28	1.76	116	1225	1154	20.84	1.90	56	565	1293	19.73	2.13
220	896	857	21.97	0.64	104	677	996	20.73	2.61	41	359	1155	19.39	1.58	213	506	1301	21.86	0.82
226	1379	859	22.04	1.73	66	349	998	20.02	2.22	188	904	1162	21.60	1.49	57	472	1309	19.83	2.39
134	614	862	21.11	1.58	136	268	1013	21.15	1.39	130	948	1178	21.03	1.94	63	136	1313	19.92	1.17
49	252	864	19.46	1.96	31	689	1017	19.08	2.23	192	255	1199	21.63	1.41	6	1447	1315	17.52	1.29
140	787	887	21.20	1.27	89	825	1017	20.50	2.13	145	219	1204	21.25	1.32	9	1423	1338	17.85	1.21
59	1226	897	19.85	1.04	99	956	1024	20.69	1.94	81	604	1214	20.31	1.38	72	402	1339	20.16	1.56
124	750	897	20.96	2.29	121	883	1037	20.91	1.12	222	395	1214	21.99	0.97	20	1025	1340	18.72	1.89
175	480	897	21.50	1.20	224	302	1037	22.01	0.94	101	543	1217	20.70	3.20	8	204	1356	17.66	1.42
208	1136	899	21.80	2.27	218	863	1038	21.94	1.22	27	1344	1225	18.94	1.34	17	1048	1369	18.64	2.29
125	191	911	20.96	1.88	170	1319	1040	21.48	1.30	108	1441	1262	20.75	1.87	118	223	1376	20.87	2.28
68	1392	935	20.04	2.39	219	313	1061	21.96	1.51	159	1088	1263	21.38	1.05	202	957	1393	21.76	1.17
126	404	938	20.96	2.98	205	1484	1077	21.79	1.01	187	64	1264	21.58	1.96	35	833	1439	19.26	0.91
110	580	947	20.76	1.36	30	132	1079	19.08	1.55	83	1300	1266	20.34	2.36	90	1187	1448	20.51	2.07
212	442	947	21.85	1.59	139	635	1091	21.18	1.80	69	980	1271	20.09	1.75	158	1241	1448	21.36	2.03
149	553	954	21.27	2.41	185	261	1103	21.56	1.45	11	1195	1280	17.89	2.21	79	542	1460	20.27	2.48
106	152	961	20.75	2.01	34	608	1105	19.25	2.31	73	945	1282	20.16	2.34	169	1089	1475	21.47	2.12
107	452	978	20.75	2.27	221	1451	1110	21.99	0.75	113	1446	1289	20.80	2.61	26	555	1479	18.86	2.28
210	1245	983	21.83	2.06	105	690	1126	20.74	1.05	2	651	1291	17.16	1.84					

TABLE 13
ABELL 2397 PHOTOMETRY

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
Cluster Center																			
478	781	14	22.55	1.95	389	99	330	22.06	1.64	123	1355	557	20.14	1.83	254	1265	746	21.30	2.20
265	1103	19	21.36	2.06	98	1205	331	19.90	2.08	208	727	557	20.84	1.61	44	515	747	19.24	2.06
218	456	21	20.98	1.57	348	1147	332	21.86	2.16	405	375	558	22.14	2.06	463	811	748	22.46	1.77
227	356	21	21.07	1.87	178	690	333	20.52	2.08	450	1377	559	22.40	1.92	1	748	751	17.68	2.08
39	630	28	19.10	1.93	301	742	333	21.61	1.98	52	929	560	19.38	2.03	214	1225	753	20.93	2.00
496	1197	51	22.68	2.66	332	1395	333	21.79	2.51	333	1102	562	21.79	2.59	8	762	754	18.25	1.98
464	374	52	22.46	2.11	33	515	335	18.93	1.91	422	619	562	22.24	1.87	10	353	754	18.28	2.00
315	1117	59	21.68	2.14	11	1133	344	18.56	2.11	212	1323	563	20.90	1.99	3	980	760	17.95	2.10
481	534	60	22.56	2.13	455	476	345	22.43	1.17	185	896	569	20.58	2.06	228	651	760	21.10	2.12
166	1144	63	20.41	2.14	522	1014	346	22.93	2.19	231	1277	574	21.13	2.13	111	1209	762	20.05	1.92
427	182	66	22.26	1.93	448	1252	347	22.39	1.92	80	1046	576	19.78	2.14	520	813	764	22.93	1.60
492	440	80	22.64	1.78	388	1061	353	22.05	2.42	504	578	582	22.73	1.18	13	746	765	18.68	2.06
51	103	88	19.34	1.65	261	933	363	21.34	2.06	73	1114	584	19.73	2.11	220	374	765	21.00	2.02
459	667	97	22.45	2.43	164	313	369	20.39	1.74	121	942	586	20.12	2.07	191	799	766	20.70	2.15
340	1032	107	21.83	2.00	192	631	375	20.71	1.60	20	172	590	18.79	1.54	16	545	767	18.72	1.80
245	753	108	21.24	1.87	169	927	384	20.44	1.98	361	1264	591	21.91	1.58	30	738	767	18.91	2.08
295	223	113	21.58	1.96	108	1308	388	20.02	2.07	324	324	593	21.76	1.87	446	1067	770	22.36	2.51
115	849	121	20.08	2.09	467	1082	392	22.47	2.24	401	401	598	22.12	2.28	132	893	778	20.22	2.06
180	1439	124	20.54	2.11	371	943	393	21.96	1.52	266	47	600	21.37	2.41	252	1357	778	21.28	2.15
281	768	128	21.48	1.88	442	1280	400	22.34	2.08	55	750	602	19.42	1.74	128	1266	779	20.19	2.05
419	306	132	22.22	2.16	134	251	405	20.22	2.32	152	1295	603	20.29	2.07	36	460	782	19.02	2.09
413	636	134	22.20	2.21	451	890	406	22.40	2.55	268	1459	604	21.39	1.81	196	1190	785	20.74	2.28
346	961	138	21.85	2.07	277	194	409	21.45	1.44	483	828	605	22.58	2.15	177	783	786	20.51	2.12
187	1264	142	20.65	1.65	396	1247	410	22.08	2.22	297	1149	607	21.58	2.39	310	910	787	21.64	2.23
296	615	146	21.58	2.03	34	1332	415	18.95	2.12	162	32	609	20.35	2.04	224	89	789	21.06	1.85
350	357	151	21.86	2.20	72	87	415	19.72	2.01	391	902	610	22.06	1.86	253	1101	792	21.30	1.98
487	946	151	22.60	1.63	92	1318	424	19.86	2.09	338	1005	611	21.83	1.74	312	686	793	21.66	1.74
461	1043	156	22.46	1.51	382	1371	424	22.03	1.99	158	615	612	20.33	2.03	319	701	793	21.71	2.29
416	1477	157	22.22	1.43	531	936	428	23.14	1.61	131	275	614	20.22	2.03	395	1289	797	22.08	2.05
66	1465	166	19.56	1.44	189	781	429	20.66	1.91	237	626	618	21.18	1.54	385	716	800	22.04	2.47
378	475	171	22.00	1.67	414	897	432	22.21	2.07	174	931	621	20.49	2.09	394	210	800	22.08	1.83
408	528	171	22.18	1.80	519	1138	434	22.92	1.94	355	1317	624	21.89	1.84	331	849	801	21.79	2.17
81	1003	174	19.78	2.15	184	677	435	20.58	2.05	494	830	628	22.66	1.85	21	802	802	18.79	2.08
285	973	174	21.50	1.61	305	683	438	21.62	1.60	175	1341	636	20.50	1.74	239	444	802	21.18	2.26
209	352	177	20.85	2.09	95	1368	439	19.88	1.72	267	1064	640	21.38	2.01	275	414	803	21.44	1.94
423	1291	178	22.24	1.74	6	798	441	18.00	1.93	190	949	641	20.68	1.79	143	625	806	20.25	2.17
263	82	181	21.36	1.50	420	1264	441	22.22	1.85	290	1184	643	21.53	2.18	118	492	809	20.09	2.18
328	479	183	21.78	1.83	57	843	446	19.49	2.09	466	1257	646	22.47	1.52	291	836	809	21.53	2.17
351	791	192	21.87	2.28	249	550	446	21.27	1.96	119	867	653	20.10	2.07	48	274	811	19.30	1.49
383	883	192	22.03	2.60	269	317	446	21.41	1.69	359	734	657	21.90	2.00	58	748	811	19.50	2.10
88	1144	195	19.81	2.06	45	1182	447	19.26	2.11	498	919	663	22.69	1.63	485	1042	813	22.59	1.82
458	352	195	22.45	2.13	432	1430	451	22.28	2.65	211	513	667	20.90	2.06	437	923	826	22.32	1.74
25	764	197	18.85	1.95	242	578	454	21.23	1.55	314	1205	667	21.66	2.17	110	680	827	20.05	2.06
489	633	202	22.62	1.23	89	1092	455	19.81	2.13	343	1057	669	21.84	2.17	18	344	830	18.74	1.50
533	865	204	23.20	1.90	409	1013	455	22.18	1.76	7	1166	671	18.01	1.89	151	1176	830	20.29	2.09
468	532	205	22.47	2.18	470	1207	455	22.48	1.98	503	1331	672	22.71	2.17	122	1122	833	20.12	2.09
2	570	208	17.71	2.05	482	866	457	22.57	2.87	306	614	673	21.62	2.29	418	971	833	22.22	2.05
213	282	210	20.91	2.36	501	678	459	22.70	1.94	43	441	674	19.23	1.56	513	415	833	22.83	1.08
106	1323	214	20.01	1.57	5	817	463	17.98	1.58	140	246	674	20.25	1.82	90	1330	839	19.82	1.78
223	1144	214	21.06	1.66	398	1082	466	22.09	3.26	201	359	676	20.78	1.39	93	919	839	19.87	2.00

