that definitive designs can be made, according to the report. There are several promising approaches:

In the electron ring accelerator concept a ring is compressed, protons are trapped and then the ring can be accelerated. Experiments in the coming year will test ring stability and feasibility of magnetic expansion. Potentially the accelerator could produce high-energy protons in a structure of moderate length.

A superconducting alternating gradient synchrotron could have a stronger magnetic field with less power consumption and ring size than conventional machines. So far superconducting magnets with time-varying fields have shown excessive power losses; but recent work with highly stranded, twisted conductors suggests this problem may be solved soon.

Because the resistance of some very pure metals drops by several factors of ten at low temperatures, one could make high-field pulsed magnets for accelerators out of aluminum, say. Cryogenic refrigeration costs might be lower than that required for superconducting magnets.

Superconducting electron linear accelerators could provide higher energy per length than conventional linacs and offer a nearly continuous beam rather than the short duty cycle required by the high dissipation of power in conventional linac walls.

Several varieties of accelerators with superconducting dc magnetic fields have been proposed.

These new techniques are applicable not only to accelerators but also to detection equipment and beam transport. The report urges both intellectual and financial support for such research and development.

The panel believes that results from Serpukhov and Batavia will show many interesting phenomena between 30 and 200 GeV; it anticipates the need for revitalizing existing laboratories by increasing the energy of proton and electron accelerators into this range. As possibilities the report suggests that the SLAC accelerating structure could be replaced with superconducting microwave cavities and the Brookhaven AGS could have its energy boosted by using superconducting or cryogenic magnets.

Proton-proton storage rings should be added to the Batavia accelerator after some experimental experience with the CERN 25-GeV storage rings, according to the report. At present 100-GeV intersecting rings appear feasible for NAL, the panel notes.

The Physics Dropout: What Turns Him Off?

Why do physics students drop out and where do they go? This question stimulated a special attrition study by Susanne D. Ellis, supervisor of manpower studies at the American Institute of Physics (reported in *Physics Manpower 1969*, AIP publication No. R-220, August 1969). The study was supported by NSF.

Between 1960 and 1966 the number of college juniors who elected a physics major declined steadily, and of that decreasing group of junior-year physics majors more than one quarter dropped out of physics before completing the bachelor's degree. Furthermore, a sizable fraction of the physics students did not complete the graduate degree for which they enrolled.

A 70% response was received to questionnaires sent to former physics students and to those remaining in physics, who acted as a control group. The "dropouts" were subdivided into four categories: those dropping physics as an undergraduate major, physics bachelors who hold nonphysics jobs, physics bachelors pursuing nonphysics graduate study, and physics graduate "dropouts."

A qualitative analysis shows that there was no dominant reason why students abandoned physics at any one point. Also, the "dropout" does not differ on the following indices from his counterpart who remains in physics: sex, marital status and father's occupation. Most of the physics students are male; approximately one third are married; and the greatest percentage of their fathers are professionals, very few of them being physicists.

Students who remain in physics are more likely to come from doctorate-granting institutions.

Those who went on to graduate study had higher undergraduate grade averages than those who accepted immediate postbaccalaureate employment. But there was no significant difference in the undergraduate performances of students who do graduate work in physics and those who leave their graduate work altogether or study another discipline.

The control group offered the following recommendations for attracting and retaining physics students: more opportunities for individual research in college, more stimulating classroom presentation, and an improvement in student-faculty interactions.

Tax Reform Bill May Limit Scientific Society Activities

The tax reform bill passed by the House of Representatives in August severely limits activities of private foundations, which are defined as any organizations that are tax exempt under Section 501 (c) (3) of the Internal Revenue code. Four types of organizations are excluded, but none of these appear to be clearly scientific and engineering societies and federations of such societies. Private foundations would be limited in making their views known to Congress, and their advertising income from publications would be taxed, whether or not the publications are related to the exempt purpose of the organization.

The Senate Finance Committee was scheduled to hold hearings on the bill beginning in September or October. Several technical societies, including the A.I.P., are offering to present their views during the hearings.

NSF Announces Plans for 1970 Expenditure Limits

The National Science Foundation is imposing institutional expenditure limitations for fiscal year 1970; it is assuming that its own expenditure limitation will be about $495 million. Institutions (136 of them) whose expenditures for FY 1970 are estimated to be greater than $500 000 would be subjected to the limitation.

NSF will not impose limitations on major construction projects; reductions in these activities were accomplished by limiting amounts and numbers of new awards. Also exempt from expenditure limitations are fellowships, traineeships, travel awards and summer education programs.

Crystallographers Elect Guinier as New President

The new International Union of Crystallographers president is André Guinier, professor of solid-state physics at the faculty of science of Paris (Orsay), France. He succeeds N. V. Belov of the Soviet Union and will