METEOROLOGY

Drought Causes Still Obscure; Alleged Cures All Futile

Sunspot Correlation Subject of Debate Among Scientists; Forests Again Championed as Moderating Influence

ARE SUNSPOTS the cause of the drought?

The answer to that question will depend upon what scientist is at the receiving end of it. For meteorologists and the men who study solar physics are not in agreement over the matter. As it stands at present, the answer would have to be a kind of double Scotch verdict: "Not proven. Also, not disproven."

Prominent among the scientists who believe that there may be a definite and rather close correlation between weather and the spottedness of the sun is Dr. C. G. Abbot, secretary of the Smithsonian Institution. He has spent many years in the study of sunspot cycles, or periods at which spots on the sun become most numerous, and then wane again.

It has taken a long time merely to devise statistical methods suitable for unscrambling the numerous cycles of varying lengths, which overlap and thus obscure each other. But finally he has worked out a culminating period of about 23 years, approximately double the most pronounced of the sunspot periods, which is a little over eleven years.

At the same time, H. H. Clayton, who edits the Smithsonian Institution's notable publication, *World Weather Records,* has developed a theory of a sunspot mechanism that could account for changes in weather here on earth. When there are many spots, the sun is pouring more radiant energy into space.

Weather Cycles Not Denied

Impact of this surplus energy on the earth causes a displacement of the "centers of action" whence masses of warm and cold air start on their weather-making journeys, and thus also changes the tracks followed by these air-mass migrations. The dislocation of the customary storm-tracks, such as we have had ever since last autumn, might well bring drought.

Meteorologists at the U. S. Weather Bureau, however, are not yet willing to trust the sunspot cycle method, at least to the extent of basing confident long-range forecasts on it. They feel that too much statistical manipulation is still necessary, and would like to have the whole thing put on a simpler and more direct basis before its use in practical everyday meteorology is attempted.

They do not deny the existence of weather cycles, however. J. B. Kincer, chief of the division of climate and crop weather, points out that the present drought, and those of the past three or four years, coincides with a steep drop in the curve of the Brückner cycle of approximately 35 years. Only, he says, this cycle and all others are not sharply defined. Nobody knows exactly when they begin and end.

Hence it is not safe, he holds, to predict when the upturn in the weather cycle will begin. The drought may end next week. Or the summer of 1935 may be worse than the summer of 1934. Mr. Kincer declines to guess which.

Raindrop Tennis With Clouds

When forests grow again on our denuded hills, will they help to prevent droughts? Do forests have any substantial influence on rainfall?

No, say many foresters and meteorologists. Yes, declare others, just as stoutly.

The earliest doctrine on the subject was that forests do have a modifying influence on rainfall and temperature. People noticed that forested regions were also regions of more even climate than open grasslands or sandy deserts. The assumption that the forests helped to produce the climate was easy to make.

Then arose a generation of scientists who claimed that the earlier idea was wrong-end-to. Equable climates, with well-distributed and abundant rainfall, would produce forests. Less rainfall, with higher evaporation rates, would permit only grasslands to develop; and still less rain would, of course, produce desert. Strip the forests away, they said, and the climate would remain substantially unchanged.

This view, which is perhaps still the majority opinion in scientific circles, has been sharply challenged by one of the best known of American foresters, Prof. Rafael Zon, now at University Farm, St. Paul.

Forests, Prof. Zon holds, play raindrop "tennis" with the clouds, picking up the water that falls and tossing it back into the air. Forests are therefore important factors in the distribution of rainfall over a continent.

Only two-ninths of the water in a rain-cloud comes directly from the ocean, Prof. Zon has stated. The rest has already fallen at least once as rain —possibly many times. It has been taken from the land, and will fall again upon the land. And forests, he said, send into the air far more water than do grassy plains or areas of bare soil.

Radio Moratorium Demanded

Radio is taking first honors—or dishonors—as the cause of the drought, in hundreds of crank letters and telegrams that daily find their way to the office of the U. S. Weather Bureau. Most of them are addressed to President Roosevelt, some to the Department of Agriculture. All are routed to the Weather Bureau, where Prof. W. J. Humphreys, master of the art of diplomacy as well as of the science of atmospheric physics, patiently dictates courteous answers.

A few of the messages attempt something like scientific reasoning: "The broadcasting stations are putting so much current into the air that the rain-bringing currents never get a chance." Most, however, are dogmatic and peremptory: "Suggest you declare moratorium of radio broadcasts for eight or ten days: watch it rain!" read one urgent telegram to the President.

Suggested remedies for the drought are as fantastic as are the allegations of its cause. One man wrote that if you leave an egg on the end of a beam in the barn, rain would certainly follow. Scattering soap, he also suggested, was a good way of bringing rain. Another suggested shutting all windows in the houses and keeping them shut.

The old rainmakers' standbys are not lacking either. Over and over again Prof. Humphreys has had the evaporation of cooling chemicals urged upon him, as well as sending up airplanes with sand to sprinkle on the clouds, and hurling aloft large charges of explosives to be detonated high in the air.

