

METEOROLOGY

"Brain" Forecasts Daily

Electronic computer grinds out nation-wide wind patterns for weather forecasts. Its use in day-to-day forecasting is the greatest meteorological advance in decades.

► A GIANT electronic "brain" is now predicting weather flow patterns 36 hours in the future at least as accurately as human forecasters.

Total forecasting time is about the same for machine and humans, but it is expected to shorten as the meteorologists get more experience and faster computers.

Operation of the computer for weather prediction, by the Joint Numerical Weather Prediction Unit in Washington is the biggest forward step in forecasting in recent decades, meteorologists agree. This is the first day-to-day use of an electronic computer in weather forecasting in the United States. The technique is called numerical weather prediction. Meteorologists expect it will eventually result in more accurate predictions both for daily local forecasts and five-day, 30-day and longer predictions.

At present, what the machine comes up with is pattern of flow, or winds, at three levels—near the ground, 20,000 and 30,000 feet—and the vertical velocity between these levels. Precipitation factors are added by the weathermen, although the electronic computer is expected to take these into account in the future.

The Joint Numerical Weather Prediction Unit is a cooperative effort of the Navy, the Air Force and Weather Bureau. Its results will be given at first only to NWAC, the national weather analysis center that makes up nation-wide charts of air flow.

The machine's forecasts have been so successful that some of the regular forecasters for NWAC consult its results before making their own predictions.

The computer is fed information on air pressures in the atmosphere from about 50 stations. It then performs mathematical computations on these figures, using equations representing a much simplified mathematical model of the atmosphere.

Within an hour, after many millions of computations, the machine yields numbers from which nation-wide flow patterns at the three levels can be charted.

Using electronic computers is a revolutionary method in numerical weather prediction developed at the Institute for Advanced Study, Princeton, N. J., by Dr. John von Neumann, now an Atomic Energy Commissioner, and Dr. Jule Charney, based on pioneering work by Dr. C. G. Bossby and J. Bjerknes.

In making forecasts at the present time, weathermen rely heavily on the skill and knowledge they have acquired, during years of practice, to make their predictions as accurate as possible.

With a picture of today's weather, they have to jump immediately from that to

their own estimation of what to expect in 24 hours, or five or 30 days. Thus, essentially, weather prediction is an art, based on certain physical principles, but varying with the forecaster's personal judgment resulting from his experience.

With the electronic computer, most, if not all, of the forecaster's subjective judgments concerning winds is eliminated, although he still has to make subjective decisions to go from wind charts to actual weather forecasts.

Some meteorologists now foresee that high speed computers will eventually eliminate most of the forecaster's personal opinions from his predictions.

The techniques needed to record automatically the required weather data, to transmit them to a giant computer, and to retransmit a finished weather map to local forecasters are now available, or are expected to result soon from such programs as the one being inaugurated by the Joint Numerical Weather Prediction Unit.

Science News Letter, May 14, 1955

PHYSICS

Study Neutron Appetite Of Atomic Pile Materials

► MATERIALS FOR atomic piles are having their appetites for neutrons determined to make sure they will not stop chain reactions.

A potent tool for such measurements is the neutron, which can penetrate the nucleus because it has no electric charge.

The energy levels of the nucleus are of "vital importance" to reactor design, Dr. D. J. Hughes of Brookhaven National Laboratory, Upton, N. Y., told the American Physical Society in Washington.

When energies of bombarding neutrons are exactly the same as one of the many nuclear energy levels, they are usually absorbed.

Such neutron "resonances" for about 400 materials have been measured at Brookhaven, Dr. Hughes reported. They give "very direct information on the way in which neutrons" react with other nuclei. Since neutrons are the particles that keep chain reactions going, materials used for building or fueling reactors should have low neutron absorption.

"If an appreciable number were absorbed," Dr. Hughes said, the chain reaction could not be maintained. A book containing curves of nuclear resonances will be distributed at the International Conference on Atoms for Peace in Geneva next August, he reported.



ANTI-ECHO CHAMBER — Spun glass wedges in this soundproofed room eliminate reflected noises. In the chamber, designed by General Electric Company, an engineer, using a microphone and an oscilloscope, measures motor noises. Sound output as small as one-hundredth of a microwatt can be measured.

The instrument used to make such measurements is the "fast chopper." It consists of a mechanical shutter that opens and closes in less than one-millionth of a second, forming sharp bursts of neutrons in a beam from the chain reacting pile.

Neutron detectors about 75 feet away are used to measure the length of time required for the particles to travel this distance, which gives the energy of the neutrons. Resonances for different materials at various energy levels are measured in this way.

Results support the recent theoretical view, Dr. Hughes said, that nuclear matter, in spite of its extremely high density, is "surprisingly transparent." Nuclear size is still uncertain, he pointed out.

Science News Letter, May 14, 1955

MEDICINE

Search for MS Twins Yields 33-350 Wanted

► THE SEARCH for twins with MS, or multiple sclerosis, has yielded 33 identical sets so far, but the National Multiple Sclerosis Society would like to locate about 350 more, fraternal as well as identical.

This number of twin sets they estimate should be living in the United States with one or both members of the pair afflicted with the dreadcripler, the cause and cure for which are not known. The twins are needed to aid investigation of possible causes of the disease.

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