Mersenne and Cole

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PICTURES FROM MACTUTOR HISTORY OF MATHEMATICS ARCHIVE
Prime Numbers and Mersenne

Mersenne primes are of the form $M_n = 2^n - 1$

$M_n$ is prime $\Rightarrow$ $n$ is prime

But which prime $n$ generate prime $M_n$?

Marin Mersenne (1588 – 1648) came up with a list:

$$n = 2, 3, 5, 7, 13, 17, 19, 31, 67, 127, 257$$
Correcting Mersenne!

Up to $M_{19}$ were already known

$M_{31}$ and $M_{127}$ are also correct!

But $M_{67}$ & $M_{257}$ are composite

And Mersenne missed $M_{61}$, $M_{89}$ & $M_{107}$

Éduoard Lucas (1876) proved $M_{67}$ composite without finding a factor
Enter Frank Nelson Cole

We know that $M_{67}$ is not prime, but what are the factors?

In 1903 Frank Nelson Cole delivered a lecture composed of two calculations:

$$2^{67} - 1 = 147,573,952,589,676,412,927$$

$$193,707,721 \times 761,838,257,287 = 147,573,952,589,676,412,927$$

3 years of Sundays well spent!