(Millions of dollars)

	TOTAL	NASA	HEW	AEC	DOD	NSF	OTHER
TOTAL	$2,074	654	375	303	286	235	220
FEDERAL GOVERNMENT	502	179	63	5	89	12	154
INDUSTRIAL FIRMS [a]	360	327	(b)	2	25	3	4
FCRC'S ADMINISTERED BY INDUSTRIAL FIRMS	31	1	—	30	—	—	1
UNIVERSITIES AND COLLEGES [a]	790	79	235	84	154	191	47
FCRC'S ADMINISTERED BY OTHER NTNPROFIT INSTITUTIONS	246	57	—	170	3	16	b
OTHER NONPROFIT INSTITUTIONS [a]	98	5	64	5	10	12	1
FCRC'S ADMINISTERED BY OTHER NONPROFIT INSTITUTIONS	5	—	—	4	(b)	—	(b)
OTHER	42	5	12	4	6	2	12

[a] Excluding Federal Contract Research Centers.
[b] Less than $500,000.
NOTE: Detail may not add to totals because of rounding.

Federal basic research money. Trouble develops at $154 million (1967): Do the universities want to take it?

Campuses and conscience

University ferment over accepting Federal money for war-related research produces a variety of answers—and more questions

• At the University of Michigan, students have voted to maintain university affiliation with the Defense Department's captive Institute for Defense Analyses. But under faculty pressure, the university is disassociating itself from IDA, qualifying at the same time its determination not to do classified research on campus.

• Cornell University has long held to a policy of refusing to do classified research on campus, while accepting it at the quasi-independent Cornell Aeronautical Laboratory. Cornell is in process of closing this route too, and may be close to finding a purchaser for the laboratory. The decision to get out reportedly was made when high university officials were asked to rubber stamp Advanced Research Projects Agency work they were not permitted to see.

• Johns Hopkins University in Baltimore is currently considering a policy that would further delineate between work appropriate to its academic divisions and research suited to its wholly owned Applied Physics Laboratory.

• And the University of Pennsylvania, which has declared against a broad involvement in classified research, is faced with a revolt by smaller nearby institutions with which it shares ownership of the University City Science Center, which does accept classified research.

University faculties can and do influence university decisions — either through policy-making committees as those at Stanford University and the University of California at Berkeley, where restrictions have been placed on military research, or through last-ditch methods like the threat by some University of Pennsylvania faculty members last year to wear gas masks at commencement exercises unless study contracts on chemical and biological weapons were canceled.

"There is a rising tide of disaffection between universities and the Defense Department," confirms an official of the White House's Office of Science and Technology, though he doesn't yet see it interfering with necessary research. He links the disaffection to dissatisfaction with the war in Vietnam, which complicates an underlying university feeling that military research—and certainly classified research—is not a legitimate academic province.

A Federation of American Scientists survey of major, research-contracting universities last year uncovered virtual unanimity in the presence of some restrictive policy on defense research. But while there may be a trend, there is little uniformity among universities.

At Berkeley, for instance, the faculty committee recommendation against any weapons research was struck from the final policy directive but a blanket prohibition against classified research survived. At Michigan, on the other hand, a qualified stand on classified research, permitting it under certain circumstances, is matched by a blanket prohibition against weapons research.

For science, the stakes are high. The Defense Department supports some 22 percent of the approximately $1.5 billion Washington spends for university-based research and development, outside of contract research centers. Of this, however, only some $154 million

is for basic research; less than three percent of that is now classified.

And it became clear last week, as more than 400 physicists attended a symposium on military research and the university at the annual American Physical Society in Washington, that feelings are also high—and divided.

There were few who went along with Dr. William C. Davidon, associate professor of physics at the Haverford College, who proposed a blanket rejection of all military research awards in an effort to channel Federal funds for science through civilian agencies.

The view of Dr. J. O. Rasmussen of Berkeley, who opposes classified research and the inability it entails for a researcher to publish or even consult with colleagues, struck a more broadly responsive chord among the physicists.

But it was matched by support for the view of Dr. Richard L. Garwin of Columbia University who argued that research was necessary to the national security and that funds for such research can be spent to the benefit of both the university and the Department of Defense.

And what the White House official called "the party line—the one I adhere to," was struck by Dr. Charles H. Townes of Massachusetts Institute of Technology, who argued against any "inappropriate absolutism" that would lock a university administration into a possibly untenable position. Classified research, he argued, would have to be undertaken in time of national emergency, and either a vigilant faculty committee or a strong administration could certainly guard against abuse in other times.

The official view in Washington now is that universities should have the freedom to choose their own course.

Dr. John S. Foster Jr., director of defense research and engineering, recently announced a policy that bars classification from all new basic research awards, while permitting those now in force to run their course.

