LXXIX. On a curious property of vulgar fractions

Mr. J. Farey Sen.
Published online: 27 Jul 2009.

To cite this article: Mr. J. Farey Sen. (1816) LXXIX. On a curious property of vulgar fractions, Philosophical Magazine Series 1, 47:217, 385-386, DOI: 10.1080/14786441608628487

To link to this article: http://dx.doi.org/10.1080/14786441608628487

Please scroll down for article
On a curious Property of vulgar Fractions.

is true, but known in France by the name of *Pylones*, and which the Greeks also called *Propylee*. There are here also two truncated pyramids 66 feet high, which contain between them the principal gate and grand entrance. This gate leads into a spacious court surrounded by galleries, formed on one side by eight columns, on the other by pilasters, on which are affixed as caryatides, but without bearing any thing, some colossal statues of Osiris. The aspect of the whole inspires, according to the report of eye-witnesses, a sentiment of ineffable veneration. Opposite to the principal entrance rises a second *pylone* of a smaller size. It leads into a second peristyle, also formed of caryatides, pilasters, and columns.

[To be continued.]

LXXIX. On a curious Property of vulgar Fractions. By Mr. J. Farey, Sen.

To Mr. Tilloch.

Sir,—On examining lately, some very curious and elaborate Tables of "Complete decimal Quotients," calculated by Henry Goodwyn, Esq. of Blackheath, of which he has printed a copious specimen, for private circulation among curious and practical calculators, preparatory to the printing of the whole of these useful Tables, if sufficient encouragement, either public or individual, should appear to warrant such a step: I was fortunate while so doing, to deduce from them the following general property; viz.

If all the possible vulgar fractions of different values, whose greatest denominator (when in their lowest terms) does not exceed any given number, be arranged in the order of their values, or quotients; then if both the numerator and the denominator of any fraction therein, be added to the numerator and the denominator, respectively, of the fraction next but one to it (on either side), the sums will give the fraction next to it; although, perhaps, not in its lowest terms.

For example, if 5 be the greatest denominator given; then are all the possible fractions, when arranged, \( \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{2}{5}, \frac{1}{2}, \frac{3}{5}, \frac{4}{5}, \frac{3}{4}, \frac{4}{5} \); taking \( \frac{1}{3} \) as the given fraction, we have

\[
\frac{1+1}{3+3} = \frac{2}{8} = \frac{1}{4}
\]

the next smaller fraction then \( \frac{1}{5} \); or,

\[
\frac{1+1}{3+2} = \frac{2}{5},
\]

the next larger fraction to \( \frac{1}{3} \). Again, if 99 be

Vol. 47. No. 217. May 1816. B b the
the largest denominator, then, in a part of the arranged Table, we should have \( \frac{15}{52}, \frac{23}{97}, \frac{13}{45}, \frac{24}{85}, \frac{11}{38}, \) &c.; and if the third of these fractions be given, we have \( \frac{15 + 13}{52 + 45} = \frac{28}{97} \) the second: or \( \frac{18 + 11}{45 + 38} = \frac{24}{83} \) the fourth of them: and so in all the other cases.

I am not acquainted, whether this curious property of vulgar fractions has been before pointed out?; or whether it may admit of any easy or general demonstration?; which are points on which I should be glad to learn the sentiments of some of your mathematical readers; and am

Sir,

Your obedient humble servant,

Howland-street.

J. Farey.

LXXX. Notices respecting New Books.

Ordnance Maps of British Counties.

The circumstances which were thought to render expedient the suspension of the publication of the ordnance maps being now removed, the publication of them is resumed, and they may be obtained, as formerly, at the Drawing-Room in the Tower, or of Mr. Faden, Charing-Cross. As the suspension was only intended to be temporary, not merely the operations of the Trigonometrical Survey, but those of the mapping and engraving, have been regularly carried on during that period, under the superintendence of Colonel Mudge; so that several county maps will be ready for delivery almost immediately. The maps of Cornwall, Devonshire, Dorsetshire, Hampshire, (including the Isle of Wight,) Sussex, and that part of the county of Kent which squares-in on the Sussex side with the general work, will be published in a very few weeks: and a separate map of the Isle of Wight is now on sale. The maps of all the contiguous counties north of these are in the hands of the engravers; and that of the whole county of Kent is re-engraving, and in a state of forwardness. When the several plots and portions now planning by the surveyors are finished, at least three-fifths of England and Wales will be ready to be placed successively in the hands of the engravers; and the work will be carried on with all possible expedition consistent with accuracy. These maps are on a scale of an inch to a mile, a scale that admits of an attention to minutiae which must of necessity be disregarded in maps of smaller size.