ON SOME NEW FEATURES IN RELATION TO LYGINODENDRON OLDHAMIUM¹.—Since the year 1872, when the late Dr. W. C. Williamson published his memoir, part iv, in the 'Phil. Trans. Roy. Soc.' on *Dictyoxylon*, *Lyginodendron* and *Heterangium*, this genus of fossil plants has undergone a good many alterations or modifications at the hands of the palaeobotanist.

In the memoir above quoted *Lyginodendron oldhamium* is described as an unbifurcating stem, but giving off very small branches (see p. 387, Figs. 14 and 16, Pl. XXV, loc. cit.), and in some respects similar to a *Lepidodendroid* stem.

In his memoir, part vi, 1874, he describes fully a stem to which he originally gave the name of *Edraxylon*, but to which he now gave the name of *Rachiopteris aspera*. (See Figs. 1 to 13, 'Phil. Trans. Roy. Soc.', 1874, part vi. Fig. 13 he describes as a petiole with pinnules and leaflets.)

In memoir, part vii, 1875, he describes a series of specimens under the name of *Kaloxylon Hookeri*. (See Figs. 23 to 38, Pl. 5, 6, and 7, loc. cit.)

The small branches which Williamson described in 1872 under the name of *Kaloxylon* have since been proved to be the roots of *Lyginodendron*.

In the case of *Rachiopteris aspera*, it is now well known that it is the leaf-stalk or petiole of *Lyginodendron*, whilst the fossils known as *Sphenopteris Höninghausi* and *Sphenopteris distans* are the foliage of *Lyginodendron*. (See Williamson's memoir, 1890, part xvii; also Williamson's and Scott's memoir, Phil. Trans. Roy. Soc. 1895, part iii).

In most cases when this stem has been described it is as an unbifurcating or unbranching stem.

In Dr. D. H. Scott's 'Studies in Fossil Botany,' p. 321, he says that 'No stem has ever been observed to branch; it does not follow that it never did so, but branching must have been very rare.' For some time back I have had various specimens in my possession which I have collected from Dulesgate, near Todmorden, Lancashire, which to me have had the appearance of giving off a branch; but during the last few months I have discovered two specimens which

¹ Abstract of paper read before Section K of the British Association, Belfast, 1902.

have set all doubt on this point at rest. Both specimens are in a first-class state of preservation.

The first of the two specimens was collected in March last, and is now in the possession of Dr. D. H. Scott; it shows a series of twenty-four sections cut transversely. The series runs through two internodes; the first shows the leaf-trace just about to leave the periderm, and the stele is commencing to take a crescent-like form on the opposite side to that of the leaf-stalk which is being given off, and so on till the stele of the branch and stem are completely separated, and till the second leaf-stalk is given off. There are also several roots given off, which dichotomize immediately after leaving the cortex.

In the above stem there are a series of four double leaf-trace bundles. The entire diameter of the stem is three-quarters of an inch, and it was about three inches long.

The last specimen I have discovered is also from Dulesgate, from a mass of small nodules, one part of which contained a quantity of foliage, broken pieces of Sigillarian bark, *Rachiopteris bibractensis*, and various other fragments.

In this there is a series of five leaf-trace bundles. This was about $1\frac{1}{8}$ inch in diameter and about four inches long.

The stem is not quite whole; a portion of one side is missing, but the development of the branch is seen quite perfectly.

The above two specimens show that *Lyginodendron* had a branching stem; also that the branch was given off in the one case between two leaf-stalks and in close proximity to several roots. This shows that it has been a plant of considerable growth.

The position of the roots also shows they must have been aerial roots, and not, as generally accepted, basal or confined to the basal regions of the stem.

There is one other point we want to make clear, and that is the generative organs of the plant. So far they have escaped our notice, but I expect that we may before very long be in a position to state definitely what were the fructificative or the regenerative organs of these most interesting fossil plants.

The detailed description of the above specimen is left in the hands of Dr. D. H. Scott.

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