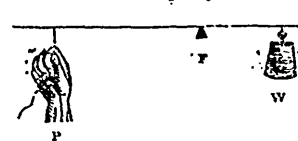


There are three different kinds of levers: in the first, which comprehends the several levers we have described, the fulcrum is between the power and the weight. When the fulcrum is situated equally between the power and the weight, as in the balance, the power must be something greater than the weight, in order to move it; for nothing can in this case be gained by velocity. The two arms of the lever being equal, the velocity of their extremities must be so likewise. The balance is therefore of no assistance as a mechanical power, but it is extremely useful to estimate the respective weights of bodies. But when the fulcrum, *r*, of a lever is not equally distant from the power and the weight, and that the power, *p*, acts at the extremity of the longer arm, the power may then be less than the weight, *w*, its deficiency being compensated by its great-



er velocity; as we observed in describing the *see-saw*. Therefore, when a great weight is to be raised, it must be fastened to the shorter arm of a lever, and the power applied to the longer arm. But, if the case will admit of putting the end of the lever under the weight, no fastening will be required, as you may perceive by stirring the fire. The poker is a lever of the first kind; the point, where it rests against the bar of the grate, whilst stirring the fire, is the fulcrum, the short arm or the resisting part of the lever, is employed in lifting the weight, which is the coals; and the hand is the power, applied to the longer arm, or acting part of the lever. A pair of scissors is an instrument composed of two levers, united in one common fulcrum: the point at which the two levers are screwed together, is the fulcrum; the handle to which the power of the fingers is applied, are the extremities of the acting part of the levers; and the cutting part of the scissors are the resisting parts of the levers: therefore, the longer the handles, and the shorter the points of the scissors, the more easily will they cut. Thus, when pasteboard, or any hard substance is to be cut, that part of the scissors nearest the screw or rivet is used. Snuffers, and most kinds of pincers, are levers of a similar description, the great force of which consists in the resisting part of the lever being short in comparison of the acting part.

In levers of the *second* kind, the weight, instead of being at one end, is situated between the power and the fulcrum. In moving it, the velocity of the power must necessarily be greater than that of the weight, as it is more distant from the centre of motion. We may sometimes see a barrel moved



by means of a lever of the second kind, as well as by one of the first. The end of the stick is thrust



under the barrel rests on the ground which becomes the fulcrum; the barrel is the weight to be moved, and the power the hands applied to the other end of the lever. In this instance there is an immense difference in the length of the arms of the lever, the weight being almost close to the fulcrum, and the advantage gained is proportional. The most common example that we have of levers of the second kind is

in the doors of our apartments; in these the hinges represent the fulcrum; the hand, the power applied to the other end of the lever; and the door, or rather its inertia is the weight which occupies the whole of the space between the power and the fulcrum. Another very common instance is found in the ear; the blade is kept in the same place by the resistance of the water, and becomes the fulcrum, the resistance is applied where the ear passes over the side of the head; and the hands at the handle are the power. Nut-crackers are double levers of this kind: the hinge is the fulcrum; the nut-crackers the resistance, and the hands the power.

In levers of the *third* kind, the fulcrum is also at one of the extremities, the weight or resistance at the other, and the power is applied between the fulcrum and the resistance. Thus



the fulcrum, the weight, and the power each in its turn, occupies some part of the lever between its extremities. But in this third kind of lever, the weight being further from the centre of motion than the power, the difficulty of raising it, instead of being diminished is increased. Levers of this description are used when the object is to produce great velocity. The aim of mechanics, in general, is to gain force by exchanging it for time; but it is sometimes desirable to produce great velocity by an expenditure of force. The treddle of the common turning lathe affords an example of a lever of the third kind employed in gaining time, or velocity, at the expense of force. A man, in raising a long ladder perpendicularly against a wall, cannot place his hands on the upper part of the ladder; the power therefore, is necessarily placed nearer the fulcrum than the weight, for the hands are the power, the ground the fulcrum, and the ladder, the weight, which, in this, as well as in the door, may be considered as collected in the centre of gravity of the ladder, about half way up it, and consequently beyond the point where the hands are applied. This kind of lever is employed in the structure of the human frame. In lifting a weight with the hand the lower part of the arm becomes a lever of the third kind; the elbow is the fulcrum; the muscles which move the arm, the power; and as these are nearer to the elbow, than the hand is, it is necessary that their power should exceed the weight to be raised. It is of more consequence that we should be able to move our limbs nimbly, than that we should be able to overcome great resistance; for it is comparatively seldom that we meet with great obstacles, and when we do, they can be overcome by art.

WHITE ZINC PAINT.—The Society for the Encouragement of National Industry, in Paris, has granted a medal of gold worth 3,000 f. to M. Leclaire for his substitution of white of zinc for white of lead. It appears that, from 1838 to 1847, no less than 3,142 persons entered the Paris Hospital, attacked by disease, originating in the use of lead. Of those, 1,893 persons worked at white lead or at minium; there were also 712 painters, 63 grinders of colors and 10 preparers of visiting cards with porcelain surface. Since 1846, no person has been attacked in M. Leclaire's establishment.—*The Builder*.

SALT INJURIOUS TO POULTRY.—Do not give poultry salt, nor salt food. It is poisonous to them.