AN ATTEMPT TO ILLUSTRATE THE USEFULNESS OF DECIMAL ARITHMETIC, IN THE REVD. MR. BROWN'S METHOD OF WORKING INTERMINATE FRACTIONS

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TO ILLUSTRATE THE

USEFULNESS

OF

DECIMAL ARITHMETIC.

THE moft confiderable Improvements in Decimal Arithmetic, that have been made fince the Days of Mr. COCKER and Mr. WINGATE, (two of the beft Authors in the laft Century) confift in the Manner of working Interminate Fractions; and of reducing our Coin to Decimal Numbers, and valuing thofe Numbers at Sight.

A   And

And it may be doubted, if any Thing new has been produced, that was not exhibited before the Revolution, by the Ingenious and Reverend Mr. BROWN, (who invented the *Rotula*) at leaft with equal Perfpicuity ?

I had the Honour to be one of his intimate Acquaintance, and learned more by a few Hours Converfation with him, than I could have attained by Years of Stody; and fhall not now prefume to offer any Thing of my own, but will only communicate what I collected from his Inftructions.

To begin with the Reduction of Money. All the Difficulties therein are owing to the Subdivifions of a Pound Sterling : For if the Integer contained exactly 1000 Parts as a Mill Ree (or Quarter of a Moi d'Or) in *Portugal* doth, our Arithmetic would be all in round Numbers.

But

But having only 960 real Parts in a Pound, we are obliged to fupply the Deficiency by the Addition of 40, and then fuppofe the Pound to confift of 1000 Farthings; whereof every 50 is accounted one Shilling, 25 are reckoned fix Pence, and all under 24 are fo many real Farthings.

By thefe Proportions we can at Sight reduce any decimal Number to Money; all Figures on the left Hand of the Pointer being Pounds, and of thofe to the right Hand, only the firft three Figures (or the thoufandth Parts) are the Fractions of a Pound.

Hence alfo we are inftructed how to exprefs Money in decimal Fractions; for we muft fet down fifty thoufandth Parts for every Shilling, and for any Thing lefs than a Shilling as many Thoufandths as

A 2   there

there be real Farthings, adding one if
they amount to or exceed twenty-four.

But such Numbers only as are aliquot
Parts of 100, will terminate rightly ; for
unless the two last Figures of the thou-
sandth Parts are Cyphers, or 25, or 50,
or 75, they will be imperfect, and require
more Places in the Decimal. To supply
which Defect, multiply the Difference or
Excess of the Thousandths by .04 (which
is the decimal Fraction of $\frac{1}{25}$th) adding
1 to every 24 in the Product, and you
gain the two subsequent Figures in the
Place of hundred thousandths. And if
the fourth and fifth Figures be imperfect,
proceed in the same Manner to gain two
more Places in the Decimal, which will
then be exact, or end in a simple Inter-
minate, which is tantamount.

Thefe

These Rules will be more evident by the following

EXAMPLES.

Let 2 s. 18 d. and 1 s. be expressed in Decimal Numbers.

For the 2 s. we set down $\frac{100}{1000}$ Parts, (which is $\frac{50}{1000}$ for each Shilling) expressed thus - - - - - - - .100

For the 18 d. $\frac{50}{1000}$ and $\frac{25}{1000}$ thus .075

For the 1 s. only $\frac{50}{1000}$ thus - .050

And 6 d. being the Half of 1 s. is .025

These four Numbers are perfect in the Place of Thousandths, an Unit being added in each Decimal, for every 24 Farthings in the Sum expressed.

Now, if 6 d. or 24 Farthings, require the Addition of an Unit, the Decimal of every single Farthing must have the $\frac{1}{24}$th

A 3   Part

Part of that Unit added thereto to make it complete.

Thus for one Farthing we set down .001 thousandth, but the Decimal is imperfect, for it is not a full 24th Part of the true Decimal of six Pence, but wants the Addition of $\frac{1}{14}^{th}$ of 1, which is .0416, and if this Number be subjoined thus .0010416, it will perfect the Decimal of a Farthing.

For Proof of which, divide the Decimal of 6 *d.* by 24, and the Quotient will be .0010416.

Here observe the Reason of substituting .04 instead of .0416, as a Coefficient for perfecting the Decimals. A Twenty-fifth being less than a Twenty-fourth only by 1 in 24; and the lesser Number being more easy to work by in the Head; for if you multiply by .04, and add 1 to every

24

24 in the Product, it will be the same as if you had multiplied by .0416.

Some Fractions of Money will be perfect at the fourth or fifth Place in the Decimal, as the following,

$$4d. \tfrac{1}{2} \qquad 3d. \qquad \text{and } 1d. \tfrac{1}{2}$$

Four Pence Halfpenny contain 18 Farthings, for which set down $\frac{18}{1000}$ thus .018, to perfect which Number multiply the 18 by .04, and the Product is 72, wherein are contained three 24s. so that 3 added to the 72 compleats the Decimal, thus .01875.

For three Pence set down .012, then multiply the 12 by .04, which produces 48, and add 2 for the two 24s. therein, and the Decimal is perfect, viz. .01250.

One Penny Halfpenny is .006, and .04 times 6 make 24, to which add 1, and the Decimal is .00625.

For