CLIMATOLOGY

# U.S.S.R. Takes Its Arctic Winters Into the Laboratory

## Laboratory of Artificial Climate in Moscow Tests Effects of Ice and Snow on Railroads, Crop Growth, and Clothing

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THE HEAT of the Turkmenian sun blazes a few feet from biting Siberian frost. A balmy Caucasian morning dawns separated by a thin partition from a crisp Arctic day.

All seasons of the year, summer and winter temperatures, calm weather and winds, humidity and drought, are reproduced in the same place, in the same building—the Moscow Laboratory of Climate.

Air is cooled in huge refrigerators, heated in electric furnaces, has its humidity controlled, and is given different velocities in imitation of wind. The reproduction of natural conditions is very accurate, coming within 0.2 to 0.3 degrees of variation in temperature and 3 to 4 per cent in the relative humidity of the air. In short, this Moscow laboratory practices air-conditioning on a grand scale.

The conveniences thus provided for scientific experimenters greatly accelerate the tempo of scientific research.

### Study Snowdrifts

One problem studied is that of snow retention and protection of railroads against snowdrifts. This is done with a wind tunnel in which wind velocities are produced identical to those actually observed in nature. The tube is long enough to provide study of the effect of fences and barriers on wind-blown snow over a considerable distance. Snow is blown at model fences. By comparing results it is possible to determine the coefficients of efficiency of various designs of snow fences.

This research has led to the discovery of a new method of protection called "the active struggle against snow." It was found that if several raised barriers are placed on both sides of the railway road-bed, leaving a comparatively narrow opening between the top of the railway cut and the bottom of the barriers, and a current of wind and snow be blown through the opening, the wind (as tests have shown) will force the mass of snow beyond the railway cut.

This method of struggle against snowdrifts is already in use on the railways of Siberia.

Mastery of the complex of temperature and humidity is a further complication of the methods of laboratory climate. Progress is being made in determining the hardness of various crops under conditions of frost, heat, and drought. This calls for highly scientific regulation of the temperature of the air. With the laboratory's "frost machine" it is possible to obtain, without leaving Moscow, a thermic and hydrometric soil regime which corresponds exactly to the soil regime of, let us say, Station Skovorodniki on the Ussuriisk railway in the Far East.

### Frost on the Wheat

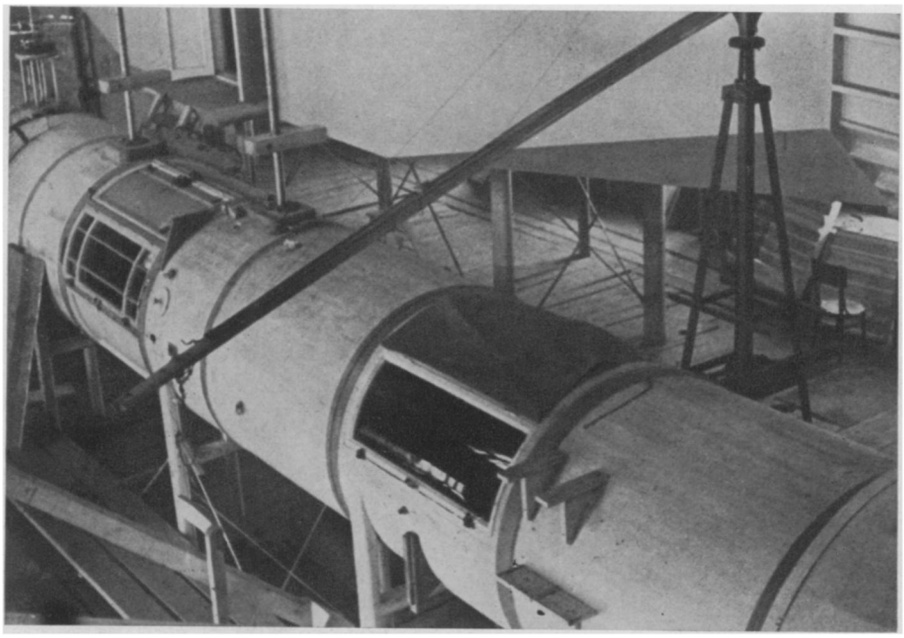
Glazed frost and ice-crust on winter wheat is an extremely widespread phenomenon in the Ukraine; but up to this time it has never been studied. In the Moscow Laboratory of Climate the experimenter obtains ice-crusted wheat stalks for study, without waiting for weather conditions.

There is yet another original problem in which the Moscow Laboratory of Climate has done important work—the testing of lubricants. At the laboratory is a railway car bearing-box inside of which is mounted the greased end of the axle. The qualities of lubricating grease in different seasons of the year and in various geographical zones can be studied under every imaginable climatic condition by creating in the room corresponding climatic regimes, which vary from the awful cold of Siberia in the dead of winter to the tropical heat of Central Asia in July and August, while day and night the axle rolls "on its way."

### Control Chamber

There are still more complex apparata in which experiments are enlarged upon. One is an aero-dynamic tube, having in the upper part a testing section and in the lower part a chamber for conditioning the air temperature. Humidity and wind-velocity are obtained in the testing chamber.

The control system of the measuring instruments is comparatively simple, especially the "three-element" switchboard. Heating, cooling, dampening and drying aggregates are put into operation on a very wide range. (*Turn page.*)



***WIND TUNNELS***

*Here, through the windows, Soviet scientists watch the effects of bitter winds upon masses of snow.*

By subjecting various kinds of fabrics to these tests, the Moscow Laboratory of Climate assists in creating the most convenient and appropriate clothing for all kinds of industrial conditions.

