



James B. Pawley

1944 - 2019



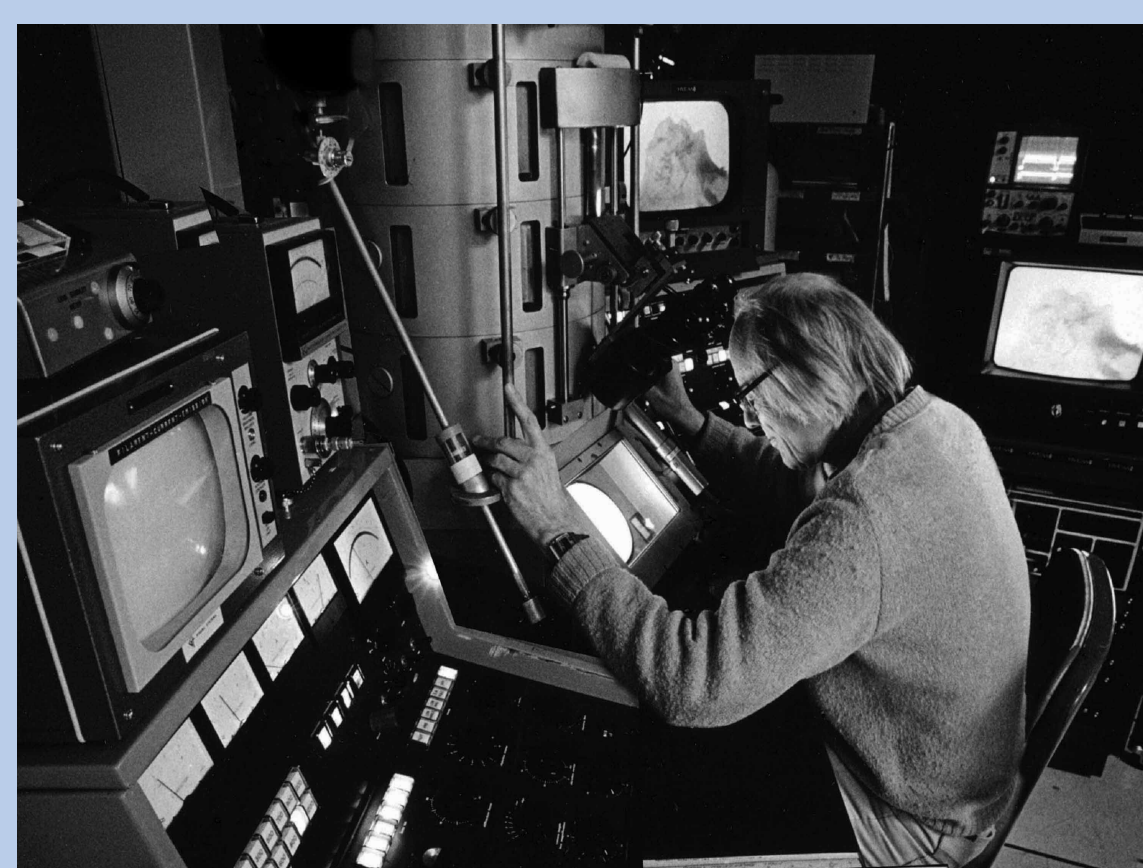
Biography

James Pawley was born January 15th 1944 in Gerrard's Cross, England. He immigrated to Canada with his parents in 1946 first to Cloverdale, BC, and then to Vancouver. In the late 1950's, the family moved to California. From 1962 to 1966 he studied electrical engineering at the Carnegie Institute of Technology in Pittsburgh, and in 1972 he got his Ph.D. in biophysics at the University of California-Berkeley. After a series of postdoctoral positions, in 1978 he took a faculty position in the department of Zoology at the University of Wisconsin-Madison. One of his main responsibilities was to run the three-story million-volt electron microscope, part of a national microscopy facility (an NIH P41 BTTR, started by Hans Ris).