TABLE 13—Continued

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
497	119	222	22.68	3.42	171	853	467	20.48	2.06	380	668	681	22.01	1.67	386	317	840	22.05	1.85
163	1302	231	20.35	2.08	150	506	471	20.29	2.02	274	1303	683	21.44	1.89	179	809	841	20.54	2.07
107	827	233	20.01	2.12	234	1138	473	21.16	2.05	472	1403	691	22.49	1.77	251	520	842	21.28	2.30
410	1238	233	22.19	1.60	358	958	476	21.89	2.20	438	549	693	22.32	2.35	56	630	843	19.49	1.48
17	1027	237	18.72	2.07	257	1442	478	21.33	2.00	157	1217	695	20.32	2.16	374	139	845	21.97	2.09
53	712	246	19.39	1.89	435	445	486	22.31	2.01	233	374	696	21.16	1.49	68	850	855	19.57	1.93
230	250	249	21.11	2.44	318	851	488	21.71	1.99	426	1040	696	22.26	1.70	476	1316	860	22.53	1.43
508	621	249	22.75	3.31	334	1441	490	21.80	2.01	129	834	698	20.20	1.94	246	1023	863	21.26	1.57
273	283	253	21.43	2.29	27	538	492	18.88	1.75	96	969	706	19.88	2.06	247	182	863	21.26	2.02
400	1371	259	22.11	1.85	445	1255	492	22.36	1.86	195	614	707	20.72	2.12	367	705	864	21.94	2.14
241	500	260	21.20	2.11	46	319	498	19.26	2.09	440	1141	708	22.33	2.50	243	1157	865	21.23	2.05
94	1071	268	19.87	2.15	474	871	498	22.51	2.49	356	111	711	21.89	1.81	144	1092	867	20.26	2.06
165	1129	271	20.39	2.09	517	584	502	22.90	1.18	126	784	717	20.17	2.08	288	680	868	21.52	2.41
327	1443	283	21.77	1.85	170	902	504	20.48	2.09	28	335	719	18.89	1.62	365	1411	868	21.93	2.02
279	533	286	21.46	2.50	78	1025	508	19.76	2.10	215	703	719	20.94	1.79	509	1351	869	22.78	1.37
321	171	286	21.72	2.21	197	838	520	20.75	2.10	70	656	721	19.68	2.10	518	742	869	22.91	0.96
521	317	286	22.93	1.89	26	681	521	18.87	2.10	425	1357	722	22.25	3.11	141	555	876	20.25	2.17
82	497	287	19.79	2.03	161	395	521	20.34	2.02	85	1011	723	19.79	2.11	101	1455	880	19.94	1.66
330	194	288	21.78	2.35	510	655	524	22.79	2.10	105	739	723	19.98	2.10	529	369	883	23.04	2.06
428	1110	288	22.27	1.83	202	899	529	20.78	1.90	168	1027	723	20.43	1.99	283	471	884	21.48	2.08
434	744	289	22.30	1.75	373	41	536	21.97	1.53	308	43	723	21.63	1.92	147	1396	888	20.28	2.12
479	1162	289	22.55	2.06	293	698	539	21.57	2.38	167	793	724	20.42	2.22	63	413	889	19.55	2.06
244	716	292	21.23	2.29	431	711	539	22.28	2.26	135	757	725	20.22	2.48	67	1329	890	19.56	2.16
412	261	296	22.20	1.65	235	569	540	21.16	2.06	366	244	727	21.93	2.48	256	174	894	21.32	2.00
262	1461	299	21.34	2.19	219	790	547	20.99	2.11	250	579	731	21.28	1.91	37	997	895	19.04	2.08
377	1044	302	21.99	2.61	475	1225	547	22.52	1.62	255	680	731	21.31	1.97	406	834	895	22.14	3.24
188	317	305	20.65	2.09	12	89	549	18.58	1.70	62	772	734	19.54	1.94	284	847	896	21.49	2.03
335	817	306	21.80	2.06	31	139	551	18.91	2.09	154	1459	734	20.31	1.20	64	1188	898	19.55	2.09
403	1084	319	22.13	1.89	258	513	551	21.33	2.13	221	180	740	21.00	2.11	317	723	901	21.68	2.36
127	1487	326	20.18	2.08	480	1272	551	22.56	1.39	347	671	742	21.85	2.29	114	903	902	20.07	2.07
457	322	326	22.45	1.86	207	1488	555	20.83	2.38	40	517	744	19.14	2.01	505	937	904	22.73	1.87
176	1196	906	20.50	1.99	469	790	1021	22.48	1.87	280	541	1171	21.47	2.33	61	132	1315	19.53	2.06
182	980	908	20.56	1.95	372	758	1023	21.96	2.59	525	1304	1171	23.00	2.51	109	1077	1318	20.04	1.90
138	1389	910	20.24	2.23	495	1311	1026	22.67	2.33	248	249	1172	21.26	2.08	120	645	1323	20.11	2.10
300	615	912	21.59	2.44	375	808	1028	21.98	2.32	473	1126	1172	22.50	1.45	99	109	1326	19.93	2.06
71	1020	916	19.71	1.96	342	566	1029	21.84	1.88	75	429	1174	19.75	2.04	507	265	1330	22.74	1.75
113	916	919	20.07	2.01	112	595	1030	20.07	1.67	397	555	1177	22.08	2.42	456	1004	1337	22.45	1.64
42	1222	920	19.21	2.07	86	1277	1043	19.80	1.94	329	1049	1178	21.78	2.07	404	221	1338	22.13	1.96
349	476	921	21.86	2.17	145	256	1044	20.27	2.08	299	985	1183	21.59	2.19	415	176	1338	22.21	2.15
392	963	922	22.07	2.07	29	1218	1049	18.89	2.15	238	1375	1185	21.18	2.02	59	1408	1345	19.50	2.11
32	794	923	18.92	2.04	260	1348	1072	21.34	2.02	527	1425	1185	23.03	1.99	139	882	1345	20.25	1.62
486	629	929	22.59	2.09	354	403	1074	21.88	2.31	493	714	1186	22.65	1.85	311	550	1346	21.65	2.19
341	746	930	21.83	2.31	200	1059	1075	20.76	2.11	444	319	1188	22.36	1.83	441	932	1357	22.34	1.15
155	1010	933	20.31	2.03	462	118	1076	22.46	1.75	69	190	1200	19.68	1.90	500	166	1360	22.69	1.95
41	970	940	19.17	2.06	217	844	1077	20.97	2.06	407	1356	1201	22.16	1.89	316	698	1361	21.68	2.13
514	723	940	22.83	2.27	186	704	1078	20.62	2.08	133	488	1203	20.22	2.11	390	767	1367	22.06	1.79
528	83	940	23.04	1.74	160	435	1082	20.33	2.16	298	658	1205	21.59	1.98	216	310	1373	20.96	2.07
309	853	941	21.64	2.30	424	470	1082	22.25	2.17	360	1270	1205	21.91	1.28	447	1177	1376	22.37	2.72
199	866	944	20.76	1.95	104	413	1092	19.97	1.99	512	745	1205	22.81	1.76	14	134	1378	18.68	2.12
393	1082	944	22.07	1.86	83	906	1093	19.79	1.94	339	986	1212	21.83	1.81	362	999	1378	21.91	1.90
125	1323	947	20.15	1.89	287	454	1095	21.52	1.70	353	782	1216	21.88	1.95	259	697	1380	21.34	1.85
286	411	947	21.50	2.08	193	303	1097	20.71	1.75	384	112	1221	22.04	1.95	439	821	1390	22.33	2.24
506	73	952	22.73	2.14	477	1185	1098	22.55	1.42	471	646	1222	22.49	2.00	60	1347	1395	19.52	1.81
130	1278	954	20.21	2.09	411	563	1102	22.20	1.76	436	1129	1227	22.32	1.58	173	1383	1398	20.49	2.08
77	809	956	19.76	2.17	292	648	1105	21.55	2.04	303	221	1228	21.61	2.23	137	598	1403	20.24	2.03
65	684	959	19.55	2.12	74	1379	1108	19.75	1.63	336	615	1229	21.81	1.98	183	823	1406	20.56	1.90
369	925	961	21.95	2.56	100	508	1108	19.93	2.09	282	1103	1233	21.48	2.03	313	791	1409	21.66	1.76
307	322	962	21.63	1.45	194	1236	1108	20.72	2.12	344	1462	1239	21.84	2.11	402	1231	1410	22.13	1.12
205	611	966	20.80	1.91	417	788	1112	22.22	1.93	345	1009	1247	21.84	2.36	232	1248	1412	21.14	1.85
225	1023	967	21.06	1.78	116	707	1114	20.09	2.02	524	451	1251	22.98	1.33	236	1297	1414	21.16	2.03
91	1169	968	19.84	2.25	352	1195	1115	21.88	1.36	84	540	1255	19.79	2.18	460	910	1414	22.46	1.42
433	931	968	22.29	1.78	15	812	1118	18.69	2.08	429	161	1256	22.27	1.87	38	1183	1416	19.05	2.02
23	627	969	18.84	2.05	322	1074	1122	21.75	1.91	49	104	1257	19.31	2.06	490	469	1421	22.63	1.55
430	854	969	22.28	2.16	304	398	1124	21.62	1.56	271	1393	1257	21.42	2.08	516	238	1422	22.87	1.79
278	840	971	21.45	1.60	337	580	1124	21.81	1.86	204	435	1262	20.79	1.77	399	1435	1423	22.10	1.55
511	1070	975	22.81	1.23	484	1214	1128	22.59	1.87	532	1368	1268	23.17	2.42	76	1379	1424	19.76	1.96
206	519	977	20.83	2.03	79	335	1132	19.77	2.14	102	1135	1272	19.95	1.95	387	260	1428	22.05	2.24
452	1294	977	22.41	2.14	272	1203	1133	21.43	2.34	198	152	1275	20.76	1.93	124	614			