Some of those projects, it has been decided, were classified without adequate reason, for the convenience of the Pentagon. For instance, classification was imposed in some cases to permit a researcher to consult with defense officials and receive classified material, even though his own research was of a nonsecret nature. Some 128 projects are involved.

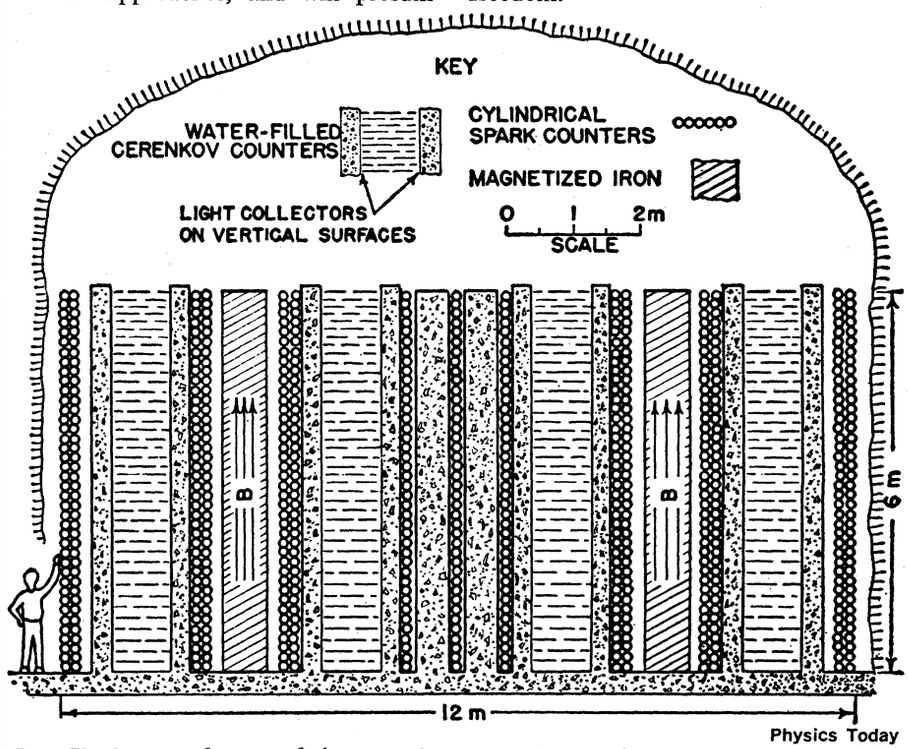
But if the universities should decide to disassociate themselves from applied research, it could hamper the Pentagon. "The IDA case is a problem," says an official, concerned over reports that universities besides Michigan are contemplating a quarantine. Just under 10 percent of the Defense Department's $1.5 billion applied research budget is spent in universities, and another $83 million in university-run contract research centers like Cornell's, Pennsylvania's and Johns Hopkins'. Twenty-two percent of the applied projects are classified and, despite policy shifts, are likely to remain so.

If, as Dr. Rasmussen proposes, all classified research comes off campus and is done in Federal laboratories or contract research centers, both the needs of the Pentagon and the universities might be served. Pennsylvania is apparently able to live with such an arrangement, even if Cornell is not.

Such divisions are regarded as reasonable approaches, and will presumably be encouraged in the future.

"They permit us," says a university official, "to serve the needs of the Defense Department off campus, while not doing anything on campus that we can't discuss with our graduate students."

At Johns Hopkins, for instance, the board of trustees will act next month on a faculty recommendation that would channel all classified research through the Applied Physics Laboratory unless, according to provost Dr. William Bevan, an academic division can make a strong enough case for taking on a job that would restrict its freedom.



In a Utah mine the search for cosmic neutrinos reveals a new type of particle.

WEAK FORCES

Boson hunters wary

One of the triumphs of particle physics in the early 1950's was the discovery of the pion—a particle predicted almost 20 years earlier by the Japanese theorist Hideki Yukawa as the means for transporting strong forces between particles in the nucleus.

A similar search has been going on in recent years for a particle—called an intermediate boson—that would transmit weak forces: the kind involved in the decay of some unstable particles (SN: 1/13 p. 42).

Studies of particles arriving at an underground detector in Utah make some physicists think they have found intermediate bosons. But others are not sure, especially Dr. H. E. Bergeson of the University of Utah, one of the researchers.

Reporting to the American Physical Society meeting in Washington on the progress of the Utah experiments, Dr. Bergeson cautioned against jumping to conclusions without matching theory carefully with experimental results.

The tests have found evidence of the existence of a particle that needs to be explained, however, and the chance that it may be the looked-for boson is appealing.

Of the four kinds of forces that physicists hold accountable for natural phenomena the weak interaction has been most puzzling. The weak force is a little hard to fit into the scheme of things; most of the particles that decay through weak interactions have no known function. Each of the other forces has a role in the structure of