diversity are very great. They are probably formed in each instance, by peculiar and appropriate organs, but in what manner is quite unknown.

Art. III—*Of the Spontaneous Motions of Plants.*

Although plants, as is well known, possess no locomotive power, yet, in different parts, they often exhibit what are deemed spontaneous movements. In cloudy weather through the day, and always towards evening, many plants, at certain hours, close their leaves and flowers. Bonnet remarked, that the leaves of certain plants approached by their superior surface when the sun shone ; but as he de­clined or set, they fell down, and, even in some instances, approached by their inferior surface. If heat was applied to leaves thus closed, they would open and fold back in a contrary direction : and, on the other hand, if moisture was applied to leaves that had been folded by the sun's heat, they also would open and fold back as from dew. In these examples, the different conditions of heat and moisture seem very much to influence the movements of the leaves. In like manner, the stalks of many fruits change their office under the different conditions, with respect to moisture, that accompany the ripening process : for under the desiccation which then occurs, many of them, says Du Hamel, exercise movements not unlike those of muscular action, and are thereby enabled, in some instances, to scatter their seeds.

We have already described many important effects pro­duced in plants by the direct action of light, and have now to notice the influence which it exerts on their movements. If plants be confined in a chamber, where there is but one window, all the younger shoots will forsake their perpendi­cular direction and make towards the light. In like manner, a young tree, when growing in the midst of older ones, pushes rapidly upwards, till it reaches the height of those that surround it, when it ceases to grow in height, but aug­ments in size : or, if a young plant be made to grow in an opaque vessel pierced with holes which admit the light, the shoots which it puts forth will be directed towards the holes. Some plants appear to follow the sun more or less distinctly in his course from east to west. Over these movements, Bonnet ascertained that neither heat, nor humidity, nor air, had much influence ; so that the sun, says Du Hamel, in causing these motions, acts more by his light than by his heat.

But there are other movements, proper to certain plants, or to particular parts of them, over which light exerts little or no power. Many observations have been made on the motions of the sensitive plant by H∞ke, Du Hamel, and others. The latter author remarks, that the movements of this plant do not depend essentially on light or heat; for if kept in a green-house. It closes its leaves early in the even­ing, before the sun has withdrawn, and while the tempera­ture is yet high ; or if placed in perfect obscurity. It still continues to open in the morning, and close in the evening as before. If, during its expansion in the early part of the day. It be gently touched. Its leaves partially close, but soon recover theiτ former state. Mere touch, however, without agitation, docs not produce motion ; for the leaves may be pressed between the fingers, without causing motion, if no agitation be given. With proper address. It is possible, says Du Hamel, to divide the mid-rib of a leaflet, without exciting motion in the other leaflets, or even in its own folioles ; nor does motion follow the puncture of a needle, if all agitation be avoided. The time required for a branch, that has been touched, to resume its former state, depends on the vigour of the plant, the hour of the day, the season, &c. ; and the order in which the parts re-establish them­selves likewise varies.

The motions of this plant seem to depend much on pe­culiarity of structure. From a branch proceed the branch- lets that bear the leaves. These leaves are formed of a common petiole, which at its extremity terminates in four conjugate leaflets, each of which has a mid-rib, furnished with a certain number of folioles. In the movements of this plant, the branchlets are so articulated with the branch, that they move on it in the manner of a hinge. The com­mon petiole of the leaves has a like movement; and lastly, each foliole moves on its proper stalk to apply itself to the opposite foliole. This peculiarity of structure explains why agitation is so necessary to the movements of this plant ; and why it bears such great violence without moving, if no agitation be employed to excite motion in its several arti­culations ; so that it is principally in the articulations, says Du Hamel, that the scnsibility of this plant resides. He adds, that, when this plant closes. It is not through weak­ness, but by a sensible contraction, which resists any at­tempt to replace it in its former state. Dutrochet accounts for the motions of the sensitive plant by the distension and contraction of the upper and lower portions of the swell­ings which are met with at the base of the petiole and of the leaflets.

In certain flowers spontaneous movements take place at the period of fecundation. The stamens of the barberry approach towards the pistil on the slightest irritation, as do those of the sun-flower and other plants. During the night, the petals of may-flowers close, and thereby protect the stamens and pistils ; but they cease to do so after fecunda­tion is effected. The water-lily is said to bear its flowers on a foot-stalk under water; and when the flowering season arrives, the stalk rises through the water, till the flowers reach above the surface. The flowers then expand, and the anthers burst and discharge their pollen on the stigma in the usual way. About four o’clock in the afternoon, the expanded flowers close, and the stalk then lies down either upon or under the water. The next day it rises, as before, and continues to do so daily until fecundation is completed, when it sinks beneath the surface, and there remains to ripen its seeds. Other spontaneous movements are exhi­bited by claspers and tendrils in seeking support from neigh­bouring bodies, and by roots in the directions which they take in search of food.

Unable to assign physical reasons for these and similar phenomena, some naturalists, guided by vague analogies drawn from the animal kingdom, ascribe such movements in vegetables to sensation and perception, by which they not *on∖y feel* their wants, but *perceive* the best modes of gratifying them; and in the performance of the actions ne­cessary to accomplish their objects, they are, according to some, directed by Instinct, and, according to others, by Vo­lition. Such modes of reasoning not only afford no expla­nation of the phenomena described, but supersede all ne­cessity for it; and are apt, therefore, to beget a conceit of knowledge where ignorance alone prevails. In reference to such attempts at explanation, Du Hamel well observes, that “ every peasant has remarked the fact, that the radicle of the seed tends always towards the earth, and that the plume rises in the air. If we ask of them why one part thus strikes into the earth, and the other seeks the air, they give the fact for a reason, by replying that the one part strikes down because it is the root, and the other ascends because it is the stem. And let us not smile too complacently at these modes of expression; for we ourselves use them every day when we raise questions about things which are unknown to us. Do we not say that a stone falls because of its gravity ? And those who give for a reason that it is attracted by the earth, do not satisfy the real philosopher, who never is content with simple terms void of meaning. To me it seems both more simple and more honest to make at once a confession of our ignorance.”

Art. IV.—*Of the supposed Sleep of Plants.*

Some writers, deeming plants to possess voluntary power,