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In the end, the author concludes that there is no evidence that chimps can produce sentences. Moreover, analysis of the project's videotapes indicated that most of his signed utterances were prompted by a teacher and contained major constituents of the teacher's previous utterance. Only 10% of Nim's utterances were spontaneous. Furthermore, he showed little ability to hold a conversation; he tended to interrupt his teachers frequently and to be unaware of the notion of taking turns.

Terrace carried his argument further by analysing films from other ape language projects and arriving at the same conclusions. Like the turn-of-the-century horse prodigy, Clever Hans, who appeared to do sums in his head and tap out the answers with his hoof, the signing apes appear to be responding at least in part to subtle cues from their trainers.

Reports of Terrace's work have been

widely disseminated. Understandably, they have added to the ape-language controversy, and counter-arguments from other researchers have begun to appear. The author himself, at the end of the volume, explains why he thinks Nim's full linguistic potential may not have been realized, and he outlines a million dollar plan that he believes would produce greater success in a future project.

Language is the central issue, but the book also offers some rare insights into the personality of a bright young chimp. There are some fine photographs, and an informative appendix devoted to sign language. While the definitive work on language in apes has yet to appear, this is certainly both a scholarly and well-written one. □

Jean Berko Gleason is Professor of Psychology at Boston University.

Eclipsing binary light curve analysis

Joel A. Eaton

Language of the Stars: A Discourse on the Theory of the Light Changes of Eclipsing Variables. By Zdeněk Kopal. Pp. 280. (Reidel: 1979.) Hardback Dfl. 120, \$63; paperback Dfl. 55, \$28.95.

THIS book is written for an exceedingly small audience of specialists, or would-be specialists, involved in eclipsing binary light curve analysis. Contrary to the publisher's claim on the back cover, it is not a suitable book for amateur astronomers - other than those with doctorates in theoretical physics. Likewise, it would be inappropriate as a text for a university course about double stars as its content is too narrowly defined, while the references are almost completely restricted to the work of Kopal and his associates.

Throughout the book, Kopal seems to be re-fighting his traditional battle against the Russell model for calculating light curves. In doing this he has for the most part ignored the important work on the synthesis of light curves in the past decade, in which electronic computers have been used to integrate numerically over the visible surfaces of the components of a

model binary system the light received at a distant point. This approach, developed by Leon Lucy, Robert E. Wilson and Graham Hill, to mention but a few of the more important contributors, has practically superseded the Russell model for application to tidally distorted binaries. Yet it rates only a few sentences of disparagement from Kopal.

The subject of this book is a method for determining the geometry of an eclipsing binary star by the Fourier analysis of its light variation, a technique already used extensively by others, Slawek Ruciński for example (*Acta Astronomica* 23, 79; 1973), in studies of the light curves of W Ursae Majoris binaries. The classical method of analysing such light curves is to calculate a theoretical light curve for an assumed set of geometrical and photometric elements, compare these calculations with the observations of brightness as a function of orbital phase, and modify the elements to produce a better fit.

Kopal has devised a scheme for relating the geometrical elements of the model to certain properties of the Fourier transform of the light variation. Specifically, he has derived complicated algebraic equations relating geometrical elements and certain Fourier coefficients. However, after roundly criticizing the Russell model for basing a light curve solution on only three fixed points on the light curve (as was done in the early days), Kopal goes on to base his Fourier-analysis solutions on the power at only four frequencies in the Fourier transform. Indeed, nowhere in the book does he illustrate the Fourier transform of a light curve. □

Joel A. Eaton is a Research Associate at the Dyer Observatory of Vanderbilt University, Nashville, Tennessee, who specializes in studies of eclipsing binary light curves.

Inspec have just published *Ion-Solid Interactions: A Comprehensive Bibliography*, compiled by Walter M. Gibson and Henry H. Teitelbaum. The bibliography, which consists of three volumes - *Bibliography*, *Permuted title index* and *Author-title index* - and contains more than 12,000 references, is available from Inspec, Nightingale Road, Hitchin, Herts, UK, price £95, \$195.