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A. D. Code
T. E. Houck

Washburn Observatory
September 27, 1954

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PHOTOMETRY OF THE LACERTA AGGREGATE*

The group of early-type stars in Lacerta, forming one of the nearer OB aggregates, is of special interest because of its apparent expansion (Blaauw and Morgan 1953), which leads to an age of 4.2×10^6 years. To obtain improved photometric data for the aggregate, the stars were observed at the McDonald Observatory in the fall of 1952.

The magnitudes and colors in Table 1 are based on at least one observation with the 82-inch reflector and on at least three observations with the 13-inch reflector. The uncertainty in the zero points of the magnitudes and colors should be quite small, as the observations were made relative to the fundamental standards 10 Lacr and BS 8832 (Johnson and Morgan 1953). The mean errors of the magnitudes and colors, as determined from the ranges, are 0.010 and 0.005 mag. The relatively large mean error of the visual magnitudes is due to the retention of several stars which show evidence of being variables of small range. Before these are announced, further observations must be made to guarantee their being variable.

The color excesses, E, are based entirely on the photometric data, according to the method outlined by Morgan and Harris (1954). The total absorption, $3.0E$, applied to V, gives the corrected apparent magnitudes, V_0.

The color excess of 0.11 mag. for 10 Lacr determined photometrically agrees with the value determined from the intrinsic color of an O9V star (Morgan, Harris, and Johnson 1953). This color excess is supported by the color excesses of the other stars in the neighborhood.

The photometric method of determining color excesses fails in the case of some emission-line stars; therefore, we have not used the values of E given in parentheses but have adopted the values derived from the spectral types and intrinsic colors. The values of E_{sp} for HD 211835 and 215227 are 0.19 and 0.25 mag., while that for HD 214168 is 0.11 mag. The differences between the photometric and spectral color excesses can be interpreted as being caused by the ultraviolet being too bright by 0.27 and 0.38 mag. for the first two stars, as compared to normal main-sequence stars. The third star has a difference of only 0.02 mag., which is not significant when the variation among the main-sequence stars is considered.

The values of V_0 can be reduced to absolute magnitudes when a value for the distance modulus of the aggregate is assumed. The distance modulus given by Blaauw and