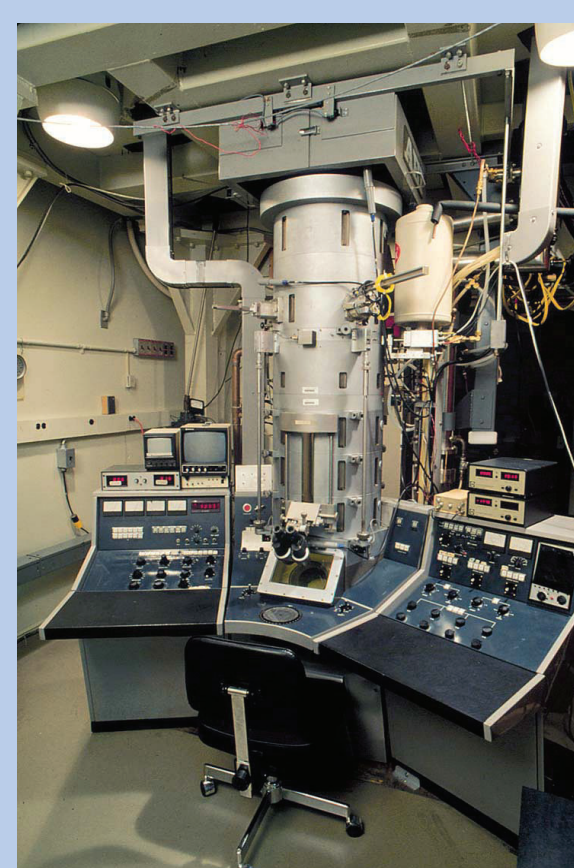
For sixteen years he also directed the "3D Microscopy of Living Cells" course on the University of British Columbia's campus, with a faculty of internationally known scientists and cutting-edge equipment loaned by manufacturers. The "3D Microscopy of Living Cells" motto was "It's not just diffraction; it's not just statistics; it's biology!". The course attracted participants from all over the world. The course provided the foundation for his best-known publication, the Handbook of Biological Confocal Microscopy, now in its third edition and still an essential resource.

He was especially active in the Clean Air Society and the Sunshine Coast Community Solar Association; his letters often appeared in local papers. He was a founder of the Doriston Music Festival. In 2012 he moved to the house he and his wife built in Sechelt, British Columbia.

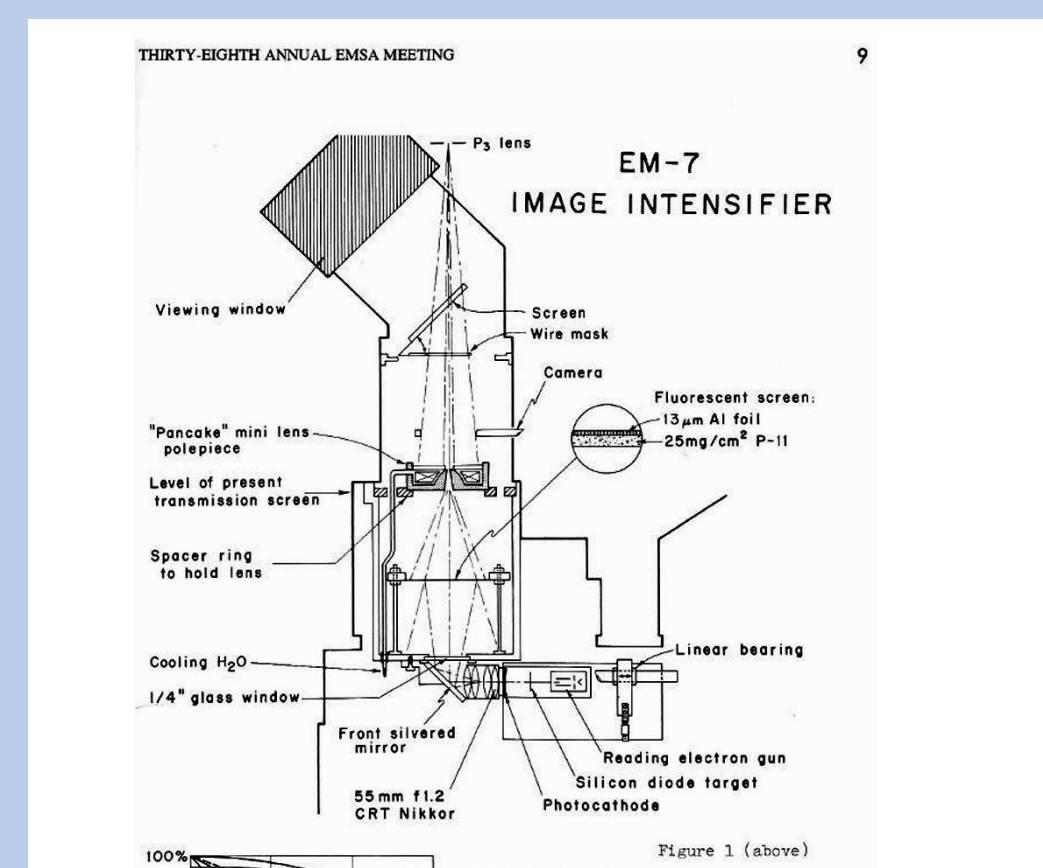
HVEM As mentioned, Pawley's first responsibility at UW Madison was the AEI EM-7 Mk II HVEM. He made many improvements to the HVEM, e.g. cryo-TEM and low-dose data collection. Along with Gatan, he developed high-resolution cryo-transfer (and an accompanying antimicrotainer) for the HVEM. Although the Madison HVEM has been scrapped, another AEI EM-7 Mk II is still intact in Albany, NY and Albany group recovered much of the equipment from Madison.



