the leaves are attached ; and ſometimes the leaves themſelves are expanded, before the other parts have made any attempt to be reinſtated in their former poſition.

10. If, without ſhaking the other ſmaller leaves, we cut off the half of a leaf or lobe belonging to the laſt pair, at the extremity or ſummit of a wing, the leaf cut, and its antagoniſt, that is to ſay, the firſt pair, begin to approach each other ; then the ſecond, and ſo on succeſſively, till all the leſſer leaves, or lobes of that wing, have collapſed in like manner. Frequently, af­ter 12 or 15 seconds, the lobes of the other wings, which were not immediately affected by the ſtroke, ſhut; whilſt the ſtalk and its wing, beginning at the bottom, and proceeding in order to the top, gradually recover themſelves. If, inſtead of one of the leſſer extreme leaves, we cut off one belonging to the pair that is next the footſtalk, its antagoniſt ſhuts, as do the other pairs succeſſively, from the bottom to the top. If all the leaves of one side of a wing be cut off, the oppoſite leaves are not affected, but remain expanded. With some addreſs, it is poſſible even to cut off a branch without hurting the leaves, or making them fall. The common footſtalk of the winged leaves being cut as far as three-fourths of its diameter, all the parts which hang down collapſe, but quickly recover without ap­pearing to have ſuffered any conſiderable violence by the ſhock. An inciſion being made into one of the prin­cipal branches to the depth of one-half the diameter, the branches ſituated betwixt the lection and the root will fall down ; thoſe above the inciſion remain as be­fore, and the lesser leaves continue open ; but this di­rection is ſoon deſtroyed, by cutting off one of the lobes at the extremity, as was obſerved above. Laſtly, a whole wing being cut off with precaution near its inſertion into the common footſtalk, the other wings are not affected by it, and its own lobes do not ſhut. No motion enſues from piercing thebranch with a needle or other ſharp inſtrument.

11. If the end of one of the leaves be burned with the flame of a candle, or by a burning glaſs, or by touching it with hot iron, it cloſes up in a moment, and the oppoſite leaf does the ſame, and after that the whole ſeries of leaves on each side of the partial or little footſtalk ; then the footſtalk itſelf ; then the branch or common footſtalk ; all do the ſame, if the burning has been in a ſufficient degree. This proves that there is a very nice communication between all the parts of the plant, by means of which the burning, which only is applied to the extremity of one leaf, diffuſes its influ­ence through every part of the ſhrub. If a drop of aquafortis be carefully laid upon a leaf of the ſenſitive plant, ſo as not to ſhake it in the leaſt, the leaf does not begin to move till the acrid liquor corrodes the ſubſtance of it ; but at that time, not only that particular leaf, but all the leaves placed on the ſame footſtalk, cloſe themſelves up. The vapour of burning ſulphur has alſo this effect on many leaves at once, according as they are more or leſs expoſed to it ; but, a bottle of very acrid and ſulphureous ſpirit of vitriol, placed under the branches unſtopped, produces no ſuch effect. Wetting the leaves with ſpirit of wine has been obſerved alſo to have no effect, nor the rubbing oil of almonds over them ; though this laſt application deſtroys many plants.

From the preceding experiments the following con­

clusions maybe fairly drawn : 1. The contraction or the parts of the ſenſitive plant is occaſioned by an exter­nal force, and the contraction is in proportion to the force. 2. All bodies which can exert any force affect the ſenſitive plant; ſome by the touch or by agitation, as the wind, rain, &c. ; ſome by chemical influence, as heat and cold. 3. Touching or agitating the plant pro­duces a greater effect than an inciſion or cutting off a part, or by applying heat or cold.

Attempts have been made to explain theſe curious phenomena. Dr Darwin, in the notes to his admired poem, intitled, *The Botanic Garden,* lays it down as a principle, that “ the sleep of animals conſiſts in a ſuſpenſion of voluntary motion ; and as vegetables are ſubject to ſleep as well as animals, there is reaſon to con­clude (says he) that the various action of cloſing their petals and foliage may be juſtly aſcribed to a voluntary power ; for without the faculty of volition ſleep would not have been neceſſary to them,” Whether this defi­nition of ſleep when applied to animals be juſt, we ſhall not inquire ; but it is evident the ſuppoſed analogy be­tween the ſleep of animals and the ſleep of plants has led Dr Darwin to admit this aſtoniſhing conclusion, that plants have volition. As volition preſuppoſes a mind or ſoul, it were to be wiſhed that he had given us ſome in­formation concerning the nature of a vegetable ſoul, which can think and will. We ſuſpect, however, that this vegetable ſoul wall turn out to be a mere mechani­cal or chemical one ; for it is affected by external forces uniformly in the ſame way, its volition is merely paſſive, and never makes any ſucceſsful reſiſtance againſt thoſe cauſes by which it is influenced. All this is a mere abuſe of words. The ſleep of plants is a metaphorical expreſſion, and has not the leaſt reſemblance to the ſleep of animals. Plants are ſaid to ſleep when the flowers or leaves are contracted or folded together ; but we never heard that there is any ſimilar contraction in the body of an animal during ſleep.

The fibres of vegetables have been compared with the muſcles of animals, and the motions of the ſenſitive plant have been ſuppoſed the ſame with muſcular motion. Between the fibres of vegetables and the muſcles of ani­mals, however, there is not the leaſt ſimilarity. If muſcles be cut through, ſo as to be ſeparated from the joints to which they are attached, their powers are completely deſtroyed ; but this is not the caſe with vegetable fibres. The following very ingenious experiment, which was communicated to us by a reſpectable member of the University of Edinburgh, is deciſive on this ſubject. He ſelected a growing poppy at that period of its growth, before unfolding, when the head and neck are bent down almoſt double. He cut the ſtalk where it was curved half through on the under side, and half through at a ſmall diſtance on the upper fide, and half through in the middle point between the two ſections, ſo that the ends of the fibres were ſeparated from the stalk. Notwithſtanding theſe ſeveral cuttings on the neck, the poppy raised its head, and aſſumed a more erect poſition. There is, therefore, a complete diſtinction between muſcular motion and the motions of a plant, for no motion can take place in the limb of an animal when the muſcles of that limb are cut.

In fine, we look upon all attempts to explain the motions of plants as abſurd, and all reaſoning from ſup­poſed analogy between animals and vegetables as the