

mission, the radar will begin reporting the LM's altitude from about 32,000 feet on down, but for Apollo 10, it was modified so that it began picking up the surface from almost 70,000 feet.

Following the low point of the LM's descent, the astronauts then fired the spacecraft's descent engine for the second and last time, carrying the vehicle upward into an orbit even higher than the command module's. Giving the command module the inside track allowed the LM to fall behind the CM, then drop below it to be in position to simulate the Apollo 11 ascent from the lunar surface.

Here the LM descent stage was to be jettisoned, letting the remaining ascent stage carry the astronauts up to a rendezvous with the waiting command module. As the staging maneuver took place, a misread switch position gave the LM crewmen a frightening surprise when it caused the ascent stage abruptly to begin orienting itself for the return to the CM, instead of holding still for staging as expected. Stafford, however, coolly canceled out the unwanted guidance computer program, and no damage was done.

**The ascent engine** then received its first test around the waiting CM, this time from a low point of about 11 nautical miles. The remaining maneuvers leading toward rendezvous went like clockwork, until, during the 16th orbit of the moon, the command and lunar modules—Charlie Brown and Snoopy—were joined once again.

More than a day remained to be spent in lunar orbit, largely to provide more tracking data to help understand the errors caused by variations in the moon's gravity, along with its irregular shape.

The extra time seems to have paid off. By mission's end last week, officials claimed that they could predict the altitude of a moon-orbiting spacecraft to within 500 feet for each revolution in advance. This is 27 times as good as was possible during the Apollo 10. The tracking also helped to correct specific errors from previous measurements, notably that Apollo site 2, the one chosen for the first lunar landing, is 2,000 feet higher than indicated by maps made from lunar orbiter photographs.

The flight home was smooth; splash-down in the Pacific was within a few thousand yards of the prime recovery ship, Princeton.

Meanwhile, Apollo 11 is already in position on pad 39A at Cape Kennedy, aiming for a July 16 launch. The possibility exists that the launch could be postponed until August to allow additional crew training, but NASA officials last week seemed unanimous in favor of July. ◇

## SOVIET SCIENCE

### Getting out the cast iron

Central planning is an old story in Russia. The Czarist Government allowed private enterprise, but it never let it be very free. When the Bolsheviks took over, they nationalized what enterprises were not already owned by the state and amalgamated their administrative bureaucracy with the already cancerous state bureaucracy.

**One organization** the Bolsheviks inherited from the Czars was the Imperial Academy of Sciences, now known as the U.S.S.R. Academy of Sciences. According to a report on Soviet science policy by the European Organization for Economic Development, the eighth in a series of national reports and the first on a non-member, this old and prestigious group has successfully maintained its independence against pressures from party and ministerial officials. But it has become, as Communist planners wished, the central administrator for much of the country's research effort. Nearly all the pure research and much of the applied research is done in institutes managed by the academy or by the academies of the constituent republics, which are supervised by the U.S.S.R. Academy.

While it fights interference from outside, the U.S.S.R. Academy has established within its rank a control so rigid as to provoke loud complaints. If a Soviet scientist has enough prestige, he can fight back by refusing to send papers up and down stairs. Such a one is Dr. Gersh Istkovich Budker, director of Institute to Nuclear Physics at Novosibirsk, who builds large particle accelerators without asking permission and is very outspoken when interviewed. Referring to one such project, he says: "Our chiefs at the Academy of Sciences did not know about this accelerator until we had built the tunnel." He found the money by juggling other items in the budget he had been given.

**There is** open dissent as well. The report located a present center of outspoken discontent in the academies of the Soviet republics. Their complaint is the attempt by the U.S.S.R. Academy to make each of them concentrate its effort in a single scientific specialty. They want to build up general scientific communities in their several countries. Whether their protest will have any effect is yet to be seen.

Soviet universities are responsible for far less of the country's research effort than are their counterparts in Western countries. One reason for this, says the OECD, is that they are officially in a second-class position. In the scale established for payment of salaries and qualifications of personnel, the academy in-



APN/Novosti

*Academy President M. V. Keldysh.*

stitutes occupy the highest level, the universities come second. The academy, therefore, takes the best personnel.

Some hope of strengthening university research lies in a new policy by which industrial managers are being allowed to contract with university researchers for research programs they think they need. This method, which is traditional for both private and government agencies in Western countries, has done much to build up the research capabilities of the colleges and universities in the West.

**The Russians** seem to hope, the report indicates that it will also help to bring innovations into industry. Industrial laboratories themselves are on the bottom of the prestige list and have usually concentrated on the immediately practical. Yet any discovery that may be of industrial use has a hard time getting into production because of bureaucratic inertia.

In areas like armaments, nuclear technology and space science, the pressure of national defense and national prestige and the power of the military have combined to cut through the red tape and bring innovations to quick application. In the average washing machine factory this has not been so, and the over-all result is that the Soviet Union lags behind the West in most consumer industries.

The problem is that factory managers have production goals set for them by a general five-year plan. If they use familiar methods, they may fulfill the norm. Innovation entails the risk of missing the goal, and that can be fatal to careers.

**Meanwhile money** for science is getting tighter in the Soviet Union as elsewhere. The rate of increase in expenditures for science has steadily dropped, according to the OECD: from 18 percent per year in 1960 to 5 percent per year in 1966. As this has gone on, the government has been looking at

pure research with a harder and harder squint.

