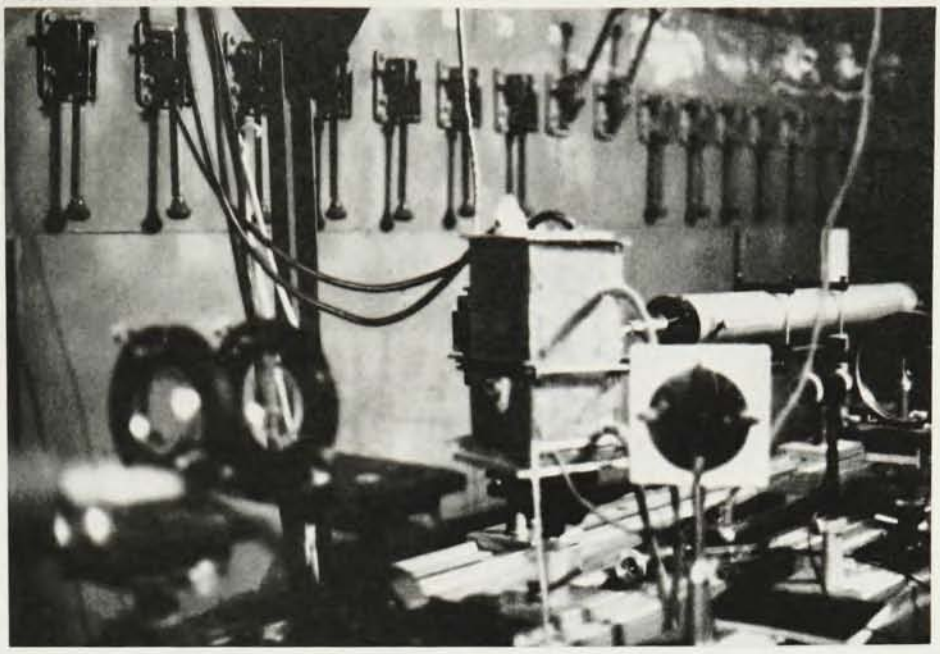
PHOTOS BY GLORIA LUBKIN

NIKOLAI G. BASOV directs nonnuclear-physics research at Lebedev and also heads the quantum-electronics laboratory.



AUXILIARY LASER SYSTEM triggers high-power laser. Pulse lasting 10^{-11} sec strikes lithium-deuteride target, and experimenters observe neutron production in coincidence with pulse. Neutrons are attributed to fusion of two deuterons.

of Sciences, seven corresponding members, 15 winners of the Lenin Prize, 41 "candidates" (a higher degree than the Western PhD) and 225 PhD's. The average age of a Lebedev scientist is 35 years (see table).

Scientists are well supplied with technicians, we were told. Whereas in 1925 the ratio of technicians to scientists was 0.5, in 1967 the ratio had increased to 5.0.

Impressions. Our one-day visit ended before we could hear much about the institute's 19 other laboratories. The buildings we saw were dark and a little old fashioned (but no more than a typical Ivy League physics building). There were bright touches everywhere, like the melons ripening on a lab bench and the colorful flower beds that line the walks.

We came away impressed with the quality and imaginativeness of the work we saw at the institute, and delighted with the friendly enthusiasm of the physicists we met. —GBL

Illinois Building 30-MeV Superconducting Linac

The University of Illinois at Urbana-Champaign expects to be running a superconducting linear accelerator in about a year. The 30-MeV electron machine is similar to the one being developed for higher energies by William M. Fairbank and H. Alan Schwettman at Stanford (PHYSICS TODAY, January 1966, page 96). The National Science Foundation has

IN BRIEF

Two historic reactors are being phased out after about 20 years' service. British Experimental Pile 0 (BEPO) at Harwell in England was started in July 1948; its irradiation program has been transferred elsewhere. The Brookhaven Graphite Research Reactor, started in 1950, is on stand-by status; it can be started up again on 30-day notice.

Project Stormfury tried again this year to seed hurricanes with silver iodide in an effort to lessen their violence. Only two storms had been successfully seeded in the previous seven years. The project is sponsored by the Environmental Science Services Administration.

The National Bureau of Standards will adopt a new reference base for the volt 1 Jan. in a coöperative plan to bring the volt units of 10 countries into agreement. One present volt (US) will equal about 1.0000010 new volts (US).

A 178-cm cyclotron is producing 95-MeV protons at the Naval Radiological Defense Laboratory in San Francisco. It will be used for biomedical radiation research, nuclear chemistry and radiation-effects research, neutron physics and radiation-transport research and charged-particle physics.

Woods Hole Oceanographic Institution has launched its fifth research ship, the 245-foot (75-meter) RV Knorr. The ship will carry 60 scientists and crew members.

