Since $a \leqq 374930473917097$, we have in each case $k \leqq 39111579$. Thus the problem of representing N as the difference of squares was split into 8 parts. The first two parts were covered by the machine without any result. On the third run, however, the machine stopped almost at once at $x = 58088$. This gives

$$a = 556846584735, \quad b = 556644555032.$$

Hence we have the factorization

$$2^{79} - 1 = 2687 \cdot 202029703 \cdot 1113491139767.$$

It is not difficult to show that the factors are primes. This is the 13th composite Mersenne number to be completely factored. The author's recent report* on Mersenne numbers should be changed accordingly.

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MATRICES WHOSE sTH COMPOUNDS ARE EQUAL

BY JOHN WILLIAMSON

If A is a matrix of m rows and n columns and s is any positive integer less than or equal to the smaller of n and m, from A can be formed a new matrix A_s of ${}_mC_s$ rows and ${}_nC_s$ columns, the elements in the tth row of A_s being the ${}_nC_s$ determinants of order s that can be formed from the t_1th, $\cdots$, t_sth rows of A, and the elements in the tth column being the ${}_mC_s$ determinants of order s that can be formed from the t_1th, $\cdots$, t_sth columns of A. The matrix A_s, so defined, is called the sth compound matrix of A. In the following note we discuss the necessary and sufficient conditions under which the sth compounds of two matrices are equal. We shall require the following lemmas.

LEMMA I. *The rank of the sth compound of a matrix A, whose rank is r, is ${}_rC_s$ if $r \geqq s$ and is zero if $s > r$.*†

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* This Bulletin, vol. 38 (1932), p. 384. Dr. N. G. W. H. Beeger has kindly called my attention to the fact that $2^{233}-1$ has two known prime factors and should be classified accordingly.

† Cullis, *Matrices and Determinoids*, vol. 1, p. 289.