soil, moisture, and other causes, are obvious. In some trees many of the outermost rings differ in colour from those beneath them, and are called by workmen, the *Sap*. In the Liburnum the sap-rings are yellow, and the internal rings are brown. In the Oak and several other trees a similar difference is observable, although not so obviously, and in most trees the external layers are much less firm, compact and durable than the inner rings, retaining more of the vital principle and more of the peculiar juices of the plant: They are termed by Du Hamel "*aubier*" —alburnum; and he observes that this difference extends more on the one side of a tree, than on another, and that the more vigorous the tree, or a side of it is, the alburnum is converted into perfect wood. The alburnum however in its proper sense, signifies only the layer of new wood of the present year, which is not hardened.

In this sense we shall apply it.—Physiologists have long differed about the origin of wood, and the question is still unsettled. Malpighi and Gren thought that it was formed by the bark, and observation is in favour of their opinion. Hales thought that wood added a new layer to itself externally every year. Linnæus thought that the pith secreted a new layer annually and added it, internally, to the other enveloping layers, but there is neither proof nor probability of this hypothesis. The experiments of Du Hamel prove that the wood is secreted from the innermost part of the bark, which is called liber. He introduced plates of tin-foil under the bark of growing trees, he then carefully bound up the wounds, and in after years when he cut them across, he found the new layers of wood on the outside of the tin. Dr. Hope, the Botanical Professor in Edinburgh, cut the bark of a Willow, three or four years old, carefully through longitudinally on one side for several inches so that it might be slipt aside from the wood in the form of a hollow cylinder, the two ends being undisturbed; the edges of the bark were then united as carefully as possible, the wood covered from the air, and the whole bound up to secure it from internal injury. After a few years the branch was cut through transversely. The cylinder of bark was found lined with layers of new wood, whose number, added to those in the wood from which it had been stript, made up the number of rings in the branch above and below the experiment. Du Hamel engrafted a portion of the bark of a Peach tree upon a Plum—after some time he found the layer of new wood under the engrafted bark, white; like the Peach, and different from the dark wood of the Plum.

In all these experiments the layers of wood were connected with the bark and not with the old wood.—Du Hamel found that the thickness of the layer was influenced by the season, and that it was always thinner in proportion to the lateness of the season in which the operation was performed. It seems certain therefore that the bark produces the wood, but Du Hamel was inclined to believe that in certain circumstances the wood could regenerate the bark. This never happened in any case, but when the whole trunk of a tree was stript of its bark. A Cherry tree thus stript threw out in little points from the whole surface of its wood a gelatinous matter, which gradually extended over the whole, and became a new bark, under which a layer of new wood was speedily found, hence Mirbel concludes that the alburnum and the wood are really the origin of the new layers of wood, by producing first the gelatenous substance which he and Du Hamel call *cambium*, and which Mirbel supposes to produce the liber or young bark, and at the same time by a peculiar arrangement of the vascular parts, the *alburnum* or new wood. This opinion is supported by