asked, or one in which so many sentences begin with: "Let us imagine a . . ." or "Imagine that . . ." Slow-moving electrons are called "slowpokes"; high-velocity stars are "high-speed renegades"; the highly improbable becomes an "extremely long shot"; stars are "fellows"; meteors are "fragile flakes" that "ram" the earth's atmosphere; planets "spin" and rotating stars are "spinners"; cooling white dwarfs are on their way to becoming "cinders"; charged particles "run back and forth" in a "cage" created by a Jovian magnetic field; and cepheids "roam" in the galactic disk.

The author is in error when he states that nearly all of the methods of estimating great distances are based ultimately on information supplied by the method of annual (trigonometric) parallaxes. Trigonometric parallaxes are easy for the beginner to understand, and historically they came first and thus achieved early fundamental importance. But today, almost all very large distances are based on cepheid luminosities derived from the equation that distance $D = T/4.74\ \mu$, where T is the tangential velocity in kilometers per second and μ is the proper motion in seconds of arc per year. Whenever T can be evaluated, so can the distance, provided μ has been measured to the required accuracy. This happens in a number of ways when *radial* velocities (V, in km/sec) are known. In a moving cluster, for example, the geometry is sometimes precisely known, thus giving the relation between T and V. The Hyades and other moving clusters form the backbone of the zero-age main sequence from whence accurate cepheid luminosities from cepheids in clusters can be derived. The geometry is also known between T and V in the case of an expanding shell of gas about a nova or supernova (for example, the Crab nebula).

For groups of stars, T can be related to the backward drift of stars due to the sun's peculiar motion (the upsilon method, which has given independent evaluation of cepheid luminosities); or T can be related to the average absolute value of the peculiar radial velocities of groups of similar stars (the tau method). One can also use the *total* proper motion and assume an individual star has an *average* tangential velocity. This crude and unsophisticated method gives no negative parallaxes; it is as good or better than trigonometric parallax measurements for stars 50 parsecs distant and is useful for distances up to about 1000 parsecs. When more precise proper motions become available in the next 10 years, the total proper motion method should be good to distances of nearly 2000 parsecs. For example, if one adopts an average tangential velocity for an individual nearby star, the distance so computed will be accurate within a factor of two about two-thirds of the time; for one of the kinematically more homogeneous "brightest" stars the result is somewhat more accurate, and of course is very much more accurate when applied to groups of stars.

The book is well and profusely illustrated, although some of the diagrams are too small and a few of them need to be rotated through 90 degrees. I wish the author had provided diagrams of the interstellar reddening curve, the color-color curve, galactic rotation curves for observed radial velocities, the numbers-flux density relation for distant radio sources, and brightness contour diagrams of double radio sources (for example, Cygnus A and Centaurus A). A better discussion is needed for the spectacularly luminous quasistellar sources, the importance of the Crab nebula polarization needs emphasis, precision methods for evaluating the color excess and total absorption should be given, as should the binary nature of novae and dwarf novae. There are very few real mistakes—for example, Tycho's star of 1572 is incorrectly placed in Sagittarius.

The problems given at the end of each chapter are often truly excellent. Whether or not a college professor adopts this text for use in his beginning astronomy course, he will find it most worthwhile to study in some detail Wyatt's techniques of explaining things. The nonmathematical discussion of the nature of 21-centimeter radiation is the best I have seen, and this is true of many other subjects treated in the book. This text requires of the student a knowledge of only high school algebra and geometry, and within this limitation would seem to be, by a clear margin, the best book of its kind now on the market. And books of this type are ever more important as a growing percentage of our population becomes associated with the expanding space programs.

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Czech Science Today

Science in Czechoslovakia. Vladimir Slamecka. Columbia University Press, New York, 1963. xii + 175 pp. Illus. $6.

This book describes the organization of scientific research, the training of personnel and the publication of technical literature in Communist Czechoslovakia. The material is drawn exclusively from official sources; the prose style of the explanatory parts conforms to the subject matter. Numerous statistical tables deal with indices of industrial production, output of scientific workers, and the like. Organizational charts are displayed. Appendices list the names and addresses of institutes and other scientific organs and provide a bibliography of Czech technical publications together with their location in U.S. and Canadian libraries.

Part of the book deals with the planning of research. The Five Year State Research Plan specifies 16 broad "complex research tasks" covering the gamut of economic and social activities. The orientation is exclusively practical; basic research is included as the necessary foundation for later applications. The comprehensiveness of the research, as it is outlined discipline by discipline in chapter 5, is truly staggering. It is distributed among 129 installations of the Academy of Science and 200 industrial laboratories, not to mention 10 universities and 14 technical colleges. Despite recent efforts to coordinate work in different Communist countries, the Czechs seem reluctant to abandon the goal of research self-sufficiency.

The author explicity avoids a critical or comparative approach to his subject. The question of scientific progress and technical achievement under the Czech system is not systematically treated. Nor are the morale, working conditions, or remuneration of scientific workers discussed. That research output has greatly increased is evident from the expansion of Czech journals. It is therefore surprising to discover that in spite of deepest official concern, scientific manpower is increasing only by 1.7 percent annually, compared with 4.5 percent for the U.S. and 10 percent for Russia.

Slamecka has also provided a companion volume *Science in East Germany* (Columbia Univ. Press. 134 pp., $5).

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