Hans Ris at the Madison HVEM



The Albany AEI EM-7 HVEM



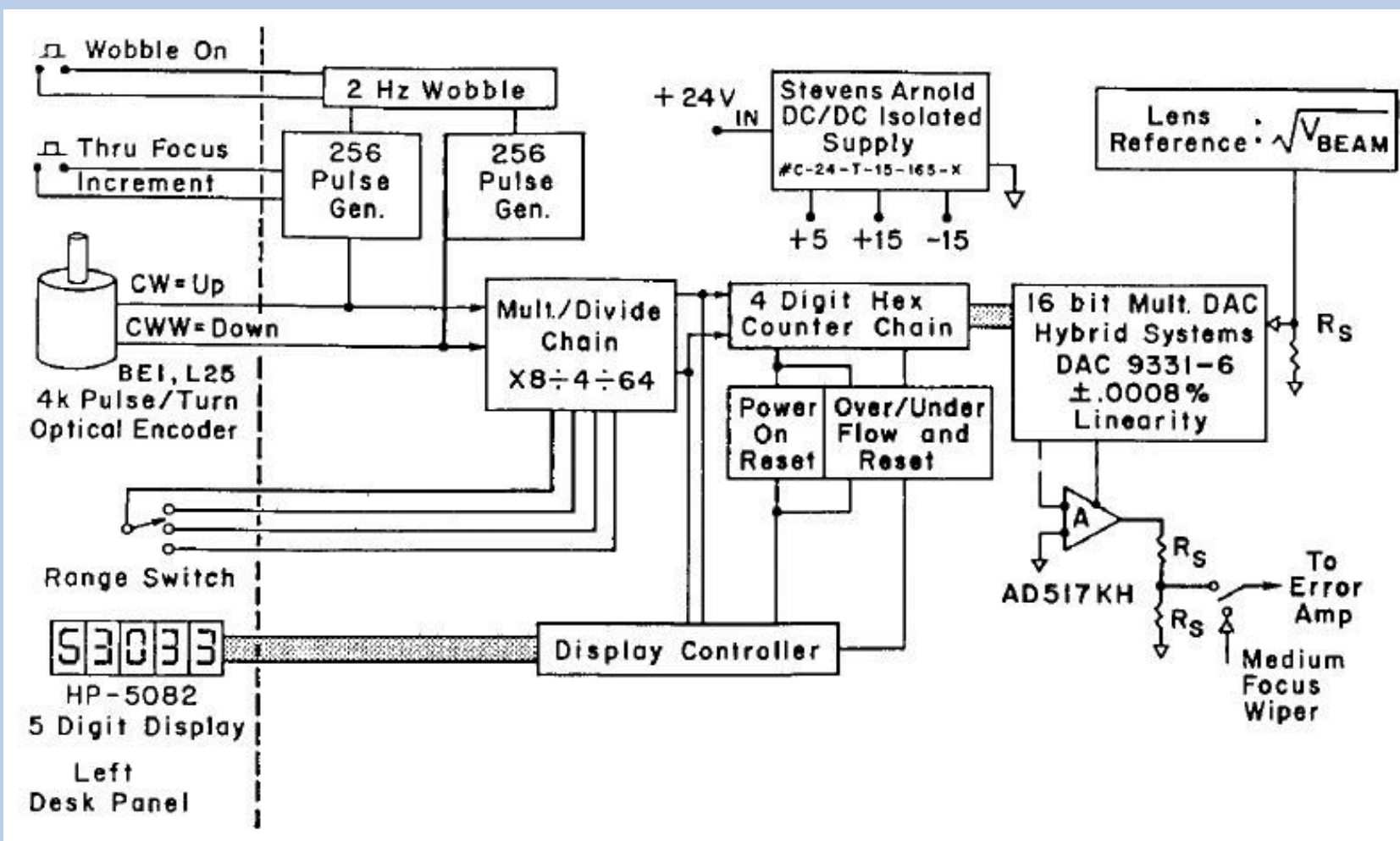
An image intensifier using a mini-lens to optimize its spatial resolution (1979 EMSA submission).

