GENERAL SCIENCE

Russians Look at Future

Russian scientists make many hopeful predictions on the course of science, ranging from cosmic ships flying at 40,000 miles an hour to a disease-free environment.

➤ ROCKET-POWERED airliners flying at 10,000 miles per hour; transparent and transportable houses; a disease-free environment; self-controlling and self-checking factories and excursions to the moon.

These are some of the promises of science in the foreseeable future, according to Soviet scientists.

Guided by the new slogan, "The Future Is Being Made Today," Russian scientists have taken a peek into the immediate future in the current issue of *USSR* (No. 4), the English language Russian magazine published and sold in the United States.

This is what they predict:

1. Tomorrow's Cities—Russian houses of tomorrow, according to Academician Pyotr Rebinder, will be thin-walled, graceful structures that are easy to build, easy to transport, and simple and inexpensive to heat and to cool. They will be transparent but "strong and lasting." They will be made of a new building material that will be easy to mold, process, stamp and will assume any shape desired. Unusual cities will also be built.

2. Tomorrow's Health — Medicine, predicts Prof. Irina Lagunova, "will have been altered from a science of healing to a science of prevention, one which will have destroyed all sources of disease, and left for the physician only the problem of keeping his patients healthy." Radiant energy and high-frequency energy have already been used to destroy harmful bacteria, Prof. Lagunova points out. Radioisotopes promise complete control of every major gland of the body. "Experimental medicine in the Soviet Union has succeeded in reviving the human organism after clinical death has set in. It has been able to restore to elderly people lost hair color, memory, capacity to work, hope for longevity."

3. Tomorrow's Rocket Plane—The "airliner of tomorrow" will shoot like a rocket into outer space, taking off vertically, but landing as a conventional airplane. It will fly at heights of 600 miles and at speeds of 10,000 miles per hour. According to Vasili Alexandrov of Technical Sciences, Soviet science is rapidly developing techniques that make creation "of such planes possible."

4. Tomorrow's Machine — The complete automation of the future, claims Prof. Grigori Shaumyan, "is not only a blueprint, its development is already in process and has been for some time." Advances in the Soviet Union, he reports, have been made that can be set to reproduce the best human control of a machine tool and function independently of an operator. One such automated device machines crankshaft pins on a lathe. Complete automation controlled electronically, Prof. Shaumyan predicts, will handle the most complicated technological processes without the need for human interference.

5. Tomorrow's Oceans—Submarine farming will help feed hungry people. Swarming masses of plankton will be scooped out of the sea to be converted into fodder for animals. The oceans' storehouse of seaweed will be tapped for food and industrial uses. "In the future not too far distant," says Lev Zenkevich, a corresponding member of the U.S.S.R. Academy of Sciences, "we can envisage a vast and well-ordered marine economy, with minerals extracted from the ocean floor, energy from its waters, food from its rich stores of plant and animal life."

6. Tomorrow's Earth Depths—"A plentiful mineral future is foreshadowed," according to Academician Dmitri Shcherbakov, by mining the depths of the earth. "Preliminary, but successful" experimentation in Russia has already yielded basalt that can substitute for rare earths or be used as a building material. Soviet scientists have also extracted nephelite and worked out a method for wringing aluminum, potash and soda from it. "The time will come," Academician Shcherbakov says, "when the subterranean machine, working on atomic fuel independent of the surface, will penetrate deep into the bowels of the earth, breaking up and melting rock as it burrows in search of ore deposits."

7. Tomorrow's Star Flights—The plane that we know today will be replaced by "the cosmic ship which will fly at speeds varying anywhere from 40,000 to 60,000 miles per hour." A flight to Mars in the "nuclear or radiant" powered space ship will take a year. "It may very well be that within a matter of decades," Victor Kaznevsky, a design engineer, states, "our neighboring planets will no longer be offering a challenge. The distant stars will be our goal."

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ENGINEERING

Predict Nuclear Power Will Compete With Steam

➤ NUCLEAR POWER will be economically competitive with conventional steam plant power by 1965, a Columbia University engineer predicts.

John E. Ullmann says the cost of nuclear power would begin to compete within two years and that it would be completely competitive within ten years.

His forecast, more optimistic than most made to date, assumes that costs of conventional power in the future will rise. The prediction is reported in *Science* (April 4).

Mr. Ullmann also assumes nuclear power costs in the future will be reduced at the same rate as costs for steam power plants have decreased since 1910.

These two assumptions are then blended to produce a prediction of "break-even" points, beyond which nuclear power may be expected to have an increasing economic advantage.

Nuclear power costs could be reduced in the future, Mr. Ullmann suggests, by using higher steam working pressures, by cutting down on personnel, by developing suitable substitute materials for the present expensive ones, and by safely lowering construction standards as experience is gained.

Mr. Ullmann considered only steam-cycle nuclear plants. He did not attempt to estimate costs of direct generation fission or fusion plants but concluded that if such plants are feasible, they would "hasten the demise of the coal-fired steam plant even more."

By 1968, Mr. Ullmann predicts, even the highest cost of nuclear power will be about the same as the lowest costs of conventional steam power. That date will come sooner if nuclear power plants are put into operation at a rate faster than now expected.

However, if the construction rate for nuclear plants is lower, the 1965 date would still hold, Mr. Ullmann contends. He explains that large-scale reactors now being built in other countries, particularly in Europe and Russia, will result in reduced costs.

Mr. Ullmann estimates nuclear power will cost about 12 mills per kilowatt hour in 1960, from six to eight mills by 1965. In contrast, conventional plants, depending upon their capacity, will yield power costing from 5.75 to 14.35 mills per kilowatt hour.

Science News Letter, April 19, 1958

GEOPHYSICS

Valuable Data Being Gathered by Explorer III

➤ INFORMATION considerably more valuable than expected is being gathered by Explorer III because of its unplanned, close-to-earth orbit.

The satellite, officially named 1958 Gamma, is "completely fulfilling" its scientific mission, the National Academy of Sciences IGY committee reported. The "tremendous sweep" of the orbit, varying from 117 to 1,740 miles above the earth, is "splendid" for cosmic ray research.

The information radioed back from Explorer III almost ties into the cosmic ray data from vertical rocket firings. The transmitters and tape recorder are working properly, according to Dr. James A. Van Allen, member of the IGY committee's technical panel on the earth satellite program.

Information on temperatures and micrometeorites, as well as on cosmic rays, is being continuously telemetered to earth by the satellite's low-power transmitter.

Science News Letter, April 19, 1958

Existing methods for *television* transmission require the equivalent of 1,000 telephone circuits for one video channel.