The construction of the table is quite straightforward. A quadrant, being the basis for lunar reference systems as well as for trigonometric values, is naturally fundamental to this conversion. Along the ETA axis a parallel to the equator is taken for every 0.05 of a lunar radius, and the lengths of the twenty parallels derived in this way are found from the simple formula \( c = \sqrt{h^2 - h^2} \), where \( c \) is the length of the parallel, or half chord as it also is, and \( h \) is the radius minus the value of ETA along that parallel. These calculations which take the radius of the moon as 1.00 must all be less than unity. As decimal values, then, their product with any XI reading will give sine equivalents, and consequently the longitude of a ETA value for any of the 20 ETA tabulations. Although theoretically interpolation cannot be done in the usual manner without introducing measurable error, the discrepancy between a proportional method of determining intermediate values and the strictly correct procedure is seriously significant only when using the table for extensively foreshortened lunar features. However, a future extension of the table to include every 0.01 of a lunar radius in ETA in conformity with the XI intervals will make any alternative to simple proportional interpolations superfluous for anything but the most exacting work.

In use the procedure is to determine intermediate values in XI and ETA by proportional differences from the body of the table, which is in degrees and decimals of a degree and denotes longitude. For finding latitude the XI column is treated as being values in ETA; and in the column for ETA = 0.00 the values of latitude are read, and proportional corrections are applied.

An example may clarify the steps: We propose to find the distance between a craterlet near Eratosthenes at XI = -0.2055, ETA = 0.2895 and one near Archimedes at XI = 0.1265, ETA = 0.5420.

Taking the column for ETA = 0.25, we find a (negative) longitude of 11\(\frac{92056}{12112562} = 0.20 \) and one of 12112562 for XI = 0.21. Linear interpolation supplies 11\(\frac{92056 + 0.55(12112562 - 11\frac{92056}{12112562})}{12112562} = 0.223562 \). In the column for ETA = 0.30 and the same values of XI the same procedure gives 12110222 + 0.55(12110222 - 12112562) = 12114048. We finally need to interpolate on ETA; here 12125362 + 0.79(12140448 - 12125362) = 12140124 as the desired longitude, where 0.79 is the ratio \( \frac{0.2895 - 0.25}{0.30 - 0.25} \).

To find the latitude we take the column for ETA = 0.00 and note that the latitude is 16\(\frac{26111}{16185833} = 0.28 \) and 16\(\frac{85383}{16185833} = 0.29 \). Since we want XI = 0.2895, we take 16\(\frac{26111 + 0.95(16185833 - 16126111)}{16185833} = 0.30 \). The desired latitude is 16\(\frac{82847}{16185833} \).

These steps are then repeated for the craterlet near Archimedes. The ETA = 0.00 column gives an interpolated longitude of 8\(\frac{15379}{185150} \), and the ETA = 0.55 column gives an interpolated longitude of 8\(\frac{15380}{80066} \). Interpolation on XI for latitude in the ETA = 0.00 column results in a value of 2182000.

The final calculation of distance is then a classical problem in spherical trigonometry.

Comments by Editor. We must apologize to our readers and to Mr. Swinburn for the great delay in the publication of this paper. Yet we hope that it may now be even more useful to advanced amateur students of the moon than it would have been in 1961. The interpolations involved need to be done very carefully, as students using this process in trigonometric tables will verify. Often available positional data would not be accurate enough to justify as many decimal places as Mr. Swinburn carries. Our thanks to our contributor for some useful tables!

BOOK REVIEWS


Reviewed by William O. Roberts

This is the first volume in a newer astronomical series, STARS AND STELLAR SYSTEMS, following the scheme developed by the editors in THE SOLAR SYSTEM. Comments made in ear-

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lier reviews* of these volumes apply generally to this book as well. It may as well be said right now that the present text is hardly one for the novice. Yet the fact remains that this is the kind of reference which often proves to be the most useful and long-lived on the amateur's bookshelf. His observatory reflects in a microcosm the design and practice of a large institutional establishment. It must follow that the better he understands instruments and their uses, the more effectively he will be able to plan and to operate his observatory for his own work. Let us see what this book has to offer.

There are twelve chapters and a supplemental listing of optical telescopes of greater than 20 inches aperture. The first article, naturally, is on the 200-inch Hale Telescope on Palomar Mountain by J. S. Bowen. The subject is treated concisely, yet adequately, in 15 pages; and a generous bibliography is included. A substantial group of illustrations comes with the text; among them are eleven of Russell Porter's amazing drawings which, for once, have been reproduced with sufficient scale and clarity. This is followed by W. W. Baustian's description of the Lick Observatory's 120-inch telescope. A. B. Meinel contributes a section on the design of reflecting telescopes. This is characterized by comparisons of designs and materials. Interesting was the discussion on Corning's new family of materials, Pyroceram, which appears to hold promise as a low-expansion material for telescope mirrors. The information given suggests that mirrors of zero coefficient, great hardness, and strength are a distinct possibility in the not too distant future.