AN HVEM FOR HIGH RESOLUTION LOW-DOSE STUDIES OF BIOMACROMOLECULES

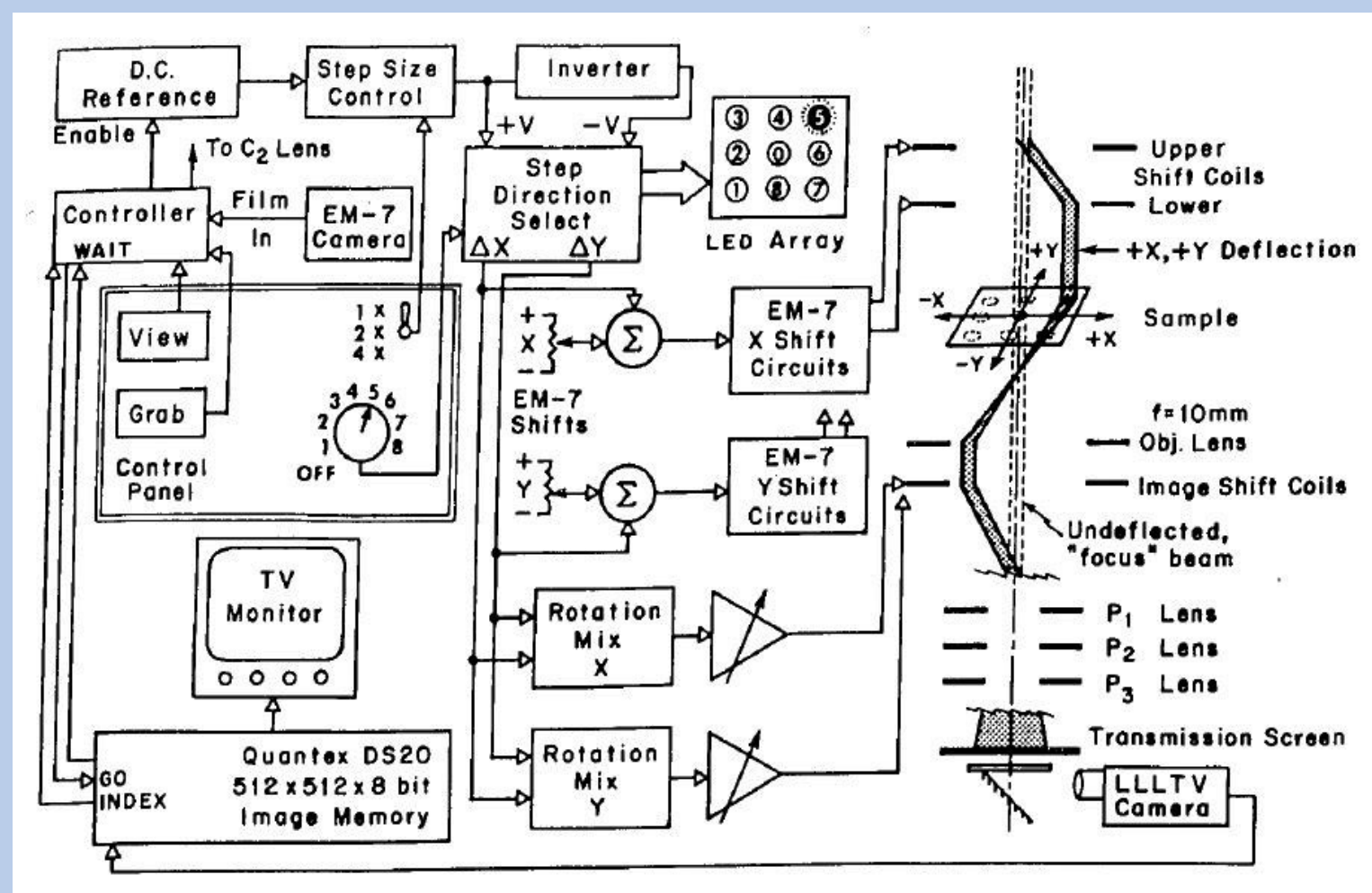
James PAWLEY

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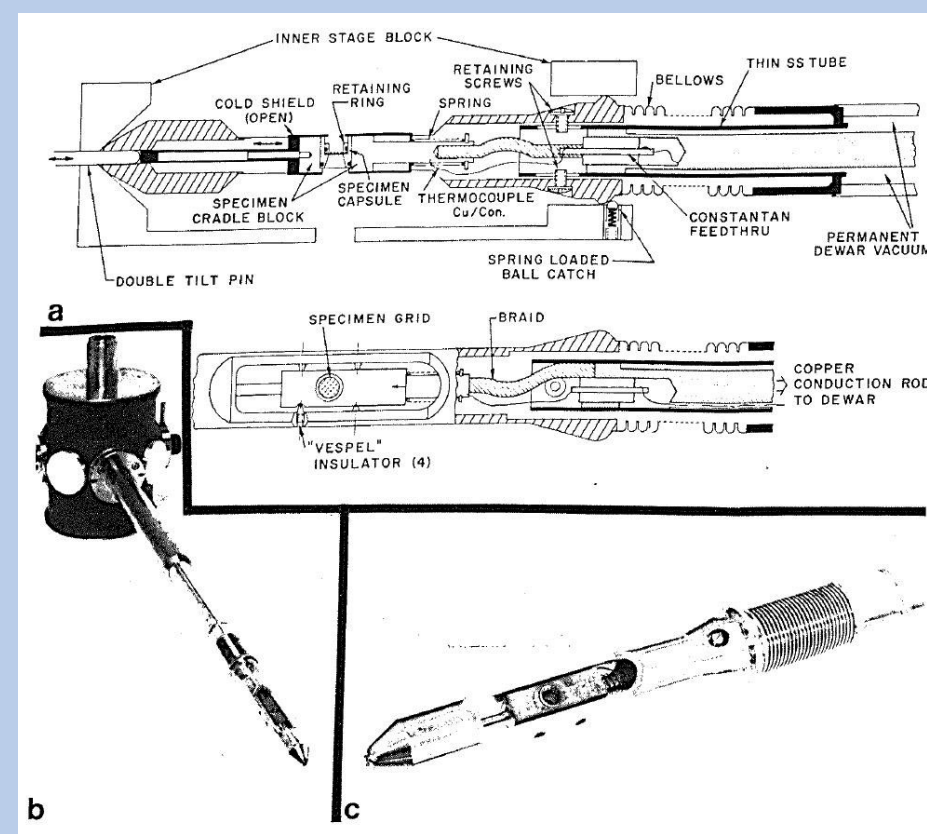
This paper was the culmination of all of Pawley's