ASTRONOMY-METEOROLOGY

"Controls" the Weather

Changes in the sun's radiation may affect the earth's weather indirectly through variations in the thickness of "E" layer in outer atmosphere.

➤ WEATHER changes on earth may be indirectly controlled by changes in the sun's radiation, through variations in the thickness of the radio-wave-reflecting "E" layer of the earth's outer atmosphere. A close correlation between thickness changes in this layer and shifts in the weather has been found by Dr. Charles G. Abbot, research associate of the Smithsonian Institution, in a study of records extending over seven years.

Dr. Abbot has for many years followed the apparent connection between the weather and the solar constant, or total radiant energy received from the sun, as recorded daily at Smithsonian observatories in California, New Mexico and Chile. Changes in the solar constant are small and difficult to make at best—impossible under bad weather conditions. "E" layer thickness variations, on the other hand, are easier to measure and observations are not affected by weather. These thickness variations are also measured daily, by observers of the Carnegie Institution of Washington; the best records are those kept by the Carnegie stations at Huancayo, Peru, and Watheroo, Australia.

"It is clear," states Dr. Abbot, "that the sun's variations are a major factor in weather. The effects produced are large. In Washington temperatures it makes nearly 20 degrees Fahrenheit of difference in some months whether the solar constant rose or fell by three-fourths of one percent a week or more previously. The effects are long continuing. They appear to begin three days before measurable changes in radiation occur, and to last at least until 14 days after, making an important sequence of at least 17 days in weather, attending each change of solar radiation.

"It appears that approximate predictions a week in advance could be made of dates of peaks and troughs of Washington temperature if daily reports of the 'E' layer were obtained from a sufficient number of ionization stations, and if means could be found to anticipate by a few days closely the date of the next approaching solar change. Its sign would always be known to be opposite to that last observed. From present records we should expect solar changes of the same sign to follow each other at intervals of about nine days, with changes of opposite sign intervening. There is, I think, a fair hope that such important dates as heavy frosts may become predictable a week in advance from solar observations by this method."

Science News Letter, November 17, 1945

GENERAL SCIENCE

Many Russian Scientists

The USSR has trained 3,900 for doctor's degree since 1937; 11,543 doctor's degrees in science were granted in the United States for the same period.

➤ IN SOVIET RUSSIA, 3,900 scientists were graduated from the colleges with the degree of doctor in the years 1937 to 1944; about 20,000 received a master's degree, according to Joseph Agroskin, vice-chairman of the Committee on Higher Education in Moscow.

The Soviet Government has been paying particular attention to the matter of training scientists, Vice-Chairman Agroskin said, because of the pressing need for teachers of technical subjects in the colleges due to a greatly increased student body.

In 1929, there were only 26,000 engineers with diplomas in all the heavy industries of Russia. But in the last six years, about 80,000 engineers were graduated.

In pre-revolutionary Russia, Vice-Chairman Agroskin said, higher education was for the privileged few of the upper strata. In 1914, Russia had only 91 colleges with 112,000 students. The Soviet Government placed the entire system of higher education on new principles. Nationality and class distinctions were abolished. Education was free. All nationalities were permitted to teach in their own languages in colleges on the territory of their own national republics. Both universities and institutes were opened to all working people.

As a result, there are now 772 colleges with 562,000 students. Of these 132 are industrial institutes, 18 transport institutes, 87 agricultural institutes, 68 medical institutes, 115 pedagogical colleges and 29 universities.

In 1925, Vice-Chairman Agroskin reported, there were only 17,900 professors and lecturers in all Russia's colleges. Now there are 40,000.

More in U. S.

➤ IN the United States, about three times as many doctor's degrees are granted to graduate students of science as those reported granted in Soviet Russia, according to an estimate based on figures appearing in the *"Science, The Endless Frontier"* report to the President by Dr. Vannevar Bush, director of the Office of Scientific Research and Development.

In the United States, according to the Bush report, an average of 1,649 doctor's degrees in the sciences were granted annually for the prewar years 1935-1940. This would mean about 11,543 for a period comparable to the seven years reported by Vice-Chairman Agroskin from Russia during which 3,900 scientific doctorates were granted in that country. The population of Russia is, however, much larger than that of the U. S.

Although the war will probably mean a drop in the number of candidates for the doctor's degree, the peak of this deficit is not expected to be felt until several years after the war when there will be fewer college graduates ready to enter training for advanced degrees.

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MEDICINE

Small Defects in Skull Repaired by Wire Mesh

➤ THE patient who has lost a small piece of skull, either because of disease or injury, may have it replaced with a wire mesh of stainless steel if his surgeon follows a method developed by Dr. Edwin B. Boldrey of the University of California Medical School in San Francisco. Announcement of the development has been made through the University.

The wire screen, Dr. Boldrey found,