no concrete comparison with nature seems possible. In the concluding chapter the author is able to obtain the well-known spectra of a harmonic oscillator and the hydrogen atom and points out analogies with theories of Čap and Bopp. The real difficulty that bedevils this and other similarly interesting theories is that it is much more likely that an advance in our knowledge will come from a new physical principle rather than by exploiting mathematical analogies.

It is strange that, while French paperbacks are highly priced, the art of mechanical page cutting still seems to be unknown in France.

Astronomy and Physics. Vol. 3 of Proceedings of the 3rd Berkeley Symp. on Mathematical Statistics and Probability. (U. of California, Dec. 1954 & July–Aug. 1955) Edited by Jerzy Neyman. 252 pp. U. of California Press, Berkeley & Los Angeles, Calif., 1956. $6.25. *Reviewed by C. Payne-Gaposchkin, Harvard College Observatory.*

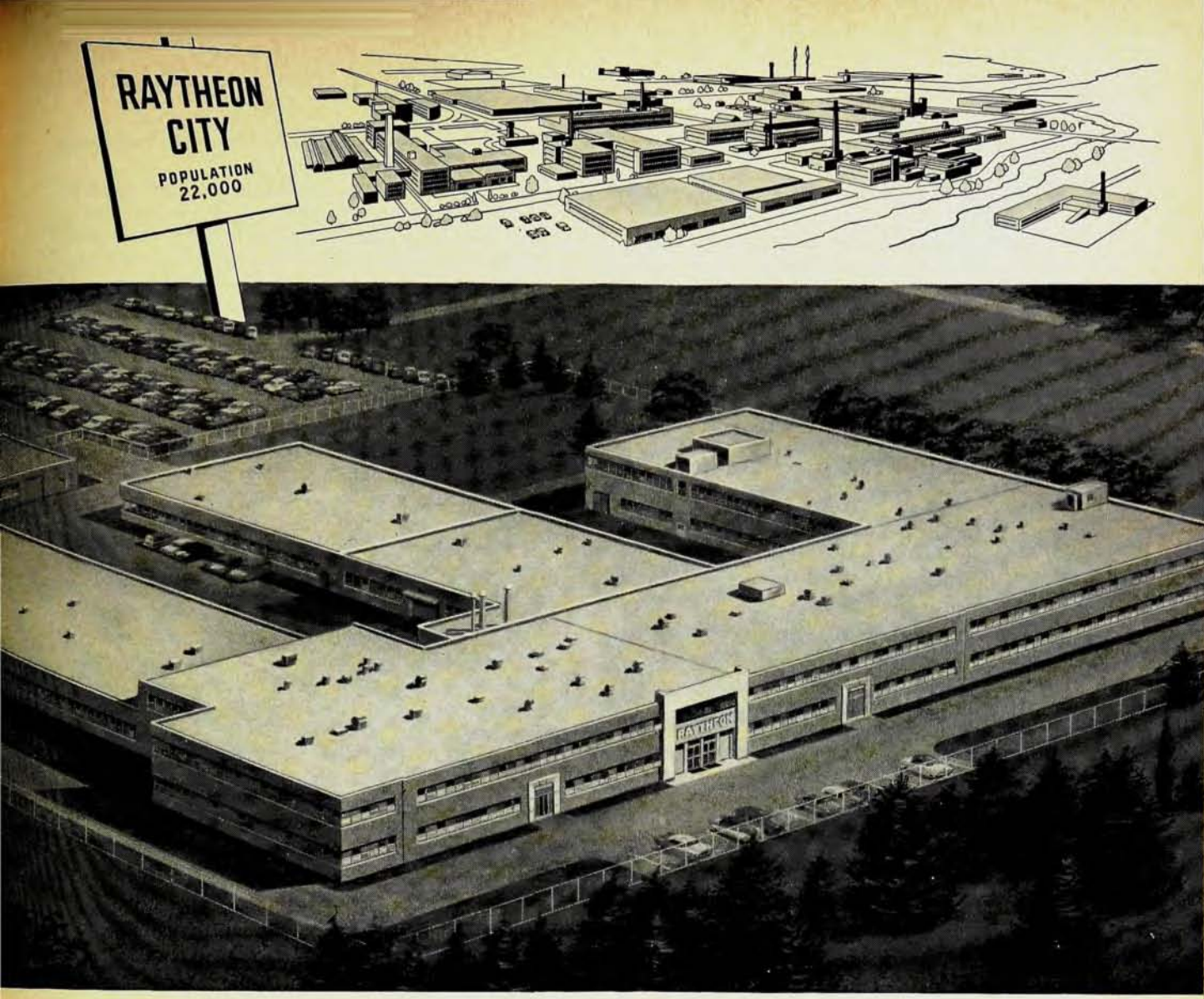
The Berkeley Symposia are doing a valuable service in bringing together authoritative presentations of current scientific problems, and a still more valuable service by publishing them promptly. The volume under review unites a group of contributions to astronomy and a shorter series of papers on theoretical physics.