HVEM improvements. Each item was first presented as an EMSA submission.



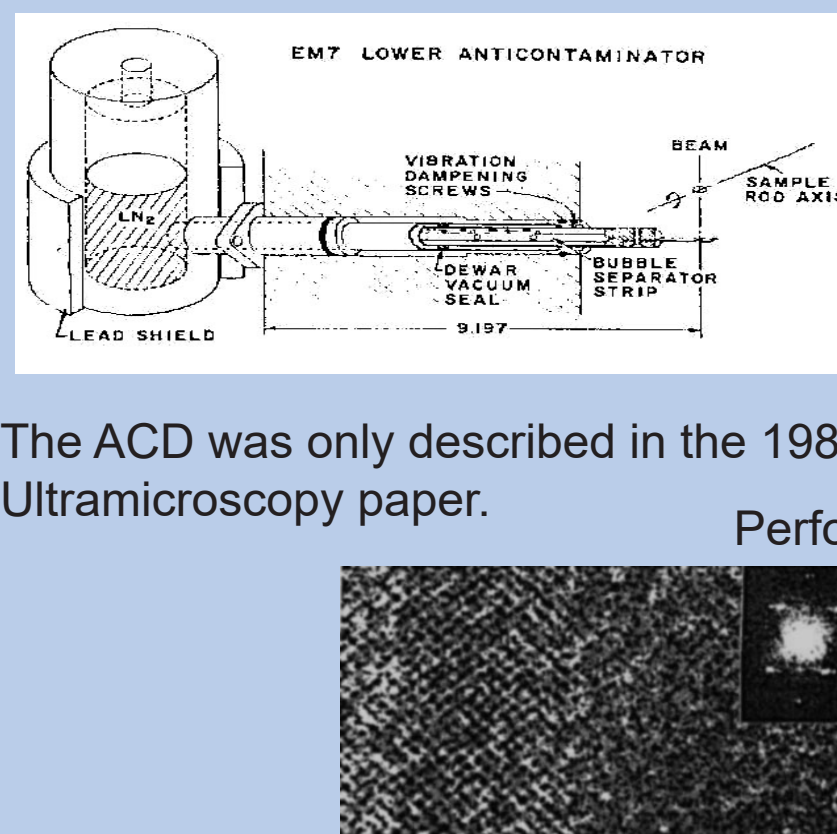
Digital fine control for the objective lens current of the EM-7. (1981 EMSA submission).



Minimal exposure system for the HVEM (1981 EMSA submission).

