MICROSCOPY TODAY

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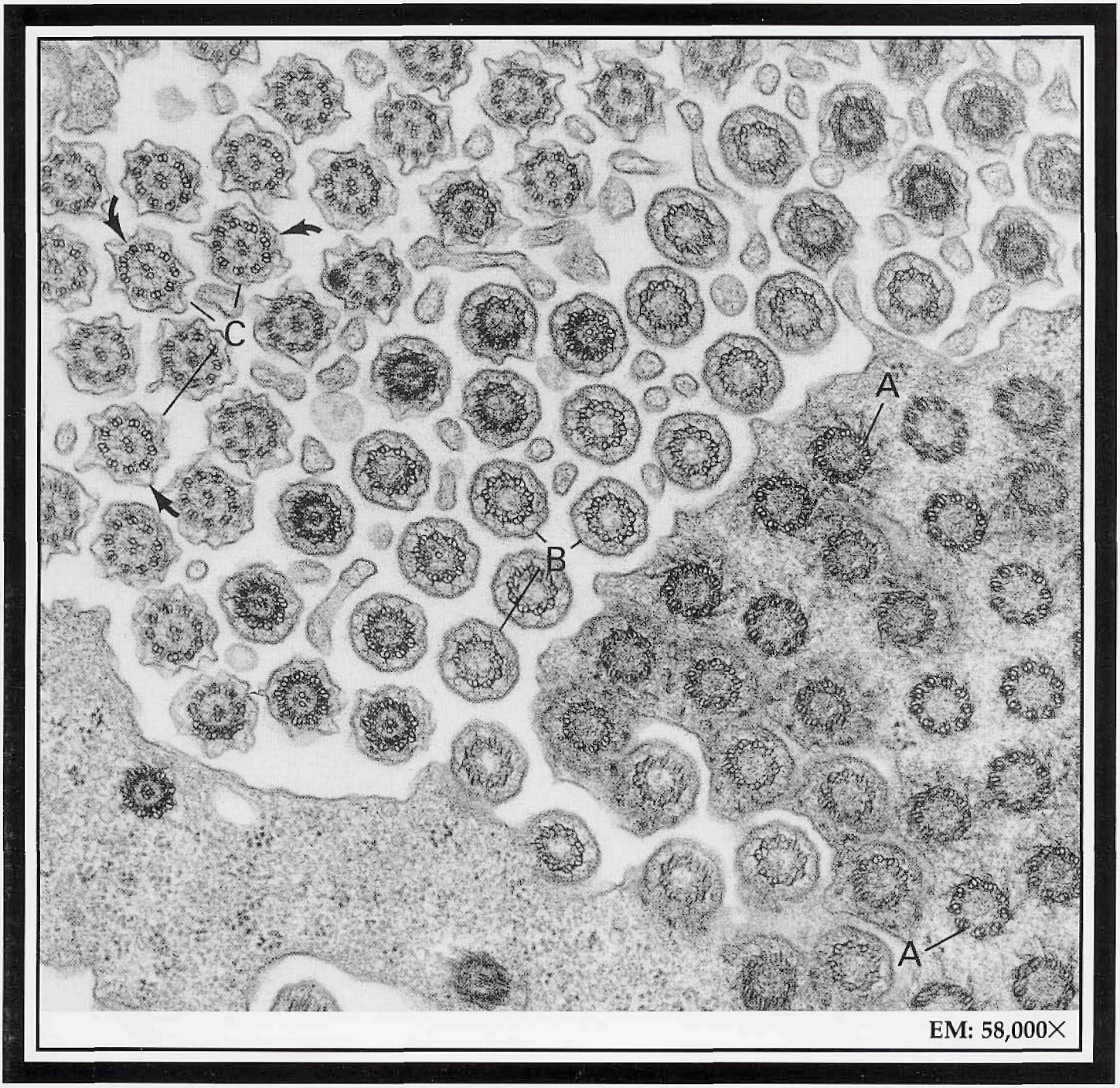
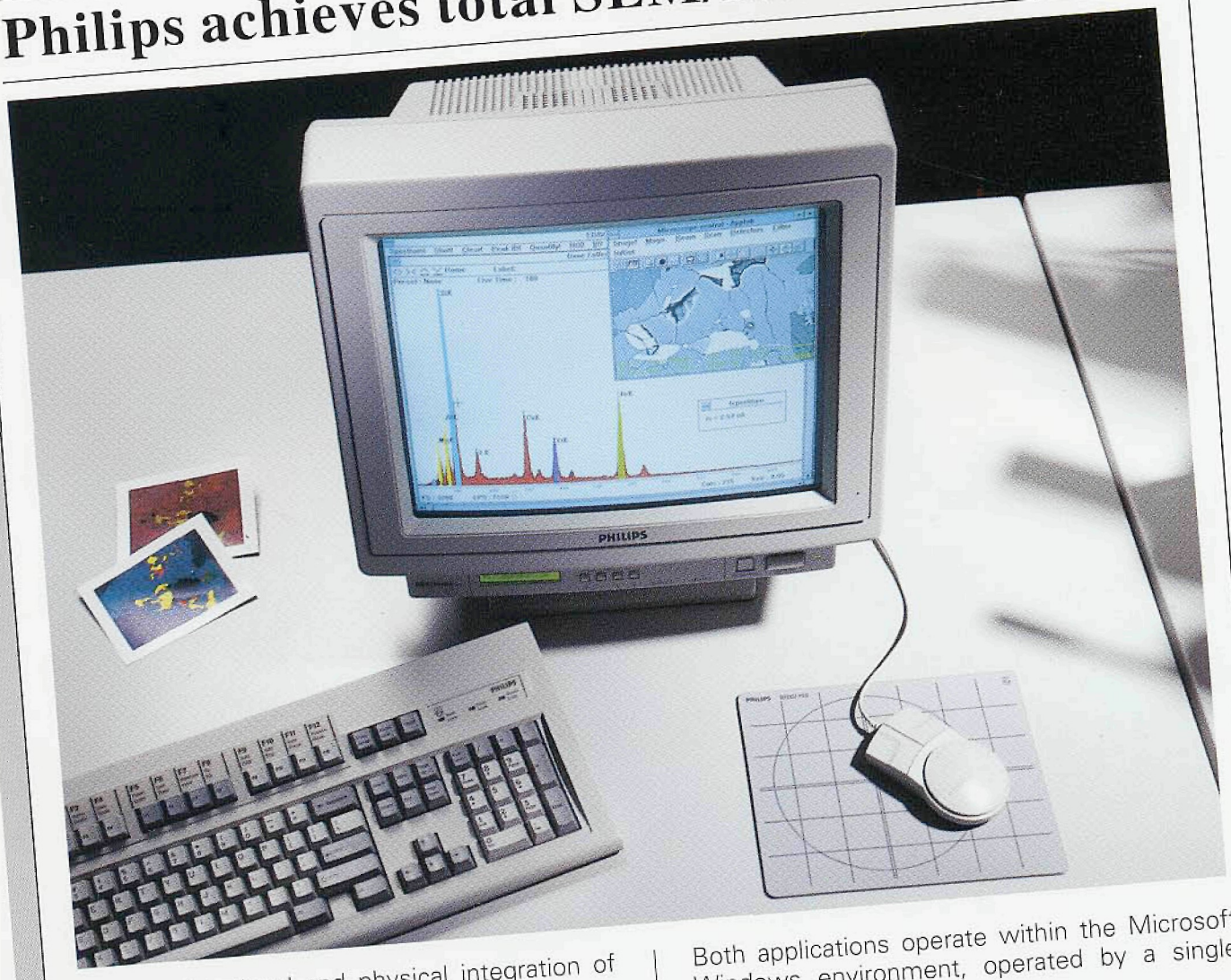


