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INFLUENCE OF SUNSPOTS ON WEATHER

VAGUE correlations between sunspots and the weather probably exist, but the weather is affected so much by other factors that the influence of sunspots is insignificant. This is reported in a lecture at Stanford University by Dr. Seth B. Nicholson, of the Mt. Wilson Observatory, after a quarter of a century devoted primarily to solar research concerning the much-discussed question of whether the weather can be predicted from sunspot activity.

Dr. Nicholson conceded, however, that conditions upon the sun are not exactly the same when there are many spots as when there are few, and that any change in the sun's radiation will certainly be reflected some way in the weather. Ever since the great astronomer, Sir William Herschel, in 1800 tried to correlate the price of wheat with the number of sunspots, not only astronomers, but meteorologists, botanists and bankers, both professional and amateur, have been trying to find such correlations without much success. Invariably they arrive at the same conclusion as Herschel—more data are needed in order to prove them. This is true in spite of the fact that both the quantity and quality of solar data have greatly increased since Herschel's time.

With regard to the possibility of making short range predictions for particular regions from individual sunspots, Dr. Nicholson was even more emphatic. He said: "Certainly it is foolish to think that an individual sunspot can in any way produce definite changes in the weather at any particular locality on the earth."

SNOW

DON'T grumble if there's a lot of snow in your neighborhood. Be thankful instead. Snow is one of the important ingredients of victory. Not, perhaps, in the direct sense that it is in Russia, but our American snow is a great help toward the goal none the less.

Snow on the ground now means bread and milk on the table before next winter's snow begins to fall. For winter wheat and other fall-sown grains depend on snow now for protection against the cold and drying winds of winter, and they will depend on the water from the thaw for most of their growth in spring. If they get a good start in late March and during April, a very little rain in May will suffice to make the crop that will be harvested in July. Similarly, snow makes the early hay crop and the spring pastures, on which our milk supply depends to a large extent.

Snow is a major source of the water that few of us ever even think about, except weather men and agricultural scientists; what is known as subsoil water. This is the moisture well below plow level, on which trees and bushes depend, and the deeper-reaching roots of maturing crops. Corn roots, for example, go down from three to five feet; alfalfa roots as much as twenty. And it is this moisture reserve that they depend on.

Water that trickles down through partly melted snow during occasional winter warm spells is an especially good means for replenishing this deeper deposit on which crops may draw later on. Such melt-water can not run off very well; there is nowhere for it to go but down. It is only when the snow cover melts away completely that there is cause for anxiety—the more so since the winter grains are then left naked to possible fierce sudden freezes or hard dry winds. No Northern farmer feels easy in winter if he is able to see the soil in his fields.

How much water it takes to make a bumper crop is vividly brought out in a calculation recently offered by J. B. Kincer, of the U. S. Weather Bureau. Comparing the excess of water that fell in the abundant crop year of 1942 with the scanty fall during the desperate drought of 1934, he said: "If it were possible to load this excess water on super-trains of 100 tank cars, each carrying 100 tons of water, and transport them over a super-railroad at the rate of two trains a minute around the clock without missing a single schedule, it would require more than 100 years to complete the shipment."—FRANK THONE.

HEARING AND VISION OF AMERICAN FLIERS

CHANGES in plane designs to aid the hearing and vision of American combat fliers were recommended to the Institute of Aeronautical Sciences meeting in New York. Professor Walter R. Miles, of Yale University, stated that "Both seeing and hearing, if accompanied by prolonged attentive effort, especially under conditions of unfavorable plane design, are capable of contributing to pilot and air crew fatigue and loss of efficiency." Collaborators with Professor Miles in preparing the report were Commander Leon D. Carson, head of the Medical Research Section in the Navy's Bureau of Aeronautics, and Professor Stanley S. Stevens, one of the directors of the Psycho-Acoustic Laboratory at Harvard University.

Plane gunners should be moved much nearer the aiming window. The position of the gunner now gives him the same sort of vision as he would have in a tunnel, since his eyes are some distance away from the window. Sections of gun mounting, electrical switches and other gadgets which lattice the aiming window are also a hazard to vision and life. The amount of structure in front of gunners should be reduced. Clearing away these obstructions to vision and moving the gunner nearer the window will "increase his angle of uninterrupted view, make visual pursuit of his targets easier, and reduce the blinding effect from the flashes of his own guns."

In the cockpit, the instrument panels have too large an illuminated area. They are usually illuminated too intensely and with a color that disturbs night vision. Indirect red light was recommended by Professor Miles and his associates as best. Discussion of vision from the cockpit disclosed that transparent enclosures often become discolored with exposure to sunlight or become checked due to temperature changes and vibration.

Dr. Miles pointed out that "Rapid strides in development of better plastics are being made, and it should be possible soon to mold transparent cockpit enclosures of better grades of optical plastics in one piece. Surface hardening of such molded parts is desirable."

