satellite plan has been provided by the U.S. National Committee. The inside front cover carries a map of the Antarctic with the positions of the various national stations and the inside rear cover the Geophysical Year calendar, with the dates of those special days and periods it has been possible to fix in advance for more concentrated observations. There will be other special periods, the Special World Intervals, on occasions of unusual solar phenomena, such as solar flares. The pamphlet concludes with a description of relatively simple apparatus for observing sunspots and roughly recording changes in magnetic variation which could be assembled in a school physics laboratory. The newer and less-tried methods of carrying instruments by rocket and artificial satellite are perhaps given undue prominence, and there is no mention in the text of the World Meteorological Intervals shown in the calendar. The pamphlet should be useful to a science teacher for preparing lessons on the Geophysical Year.

The Unesco pamphlet gives much more, but not altogether overlapping, information for sixpence more than the Guide. It includes many quantitative geophysical data and a detailed account of the history of the plan for the Year, naturally stressing the financial support given by Unesco. It goes into greater detail than the Guide, stating fully, for example, as the Guide does not, the reasons for the selection of particular dates and periods for the specially concentrated observations, and under "Measuring the Earth" it explains that it is hoped to increase the accuracy of knowledge of the distance between the continents from roughly 100 m. to 30 m. The pamphlet concludes with a useful glossary. It is not necessary to go to Antarctica to study lee-wave clouds as might be thought from the caption to a photograph of one, and there is no detailed calendar. Neither the Guide nor the Unesco pamphlet says enough about what will be done in the special days and periods ; it is merely stated that observations too complex to be made daily will be made during them. Altogether, however, the Unesco pamphlet is strongly to be recommended.

The Science Museum pamphlet provides an easily readable, broadly popular, mainly qualitative, account of the aims and methods of the Geophysical Year.

<div align="right">G. A. BULL</div>

PRIMES AND FACTORS

Factor Table for the First Ten Millions
Containing the Smallest Factor of Every Number not Divisible by 2, 3, 5, or 7 between the Limits 0 and 10,017,000. By Derrick Norman Lehmer. Pp. xvi+476. (New York and London : Hafner Publishing Company, 1956.) 160s.

List of Prime Numbers from 1 to 10,006,721
By Derrick Norman Lehmer. Pp. xv+133. (New York and London : Hafner Publishing Company, 1956.) 107s. 6d.

PRIME numbers have interested professional and amateur mathematicians for many centuries, and continue to do so. Many have made factor tables and lists of primes, culminating in the great factor table of Kulik to 100 millions ; this remains in manuscript and is inaccessible, difficult to read, and full of errors.

For practical purposes the two volumes produced by D. N. Lehmer form the definitive tables for those needing factors of numbers and using primes not exceeding ten millions. These two volumes first appeared in 1909 and 1914. The first gives the least factors of all numbers up to 10,017,000 that are not divisible by 2, 3, 5 or 7, in an easily usable though (because of the absence of multiples of 7) not absolutely direct form. The second volume lists all primes from 1 to 10,006,721 in a manner allowing the rank (that is, n for the nth prime) to be easily extracted.

Lehmer's tables superseded the considerable earlier efforts of Burckhardt (first three millions), James Glaisher (fourth, fifth and sixth millions), Dase (seventh and eighth millions) and Dase and Rosenberg (ninth million). Of these, Glaisher's were remarkable for accuracy when they appeared, but all are surpassed in this respect by Lehmer's table. In the list of primes the only known errors are :

Page	Column	Line	For	Read
11	13	1	8151	8051
14	30	55	51	47
99	20	heading	224	724

although there are several missing rules, and a few misprints in the Introduction. No error is known in the Factor Table.

Lehmer's tables have been out of print for some time, so that the demand, constant over decades though not great, has led to a high scarcity price for second-hand copies, which are all too rare. It is therefore with much pleasure and interest that this new edition is received, of a standard, definitive and highly accurate work ; it is time for the volumes to be generally available again.

The reproduction of the original tables was good, but the figures, typed and reduced, are considerably too small and the large page awkward to use ; legibility was reduced by use of a yellowish paper. It is thus pleasant to record the use of a whiter paper, even though the page has, inevitably, the same layout and is of the same unwieldy size. One criticism may be mentioned ; it is a pity that known errors were not corrected—as might easily have been done—before reproduction. Instead, an arbitrary hand-marked copy has been used, with errors apparently all noted, but no corrections given. The interest of a user of the original copy in early prime fours is unexpectedly evident ! This is, however, only a minor criticism of a useful job well done.

We may, perhaps, note some further tables. There is the table published in 1951 which was prepared by Kulik, Poletti and Porter giving primes in the 11th million, and the manuscript factor table for this million prepared by N. G. W. H. Beeger in Amsterdam. There are also two sieves of primes, computed electronically on cards—one by D. H. Lehmer (son of D. N. Lehmer) prepared on SWAC at Los Angeles to about 35 million, and one prepared by D. O. Clayden on the pilot ACE at the National Physical Laboratory. The latter has been used to check a list of primes, prepared on EDSAC at Cambridge by the writer, that extends at present to 17 million. Thus Kulik's great work stands alone, even in the present day of electronic computation, just as Lehmer's tables are the outstanding published source.   J. C. P. MILLER