

especially in the returning sap, of all known plants, from its bland and unirritating qualities, from its great solubility in water, and from the facility with which other vegetable products are convertible into this product, Gum may be fairly assumed to be the principal basis of vegetable nutriment; and its simple and definite composition points it out as being the immediate result of the chemical changes which the sap experiences in the leaves. During the descent of the sap, however, this fluid undergoes, in various parts of the plant, a farther elaboration, which gives rise to other products. We are now, therefore, to follow it in its progress through the rest of the vegetable system.

The returning sap descends from the leaves through two different structures: in exogenous plants the greater portion finds a ready passage through the liber, or innermost layer of bark, and another portion descends through the alburnum, or outermost layer of the wood. With regard to the exact channels through which it passes, the same degree of uncertainty prevails as with regard to those which transmit the ascending sap. De Candolle maintains that, in either case the fluids find their way through the intercellular spaces: other physiologists, however, are of opinion, that particular vessels are appropriated to the office of transmitting the descending sap. The extreme minuteness of the organs of vegetables has hitherto presented insuperable obstacles to the investigation of this important question; and consequently our reasonings respecting it can be founded only on indirect evidence. The processes of the animal economy, where the channels of distribution, and the organs of propulsion are plainly observable, afford but imperfect analogies to guide us in this intricate inquiry; for although it is true that in the higher classes of animals the circulation of the nutrient fluid, or blood, through distinct vessels, is sufficiently obvious, yet in the lower departments of the animal kingdom and in the embryo condition even of the more perfect species, the nutritious juices are distributed without being confined within any visible vessels; and they either perme-