paraphernalia and credentials of the academic world—has turned out to be a refreshing source of alternative arguments.

Under these circumstances, Melman has supplied a good amount of fuel for an already brisk fire, with the result that this year, for the first time, Congress is likely to subject the Defense budget to more than the usually perfunctory debate. In the last session, Senator George McGovern (D–S.D.), who is an ideological distant cousin of Melman's, sought to exploit some of the Melman-abetted fervor by seeking a simple 5-percent cut in the defense budget. He got two votes for the record. But he also got a lot of whispered support, some of it from very surprising places, which has led him to believe that the atmosphere is improving for an assault on the defense budget. It hasn't improved to the point where anyone really expects Congress to suddenly reverse its annual tradition of treating defense requests as sacrosanct, but the thesis of "too much" has clearly infected the legislative scene, and this, in turn, ties in with some other aspects of defense politics.

Within the Pentagon there is no love for Melman, but the hostility toward him is not evenly spread. The civilian directors of the Pentagon, who are caught between Melman's cries of too much and the Air Force's dire warnings of too little, seem to regard Melman's thesis as nonsense, but nonsense that is not altogether without utility in their struggles with the Air Force. When Melman first began to stir up the Capitol with his industrious canvassing of congressional offices, McNamara, upon request of an early Melman supporter, Representative William F. Ryan (D–N.Y.), had a rather quick and lean rebuttal prepared. The gist of this was that defense policies have been carefully worked out and we should all feel confident in their wisdom.

This, of course, did not satisfy Melman, but even less did it satisfy the Defense Department subsidiary toward which Melman has principally directed his fire—the Air Force. So, the Air Force has been grinding out its own rebuttals. Last February, for example, *Air Force and Space Digest*, a monthly magazine that regularly reflects Air Force thinking, featured a thoughtful analysis of Melman by Amron Katz, of the Rand Corporation. In the same issue it also reprinted an article on overkill by General Thomas S. Powers, commander of the Strategic Air Command. And last month there appeared separately a 69-page paper titled "A Response to Professor Melman and 'Overkill'." This was prepared by Murray Green, a civilian in the research and analysis division of the office of the Secretary of the Air Force. Quite possibly, the object here was a forensic overkill of Melman, for the paper not only argued about his numbers and analysis but went so far as to point out that Melman has a "modest military background consisting of about 1½ years of duty," all in the continental United States during World War II. (For what it's worth, Green had 4 years' service as a junior naval officer in the Pacific during World War II.)

In any case, no rebuttal is likely to dampen Melman. He is riding a rising issue, and, interestingly, is using some of the very same tactics of excess and fright which have so well served the Air Force in its budgetary campaigns. Perhaps the thing for which we should be most thankful is that they are not on the same side.—D. S. GREENBERG

Industrial R&D: Competition from Universities, Non-Profits, Alarms Independent Laboratories

Standing outside the tight R&D club formed by government, industry, and the universities—and trying hard to get some attention for itself—is a small segment of American business composed of private commercial scientific laboratories. These laboratories perform a variety of chemical, engineering, and business services at a fee for industry and government, mainly along such lines as product development and testing, investigation of materials failures, and so on. Eighty of these laboratories are affiliated as the American Council of Independent Laboratories (ACIL), an organization which, since its establishment in 1937, has been sporadically protesting what it calls the "trend toward commercialism of research in universities." In a series of letters to congressmen, public appearances, and pamphlets, ACIL representatives have recently made it plain that they regard such "commercialism" both as intrinsically objectionable and as unfair competition with the legitimate activities of private enterprise.

The ACIL is a peculiar hybrid, part lobby, part professional society. Membership, by invitation only, is extremely restrictive. Member labs must be firmly established as going businesses, and they must be "unaffiliated with any academic or governmental institution or with any outside industrial company or trade group." These qualifications not only exclude the couple of thousand one-or-two man labs that might give ACIL a foothold in enough congressional districts to get some support, they also exclude the most common phenomena in this type of work—the three or four professors who set themselves up as consultants, the industry-sponsored research laboratory, and the university-affiliated research institute. ACIL members vary both in scope and size, the average probably having something over 50 employees. Among the largest are the Barrow-Agee Laboratories in Memphis; Froehling and Robertson in Richmond; and the Shilstone Testing Laboratories, with offices in several southern cities.

In trying to get attention for its claims, the ACIL is at a considerable disadvantage. In the first place, at a time when, as the joke goes, "all the money is in the non-profits," these outfits are frankly trying to operate profitably. Secondly, they practice a specialized kind of research that keeps them apart from the policy-making groups that oversee most of the relations between science, government, and industry. Thirdly, the private laboratories are trying to enforce a distinction between basic and applied research which it is rapidly becoming fashionable to overlook. And, finally, all the arguments appear to be weakened by the very large dose of self-interest that underlies them.

Nonetheless, however minute ACIL's chances of overturning the flourishing system it has been protesting—and most of the group's spokesmen readily admit that such an overturning is highly unlikely—the ACIL arguments illuminate a specialized aspect of the "research boom"; they are restrained and dignified; and they deserve some attention, if only as a reminder that one man's fortune is another man's headache.