Pure research in the Soviet Union used to be justified on grounds of national prestige, culture and scholarship. Now its defenders are sounding a practical note. Speaking at a meeting in Miami last winter, Prof. D. I. Blok-hintsev of the Joint Institute of Nuclear Research at Dubna gave an apology for pure science that was based on its benefits to human life rather than to human intellect. And Soviet physicists who have been working toward the design of a planned 1,000-GeV particle accelerator justify themselves in the volume of plans they have written by saying: "The history of the development of physics shows that the discovery of fundamental laws leads, as a rule, to the revolutionary advancement of engineering."

The Soviet Government would like to see it happen. ◇

## SOCIAL WORK

### Choosing a new way

The nation's welfare programs have been a thorn in the side of city governments for a decade or more. Recently they have become a national issue, and one which the Nixon Administration is girding its loins to handle.

**Last week,** as Mr. Nixon was trying to pick one of several plans to revamp the nation's welfare system, the issue erupted in a raucous invasion of the 96th annual forum of the National Conference on Social Welfare by a group of insurgents trying to finance their own activist organization.

The Administration is wavering between the idea of a straight Federal minimum for welfare payments (SN: 5/10, p. 448), leaving the structure of the system relatively intact, and the more radical approach of the negative income tax (SN: 11/16, p. 497), called the Family Security Plan by the White House. The FSP would supplement the income of families with low incomes and support those which had no income. Under the plan, a family of four, with no income, would receive \$1,500 to \$1,800 annually.

**The Family Security Plan,** being pushed by Secretary of Health, Education and Welfare Robert H. Finch and Urban Affairs Council Director Daniel P. Moynihan, would stimulate and reward poor people to get work rather than rely entirely on welfare payments. Under the present system, if a father is employed, his family gets little aid, no matter how marginal his income.

Under the negative tax plan, recipients would be guaranteed a basic annual income. The amount they received would be reduced by half of what they

earned: A family that earned \$2,000 would have its welfare payment reduced by \$1,000. When the family income reached a cut-off point—\$3,000 in the Moynihan plan—the payments would stop.

At the prestigious social welfare conference, headed by former HEW Secretary Arthur S. Flemming, the concern among the 7,000 delegates was with the basic details of social work. Week-long meetings, forums and exhibits dealt with employment opportunities in social work, relations with the black community, work with the mentally retarded, the aged and the drug addict.

**But outside the meeting halls,** and sometimes inside them, the insurgent members of the National Welfare Rights Organization demonstrated for a revamping of the entire public assistance system. The group's demands are along the lines of the Moynihan approach: a guaranteed minimum income and a national minimum for public assistance.

The radical group, headed by militant civil rights advocate, Dr. George A. Wiley, is demanding that the social workers attending the meeting and the national conference donate \$35,000 as a downpayment on the \$250,000 he says his group needs for operating expenses this year. Dr. Wiley, an organic chemist and former associate national director of the Congress of Racial Equality, claims the NWRO has 30,000 members, most of them Negro women on welfare.

The demonstrators began by trying to disrupt registration in the national conference by demanding one dollar from each delegate as a "poor-people's surcharge."

**The reaction of the social workers** was a mix of the mild and the indignant. Dr. Flemming, though he had the microphone snatched from him, said he believed the conference should support Dr. Wiley's movement. He rejected the money demand but said the general membership might reconsider. Members of the audience were not so tolerant, and shouts of "blackmail" echoed from the 3,000-member audience in the New York Hilton.

A major complaint of welfare recipients has been what they call unjust distribution of benefits handed out on the basis of investigations into their personal life to determine if they meet the requirements of local ordinances. This is the reason for the demands for national guaranteed minimum income, under which the only criterion for getting aid would be a lack of money coming in. Such a system, which is the basis of the negative tax idea, would eliminate the need for investigations, surprise visits, and all the other investigative operations that fill the social worker's workday.

## PROJECT GRANTS

### Splitting the costs

Universities here have long contended that for every dollar of Federal research support they receive they spend 15 to 30 cents of their own for overhead, not covered by the research project grants.

Federal efforts to deal with the problem, either by setting a Government-wide standards for overhead or by denying that they are legitimate, grant-linked expenditures, have been going on for a decade. But university officials have never agreed on the fairness of agency-by-agency standards, and even Bureau of the Budget guidelines have failed to bring peace.

**Under the mantle** of concern with the Government's policy of paying all the direct costs but only part of the indirect costs universities incur for research, Sen. Fred Harris (D-Okla.), chairman of the subcommittee on Government research of the Committee on Government Operations, has been holding hearings aimed at reviewing Federal support of education.

The Harris hearings are not leading to any new legislation, but are aimed at blocking proposals that may come from members of the appropriations committee, including Sen. Karl E. Mundt (R-S.Dak.), who also sits on the research subcommittee. Mundt contends that in paying an additional 25 percent of grant levels in indirect costs, the Government is really subsidizing the administrative activities of some universities (only 100-150 institutions receive substantial support because most small schools are unequipped for major research) and that the others deserve a share of the Federal pie. "How can we grant money to smaller universities," he asks, "instead of concentrating on Harvard and MIT?"

Last year, Sen. Mike Mansfield (D-Mont.) maneuvered through the Senate a 25 percent ceiling on indirect costs, to which the House did not agree.

**One solution to the hassle over direct versus indirect costs and the question of whether or not universities should share the financial burden of research** may lie in a Bureau of the Budget proposal to abolish grants and contracts and replace them with research agreements. "The difference between grants and contracts is essentially one of semantics," says Phillip S. Hughes, deputy director of the Bureau of the Budget, who contends their use under varying circumstances is more traditional than logical. Just what a research agreement would be is, at this point, rather undefined but, Hughes comments, "it would be a middle ground," an arrangement that could be