None of these things, he explains, will avail to wring water out of arid air. Some of the proposed remedies are just naive magic: the scattering of soap, for example. This might be termed "associative magic," the basis of reasoning being that where there is soap there must surely be water.

Other proposed drought remedies, like the use of cooling chemicals and sprinkling sand from aircraft, smack of the scientific. They would expend energy enough to condense the water from vapor to liquid drops, and thus bring rain. But the amount of energy needed to assemble a rainstorm out of heated air is so great that all the rainmaking munitions that could be piled up over a whole township would not produce even a timid little shower.

Proposals to use explosives are the surest smile-provokers at the Weather Bureau. They have been advocated as rainmakers ever since the earliest days of gunpowder. They have also been advocated—and tried—as means of stopping hailstorms. Apparently a big, healthy "bang!" in the sky is supposed to bring whatever results are desired at the moment, whether more precipitation or less.

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ANTHROPOLOGY

Human Missing Link May Lie Entombed in Solid Rock

ONE of the most delicate tasks scientists ever had thrust upon them engages four men and women at the Royal College of Surgeons in London.

In the basement of the College lie tons of hard and heavy rock. In the large blocks may be seen outcroppings of bones, human bones, which the eminent British anthropologist, Sir Arthur Keith, pronounces "the most imposing specimens of fossil humanity I have even seen."

It is up to the squad of workers, led by Theodore D. McCown, an American, to get those fragile, brittle, imposing specimens of humanity out of their hard beds. To meet the situation, the squad is armed with an electric dental grinder, an electro-pneumatic chisel, scrapers, hammers, and an inexhaustible supply of scientific patience.

If the specimens of humanity can be freed without much damage, science will discover what a vanished race of men that lived 75,000 years ago was like. If the bones prove too crumbly, or the workers too impatient—? But such disaster now seems unlikely.

A cheerful report of progress on this job which the scientific world is watching has just been sent back home to America by Mr. McCown. His report comes to the American School of Prehistoric Research, of which Prof. George Grant MacCurdy of Yale is director. Mr. McCown and his assistants have been working eight months at their task, and will probably not be finished for many months to come. He tells of removing two tons of plaster and cement casing from two of the important fossil humans, and bringing to light such features as the hidden bones of fingers and toes and the vertebral columns of the unknown ancients.

The men and women whose skeletons are thus being extricated from solid rock with such gentle care represent the oldest inhabitants of Palestine. They lived in their time in caves along the Mediterranean shore. Their ungainly frames, even half buried in a matrix that cased itself about them, seemed to reveal to science a type of human anatomy not heretofore known. That is why they were dug out of their cave tombs in chunks, so to speak, and their release from the stone is now so eagerly watched.

The unknowns belong to the age of Neandertal Man, and have many points in common with him. But some at least of the Palestine men seem to have had higher foreheads and more man-like chins than the Europeans of that rather ugly stage of human development.

Were they nearer to modern humanity than their fellow Europeans? It is important to know, scientifically, for just after the slouching Neandertals rather mysteriously emerged the famous *Homo sapiens,* our own type of modern man; and these Palestinians may be a missing link in our ancestral line.

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An intensified campaign to eradicate diseases of cattle was begun in June by officials in 24 states.

PSYCHIATRY

Mental Diseases Described Frequently by Shakespeare

WAS Queen Elizabeth's favorite, Essex, the model for the misanthropic Timon in Shakespeare's tragedy, Timon of Athens? The suggestion that he may have been was made by Dr. Andrew H. Woods of the Iowa Psychopathic Hospital at the meeting of the American Psychiatric Association.

The Timon of Shakespeare's play suffered from the mental disease, paralytic dementia, which is due to syphilitic infection, Dr. Woods asserted. Shakespeare's picture of this disease is so perfect that Dr. Woods believes he drew it from the example of some prominent Elizabethan who suffered from it. There are so many points of resemblance between Essex and the hero of the tragedy as Shakespeare wrote it that Dr. Woods declared if there were documentary proof that Essex suffered from syphilis, it would settle the matter.

Shakespeare was greatly interested in mental diseases, evidently knew much about them and featured them in six of his plays, Dr. Woods pointed out. Hamlet in the play of that name pretended to have the mental disease, schizophrenia, while Ophelia in the same play showed signs of the real disease. Othello and Julius Caesar suffered from epilepsy. In addition, Othello showed the suspiciousness and savage violence of a sufferer from another mental disease, paranoia. King Lear gives a picture of the mental debility of old age. Lady Macbeth's sleepwalking and loss of memory show that Shakespeare knew the peculiar way in which hysterical patients behave.

The original Timon who lived in Athens was quite different from the character in Shakespeare's play. There is nothing in the brief accounts of him written by earlier historians and in another play about him to suggest that he had syphilis or the mental disease, paresis. Shakespeare in the first part of his play pictured Timon as much more attractive and capable than the Athenian actually was, and in the last part of the play the dramatist makes Timon's turning against his friends and the entire world not so much the result of his misanthropic nature as of the ravages of the disease which destroyed his mind.

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