Innovation in Integration

Philips achieves total SEM/EDX integration



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Absolute functional and physical integration of scanning electron microscopy and energy dispersive microanalysis have been realized in the Philips XL Series SEMs.

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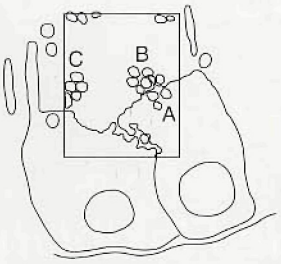
Front Cover Image
APICAL SPECIALIZATIONS: Cilia, Basal Body

The SEM micrograph on the front cover and the following description, while shorter than average, as a set is representative of the coverage of some 180 cells in the body in the 420 page, atlas-like book *Cell and Tissue Ultrastructure, A Functional Perspective* by Patricia C. Cross and K. Lynne Mercer (Stanford University School of Medicine.

For ordering information, and a review by Dr. John J. Bozzola (Southern Illinois University), refer to page 5 of this publication.

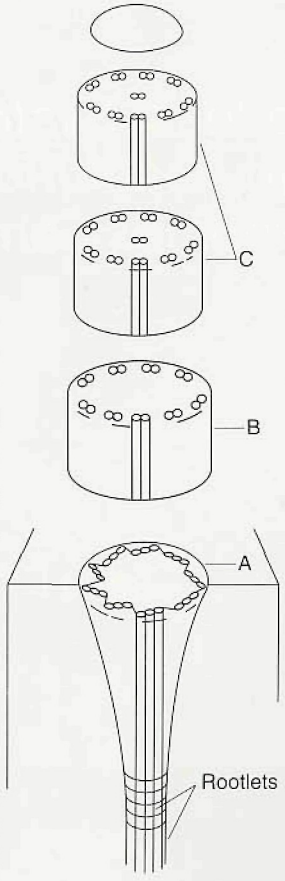
APICAL SPECIALIZATIONS: Cilia, Basal Body



The micrograph depicts the apical surface of an epithelial cell and cross sections of cilia at various distances distal to the apical cytoplasm. Cilia develop from **basal bodies** (A, micrograph) in the apical cytoplasm. Basal bodies originate from and have a substructure similar to that of centrioles, with nine peripheral microtubule triplets. The two inner microtubules of each triplet in a basal body act as templates for the growth of the **outer doublets** in the cilium. The **central microtubules** arise distal to the basal body and are not present in cross sections of cilia near the apical surface (B, micrograph). In more distal cross sections the typical axoneme 9 + 2 arrangement is evident (C, micrograph). Radial spokes can be seen in the cilia indicated by curved arrows.

Basal bodies, like the centriole region of the mitotic spindle, are the site of nucleation of microtubules and are associated with their negative ends (see Cell, pages 34, 36). The tip of each cilium, like a kinetochore within the mitotic spindle, is the positive end region of the microtubules and the primary site of microtubule assembly and disassembly. A degree of homology has been demonstrated in certain species between proteins that "cap" the tips of cilia and proteins within the kinetochore.

Basal bodies develop from centrioles that divide and migrate to positions directly under the apical cell membrane. As the axoneme is forming at the apical region of the basal body adjacent to the cell membrane, striated filamentous rootlets (not seen on the micrograph) are extending from the opposite side into the cytoplasm to anchor each cilium. In at least one instance, the basal body is known to return to a centriole function. At fertilization the basal body of the sperm flagellum develops into the centrioles of the mitotic spindle of embryo cleavage.



Modified from J. A. G. Rhodin, *Histology, a Text and Atlas,* Oxford University Press, New York, 1974.

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