

BOOK REVIEW

Antonín Bečvář. *Atlas Coeli II – Catalog 1950.0*.
Prague, Czechoslovak Academy of Sciences Press, 1959.

Reviewed by P. G. Kulikovskii

The astronomers of the Skalnaté Pleso Observatory in Czechoslovakia, under the direction of Antonín Bečvář, published in 1948 an *Atlas of the Heavens* (*Atlas Coeli Skalnaté Pleso*), which has since become widely known. The *Atlas* has now entered a third edition in Czechoslovakia, and has been published in the United States. The scale chosen, the well-selected gradation in the symbols for stars of different magnitudes, the completeness of the *Atlas*, its coverage of the entire sky, the abundance of information it contains – all these things render the *Atlas Coeli* valuable not only for a large number of amateur astronomers, of whom there are so many in Czechoslovakia, but also make it very convenient and useful for the handling of many of the specialist's problems.

On 16 maps, each measuring 50×40 cm, the entire sidereal sky is shown, and all stars brighter than 7.75 visual magnitude are plotted (about 7000 stars). Double and multiple stars are marked, as well as spectroscopic binaries (including binaries in which one or both components are themselves spectroscopic binaries), variable stars, and novae (having maxima brighter than $7^m.75$). Star clusters, planetary nebulae, and galaxies are designated by symbols of various sizes, depending on their integrated brightness. The maps show isophotes of the Milky Way and the outlines of dark nebulae; constellation boundaries are delineated according to the International Astronomical Union's code; and the ecliptic and galactic equator are plotted.

The symbols representing the several kinds of celestial objects are accompanied by literal or other designations, including the catalog numbers of nebulae and galaxies.

Thus, in the wealth of data it contains, the *Atlas Coeli Skalnaté Pleso* represents one of the most complete and, considering its scale and the limiting stellar magnitude, one of the best of all the atlases that have been made (such as those of Schuring, Beyer-Graff, A. A. Mikhailov, and others).

The *Catalog* has appeared as a supplement to the *Atlas*, being issued in a second revised edition in 1959. This is a solid volume of 368 large-sized pages, containing data on all stars to magnitude 6.25, and a large amount of information on many objects plotted on the maps of the *Atlas Coeli*. The preface and all the explanations to the tables are given in three languages: Czech, Russian, and English.

The first and most extensive table (127 pages) contains the following data on all stars to $6^m.25$: the num-

ber in B. Boss's catalog (the GC); the 1950.0 coordinates with their annual variations (with proper motions allowed for); the annual proper motion in both coordinates; the stellar magnitude (RHP system); the absolute stellar magnitude (with allowance for interstellar absorption); the spectrum (the Mt. Wilson classification, with the Harvard system for faint and for southern stars), with an indication, wherever possible, of the giant-dwarf characteristic of the star; the absolute parallax; the radial velocity; the name of the star in the standard literal or numerical nomenclature, with the name of the constellation; and notes indicating if the star is double or variable, and thus referring to other tables in the catalog.

To aid the reader in consulting the catalog, two auxiliary tables are given.

1. Index of Named Stars (19 pages), containing the Flamsteed numbers for the stars in each of the constellations (which are arranged alphabetically), the Greek-letter designation or the Latin designation of the stars, the standard nomenclature for variable stars and, finally, an approximate value for the right ascension so that the star can be found in the main star catalog.

2. Index of Numbers, Henry Draper Catalog (the Harvard catalog of spectra) for all the stars in the main catalog, in order of increasing GC number.

The remainder of the *Catalog* is devoted to the following supplementary specialized tables.

A table of visually double and multiple stars (40 pages), complete to combined stellar magnitude $6^m.75$. This table gives: GC number; 1950 coordinates; number in Aitken's New General Catalog of Double Stars (ADS); designation in other catalogs in which the duplicity of the stars was first announced; the type of duplicity; the total visual magnitude and the magnitudes of the components; the position angle, distance, and epoch, or else the eccentricity, major semiaxis, and period for orbiting binaries; the designation of the star, or the constellation alone; and notes referring to spectroscopic doubles and the availability of computed orbital elements. These notes direct the reader to succeeding tables, which provide more detailed information in this regard.