The Hertzsprung-Russell diagram has rightly dominated our ideas of stellar evolution for more than thirty years. Indeed, we first began to regard this problem in modern terms when the importance of the relation between the luminosities and colors of stars was recognized. The recent advances in this field are the results of the new precision furnished by photoelectric photometry, and of the recognition of the very definite and restricted patterns shown by the H-R diagrams of suitably chosen groups of stars. The characteristic arrays of luminosity and color shown respectively by the globular and galactic clusters pointed the way to the modern conception of stellar populations. They provide criteria of age and origin that are forming a basis for convincing theories of the evolution of stellar systems and of stars.

The material on clusters is excellently presented by Harold L. Johnson, who has established the three-color photometric system that has become the standard for such studies. His discussion of the evolutionary significance of the data is closely interwoven with the observations and ideas of Allan R. Sandage.

The colors and luminosities of stars in the solar neighborhood are presented and discussed by Olin J. Eggen; he draws the important conclusion that there is a main sequence "certainly less than $0^m.2$, and probably less than $0^m.1$ wide". He also presents evidence for a clearly defined sequence of subdwarfs.

The array for the *M* dwarfs is critically presented by Gerald E. Kron, with the conclusion that the sequence is probably multiple. The extremely important white dwarfs and subdwarfs are discussed by Jesse L. Green-



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stein. The section on composition and its evolutionary implications is of especial interest.

Bengt Strömgrens's article on the H-R diagram covers an immense field. He starts with a historical review, and passes within a few pages to his own scheme for two-dimensional classification by narrow-band photometry, which promises to add a new dimension to the subject. His final remarks on interpretation give a very condensed summary and preview of the whole subject. There could be no better introduction to modern aspects of stellar evolution than this group of papers.

The second group of astronomical papers embraces the spatial distribution of galaxies. Each of the three papers that it contains is a unit.

George C. McVittie contributes a brief, nonmathematical summary of his own view on relativistic cosmogony.

The discussion of the Lick galaxy counts, by Jerzy Neyman, Elizabeth Scott, and C. D. Shane, is the longest contribution. It sets forth and applies the methods developed by the two former authors for the discussion of the apparent distribution of faint galaxies, and concludes by calling attention to a number of theoretical problems that are still in need of solution.

Fritz Zwicky contributes his own views on clusters of galaxies, which attack the problem from a morphological angle, rather than by formal methods of statistics.

The three papers that deal with the clustering of galaxies are all of a pioneering nature, and the reader will rightly conclude that the broader cosmological problems are less firmly consolidated than those of stellar evolution.

The final section of the volume contains five somewhat unrelated papers on theoretical physics. André Blanc-Lapierre and Albert Tortrat write on statistical mechanics and probability theory, M. Kac on kinetic theory, J. Kampé de Feriet on random solutions of partial differential equations, Elliott Montroll on the vibrations of simple cubic lattices, and Norbert Wiener on nonlinear prediction and dynamics.

The reviewer feels justified in discussing only the astronomical papers. Particularly welcome features of these articles are the excellent bibliographies.

Radio Telemetry (2nd Edition). By Myron H. Nichols and Lawrence L. Rauch. 461 pp. John Wiley & Sons, Inc., New York, 1956. $12.00. *Reviewed by S. F. Singer, University of Maryland.*

In physical research one may be faced with the problem of transmitting information (in the information theory sense) at a certain rate over large distances and, because of the inaccessibility of the device where the information is being produced, one must use radiowaves. The introduction of a radio receiver and of a transmitting medium (generally the atmosphere and occasionally also the ionosphere) introduces not only vast complications but also noise, in addition to the inherent noise of the source of information. If this problem oc-