TABLE 13—*Continued*

Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f	Galaxy	X	Y	f	j-f
Blank Field																			
120	99	12	21.59	1.74	80	563	167	20.98	1.88	157	846	347	22.01	2.02	263	665	470	23.00	2.10
148	66	12	21.92	1.76	43	868	172	19.89	2.25	113	834	350	21.50	1.57	266	1039	478	23.03	2.32
237	146	21	22.74	2.34	255	406	174	22.94	1.80	33	385	353	19.51	2.05	138	353	482	21.82	1.76
169	1218	22	22.10	1.54	210	573	194	22.52	2.84	112	223	360	21.49	2.06	244	540	483	22.84	2.02
125	1073	36	21.65	1.86	12	496	195	18.76	1.95	156	500	363	22.01	1.90	198	670	489	22.39	1.90
4	349	51	18.15	1.96	162	545	199	22.05	1.60	91	38	367	21.13	2.03	181	287	491	22.23	2.16
190	435	51	22.33	2.66	252	266	214	22.91	1.92	10	399	370	18.71	1.76	228	20	500	22.65	2.48
16	912	53	18.92	1.73	172	530	235	22.11	1.77	165	968	370	22.07	1.79	227	412	503	22.65	2.15
260	1460	60	22.97	2.01	154	1001	239	21.98	1.62	133	382	377	21.69	2.53	82	615	506	21.03	1.89
20	1024	65	19.18	2.06	144	551	251	21.88	1.84	123	416	380	21.63	1.78	72	497	509	20.82	1.67
71	48	69	20.71	2.31	6	1382	262	18.33	1.96	173	890	381	22.13	2.47	132	843	515	21.69	2.40
233	250	73	22.68	2.79	111	981	281	21.47	1.62	128	17	385	21.66	1.83	21	1182	522	19.20	2.04
2	1080	75	18.06	1.52	240	134	292	22.81	1.43	178	632	387	22.20	1.94	222	907	524	22.62	1.99
35	307	78	19.55	1.59	8	1470	294	18.64	2.04	78	179	388	20.94	2.04	52	485	527	20.13	2.18
214	183	84	22.55	1.83	203	1375	296	22.47	1.47	246	1218	391	22.86	2.18	127	1249	551	21.66	1.86
226	444	87	22.65	1.83	215	1056	311	22.55	2.62	232	353	393	22.68	2.94	208	1325	555	22.51	1.94
236	1264	88	22.73	2.08	265	710	314	23.03	1.34	119	1427	399	21.58	1.91	247	1420	560	22.87	1.76
84	1232	90	21.05	2.15	131	730	317	21.68	1.66	250	864	414	22.89	2.20	171	792	566	22.11	1.37
217	840	101	22.58	2.10	243	925	322	22.82	1.92	124	1095	415	21.64	2.52	117	268	570	21.56	2.01
242	823	107	22.82	1.62	139	1282	323	21.83	2.09	276	1269	432	23.17	1.97	225	193	581	22.63	1.97
49	662	112	20.11	2.12	77	145	324	20.94	1.48	262	410	436	22.98	1.95	7	1330	582	18.62	1.75
97	329	120	21.21	1.91	170	275	324	22.10	3.24	47	1133	440	20.06	1.62	274	446	613	23.16	4.66
11	932	125	18.71	2.02	251	1325	324	22.91	1.65	38	954	453	19.76	2.10	34	907	618	19.52	1.83
68	1168	127	20.60	2.17	272	956	324	23.08	1.80	199	1046	455	22.40	2.25	258	567	621	22.96	2.18
216	551	133	22.56	1.78	45	321	325	20.02	1.62	56	94	456	20.22	2.18	41	1277	622	19.88	2.09
195	1328	144	22.37	2.25	179	1106	327	22.21	2.37	53	890	457	20.13	2.17	268	1443	626	23.04	2.40
79	684	146	20.95	1.54	209	217	329	22.52	1.54	28	979	466	19.29	2.09	61	948	635	20.31	2.04
221	889	154	22.61	2.49	143	1340	345	21.87	2.14	257	1362	468	22.96	1.48	39	1187	642	19.77	2.19
204	713	646	22.47	2.20	57	52	872	20.24	1.96	85	94	1101	21.06	1.58	223	344	1288	22.63	2.10
116	1350	647	21.55	1.47	19	186	882	19.18	1.55	5	823	1108	18.26	2.03	89	26	1290	21.11	1.87
73	258	650	20.83	1.46	115	1112	885	21.54	1.97	202	1453	1117	22.42	2.35	126	1349	1290	21.65	2.29
207	322	659	22.49	2.35	13	1351	891	18.82	1.35	99	870	1123	21.31	1.86	254	1315	1292	22.92	2.03
234	64	659	22.71	1.80	160	1261	909	22.04	1.79	104	263	1128	21.40	2.13	261	477	1292	22.98	0.78
152	1253	674	21.95	2.06	211	1327	912	22.52	3.17	9	1398	1130	18.69	1.54	65	73	1304	20.42	1.89
149	327	677	21.93	1.67	93	140	913	21.14	1.89	245	50	1143	22.86	1.99	121	474	1310	21.60	1.34
136	675	685	21.77	1.81	185	784	914	22.27	2.15	187	1452	1144	22.31	2.20	60	91	1325	20.31	1.75
231	1023	687	22.68	2.06	118	1405	915	21.58	1.75	264	848	1148	23.01	1.91	137	1113	1332	21.79	1.88
135	1129	697	21.73	1.55	166	955	921	22.07	1.77	259	1165	1149	22.96	2.17	103	23	1343	21.40	1.76
130	446	698	21.67	1.94	134	522	939	21.72	1.57	220	897	1151	22.60	1.89	86	750	1344	21.07	2.07
186	1314	701	22.28	3.33	206	754	941	22.49	2.18	1	674	1152	18.02	1.71	110	147	1347	21.45	2.29
59	489	709	20.29	2.04	271	817	952	23.07	2.71	241	123	1158	22.81	2.12	23	1425	1351	19.26	1.68
37	731	712	19.70	2.11	64	366	955	20.37	2.15	67	1109	1165	20.57	2.20	174	1301	1355	22.15	1.53
51	922	712	20.13	2.11	105	1412	955	21.41	2.09	192	928	1167	22.35	1.44	176	415	1359	22.17	2.24
230	194	714	22.68	1.57	224	413	965	22.63	1.80	31	704	1172	19.41	1.96	219	51	1362	22.60	1.43
256	882	727	22.94	2.02	108	115	971	21.44	2.15	76	315	1173	20.91	2.00	50	721	1363	20.12	1.73
163	481	731	22.06	1.42	248	283	997	22.87	2.00	88	641	1176	21.09	1.63	42	50	1376	19.89	1.72
239	450	732	22.78	1.81	196	1367	1000	22.38	2.19	253	64	1179	22.92	2.16	40	1310	1379	19.79	1.65
213	1349	737	22.55	1.33	114	1118	1003	21.51	2.16	153	1191	1184	21.97	1.52	273	639	1386	23.10	1.59
87	764	740	21.08	2.16	66	745	1011	20.42	2.14	24	1124	1186	19.27	1.64	25	1427	1394	19.27	1.63
90	956	742	21.13	1.91	69	753	1013	20.62	2.42	55	1329	1186	20.19	2.08	141	1120	1404	21.84	2.91
48	1297	746	20.09	1.71	147	1069	1014	21.91	2.36	96	1449	1190	21.19	2.06	218	267	1409	22.58	2.21
129	590	754	21.67	1.74	75	762	1015	20.89	1.80	81	598	1201	20.99	2.03	95	1314	1410	21.15	1.82
101	268	766	21.34	2.06	74	62	1019	20.85	1.65	106	846	1201	21.42	1.86	44	1032	1411	19.92	2.03
158	388	770	22.03	2.06	212	547	1023	22.53	1.65	18	1213	1206	19.01	2.10	100	1424	1411	21.31	2.27
183	329	771	22.24	2.63	15	1060	1027	18.91	1.52	167	1414	1206	22.09	1.93	92	1384	1413	21.14	1.79
146	712	778	21.89	2.40	36	975	1027	19.69	2.09	151	1264	1227	21.95	1.81	205	36	1416	22.49	1.52
70	1119	781	20.65	1.98	142	1084	1031	21.85	1.55	229	1247	1233	22.66	2.40	267	358	1419	23.04	1.65
168	465	781	22.09	2.25	14	87	1042	18.87	1.34	107	236	1249	21.43	1.98	29	1393	1426	19.36	2.03
197	865	789	22.38	2.44	145	32	1044	21.88	2.30	177	1078	1249	22.18	1.88	201	122	1428	22.41	2.03
191	967	797	22.34	2.03	46	123	1046	20.05	2.10	200	26	1255	22.41	1.57	109	1142	1433	21.45	2.21
180	1436	828	22.23	1.41	54	939	1051	20.14	2.22	58	755	1262	20.27	1.62	62	179	1436	20.35	1.87
235	969	837	22.73	1.58	175	283	1055	22.16	2.00	32	556	1264	19.45	1.83	194	256	1443	22.35	2.47
26	35	841	19.27	2.07	269	814	1056	23.07	2.05	22	456	1266	19.22	2.08	238	157	1446	22.75	1.50
164	477	848	22.06	1.52	102	702	1062	21.35	1.82	3	879	1273	18.07	1.63	182	867	1457	22.23	2.16
63	96	851	20.36	1.92	122	151	1064	21.61	1.81	189	421	1274	22.33	1.26	155	1066	1462	21.99	1.37
249	842	859	22.88	1.96	150	620	1065	21.94	1.93	27	1212	1277	19.28	2.02	184	1300	1462	22.26	1.69
275	1267	861	23.16	3.25	193	1306	1077	22.35	1.94	98	468	1283	21.26	2.21	30	18	1467	19.39	1.74
188	393	863	22.32	2.30	17	607	1092	18.92											

