

CLIMATOLOGY

Calamity Behind the Ice

Though It is Not Normal For the Earth to Be Ice-Capped, Loss of Ice Would Bring Disaster to Our Civilization

By **DR. FRANK THONE**

WHAT WOULD happen if the earth's polar ice caps should melt? If the mysterious southern continent where Byrd and Ellsworth struggle with endless glaciers should become bare of all glaciers? If Greenland's icy mountains should become as Patagonia's land?

The idea is not so impossible as it sounds. It is not normal for the earth to have its both ends frozen solid; it seems so merely because it has been so during all of man's recollected history. The ancients and the men of the middle ages knew the boreal regions as lands of perpetual snow. Lief the Lucky was honest when he gave Iceland its name, but when he named Greenland he seems to have succumbed to the temptation that conquers most promoters of new real estate developments: for it is probable that all he ever saw of green on the ice-sheeted subcontinent was a stretch of its shore country during the brief Arctic summer.

There is, to be sure, some suggestion that the world had milder seasons during the tenth and eleventh centuries, when the Vikings came, first to Greenland and then to America, followed by a return of the cold in about the fourteenth century, which froze out the hopeful colonies and sent the defeated settlers either into their frozen graves or into sorrowful retreat to the homeland.

The Scientist Speculates

But what if this half-hypothetical amelioration of the world climate should return, and continue long enough to clear away the last of the world's permanent ice? What other effects would it have, than to start a new boom in choice building lots in the suburbs of Upernavik? Would the world be, in the long run, gainer or loser by a complete thawing out?

Scientists no less than romancers and ordinary run-of-the-mine laymen like to speculate on such possibilities. Their guesses have at least the advantages of some quantitative estimates to back them

up, and especially of going off into directions not usually thought of by minds not scientifically trained. Science is good for the imagination as well as for the handling of cold facts: to choose a single instance, the case of H. G. Wells, who was trained as a biologist before he became a writer of romances and a popular philosopher.

The first thing that all earth-scientists know, and use as a point of departure in their speculations about an ice-free earth is that, speaking in terms of geologic ages, it is the usual, the normal thing, for the earth to be ice-free. Ice ages, such as the one in whose twilight we moderns are living, have been the exception rather than the rule in the long history of the earth. There have been only three such periods of really major importance: the Pleistocene age, which began a million years ago, more or less, and is still in process of liquidation; an Ice Age not long after the close of the Coal Age, perhaps a quarter of a billion years ago; and finally one near the dawn of all well-recorded life on earth, that misty period known as the late pre-Cambrian, vaguely from half a billion to two-thirds of a billion years back. During the rest of the time the climate at the poles was at least temperate; some geologists used to believe it was outright tropical.

Among the scientists who have taken their pleasure in thinking what a "normal," ice-free earth might be like if it should return while the human species is still in existence is Prof. W. J. Humphreys of U. S. Weather Bureau. Prof. Humphreys is duly licensed to engage in such scientific questions of the imagination, for his special subject has long been the physics of the air—the quirks and turns of that ocean of labile fluid at the bottom of which we live and move and have our being. This final melting-off of the last remains of earth's ancient mantle of ice may come faster than we usually think possible for geologic processes. Prof. Humphreys says it may happen in as little as ten thousand years—and human civilization is already almost as old as that.

The existence of permanently refrigerated spots on the earth has a decided influence on the behavior of the earth's blanketing ocean of air. The migrations of chilled air masses toward the south, their encounters with warmed air masses from the tropics migrating toward the north, and the ebb and flow of battle that ensues when such masses of air encounter each other, make up a large part of the story of the weather, especially in those regions of intemperate climatic contrasts and changes which we have inaptly called the temperate zones.

Climate Would Change

The first and most important change a disappearance of the Arctic and Antarctic ice regions would accomplish, says Prof. Humphreys, would be the removal of the present type of climatic contrasts in these middle latitudes. The sun would still shine on the tropics and subtropics, to be sure, warming the air, making it less dense, and inviting cooler air from elsewhere to slide under and lift it up. Moisture-laden warm air from over the oceans would migrate over the lands that are now the tropical rain belts and monsoon regions, leaving them still lands of heavy rains. The tropics, he thinks, would be relatively little changed, except perhaps that their present tropical characteristics might be intensified.

