AGRONOMY

Soil Erosion Shown As Manifold Menace

SOIL erosion by running water works mischief far beyond visible effect in gullying and wasting good farm, grazing and forest lands, bad though that is in itself. Some of these less obvious harms of erosion were pointed out by Dr. W. C. Lowdermilk, vice-director of the U. S. Soil Erosion Service, in the course of an address before the recent memorial meeting at Iowa State College, Ames, Iowa.

Soil erosion not only takes good soil away from where it is wanted, but frequently dumps it where it does millions of dollars' worth of damage. As an example, Dr. Lowdermilk pointed out the case of the rapid silting up of the irrigation reservoir at Elephant Butte, in New Mexico.

When the Elephant Butte dam was constructed, a survey made on the basis of the inflowing water's silt content indicated that the reservoir would not be silted up to the point of uselessness in less than 233 years. Surveys since then indicate that its life has been shortened, by silt from eroded lands, to 110 years. Even more disquieting, said Dr. Lowdermilk, is the fact that in about 60 years the capacity of the reservoir will be only that required for one season's use, leaving nothing in reserve for years of short rainfall and high water requirement.

Corking the Reserves

Another invisible damage wrought by erosion is the "corking" of underground reserves of water. These have been very heavily drawn upon by heavy pumpage during recent years, the speaker stated, and they are very much in need of replenishment by the downward movement of surface water. But when the water bears too heavy a burden of erosional mud, the "spreading grounds" become sealed up, and the water, no longer able to sink, flows off uselessly to the ocean.

Dr. Lowdermilk proposed, as a part of the answer to the deadly challenge of erosion, that the national readjustment of agriculture aim at the maximum possible use of good level lands, and that hilly lands be withheld from plowing until we can afford to work their sides over into great stair-steps of level terraces, as the Incas of the Andean highlands did with their mountainsides.

Fertilizing and liming soil pays not only in increased crop yields but indirectly in decreased losses of top soil due to erosion. This point was stressed in an address by R. E. Uhland, of the U. S. Soil Erosion service.

Comparative Runoffs

Mr. Uhland told of experiments conducted under his direction at a soil erosion station near Bethany, Mo. Here strips of sloping soil are planted in various crops, with and without fertilizer, and the losses in runoff water and eroded top soil are kept accurately checked. Unfertilized land under corn lost soil 300 times as fast as did the comparison strip under the much closer-growing alfalfa, and had nine times more loss in runoff water.

The use of fertilizer greatly increased the contrast between "close" crops like alfalfa and grass and "open," vegetation-free soil. From areas cropped under a three-year rotation of corn, wheat, clover and timothy the loss of soil where neither fertilizer nor lime was used was at the rate of little less than 12 tons per acre, as compared with only 3.74 tons per acre, where lime and fertilizer were applied and the same rotation used.

Salvation of the soil from destruction by water erosion is wrought by the meekest of plants as well as by conquering grasses and towering forests of trees. Mosses, the Cinderellas of the plant world, play their disregarded but none the less effectual part in balking the "soft insatiable tooth" of soil-stealing water. Prof. Henry S. Conard of Grinnell College reported on the various ways in which these seemingly insignificant plants operate in checking surface soil losses.

Obviously, mosses are not equipped to check the heavier, undercutting types of erosion, as do the massive-rooted trees and other larger plants. Their hold in the soil is not deep enough for that. But mosses can and do work powerfully against the surface waste known as sheet erosion. This is the even washing away of the top layer of soil, that comes before runnels and small streams start cutting deeper. Mosses accomplish this in several ways, Prof. Conard said.

For one thing, a dried mat of moss can soak up water like a wick. In several experiments performed in his laboratory, bunches of dried moss absorbed from two to over five times their own weight in water before they were wet enough to let any flow away. This would mean that in the field a dried moss sod would catch and hold all the drops from a shower for an appreciable time before even the smallest flowing trickle could start.

Even when water is flowing over the ground surface, if it encounters a bed of moss it is immediately slowed down. Furthermore, if it is carrying a load of silt which it has stolen from the soil, the moss takes it away again. Prof. Conard reminded his hearers of the crystal clearness of water that drips from wet clumps of moss, and pointed out instances where piled-up borders of sphagnum moss form the only confining barriers that hold in check accumulated masses of black muck in bogs. He also described places where sods of moss formed the only, but adequate, protection against gullying on steep banks.

Science News Letter, February 2, 1935

ENGINEERING

Soviets Plan Establishment To Capture Power From Sun

SCIENTISTS and engineers of Soviet Russia are rushing experiments in which the heat of solar radiation may be turned into usable power on earth. In keeping with its program to duplicate the work of Western civilization in every form of technology Russia is now tackling the century-old problem of how to run steam engines by the energy from the sun.

At the Helio-Technical Institute of Samarkaland (Central Asia) a solar air heater is in operation. It dries vegetables and fruit in a few hours where older methods required days.

