

mens of this kind, taken alone, have been referred to the genera *Knorria*, *Bothrodendron*, and *Halongia*.

4. In some cases, though not frequently, the outer surface of the ligneous cylinder is preserved. It almost invariably presents a regularly striated or irregularly wrinkled appearance, depending upon the vertical woody wedges, or the positions of the medullary rays or vascular bundles. Specimens of this kind constituted some of the *Endogenites* of the older botanists, and the genus *Schizodendron* of Eichwald appears to include some of them. Many of them have also been incorrectly referred to *Calamites*.

5. In some cases the cast of the medullary cylinder or pith may alone be preserved. This may be nearly smooth or slightly marked by vertical striæ, but more usually presents a transverse striation, and not infrequently the transverse constrictions and septa characteristic of the genus *Sternbergia*. Loose *Sternbergiæ* afford little means of connecting them with the species to which they belong, except by the microscopic examination of the shreds of the ligneous cylinder which often cling to them.*

These facts being premised, the following general statements may be made respecting some of the more common Palæozoic genera, referring, however, principally to the perfect markings as seen on the epidermis:

Sigillaria.—Leaf-bases hexagonal or elongated, or confluent on a vertical ridge. Leaf-scars hexagonal or shield-shaped. Vascular scars three, the two lateral larger than the central. This last character is constant, depending on the fact that the leaves of *Sigillaria* have two or more vascular bundles. All so-called *Sigillariæ* having the central vascular scar largest, or only one vascular bundle, should be rejected from this genus. In young branches of branching *Sigillariæ* the leaf-scars sometimes appear to be spiral, but in the older stems they form vertical rows; interrupted, however, by transverse rows or bands of *fruit-scars*, each with a single large central vascular scar, and which have borne the organs of fructification. *Arthrocaulis* of McCoy is founded on this peculiarity.

Syringodendron.—Differs from *Sigillaria* in the leaf-scars, which are circular and with a single vascular bundle. It is a matter of doubt whether these plants were of higher rank than *Sigillaria* tending toward the pines, or of lower rank tending toward *Cyclostigma*. Their leaf-bases form vertical ridges.

Lepidodendron.—Leaf-bases rhombic, oval, or lanceolate, moder-

* See my paper, "Journal of Geological Society," vol. xxvii.