METEOROLOGY-PHYSIOLOGY

Maps for Human Comfort

Clothing almanacs will show requirements for all the world. Travelers will know whether to take summer cottons or fur coats.

By MARTHA G. MORROW

➤ CLOTHING almanacs may help peacetime travelers decide whether to take summer cottons and thin underwear, a fur coat and lots of red flannels, or a raincoat and overshoes, when voyaging to far-away lands.

Such an almanac, prepared by the Office of the Quartermaster General, shows at a glance the standard items of combat clothing needed month by month to protect the soldier from his environment. Listing both what is optional and what is absolutely necessary, clothing maps for all parts of the world have been prepared on the basis of the climate of these regions.

Maps in the past have been designed to show the elevation of a region, its rainfall, the distribution of agricultural products such as wheat or cotton, the regions where sheep or cattle are raised, and many other specific things. Not until this war, however, have maps been designed to be analyzed from the point of view of human comfort.

The average temperature for each month is shown for all parts of the world on these maps so that anyone can tell at a glance about how hot the region will be during June or October, and whether it is likely to be dry, humid or wet.

Vacation Zones

The climate zone which might be considered to include good regions to spend a vacation—this will particularly interest those of you who didn't get away this summer—are those where the temperature as a rule ranges from 50 to 68 degrees Fahrenheit. In January, this vacation climate in the United States lies around Florida and southern California. In May this zone has moved northward and spread over most of the United States. In August, when most of us are unpleasantly hot, it has gone into Maine and Canada. By October most of the country is again within this zone of ideal climate, which moves back to Florida by December.

The weather of much of coastal southern California is unique for the United States. Here are probably the only places in the country where the temperature throughout the whole year averages from 50 to 68 degrees. In only a few other places in the world, such as in tropical mountains like Mexico City or in northern New Zealand, is there a similar range of temperature variation.

Various colors and shades are used on these maps for each drop of 18 degrees Fahrenheit, ranging from regions where it is extremely hot to those where it is ultra cold. Dry-looking colors such as tan, yellow and gray are used on these colorful maps to mark regions where there is little precipitation. Humid regions such as those in which most of us prefer to live are shown by softer, greener colors. These same shades are dotted to indicate really wet regions, where more rain falls than can easily be evaporated into the surrounding air.

The warmer the air, the more moisture it will evaporate. Thus in making the maps, not only the average rainfall for that month, but also the temperature must be considered. If the average temperature is 86 degrees or over, the region is classed as humid when about 2.6 to 8.9 inches of rain falls a month. But when this same amount of rain falls in a region where the temperature stays around 14 to 32 degrees, the section is classed as wet.

Some maps show all on one sheet the climate for a particular place for each of the 12 months. A circle is divided into 12 segments to represent the months, while colors show the likely temperature and moisture for each month.

Northeastern continental Asia has a greater range in temperature than any other section of the world. During the warmest month the temperature averages as high as 86 degrees. In the coldest winter month the temperature averages 60 degrees below zero, sometimes going as low as 90 degrees below.

TEMPERATURE VARIATIONS—This map, being worked on at the Office of the Quartermaster General and photographed by Fremont Davis, Science Service staff photographer, shows the temperature variation of all parts of the world.

CLIMATE CHART—Maps have been designed to show the climate of important cities month by month. Circles, divided into 12 segments to represent the months, are colored to show the likely temperature and moisture during each month.

Japan, which extends almost as far north and south as the United States, has a variety of climates. The northern island of Hokkaido has about the same weather as Newfoundland. Honshu and the islands farther south enjoy a temperature similar to that of Washington, D. C., but the rainfall is higher in Japan. Except for having to be prepared for more frequent rains, pretty much the same clothing would be needed month by month in Tokyo as in Washington.

The climate of Europe on the whole is mild and equable. In winter western Europe ranges from 32 to 50 degrees Fahrenheit, and from 50 to 68 in summer. Whereas in the United States people wishing to go to a colder climate would travel northward into Canada, in Europe they would not go toward the north but east, moving from England into Germany and Russia. Edinburgh is usually about as warm in January as the Riviera.

France and western Germany have about the same temperature as northern California, Oregon and Washington. Temperate coasts on the eastern side of continents, as represented by Savannah, Ga., or Shanghai, generally experience more severe temperatures than west temperate coasts.

Climate maps make it possible to look at any place for a particular month and compare that climate with the kind of climate with which you are already familiar, probably found right here in the United States.