The ears of flying personnel take even greater abuse than their eyes. Noise from air turbulence around the plane is in some ways more disturbing than the noise from the propeller itself. The interior of a glider plane, for example, is a very noisy place when traveling at 150 miles per hour. Conversation is difficult if not impossible. Several methods were suggested for overcoming the distracting noises of combat flying. "Judicious use of sound treatment in the plane, conversion to high-fidelity microphones and earphones, and the development of acoustic devices to shield the mouth and the ears of the personnel," Professor Miles said, "will permit the aviator to carry on in the best noises which the aeronautical engineers are now planning to produce."

THE PHYSIOLOGICAL STRAINS OF MODERN FLYING

Engineer and biologist must cooperate if human beings are to be really successful in handling the formidable flying machines which aeronautical invention has given them, was emphasized by Professor D. W. Bronk, of the University of Pennsylvania, at a lecture sponsored by the national science honor society, Sigma Xi. The biologist, and in particular the biophysicist, has as his task the discovery of the performance limits of the units of the human nervous system. The engineer must adapt his machine to a controlling organism operating within those limits.

As an example of these performance limits, Dr. Bronk cited the now familiar "blackout" experienced by dive bombers in pulling out of a steep, fast dive. It is known that the centrifugal effect of this sudden upswerve drains the blood away from the brain, and "blackout" results.

Basic reason for this momentary unconsciousness is oxygen starvation on the part of the brain cells. Brain cells are at all times very greedy for oxygen; they never have more than a few seconds' supply on hand. So anything that cuts off fresh supplies, even for a little while, creates a physiological crisis—threatens a shutdown for lack of an essential material.

Professor Bronk described some of the exceedingly delicate instruments used in modern physiological research to obtain data on the needs and capacities of nerve and brain cells. The chronic state of incipient oxygen starvation of the brain cells was discovered by means of a microscopic metallic electrode than can be inserted into various regions of the nervous system with relatively little damage. Differences in the minute electrical current transmitted tell tales of fluctuations in amount of oxygen present, and hence of the relative state of efficiency of the cell at the moment.

Nerve cells can be isolated, yet kept alive, and thus studied as single units. Thus isolated, their structure can be analyzed by new electrical, optical and electron-microscopic methods. The electron microscope gives new vistas into the molecular architecture of the cell. The electrical states tell of its internal responses to fluctuations in the supply of essential elements such as calcium and phosphorus, and other environmental influences.

ITEMS

Diesel engine power may soon be increased by superchargers similar to those now used on plane engines. Problems involved in thus increasing our power supply was discussed at the Detroit meeting of the Society of Automotive Engineers. A Swedish supercharger now being applied to American engines was explained in a paper prepared by Alf Lysolm, of Aktiebologet Ljungstrom, Augturbin, Sweden, and Ronald B. Smith and W. A. Wilson, of the Elliott Company, Jeanette, Pa. Such a device now being manufactured weighs only 80 pounds and handles 400 to 500 cubic feet of air per minute. Other sizes adequate to serve the largest diesel engines can be built, the report stated.

To protect passengers in stratosphere planes, the cabin must be sealed airtight. Progress and difficulties encountered in solving this complicated problem were reported at the annual meeting of the Society of Automotive Engineers by R. L. Ellinger, of Transcontinental and Western Air, Inc., Kansas City, Mo. The cabin must be filled with air at proper temperature and pressure, the speaker pointed out, regardless of outside conditions and the major problem of stopping leaks. Seals of many types and designs are needed at points where controls pass out of the cabin. Actual planes must be used as flying test laboratories, as simulated conditions in test chambers were not successful.

Central and South Americans will soon be practicing splinting, bandaging and artificial respiration on each other, as we did last winter and spring, it appears from an announcement made by Chairman Norman H. Davis, of the American Red Cross in Washington. The gray paper-covered American Red Cross first aid text-book, now familiar to millions of North Americans, has been translated into Spanish and Portuguese and will soon be available for distribution to all Central and South American countries. The translations will be made by the Mexican Red Cross and the Brazilian Red Cross with the permission of the American Red Cross. Previously, its distribution had been limited to Mexico and Venezuela.

If you are taking fresh yeast as a means of getting extra vitamins into your system, boil it before you eat it. The human body apparently can extract two or three times as much thiamin or vitamin B_1 from boiled yeast as from fresh, according to a report by Dr. Helen Parsons, of the University of Wisconsin, at the Detroit meeting of the American Dietetic Association. Boiling the yeast, though troublesome and likely to make it less palatable, increases the amount of two other B vitamins (riboflavin and vitamin G) the body can get from the yeast. Pronouncements on boiled vs. fresh yeast were based on experiments with ten students and with laboratory animals.