No. 55 INFRARED OBSERVATIONS OF THE NEUGEBAUER-MARTZ-LEIGHTON "INFRARED STAR" IN CYGNUS*

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The discovery of several "infrared stars" has been announced by Neugebauer, Martz, and Leighton (1965). They have published finding charts for two of these objects, one in Cygnus and the other in Taurus. We have observed the Cygnus object, with the results given in Table 1. The data are on the photometric systems defined by Johnson (1964) and Low and Johnson (1964). The object is very bright in the infrared, brighter than α Orionis at magnitude N, even though it cannot be seen in the 200-inch telescope (Neugebauer *et al.* 1965).

The unweighted means have been taken, except that the K-data for JD 2438889.969 and 94.937 were excluded from the K-mean. If they had been included, we would have obtained K = +0.50. Taken at face value, these data indicate that the object was fairly constant in brightness during the time of our observations, except for a 5-day decrease in brightness followed by a return to the former value; during this variation, the colors of the object remained essentially constant over the range of wavelength from 1.25 to 10.2 μ. We are continuing observations to see whether additional brightness variations will occur.

The absolute flux densities, computed by means of our absolute calibration (Johnson 1965), are given in Table 2. We have also included an approximate value for magnitude Q (20 μ), which was measured on the last two nights of observations. The unpublished calibration of the 20-μ measures is more uncertain than those for the other wavelengths, but the value in Table 2 is probably not in error by as much as a factor of 2. The spectrum of the Cygnus object,

TABLE 1

OBSERVATIONAL DATA

JD	K	J–K	K–L	K–M	K–N
2438874.988	0.35	4.17	2.16	——	——
76.972	0.51	4.44	2.41	——	——
76.985	0.36	4.26	2.14	——	——
78.004	0.36	4.28	2.32	——	——
82.919	0.31	——	——	3.84	——
88.976	0.42	4.32	——	——	——
89.969	0.79	4.08	2.46	——	——
94.937	1.10	——	——	3.78	5.86
95.979	0.38	——	——	3.92	5.68
Mean	0.38	4.26	2.30	3.85	5.77

TABLE 2

ABSOLUTE FLUX DENSITIES

FILTER	MAG	λ, μ	F_λ ($\times 10^{-15}$ W/cm$^2\mu$)
J	+4.64	1.25	4.75
K	+0.38	2.2	27.5
L	−1.92	3.4	47.6
M	−3.47	5.0	53.9
N	−5.39	10.2	17.6
Q	——	20	6

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over the range of wavelength from 1.25 to 20 μ, is shown in Figure 1. We have fitted a 700° K blackbody curve to the observed points, as indicated in Figure 1; we adopted for the present purposes an effective temperature of 700° K, although there is evidence that the object radiates more strongly at both short and long wavelengths than does the black body. The angular diameter of the object, computed from the absolute flux data and the adopted temperature, is 0".20. This number is quite uncertain, but it is, nevertheless, very large for a stellar apparent diameter; the apparent diameter of α Orionis (Michelson and Pease 1921) is about 0".040.

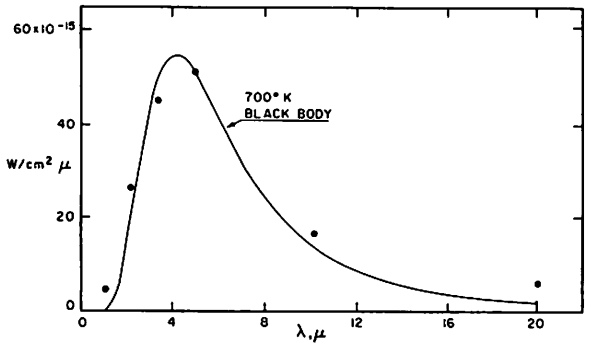

Fig. 1 The infrared spectrum of the Cygnus "infrared star."

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Note added in reprinting. The observations reported here were made with the 28-inch telescope at the Catalina Station of the Lunar and Planetary Laboratory.

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