

I. *A new Method for making Logarithms, and vice versâ, for finding the Number corresponding to a Logarithm given, by help of the following Table. Communicated by Mr. John Long, S. Theol. Bacc. and Fellow of Corpus Christi Coll. Oxon.*

<i>Log.</i>	<i>Nat. Num.</i>	<i>Log.</i>	<i>Nat. Num.</i>
0,9	7.943282347	0,0009	1.002074475
0,8	6.309573445	0,0008	1.001843766
0,7	5.011872336	0,0007	1.001613109
0,6	3.981071706	0,0006	1.001382506
0,5	3.162277660	0,0005	1.001151956
0,4	2.511886432	0,0004	1.000921459
0,3	1.995262315	0,0003	1.000691015
0,2	1.584893193	0,0002	1.000460623
0,1	1.258925412	0,0001	1.000230285
0,09	1.230268771	0,00009	1.000207254
0,08	1.202264435	0,00008	1.000184224
0,07	1.174897555	0,00007	1.000161194
0,06	1.148153621	0,00006	1.000138165
0,05	1.122018454	0,00005	1.000115136
0,04	1.096478196	0,00004	1.000092106
0,03	1.071519305	0,00003	1.000069080
0,02	1.047128548	0,00002	1.000046053
0,01	1.023292992	0,00001	1.000023026
0,009	1.020939484	0,000009	1.000020724
0,008	1.018591388	0,000008	1.000018421
0,007	1.016248694	0,000007	1.000016118
0,006	1.013911386	0,000006	1.000013816
0,005	1.011579454	0,000005	1.000011513
0,004	1.009252886	0,000004	1.000009210
0,003	1.006931669	0,000003	1.000006908
0,002	1.004615794	0,000002	1.000004605
0,001	1.002305238	0,000001	1.000002302

<i>Log.</i>	<i>Nat. Num.</i>	<i>Log.</i>	<i>Nat. Num.</i>
0,0000009	1.000002072	0,0000009	1.000000207
0,0000008	1.000001842	0,0000008	1.000000184
0,0000007	1.000001611	0,0000007	1.000000161
0,0000006	1.000001381	0,0000006	1.000000138
0,0000005	1.000001151	0,0000005	1.000000115
0,0000004	1.000000921	0,0000004	1.000000092
0,0000003	1.000000690	0,0000003	1.000000069
0,0000002	1.000000460	0,0000002	1.000000046
0,0000001	1.000000230	0,0000001	1.000000023

This Table is what I sometimes make use of for finding the Logarithm of any Number propos'd, and *vice versâ*. For instance: Suppose I had occasion to find the Logarithm of 2000. I look in the first Class of my Table (the whole Table consists of 8 Classes) for the next less to 2, which is 1.995262315, and against it is 3, which consequently is the first Figure of the Logarithm sought. Again; dividing the Number propos'd 2, by 1.995262315 the Number found in the Table, the Quotient is 1.002374467; which being look'd for in the second Class of the Table, and finding neither its equal, nor a lesser, I add 0 to the part of the Logarithm before found, and look for the said Quotient 1.002374467 in the third Class, where the next less is 1.002305238, and against it is 1, to be added to the part of the Logarithm already found; and dividing the Quotient 1.002374467, by 1.002305238, last found in the Table, the Quotient is 1.000069070; which being sought in the fourth Class gives 0, but being sought in the fifth Class gives 2, to be added to the part of the Logarithm already found; and dividing the last Quotient by the Number last found in the Table, *viz.* 1.000046053, the Quotient is 1.000023015, which being sought in the sixth Class, gives 9 to the part of the Logarithm already found: And dividing the last Quotient by the new Divisor, *viz.* 1.000002072, the Quotient is 1.000000219, which being greater than 1.000000115, shews that the Logarithm already found, *viz.* 3.3010299 is less than the Truth by more

more than half an Unit; wherefore adding 1, you have *Briggs's* Logarithm of 2000, *viz.* 3.3010300.

If any Logarithm be given, suppose 3.3010300, throw away the Characteristic, then over against these Figures 3 . . . 0 . . 1 . . . 0 . . 3 . . 0 . . 0, you have in their respective Classes 1.995262315 . . . , 0 1.002305238 0 1.000069080 0 . . . 0 which multiplied continually into one another, the Product is 2.000000019966, which by reason the Characteristic is 3, becomes 2000.000019966, &c. that is, 2000, the Natural Number desired. I shall not mention the Method by which this Table is fram'd, because you will easily see that from the use of it.

It is obvious to the intelligent Reader, that these Classes of Numbers are no other than so many Scales of mean Proportionals: In the first Class, between 1 and 10; so that the last Number thereof, *viz.* 1,258925412 is the tenth Root of 10, and the rest in order ascending are the Powers thereof. So in the second Class, the last Number 1,023292992 is the hundredth Root of 10, and the rest in the same manner are Powers thereof. So 1,002305238 in the third Class, is the tenth Root of the last of the second, and the rest its Powers, &c. Or, which is all one, each Number in the preceding Class, is the tenth Power of the corresponding Number in the next following Class: Whence 'tis plain, that to construct these Tables requires no more than one Extraction of the fifth or sur-solid Root for each Class, the rest of the Work being done by the common Rules of Arithmetick; and for extracting the fifth Root, you will find more than one very compendious Rule in *Num.* 210 of these *Transactions*, if any one shall desire to examin the *computus* of these Tables.

The Process is exactly the Reverse of Mr. *Briggs's* Doctrine, in *Cap.* XII. of his *Arithmetica Logarithmica* of *Vlacq's* Edition; and had *Briggs* been appriz'd hereof, it would have greatly eased the Labour of deducing the Logarithms of the first prime Numbers, which appear to have cost him so much Pains.