TABLE 14
ABELL 2645 PHOTOMETRY

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
Cluster Center																			
295	695	11	21.30	1.90	345	900	370	21.67	0.55	270	1456	582	21.19	2.97	112	721	814	19.96	1.97
115	250	13	19.98	1.89	329	23	376	21.57	2.52	109	581	585	19.94	2.11	399	1048	815	22.06	1.12
155	1281	34	20.26	2.26	33	243	377	19.05	1.84	417	804	585	22.24	1.53	46	670	828	19.26	2.28
32	966	38	19.02	2.18	156	1268	388	20.27	2.12	364	497	586	21.81	1.16	105	802	828	19.89	2.51
130	954	40	20.09	2.09	407	1026	388	22.13	1.25	440	710	587	22.54	0.76	213	632	828	20.77	2.38
323	1129	45	21.55	1.20	107	855	390	19.94	1.94	61	699	593	19.44	2.24	412	1175	829	22.17	2.16
136	1038	47	20.15	1.89	298	762	390	21.33	2.14	224	263	596	20.84	1.99	175	1352	830	20.44	1.64
5	61	58	17.97	2.27	55	796	391	19.39	2.12	376	788	598	21.87	1.65	387	991	830	21.96	1.27
356	318	58	21.74	0.91	286	882	392	21.26	1.70	267	589	603	21.17	1.31	324	710	831	21.55	3.53
340	994	62	21.65	2.33	138	829	393	20.16	2.41	308	58	607	21.37	1.13	135	766	832	20.14	1.99
352	982	66	21.71	2.39	123	1229	395	20.03	1.95	203	708	612	20.71	1.37	240	1015	833	20.98	1.84
281	780	75	21.23	0.42	174	1132	401	20.43	0.86	234	689	613	20.93	2.17	7	739	834	18.07	2.18
338	308	76	21.65	1.30	51	585	402	19.31	2.08	348	106	613	21.69	1.18	116	695	835	19.99	1.97
379	1221	82	21.90	2.38	37	1065	404	19.09	2.24	85	851	614	19.70	1.87	214	861	835	20.77	2.31
292	597	88	21.29	2.31	230	972	408	20.89	2.32	310	1293	617	21.40	1.87	56	424	836	19.39	2.13
207	547	96	20.73	0.74	311	84	416	21.40	2.78	38	989	619	19.15	2.19	110	1241	847	19.95	1.53
211	1377	101	20.75	2.19	239	562	417	20.98	1.99	108	1099	620	19.94	2.06	16	532	849	18.59	2.25
26	1363	106	18.93	2.16	124	676	418	20.04	1.85	420	1081	630	22.27	1.02	410	779	850	22.14	1.20
304	306	108	21.36	1.27	282	1152	421	21.24	1.22	187	592	634	20.55	2.21	195	1030	856	20.61	1.88
325	1008	108	21.56	1.80	288	1388	421	21.27	3.55	428	429	637	22.43	0.96	337	412	858	21.63	1.47
416	963	116	22.23	1.21	165	1119	425	20.37	2.52	225	386	649	20.85	1.06	238	1283	859	20.97	1.74
330	1456	125	21.58	1.81	50	112	432	19.30	2.06	402	1364	656	22.11	1.00	266	821	862	21.15	2.20
183	578	128	20.52	2.51	209	454	434	20.74	1.30	4	798	663	17.60	2.31	278	890	863	21.22	1.82
305	880	135	21.36	1.27	137	435	437	20.16	1.29	274	692	666	21.21	1.20	22	1052	867	18.79	1.21
268	804	137	21.17	1.37	248	843	447	21.06	2.13	49	29	669	19.30	2.01	71	567	867	19.59	2.11
79	849	138	19.63	2.62	44	515	452	19.23	2.29	227	1048	670	20.87	1.73	342	932	884	21.66	1.37
395	1226	158	22.02	1.77	289	758	453	21.28	1.64	250	956	672	21.07	2.17	357	331	887	21.75	0.86
64	743	160	19.51	1.26	75	865	460	19.62	1.61	24	1002	674	18.80	2.20	74	444	888	19.61	2.03
231	1380	160	20.90	1.57	143	1252	460	20.29	1.30	28	618	681	18.95	2.13	81	810	888	19.67	1.36
429	495	162	22.44	0.76	408	1288	466	22.14	1.13	205	557	689	20.71	2.03	14	1454	889	18.59	1.08
434	479	166	22.48	1.48	257	1348	469	21.10	1.63	322	1274	693	21.51	1.25	423	563	893	22.31	2.52
360	864	171	21.78	1.12	237	280	471	20.95	2.44	447	48	695	22.75	1.71	1	471	894	17.36	1.04
191	1247	174	20.58	1.47	299	1156	471	21.33	1.84	40	425	696	19.18	2.17	198	625	894	20.67	1.87
318	1287	178	21.47	2.11	389	720	473	21.97	1.66	374	117	697	21.86	1.95	35	584	900	19.06	2.27
90	1117	179	19.73	2.13	370	1094	475	21.82	1.85	296	457	698	21.31	2.14	384	264	908	21.93	1.26
446	1352	180	22.75	0.45	154	544	476	20.26	2.12	164	905	699	20.36	1.98	307	971	909	21.36	1.96
347	249	183	21.68	1.99	235	519	481	20.95	1.62	232	570	700	20.90	2.01	354	980	911	21.72	1.64
293	75	184	21.30	1.45	184	529	483	20.54	1.51	121	438	701	20.01	1.49	300	322	914	21.34	1.79
139	749	186	20.19	2.04	125	870	484	20.04	2.09	133	274	702	20.13	2.07	142	255	918	20.19	3.12
11	862	194	18.56	1.36	306	879	484	21.36	1.79	48	711	704	19.28	2.15	243	619	918	21.03	1.24
332	1476	194	21.60	2.98	252	1439	490	21.08	1.50	67	98	709	19.53	2.04	436	39	920	22.51	2.33
391	127	194	21.98	1.00	255	842	495	21.09	2.41	259	994	709	21.11	2.10	145	1102	923	20.20	2.12
15	256	195	18.59	2.26	317	1220	505	21.45	1.94	380	893	709	21.92	1.11	344	600	924	21.66	2.12
409	152	197	22.14	1.23	53	1075	508	19.33	1.61	283	826	714	21.24	1.17	177	1029	931	20.46	2.24
118	830	209	19.99	2.21	373	1141	514	21.85	1.53	321	527	718	21.48	3.14	351	1169	933	21.71	1.22
430	904	210	22.44	1.08	312	884	516	21.41	1.84	190	778	722	20.57	2.18	19	945	934	18.71	1.78
77	1126	216	19.63	2.08	160	1024	517	20.31	2.07	415	1068	722	22.20	1.72	141	1430	940	20.19	2.38
196	1289	226	20.66	1.86	163	1067	518	20.36	1.61	217	840	723	20.78	2.15	427	165	941	22.43	0.04
366	197	231	21.81	1.93	200	1157	522	20.69	1.64	210	888	733	20.74	2.42	87	319	945	19.72	2.07
349	195	239	21.69	1.79	201	1226	523	20.69	2.73	426	1165	733	22.42	0.98	166	1100	948	20.38	1.11
89	1045	241	19.73	2.07	261	829	523	21.12	2.11	120	995	734	20.01	1.72	98	1005	949	19.78	2.09
368	1387	249	21.82	0.43	263	980	524	21.14	2.06	397	1275	744	22.03	1.93	161	837	950	20.32	2.05
42	1049	253	19.19	1.50	377	1481	524	21.88	3.41	30	503	747	19.01	2.21	220	1022	950	20.82	1.98
178	1338	254	20.47	2.40	245	1102	525	21.04	1.18	73	951	748	19.60	2.17	442	905	952	22.66	0.99
31	1290	265	19.02	1.78	128	872	526	20.06	2.03	25	750	751	18.82	2.08	131	379	953	20.10	2.60
424	1106	269	22.34	1.31	96	402	528	19.77	2.11	92	1167	752	19.74	2.07	86	1336	962	19.71	2.18
94	967	270	19.74	2.15	39	910	530	19.18	2.06	82	673	753	19.67	1.52	242	799	968	21.02	2.37
95	673	270	19.76	0.90	303	698	534	21.36	0.99	334	1399	753	21.61	1.86	363	761	972	21.80	1.29
62	747	273	19.48	2.21	326	552	534	21.56	2.02	140	1073	754	20.19	2.17	314	1057	973	21.42	2.12
405	395	275	22.13	0.72	41	792	537	19.18	2.22	362	831	758	21.80	0.99	212	53	983	20.76	2.67
392	1082	278	22.01	1.32	361	1032	537	21.79	2.76	382	872	760	21.92	2.06	18	697	984	18.70	2.27
34	1195	292	19.06	1.85	335	708	546	21.61	2.36	431	1199	762	22.46	0.79	157	302	985	20.28	1.68
88	1142	293	19.72	2.64	233	618	550	20.91	2.32	176	262	764	20.45	1.97	320	105	985	21.48	1.51
180	1121	294	20.50	1.01	153	796	551	20.26	2.01	23	1142	765	18.80	1.99	341	920	988	21.65	2.56
290	905	304	21.28	1.91	256	428	554	21.10	1.80	113	730	768	19.96	2.30	433	801	990	22.47	0.71
406	947	308	22.13	2.04	309	766	554	21.38	1.80	365	1251	768	21.81	2.03	301	400	991	21.35	1.61
158	1258	313	20.28	1.80	319	410	554	21.47	2.58	339	1327	771	21.65	1.00	59	1361	996	19.42	0.86
297	685	315	21.33	1.79	126	954	559	20.05	1.24	327	703								