* Contributions from the McDonald Observatory, University of Texas, No. 250.
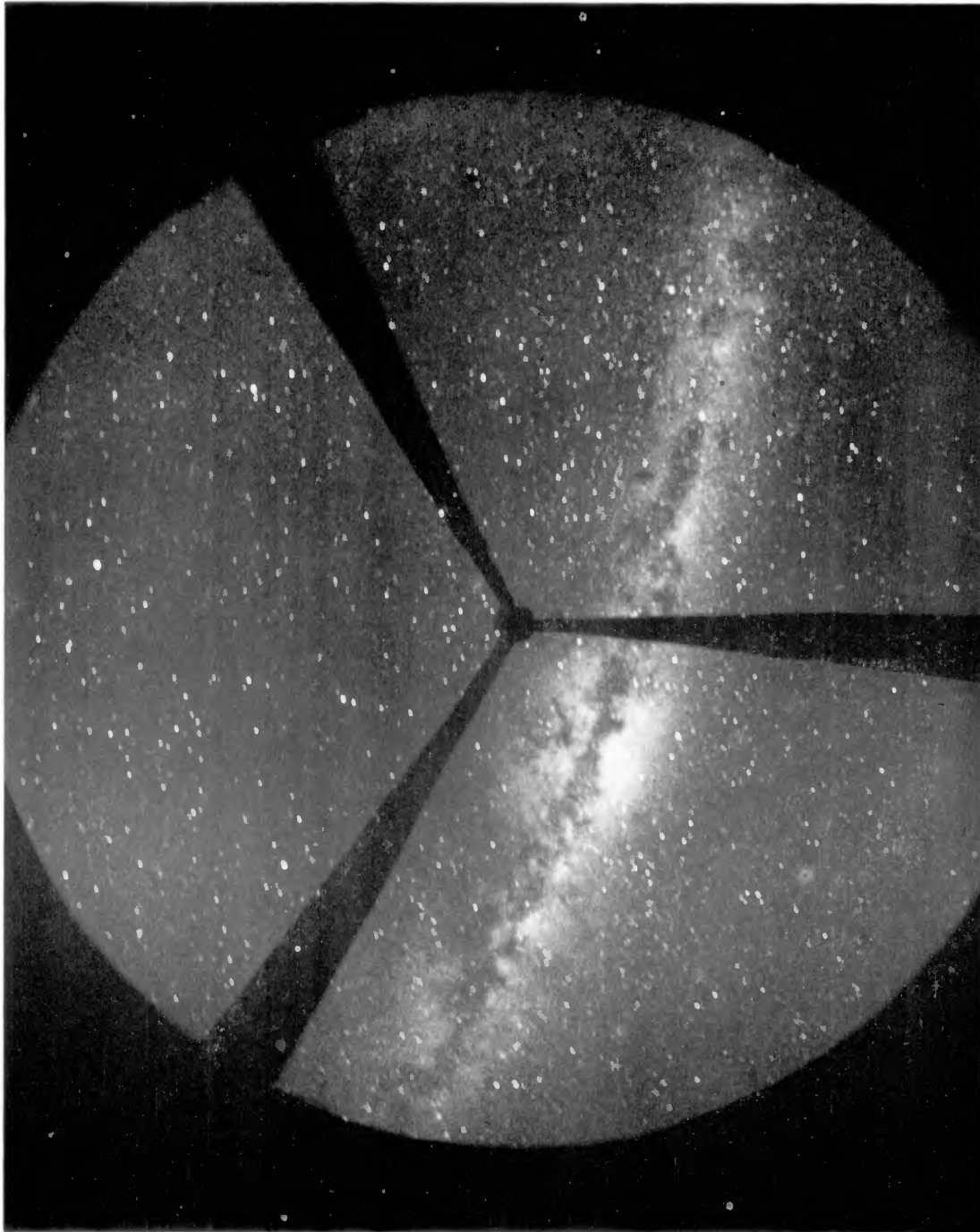
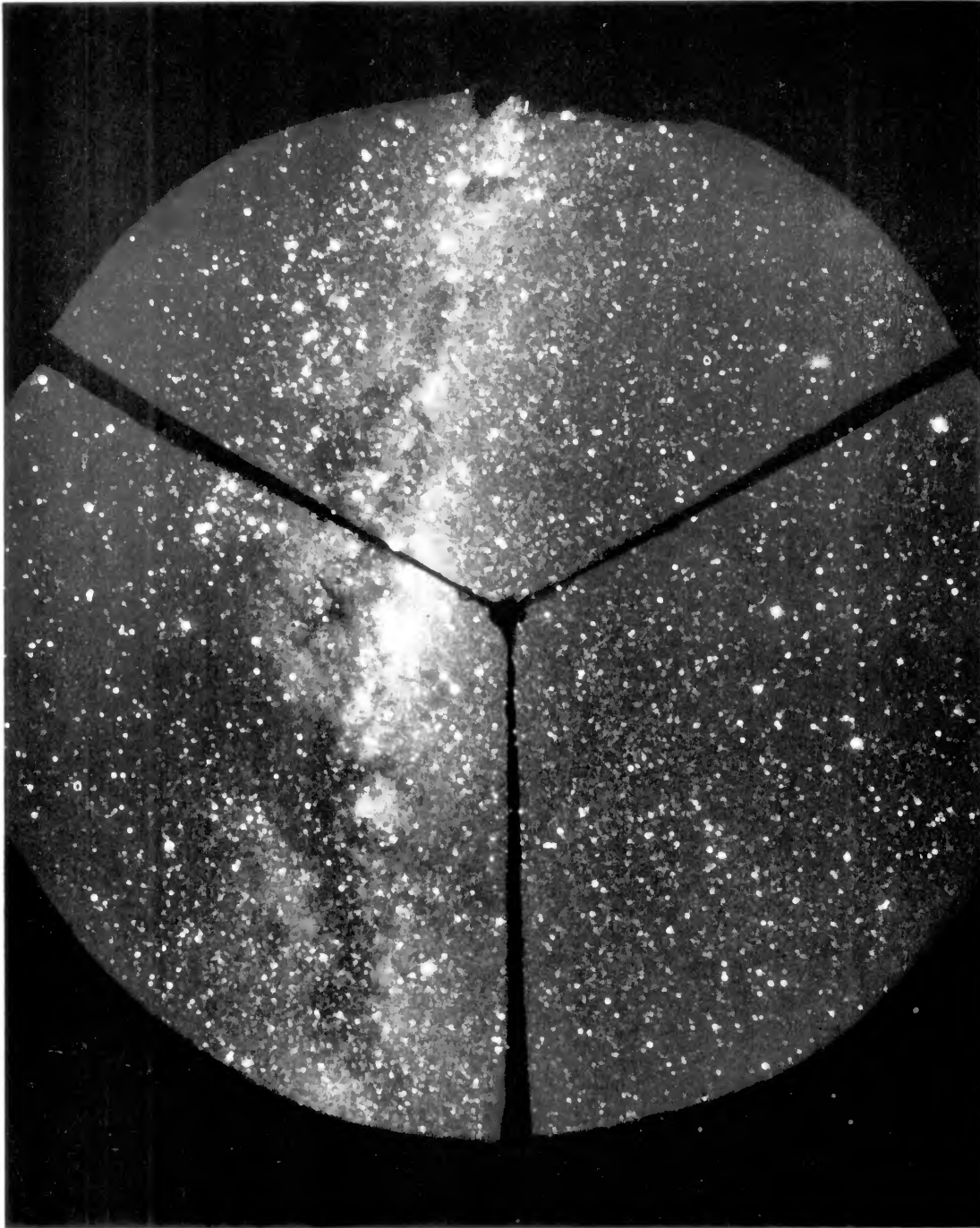Fig. 1.—The Milky Way from Aquila to Carina in the infrared

