

PHYSIOLOGY

# Weathering Urged for Army

**Men as Well as Airplanes Should Be Thoroughly Tested For Climatic Adaptability; Seasoning Makes Better Men**

By JANE STAFFORD

**T**HE YOUNG MEN in training camps this winter, and particularly the ones to follow in the spring draft call, are in for some scientific weathering, if U. S. Army officials follow the advice of Dr. Charles I. Singer, of Long Beach, N. Y.

They may get an ice cube test which will remind some of them of parties at which they played the trick of putting a piece of ice against some unsuspecting girl's bare arms or back. In the test, the ice cube is held against the skin for two seconds. If the skin does not redden within 10 seconds after removing the cube, it indicates poor reacting ability of the skin to temperature change.

Reason for this and other tests and for the scientific weathering is that America's defense army needs to be trained not only to fight but to stand sudden changes of climate and to keep up "peak performance" in the frosty Arctic regions of Alaska or the sweltering tropics of Central and South America, if we are

planning for hemisphere defense.

We are spending \$7,000,000 for an army aviation test station at Fairbanks, Alaska, to study the behavior of airplane motors in Arctic climates.

"This is a very necessary establishment," Dr. Singer states, "yet little provision has been made for testing the climatic adaptability of the most important military machine—the human body. Such tests," he declares, "should be conducted both at rest and during varying degrees of activity in different clothing."

Directions for such tests and for training men to adapt to climatic changes were given by Dr. Singer in a report to the *Journal of the American Medical Association*. Dr. Singer has had some experience with weathered and unweathered troops. During the World War in March, 1916, he was detailed as medical officer with two companies of infantry to clear up a high mountain road in the

Austrian Tyrol which was buried under an avalanche of snow. The altitude was 14,000 feet.

"We started from the Adige valley with an average temperature of 60 degrees Fahrenheit to reach a wind-swept valley, the average temperature of which ranged from 30 to 35 degrees Fahrenheit," he relates.

"Company A had been stationed in the valley for about six weeks and was composed of raw recruits from cities. Company B had arrived 10 days previously after an all-winter campaign through Russian Poland—a company of seasoned, hardened fighters. It took us three days to accomplish our task, working in the snow, wind and rain 12 hours a day, and sleeping in the primitive deserted stone huts of mountain shepherds."

In the five-day period beginning with the first day of the assignment, the sick list for Company A was more than three times as large as that for Company B, the company made up of troops hardened in Russian Poland.