But in the lands of the mid-latitudes, especially in the Northern Hemisphere (where the greater area of such lands lies) a startling and not at all favorable change in climate would occur. At present, the great grain lands that feed the

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an address by

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world—Canada and the United States, Russia and China, and in the Southern Hemisphere Australia and Argentina—owe their fruitfulness to the rain- and snow-yielding storms that result from the encounter of moisture-laden warm air from lower latitudes with chill, moisture-condensing air moving down from the regions of perpetual cold. Our crops are born of these stormy marriages of the genii of the air.

Remove the northern partners, or weaken them appreciably, and the rains will dwindle or even cease altogether. This is the fate Prof. Humphreys foresees for the great grain belts as they now exist: they will become first thin-grassed lands fit only for marginal herds of sheep and goats, then even that scant vegetational cover will disappear—its end hastened, perhaps, by desperate overgrazing carried on by starving nomad shepherds. Then will Iowa and Nebraska, Manitoba and Saskatchewan become extensions of a great American desert stretching southward to the borders of the Mexican tropics, empty and arid as the Sahara is now, the soil burned dry of its fertility by the summer suns and blown into towering dust-storms by occasional winds. But for the most part even these winds will be lacking, for the wind-engendering cold air from the north will fail. It will be a land of stagnant death. And the great grain lands of central Europe and Asia will share its fate.

"Go North"

What will the peoples of the earth do when the old, long-relied-on corn lands fail them? The first and most obvious answer is, "go north." There will be folk-migrations of vast extent, compared with which those that preceded the Fall of Rome were but picnic excursions. If we are no more civilized than we are now when this irresistible "Drang nach Norden" begins to make itself felt, if the nations possessing northern lands refuse to admit the hordes of new immigrants who will clamor for admittance and passage to the new frontier, there will unquestionably be terrific wars, and in the trail of those wars famine and pestilence. It may well be that the whole structure of whatever civilization may be in existence at that time will collapse utterly, as that of the Roman West did under the weight of Germanic hordes fifteen hundred years ago, and a new and bitter Dark Age thus begin.

Nations possessing broad lands in the North may well be justified in denying



EVERLASTING ICE

Ice that all year round hides the coasts of Antarctica evidences the continuing ice age.

their gates to hard-pressed folk from the increasingly desert South. For the lands of the North will not suffice to support as large a population as will by that time swarm in the grain belt lands of the world. On the ordinary Mercator-projection map these great northern lands—Alaska, northern Canada, Greenland, Siberia—loom huge. But look at a globe, or at a map that spreads and distorts the northern areas less, and you will at once see that their area, even if all were fertile, is not equal to that of the temperate-zone lands of the present day.

Moreover, much of this northern land will be unsuited for human support even when the ice does finally melt off. A great deal of what is now forest in northeastern Canada stands on almost bare rock, with the roots of the trees holding precariously in a few inches of raw humus and half-decayed leaves and moss—"duff," the foresters call it. So scanty is this roothold that a forest fire burns not only the trees but the very soil they stand in, leaving nothing but a sprinkling of ashes on the bald rock. Such lands must forever remain forest, to be of even minor usefulness to mankind.

Bald rock, also, will probably be the whole inheritance of the nations when the ice sheets over Greenland and Antarctica melt away. Much of the rock underlying the forests of Canada was

left stark and bare when the great twin ice sheets of northeastern North America slowly retreated a hundred thousand years ago; any soil they may once have had had been cleared away as with a plane by the plowing fronts of the ice lobes. It is highly improbable that any appreciable part of the sub-ice surfaces of Greenland and Antarctica today are in any better case. They may some day be useful for airplane fields, and miners may exploit them for coal and minerals, but it is beyond human imagination to think of plowing them and planting corn.

Loss of Land

But supposing peace to come among the nations (or their fragments) after the great wars of Arctica and Antarctica, and supposing the relics of their populations spared by the sword, famine and pestilence to be settled down in a wearied peace. Would the broad lands for which they fought be there to receive them?

Not in anything like their present form. For the ice caps of the polar regions now contain, locked up away from circulation in rivers and oceans, enough water to raise the world's sea level about 150 feet. This is enough to make a material reduction in the coastal land areas of the world. Much of our Atlantic and Gulf coastal areas, including the greater part of Florida and a

deep embayment up the Mississippi valley, would be thus flooded. The greater part of Holland would disappear, and a goodly share of Belgium, as well as wide stretches of the North Sea coasts of both Britain and Germany. Denmark would be reduced to a mere collection of tiny islands. The Baltic "succession states"—Finland, Lithuania and the rest—would have to cede stretches of their sea fronts to the hungry sea. Every harbor in the world would be rendered useless, and new ones created.