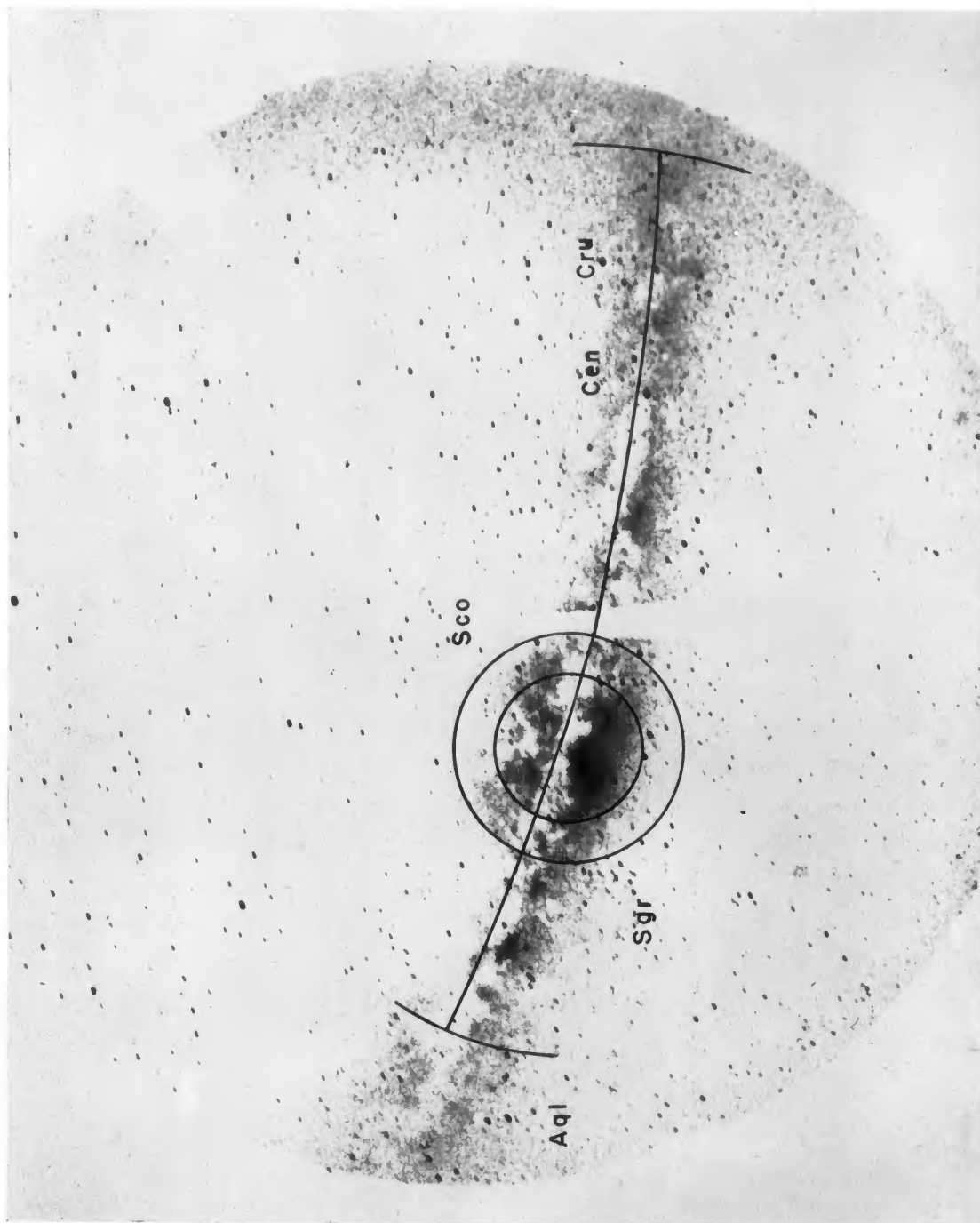Fig. 2.—The Milky Way from Sagitta to Crux in the blue

