

## ENGINEERING

# Army Girds for Polar War

**Arctic climate must be conquered as well as enemy. Machines and tools must function properly at temperatures as low as 65 degrees below zero.**

By ALLEN LONG

► THE NEXT war may be a cold war. The Arctic may be the locale. It offers a bleak, barren, frigid face, whipping winds, dazzling brightness and treacherous, swamp-like land.

Under those conditions the serviceman of World War III may have to fight. He must be prepared to conquer not only the enemy but also the elements.

It will not be an easy job. But at least he will have paths already blazed for him over some of the obstacles studied by technical research workers. Men who acted as guinea pigs during peacetime also will have provided him with solutions to some Arctic problems.

## Two Uniforms Developed

A soldier must not freeze to death if he is to fight. To protect him from temperatures which fall as low as 65 degrees below zero, and from winds which swirl cold air around him, carrying off his body heat, the Army Quartermaster Corps set up a research department to explore new ways of clothing the soldier's frame.

Out of the research work came two uniforms which solve some of the problems encountered in cold weather.

The "cold-wet" field combat uniform is designed to protect the soldier operating in areas where mean monthly temperatures range from 68 degrees down to 14 degrees Fahrenheit. It is designed to withstand such adverse environmental conditions as driving rains, wet snow, slush and muddy ground. Trenchfoot and damp penetration which produced chill were problems encountered by research workers developing that uniform.

Designed for Arctic use where mean monthly temperatures range from 14 degrees on down, the "cold-dry" field combat uniform should protect the soldier from freezing and from frostbite.

Both uniforms are based on the layer principle. Clothes, rather than being tight-fitting, instead are loose enough to allow air to be retained as insulation. That principle has been used for years by Eskimos.

The soldier dons long underwear which looks baggy compared to present-day civilian styles. Then he starts putting on shirts, trousers and jackets designed so that their linings can be worn and the outer garment removed. When the soldier gets all his

cold-dry uniform on, he weighs about 25 pounds more than he did before he started dressing.

One object of the layer principle was to provide the serviceman with a uniform which he could shed or add to as he got warmer or cooler. It has not been found satisfactory to take jackets and parkas off to remove a sweater, then to replace the jackets and parkas. In battle, the soldier might not have enough time to do that. Furthermore, at Arctic temperatures he might be frostbitten while going through that process.

Since it is almost like signing your own death certificate to work up a sweat in the Arctic (because perspiration freezes and, eventually, so do you), when the soldier feels he is getting too warm, he merely takes off a jacket, or the outer-lining of a jacket, depending upon how hot he is.

Currently a new garment is undergoing tests. It is a foam-rubber sort of plastic material which contains millions of tiny air

pockets. No clothes are worn under it. An ordinary pair of army trousers and a field jacket are worn over it to protect the material from being torn.

The new garment is unaffected by moisture. Furthermore it is buoyant. If the soldier falls into a river or lake, the garment will support him plus a 26-pound pack. When he steps out of the water, the moisture in the garment runs out and he becomes warm again in a matter of minutes.

## Other Problems to Solve

Clothing the Arctic fighter in a suitable uniform is only one of the problems which must be solved. Other problems involve machines, tools, tactics and morale.

Since the shortest distance to major land masses of the Northern Hemisphere is over the Arctic, provisions must be made for transporting materials. Airfields to support heavy aircraft probably will have to be built in the event of a cold war. Much of the Arctic land is muskeg, a swampy muck which will not support even a man, much less an airstrip.

Again the elements and environment come into the picture. They offer more problems which must be solved before the elements can be enlisted as allies. Just



**SNOWBOUND IN THE ARCTIC**—This snow-covered but illustrates one of the problems encountered in Arctic life. Drifts often bog equipment and endanger personnel. Winds shift snow into the streets if buildings are not situated properly relative to the wind. Even the drifts created by snow plows are dangerous.

this week the Army concluded operation "Eager Beaver" in the Canadian Yukon in which 435 engineers built emergency airstrips on the frozen lakes and shifty muskeg of the Arctic.

When the first attempts were made to discover what conditions the serviceman would find in the Arctic, unexpected difficulties constantly were being encountered. Motors would not start. Fuel lines froze. Huts created snowdrifts which blocked the streets. Equipment stuck in the snow. Tools became brittle and broke in normal use. All of those problems had to be solved.

Now when the Army announces a new model of its equipment, usually the description of it says, "... and it will operate in temperatures as low as minus 65 degrees Fahrenheit." Such a statement was made recently in connection with a new hand-talkie FM radio, and the latest jeep model.

Military tactics in the Arctic will be affected by four things, according to Lt. Col. Joseph J. Peot, an instructor in the Signal Corps. They are sparse settlement, lack of roads and railroads, numerous lakes and waterways, and lack of maps.

#### Natural Communication Routes

Lakes and waterways frequently offer a good road system about six or eight months of the year when they are frozen, he said. Snow can be removed from the ice, and waterways may provide natural airstrips.

But military tactics may be affected adversely by sparse settlement which creates a scarcity of local supplies and of quarter-

ing facilities. Roads and railroads, almost nonexistent, are highly vulnerable to the enemy, as well as to the weather.

Maps are unreliable, and aerial photographs are not too satisfactory because of a lack of contrast in the topography and because of a lack of actinic values in Arctic sunlight. The actinic value in light affects the exposure of photographic films.

#### Morale Inhibiting Factors

Morale of troops is apt to drop in Arctic operations because of a feeling of loneliness brought on by the absence of inhabitants, industry and cultural features. The long winter nights and deathly silence accompanying dropping temperatures also may inhibit good morale. A feeling of being isolated may develop in troops because of their being far away from built-up areas.

Because of these morale-inhibiting factors, emotional stability in the soldier assumes an even greater importance. It is still controversial whether psychological tests can reveal which men are best suited for Arctic duty, but physical tests at least ought to screen out the men whose health would be affected by the Arctic climate, Col. Peot said.

Much remains to be learned about the Arctic and about Arctic warfare. But the armed services are working toward a goal which should provide adequate protection for the United States should some nation decide to get rambunctious in the cold, desolate regions of the North Pole.

Science News Letter, June 14, 1952

#### METEOROLOGY

## Weather Pattern Reversed

► THE NATION'S weather has been going backward and it is expected to continue going backward for the rest of June.

Instead of the general weather patterns moving from west to east across the nation, they are moving from east to west. In mid-May, the Weather Bureau's Extended Forecast Section predicted that average temperatures for the period to mid-June would be

below seasonal normals across the northern half of the nation from New England to the Rockies.

On June 1, it was forecast that this below seasonal normal area will extend from an area around Ohio and Indiana out to the West Coast. East of there, near normal temperatures are expected during June.

The extreme Southwest and the Southeast can expect above normal temperatures, while the rest of the South will have about average temperatures.

"Abundant showers, giving more than normal rainfall, are expected over most of the country between the Rockies and the Appalachians," the weathermen predict for June. Other parts of the country can expect normal amounts of rain.

This backward movement of the weather patterns is caused by an east-to-west movement of the waves in the general air current which circles the globe above 10,000 feet. The current continues to move from west to east, but the waves or north-and-south undulations in it are now travelling from east to west.

Science News Letter, June 14, 1952

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