TABLE 14—*Continued*

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
437	236	1040	22.53	1.36	127	571	1153	20.05	1.67	414	749	1257	22.20	0.69	394	1015	1349	22.02	1.69
236	687	1042	20.95	2.02	206	1277	1154	20.72	1.69	167	1275	1262	20.38	1.45	287	1182	1353	21.27	1.63
393	771	1046	22.02	0.87	223	715	1159	20.84	1.28	12	1028	1263	18.56	1.98	383	96	1358	21.93	1.09
258	613	1048	21.11	1.36	438	696	1163	22.53	1.40	66	974	1268	19.52	2.63	122	632	1369	20.02	2.31
367	238	1048	21.82	0.98	43	636	1166	19.22	2.03	215	898	1270	20.78	1.03	294	1039	1376	21.30	1.79
9	439	1049	18.39	1.90	117	1119	1171	19.99	2.07	280	735	1271	21.22	2.17	425	198	1380	22.37	0.97
398	1340	1049	22.04	1.04	265	1261	1171	21.15	1.51	119	1315	1273	20.00	1.77	2	1273	1383	17.56	1.75
249	887	1051	21.07	1.63	181	1271	1172	20.51	1.49	272	1330	1273	21.20	1.66	27	1108	1392	18.94	2.11
146	559	1055	20.21	1.25	229	661	1178	20.88	2.25	147	1242	1281	20.21	1.61	172	222	1400	20.41	2.36
350	953	1057	21.69	2.57	199	1030	1180	20.68	2.72	129	1479	1284	20.09	1.62	80	90	1403	19.64	1.43
285	199	1060	21.26	1.27	47	650	1183	19.27	2.20	93	1034	1290	19.74	2.13	111	886	1405	19.95	2.30
277	910	1066	21.21	2.03	102	759	1189	19.88	2.03	401	1166	1290	22.07	1.68	13	751	1411	18.57	2.26
264	1125	1067	21.14	2.19	3	345	1200	17.56	2.20	204	691	1295	20.71	1.98	103	491	1412	19.88	1.94
17	749	1076	18.64	2.24	21	1435	1202	18.76	2.19	435	447	1295	22.49	1.24	315	1270	1417	21.43	1.04
20	1006	1077	18.75	2.11	226	496	1202	20.87	1.50	358	131	1296	21.75	1.02	186	658	1422	20.55	2.07
219	838	1089	20.82	1.86	244	84	1209	21.03	1.95	316	1308	1297	21.44	1.29	192	1461	1425	20.59	1.24
63	719	1092	19.50	1.96	246	51	1210	21.06	1.41	106	475	1307	19.92	1.96	271	1304	1432	21.19	2.69
276	1480	1092	21.21	1.76	65	1331	1223	19.52	2.23	313	766	1307	21.42	1.28	162	968	1434	20.33	1.44
378	420	1101	21.90	2.01	173	1409	1225	20.42	2.20	197	92	1312	20.66	2.33	441	806	1435	22.61	1.50
445	657	1101	22.73	1.75	202	721	1226	20.70	2.08	188	1016	1313	20.56	2.04	58	676	1436	19.40	1.89
216	985	1103	20.78	1.22	260	1429	1226	21.12	1.49	275	1068	1314	21.21	1.80	418	182	1455	22.25	1.09
45	745	1104	19.24	1.95	132	132	1230	20.11	2.01	97	1078	1315	19.78	2.08	91	1064	1459	19.74	0.92
168	829	1111	20.40	1.72	302	998	1230	21.35	2.57	182	1231	1315	20.52	1.28	269	1325	1467	21.19	1.13
333	1138	1113	21.61	1.48	411	1321	1234	22.14	1.95	343	1300	1317	21.66	2.12	29	406	1470	18.97	2.27
70	633	1122	19.57	2.38	388	168	1239	21.97	1.03	169	1420	1321	20.41	1.14	68	1106	1470	19.56	1.53
432	738	1134	22.46	0.71	396	559	1242	22.03	1.26	444	1075	1333	22.70	0.34	36	893	1472	19.09	2.11
400	545	1136	22.06	1.47	253	1148	1244	21.08	1.75	336	907	1334	21.62	1.89	331	865	1472	21.59	1.27
247	827	1137	21.06	1.89	194	1439	1251	20.60	1.20	72	987	1337	19.60	1.98	422	617	1477	22.28	0.78
69	1300	1143	19.57	2.03	151	1104	1252	20.24	1.18	101	552	1339	19.86	2.10	78	15	1478	19.63	2.42
134	185	1149	20.14	1.22	185	730	1252	20.54	1.95	359	1020	1343	21.77	2.34	170	800	1487	20.41	1.89
193	744	1152	20.59	1.97	8	1057	1253	18.30	1.48	54	1068	1346	19.37	2.35					
Blank Field																			
205	1119	16	21.99	1.31	227	949	339	22.18	1.48	179	366	610	21.77	1.71	246	821	923	22.41	0.86
63	1452	35	20.37	1.09	120	582	340	21.05	2.17	77	1179	620	20.56	2.06	26	108	937	19.37	2.54
8	575	39	18.19	1.81	15	171	343	18.85	1.41	244	1056	626	22.34	1.53	43	199	951	19.87	2.23
241	936	41	22.30	1.43	153	285	351	21.46	1.67	184	1149	634	21.81	0.83	243	731	960	22.31	0.96
75	236	47	20.55	1.41	110	347	359	20.97	1.08	78	477	639	20.59	1.73	64	1314	966	20.37	2.25
91	367	47	20.76	1.03	183	1099	360	21.79	2.34	230	546	643	22.19	1.76	214	1277	972	22.09	1.61
178	1253	52	21.76	2.03	150	592	366	21.45	1.45	216	833	653	22.09	1.97	85	746	989	20.72	1.33
59	1435	57	20.24	1.95	238	493	369	22.28	1.46	164	1435	658	21.54	1.67	221	340	989	22.14	0.86
58	642	84	20.23	1.63	229	1131	383	22.19	1.57	56	1174	659	20.22	1.97	248	29	991	22.42	1.11
176	571	84	21.76	1.43	18	238	388	18.94	1.52	224	471	659	22.15	1.67	127	771	992	21.15	1.67
156	1341	88	21.48	2.01	73	161	392	20.53	1.88	109	346	663	20.95	1.70	137	573	1005	21.27	2.35
118	1433	93	21.01	2.47	174	119	396	21.74	1.63	36	1067	666	19.65	1.68	237	1197	1006	22.27	1.50
203	1045	97	21.99	0.38	257	1316	396	22.69	0.72	51	159	682	20.01	1.50	202	1183	1012	21.98	3.08
4	1000	105	17.51	1.26	7	381	414	18.03	1.79	27	842	683	19.41	2.22	133	482	1014	21.22	2.60
21	1389	110	19.05	0.85	84	1064	417	20.71	0.96	29	858	685	19.54	1.82	9	695	1018	18.27	2.26
99	551	113	20.83	0.86	45	792	420	19.91	1.66	102	791	691	20.88	1.42	13	1365	1028	18.75	2.18
76	426	117	20.56	1.91	1	1304	425	16.70	1.71	23	328	693	19.26	2.25	123	257	1028	21.13	1.81
66	779	123	20.41	1.69	122	646	427	21.09	2.87	212	1204	700	22.08	1.80	188	957	1040	21.84	1.59
235	1446	123	22.25	1.78	247	1426	428	22.41	2.66	69	1477	708	20.47	1.18	161	575	1042	21.51	2.03
251	1203	126	22.56	1.56	22	1240	432	19.15	1.79	201	1180	717	21.97	1.31	106	1405	1045	20.91	1.98
16	1263	131	18.86	1.29	228	943	433	22.18	1.43	38	321	734	19.73	0.89	88	1422	1046	20.75	1.45
198	178	131	21.94	1.22	200	414	440	21.95	1.37	185	22	742	21.83	1.42	138	658	1046	21.30	1.48
219	396	131	22.13	1.48	126	187	443	21.14	2.32	172	1015	746	21.69	2.45	197	261	1048	21.93	1.66
187	1151	144	21.84	1.82	141	1411	449	21.34	1.27	226	93	758	22.17	1.45	132	1114	1055	21.22	1.39
134	1286	168	21.23	0.95	135	733	450	21.26	1.56	46	1390	760	19.96	1.29	195	221	1057	21.92	2.33
103	920	182	20.88	2.14	151	1162	450	21.45	2.47	143	1310	765	21.34	3.80	98	540	1066	20.80	2.54
67	1466	184	20.43	1.30	40	124	453	19.80	1.73	5	28	776	17.85	2.25	142	1036	1079	21.34	1.84
92	1132	185	20.76	1.85	113	408	456	20.98	1.60	159	906	776	21.50	1.82	108	305	1082	20.93	2.23
213	133	194	22.09	0.64	116	419	459	20.99	2.30	255	418	779	22.67	0.35	129	1048	1089	21.20	1.96
242	768	196	22.31	0.66	17	1098	460	18.89	1.56	3	250	803	17.50	1.86	52	279	1090	20.07	2.46
90	290	199	20.75	1.80	107	408	468	20.93	1.04	199	865	805	21.94	1.57	139	629	1094	21.32	0.94
89	482	200	20.75	1.47	191	1216	470	21.90	0.84	86	495	831	20.72	2.13	100	1304	1105	20.85	1.99
208	1238	200	22.04	2.18	60	470	472	20.27	2.14	50	1233	846	20.00	2.26	231	131	1105	22.20	1.12
220	1055	202	22.13	1.63	215	806	489	22.09	1.38	112	508	848	20.98	1.59	61	1369	1114	20.33	1.28
82	401	205	20.66	2.35	249	904	494	22.53	0.64	32	1071	851	19.56	2.10	217	774	1114	22.10	1.29
254	687	205	22.66	1.46	20	426	503	19.03	1.45	182	741	857	21.79	2.10	234	1322	1116	22.24	2.73

