METEOROLOGY

Weather From Satellite

Artificial vehicle circling the earth would be able to spot and track hurricanes, tornadoes and other stormy weather from 4,000 miles above the surface.

➤ AN ARTIFICIAL moon zooming around the earth every four hours would be of "inestimable value" as a storm patrol, Dr. Harry Wexler of the U. S. Weather Bureau has reported.

Hurricanes, incipient tornadoes and jet streams are among the weather conditions that could be spotted from a satellite vehicle 4,000 miles above the surface. Dr. Wexler's look into the future as the weatherman would see it from an earth-circling moonlet was illustrated with a color drawing of how the Northern Hemisphere would appear from 4,000 miles above Amarillo, Texas, at noon on June 21, year not specified.

The hurricane, with clouds swirling like a pinwheel about its calm center, was centered in the West Indies. Many other cloud formations, with land spotted beneath them, could be seen. Each cloud type is a clue to the weather at the surface.

Cloud "streets," for instance, are thousands of bright cumulus clouds lined up in parallel bands that usually indicate the wind direction. They are found two to eight miles from the surface and normally mean fair weather.

The visual cloud patrol could be made automatically by a television camera if the satellite were unmanned, Dr. Wexler told scientists attending the Third Symposium on Space Travel, sponsored by the American Museum-Hayden Planetarium in New York.

For predicting tomorrow's weather as well as for spotting storms, a pole-to-pole orbit around the earth would be best.

Dr. S. F. Singer of Maryland University urged preparing now to launch a small satellite. (See SNL, March 27, p. 197.)

If the vehicle started from above the equator at noon on a given day, headed toward the North Pole, it would be over that pole in an hour, over the South Pole two hours later. The moonlet would again cross the equator headed north in four hours.

In those four hours, however, the earth would have rotated so that the space vehicle would be crossing the equator 60 degrees farther west. Thus in 24 hours, the moonlet would return to its starting place, having given the earth's atmosphere and surface the once-over twice in that time, once by daylight and once at night.

A weatherman, given such a picture of the earth's clouds and their movements, Dr. Wexler said, "would have a much better idea of the large-scale weather distribution than his earth-bound colleague, who is forced to rely on scattered observations taken taken at or near the surface."

With a properly manned and equipped earth satellite, weathermen could know the temperature of the earth's surface and of the atmosphere, the areas of precipitation, the thunderstorm areas, the amount of solar radiation and how it might affect "unusual spells of weather," changes in the amount of radiation reflected by the earth, and whether meteoritic dust particles can serve as rain-making nuclei.

This would be so much more information than weathermen now have available that the prediction of "Heavy rain at 11:07 this morning, ending at 12:32 this afternoon" would become a routine one for local newspapers. Long-range forecasts would also become vastly more accurate, thus saving untold millions of dollars in crops.

In drawing his chart of the earth's weather as seen from a satellite, Dr. Wexler took into account the surface features of the earth, their normal color and reflectivity, and the scattering and depleting effects of light passing through the atmosphere.

The over-all result of atmospheric light scattering would be to give a bluish tinge to what is seen from a circling satellite. The color of the sky at the horizon as seen from a space vehicle, Dr. Wexler said, would be gray in a thin layer corresponding to the atmosphere in the lower 10,000 feet, with an upper thin blue region. Above that, the heavens would be black.

Science News Letter, May 15, 1954

PHYSICS

Suggest Arithmetic as Link to Extraterrestrials

➤ SOME SORT of understanding with Martians, once communication has been set up, would not be really difficult, unless they are far more inhuman than we imagine.

Basic arithmetic would be the first bridge of understanding if some intelligent response were received from a celestial planet, stated Dr. Claude E. Shannon of Bell Telephone Laboratories, New York, at the same symposium on space travel.

Dr. Shannon expressed confidence that the entire communication problem between extraterrestrial beings and ourselves would not present any really great difficulties.

Assuming a radio link were established between another planet and earth, "it seems natural to make arithmetic the subject of our first language lesson," Dr. Shannon said.

Equipment now available can transmit radio messages to Mars and receive replies from there if any were sent out, he said. During World War II, the need for radar gave great impetus to development of microwave techniques. Microwaves are very short radio waves.

John R. Pierce, an electronic engineer, has shown that it would require remarkably little power to communicate with Mars. When Mars is in conjunction, or on the same side of the sun as the earth, Mr. Pierce found that a teletype channel on a three-centimeter wavelength would require only a quarter of a watt. A telephone channel uses 570 watts, which is less than the power needed to heat an ordinary flatiron.

It would even be possible to telegraph information by microwaves to the nearest stars, assuming a reasonable development in the electronic art, said Dr. Shannon, if such a communication link were set up between Mars and the earth.

Dr. Shannon recommended first sending simple patterns of elements of arithmetic. Basic multiplication patterns would then be transmitted and, if response from Mars were intelligent, algebra and logic could be sent across space.

The next lesson in the celestial kindergarten would be more difficult, he stated. Chemistry might be the next step. Symbols for the elements arranged to emphasize the periodic table might give the necessary clue.

Some basic principles of physics might be recognized by a Martian physicist who understood the algebraic notations.

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PSYCHIATRY

Test Predicts Recovery From Mental Sickness

➤ STATISTICS SHOWING that the outcome of treatment for mental patients can be predicted by the simple Funkenstein pretreatment test were reported by Dr. Leo Alexander of Boston State Hospital and Tufts College Medical School, Boston, at the meeting of the American Psychiatric Association in St. Louis.

The test is made by injecting adrenalin into the veins and another chemical, mecholyl, into the muscles.

Those patients whose blood pressure response to mecholyl is greater than normal have a greater potential for recovery. And their chance for recovery after treatment is in direct proportion to the degree of over-reaction to the drug.

Chances for recovery are least good, Dr. Alexander found, in those patients whose blood pressure response to adrenalin is lower than normal.

The test also points to the kind of treatment likely to be effective in particular patients. For example, patients whose blood pressure response to mecholyl is exaggerated respond well to electroshock treatment. Those whose response to adrenalin was below par do not improve on electroshock treatment.

Insulin shock treatment, on the other hand, proved best adapted to patients who over-reacted to the adrenalin test.

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