

NEW SOUTHERN OPEN CLUSTERS

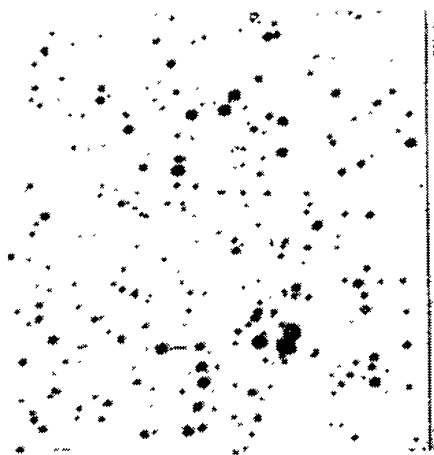
A. R. HOGG

Mount Stromlo Observatory
The Australian National University*Received August 18, 1965*

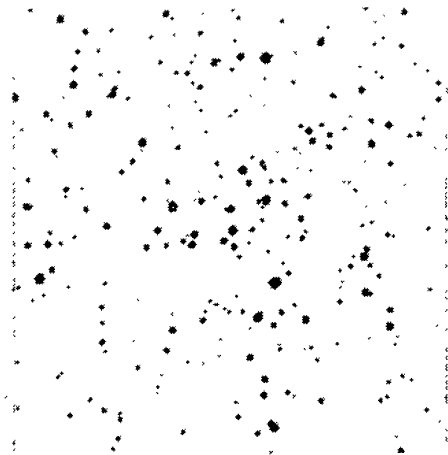
Twenty-two hitherto unreported open clusters have been found on a series of Kodak 103a-O plates exposed for 10 minutes with the Mount Stromlo 74-inch reflector diaphragmed to 45 inches, and reaching a limiting magnitude of 16–17. The plates, totalling 98, were centered on the open clusters listed by Trumpler as being south of -45° declination.¹ Photographic reproductions of the plates, each covering an area of $50' \times 50'$ at a scale of $15'/\text{mm}$, have been made to form an *Atlas of Southern Open Clusters*.^{*} Initially, the clusters were recognized from their visual appearance. This procedure is, of course, open to question, for the extent to which a group of stars appears as a cluster is subject to personal bias, to the scale of the plate, and to the nature of the surroundings. As a partial confirmation of the reality of the suspected groups, star counts have been made inside and outside of the suspected cluster area and the number of “members” estimated, using a standard deviation computed as the square root of the mean number of background stars in an area equal to that assumed to be covered by the cluster. In one case, cluster No. 18, a color-magnitude array has been observed to indicate the reality of the cluster.² Additional discriminatory work of this nature is obviously needed for the other clusters listed in Table I. This table shows the location of the clusters in equatorial and new galactic coordinates, the angular diameter A.D. and number of members N_m of the cluster together with the standard deviation, s.d., of the background stars already referred to. Plate I shows seven of these new open clusters.

* By A. R. Hogg and V. O. Hunt, available from Mount Stromlo Observatory, Canberra, at the charge of £A20 per set plus mailing charges.

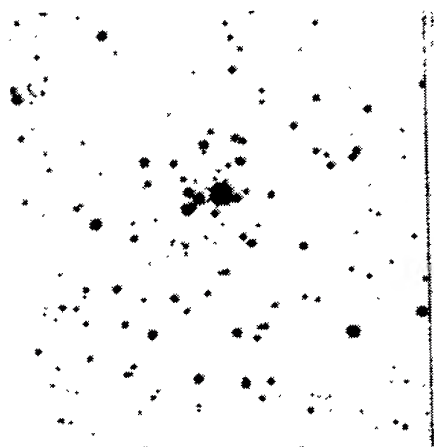
PLATE I

No. 3
and
No. 4

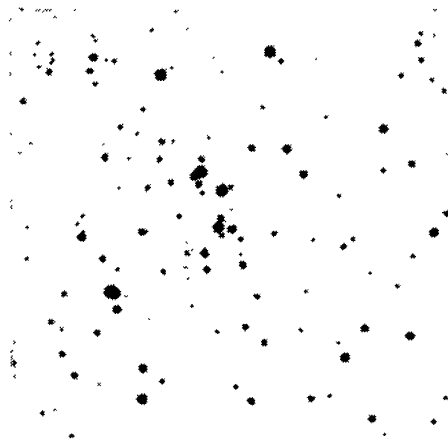
No. 6



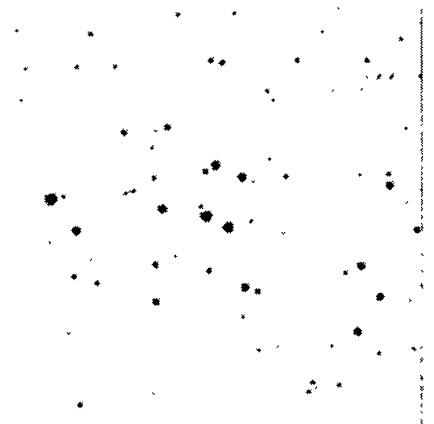
No. 10



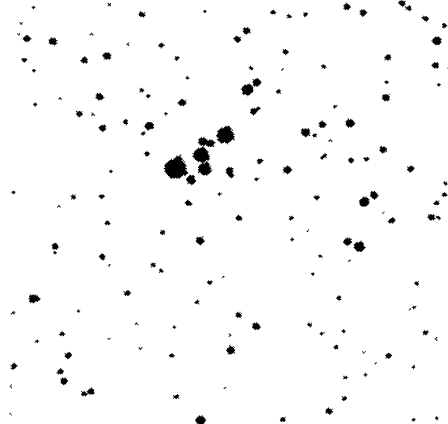
No. 12



No. 16



No. 22



Photographs of a selection of the open clusters listed in Table I. The original negatives were obtained with the Mount Stromlo 74-inch reflector using a diaphragm of 45 inches diameter ($f/8$) and ten-minute exposures on Kodak 103a-O plates. The photographs are all reproduced at the same scale, each covering a field $4'$ square with north at the top and west to the right.

