

METEOROLOGY

Machine Predicts Weather

Predicting large-scale mean flow of atmosphere over United States now possible and economically feasible, using mechanical or electromechanical business machines.

► A COMPLETELY automatic weather-forecasting machine," into which information about the current state of the weather will be fed directly, and "which inexorably and with great exactitude will calculate out the entire future course of the atmosphere," has been envisioned by a few meteorologists and mathematicians.

This machine of the future would utilize mathematical physics to make its calculations by a process of numerical forecasting. But already, according to Maj. Philip D. Thompson of the Massachusetts Institute of Technology, predicting the large-scale mean flow of the atmosphere over a few days time by machine methods is today economically feasible.

Right now, Maj. Thompson says, using only those mechanical or electromechanical business machines already in production, the process of predicting this large scale flow over an area the size of the United States could be made quite quickly.

"It would be neither necessary nor economical to install automatic forecasting equipment at each station," Maj. Thompson says. "It would be sufficient to maintain such facilities at only a few weather 'centrals.' Moreover, because it would require a highly trained team of specialists to operate and service the equipment, it would also be most economical to do so. The yearly cost of procuring, installing, continuously operating, and maintaining a facility of this type, amortized over the life of the equipment, would be comparable with the yearly salaries of ten professional forecasters."

Present day forecasting is of the type called "synoptic." The weatherman bases his prediction on his own skill and on his knowledge of the past behavior of a few variables in the weather, culled from observations at weather stations for a period of years.

This, according to Maj. Thompson, is an extension of the "statistical" method. In this, if temperature records over 50 years for a city show that the temperature has gone up one degree between Dec. 15 and Dec. 16 in 25 of those years, the statistical forecaster predicts that there is a 50% chance it will rise one degree this year.

Numerical forecasting, treating the atmosphere as a fluid, applies the laws of motions of fluids, expressed in mathematical formulas, to the problem of predicting how the fluid called air will move in the next few days. It applies those formulas to the information about the current weather. This involves millions of calculations. Now, with calculators which can do these "sums" in microseconds, this method becomes practicable.

Maj. Thompson did his work on numerical forecasting at the Air Force Cambridge Research Center, Cambridge, Mass.

Science News Letter, December 13, 1952

OCEANOGRAPHY

Ocean Level Rises Five Inches Since 1895

► THE GENERAL level of the world's oceans has risen five inches since 1895.

Dr. George F. Carter, chairman of the Johns Hopkins University geography department, Baltimore, reported to the Office of Naval Research in Washington that the rising sea is due largely to melting polar ice. The world now is in the tail end of a glacial period.

According to the best estimates, the coastlines of the world would be changed radically if all the polar ice melts. Sea level would be about 100 feet higher than at present.

"The east and Gulf coasts of America," he said, "would be altered beyond recognition. Long Island, most of New Jersey, the Delmarva Peninsula, most of Florida and great slices of the other coastal plain states would be under water. The Chesapeake Bay would cease to be a bay, while an inland sea would be created in the San Joaquin-Sacramento Valley; the Imperial Valley would become an extension of the Gulf of Lower California."

Although the sea level has risen in the last 12,000 to 25,000 years, it has not done so steadily. That makes "touchy business" of predicting when and if the total polar ice will melt. Since the sea level has changed irregularly, scientists have no basis upon which to make a forecast.

Although no immediate catastrophe is at

hand, future harbor facilities should be designed to accommodate a sea-level rise of about 24 inches within the next century.

Dr. Carter now is directing an ONR project aimed at learning more about the restless sea as it affects the Navy. Details of his work appear in *Research Reviews* (Nov.).

Science News Letter, December 13, 1952

Do You Know?

Aphids can infect healthy plants with beet-mosaic virus in only 10 to 15 seconds.

Helicopters can fly twice as fast, six times as far and can carry 15 times more payload than they could 10 years ago.

Small amounts of *terramycin* stimulate the growth of hatchery-bred rainbow trout.

Every gallon of present-day *gasoline* contains from 3,500 to 5,000 different chemical compounds made up of hydrogen and carbon.

With help from the World Health Organization, a 25-man team of Burmese health workers expects to give *anti-malaria protection* in 1953 to 110,000 persons living in an area of 2,000 square miles.

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