It is apparent from previous work that the major brain phospholipids are synthesized in the endoplasmic reticulum and in vivo are transferred to 'myelin' in both developing and mature animals (1). Nevertheless, no transfer of phospholipids from 'microsomes' to 'myelin' has been demonstrated in vitro (2), after subcellular fractionation, as it has been between 'microsomes' and mitochondria. One possible reason for the failure of workers to establish phospholipid exchange with myelin in the usual simple in vitro test systems employed is that subcellular fractionation may disrupt some critical structures required for exchange in this particular instance. A second possibility may be that the exchange reactions are too slow to be ever detected in the 60 or 90 min incubations used by most workers investigating phospholipid exchange.

In the following presentation we demonstrate how a movement of phospholipids to the myelin membrane from their site of origin can be followed by autoradiography.

The design of an autoradiographic experiment of this ty-
Experimental autoradiography involves labeling the tissue with a phospholipid precursor, stopping the metabolism by fixing the tissue, efficiently washing out the water-soluble precursor, preparing the tissue for microscopic viewing without displacing the radioactive product, and localizing the latter photographically by placing a thin film of photographic emulsion over a thin slice of radioactive tissue. By varying the time between introduction of the precursor and stopping metabolism one obtains information about the movement of the radioactive lipid from its site(s) of synthesis to various other locations where the lipids are needed, but cannot be synthesized.

Fig. 1: Scattering of developed silver grains around a 400 Å thick ³H-polystyrene "hot-line" source. Grains are from Ilford L4 emulsion developed 3 minutes in Microdol X developer. Taken from Salpeter and Bachmann Ref. 3, p.270. From Principles and Techniques of Electron Microscopy, edited by M.A. Hayat, 1972 by Litton Educational Publishing, Inc., Reprinted by permission of van Nostrand Reinhold Co.

The major drawback of the autoradiographic approach is limited resolution. Where one would ideally wish to locate a radioactive lipid in the confines of a bilayer or ideally a monolayer of 50-100 Angstrom units, one obtains silver grains of the order of 1-2000 Angstrom units diameter i.e. 10-20 stacked bilayers. Resolution or discrimination problems are augmented by many factors which it is beyond the scope of the present article to discuss (3,4,5). These factors, such as energy of the isotope, cause a scattering of the silver grains from their site of origin (Fig.1), which in the illustration