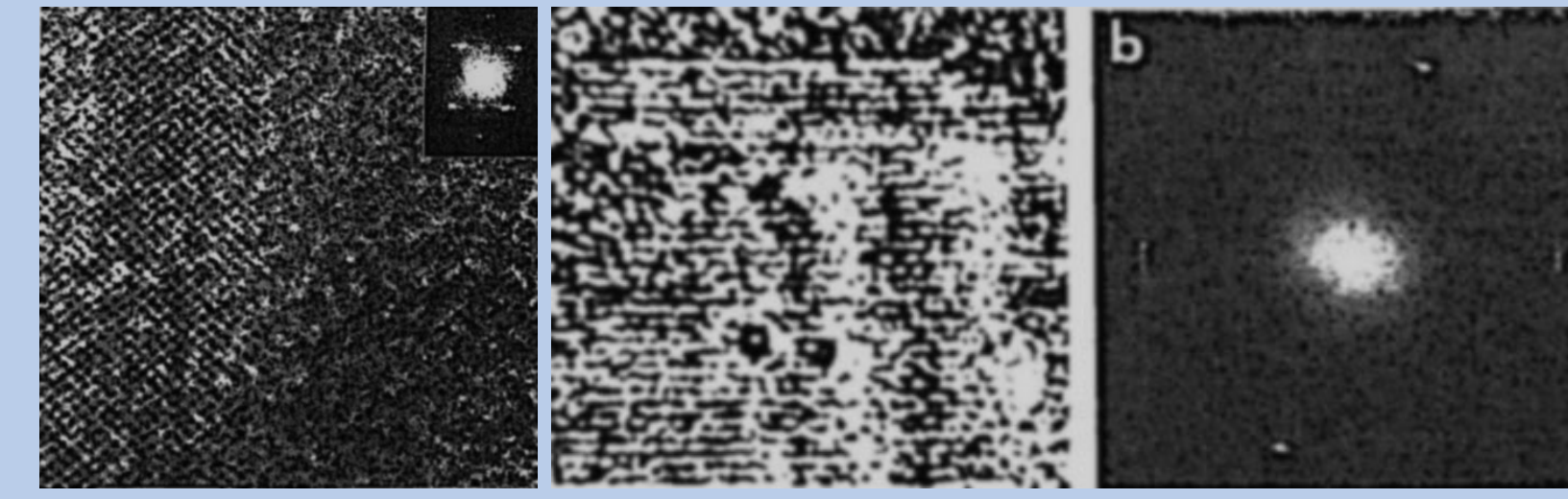


A side-entry cold stage for low-dose high-resolution studies at 1 MV (1984 EMSA submission).



The ACD was only described in the 1984 Ultramicroscopy paper.

Performance of the modified HVEM



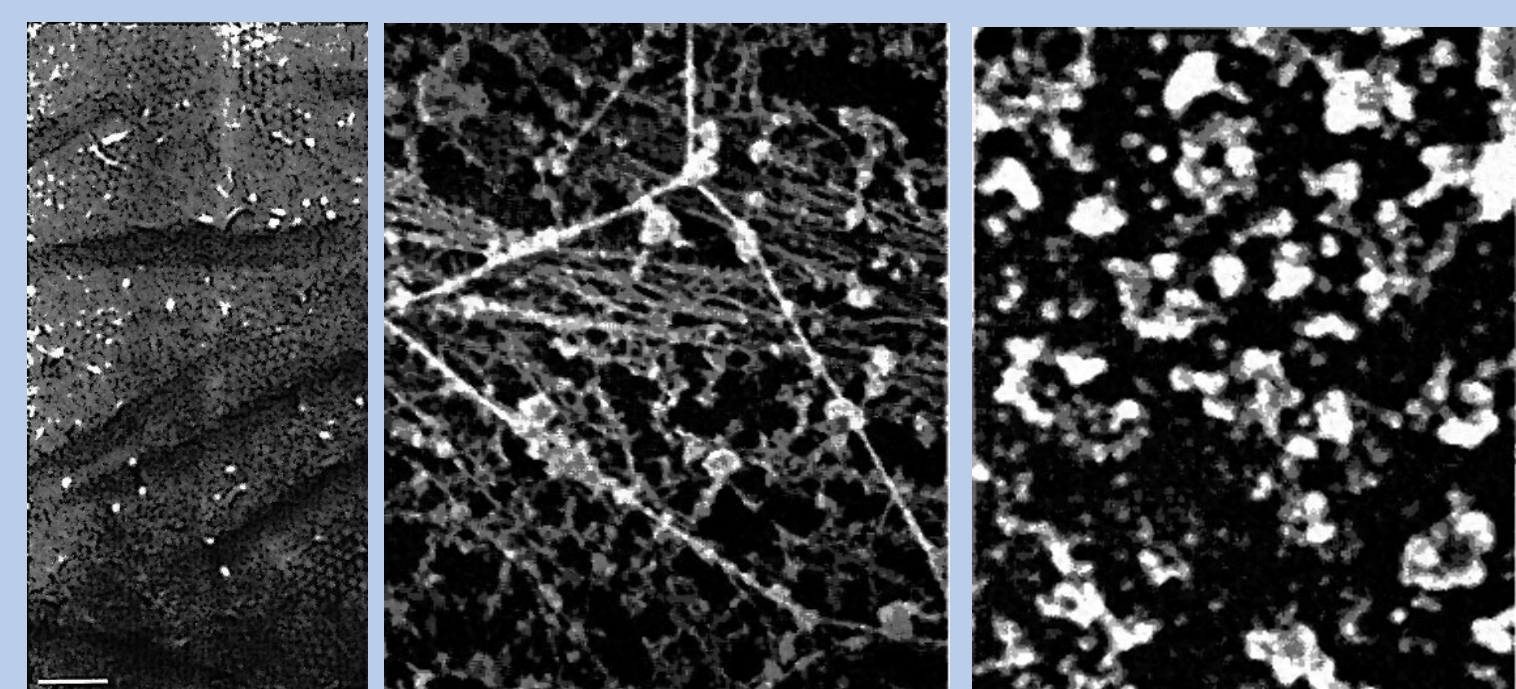
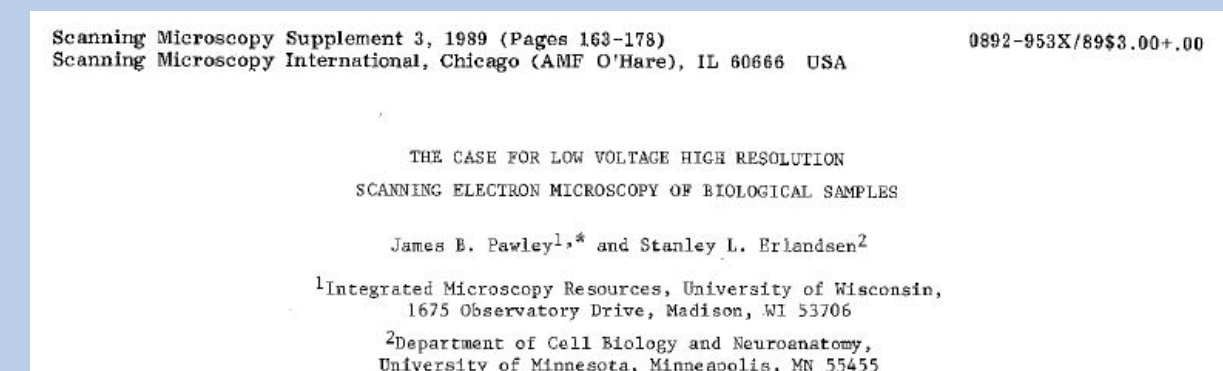
Au crystal, ~0.2 nm Gr Carbon Gr carbon ~0.3 nm

