7. *Lever.*] The lever is generally underſtood to be a bar made uſe of for moving great weights, or effecting ſome great force.

Fig. 5, 6. The bar is applied in one part to ſome ſtrong ſupport; this is called the fulcrum, and is the centre of its motion; the farther the power Q is applied from this centre, the greater muſt be its motion, but the greater weight will it raiſe at G; on the contrary, if we ſuppoſe G to be the power, and Q the effect or the weight to be raiſed, the nearer the fulcrum the force is applied, the leſs will be its power, but the greater velocity will it give to Q. We may conſider our own limbs as levers of this latter deſcription.

8. *Wheel and Axis.*] A lever may be hung upon an axis Fig. 7. and then the two arms of the lever need not be continuous, but fixed to different parts of the axis, and the axis here muſt be conſidered as the fulcrum.

From this caſe of the lever hung upon an axis, it is eaſy to make a tranſition to the wheel and axis. Fig. 8. Here the axes may be conſidered as fulcrums, and the wheels and rollers as levers, whoſe lengths are their ſemidiameters. By different combinations of the wheel and axis, many of the moſt complicated machines are principally made out; and the way of communicating motion from one wheel to another, is by means of teeth at the extremities of the wheels, or by cords or bands, as in the combinations of pulleys.

It has already been remarked, that no combinations of the mechanical powers, however nice or complicate, can encreaſe the whole effect of the force applied; the force can only be modified into certain degrees of ſtrength or velocity.

9. *Balance.*] While we may read the laws that govern the ſpheres, in the properties of any of theſe inſtruments, whether ſimple or complicated, they appear the moſt obvious in the ſimple lever, balance or ſteelyard. If the two balls G and Q were connected together by an inflexible rod, ſteelyard, or lever, drawn from centre to centre, and the rod was ſo divided in C that the part C G bears the ſame proportion to C Q as the ball Q bears to the ball G, then the rod being ſupported at C, ſuppoſe by a thread, will uphold the ball. Now if the thread be twiſted, ſo as to make the balls turn round their common centre of gravity C, it is evident, that the ſmaller ball will perform a larger circle than the greater; in fact it will wheel round the orbit of the greater. So it is with the earth revolving round the ſun; and ſo with the moon wheeling round the earth.

SECTION V.

DAY, NIGHT, *and* SEASONS.

1. *Diurnal Revolution.*] Fig. 20. The earth is alſo obſerved to turn round on its axis, at the ſame time that it moves in its orbit round the ſun: this revolution is performed in the ſpace of twenty-four hours; as any part of its ſurface is turning to the ſun, to that part the ſun ſeems to riſe; and it is with them morning. Turned oppoſite to the ſun, they enjoy noon. Turning from the ſun, he ſeems to ſet; and it is