

which in the smaller species is either subterranean or runs along the ground, takes in the tree-fern a different direction, and, rising erect, climbs slowly upward in the character of a trunk or stem, and sends out atop, year after year, a higher and yet higher coronal of fronds. And in order to impart the necessary strength to this trunk, and to enable it to war for ages with the elements, its mass of soft cellular tissue is strengthened all round by internal buttresses of dense vascular fibre, tough and elastic as the strongest woods. Now, not a few of the more anomalous forms of the Coal Measures seem to be simply fern allies of the types Lycopodiaceæ, Marsileaceæ, and Equisetum, that, escaping from the mediocrity of mere herbs, shot up into trees,—some of them very great trees,—and that had of necessity to be furnished with a tissue widely different from that of their minuter contemporaries and successors. It was of course an absolute mechanical necessity, that if they were to present, by being tall and large, a wide front to the tempest, they should also be comparatively solid and strong to resist it; but with this simple mechanical requirement there seems to have mingled a principle of a more occult character. The Gymnogens or conifers were the highest vegetable existences of the period,—its true trees; and all the tree-like fern allies were strengthened to meet the necessities of their increased size, on, if I may so speak, a *coniferous* principle. Tissue resembling that of their contemporary conifers imparted the necessary rigidity to their framework; nay, so strangely were they pervaded throughout by the coniferous characteristics, that it seems difficult to determine whether they really most resembled the acrogenous or gymnogenous families. The Lepidodendra,—great plants of the club-moss type, that rose from fifty to

of the circumference; *f, v*, darkly-coloured woody fibres of great strength, the “internal buttresses” of the illustration; *e*, the outer cortical portion formed by the bases of the leaves.