FIG. 3.—Infrared exposure of the southern Milky Way, indicating the position of the galactic center, the galactic equator, and the extent of the inner spiral structure.

Morgan (1953) is 8.3, while four stars in Petrie's lists (1953, 1954) make it 7.9. However, the values of V_0 for the B2 V and B3 V stars, combined with the absolute magnitudes -2.6 and -2.0 given by Johnson and Morgan (1953), would lead to a distance

TABLE 1

MAGNITUDES AND COLORS OF THE LACERTA AGGREGATE

HD No.	MKK	V	$B-V$	$U-B$	n	E	V_0	Notes
209961	B2 V	6.27	−0.06	−0.71	5	0.17	5.8	1
211835	B3:Ve	8.48	.00	−0.80	6	(.28)	7.9	
212883	B2 V	6.45	− .13	−0.75	5	.09	6.2	2
212978	B2 V	6.14	− .14	−0.77	5	.09	5.9	2
213420	B2 IV	4.50	− .08	−0.73	5	.15	4.0	
213976	B1.5 V	7.02	− .11	−0.80	6	.14	6.6	
214167	B2 V	6.46	− .15	−0.82	4	.10	6.2	
214168	B1 Vne	5.73	− .15	−0.90	4	(.12)	5.4	
214240	B3 V	6.29	− .05	−0.54	4	.12	5.9	1
214263	B2 V	6.85	− .13	−0.78	5	.08	6.6	
214432	B3 V	7.59	− .11	−0.67	6	.09	7.3	
214652	B2:V	6.84	− .11	−0.74	5	.12	6.5	1
214680	O9 V	4.87	− .20	−1.04	S	.11	4.5	
214993	B2 III	5.25	− .14	−0.87	5	.13	4.9	3
215191	B1 V	6.43	− .09	−0.81	5	.16	5.9	
216092	B1:V	7.85	− .07	−0.70	6	.16	7.4	4
216200	B3 IV:	5.91	.08	−0.51	4	.29	5.0	5
216534	B3 V	8.50	− .01	−0.58	5	.19	7.9	
216684	B3 V	7.76	− .02	−0.60	4	.19	7.0	
216851	B3 V:n	8.02	.04	−0.50	4	.24	7.3	
216916	B2 IV	5.58	− .14	−0.83	4	.11	5.3	3
217101	B2 IV–V	6.17	− .15	−0.80	4	.09	5.9	
217227	B2:V	7.16	− .06	−0.61	4	.14	6.7	
217543	B3	6.54	− .11	−0.64	4	.09	6.3	
217811	B2 V	6.38	.00	−0.58	4	.20	5.8	
218325	B3 V	7.71	.06	−0.61	4	.29	6.8	
218344	B2 V	7.42	− .11	−0.72	8	.11	7.1	
218407	B2 V	6.66	− .05	−0.68	4	.18	6.1	1
218674	B3 IV	6.73	− .01	−0.57	5	.19	6.2	
215227	B5:ne	8.75	0.09	−0.77	6	(0.39)	8.0	6, 4

NOTES TO TABLE 1

1. Spectroscopic binary; V_0 is for combined light.
2. Possible field stars (Blaauw and Morgan 1953).
3. Beta Canis Majoris variable.
4. Possible field star.
5. Variable announced by Walker (1952).
6. Not included by Blaauw and Morgan (1953).

modulus of the order of 9.0. It is apparent that the reduction to absolute magnitudes will have to await the final calibration of luminosity classes now in progress (Blaauw and Morgan 1952).

DANIEL L. HARRIS III

YERKES AND MCDONALD OBSERVATORIES