posed site had been presented to House and Senate Appropriations Committees. Plans for the site have been given to the National Capital Planning Commission and to the Regional Planning Council, and it is expected that these groups will work with the bureau in utilizing the land. The General Services Administration will participate in planning and will supervise construction. Transfer of operations to the new location is expected to be completed in about 5 years.

The bureau occupied its present site on Connecticut Avenue in Washington in 1903. Since that time its responsibilities have greatly increased, largely as a result of the rapid expansion of technology and the growth of scientific research. Extensive programs of research and development must now be conducted in the physical sciences and engineering to meet the needs of science and industry for new and improved standards and measurement methods.

It is expected that the new location will make possible a more modern research operation in structures that can be very efficiently managed. In addition, the rural location will remove the bureau's work from the variety of mechanical, electric, and atmospheric disturbances present in a city and will reduce the effect of these forces on precise scientific measurements.

In addition to its Washington laboratories, the bureau maintains a major research center in Boulder, Colo., and 20 widely scattered field stations. The Boulder laboratories are concerned with radio propagation research, radio standards, and cryogenic engineering. Most of the field stations are engaged in gathering data on radio propagation.

Science, Secrecy, and Wall Street

It is perhaps of interest to note that recently the *Wall Street Journal* carried a full-page condensation of testimony on "The High Cost of Secrecy to Science" given by Gerard Piel, publisher of *Scientific American,* before the House Government Information Subcommittee. The article ends with the following paragraphs.

"Under our Constitutional principle of the separation of powers, our Congress has long opposed the human tendency in the Executive Department to make Government a private affair. It is an old experience in the administration of our country that secrecy can be a shield for incompetence and corruption.

"Now we have a new reason to oppose secrecy in the operations of the Government. It is the danger that secrecy lays to the advancement of science, and hence to the general welfare and to national security."

Nuclear Progress in India

India's first atomic reactor went into operation on Trombay Island, 13 miles from Bombay, on 4 Aug. This is the first reactor to be set up in Asia. Japan is running just behind India in the atomic field; its first reactor is due to start operating shortly.

The Indian reactor will turn out radioactive isotopes for use in biological, medical, and industrial research, and will be used to train nuclear scientists for further projects. A second reactor, provided by Canada under the Colombo Plan, will start operating by 1958. This will also be set up at Trombay, and will be a high-power, high-flux machine that will enable India to undertake advanced engineering research and the testing of materials connected with the more advanced types of power reactors.

To feed the reactors, India has vast potential supplies of atomic fuel. The beaches of Travancore-Cochin are rich in black monazite sands, bearing uranium, thorium, and zirconium. The thorium content of the sands is estimated at 100,000 tons—the biggest thorium deposits in the world. In Rajasthan, deposits of beryl have been discovered, and uranium-bearing materials have been located in Bihar, Udaipur, and Nellore.

A plant has already been operating for 4 years at Alwaye in Travancore-Cochin to process monazite sands for the extraction of uranium and thorium "cake." A second plant at Trombay processes the cake for the production of small quantities of pure thorium nitrate and uranium. Two more atomic fuel plants are being planned: one plant will extract uranium from copper tailings; another, to be set up at Nangal in the Punjab, will turn out heavy water as a byproduct of nitrogenous fertilizers.

The training of special workers was begun 11 years ago by the Tata Institute of Fundamental Research, so that when the government established its Atomic Energy Commission in 1948 there was already a small team of trained nuclear physicists. Today, there are 200 natural scientists on the staff of the Atomic Energy Commission's establishment at Trombay. By 1959 there will be 800.

In addition to Canada, other foreign countries have also helped Indian nuclear development. Britain has signed an agreement with India for "close cooperation and mutual assistance" on the peaceful uses of atomic energy and is providing enriched uranium as fuel for the first reactor. A British firm of consultants is helping to plan the heavy-water factory at Nangal.

The United States is also ready to cooperate with India and is supplying 21 tons of heavy water for use in the second reactor. France has been cooperating in the processing of the monazite sands. The U.S.S.R. has offered India any information needed on peaceful uses of atomic energy. India is also cooperating informally with Norway and Sweden.

Larger Orbit for Satellite

Improvement in the performance o the launching vehicle for the IGY earth satellite, including a reduction in the vehicle's weight, has led to new estimates for the orbit that may be attained, according to those in charge of Project Vanguard in the Office of Naval Research. It is now estimated that a satellite may attain a final velocity of 19,000 miles per hour instead of 18,000, and an elliptical orbit that could reach a maximal distance from the earth of some 1500 miles instead of the 800 originally predicted. Spokesmen for the project indicate that developments have gone better than expected and that recent rumors about unexpected difficulties are unfounded.

Heavy Water in Germany

The production of heavy water is of great importance in the atomic energy program. How far this program can compete with ordinary power stations depends to some extent on the price of the heavy water.

H. C. Urey and collaborators discovered the heavy hydrogen isotope in 1932 by the fractional evaporation of liquid hydrogen, and in 1943 Urey and engineers at the DuPont Company considered its industrial use. However, it was Clusius who suggested independently in 1941 that heavy water might be produced on an industrial scale by rectification of liquid hydrogen. He gave detailed calculations in 1949, and now K. Winnacker, Frankfurt (M)-Hoechst [*Physik. Bl.* **12**, No. 6, 274 (1956)], reports that an installation is being set up in cooperation with Linde Eismaschinen for a production of 6 tons of heavy water per year.

As starting material for the heavy hydrogen, ammonia synthesis gas of about 70 percent hydrogen, 20 percent nitrogen, and some impurities is being used. (The exact composition may vary from plant to plant. For example, at the Phillips plant in Etter, Tex., the gas contained 72.2 percent hydrogen, 24.1 percent nitrogen, and various impurities). Since in normal hydrogen only 1 atom of heavy hydrogen in about 7000 atoms of ordinary hydrogen is present, large amounts of synthesis gas (8500 cubic meters per hour) have to be processed. By cooling this gas with liquid nitrogen under a pressure of 8 atmospheres, most of the nitrogen is removed. The last traces of impurities