MONEY CUTS

Town meeting sees catastrophe

The effects of fund cuts being made in Federal support of scientific research range from inconvenient to catastrophic. This charge was made by a 22-man investigative panel of the New York Academy of Sciences that included six Nobel Prize winners and a former Presidential science adviser.

The panel's investigation into the effects of budget retrenchments followed an emergency town meeting of scientific representatives of Government, universities, private research institutes and industry last June (SN: 7/6/68, p. 6) and a late July meeting with President Johnson's science adviser, Dr. Donald F. Hornig. Its findings are based on a survey of 84 academic institutions and 193 individual scientists, whose opinions were in remarkably close agreement.

The preliminary report is directed to President Johnson, President-elect Richard M. Nixon, their science advisers and the new Congress. It stresses that an intensifying crisis in science and education is resulting from drastic cuts in Federal support. The panel called the loss of opportunity and continuity in scientific research "the bitter fruits of budget reduction."

Its recommendations cover both short-range and long-range actions. To alleviate the situation in the immediate future, the committee recommended, as an emergency measure only, diverting funds from appropriations ear-marked for new buildings and other capital equipment. Such temporary measures, however, ought to be compensated for in the 1970 budget, which President Johnson has sculpted but which the then President Nixon will direct. Forecasts so far indicate that the budget President Johnson delivers to Congress this month will be at least as lean as the last.

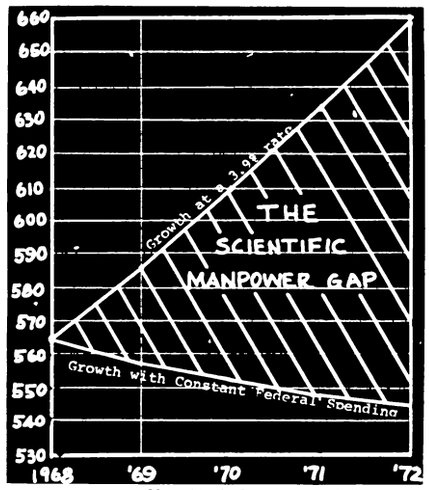
The panel warned that long-term reliance on diversion of capital funds "can only further impede scientific progress by curtailing the number and quality of scientific facilities."

Another serious result is that the continued existence of some institutions of higher learning, particularly those not long established, has been placed in doubt. Also, new schools, hospitals and research centers are not being fully utilized, research that is now reaching a fruitful stage must be discontinued, and experienced research teams are being disbanded with consequent permanent losses of important capabilities.

The future supply of scientists is being adversely affected by the budget cuts, since training programs for both scientific and technical personnel are being cut back severely. As a result of these factors, morale in the scientific community is low.

The panel made some forecasts of the effects of variations in Federal Government research and development spending on the magnitude of scientific manpower. The forecasts are based on the assumption that non-Governmental research and development expenditures will continue to rise at a 9.6 percent annual rate, as it has since 1954; that the price index for research and development work will continue to rise at a 4.6 percent annual rate, as it did during the 1954-1965 period, and that Federal Government expenditures support 63 percent of the scientific manpower performing research and development work.

The basis used for the forecasts was checked by seeing how well the predictions agreed with actuality for the period 1954 to 1965. For the fiscal year 1969, the proposed budget called for a 4.2 increase in R&D spending over 1968 (SN: 12/10/68, p. 133). Since then, however, major cuts in the budget ($6 billion) have been mandated, and it is now estimated that Federal expenditures on R&D will be about 15 percent less than in fiscal year 1968. Such a reduction, the panel finds, results in a 10 percent decrease in scientific manpower employment.



New York Academy of Sciences

Scientific manpower—down, down.

Using these same assumptions, plus one that Federal spending remains at the 1968 level and another that the growth rate of the 3.9 percent increase in manpower that occurred during the 1961-1965 period is necessary to match expanding population, the panel made other predictions. In only one year, a gap of 29,000 scientists and engineers will develop. After four years, the gap would widen to 116,000 scientists and engineers, 18 percent of the supply.

AT CERN

Ultrasonic bubble chamber

A new technique by which high energy physicists can capture photographically the tracks nuclear particles leave in bubble chambers has been proved at CERN, the European Organization for Nuclear Research in Geneva.

In a chamber filled with liquid helium, ultrasonic waves were produced that make the tracks clear. The ultrasonic bubble chamber, when perfected, should enable photographs of nuclear events to be taken much more frequently than the one or two times a second usual with most instruments with which the debris from nuclear collisions are studied.

In the conventional bubble chamber, a liquid, such as hydrogen, helium or freon, is held near its boiling point under pressure. Before a charged particle beam is fired into the liquid, the pressure is released by a moving piston or a membrane. This causes boiling preferentially along the particle tracks, which are then photographed and the film analyzed. The liquid must then be immediately placed under pressure again.

For the idea and development of the first bubble chamber, Dr. Donald Glaser, now working as a biophysicist at the University of California in Berkeley, was awarded the Nobel Prize in Physics in 1960.

In the new ultrasonic chamber, built under the direction of Colin A. Ramm, there is no piston or membrane, so there are no complicated moving parts and no general disturbance of the liquid mass. The liquid helium is made sensitive by sound waves, having such a high frequency they cannot be detected by the human ear. They cause bubbles to form when nuclear particles flash through the chamber.

Money and time were both running out when the CERN scientists kept an agreement made with Dr. Arthur H. Rogers, a visiting professor from 1966 until last August, to continue his attempts to operate the ultrasonic bubble chamber. Colleagues Drs. R. C. A. Brown and H. J. Hilke carried the effort to success only a month before the deadline. Technical details on the ultrasonic bubble chamber are reported in the Dec. 21, 1968, NATURE.

Successful operation was achieved when the helium temperature was lowered to 3.5 degrees K. ◇