

of the *Trachæa*, and afterwards concreted by the Heat of the Part. As this may serve to explain the remarkable Case of *Tulpius*, so I thought it worth being communicated to the Society. I am,

With great Respect,

Your very humble Servant,

June 17.
1731.

FRANK NICHOLLS.

V. *An Account of an Experiment explaining a mechanical Paradox, viz. that two Bodies of equal Weight suspended on a certain sort of Balance [as in Tab. Fig. 2.] do not lose their Æquilibrium, by being removed one farther from, the other nearer to the Center. By the Rev. T. J. Defaguliers, L. L. D. & F. R. S.*

Proposition.

IF the two Weights P, W, in Fig. 3. hang at the Ends of the Balance A B, whose Center of Motion is C; those Weights will act against each other (because their Directions are contrary) with Forces made up of the Quantity of Matter in each multiplied by its Velocity; that is, by the Velocity which the Motion of the Balance turning about C will give to the Body suspended. Now the Velocity of an heavy Body is its perpendicular Ascent or Descent, as will appear

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by moving the Balance into the Position $a b$; which shews the Velocity of P to be the perpendicular Line $e a$, and the Velocity of B will be the perpendicular Line $b g$: For if the Weights P and W are equal, and also the Lines $e a$ and $b g$, their *Momenta* made up of $e a$ multiplied into W, and $b g$ multiplied into P, will be equal, as will appear by their destroying one another in making an *Æquilibrium*. But if the Body W was removed to M, and suspended at the Point D, then its Velocity being only $f d$, it would be over-balanc'd by the Body P; because $f d$ multiplied into M, would produce a less *Momentum* than P multiplied into $b g$.

As the Arcs A a , B b , and D d described by the Ends of the Balance or Points of Suspension are proportionable to their Sines $e a$, $g b$, and $d f$, as also the *Radii* or Distances C A, C B, and C D; in the Case of this common sort of Balance, the Arcs described by the Weights, or their Points of Suspension, or the Distances from the Center may be taken for the Velocities of the Weights hanging at A, B, or D; and therefore the acting Force of the Weights will be reciprocally as their Distances from the Center.

SCHOLIUM.

The Distances from the Center are taken here for the Velocities of the Bodies, only because they are proportional to the Lines $e a$, $b g$, and $f d$, which are the true Velocities. For there are a great many Cases wherein the Velocities are neither proportionable to the Distances from the Center of Motion of a Machine,

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nor to the Aris described by the Weights or their Points of Suspension. Therefore it is not a general Rule, *that Weights act in Proportion to their Distances from the Center of Motion*; but a Corollary of the general Rule, *that Weights act in Proportion to their true Velocities*, which is only true in some Cases. Therefore we must not take this Case as a Principle, which most Workmen do, and all those People which make Attempts to find the *perpetual Motion*, as I have more amply shewn in the *Philosophical Transaction*, N^o 369.

But to make this evident even in the Balance, we need only take Notice of the following Experiment, Fig. 2. A C B E K D is a Balance in the Form of a Parallelogram passing thro' a Slit in the upright Piece N O standing on the Pedestal M, so as to be movable upon the Center Pins C and K. To the upright Pieces A D and B E of this Balance are fix'd at right Angles, the horizontal Pieces F G and H I. That the equal Weights P, W, must keep each other in *Æquilibrio*, is evident; but it does not at first appear so plainly, that if W be removed to V, being suspended at 6, yet it shall still keep P in *Æquilibrio*; tho' the Experiment shews it. Nay, if W be successively moved to any of the Points 1, 2, 3, E, 4, 5, or 6, the *Æquilibrio* will be continued; or if, W hanging at any of those Points, P be successively mov'd to D or any of the Points of Suspension on the cross Piece F G, P will at any of those Places make an *Æquilibrio* with W. Now when the Weights are at P and V, if the least Weight that is capable to overcome the Friction at the Points of Suspension, C and K be ad-

ded to V , as u , the Weight V will overpower, and that as much at V as if it was at W .

From what we have said above, the Reason of this Experiment will be very plain.