Basically, the ACIL believes the functions of a university are to teach the young and to promote basic knowledge. When any offshoot of the university—an individual, a department, or a subsidiary institution—trading on its reputation, leaves the classroom and turns to evaluating, say, razor blades, it is not only diverting teachers from their basic purpose but taking advan-

tage of its tax-favored status to compete unfairly with private enterprise. The ACIL has no thought of competing with the large-scale industrial R&D projects sponsored by NASA or the AEC, nor is it against contract research at universities when the research is of a fundamental nature. Rather, it is concerned because, under the guise of these acceptable relationships, a great many universities have permitted or encouraged the applied research in "gadgetry" that makes up a sizable proportion of the business of the private laboratories. Representative of the kind of work that agitates ACIL members are the testing of primary aluminum windows and sliding glass doors performed at one southeastern university and the testing of a variety of fans at an institution in Texas. Similar activities are conducted in many other universities as well. "At a time when the need is greatest and growing for our universities to fulfill their traditional and honored functions of education and advancement of knowledge," says a pamphlet recently issued by the association, "university people increasingly engage in what may properly be considered non-university activities—sponsored industrial and government nonbasic and developmental research. No substitute exists," the pamplet continues, "for the primary and vital responsibilities of universities once educators divert their talents into other directions."

"We do not mind bidding against other laboratories which pay taxes on their profits, building and equipment, and which charge 100% for the truly pro-rated salaries and wages of the people working on the project because this is competition in the American sense," says another statement from an ACIL representative in New Jersey. "But we cannot survive if we must compete financially with a tax-free institution." Thus, aside from the fact that the ACIL holds such "gadgetry" to be objectionable in itself as a university activity, it also feels that the university's ability to perform it rests on an abuse of its tax-favored status, which permits it to underbid private laboratories seeking the same work from both government and industry. Equipment, frequently acquired by the university through a route other than direct purchase, does not have to be calculated as part of costs; other needed facilities already exist; graduate students provide a ready supply of low-cost labor. The result, stated simply, is that university-affiliated institutions may be able to perform the same job for less money than the private labs. The manufacturer may also prefer the seal of approval of a university to that of a private lab. A further affront to the tax collector, according to ACIL, is the fact that after performing work on this basis, at least in the case of some industrial contracts, the universities agree to forego scientific publication to protect commercial secrets.

Although clearly this situation makes life difficult for the private laboratories, its existence is not without justification. Some economists would say, for example, that multiple use of university-owned equipment that would otherwise lie idle for certain hours is socially useful in itself. Others would point out that however inequitable such discrepancies may be, some universities are simply better qualified than some laboratories to perform certain work.

Nonetheless, the fact is that the situation the ACIL is protesting is part of a larger problem. Many other people—without economic gripes—have worried that the teaching function of the university is being eroded by too much emphasis on research of all kinds. Most critics have concluded that the situation is here to stay, and have comforted themselves with the belief that research is a valuable form of intellectual activity and that even if students never do get to see their busy, famous professors, mere geographical proximity can somehow be instructive in itself. What the ACIL has done is to point out that not all that is going on under the heading of "research" is very significant, and that a good part of it is the routine evaluation of sheerly commercial items. It seems to be the case that many universities discreetly encourage this kind of work along with the other kinds, in part to ensure their faculty members ample opportunity to supplement their official salaries. Many bystanders, while publicly lamenting the trend to commercial research, have privately rejoiced to see the opportunities develop, and for a variety of reasons, many favor still closer ties between the academic and the business communities.

At least one school of thought within the government falls into the latter category, for while the private laboratories are worried about university competition, the Commerce Department is worried about serious lags in the application of scientific knowledge to civilian products. As one way around this, the department's Civilian Industrial Technology (CIT) program sought to encourage industry to give more research and development work to universities. Although the CIT program was thoroughly emasculated in Congress, J. Herbert Holloman, assistant secretary of commerce for science and technology, has been doing some stumping for the principle at a variety of local conferences of state university and industry representatives, and in fact Holloman's activity is one of the things that has spurred the ACIL to take a renewed interest in what is going on in Washington. And while it may be the case in the short run that the civilian technology program will lead industry to turn to universities more readily, perhaps at the expense of some private labs, in the long run any program directed toward a basic expansion of the civilian economy should work to the benefit of all participants in the field.—ELINOR LANGER

Announcements

Massachusetts Institute of Technology has made available 180 sets of the first section of a manufacturing description of the **Laboratory Instrument Computer** (LINC). Copies will be provided at cost on a first-come-first-served basis, one set per organization. The first section will contain enough information to allow individuals to acquire and fabricate all LINC parts and subassemblies. Later sections will include material dealing with overall system assembly, programming, and operation theory.

The LINC, a small, stored-program digital computer, was developed at M.I.T. as a biomedical research tool; it was supported by NIH and NASA. Inquiries must be received by 15 May. (MIT-CDO, 292 Main St., Cambridge, Mass. 02142)

Grants, Fellowships, and Awards

Travel and subsistence grants are available for science teachers to attend a program in **marine microbiology** 15 June to 24 July at the Institute of Marine Science of the University of Miami. The program is supported by the National Science Foundation. (C. H. Oppenheimer, Institute of Marine Science, 1 Rickenbacker Causeway, Miami, Fla. 33149)