have 54 additional cycles or a grand total of 252 cycles. By varying the number emitted into FS2, the number of cycles in program step 6, and hence in the total, may be increased. By varying the number read into MQ from the card the number of cycles may be increased or decreased by multiples of 4. If the machine has fewer cycles the unfinished program will cause it to stop. Usually key punching 3 or 4 cards and moving one wire on the 521 control panel 2 or 3 times will determine the capacity of the machine to the nearest cycle.

If the user has a 20 or 40 program step 604 the programming must call for 40 or 20 electronic cycles less respectively. This can be accomplished by simply changing the number read into MQ.

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134. FRITZ EMDE.—Fritz Emde, professor emeritus of the Technische Hochschule, Stuttgart, died there on June 30, 1951; he would have been 78 years old on July 13. In *MTAC*, v. 3, we published (p. 397–398) some biographical notes, and (opp. p. 333) a portrait.

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135. RALPH ERNEST POWERS.—This amateur mathematician died on Jan. 31, 1952, at Puente, California. He would have been 77 years old on April 27. Mr. Powers was more responsible than any other man for the demonstration of the failure of Mersenne's conjecture. He proved that $2^{89} - 1$ and $2^{107} - 1$ were primes, and that several other Mersenne numbers were composite by long and laborious desk machine calculations. He was not aware of the discovery, the night before his death, of two new Mersenne primes (*MTAC*, v. 6, p. 61). Mr. Powers was born in Fountain, Colorado, and spent most of his life in Denver.

D. H. L.

QUERIES

41. A DEFINITE INTEGRAL.—Does the integral

$$\int_0^\infty u^{-1} \exp(-zu - u^{-2})\, du$$

have a generalized asymptotic form for large positive values of z, say $z > 10$? The integral is a solution of the differential equation

$$zy''' + 2y'' + 2y = 0.$$

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