

Lampport D T A. Cell wall metabolism. *Annu. Rev. Plant Physiol.* **21**:235-70, 1970.  
[MSU/AEC Plant Res. Lab., Michigan State Univ., East Lansing, MI]

The review deals with the biosynthesis and degradation of cell wall components emphasising the primary cell wall and its protein component, 'extensin,' hypothetically involved in the 'subtle chemistry of cell wall loosening.' [The *SC*<sup>®</sup> indicates that this paper has been cited over 165 times since 1970.]

Derek T.A. Lampport  
MSU-DOE Plant Research Laboratory  
Michigan State University  
East Lansing, MI 48824

January 31, 1980

"In 1958 I joined Donald H. Northcote's group. (A few months later Fred Sanger in the lab next door won his first Nobel prize!) I had a somewhat stormy but fruitful three years as a research student with Northcote who, to his everlasting credit, allowed me to make my own mistakes, one of which was to donate, literally, 'the armchair of plant biochemistry' to the hyperindustrious don...but that is another story!

"I had the simple idea, based on reading (one never admits to 'studying' at Cambridge) Roger Gautheret's work,<sup>1</sup> that plant cells could perhaps grow like bacteria in suspension culture. Louis Nickell's classic paper<sup>2</sup> confirmed that idea and with the help of Philip White's book<sup>3</sup> I isolated sycamore maple suspension cultures. I vividly remember showing these first cultures to Robin Hill (who also worked next door but across the hall from Sanger's lab) saying that I had turned a tree into an alga! Robin remarked: 'Wouldn't it be wonderful if you could turn an alga into a tree!' Then dutifully following the footsteps of Cambridge *microbiologists* I isolated the cell walls and dis-

covered (with the aid of Les Smith in Sanger's group) that they contained most of the cell's bound hydroxyproline. Taking this result at face value solved the long standing problem of whether or not plant (primary) cell walls contained protein. Some, notably F.C. Steward, remained sceptical and hostile and wrote letters of complaint. I quoted his Humpty-Dumptyish statement at the head of the review chapter: 'When I speak about a cell wall, I mean a cytological cell wall...not a biochemical wall.' The quotation prettily encapsulates valid criticism tempered by the notion of walls and Humpty-Dumpty...a precarious combination! Rightly or wrongly I christened the hydroxyproline-rich cell wall protein 'extensin' while in Joseph Varner's laboratory —at his encouragement (perhaps one of his rare mistakes!). Extensin is a metaphor of the missing cross-links holding the growing cell wall together, and cell extension is surely under cellular control. The details are still elusive, but the extensin hypothesis *predicting* covalent saccharide attachment was productive. We discovered the glycopeptide linkages Hyp-Ara, and Ser-Cal in extensin, and Hyp-Gal in the related wall glycoproteins of *Chlamydomonas*, and arabinogalactan proteins, as well as the Ser-Hyp-Hyp-Hyp-Hyp pentapeptide periodicity (indicating a rod-shaped molecule) which may characterise other Hyp-rich proteins besides extensin!

"More recent reviews deal inclusively with wall protein.<sup>4,5</sup> Why then is the 1970 review oft quoted? Some parts may be quite entertaining, but despite my belief in Michael Polyani's dictum that 'Objectivity in science is an illusion,' I suspect an overly breezy style gains neither readership, nor, with rare exceptions, a stint on late-night talk shows! Apart from my 1965 review<sup>h</sup> the 1970 review is the only one to cover in detail the sub-field of wall protein and was conveniently placed in a journal of high visibility. Need I say more?"

1. Gautheret R J. *Une vote nouvelle en biologie végétale: la culture des tissus*. Paris: Gallimard. 1445. 202 p.
2. Nickell L G. The continuous submerged cultivation of plant tissue as single cells. *Proc. Nat. Acad. Sci. US* **42**:848-50. 1956.
3. White P R. *Cultivation of animal and plant cells*. London: Thames & Hudson. 1955. 228 p.
4. Preston R D. Polysaccharide conformation and cell wall function. *Annu. Rev. Plant Physiol.* **30**:55-78.
5. Brown R G & Kimmins W C. Glycoproteins. (Northcote D H. ed.) *Plant Biochemistry II* Baltimore, MD: University Park Press. 1477. p. 183-209.
6. Lampport D T A. The protein component of primary cell walls. *Adv. Bot. Res.* **2**: 151-218. 1965.