

$$R = R_s + R_z = a_{1,0} + a_{0,1}.$$

In conclusion it should be stated that  $R_z$  is the negative of  $\bar{R}$  defined in the article in the Transactions (loc. cit.); this change is also carried over into the definition for the total residue. The reason for this change is partly evident in the results just obtained; then this change of sign brings  $R_z$  into accord with the mean derivative and the circulation theorem (4'). Also a slight change in the proof of Theorem 1 for  $R_s$  will establish the theorem for  $R_z$ .

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## NOTE ON A MERSENNE NUMBER

BY R. E. POWERS

I have recently determined by the computation of Lucas' series 4, 14, 194, . . . \*that the number  $N = 2^{241} - 1$  is composite, since the 240th term of the series is congruent to

$$- 98\ 6778335538\ 8807227981\ 3604528486\ 9326522489\ 7467133466 \\ 0099172867\ 1619979800 \pmod{N}.$$

This term would be zero if  $N$  were prime.

The square of each term was obtained by means of a computing machine, D. N. Lehmer's *cross-multiplication*† being used; and these squares, diminished by 2, were divided by  $N$  by hand, with the aid of a table of the 1000 multiples of  $N$ :  $N, 2N, 3N, \dots, 1000N$ , the quotients being thus obtained three or more digits at a time, and the computation was checked throughout by the four moduli 9,  $10^3 + 1$ ,  $10^4 + 1$ , and  $10^7 + 1$ .

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\* This Bulletin, vol. 38 (1932), p. 383.

† American Mathematical Monthly, vol. 30 (1923), p. 67, and vol. 33 (1926), p. 199.