But all these changes would be of little moment after all, for all these countries, or at least the great hinterlands that support them, would be pro-

ducing nothing to ship; so what would be the use of harbors, or the importance of lost coastal lands?

But the Arctic Ocean would be demanding its acres, too, and there the rub would hurt worse. For most of the lands that slope towards the Arctic fall off very flatly and gradually as long, level grasslands becoming sea-swamps and then sea. Up this sea-plane, and spreading out from the banks of the rivers that meander through it, the sea will spread its hundred-and-fifty feet of added elevation, and the lands for which the nations may fight their last Armageddon will be sadly curtailed by the time they are won.

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ENGINEERING

Engineers Test Structures Without Destroying Them

THE ADAGE that states that you cannot eat your cake and have it too expresses tersely the dilemma of the manufacturer or engineer who wishes to test his materials. For true testing by most commonly accepted methods involves the destruction of the material tested. The engineer wishes to know how much strain his material can stand before it will break, and to learn this he finds it necessary to break it. Testing by sample or by model involves a gamble upon the likeness of the sample to the rest of the material.

The examination of materials with X-rays and gamma rays does not provide the immediate solution to this problem, we are warned by an article in the British journal, *Engineer*, abstracted in the current issue of *Industrial Standardization*. For such an examination is no test at all in the technical sense.

"Rapidly as the use and usefulness of X-rays and gamma rays are advancing in engineering practice, it is still true that radiography as applied to metals has as yet barely entered the measurement phase," the report reads. "It serves in a remarkable and valuable way as a means of detecting the existence of certain, not all, types of internal flaw, but it is only with difficulty and with considerable latitude for error that it can at present be used to measure the size of the flaws and their positions within the bodies examined."

Nevertheless, it is anticipated that this radiographic method may be de-

veloped to provide an actual measure of stress as well as a revealing device for detecting flaws.

"The new technique covering the detection of crystal lattice distortion by the reflection of X-rays may soon result in very considerable developments. It is conceivable, for example, that by the application of the reflected ray method to a structure in service it may be possible, not only to detect the existence of strain in it or any of its parts, but to measure that strain and to convert it into terms of the corresponding stress. In such event radiography would provide a unique system of non-destructive testing."

Meanwhile, other methods of true non-destructive testing in use or within possibility should not be overlooked, the report warns. Such, for example is the test commonly applied to a finished bridge, involving the measurement of its deflection under different given loads. A test of this nature confirms the suitability of the design, the accuracy of the calculations, and the soundness of the materials.

Electrical methods are also important, such as placing the specimen in a magnetic field and then sprinkling it with fine iron filings to detect surface cracks, or passing a current through the length of the specimen and noting the extent and manner of the obstruction to the flow as a means of revealing deep-seated defects.

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MEDICINE

Pure Oxygen Piped To Hospital Rooms

PURE oxygen is being piped directly to rooms in the University of Wisconsin State General Hospital at Madison. The new arrangement is to make oxygen available to patients with pneumonia or other ailments which affect directly or indirectly the breathing apparatus.

The bulky oxygen tanks which must be carted from room to room and replaced from time to time are becoming obsolete, hospital authorities said. Oxygen tents and oxygen tubes are more and more frequently called upon in cases even in which there is no direct involvement of the lungs or chest muscles. Pure oxygen administration has been found to increase the constitutional stamina as well as to alleviate the various forms of distress from inability to inhale atmospheric oxygen. The oxygen will now come to the rooms in pipes from a central system from which the necessary supply for the patients may be taken, as water is taken from a sink or faucet.

The Wisconsin General Hospital will be the first in the country to establish this innovation.

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PSYCHOLOGY

Suggestion During Hypnosis Causes Strange Blindness

A PECULIAR temporary blindness in one eye, produced merely by a suggestion when the individual was in a hypnotic trance, was described at the Southern Society for Philosophy and Psychology by Dr. Frank A. Pattie, Jr., of Rice Institute.

The "blind" eye could discern light, but could not make out any form. When looking at a moving flashlight in a dark room, the subject could not tell horizontal from vertical movement, nor could he make out even the largest letter on an illuminated eye-test chart. When the room was illuminated evenly, no evidence was found that this "blind" eye could see anything at all.

With both eyes open, the subject did not have binocular vision, but saw things just as he would if the blinded eye had been covered. When the suggestion was made after the hypnotic spell instead of during the trance, the blurring of vision was not so great.

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