Dr. Bowen has written a second article, this time on Schmidt cameras. The fifth chapter, Telescope Driving Mechanisms, is by R. R. McKeth and O. C. Mohler. Many people are already familiar with some of the work done at McMath-Hulbert Observatory on precise and sophisticated designs. Three chapters follow on instruments associated with the making of charts: The fundamental astronomical measurements, namely, the equatorial, zenith tube, dual-rate moon camera, and the impersonal astrolabe. Their use lies almost exclusively within the province of the professional astronomer.

Astronomical Seeing by J. Stock and G. Keller and Astronomical Seeing and Site Selection by A. B. Meinel cover a field of great importance to the lunar and planetary observer; and the effort spent in grasping the explanations will be amply repaid in better understanding of the A.L.P.O.'s efforts to establish a simple and effective seeing scale. The book is brought to a close with two chapters on radio telescope antennas and circuitry.

Most of the articles are generously provided with illustrations and bibliographies. While the plates add considerably to the cost of manufacture, they also add greatly to the clarification of the text. This reviewer finds the clear, unburdened prose a welcome change from the anecdote-laden style typical of so many works of a more popular nature. The individual who will employ this book as a guide to method, rather than as a collection of blueprints, is far more likely to realize the potential values that lie within its covers.

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Reviewed by William O. Roberts

In 1890 Sir Norman Lockyer on a visit to Greece was impelled to note the bearings of the Parthenon and of the various foundations at Eleusis, having in mind that English churches were said to have their eastern windows facing to the place of sunrise on the festival day of the patron saint. Subsequent investigation showed that very little work had been done on this subject; and Sir Norman, with characteristic directness, went to Egypt to investigate further. The book was published in 1894 and, as Giorgio de Santillana says in the preface of 1964, "Egyptologists dismissed it with good-natured laughter."

Yet the result was full of information on Egyptian temples and religious ideas, tied into a discussion of the astronomical implications of these matters. Again, and again, the author took problems which Egyptologists had considered insoluble and proceeded to offer convincing explanations based on his keen knowledge of astronomy. From all this was de-


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veloped a strong case for the notion that the Egyptian priesthood had an excellent understanding of astronomy, and a number of important uses for it. One of the more interesting proposals was that many temples were oriented to the rising or setting of the sun on certain days, or even of the sun itself, at specified times of the year. Observation of the sun's rising at the summer solstices, for example, would serve not only to regulate the calendar but to predict the early rising of the Nile, a vital matter to the agrarian civilization of the Nile Valley.

Lockyer, being dependent upon the information supplied by Egyptologists of his day for information on history, language, and customs, was badly handicapped by the state-of-the-art in 1890. The dating of the dynastic history was strongly influenced by Manetho's list of kings, yielding a period some 2600 years longer than that favored by modern authorities. Had it been possible to consult more recent translations of the Pyramid texts, some of the errors concerning the roles played by major deities, such as Set, Horus, and Osiris, might have been avoided. By way of illustration, Lockyer not only confuses Set with Amnis, which is understandable in view of the superficial similarities in their respective hieroglyphic symbols, but he also gives Ombos as an alternative name for Set when it is actually part of a title, Set, Lord of Ombos.

Astronomers familiar with Sir Norman's engaging and practical textbook, Elements of Astronomy, or with his researches into solar astronomy, will be inclined to regard this excursion with more than usual interest. It is marked by a chatty, yet lucid, prose style that recalls the literary graces of a bygone day. One regards it as a challenging study that ought to lure more than one astronomical enthusiast into the fascinating entangle-ment of Egyptian history and culture, if only in order that we may find out just how well the author's conclusions stand up in the light of mid-twentieth-century archaeology, philology, and astronomy. The M.I.T. Press is to be complimented for having restored this book to print.

ANNOUNCEMENTS

Error in May-June, 1964 Issue. We regret that on pg. 128 of the issue named the Roman numerals I and II were interchanged in the formulas for the drift of the NTB³ spot. They should have read:

L = 1845 - 9136 (T-Nov. 6, 44,1964) in System II.
L = 011 - 1473 (T-Nov. 6, 44,1964) in System I.

We regret any confusion caused for readers who may have attempted to observe this spot, though we also understand that it became visually quite invisible in apertures up to 16 inches by the end of 1964.

Sustaining Members and Sponsors. As of May 3, 1965 we have in these special classes of membership:


We express our thanks to all these colleagues for their loyalty and very helpful financial support. Sponsors pay $25.00 per year; Sustaining Members, $10.00 per year. The balance above the regular rate is used to support the work and activities of the A.L.P.O.

Status of A.L.P.O. Observing Manual. The following brief progress report on our Observing Manual was communicated by Mr. Clark Chapman on April 15, 1965. The Editor of this Journal can only underscore this appeal for full cooperation on this important project. Messrs. Chapman and Cruikshank and others have invested heavily of time, thought, and effort and merit our full support. Perhaps some discussion of the Manual can be included in our Convention with the Astronomical League at Milwaukee in early July. Clark