

METEOROLOGY

Link Abnormal Weather To Ocean Temperature

► WHEN WEATHER patterns are persistently abnormal for a season, blame the oceans or unusual snow cover.

Jerome Namias, head of the extended forecast branch of the U.S. Weather Bureau, told a symposium on long-range forecasting that he had found an "amazing tendency" of earth's land and water masses to interact with the atmosphere. Such interactions frequently cause unusual weather patterns for an entire season.

Dr. Julian Adem, on leave from the National University of Mexico, said he had worked out a method of predicting the temperature for as long as a month or a season in advance using equations solved by an electronic computer. His computations showed the "great importance" of ocean temperatures and snow cover in predicting long-term weather.

Although an electronic computer is now used in making 30-day weather forecasts, its predictions are not based entirely on mathematical equations. The past experience of meteorologists is also a factor.

William H. Klein, also of the Weather Bureau's extended forecast branch, reported that he had found a relationship between winds at one level high in the atmosphere and storm tracks at the earth's surface. This relationship is helpful in making weather forecasts.

The symposium sponsored by the World Meteorological Organization and the International Union of Geodesy and Geophysics was held at the National Center for Atmospheric Research, Boulder, Colo.

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MEDICINE

Children With Arthritis Crave Physical Exercise

► PUTTING CHILDREN to bed and keeping them there as a treatment for rheumatoid arthritis can have bad effects psychologically, especially if they are boys. Boys show more anxiety over this crippling handicap.

Arthritic children, like many adults with this disease, are likely to have been accustomed to competitive sports and other muscle activity.

Total immobility, as required by bed rest or application of body casts, might be expected to have unfortunate psychological repercussions, a scientific meeting of the American Rheumatism Association was told in San Francisco.

A study by a team of Houston, Texas, physicians at the Baylor University College of Medicine revealed, however, that different personalities react differently. Some take the crippling experience in stride, while others look on it as a catastrophe.

Mothers apparently were often unable to help their disturbed children.

Dr. S. E. Cleveland, psychiatrist, and head of the team of researchers, said such mothers commonly have a feeling of guilt for having in some way brought about the

child's illness through neglect, being too demanding, or in other ways.

A number of the mothers were depressed and pessimistic in their outlook. If there were children in the family who did not have arthritis, they too, demanded pills, exercise tools and other demonstrations of the mother's affection for them.

Dr. Cleveland, assisted in the study by Drs. E. E. Reitman and E. J. Brewer Jr., studied a group of 16 girls and 14 boys with rheumatoid arthritis. Their mean age was 10.5.

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TECHNOLOGY

Heat-Halting Material Developed for Spaceships

► A NEWLY DEVELOPED material containing hollow glass and plastic spheres shows promise of shielding astronauts from the abusive heat of reentry after a moon trip.

Scientists at the National Aeronautics and Space Administration's Langley Research Center, Hampton, Va., consider the new material "a major advance" over the substance used for heat shields on the Project Mercury spaceships.

The material is a silicone elastomer, or rubber-like substance, of a class known as charring ablators. The spheres are embedded in a plastic honeycomb to give structural strength.

The material's low density would provide good insulation for men and instruments from the searing heat of reentry into earth's atmosphere on a return trip from the moon. Such heating will be much greater than the 3,000 degrees Fahrenheit which the Mercury spacecraft went through on its return to earth.

As a craft enters the atmosphere and heat builds up, ablative material melts and absorbs some of the heat. As the air becomes hotter, the melting material vaporizes and blocks part of the heat transfer to the remaining material. Thus, the efficiency of ablation actually increases with temperature.

When temperatures get still hotter, charring ablators will develop a charred layer of coke-like material capable of radiating heat away from the spacecraft.

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ENGINEERING

Use Great Lakes as Vast Water Reservoir

► SEVERAL million million gallons of desalted ocean water could be added to the Great Lakes in order to form a mid-continent freshwater reservoir for both Canada and the United States.

Within ten years, scientists will be able to add desalted water to the lakes at the rate of 20 billion gallons a day, believes Prof. Allen K. Philbrick of Michigan State University, East Lansing.

