

sap, precipitated from it by the separation of the greater part of the water that held it in solution. The cambium becomes, in process of time, more and more consolidated, and acquires the organization proper to the plant of which it now forms an integrant part: it constitutes two layers; the one, belonging to the wood, being the alburnum; the other, belonging to the bark, being the liber.

The alburnum and the liber, which have been thus constructed, perform an important part in inducing ulterior changes on the nutrient materials which the returning sap continues to supply. Their cells absorb the gummy substance from the surrounding fluid, and by their vital powers effect a still farther elaboration in its composition; converting it either into starch, or sugar, or lignin, according to the mode in which its constituent elements are arranged. Although these several principles possess very different sensible properties, yet they are found to differ but very slightly in the proportions of their ingredients; and we may infer that the real chemical alterations, which are required in order to effect these conversions, are comparatively slight, and may readily take place in the simple cellular tissue.\*

In the series of decompositions which are artificially effected in the laboratory of the chemist, it has been found that gum and sugar are intermediate products, or states of transition between various others; and they appear to be peculiarly calculated, from their great solubility, for being easily conveyed from one organ to another. Starch and lignin, on the other hand, are compounds of a more permanent character, and especially adapted for being retained in the organs. Starch, which, though solid, still possesses consi-

\* According to the analyses of Dr. Prout, the following is the composition of these substances: 1000 parts of

Pure Gum Arabic consists of	586	of oxygen and hydrogen, united in the proportions in which they exist in water,	and	414	of carbon.
Dried Starch, or Fecula, of	560	water,	and	440	- - -
Pure crystallized Sugar, - -	572	- - -	- - -	428	- - -
Lignin from Boxwood, - - -	500	- - -	- - -	500	- - -