As the Lines AC and KD , CB and KE always continue of the same Length in any Position of the Machine, the Pieces AD and BE will always continue parallel to one another, and perpendicular to the Horizon: However, the whole Machine turns upon the Points C and K ; as appears by bringing the Balance to any other Position, as $abcd$: And therefore as the Weights applied to any Part of the Pieces FG and HI can only bring down the Pieces AD and BE perpendicularly, in the same Manner as if they were applied to the Hooks D and E , or to X and Y , the Centers of Gravity of AD and BE ; the Force of the Weights (if their Quantity of Matter is equal) will be equal; because their Velocities will be their perpendicular Ascent or Descent, which will always be as the equal Lines $4l$ and $4L$, whatever Part of the Pieces FG and HI the Weights are applied to. But if to the Weight at V be added the little Weight u , those two Weights will overpower, because in this Case the *Momentum* is made up of the Sum of V and u multiplied by the common Velocity $4L$.

Hence follows, that it is not the Distance $c6$ multiplied into the Weight V , which makes its *Momentum*; but its perpendicular Velocity $L4$ multiplied into its Mass Q . E. D.

This is still further evident, by taking out the Pin at K ; for then the Weight P will over-balance the
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other Weight at V, because then their perpendicular Ascent or Descent will not be equal.

VI. *De Ingenti Sanguinis Vomitu perquam gelidissimis brumali tempore Potionibus curato, Observatio ad Regiam Scientiarum Londinensem Societatem à Petro Antonio Michelotto M. D. R. S. S. transmissa.*

QUUM Patritius Juvenis Præstantissimus Ludovicus Maffetti, rure, ubi venatione, & perequitando se vehementer exercuerat, in urbem reverfus Sanguinem Decimo Calendas Januarias MDCCCXXVIII. ad uncias quinque, sexve matutinis temporibus vomeret, hujuscemodi curationem institui. Primum, quòd Cruoris in Arterias, Venasque viam, eas distendere continenter nitentem insigniter, & præcipuè ex superfluente Sanguineæ materiæ copia adauctam animadverteterem; minimèque ignorarem ipsum Nobilissimum Juvenem laborare scyrrhoso lienis tumore, ob quem, & Sanguinem vel hos ante quatuor annos evomuerat, & narium copiosis hæmorrhagiis à prima usque adolescentia vere, & autumno quotannis tentari consueverat; quæ, posteaquam fortuitò à luforibus follis capiti impactus fuerat, ferè ex toto defecerant; quòd hæc, inquam, minimè ignorarem, ad uncias circiter octo ex hæmorrhoidibus Sanguinem per hirudines protinus mitti, ejus copiæ demendæ, atque à liene, & ventriculo avertendæ causa præcepi; tum aquam ex
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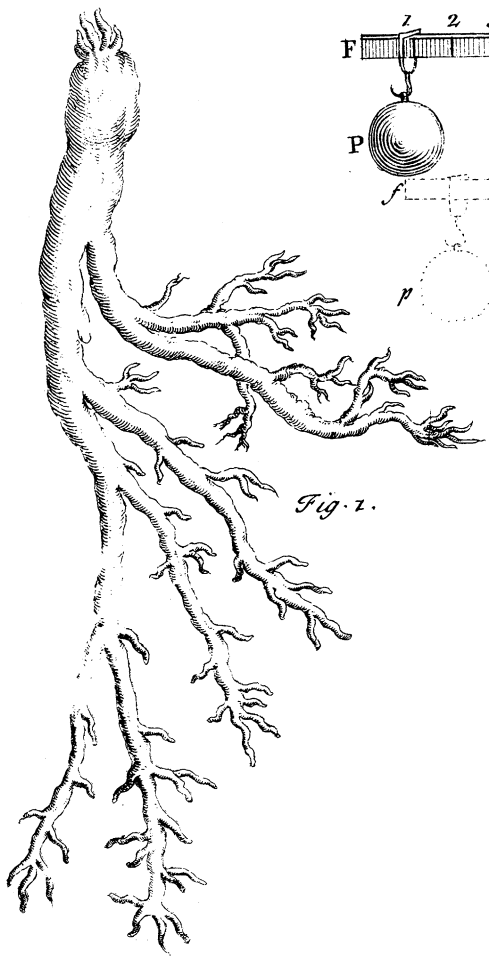


Fig. 1.