LV SEM

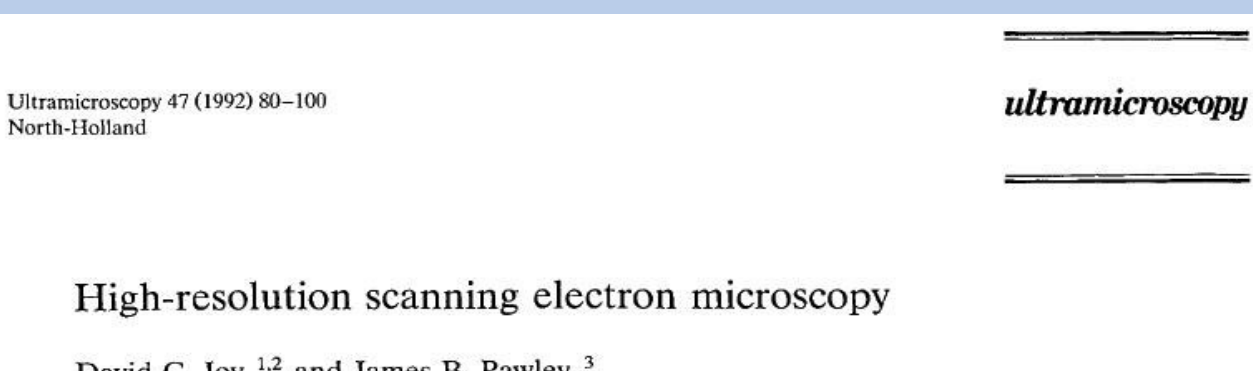
Electron optical design of a high-resolution low-voltage scanning electron microscope with field emission gun

