

limestone. The sandstone, ironstone, shales, and coal itself, all contain them. Mr. Binney has at length found in the clay-ironstone of Lancashire several specimens displaying structure, and from these, says Dr. Hooker, we learn that the *Trigonocarpon* belonged to that large section of existing coniferous plants which bear fleshy solitary fruits, and not cones. It resembled very closely the fruit of the Chinese genus *Salisburia*, one of the Yew tribe, or Taxoid conifers. In five of the fossil specimens there is evidence of four distinct integuments, and of a large internal cavity filled with carbonate of lime and magnesia, and probably once occupied by the albumen and embryo of the seed. The general form of the fossil when perfect is an elongated ovoid, rather larger than a hazelnut. The exterior integument is very thick and cellular, and was no doubt once fleshy (see fig. 487). It alone is produced beyond the seed, and forms the beak. The second coat was thinner, but hard, and marked by three ridges. This coat, being all that commonly remains in a fossil state, has suggested the name of *Trigonocarpon*. Within this were the third and fourth coats, both of which are very delicate membranes, and may possibly have been two plates belonging to one membrane.

Grade of the Carboniferous Flora.—On the whole, these fruits, says Dr. Hooker, are referable to “a highly developed type, exhibiting extensive modifications of elementary organs for the purpose of their adaptation to special functions, and these modifications are as great, and the adaptation as special, as any to be found amongst analogous fruits in the existing vegetable world.”* Professor Williamson, in his paper on *Sternbergia*, has likewise remarked that its structure was complex, and that “at a period so early as the carboniferous all the now-existing forms of vegetable tissue appear to have been created.” These observations deserve notice, because a question has arisen—whether the *Coniferæ* hold a high or a low position among flowering plants,—a point bearing directly on the theory of progressive development. By some botanists all the Gymnospermous Dicotyledons are regarded as inferior in grade to the Angiosperms. Others hold, with Dr. Hooker, that the Gymnosperms are not inferior in rank, having every typical character of the dicotyledons highly developed. Thus *Coniferæ* have flowers, and are propagated by seeds which are developed through the mutual action of the stamens and ovules; they have distinct embryos, and germinate in a definite manner. The seed-vessel (or ovary) is not closed, but this is also the case in some genera of angiosperms, in which the ovary is open before or after impregnation, so that this character cannot be relied on as constituting a fundamental difference in structural development. The *Coniferæ* are exogenous, and have the same distinctions of pith, wood, bark, and medullary rays as have the angiospermous trees. Whether the woody fibre with disks characteristic of *Coniferæ* be a more or a less complex tissue than the spiral vessels, is a controverted point. As the spiral vessels occur in the young shoots, and are lost in the mature

* Proceedings of the Royal Society, vol. vii. March, 1854, p. 28.