

Reprinted from:
Report of the Superintendent of the Coast Survey, 1876, pp. 81–82.

A P P E N D I X No. 6.

A NEW SYSTEM OF BINARY ARITHMETIC, BY BENJAMIN
PEIRCE, CONSULTING
GEOMETER, UNITED STATES COAST SURVEY.

CAMBRIDGE, *February 25, 1876.*

DEAR SIR: In sending you the inclosed paper upon a new system of binary arithmetic, I have no such extravagant thought as that of a substitute for our decimal system. I presume, however, that it is not unsafe to follow in the footsteps of Leibnitz, even in his excursions of pleasure. It seems to me, also, that it may be interesting to compute some of the fundamental numbers of science by a new arithmetic, for the purpose of comparison and verification.

Yours, very truly,

BENJAMIN PEIRCE.

CARLILE P. PATTERSON,
Superintendent United States Coast Survey.

1. Leibnitz proposed a system of binary arithmetic which he thought to be peculiarly fitted to exhibit the symmetry of certain arithmetical operations. Misled by erroneous reports, he believed that a similar system was originally used by the Chinese, as long as two thousand years before the Christian era.

2. The system here proposed retains the advantages of that of Leibnitz, while it is more economical of space, more so even than our ordinary decimal arithmetic. It admits of ready transformation into any other system of which the base is some power of two.

3. In the new system, as in that of Leibnitz, there are only two elementary characters, a vertical straight line and a circle, but their mode of use is interchanged. Leibnitz adopted the ordinary mode of ciphering, in which the circle, called the cipher, occupies each vacant space, while the vertical line is the only significant digit, and represents unity. In the new