Jiyo Ximen¹, P. B. D. Liu², J. B. Pawley³

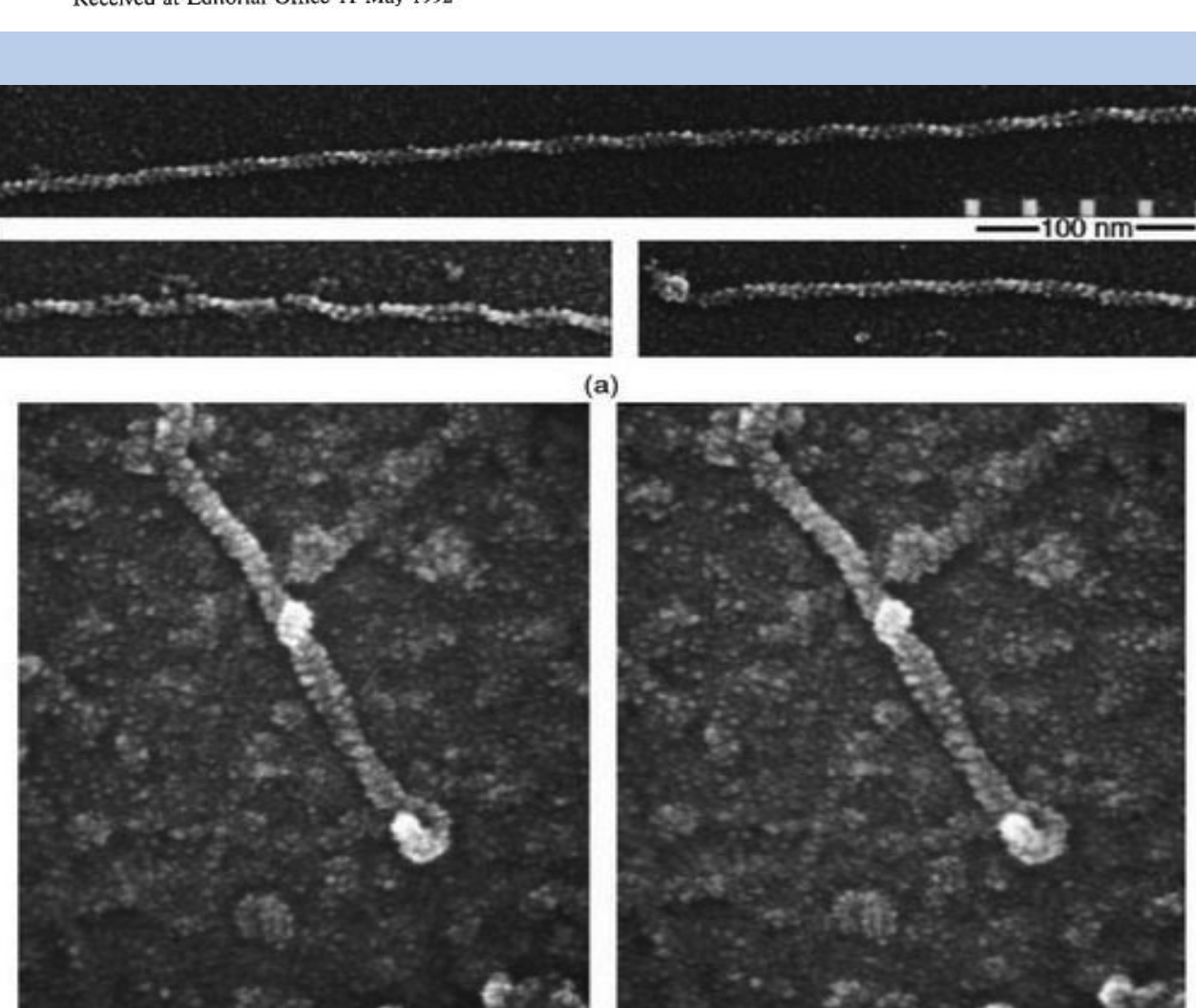
In the present study, a comprehensive description and a complete process for designing a high-resolution low-voltage scanning electron microscope with a field emission gun have been discussed. Including the design of two types of magnetic immersion lenses optimized for low-voltage operation, the evaluation of their resolution, the design of the magnetic lens/secondary electron collector system, the calculation of three-dimensional trajectories for both secondary electrons and backscattered electrons, and the estimate of their collection efficiency. The computed results and the primary experiments indicate the possibility of achieving nanometer resolution, which basically approaches the electron optical predictable probe size for the low-voltage scanning electron microscope.



Jim often worked with former MSA President Stan Elandsen, advocating high-res. LVSEM for biological applications, such as intramembrane particles (I), intermediate filaments (ctr) and nuclear pores (r).



David C. Joy^{1,2} and James B. Pawley³



The paper by Joy and Pawley summarized the state-of-the-art. These pictures of the subunits of actin filaments by Ya Chen attracted much interest.



Biological Low-Voltage Scanning Electron Microscopy
Heide Schatten and James Pawley, Editors
Springer
As was becoming his custom before moving on to a new area of interest, Pawley edited a book on LVSEM, inviting prominent authors. In 2008, Jim was invited to edit Heide Schatten's book on LVSEM, in which could be imparted what was known about the subject.

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