TABLE 14—*Continued*

Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F	Galaxy	X	Y	F	J-F
209	528	1200	22.05	1.44	145	50	1280	21.37	1.14	177	192	1337	21.76	1.14	34	812	1428	19.59	2.29
74	25	1203	20.54	1.81	33	607	1287	19.58	2.19	131	691	1345	21.21	2.88	11	1282	1438	18.56	0.94
239	1103	1205	22.29	1.08	148	661	1302	21.42	1.27	37	741	1349	19.68	1.12	57	540	1440	20.23	1.18
70	791	1207	20.51	1.22	232	749	1313	22.23	0.86	193	463	1352	21.92	1.12	222	434	1442	22.15	0.62
210	772	1208	22.06	0.97	47	67	1314	19.98	1.86	80	830	1357	20.65	2.97	121	519	1445	21.06	1.60
28	270	1212	19.49	1.15	236	1404	1317	22.26	1.84	6	768	1361	17.86	2.17	30	33	1450	19.55	1.81
160	1137	1218	21.51	1.00	240	101	1318	22.30	1.16	79	507	1364	20.63	1.44	72	612	1459	20.52	1.19
41	633	1219	19.81	1.58	192	833	1319	21.91	1.04	83	1293	1397	20.68	2.60	12	260	1461	18.71	1.93
211	676	1226	22.08	1.16	147	458	1320	21.41	2.66	169	1331	1400	21.65	2.44	24	83	1470	19.30	1.74
136	817	1228	21.26	1.87	194	262	1320	21.92	1.23	204	1100	1400	21.99	1.47	171	534	1472	21.68	1.55
155	1482	1232	21.47	3.30	250	565	1321	22.55	1.75	256	787	1406	22.69	1.31	71	282	1476	20.52	0.86
207	500	1241	22.03	1.53	44	428	1324	19.88	2.10	146	541	1417	21.37	1.58	168	814	1477	21.63	1.37
124	224	1252	21.13	2.82	206	360	1334	22.00	0.94	115	740	1421	20.99	1.59	68	865	1489	20.46	1.73
186	163	1264	21.84	1.58	245	744	1336	22.38	0.74	154	545	1426	21.47	1.36	94	400	1490	20.77	2.61
128	1340	1272	21.20	1.47															

TABLE 15
CL 0949+4409 PHOTOMETRY

Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R
57	103	10	22.50	0.45	11	201	70	20.34	1.33	66	89	104	22.78	1.88	64	129	152	22.71	0.00
69	52	16	22.87	0.11	3	145	72	19.63	1.39	27	135	106	21.30	1.43	78	210	154	23.36	-0.11
15	93	19	20.76	1.11	61	66	73	22.64	1.61	13	169	107	20.37	1.30	65	134	157	22.75	0.31
36	114	22	21.79	0.57	43	104	74	22.06	1.37	34	225	107	21.69	1.29	2	159	158	19.52	1.45
9	155	26	20.26	1.15	59	164	78	22.57	0.81	23	59	110	21.19	-0.10	73	220	161	22.98	0.00
74	64	32	23.03	1.01	19	96	80	21.04	1.10	42	47	114	22.04	2.23	35	183	176	21.75	1.31
25	67	34	21.24	1.21	28	166	81	21.39	1.27	71	20	114	22.89	0.01	21	155	177	21.17	1.43
22	122	36	21.17	1.17	48	126	81	22.29	1.21	62	184	116	22.70	1.17	49	46	192	22.30	1.53
30	162	38	21.49	1.34	60	106	82	22.60	2.45	44	40	117	22.12	0.61	53	235	196	22.43	2.73
51	62	38	22.33	0.00	14	122	83	20.54	1.37	6	162	118	19.82	1.40	56	160	196	22.49	2.28
41	28	40	21.91	0.97	1	106	88	19.02	1.44	63	144	122	22.70	0.90	75	17	196	23.19	0.05
45	123	41	22.15	1.16	31	171	89	21.64	1.44	39	231	124	21.87	0.57	52	153	201	22.35	0.75
5	215	42	19.77	1.49	46	163	94	22.16	1.52	38	215	125	21.87	1.96	4	94	202	19.72	1.29
54	246	45	22.46	0.00	10	83	96	20.30	1.20	68	154	126	22.81	1.00	18	140	210	20.99	1.02
12	160	48	20.36	1.28	16	22	96	20.91	2.12	7	144	138	20.00	1.33	33	243	222	21.65	0.98
17	186	48	20.95	0.25	50	196	96	22.30	0.30	8	108	139	20.03	1.43	37	234	232	21.81	0.96
40	196	51	21.89	1.86	70	171	96	22.87	1.44	72	163	140	22.94	0.45	79	223	236	23.49	1.01
77	228	58	23.35	0.00	58	61	99	22.53	0.46	55	151	145	22.46	2.02	67	206	246	22.79	0.00
47	190	59	22.20	1.84	32	96	100	21.64	1.18	29	59	147	21.47	1.50	76	101	284	23.23	0.79
20	18	60	21.13	0.59	24	117	104	21.22	1.34	26	164	152	21.28	1.06					

TABLE 16
CL 1446+2619 PHOTOMETRY

Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R	Galaxy	X	Y	R	V-R
49	198	12	20.95	1.39	97	120	70	22.23	0.79	105	87	118	22.59	0.29	66	179	160	21.35	0.00
82	105	15	21.85	1.72	38	173	71	20.67	1.34	80	132	122	21.77	0.00	69	234	160	21.41	0.60
93	144	17	22.15	1.07	61	93	73	21.26	1.43	35	176	123	20.66	1.49	57	195	162	21.20	1.57
15	42	18	20.08	1.06	81	205	74	21.80	0.63	5	120	124	19.28	1.23	29	203	163	20.40	1.53
70	138	24	21.42	0.80	96	60	74	22.22	1.50	24	148	125	20.29	1.58	107	219	166	22.70	0.00
37	197	28	20.66	0.90	7	83	75	19.46	0.64	31	18	126	20.54	2.01	14	128	168	20.06	1.53
75	14	30	21.64	0.92	34	184	75	20.65	0.81	89	87	126	21.99	0.51	19	165	168	20.16	1.08
63	147	35	21.31	0.70	18	19	81	20.14	0.79	52	206	127	21.04	1.04	74	198	177	21.59	1.48
94	168	37	22.16	1.33	1	100	86	18.46	1.05	45	200	128	20.85	0.73	102	213	178	22.38	1.16
55	66	39	21.09	0.88	25	88	87	20.30	1.36	58	113	128	21.20	1.65	26	163	180	20.35	1.40
44	52	40	20.83	1.13	85	52	87	21.93	0.58	100	156	129	22.27	0.90	32	241	181	20.59	0.72
39	120	41	20.71	1.57	10	114	88	19.97	0.84	47	178	130	20.91	1.73	59	236	182	21.21	1.00
65	153	44	21.33	1.25	20	154	88	20.17	1.28	104	243	130	22.58	1.02	13	236	188	20.02	1.41
71	184	46	21.42	1.54	73	89	91	21.52	0.80	60	232	132	21.25	1.53	77	115	192	21.67	1.51
11	215	47	20.00	1.46	22	114	93	20.20	1.60	79	237	139	21.76	1.41	40	101	198	20.73	1.12
21	84	47	20.20	0.61	48	140	95	20.95	1.63	72	222	140	21.50	1.56	54	234	200	21.07	1.19
33	205	51	20.64	0.61	16	113	104	20.13	1.40	87	89	140	21.94	1.32	108	232	205	22.74	0.96
36	225	55	20.66	1.21	90	66	104	22.05	0.80	17	120	142	20.14	1.58	106	73	210	22.67	0.95
91	155	56	22.11	0.26	3	166	105	18.95	1.40	88	163	142	21.96	0.00	43	153	213	20.82	0.84
109	140	57	22.96	-0.05	23	123	106	20.26	1.60	50	175	143	20.98	1.78	86	180	213	21.94	1.02
51	203	59	20.98	1.13	30	140	107	20.45	1.55	4	146	144	19.04	1.43	103	237	214	22.47	1.10
76	34	59	21.65	0.54	101	25	107	22.37	0.00	68	219	146	21.40	0.78	92	76	218	22.12	1.43
6	78	61	19.33	1.26	46	106	108	20.90	1.41	95	215	149	22.21	1.31	9	211	224	19.80	0.68
78	171	61	21.71	0.95	64	75	112	21.32	1.18	62	50	153	21.27	0.52	67	156	232	21.39	1.56
42	133	62	20.73	0.78	99	146	112	22.24	1.24	53	58	157	21.05	0.82	27	201	237	20.37	0.99
56	59	64	21.11	1.58	28	13	115	20.37	0.77	12	203	158	20.01	1.41	83	154	241	21.86	0.64
41	112	69	20.73	1.87	2	165	116	18.73	1.47	98	73	159	22.24	0.67	8	187	246	19.67	1.02
84	197	69	21.92	0.61															