Joint studies of the upper atmosphere and near space by the US and four other countries have been worked out by NASA. Launches will be conducted from Brazil, Norway, Spain and Sweden.

Concentrations of dense material beneath the lunar surface have been discovered by analysis of slight speed changes of orbiting spacecraft. The mass concentrations ("mascons") were found centered below all five ringed seas on the near side of the moon, suggesting a relationship between the mascons and the origin of the seas.

Princeton physicists measured 3.3-mm microwave background radiation at the High Altitude Observatory, Climax, Colo. (3450-meters high). They found a radiation temperature of 2.46 (+0.40, −0.44) K, which is consistent with a blackbody spectrum necessary for the primeval fireball hypothesis.

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awarded Illinois a $500 000 grant for the machine.

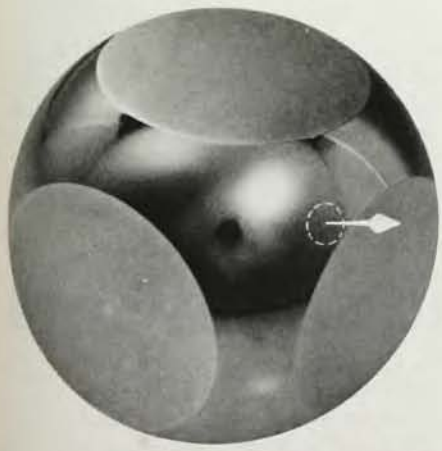
Peter Axel and Alfred O. Hanson head the project; other team members include James S. Allen, Clark S. Robinson and David C. Sutton.

The Illinois group would like to add to the linac a racetrack microtron, so that the beam would enter the linac 20 times to achieve a final energy of 600 MeV.

Six-Sided Reflecting Satellite Could Check General Relativity

Duane H. Cooper and Howard W. Knoebel (University of Illinois) have studied a low-cost orbiting-gyro experiment that they expect could distinguish between the predictions of general relativity and Brans-Dicke theory (PHYSICS TODAY, January 1967, page 55).

The satellite would be a spinning dielectric sphere, 60-cm across, with six optical flats symmetrically arranged on the surface (reflectively coated). Then existing satellite-observing stations would simultaneously photograph the stellar background and flashes of sunlight reflected from the optical flats to measure reflected rays. Thus the experiment determines spin-axis orientations. By using a dielectric body at an orbital altitude of 1000 km, Cooper and Knoebel expect to eliminate both magnetic and atmospheric disturbances. Recently, by simulating the experiment on a computer they concluded that remaining disturbances can be eliminated by data-reduction procedures.



GENERAL-RELATIVITY SATELLITE. Ground stations would simultaneously photograph stellar background and sunlight reflected from the six optical flats to find change in spin-axis (arrow) orientation over one to two years. Experiment could check Brans-Dicke theory.

By running the experiment for one to two years, Cooper and Knoebel expect they could measure the relativistic precession to better than 1%, sufficient to observe the 8% discrepancy between the predictions of general relativity and Brans-Dicke theory.

Another orbiting-gyro experiment, which uses a superconducting rotor, (PHYSICS TODAY, January 1968, page 103) is being prepared by C. W. F. Everitt and William M. Fairbank of Stanford.

Dubna and LRL Compress Smokatron Electron Rings

Enthusiasm for the electron ring accelerator ("smokatron") is growing. In a special session at the International Atomic Energy Agency conference on plasmas and controlled nuclear fusion (held in Novosibirsk the first week in August) physicists from Dubna and Lawrence Radiation Laboratory compared notes.

In an electron ring accelerator (PHYSICS TODAY, February 1968, page 51), the plan is to inject electrons into an axially symmetric magnetic field, at right angles to the field. Electrons move in a circular orbit in a plane perpendicular to the field. The magnetic field is increased, causing the ring to shrink and the electron energy to increase. Then hydrogen gas is injected, becomes ionized, and the protons become trapped inside the ring of circulating electrons. After shrinking one can accelerate the ring by a variety of methods.

V. P. Sarantsev reported that his Dubna group had successfully trapped and shrunk a ring with a maximum current of 2000 amperes. A 200-A beam of 1.5-MeV electrons is injected and forms a doughnut 40 cm in radius. After compression the major radius is 5 cm and the minor radius is 0.15–0.20 cm. The ring lasts about 50 microseconds and then grows because the magnetic field is decreased. Eventually they expect to build a 2000-A electron injector.

The Dubna experimenters have not succeeded in accelerating a ring yet. Work has been slowed because the injector was not working for several months. To accelerate the ring, they are building a system for expanding the ring in a decreasing magnetic field.