

IV. *Experiments concerning the Time required in the Descent of different Bodies, of different Magnitudes and Weights, in Common Air, from a certain Height.* By Mr. Fra. Hauksbee, F. R. S.

TO make these Experiments accurately, I devised the following *Apparatus*, to account exactly for the time of the Bodies descending. At the Height from which the Balls were to be dropt, I fix'd a contrivance in form of a Trough, in all about 4 Feet long; and the end of it, on which the Balls were laid, was loose, swinging on 2 Pins at the extremity of it. This loose end was supported by a thin Piece of Board, which slid under it through a Groove from the other part of the Board: To this sliding Board was fix'd a String, which related to a small Wire that reach'd to the bottom of the Descent, where it (the Wire) had a Communication with a Contrivance, to give motion to a Pendulum which beat  $\frac{1}{2}$  Seconds: Now when this sliding Board (just mention'd) was drawn from under that part of the Trough on which the Balls were placed, the String thereby became so much shorten'd, as to move the Limb of that Contrivance at bottom, which dropt the Pendulum at the same instant of time, as the Balls began to Descend.

EXPERIMENT I.

The first Experiment I made, was with two Balls: One of them a thin Glass Buble, fill'd with Quicksilver; its Diameter 8 tenths of an Inch, and its Weight 840 Grains:

**Grains:** The other Ball was of Cork, whose Diameter was 2 Inches two 10ths, and its Weight 120 Grains. When these Balls were dropt, the Pendulum made 8 Vibrations, just as the Quicksilver Ball struck the Ground, and 8 more were repeated before the Cork arrived at the same place. The Pendulum vibrated  $\frac{1}{2}$  Seconds precisely.

### EXPERIMENT II.

I took a Quicksilver Ball, much of the same Weight and Diameter as before: The other was a thin Glass Buble, its Weight 493 Grains, its Diameter 4 Inches 3 10ths. For these, when they came to descend, the Pendulum made just so many Vibrations as in the last Experiment; that is, the Quicksilver Ball struck the Ground at eight Vibrations, and the other just at the end of sixteen.

### EXPERIMENT III.

The Quicksilver Ball that I made use of in this Experiment, was likewise much of the same Weight and Diameter as before: The other Ball was of Glass, whose Weight was 535 Grains; its Diameter one way measured 5 Inches  $\frac{1}{4}$ , and its opposite Diameter but 5 Inches. Upon the Descent of these Balls, the Pendulum made but one Vibration more than in the other Experiment; that is, the Quicksilver grounded exactly at 8 Vibrations, and there were 9 more before the other Ball arrived at the same place.

These Experiments were made from the top of the Cupito of St. Paul's Church, London; from whence to the Floor, on which the Balls were dropt, measured near 220 Feet. It is to be observ'd, that the Quicksilver Balls made no sensible Impression on the Floor on

which they descended (which at that time was covered with Deal Boards) notwithstanding their Weight and Velocity of Descent.

*The following Experiments on the Descent of Bodies in Air, were made in the same manner, at the Place before mentioned, answering very exactly with the former.*

## Quicksilver Balls.

## Large thin Glass Balls.

| Weight in Grains. | Diam. 10ths of Inch. | Time of falling in $\frac{1}{2}$ Seconds. | Wt. in Gr. | Diam. 10ths. | Time of falling in $\frac{1}{2}$ Seconds. |
|-------------------|----------------------|---|------------|--------------|---|
| 908               | .8                   | 8   | 510        | 5.1          | 17  |
| 993               | .8                   | 8 a little less.                          | 642        | 5.2          | 16  |
| 866               | .8                   | 8   | 599        | 5.1          | 16  |
| 747               | .7 $\frac{1}{2}$     | 8 a little more.                          | 515        | 5.0          | 16 $\frac{1}{2}$                          |
| 808               | .7 $\frac{1}{2}$     | 8   | 483        | 5.0          | 17  |
| 784               | .7 $\frac{1}{2}$     | 8 a little more.                          | 641        | 5.2          | 16  |

These Experiments were made *June* the 9th 1710. at which time the Height of the Quicksilver in the Barometer was 29.7 Inches, and the Thermometer 60 Degrees above the Freezing Point.

*Note,* That the Quicksilver Balls, and the large thin Glass Balls, were dropt together as they are ranged in their several Lines.

## V. Experi-