Chemistry Department Enters Microscale Era

by Joel Patterson

Bigger is no longer better, at least according to the Canisius Chemistry department.

Canisius will be implementing the use of microscale laboratory equipment into the organic chemistry labs in the near future. The microscale equipment to be used will be much smaller than conventional apparatus presently being used.

Dr. Frank J. Dinan is chiefly responsible for introducing this new equipment to the college. Dinan was selected by the Sloan Foundation, an educational research foundation that sponsored a workshop at Bowdoin College in Brunswick, Maine where the microtechniques were developed.

Dinan was one of thirty chosen amongst hundreds of nationwide applicants by the Sloan Foundation.

His interest in microtechniques extends back many years.

"I have always been trying for years to cut back on the scale of organic experiments. Back in 1982 I began thinking about this because it only makes sense to get smaller and smaller because there is less danger, less cost, and less waste. Thus far, we have been only able to make small cuts like cutting from 400ml to 200ml (volume). The Bowdoin experiment has shown that we can now cut experiments back from 400ml to 40 microliters."

The developing of microtechniques allows for greater laboratory efficiency. Dinan states, "At the very least you would save one-third the time. This allows us to do more chemistry in a shorter period of time, and we will be able to work in a lot more experiments than we have in the past."

He adds, "The combined total of starting material used by twenty five students on the microscale level would be less than that of one student performing the experiment by conventional methods."

The risk of fire and explosion is always a serious consideration in the Organic lab. With microscale techniques however, this risk is greatly diminished.

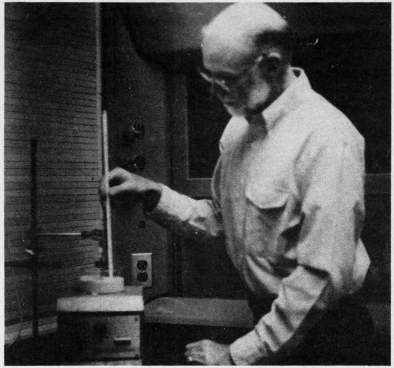
"You don't have to worry about safety as much because the quantities are really tiny so it lets you do things with reagents that you might be more reluctant to use in a regular classical organic laboratory," states Dinan.

Dinan recalls his first experience with microsale techniques," Ron Pike at Bowdoin College said that he was going to make 2-nitro-1, 4-dichlorobenzene and he said he was going to do it while he was talking to us. He was going to doit by first making 100% nitric acid (very dangerous). I started looking for a seat by the door. I thought it was crazy. I was in a room with no hoods (used for ventilation) and the room is full of people. Well, he did it in less than 20 minutes. That's how safe and easy it can be to run these reactions."

"The best part about this is that it is so much fun, because it is much faster to get things done. What once took half an hour to evaporate off liquid now takes less than five minutes. It's just like a chemistry set, you could even run reactions at your desk."

A synthetic organic chemistry course will be offered in the spring for juniors and seniors which will incorporate the use of microscale equipment in the laboratory.

The chemistry department is projecting that microscale equipment will be used in sophomore labs by the fall of 1987, providing there are sufficient funds and a significant amount of success is reached in the junior and senior level course next semester.



Dr. Frank J. Dinan, professor of chemistry, polishes microscale techniques.

Photo by AILEEN WOODRICH

Dinan feels that the implementation of microscale equipment will lead to Canisius becoming a "front-runner" in chemistry.

"I don't think other schools have the interest in, or the awareness of, these developments, or are not able to move as fast as we can in these developments," he stated.

"We're (chemistry department) always interested in educational innovations. I think a great deal of credit should be given to Dr. Joe Bieron (chemistry department chairman), as well as Dean Sharrow (dean of arts and sciences) and Fr. Ryan (executive vice president of academic affairs) for allowing the freedom to pursue these experiments."