A year's additional supply of water for the Great Lakes region could be stored in less than five inches of rise in the level of the lakes, which are the world's largest storage reservoirs, and made available for free use without building a single dam.

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PUBLIC SAFETY

Air-Filled Bags Reduce Injuries in Plane Crashes

► AIR-FILLED plastic bags automatically inflated to hold passengers in their seats during an airplane crash will protect them from injuries.

This was learned when such an automatic system was tested by purposefully ramming a DC-7 airliner into a hillside near Phoenix, Ariz., at more than 160 miles an hour. The dummy that sat in for a man and was protected by the "airbag" system showed a live person could have survived the crash.

The Martin Company is studying the method for possible use both by airplane passengers and astronauts, under a contract from the National Aeronautics and Space Administration.

The bags would be stored out of the way during flight, then rapidly inflated by a switch in the pilot's cabin when a hard landing or crash is anticipated. The plastic inflates in the space between the passenger and the seat ahead of him, holding him securely in place.

When the airplane lands, a time delay switch would automatically deflate the bags.

Martin engineers estimate that the forward acceleration sustained by the dummy was cut one-half to three-fourths. An unprotected dummy suffered an acceleration estimated at 40 times the force of gravity.

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PUBLIC HEALTH

Cigarette Smoking Dulls Taste Buds

► CIGARETTE SMOKING appears to decrease a person's ability to taste bitter things.

In an experiment supported by the Council for Tobacco Research and the U.S. Public Health Service, 34 heavy smokers from 31 to 50 years old were selected, with 40 non-smokers as control subjects.

The subjects tasted solutions of quinine and of 6-n-propylthiouracil, a bitter-tasting chemical, each dissolved in distilled water. Each solution sample was twice as concentrated as the one before it.

Smokers, both male and female, were found to require more concentrated solutions to taste either chemical. Compared with earlier studies, this experiment indicates that smoking has a greater effect on taste in older people than in college-age smokers.

The study was performed by Arnold R. Kaplan and Edward V. Glanville of the Cleveland (Ohio) Psychiatric Institute and Roland Fischer of the Ohio State University Medical School, department of psychiatry, Columbus. The experiment was reported in *Nature*, 202:1366, 1964.

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CE FIELDS

MEDICINE

Personality-Disease Link Seen in Cancer Patients

► PERSONALITY TRAITS of hopelessness or the "giving-up syndrome" show a possible predisposition to cancer, a preliminary study indicates.

Before giving the usual surgical test for diagnosing cancer of the cervix, two psychiatric researchers correctly predicted whether or not 31 of 40 women would have the disease.

The University of Rochester researchers found that all of the predicted cancer patients had recently experienced severe feelings of hopelessness and defeat as a result of personal loss, such as a death in the family, or some other setback.

If further work is successful in identifying persons susceptible to specific diseases, a promising new approach to preventive medicine would be found, Dr. Arthur Schmale Jr. and Howard Iker told a meeting of the American Psychosomatic Society in Rochester, N. Y.

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MEDICINE

Radioactive Isotopes Diagnose Anemia

► RADIOACTIVE ISOTOPES and a device called a whole-body counter are now being used to tell doctors accurately the causes of iron-deficiency anemia.

Used to diagnose this most common of anemias are four milligrams of iron with two microcuries of radioactive iron. This exposes the patient to a much smaller gamma ray dose than from a chest X-ray.

After this dose is given, a very sensitive sodium iodide crystal counter, or a scintillator, is able to count at intervals the loss of the iron from the entire body. By the rate of loss of the radioiron from the body in red blood cells, the physician can tell if the anemia is caused from bleeding or by the patient's past absorption of iron.

This distinction is most important for proper diagnosis of the anemia and in treating patients in the course of diseases that may have caused the anemia.

New diagnostic work now being done at Donner Laboratory, University of California, Berkeley, was reported by research biophysicist Dr. Thornton Sargent at a meeting of the Society of Nuclear Medicine in Berkeley.

Using the whole-body counter and iron-59, Dr. Sargent found impaired iron absorption in some patients who had part or all of their stomachs removed. Among other poor iron absorbers some bled and others did not. In some cases of poor absorption no organic defect could be found.

