brought out again into the air, and there recovered their natural periodical motions, shutting every night, and open­ing every morning, as naturally and as strongly as if the plant had not been in this forced state ; and while in the cave, it was observed to be very little less affected with the touch than when abroad in the open air.

Sixthly, the great heats of summer, when there is open sunshine at noon, affect the plant in some degree like cold, causing it to shut up its leaves a little, but never in any very great degree. The plant, however, is least of all af­fected about nine o’clock in the morning, and that is con­sequently the most proper time to make experiments on it. A branch of the sensitive plant cut off, and laid by, retains still its property of shutting up and opening in the morning for some days ; and it holds it longer if kept with one end in water, than if left to dry more suddenly.

Seventhly, the leaves only of the sensitive plant shut up in the night, not the branches ; and if it be touched at this time, the branches are affected in the same manner as in the day, shutting up, or approaching to the stalk or trunk, in the same way, and often with more force. It is of no consequence what the substance is with which the plant is touched, it answers alike to all ; but there may be observed a little spot, distinguishable by its paler colour, in the arti­culations of its leaves, where the greatest and nicest sensi­bility is evidently placed.

Eighthly, Duhamel having observed, about the 15th of September, in moderato weather, the natural motion of a branch of a sensitive plant, remarked, that at nine in the morning it formed with the stem an angle of 100 degrees ; at noon, 112 degrees; at three afternoon, it returned to 100, and after touching the branch, the angle was reduced to 90. Three quarters of an hour afterwards, it had mounted to 112 ; and at eight at night, it descended again, without being touched, to 90. The day after, in finer weather, the same branch, at eight in the morning, made an angle of 135 degrees with the stem ; after being touched, the angle was diminished to 80; an hour after, it rose again to 135; being touched a second time, it descended again to 80 ; an hour and a half afterwards, it had risen to 145 ; and on being touched a third time, descended to 135, and remained in that position till five o’clock in the afternoon, when being touched a fourth time, it fell to 110.

Ninthly, the parts of the plants which have collapsed, af­terwards unfold themselves, and return to their former ex­panded state. The time required for that purpose varies, according to the vigour of the plant, the season of the year, the hour of the day, the state of the atmosphere. Some­times half an hour is requisite, sometimes only ten minutes. The order in which the parts recover themselves varies in like manner ; sometimes it is the common footstalks, somc- times the rib to which 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.

Tenthly, 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 twelve or fifteen 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 between the section 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 the branch with a needle or other sharp instrument.

Eleventhly, 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 the 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 of oil of almonds over them ; though this last application destroys many plants.

From the preceding experiments the following conclu­sions may be fairly drawn. First, the contraction of the parts of the sensitive plant is occasioned by an external force, and the contraction is in proportion to the force. Secondly, all bodies which can exert any force affect the sensitive plant ; some by the touch or by agitation, as the wind or rain ; some by chemical influence, as heat and cold. Thirdly, 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 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 will 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