the radii vectors. Symmetric and antisymmetric solutions are sought by numerical methods over a finite region. The result is a finite-atom approximation which is a proper eigenfunction of the Schrödinger equation. Preliminary computation indicates that even a first approximation yields a ground-state eigenvalue within 1% of the experimentally determined energy in Li^+ .

On the Nature of van Biesbroeck's Star +4°4048B.

SHIV S. KUMAR (National Academy of Sciences—National Research Council Postdoctoral Research Associate with NASA) *Institute for Space Studies*.—Van Biesbroeck's star BD +4°4048 (B) is the intrinsically faintest known star ($M_V=18.6$). Kron has given a color temperature of about 2000°K and color index ($P-V$)=2.33 for this star. It is most probably a star of late M spectral type. Making use of these data and the theory of stars of very low mass, the following tentative conclusions are made about its structure and evolution: (1) It is not a main sequence star; i.e., hydrogen burning is not the source of energy production inside it. It is contracting slowly. (2) Its mass is less than $0.07 M_\odot$. (3) It is a degenerate star that is slowly approaching the black dwarf stage. However, the possibility of its being a main sequence star of mass $\simeq 0.07$ is not completely ruled out.

Observational data for 726–8 and the unseen planetary companions, which are most probably degenerate stars of very low mass, are also discussed.

Photometric Investigation of the Galactic Clusters NGC 6087 and M25.

ARLO U. LANDOLT, *Louisiana State University*.—Photometric data on the Johnson–Morgan B , V system are given for 547 and 1401 stars, respectively, in the galactic clusters NGC 6087 and M25. The photographic measures were calibrated by a photoelectric sequence obtained independently by Irwin and Fernie in NGC 6087; independent observations by Johnson, by Sandage, by Irwin, and by Wampler, Pesch, Hiltner, and Kraft were combined to define a photoelectric sequence in M25.

The reddening across NGC 6087 appears constant at 0.20 mag.; differential reddening exists across M25 and ranges from $E_{B-V}=0.29$ to 0.60 mag. The evolutionary deviation curve method of Johnson indicates a distance modulus of 9.8 ± 0.1 mag. for NGC 6087 and 9.0 ± 0.2 mag. for M25. Each cluster apparently contains two red giant stars in addition to the classical Cepheids S Normae in NGC 6087 and U Sagittarii in M25. The cluster luminosity functions were investigated to $M_V=+4.0$ in NGC 6087 and to $M_V=+5.0$ in M25; both agree with the Salpeter initial luminosity function.

The differential reddening across M25 permitted a discussion of the ratio of total to selective absorption; a value of 2.9 ± 0.3 was adopted.

Optical Observations of Radio Stars. WILLIAM LILLER, *Harvard College Observatory*.—To date, five objects in the Third Cambridge Catalogue of radio sources have been identified with stellar objects. With assistance from Mrs. K. M. Strom and K. Janes, D. Latham, and D. Morrison, absolute proper motions of four objects, 3C 48, 196, 273, and 286, have been derived from old and new Harvard Observatory photographs. Polarization measurements at optical wavelengths have been made by the author using photographs taken through a Wollaston prism at the focus of the Agassiz Station 61-inch Wyeth reflector. Intensity and spectral observations are planned, and the results as of mid-April will be reported.

Unresolved Astrometric Binary α Ophiuchi. SARAH LEE LIPPINCOTT, *Sproul Observatory*, AND NICHOLAS E. WAGMAN, *Allegheny Observatory*.—Analysis by Wagman of photographic observations of α Ophiuchi: $m_{pv}=2.1$, $Sp=A5III$, made between 1918–21 and 1935–45 at the Allegheny Observatory showed a perturbation indicating an invisible companion (Wagman, N. E., *Astron. J.* **51**, 209, 1946; **53**, 138, 1948).

The parallax determinations at the Allegheny and Sproul Observatories are in good agreement: $+''060 \pm ''005$ (A) and $+''058 \pm ''009$ (S). Combining all available trigonometric parallax determinations $\pi_{abs}=+''057 \pm ''005$. An orbital analysis has been made, combining the 221 Allegheny plates taken on 186 nights through 1962 and the 93 Sproul plates taken on 28 nights 1946–62. The following dynamical elements are found: $P=8^y5$, $T=1944.2$, $e=.40$. The semi-axis major a of the photocentric orbit is $''065=1.14$ a.u. The absolute visual magnitude of α Ophiuchi A is $+0.9$.

Adopting a mass for α Ophiuchi A of $3\odot$, the minimum mass of the secondary is $.6\odot$ assuming $\Delta m \geq 6$. For $\Delta m=1$, the mass of the secondary is $2.4\odot$. The separation of α Ophiuchi A and the unseen companion is about 5 to 6 a.u.

Recent analysis by Wallace R. Beardsley at the Allegheny Observatory of spectroscopic observations reveal spectrograms on which the lines appear single and 2 plates a day apart on which some lines appear single and triple. The astrometric companion may be interpreted as a close pair (weaker lines) with a period of the order of 1 day. As revealed by the spectra, the Δm between α Ophiuchi A and the composite companion may be about 1 mag.