NOTE ON A MERSENNE NUMBER.

BY MR. H. J. WOODALL, A.R.C.S.

I DESIRE to announce the discovery that $2^{181} - 1$ is divisible by 43441 (a prime). This is important because the exponent 181 is one of the few remaining prime numbers, less than 257, about which it was to be inferred, as not being included in Mersenne's list, that, used as exponents, they would give $2^p - 1$ composite numbers. The writer has verified the result by direct division, and desires to express his thanks to Lieutenant Colonel Allan Cunningham, R.E., for his verification.

MARKET PLACE,
STOCKPORT, ENGLAND,
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SHORTER NOTICES.

A Text-Book on Advanced Algebra and Trigonometry, with Tables. By W. C. BRENKE, Ph.D. New York, The Century Company, 1910. 8vo. x + 345 pp.

PROFESSOR Brenke has suceeded in bringing together within the 284 pages of his book that are taken up by the text most of the topics of algebra and trigonometry that are suitable for presentation in the freshman year of our colleges. Selection of subjects can be made so as to suit the needs of the classes in liberal arts colleges, where only three hours a week are devoted to mathematics, as well as those of classes in the colleges of engineering, where five weekly hours is the allotted time.

As the title indicates, this book is an attempt to correlate the subjects of algebra and trigonometry. The author says in the preface: "Usually algebra is taken up first and then trigonometry, or else the two subjects are studied on alternate days. Neither plan is quite satisfactory. It has therefore seemed to the writer that a single book, treating both subjects in a correlated manner, might be of service both to student and teacher."

In the professional colleges correlation is induced by the fact that the work in mathematics is to be applied later on; the desire to direct the work as much as possible toward the applications will tend to unify and correlate the work in these colleges, independently to some extent at least of how the subjects are arranged in the text-book. It is in the non-professional colleges, where for many the freshman work in mathematics is the last they will ever do in that subject, that the problem of text-book correlations of algebra and trigonometry becomes of greater importance.

What contribution does Professor Brenke's book make towards the solution of the problem? A glance at the table of contents shows that the subject matter of plane trigonometry is inserted bodily between two chapters of algebra. The treatment of the trigonometry does not show traces of the existence of algebra to any greater extent than do ordinary treatments of the subject, neither do the chapters on algebra that follow show any influence of the trigonometry, except in those parts which are commonly studied after the trigonometry.

Clearly then, the process of correlating the two subjects has not yet gone very far. But, a first step has been taken; the two subjects have been brought within the same covers. In order to mix them more thoroughly, they will each have to be divided into smaller parts and brought into more frequent contact. If at the same time, we should consider how the work of the first year in college may be made to grow out of the high school work, we may come to a course better adapted to the needs of the students referred to above.

On the other hand, the book presents an interesting correlation of both the algebra and the trigonometry with the elements of analytic geometry and of the calculus. Introducing the graph of a linear function in Chapter IV, the author lets the graphical solution of simultaneous equations lead in Chapter V to an elementary discussion of the conic sections. In the first chapter on trigonometry the graphs of the functions are constructed, in contrast with most texts on trigonometry, in which they do not appear until near the end of the book. Although it is to be regretted that the graphical work is not developed further and not made use of more than for the solution of the equation

$$\sin 2\theta + \sin \theta + k = 0,$$

a method has at least been indicated. In Chapter XIII, Maclaurin's series is established and applied at once to the computation of the trigonometric functions and of logarithms.

The treatment throughout the book is clear and to the point;

it speaks a language the student can easily understand. Numerous examples and problems are given with every topic. We welcome Chapter XIV on computation, approximations, differences, and interpolation. The requirements of practical computation are responsible for so many of the algebraic reductions with which our classes struggle, that a first hand experience with the problems of computation must help the students to see the reasons for some of the hardships inflicted upon them. The review in Chapters I and II of those parts of the high school work which are stumbling blocks for most freshmen and the discussion of division by 0 and of infinity will be appreciated by those who teach freshmen classes.

The definition of infinite series in § 196 confuses the notion of series with that of sequence. In § 246 we read "An arrangement of the numbers 1, 2, 3, $\cdots$, n is called an inversion," a statement which attributes to this word a meaning not usually given it.

Many of the subjects taken up require a more rigorous treatment than it would be wise to give them in an introductory text. In most such cases the finer points are not slurred over, but clearly indicated and then taken for granted, as, for instance, in discussing $\lim_{z=\infty} (1 + 1/z)^z$, in deriving Maclaurin's series, etc.

The last sixty pages of the book contain the answers for the odd-numbered exercises, an index, and two appendices. The first of the appendices gives a list of formulas, definitions, and theorems. The second includes, besides the tables commonly found, also a conversion table for changing from sexagesimal to radian measure, and conversely; one for $\log_e x$, e^x, and e^{-x} from $x = 0$ to $x = 5$ at intervals of 0.05; and one for the squares and cubes, square and cube roots of numbers between 1 and 100. A handy cardboard protractor-ruler accompanies the book.

Among the misprints, we notice c in place of c^2 on page 23, 2d line from the top; and $\sqrt[4]{9.35}$ in place of $\sqrt[4]{9.35^3}$ on page 29, 10th line from the bottom.

ARNOLD DRESDEN.

College Algebra. By SCHUYLER C. DAVISSON, PH.D. New York, The Macmillan Co., 1910. Small 8vo. xvi + 243 pp. $1.50 net.

IN this book no attempt at correlation is made; it is a pres-