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GENERAL SCIENCE

## Technical Encyclopedia Serves Practical Persons

IT HAS been more than two decades since an encyclopedia devoted exclusively to technical and scientific matters has appeared. Now the needs of teachers, students, artisans and even scientists is served by 2,468 pages, some 25,000 titles, and thousands of illustrations in a four volume British-written work, *Hutchinson's Technical and Scientific Encyclopedia,* edited by C. F. Tweney and I. P. Shirshov (Macmillan).

Browsing through these volumes, many unfamiliar words tease one's ignorance. The last volume is labeled: "Petrol Engines to Zymurgy." Petrol engines is easy if one knows a little British; it means "gasoline engines" as gasoline to the British is "petrol."

Zymurgy? Easy—"the branch of technical chemistry which deals with processes of fermentation. See Brewing; Fermentation."

At the very beginning of the book—what? A. You know what that means? Do you?

"A (Astron.) A band in the solar spectrum produced mainly by oxygen in the terrestrial atmosphere; named by Fraunhofer."

Open the fourth volume to its center:

"Slicker (Leather Manufac.)—A tool used in leather manufacture for setting-out, smoothing, or stretching leather. May be made of brass, slate, stone or vulcanite."

### Gangway

And in the middle of volume 2:

"Gangway (Mining)—A main haulage road or main level."

One might go on picking out item after item from this comprehensive work. The electrical sciences, chemistry and engineering are particularly well covered. The longest articles on the more basic principles of the sciences are less elaborate and academic than those found in a larger work like the Britannica but serve well the more practically-minded audience for which the volumes are intended.

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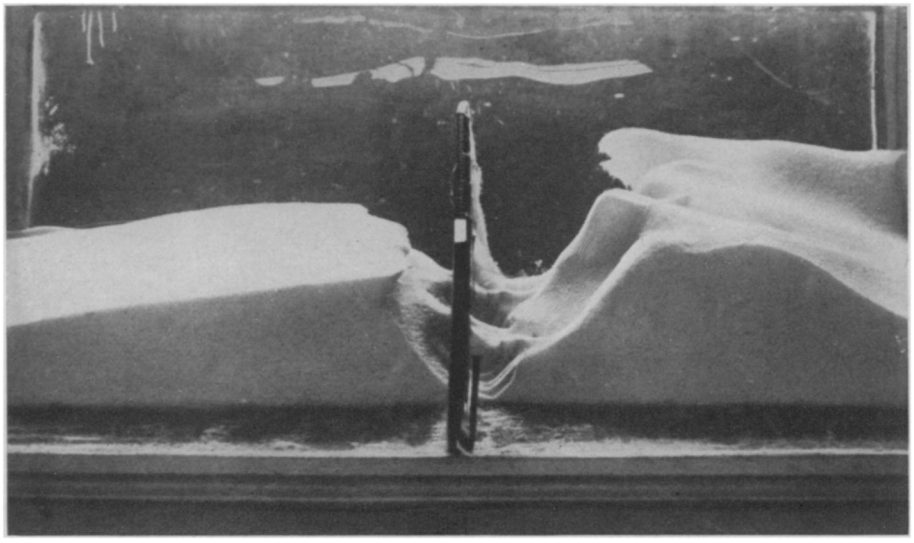
The ancient Chinese, and later the Romans, cultivated oysters.



*DRIFTED HIGH*

***Snow piles high against this snow fence in the Laboratory of Climate in Moscow.***

MEDICINE

# Waste Product Heals Wounds By Stimulating Growth

UREA, ordinarily considered a waste product of the body, is good medicine for slow-healing wounds. Its successful use on patients by physicians all over the country is reported by Dr. William Robinson, entomologist of the U.S. Department of Agriculture (*American Journal of Surgery*).

A two per cent solution of urea, made with sterile water, is applied directly to the wound. Relief of pain and rapid healing has followed in cases of varicose and diabetic ulcers, carbuncles, extensive infected burns, mouth infections, osteomyelitis and certain skin infections. No ill results have so far been reported from this use of urea, and its low cost, about fifty cents a pound, makes its extensive use quite practicable. The solution is bland, colorless and odorless, and as used medicinally comes from a manufactured product having no connection with body wastes.

The urea solution apparently achieves its effect by stimulating a "vigorous growth" of new tissue with abundant blood supply. It does not have any direct germ-killing effect on the organisms involved in chronic, pus-forming wounds. Its cleansing effect on these wounds is produced indirectly through the stimulation of the growth of new healthy tissue.

The healing effect of urea was discovered through investigations Dr. Robinson made of maggots. A war-time discovery by the late Dr. William S. Baer, American surgeon, showed that these tiny creatures, loathsome as they might seem when crawling around in an open wound, had the power to clean up the wound and stimulate healing of the tissues. Dr. Baer died before he could find why the maggots in many cases surpassed other means of healing wounds. Government scientists continued his work, breeding clean, germ-free maggots and studying them. First clue to the maggots' healing power was the discovery that they produced allantoin, which in itself is a healing agent.

Further study showed that this was not the only substance with healing power present in maggot excretions. The chemical structure of allantoin suggested the possibility that urea, which can be formed by adding hydrogen to one of the chemical groups that make up allantoin, might be the active agent with which maggots were healing wounds. Whether or not this is the case, the suggestion led scientists to a trial of urea itself, with the success reported by Dr. Robinson.

Urea can be made by combining am-