

shells of *Strophalosia truncata* and *Ambocoelia nana*. Miss Wood records a total of 72 species. The more common and characteristic of these are:

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| <i>Ambocoelia nana Grabau</i>         | <i>Spirifer (Martinia) subumbonus Hall</i> |
| <i>Chonetes mucronatus Hall</i>       | <i>Cypricardina indenta (Conrad)</i>       |
| <i>C. scitulus Hall</i>               | <i>Orthoceras exile Hall</i>               |
| <i>Liorhynchus limitare (Vanuxem)</i> | <i>O. marcellense Vanuxem</i>              |
| <i>Strophalosia truncata (Hall)</i>   | <i>Phacops rana (Green)</i>                |
| <i>Meristella barrisi Hall</i>        | <i>Primitiopsis punctulifera Hall</i>      |

#### *Cardiff shale*

The upper beds usually included in the old term Marcellus, and designated by Vanuxem the "Upper shales of Marcellus" are abundantly exposed about the village of Cardiff, Onondaga co., and recently have been named from that locality.<sup>1</sup>

This division consists of a series of dark calcareous and black slaty shales with thin layers of fossiliferous limestone. Rows of spheric concretions occur in the lower part at some localities. The fossil contents are not essentially different from those below the Stafford limestone, but the shales are more calcareous and weather, specially in the upper beds, to an ashen gray.

The beds immediately above the Stafford limestone are not exposed on this quadrangle but an exposure beginning near the New York Central Railroad bridge over Buffalo creek,  $\frac{1}{4}$  mile west of the outcrop of Stafford limestone previously mentioned and not more than 15 feet above it, extends along the bed of the stream to Gardenville and the east line of the quadrangle. The lower shales outcrop on Cazenovia creek at the park just above Cazenovia street, and the upper beds at the covered bridge, nearly 2 miles farther up the creek.

At West Seneca outcrops occur in the line of Smoke's creek between White's Corners and the western New York and Pennsylvania Railroad and at the north end of the low cliff on the lake shore at Bay View.

The more important exposures of the Cardiff shales toward the east are along Plumbottom creek at Lancaster; along Oatka river at Leroy; Conesus outlet at Littleville near Avon; Flint creek near Orleans, Ontario co. and in the vicinity of Marcellus and Cardiff in Onondaga county.

The thickness of the Cardiff shales on this quadrangle is estimated to be 45 feet. In Ontario county it is 100 feet and at Cardiff, Onondaga co. 175 feet.

<sup>1</sup>N. Y. State Mus. Bul. 63. 1903. p. 16.