

cells. Some of the authors of subsequent chapters agree, as they refer to walls as being extracytoplasmic rather than extracellular.

An intriguing unsolved problem regarding the synthesis of lignin in plants and its degradation by fungi is how peroxidases can catalyze both polymerization and depolymerization via a common aromatic radical cation formation. A working hypothesis to explain this dual activity, based on a combination of oxidative and reductive processes in the fungal system that shifts the polymerization-depolymerization equilibrium toward degradation, is discussed by Shoemaker *et al.*

Some of the best chapters provide insight into methodologies that are permitting major new insights. The use of carbon-13 labeling combined with solid-state nuclear magnetic resonance permits a picture of lignin and pectin synthesis *in vivo*. Several studies have used microradioautography effectively. Knowledge about cellulose biosynthesis is still greatly hampered by the inability to demonstrate this presumably membrane-localized process with cell-free enzymes; Hotchkiss describes the terminal complex hypothesis of cellulose biosynthesis. Molecular genetics, however, has not had any major impact in wall biochemistry.

All in all, this is an excellent book for those interested in unraveling the complexities of the biosynthesis and biodegradation of the wall, a vital aspect of plant cells that has been too long ignored.

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