lifetimes of heavy mesons, particles from atomic nuclei. Such particles are thought to exist for only billionths of a second. (One-billionth of a second is to a second as one second is to a hundred years).

The works of the outsized watch include Geiger tubes, scintillation counters, vacuum tubes and certain germanium elements. It works like this:

Fast moving cosmic rays from outer space, which bombard the earth constantly, create these mesons when they collide with atoms of matter in the device. These mesons pass through a fluorescent fluid in the instrument, then cease to exist. Their passage through the fluid causes a brief and feeble flash of light which is picked up by a photomultiplier tube causing it to flash briefly. The time interval between the two flashes is recorded and represents the mesons' brief life span.

Geiger tubes, which detect arrival of cosmic rays, alert the timing mechanism when to start ticking off its billionths of a second. The face of the stopwatch is actually the face of an oscilloscope and is characterized by a series of waves. Wave crests correspond to the numbers on a clock and are two-billionths of a second apart.

Science News Letter, September 26, 1953

METEOROLOGY

Weather Now Computed

Much more accurate forecasts in future promise of new techniques of making models of world's weather in "dish-pan" or figuring it out on electronic "brain."

➤ MODELS OF the world's weather, made either in whirling bowls or computed mathematically by giant electronic "brains," promise much more accurate weather forecasts within the next few years.

Better understanding of the causes and effects of our weather using these two types of models were foreseen by top weather experts from the United States, England, Canada and other countries attending the international Toronto Meteorological Conference.

The big question still baffling weathermen is whether our weather starts at the top of the atmosphere and works down, or begins near the earth's surface, with effects observed later at high altitudes.

By swirling colored water in dishpans and bowls, the large-scale patterns of atmospheric flow are easily seen. These patterns can be changed by varying the rate of heating, by introducing obstacles to represent mountains and other geographic features, and by using both cold and heat sources. Thus meteorologists such as Dr. Dave Fultz of the University of Chicago and Dr. Robert R. Long of Johns Hopkins University are duplicating on a small scale some of the vast changes known to be occurring in the world's weather as the seasons change, or as air masses flow past mountain ranges.

Dr. Sverre Petterssen of the University of Chicago pointed out, for instance, that about 1,000 gigantic storm centers are generated every year, and about one-half of these occur in "well-defined patterns near mountain ranges."

Yet at least two severe storms have been forecast with an electronic computer using information from weather maps drawn 12 hours before the storm began. This was done by Dr. Jule Charney of the Institute for Advanced Study. Weather changes have also been followed using mathematically simplified models of the atmosphere by Drs. R. C. Sutcliffe and J. S. Sawyer of the Meteorological Office, Dunstable, Beds., England, and Dr. E. T. Eady of the Imperial College of Science and Technology, London.

In such models, the effect of heat or geography is not directly taken into account, yet many top experts, such as Dr. J. Bjerknes of the University of California, believe that the heating effects can not be ignored.

Within a few years, however, experiments now being conducted with dishpan and mathematical models of atmospheric circulation are expected by meteorologists to give answers to these problems, and thus better weather forecasts.

Science News Letter, September 26, 1953

RADIO

Signal Corps Wrist Radio Picks Up N. Y. Stations

See Front Cover

➤ A WRIST radio has been developed at the Signal Corps Engineering Laboratories at Fort Monmouth, N. J., that uses three transistors instead of ordinary vacuum tubes and picks up New York City radio broadcasts 40 miles away.

Powered by a mercury battery a little larger than the tip of a pencil, the radio has a short antenna worn up the user's sleeve comic-strip style. Sound is carried to the soldier's ear through wires that connect to a hearing-aid earpiece.

Although the tiny radio does not transmit, it can receive programs on a tuning range of 1,000 to 1,500 kilocycles. This is about half of the standard broadcast band.

Built to explore the possibilities of shrinking bulky Signal Corps equipment, the radio is housed in a transparent plastic case two inches long, one and one-eighth inches wide and three-fourths of an inch thick. It is shown on the front cover of this week's SCIENCE NEWS LETTER. The complex wiring of standard radios is replaced by printed circuits etched in its chassis.

Signal Corps officials credit the transistor with making the tiny radio possible. Transistors are pea-sized chunks of a rare metal, germanium. They can do some of the radio amplifying jobs done by much larger vacuum tubes such as are in television and radio sets. They require little power.

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