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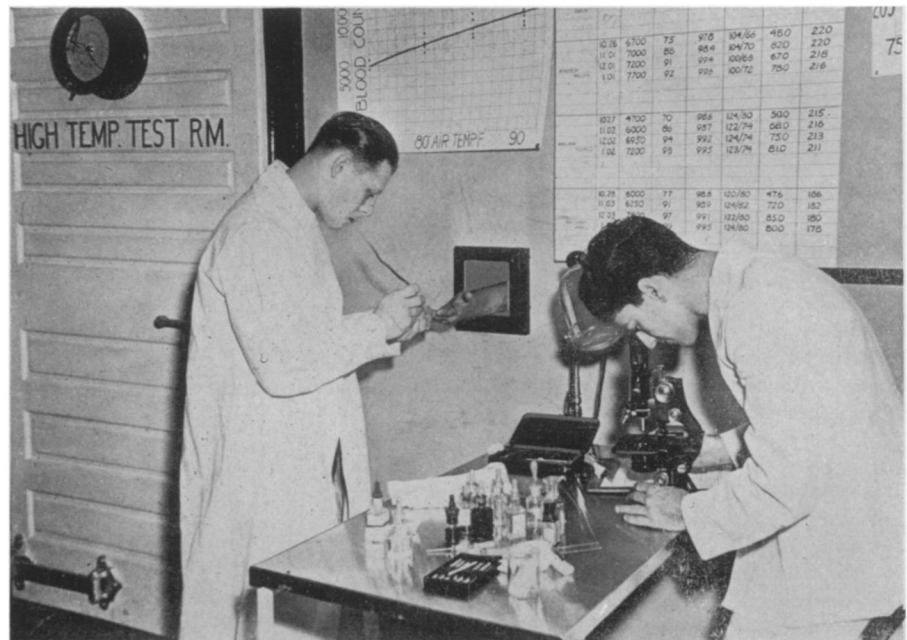
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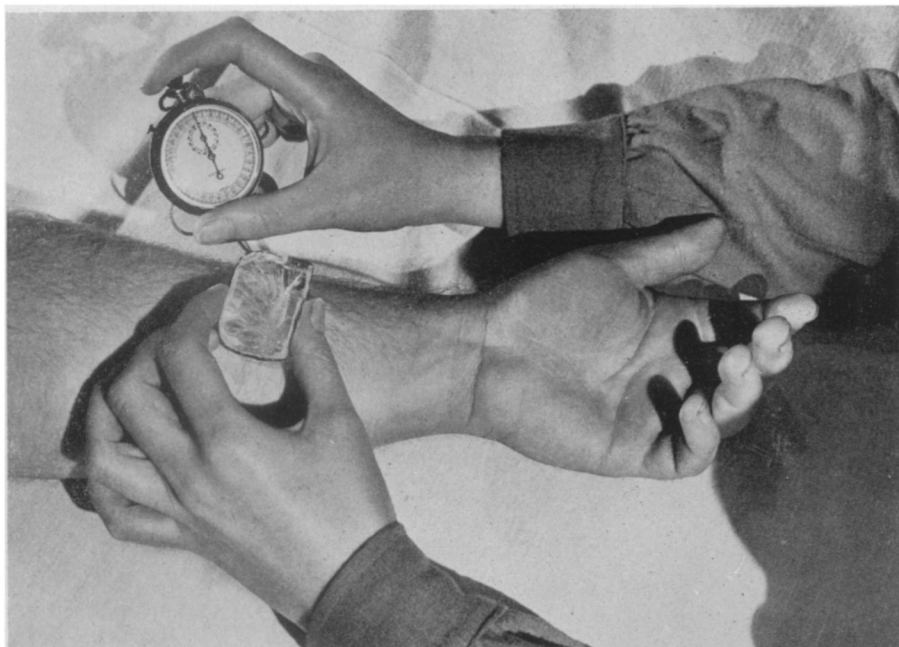
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### MEASURE ABILITY TO STAND HEAT

*Hemisphere Defense may involve fighting in the sweltering tropics. Working under conditions of high heat and humidity cause serious changes in the body leading to heat prostrations, impairment of efficiency and a lowering of safety standards through carelessness, scientists at the Pittsburgh research laboratory of the American Society of Heating and Ventilating Engineers discovered. Tests are being made on the subject whose hand extends from the "weather chamber."*



#### ICE CUBE TEST

*This measure of the skin's thermic reacting ability is suggested, among others, for finding out which of Uncle Sam's new soldiers will be able to fight effectively in the Arctic.*

This shows, Dr. Singer comments, how general resistance to acute infections tends to be lowered by abrupt climatic change. In addition, such a change may bring to the fore latent and probably unsuspected diseases, such as tuberculosis, arthritis, heart disease and respiratory infections.

The hardening or seasoning process is therefore important if the soldier is to stay well and be an effective fighter. Gradual, slow changes in climate, such as we experience in the change from fall to winter, impose no hardship on the human organism, Dr. Singer says. A sudden change, however, such as would occur if troops were rapidly moved from temperate to subarctic regions, forces on the body the necessity for quick adaptation. Arteries and veins in the skin must remain constricted, to prevent loss of heat from the body, and the body fires must keep burning at a faster rate. If these processes are prolonged, harm may be done. Prolonged and repeated constriction of the arteries and veins in the lining of the nose, for example, lowers the resistance of the lining membrane which may pave the way for colds, influenza and similar ailments.

When such diseases attack soldiers in trench warfare, the men can be kept a short distance in the rear, considered as reserves, and returned to the front within a week or 10 days. In the modern style war of movement, such men

are completely lost as effective fighters.