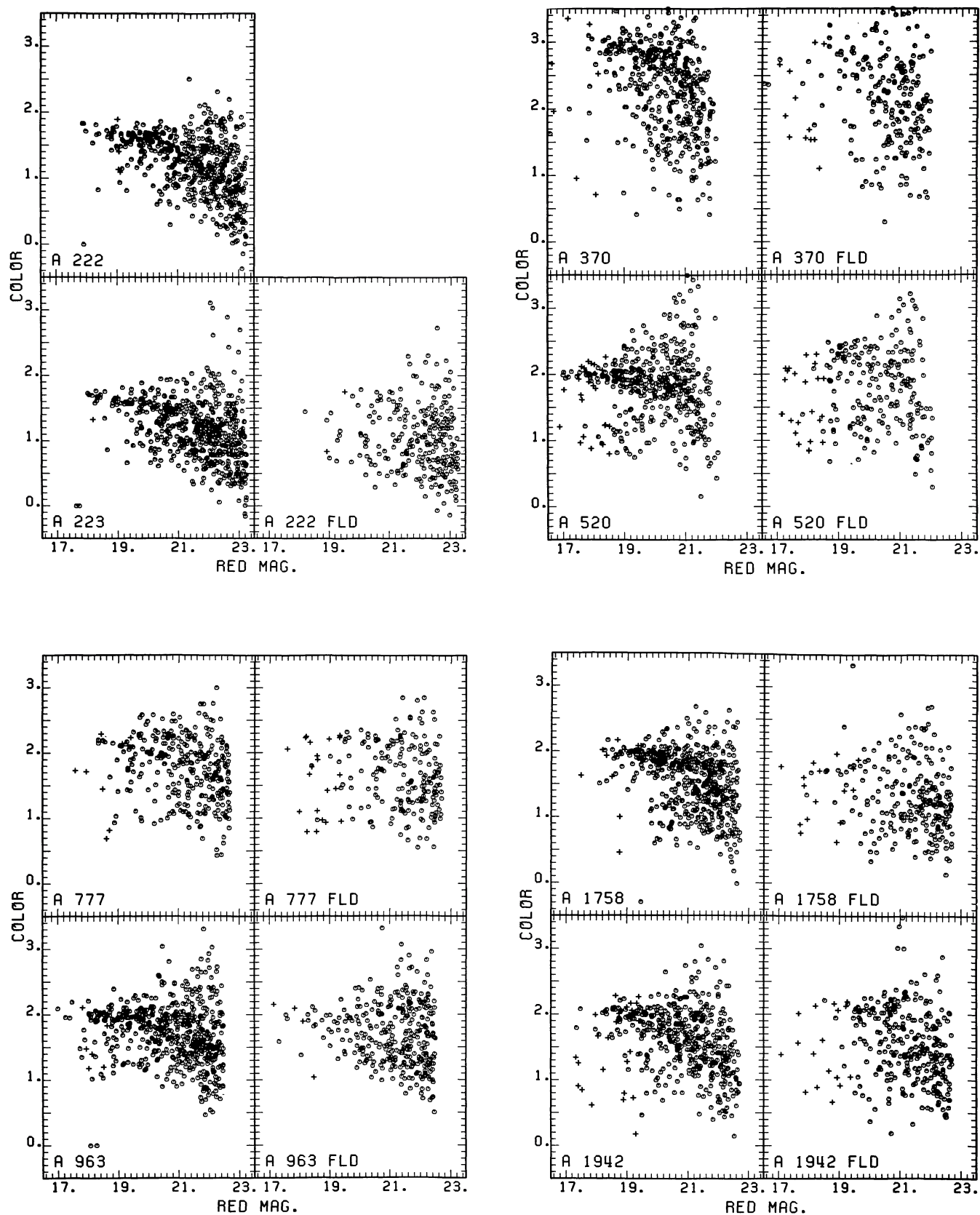
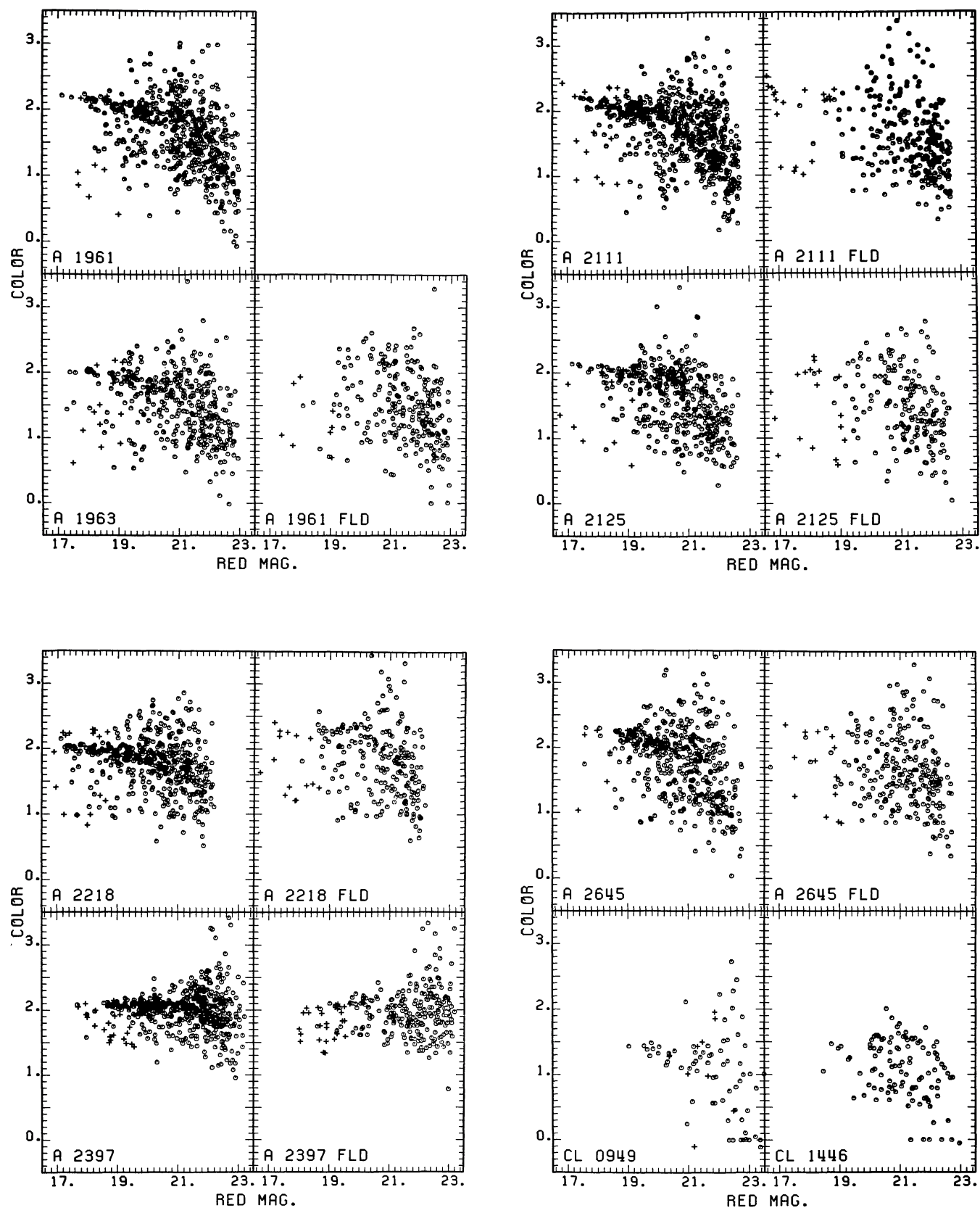


FIG. 1.—Color-magnitude distributions of the cluster and blank fields. Suspected stars are plotted as crosses.

FIG. 1.— *Continued*

combination of photon statistics and pixel-to-pixel sensitivity variations in the detector, the errors in the measured intensities of faint objects should approximate the fluctuations in the intensity of blank sky measured over areas equal to that of the objects.

In BOI we compared our photometry of stars in globular clusters with published photometry and found this approximation to be valid when the predicted magnitude error was greater than 0.05. However, although the predicted magnitude errors become arbitrarily small for very bright objects, the true errors never fall below 0.05, presumably due to other sources of error such as large-scale sensitivity variations. The videocamera data presented in this paper is of similar quality to that analyzed in BOI, and we think it reasonable to use the same technique to analyze the errors. The expected color errors may be reasonably represented by an equation of the form

$$\sigma(\text{color}) = \left[(0.05)^2 + \{0.2 \text{dex}[0.4(m - m_0)]\}^2 \right]^{1/2}. \quad (6)$$

The choice of 0.2 as a constant for the second term is, of course, arbitrary and merely determines the normalization of m_0 .

The errors in galaxy magnitudes cannot be so neatly described. The errors in the aperture magnitudes of objects measured with the videocamera are comparable to those of the colors (not smaller: a significant component of the errors is due to the detector and is correlated from V to R and, thus, cancels in the color). One is usually more interested in the total magnitude of the galaxy. As mentioned earlier, this involves a substantial extrapolation from the measured aperture magnitude. After application of the mean extrapolations discussed earlier, a reasonable guess for the uncertainty in the total magnitude of galaxies might be 0.15 for the brighter (due mostly to uncertainties in the extrapolation) and 0.25 for the fainter (due mostly to random photometric errors).

We would like to use the same technique to estimate the errors in the photographic photometry. We plot, for each cluster, the distribution $\Delta C = (J - F)_{19} - (J - F)_{27}$ against magnitude for all objects. This distribution is centered on zero, is very narrow for bright objects, and broadens toward the faint end. Any real color gradients in the objects seem to be negligible compared to the errors. The area between the two apertures is equal to the area of the smallest aperture. Thus, by our reasoning above, the spread in ΔC at a given magnitude should equal the errors in $(J - F)_{19}$ at that magnitude, if we ignore sources of error such as large-scale sensitivity variations. To test this, we have generated artificial images of 100 stars of magnitude $F = 21.3$ and $F = 22.3$ and have inserted them randomly into the A2111 inten-

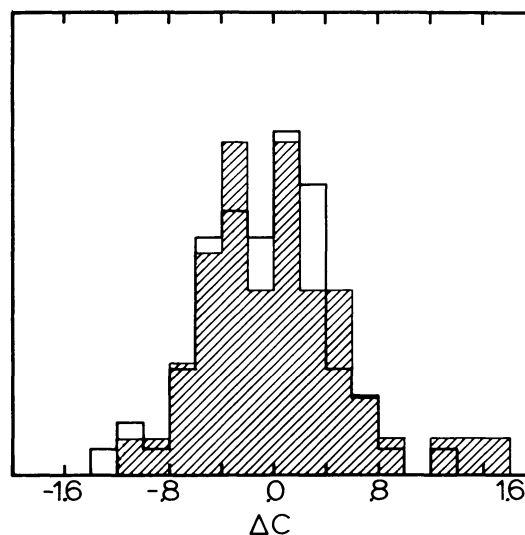


FIG. 32.—Open histogram designates errors in the measured $(J - F)_{27}$ colors of artificial stars of $F = 22.3$ in A2111. Shaded histogram designates predicted errors in $(J - F)_{27}$ obtained from the distribution of $\Delta C = (J - F)_{27} - (J - F)_{38}$ of stars with $F \approx 22.3$ in A2111.

sity array. When these data are reduced by the same detection and photometric routines as were the original data, the errors in the measured magnitudes and colors should be a good estimator of the total errors in measurements of real objects.

