and observed that well-qualified graduate students are also in short supply. "Very good schools are finding it harder to find good graduate students to maintain their department standards. These first-rate institutions are barely getting enough to fill their quotas with little or no selection of applicants."

Army Tandem Rests in Limbo, Awaits New Marching Orders

Almost a year after an Army-ordered tandem Van de Graaff accelerator completed its acceptance tests, the machine is still resting unused in a Massachusetts vault. Many nuclear physicists have felt increasing concern about future operation of the 15-Mev (Model FN) facility by the Army Materiel Command's Nuclear Defense Laboratory at the Edgewood Arsenal near Baltimore, Md. The scientists, who had hoped a university staff or some other nonprofit organization might run the $3 million laboratory, fear the present NDL personnel are inadequate to run successfully so complex a facility. The Army, however, discounts this fear and says it is confidently going ahead with the program.

According to physicists involved in the design of the laboratory, the arsenal encouraged the idea for the tandem shortly after the US-USSR test-ban treaty of 1963. "Some people at NDL," says former consultant Kemal K. Seth of Northwestern University, "thought that this would be a good time to put in a request for a big machine that could ostensibly do cross-section measurements needed in weapons development and effects research. They had little expectation of getting the machine. But their timing was good and they were somewhat taken by surprise when one day word actually came that the Defense Department had okayed the purchase."

Another consultant, Jerry Marion of the University of Maryland, notes, "The tandem request document was classified and approved through DOD channels before anybody in the physics community knew anything about it. Once something gets approved by the military, it's damned hard to get it stopped. I became a consultant with the attitude that even though we couldn't prevent it, we might try to develop something worthwhile."

Seth who had been hired as a consultant to help organize a cross-section measurement program at the Cockcroft-Walton accelerator already at NDL, was now asked to head the design of still another machine. "It was a frustrating job. It took our group weeks to write specs or design some part of the facility, but it only took the commander and the other nontechnical people at NDL minutes to mutilate the work. Often we weren't even told about it."

At the same time, the designers began to wonder who would run the tandem when it was completed. They had thought the machine would be operated by a university or nonprofit group for cross-section measurements and nuclear structure research. It soon became quite clear that NDL had no intention of letting someone other than in-house personnel run their machine. This seemed strange since they had only one physics PhD (in electrodynamics) on their permanent staff, and the consultants asked NDL to begin an effort to obtain young PhD's in nuclear physics who were serving out their tours of duty. Subsequently the arsenal did acquire a few nuclear physicists in uniform. When the advisors indicated that senior scientists were required to direct the laboratory and the transient Army personnel, the Army replied that their young PhD's were fully capable of heading the facility. "But you can't run a laboratory with such people," says Marion. "They are fresh PhD's and just don't have a broad enough perspective to run such a large facility with a $1.5 million annual operating budget." "We fought over this issue for about a year with numerous frustrations," says Seth. "The Army said that since there were no positions initially, no additional posts would be granted by Secretary McNamara's office."

Meanwhile the tandem design was completed and the machine ordered from High Voltage Engineering Corp. in October 1964. Some two years later the company completed construction at a cost of $1.953 million. It was thought a fine machine, accelerating 23 microamp of proton beam at 16 MeV. Army officials, however, had not yet decided on the building to house the accelerator. Subsequently NDL representatives went up to High Voltage but refused to accept the machine because of technical difficulties. A second test was successful; the Army accepted the machine and allowed HVEC to use it in development work. Ultimately HVEC got tired of it and asked the arsenal to take delivery. But the Army had not even laid the foundation for the building. Finally, the company dismantled the tandem and stored it in its vault at Burlington, Mass. where it still sits.

During this time, Argonne National Laboratory, who were upgrading their 12-MV EN tandem into a 15-MV FN machine, found that the rebuilding would be delayed because of the lack of certain parts. "Argonne knew that the Edgewood machine was in storage," says Marion. "They asked the arsenal for permission to use the tank from the machine which they would replace long before the Edgewood tandem was in operation. The Army gave Argonne a flat no."

Commenting on the Army refusal, Brig. Gen. William A. Becker of AMC says, "Argonne's best estimate at that time was that their machine would not be available for 15 months. Not anticipating extensive redesign of the shielding facility, the request . . . was turned down because it would be out-of-phase with the installation schedule." Gen. Becker also notes, "It is not our intention to restrict utilization of this research tool to a single military establishment, but rather because of its unique capability, to encourage utilization through the DOD and academic community."

Lt. Col. Shaw of the Edgewood Arsenal told PHYSICS TODAY, "We are negotiating right now with a contractor to go ahead with the building. I'm sure we will hire some additional senior staff to help run the machine. It's hard to say how many."

The two consultants, Seth and Marion, have given up after writing detailed solicited reports to NDL's new head at AMC, Dr. J. T. Thomas. "I myself have slept a lot easier since then," says Seth. And his colleague Marion, "It is my opinion that nothing will ever happen there and that it will just be an infinite sink of money." □