Soldiers must not only be able to adapt to sudden changes. They must be able to stand prolonged exposures to extremes of climate associated with physical strain. The annihilation of the Russian divisions north of Lake Ladoga in Finland shows this point. The Russians were healthy, hardy young men, dressed for the climate and trained in the Russian steam baths to stand sudden changes in temperature. But they could not stand prolonged exposure to the Nordic winter of Finland, Dr. Singer explains.

We Americans, following the instinct to seek comfortable temperature levels, have a limited comfort zone as a result of clothing and indoor heating, Dr. Singer declares.

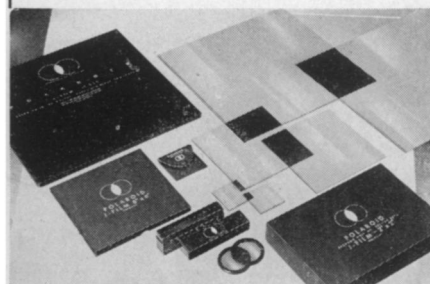
"A systematic extension of the comfort zone by direct methods of hardening Americans troops, especially those who may face the rigors of Arctic warfare, is imperative for full fighting efficiency," he warns.

To accomplish this hardening, he recommends that troops start training in the fall. Those who start next April will require at least 10 months to acquire the adaptability to climate reached by the fall group in five months.

Our present training system of summer maneuvers in the North and winter maneuvers in the South should be completely reversed, in Dr. Singer's opinion. To provide troops trained for the rigors

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of Alaska, say, or the mugginess of Central American tropics.

Surf or river bathing wherever possible, daily cool and gradually cooled showers, and treatment with alternating hot and cold streams of water will be useful, he says, to harden soldiers with poor climatic adaptability and to increase self-confidence and military morale.

Before sending units on duty to Alaska or the tropics or dry desert regions of hot days and cold nights, tests should be made of the men's climatic adaptability and endurance. Among tests recommended by Dr. Singer are determinations of the temperature at which men are chilled at different humidities and the temperature at which they start sweating at different humidities.

Another test is made by taking the

pulse after forced forward bending. Those whose pulse rate slows more than 10 beats per minute after the forced forward bending are poor risks in climatic exposures unless hardened.

There is a best diet for each climate, Dr. Singer says. This should be used as far as possible to enhance the adaptation of troops to the climate. Many calories, much fat and much protein food, such as meat, cheese and eggs, are advised for cold climates. A low calorie diet with little fat and protein but lots of sugar and starch foods, is advised for the tropics. In both cold and tropic climates, vitamins and minerals must be supplied, because in the cold climates there is a scarcity of fresh fruits and vegetables, and in the tropics the soil lacks minerals.

*Science News Letter, December 7, 1940*

## METEOROLOGY

## Texas' Big Storm Started Up In Bering Sea Region

### Was Meteorological Relative of Armistice Day Storm; Cold Mass from Arctic Met Warm Mass from Gulf

**T**EXAS' big storm (Nov. 24), that sheathed the northern Panhandle in glaze ice and at the same time "like to drowned" Galveston on the Gulf, was a meteorological relative of the Armistice Day blizzard that blocked the upper Mississippi valley with snow and drowned a lot of duck hunters.

Both storms originated in the same way, Principal Meteorologist C. L. Mitchell of the U. S. Weather Bureau told Science Service. A cold air mass, starting in the Arctic, slid down over the western part of the country, penetrated far enough to find a mass of warm air of Gulf origin, and proceeded to wring the water out of it in great quantities.

The Texas storm's air mass is known to have started either in western Alaska or eastern Siberia, for high-soaring balloons sent up from Fairbanks, Alaska, found no traces of it as it passed, while similar instrument-carriers from Anchorage got fairly into it. Striking into the United States proper near the Puget Sound region, it cut diagonally across country, to create the climax of its mischief in Texas.

There, in encounter with the moisture-bearing warm air mass from the south,

it simply hung, almost immovable, while it rained and rained and rained. At Galveston, more than ten inches fell in 24 hours. In the Panhandle area precipitation was lighter, but the rain froze as it struck the cold ground level, sheathing everything with thick layers of wire-wrecking, tree-breaking, traffic-paralyzing ice.

Skirts of the storm were far-flung. There was rain to the north, as far as southeastern Colo- (Turn to page 367)

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