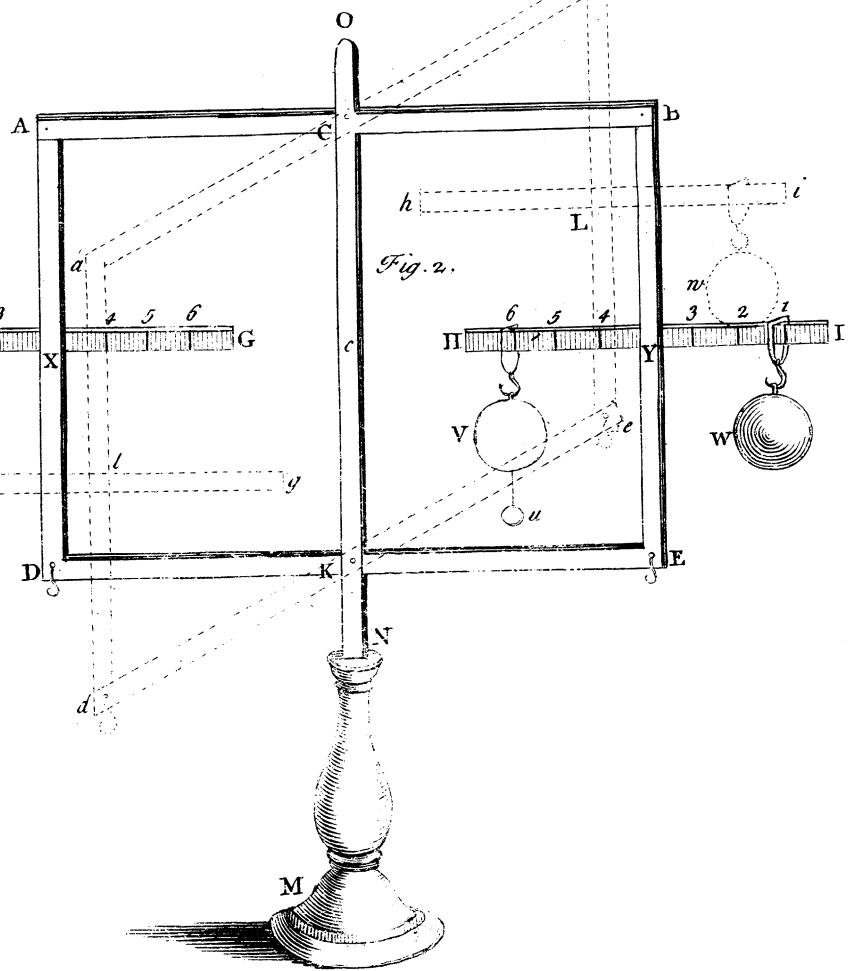
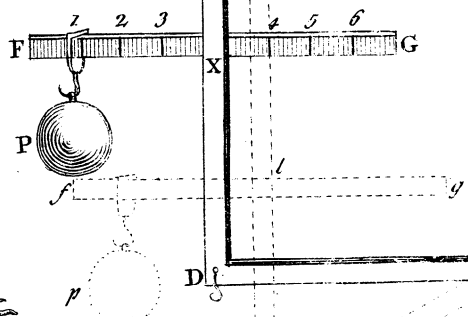


Fig. 2.

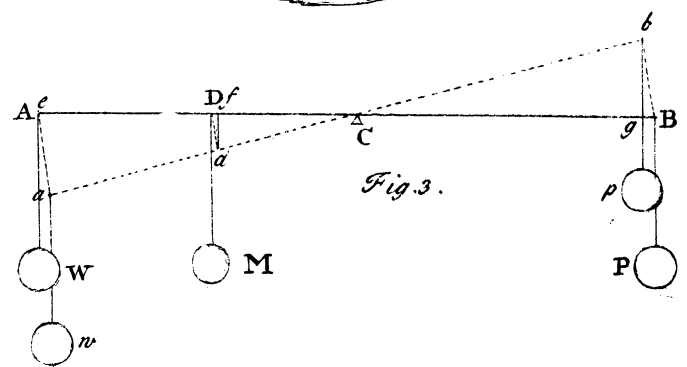


Fig. 3.