The two worst climates in which to live are the hot humid and wet cold. This is because of the problem of moisture evaporation. In order to remain comfortable you must lose as much heat as you produce. Evaporation, which is your principal avenue of heat lost during hot weather, is reduced to a minimum in a hot, humid climate such as one finds in the jungle. In a wet cold climate, such as one finds in the Aleutians, too much body heat is used up in evaporating the moisture from your wet clothing, leaving you cold and clammy. When it gets really cold, however, moisture is "frozen out" of the air.

The easiest climate to live in, irrespective of whether it is dry, humid or wet, is that where the temperature averages between 50 and 68 degrees. This is the average temperature at which we try to keep our houses and that to which we most easily adjust ourselves. We may prefer our houses warmer in the day, but we want them cooler at night. The average temperature of day and night is a good index of the degree of comfort in a house or in a climate zone.

Weather is the atmospheric condition which you experience at any one time. Weather averaged over a long time is climate. Thus the amount of clothing

Do You Know?

Liquid *oxygen* is attracted by a magnet.

Much long-fibered *asbestos* comes from Rhodesia.

Garden *mulches* do not add to the soil but they do hold for crop use the moisture already there or added later by rain.

The *oyster* is equalled or excelled only by liver in the amounts of iron and copper that it furnishes in an average serving at a meal.

Chemical treatment of *dirt roads* with a small quantity of resinous material makes the earth water-repellent and keeps the road dry.

The familiar moth repellent, *naphthalene,* when oxidized and combined with methyl alcohol forms dimethyl phthalate, a valuable insect repellent odorless to humans but obnoxious to mosquitoes and other pests.

needed for our soldiers or which we will want when Americans can once again satisfy their love of travel is based on the average temperature or climate of a region.

The amount of dry clothing you need depends on the amount of heat you are producing and the temperature of the air at which the heat is lost. Thus the air temperature can be used in determining the clothing which a soldier should have for walking or doing some light exercise. The amount of clothing needed is determined by its thickness—it is bulk and not weight that keeps you warm. If the clothing is dry, its value can be measured by its thickness.

A layer of clothing a quarter-inch thick, or about the thickness of a man's suit, has been taken as the basic standard layer of clothing in working out the clothing almanac. This is the amount of clothing you would probably need when the temperature is around 68 degrees Fahrenheit, if not exercising. For each cooler climate zone you need one extra layer of equal thickness.

The climate zone classification has been used for other types of maps than those showing clothing needs. One example is the mapping of insect-borne diseases according to climate. Malaria breeds at temperatures above 59 degrees Fahrenheit, which is mid-temperature of the mild climate zone. Outbreaks of malaria have been known to occur in Siberia, but only when the average temperature reaches the critical point of 59 degrees.

The amount of fuel needed to keep warm in New York is about the same as in London, though winters in the British capital are much warmer, it is shown in fuel requirement maps made by the climatology section of the quartermaster corps. Areas which have cool summer, spring and autumn weather, such as England, may require more fuel than those having cold winters but warm spring and fall seasons.

During the fall months, a man shipwrecked without drinking water may expect to survive at sea three or four days longer toward the north than near the equator where he can count on living only six or seven days. This is brought out in maps showing water requirements and survival times without water for oceans and deserts. These maps have been used to chart the need of rescue equipment.

In some sections of Arabia and India, a man can survive only one day in the desert without water. Here in the United States in the deserts of California and Arizona, he can probably live at least two days without liquid. Maps showing the expected time of survival at sea and in deserts for men without water were based largely on the precipitation of the region, and on field tests to determine water requirements.

These are just a few of the special maps based upon those showing the climate of various sections of the world. The maps were the idea of Maj. Paul A. Siple of the Climatology section of the office of the Quartermaster General, of Dr. Samuel Van Valkenburg, now with Clark University and expert consultant for the section, and of Maj. Weldon Heald, noted mountaineer and also climatology consultant.

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INVENTION

Solar Water Still for Desert Dwellers

➤ PERSONS whose jobs require them to live in desert regions where the only available water is alkali or salt are offered a way to distill fresh water out of it with no fuel other than sunlight, in the invention on which patent 2,383,234 has been granted to W. S. Barnes of Tucson, Ariz.

The unpotable water is held in a long tank, preferably oriented with its long axis on an east-west line. This is covered with a gabled glass roof, or a sawtooth series of such roofs, with a sprinkler-pipe running along the ridgepole. Daytime heat evaporates part of the water, and cooling sprays over the outside of the glass condense the vapor on the inside, where it trickles down into appropriately placed troughs and pipelines. Incidentally, the glass roof is hopefully provided with gutters and spouts, to catch such occasional rains as do fall in almost all deserts.

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