TABLE I
NEW CLUSTERS SOUTH OF -45° DECLINATION

No.	α	1950	δ	μ	b_{II}	A.D.	N_m	s.d.	Notes
1.	09 ^h 38 ^m 9		$-50^\circ 23'$	274.9	+1.6	6'	17	4	Rather open cluster of brighter stars
2.	09 49.9		$-56\ 04$	279.8	-1.7	6	16	4	Not an obvious group
3.	09 56.1		$-54\ 25$	279.5	+0.1	4	23	4	Bright and faint stars forming an apparent double cluster with No. 4
4.	09 56.2		$-54\ 21$	279.5	+0.2	4	21	4	See No. 3. Other possible clusters in this rich field
5.	10 04.6		$-60\ 08$	283.8	-3.8	3	22	5	May be an extension of Tr 12
6.	10 04.8		$-60\ 15$	283.9	-3.9	3	20	5	Similar to No. 5
7.	10 27.3		$-60\ 28$	286.4	-2.5	4	30	3	Recognizable from counts
8.	10 27.5		$-60\ 39$	286.5	-2.7	3	17	2	Similar to No. 7
9.	10 56.3		$-58\ 47$	288.8	+0.7	1½	10	1	May be globular
10.	11 08.6		$-60\ 06$	290.8	+0.1	3	23	2	Possibly extension of NGC 3532
11.	11 09.4		$-60\ 06$	290.9	+0.1	3	10	1	Similar to No. 10
12.	11 10.2		$-60\ 29$	291.1	+0.2	3	21	2	Precedes NGC 3590 and may be a double cluster
13.	11 14.1		$-60\ 00$	291.4	+0.4	3	13	2	May be associated with NGC 3532
14.	12 25.8		$-59\ 32$	300.1	+2.9	3	12	2	A small weak cluster resembling NGC 4439
15.	12 40.6		$-62\ 50$	302.0	-0.3	2	6	1	Small group of brighter and fainter stars
16.	13 26.0		$-60\ 57$	307.5	+1.3	4	13	3	May merge with Cr 227
17.	14 29.9		$-61\ 10$	314.9	-0.9	7	31	4	Resembles Tr 22
18.	14 47.1		$-52\ 04$	320.8	+6.4	3	13	1	Small elongated group of brighter stars ^a
19.	16 25.1		$-49\ 01$	335.1	-0.3	4	25	3	Adjoins NGC 6134
20.	16 40.7		$-47\ 28$	337.9	-1.2	4	12	4	Close to NGC 6200
21.	16 42.2		$-47\ 40$	338.0	-1.5	4	19	4	May be a concentration in a "wing" of NGC 6200
22.	16 43.0		$-47\ 01$	338.5	-1.2	1½	10	2	Near NGC 6204 but separate from it

Table II has been derived to indicate the number of new clusters that might be discovered using techniques similar to those in the present investigation. It has been assumed that the

TABLE II

PLATE STATISTICS

Plate Center $\pm (b^{\text{II}} \pm \frac{1}{2}^\circ)$	0°	1°	2°	3°	$>4^\circ$
Plates examined	14	18	22	10	34
New clusters found	8	$5\frac{1}{2}$	3	$2\frac{1}{2}$	3
New clusters per plate	0.57	0.31	0.14	0.25	0.09
Equivalent plate areas					
not photographed	115	241	237	249	—
“Undiscovered” clusters expected..	66	74	32	62	—

plates taken constitute a representative sample of the quadrant of the Milky Way extending from $l^{\text{II}} = 270^\circ$ to $l^{\text{II}} = 360^\circ$. For analysis the quadrant has been divided into strips of sky 1° wide and centered on $b^{\text{II}} = 0^\circ, \pm 1^\circ, \pm 2^\circ$, etc. In Table II the sign of the latitude has been disregarded, so that the column headed 0° represents only one-half the area used for columns headed $1^\circ, 2^\circ$, etc. The area of a strip $2^\circ \times 90^\circ$ is equivalent to 259 plates. The headings in the various lines of Table II are self-explanatory and the last line gives the estimate of the numbers of clusters awaiting discovery. Because of the scarcity of data, regions further than $3\frac{1}{2}^\circ$ from the galactic equator have been disregarded. As the estimated total “undiscovered clusters” within $3\frac{1}{2}^\circ$ of the galactic equator amounts to 234 in this quadrant, it appears that the opportunities for the discovery of open clusters are by no means exhausted.

¹ R. J. Trumpler, *Lick Obs. Bull.*, 14, 154, 1930 (No. 420).

² A. R. Hogg, *The Observatory*, 81, 69, 1961 (No. 921).