Elements of Visual Binary Stars (14 pages). In addition to the GC numbers, coordinates, ADS numbers, and other catalog designations, this table gives stellar magnitudes, spectra, and orbital elements, together with the name of the computer and the date of the

computation. The dynamical parallax is also listed, if it has been computed.

A table, Elements of Spectroscopic Binary Stars (19 pages), supplies similar information for binaries of this type.

A table, Variable Stars and Novae (13 pages), gives information on 633 variables including, in particular, all those that are bright at their maximum, but also a certain number of quite faint ones (magnitude 9 or 10). Data are given on the maximum and minimum brightnesses, spectra, periods, and types of variability.

The collection of data on clusters and nebulae is especially valuable; it is presented in the special tables: Open Star Clusters (293 objects), Globular Clusters (100 objects), Planetary Nebulae (144 objects), Bright Diffuse Nebulae (240 objects), and External Galaxies (1131 objects brighter than $13^m.0$).

Of course, the brightness of most of these objects lies far beyond the upper limit imposed on the star catalog ($6^m.25$). However, since they are all shown in the Atlas Coeli, they may be picked out from among the stars and identified with full assurance. All these tables present the latest values of the quantities concerned. Altogether, these tables provide a fund of information which is usually scattered through a large number of specialized publications, difficult of access.

The Catalog concludes with the following two tables: the Catalog of Messier (109 objects), and a new table, Cosmic Sources of Radio Waves (38 objects). In addition to entries giving the intensity and the frequency at which the radio emission was observed, the table includes, in many cases, an identification with galactic nebulae or galaxies.

Several supplementary tables facilitate use of the Catalog, and make the necessary transformations and comparisons easier. There are the following tabulations:

- I. List of constellations
- II. Names of stars (275 names)
- III. Conversion from parallax to distance in parsecs
- IV. The same, in light years (we note that, in preparing this table and Table VI, the solar parallax was unfortunately taken as $8''.79$ rather than $8''.80$)
- V and VI. Conversion from distance to parallax
- VII. Addition of stellar magnitudes (for binary stars)
- VIII. Relation between parallax and distance modulus $m - M$ (for determining absolute magnitudes of stars)
- IX and X. Precession tables

XI and XII. Precession for 50 years (with the annual precession as argument)

The list of literature employed (p. 8) shows that the author has attempted to give the most recent data on all the objects included in the Catalog. He has been quite successful in this. Very recently, considerable attention has been devoted to a two-dimensional spectral classification, which would make it possible to determine which sequence a star belongs to in the spectrum-luminosity (Hertzsprung-Russell) diagram. This code, of course, gives more information than the nomenclature of the Mt. Wilson classification, which indicates whether the star is a giant, dwarf, or subdwarf. No doubt, in the future, an indication of the luminosity class according to Morgan's system of spectral classification will still further enrich the physical data collected in the Atlas Coeli Catalog.

The table of double and multiple stars unfortunately does not contain, in many cases, the latest data on the positions of companion stars, and sometimes it cites positions as of the beginning of the present century, or even the end of the last one. On the other hand, since the orbital elements of binary stars are listed in a special table, it would have been very convenient if the main table had given ephemeris positions for some particular epoch (say 1965 or 1970), rather than repeat the eccentricity, major semiaxis, and period. This would have introduced some uniformity into the table, and would have freed the observer from auxiliary calculations. In the table devoted to clusters, it would have been good to list the mean apparent visual magnitude of a dozen of the brightest stars (beginning, for example, with the sixth brightest star).

It is very welcome for the authors of the Atlas Coeli to have introduced many changes and additions into their second edition. This promises that each new edition of the Catalog will contain the latest data of observational astronomy. Although the main list of stars in the Catalog contains only quite bright stars, the collection of all the other tables makes the Catalog an extremely valuable compendium, and it will be of assistance to a great many professional astronomers. It is for good reason that the Atlas Coeli has received such wide distribution over the whole world, and has been published in foreign countries. We may congratulate our Czech friends on their well-deserved success with this valuable publication.