With the aid of this pure material we can determine the per cent of active compound in our technical, as well as in various formulations, and for residue purposes.

Since registration may be dependent on the knowledge of residues in edible commodities we must know how to analyze the chemical if used on crops, fruits or animals.

All this assay work requires expensive equipment. For instance, the cost of key pieces of equipment for radio tracer studies will easily exceed $100,000.

However, more important is maintaining personnel with skills to utilize this equipment.

Chart 13

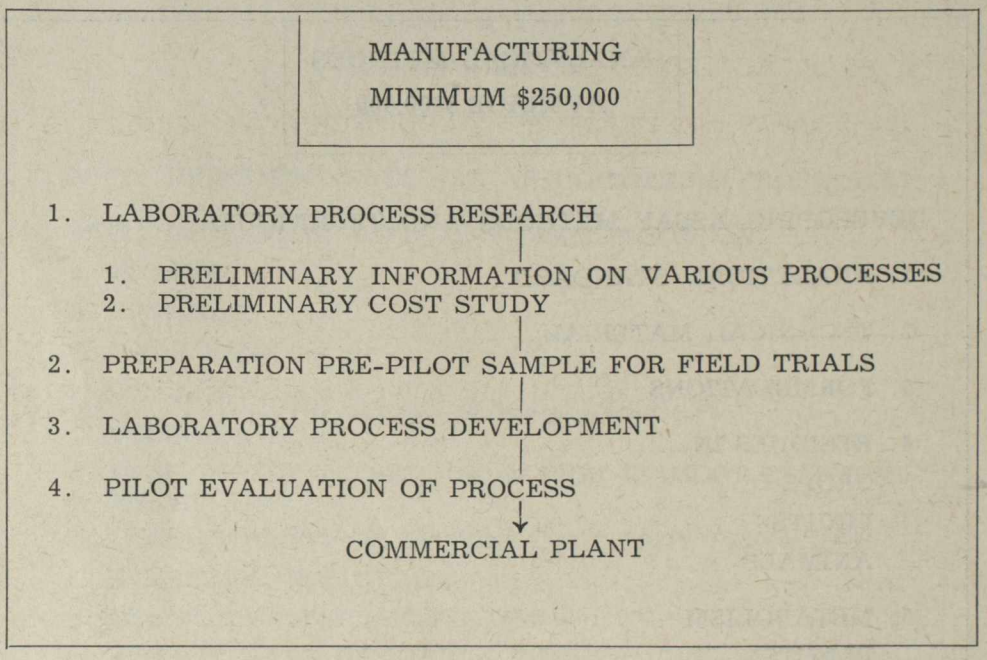

Chart 13—In the Cyanamid Company, *MANUFACTURING* or *Methods for Making the Chemical* may run from ¼ to 1 million dollars depending upon the problems involved. Here the main cost is for the needed skilled personnel and for materials—with the latter amounting to only 20 per cent of the total. We begin in the Research or early Development Stage with *Laboratory Process Research*, which gives us preliminary information on various processes for making the chemical plus some cost information. The amount of material made here is usually 10 to 15 pounds. Next, we are ready for the *Preparation of the Pre-Pilot Samples* which produces material for the first field trials. Here, the amounts produced generally range from 100 lbs. to 1,000 lbs. After our pesticide has been field tested, and we are satisfied we have a potential commercial compound we are now ready to start *Laboratory Process Development.* The purpose of this step is to select the process we plan to use commercially. Often promising pesticides are discarded here because no economical way can be found to produce them. If this stage is successful we are ready for the *Pilot Plant Stage* for evaluating the process to be used in the commercial plant. In this phase, we can produce material in amounts necessary to carry us through Experimental Sales. Cyanamid Research Chemists make use of various company installations and crews where the desired equipment is available. However, a research chemist always supervises the Pre-Pilot and Pilot Plant stages.