Figure 32 compares the errors in $(J - F)_{27}$ of fake stars with $F = 22.3$ with that predicted from the scatter in $(J - F)_{27} - (J - F)_{28}$. The agreement is excellent, as it is for the corresponding distributions at $F = 21.3$. We conclude that our internal error predictor works equally well for the photographic photometry as it does for the vidicon photometry. We assume, then, that the photographic color errors are well described by equation (6), and we use the distribution of $(J - F)_{19} - (J - F)_{27}$ to determine the values of m_0 given in the last column of Table 1.

IV. FIELD GALAXIES

Even though our clusters are very rich, contamination by superposed field galaxies is a nonnegligible problem. Because the color distribution of field galaxies is very broad, neglecting their contamination of the cluster galaxy populations will result in an overestimate of the blue galaxy populations in the clusters. Indeed, most attempts to explain away the findings of BOI have assumed that that work underestimated the density of field galaxies. That analysis of Cl 0024+1654 and 3C 295 was particularly vulnerable to such a criticism because the small field size of the videocamera forced us to estimate the density of field galaxies by indirect means.

The most careful and detailed criticism of this determination is by Mathieu and Spinrad (1981). They

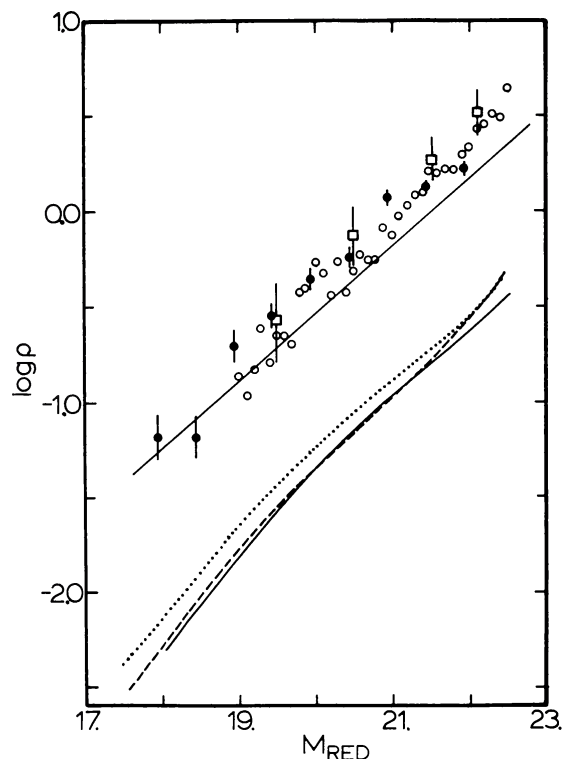


FIG. 33.—Observed and predicted field galaxy counts. Upper plots are of the observed density of galaxies $\text{mag}^{-1} \text{arcmin}^{-2}$ vs. whatever red magnitude was used. *Open circles*, Kron (1980); *squares*, Mathieu and Spinrad (1981); *filled circles*, this paper; *solid line*, BOI. Lower plots are the counts, with arbitrary normalization relative to the observations, predicted by Tinsley's (1980) models. *Solid line*, R band; *dashed line*, F_{57} band; *dotted line*, F band.

have studied the region around 3C 295 on 4 m telescope plates taken in the J and F_{57} bands. By using a mean relation $F - R = 0.2$ determined by comparing their photometry of cluster members with that of BOI, they relate the BOI field galaxy counts to Kron's (1978) and their own and find the BOI counts to be a factor of 2 too low. This underestimate of the field galaxy contamination is taken to be the explanation of the blue galaxy members reported by BOI.

Unfortunately, the very wide color range of field galaxies makes such a simple approach to relating counts in different bands very inadequate. To do a proper job, one must model the field galaxy population at faint magnitudes and calculate the expected distribution in the various photometric systems. We have used the published model galaxy counts of Tinsley (1980), supplemented by additional unpublished calculations in other bands. These models are for a variety of assumptions about galactic evolution; the detailed assumptions are unimportant as long as the predicted counts versus magnitude are a reasonable fit to the observations.

The observations and model predictions are summarized in Figure 33. The observations are presented as

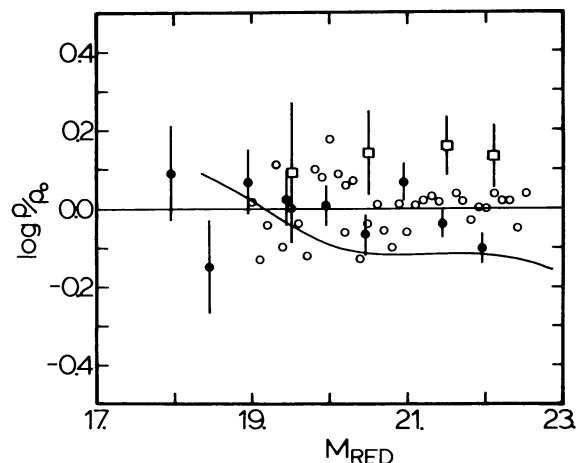


FIG. 34.—Residuals of observed galaxy counts from the best fit of Tinsley's models to Kron's counts. Symbols are the same as in Fig. 33.

surface densities of galaxies $\text{mag}^{-1} \text{arcmin}^{-2}$ versus the magnitude in whatever red band was used. The Kron counts for galaxies in SA57 are plotted without correction. Although they include stars as well as galaxies, we also plot the Mathieu and Spinrad counts without correction because those authors claim good agreement with Kron's galaxy counts. The BOI counts are represented by a line, which is the derivative of equation (1) of that paper. Of the fields studied in this paper, only five are both at high latitude and have photoelectric calibrations. These are A963, A1758, A1961/1963, A2111, and A2645. Over that range of magnitudes in which we were able to separate out the stars, we count only those objects considered galaxies. Fainter than this, we correct the object counts using Kron's counts of stars in SA57.

Also plotted in Figure 33, but with arbitrary normalization relative to the observed counts, are the predictions of a Tinsley model for counts in the R , F , and F_{57} bands. The model used is that with an exponential star formation rate for types Sbc, Sab, and E-S0. We assume that the Kron counts, the Mathieu and Spinrad counts, and those in this paper all refer to approximately the total magnitude of the galaxies. However, as discussed above, the photometry in BOI is to a very bright isophote, and we have, therefore, applied the correction in equation (1) to the model counts in the R band in Figure 33.

If we assume that Kron's counts are the most reliable, we can use his counts to normalize the model predictions. In Figure 34 we present the deviation of the various counts from the predicted galaxy densities using this normalization. The counts presented in this paper agree quite well with those of Kron. As expected, those of Mathieu and Spinrad are slightly high because of star contamination. If corrected as we have corrected our

own, they would be slightly lower than Kron's. The counts from BOI are definitely somewhat low. However, the difference of ~ 0.1 in the log represents an underestimate of only 25%. In the case of 3C 295, this represents an additional two background galaxies within the inner 1'0 on the cluster, an entirely negligible difference. The difference between our results for 3C 295 and those of Mathieu and Spinrad cannot, therefore, be ascribed to an error in our background determination.

In our next paper, we shall examine further the likely reasons for the differences.

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REFERENCES

- Abell, G. O. 1958, *Ap. J. Suppl.*, **3**, 211.
 Butcher, H., and Oemler, A., Jr. 1978, *Ap. J.*, **219**, 18 (BOI).
 ———. 1978, *Ap. J.*, **226**, 559.
 Butcher, H., Oemler, A., Jr., and Wells, D. 1980, in *IAU Symposium 92, Objects at High Redshift*, ed. G. O. Abell and P. J. E. Peebles (Dordrecht: Reidel), p. 49.
 Couch, W. J., and Newell, E. B. 1980, *Pub. A.S.P.*, **92**, 746.
 Gunn, J. E., and Oke, J. B. 1975, *Ap. J.*, **195**, 255.
 Gunn, J. E., and Stryker, L. L. 1982, preprint.
 Kirshner, R. P., Oemler, A., Jr., and Schechter, P. L. 1978, *A.J.*, **83**, 1549.
 Kristian, J., Sandage, A., and Westphal, J. A. 1978, *Ap. J.*, **221**, 383 (KSW).
 Kron, R. G. 1980, *Ap. J. Suppl.*, **43**, 305.
 Mathieu, R. D., and Spinrad, H. 1981, *Ap. J.*, **251**, 485.
 Oemler, A., Jr. 1974, *Ap. J.*, **194**, 1.
 Sandage, A., Kristian, J., and Westphal, J. A. 1976, *Ap. J.*, **205**, 688 (SKW).
 Strom, S. E., Forte, J. C., Harris, W. E., Strom, K. M., Wells, D. W., and Smith, M. G. 1981, *Ap. J.*, **245**, 416.
 Strom, K. M., and Strom, S. E. 1978, *A.J.*, **83**, 73.
 Thuan, T. X., and Gunn, J. E. 1976, *Pub. A.S.P.*, **88**, 543.
 Tinsley, B. M. 1980, *Ap. J.*, **241**, 41.

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