Letter from Newton [to John Smith?], dated 27 August 1675

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Trinity College
Aug: 27th, 1675.

Sir,

In the Theorems that I sent you I perceive I committed a mistake in transcribeing them from the papers where I had computed them. They should have been

2) $B + \frac{A}{B} = \sqrt{A}.$

3) $2B + \frac{A}{BB} = \sqrt{c:} \; A.$

4) $3B + \frac{A}{B^{c:}} = \sqrt{qq.} \; A.$

In words at length: To finde the cube root of A to 11 decimal places: seek the Root by Logarithms to 5 decimal places, and suppose it B. Then square B, not by Logarithms, but by common Arithmetick, that you may have its exact square to 10 decimal places, and by this square Divide A to 11 decimal places, and to the Quotient add 2B: The third part of the Quotient shall be the root cubical of A: to 11 Decimal places. your surest way will be to finde first the whole series of the Roots, B. by Logarithms, & try whether it be Regular by Differencing it: Then square those Roots by Nepeirs bones, and lastly Divide each Number A. by the correspondent square, and add 2B to each Quotient, and try the Resulting series againe by differencing it, whether it be Regular. If it be regular, I suppose you know the differences will at last come to be equal: what is said of Cubes is easily applyable to Square=Squares: I would have given you examples in numbers; but that I have lent my Bookes of Logarithms to a person, who is out of Towne.

your humble Servant

Is: Newton

I thank you for your
intended present.

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Mr Collins, I have left with the Maid your book of Briggs Logarithms, and would request your favour (if I might not be too troublesome) to procure me the loane of Nepeirs Bones & the Booke of their use; I should in a few dayes returne them J: Smith

I finde all the Roots (found by the longest Radius of logarithms) false & uncertaine from the 8th place of the Decimal onwards; though the logarithm it selfe & the work upon it be duly proved.

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M$_r$ Newtons rules about Pure Powers, for finding their rootes.

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