Dr. Sargent told SCIENCE SERVICE that the whole-body counter can measure the amount of bleeding in many blood diseases causing iron-deficiency anemia.

Some of these conditions are menorrhagia, or excessive menstrual bleeding; bleeding ulcers; ulcerative colitis, and congenital hemorrhagic telangiectasia. This last disease is hereditary and marked by enlargement of small blood vessels in such various parts of the body as the nose, throat and intestines.

Dr. Sargent said some cases of bleeding were not discovered before the whole-body counting. Only about six whole-body counters are in use in this country.

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VITAL STATISTICS

U.S. Population Reaches 192 Million

► THE POPULATION of the United States, including military personnel abroad, reached the 192 million mark June 22.

Although the growth rate is still slowing down after the phenomenal number of births in the period 1958-1961, the country's population continues to grow.

At present, births, deaths, immigration and emigration are combining to produce a net increase of one person every 12 seconds—300 per hour, one million every 139 days. This represents a growth rate of slightly under 1.40% per year.

The 1964 rate is slightly less than last year's rate of 1.41% or one million every 135 days; this in turn was less than the 1962 rate of 1.51% or one million every 126 days. During the 1958-1961 "population explosion," the rate was between 1.6% and 1.7% per year—one million persons every 115 days.

The rate appears to have leveled off at about 1.4%, and if it stays there we will reach the 200-million mark in mid-1967 and the quarter-billion mark sometime in the 1980s. The rate may increase again, however, as girls born in the postwar "baby boom" reach childbearing age.

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TECHNOLOGY

Social Security Saves \$1 Million With Tape

► A NEW MAGNETIC TAPE filing system in the Social Security Administration will cut costs about \$1 million a year.

The Optical Character Recognition System will automatically read and convert to tape about half of the more than 60 million earnings statements sent in every three months by the nation's employers.

The work currently requires about 140 manually operated punch card machines, as well as a great deal of reading time for human operators.

The system will be able to "read" most kinds of typewritten information although handwritten reports will still require the manual method.

Made by International Business Machines Corporation in Rochester, Minn., the new equipment will be installed in 1965.

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TECHNOLOGY

Water-Soluble Paper Has Many Possibilities

► FROM NOW ON the harrassed hero or villain in an old-fashioned spy movie who has to eat the paper with a secret message in order to keep the information from falling into the wrong hands will have an easier time.

A new water-soluble, non-toxic paper suitable for writing messages or anything else is now commercially available.

Completely ordinary in appearance and otherwise like ordinary bond paper, the new material disintegrates in less than a minute in plain tap water. Furthermore, it is mildew-resistant, is not affected by humidity in the atmosphere, and can be written, typed or printed on.

Less dramatic applications likely to be more widespread include use for classified interoffice memos and reports in government and industrial concerns, and in demonstrations for special-effects purposes. It should also be useful in packaging industrial and household materials.

The Gilbreth Company, Philadelphia, is marketing the paper under the trade-name of "Dissolvo." It is made from a derivative of ethyl cellulose by a process on which patent application is pending.

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SPACE

Sneaking Up on Earth Would Slow Reentry

► REENTRY SPEED of a returning space flight to Mars may be greatly reduced if the spacecraft swings by Venus and approaches earth from behind.

Ordinarily, a craft returning from Mars would face reentry speeds as high as 51,000 miles an hour, more than twice that of Apollo on its return from the moon. At these speeds, a mere three-second error in a crucial roll maneuver could double the acceleration experienced by the vehicle.

The new approach route, reported at the annual meeting of the American Institute of Aeronautics and Astronautics in Washington, D. C., would take a spacecraft returning from Mars close by Venus.

The pull of Venus' gravitational field would deflect the craft so that the angle between its orbit and that of earth would be reduced. This means that earth would be "running away" from the spacecraft.

The difference between the earth's orbital velocity and that of the space vehicle catching up with it would equal the reentry speed of the vehicle. This would be much less than the reentry speed using conventional approaches.

One main advantage of having a low reentry speed is that the problem of heat would be reduced. Radiative heating, for example, increases as the eighth power of velocity.

The study was reported by C. A. Syvertson, director of the mission analysis division of the National Aeronautics and Space Administration's Ames Research Center, Moffett Field, Calif.

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