At Tashkent, also in Central Asia, in what used to be Turkestan, research for several years has been progressing on solar energy plants. A kitchen is being operated. Food is cooked, water boiled and water pumped up to a small water tank.

So hopeful are Soviet engineers of solar energy that a power plant of 30,000 kilowatts capacity is to be

erected either on the shores of the Aral Sea or on the bank of one of its tributaries, the Amu-Daria River.

The latest design of pump to be used in this plant calls for movement of 4,000 cubic meters in 10 hours. Converting cubic meters into gallons of water yields the rather astonishing result of over a million gallons pumped in less than half a day.

Likewise astounding is the amount of energy in sunlight. Each year the energy falling on the earth is 1,000 times as much as that obtainable from all the coal, oil and water power used in the United States yearly if it were all available for power transformation.

But as in all forms of energy conversion, there is the question of efficiency in obtaining power from sunlight. One of the best methods, that of Willsie and Boyle in the early years of the present century, was not more than one or two per cent. efficient.

Science News Letter, February 2, 1935

BIOPHYSICS

Ultraviolet Rays Fatal To Eggs of Parasites

ULTRAVIOLET rays, at appropriate wavelengths and strength of dose, are fatal to the eggs of certain parasitic worms. The total energy of the light applied was equivalent to that of 12 days of average July sunlight, though the actual raying usually occupied only a few hours.

Previous observers of the killing effects of sunlight on these eggs had ascribed them simply to heating and drying out. But the present experimenters, W. H. Wright of the U. S. Department of Agriculture and Dr E. D. McAlister of the Smithsonian Institution, feel that they have demonstrated a direct lethal effect due to the ultraviolet radiation itself.

Science News Letter, February 2, 1935

●RADIO

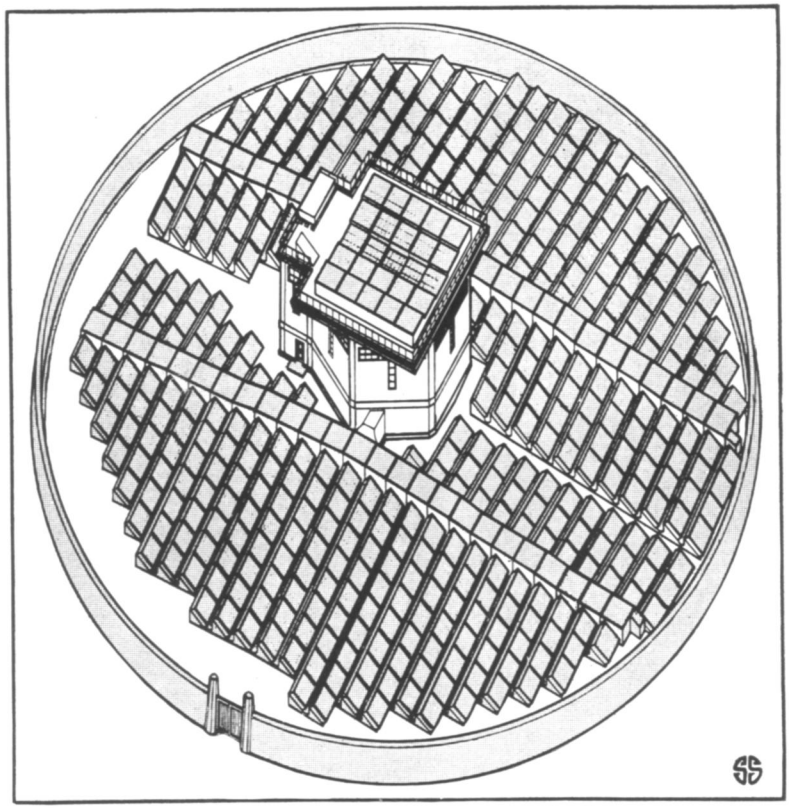
Tuesday, February 5, 4:30 p. m.

WHEN THE PAST BROKE ITS SILENCE, by Prof. E. A. Speiser, Department of Semitics, University of Pennsylvania.

Tuesday, February 12, 4:30 p. m.

THE MARCH OF THE MICROBES, by Homer N. Calver, Public Health Consultant, New York City.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.



SOVIET HOUSE OF THE SUN

Design for a new solar energy station at Tashkent, capital of the Uzbek Republic of Central Asia, U. S. S. R. At this city Soviet scientists for several years have been operating a kitchen, bath and watertower on power supplied by the sun.

MEDICINE

Warns of Danger in New Reducing Drug

DANGER may lie in wait for the person who tries to reduce by means of a simple method widely publicized during the last eighteen months.

Warning to doctors, press and public against the indiscriminate use of this drug, called alpha-dinitrophenol, is issued by the *Journal of the American Medical Association* (Dec. 21) in an editorial.

Three persons have died and many others are experiencing ill effects from the use of the new method of reducing.

Some 100,000 persons in the United States have been treated with this drug in the past year, it is estimated, in the belief that here at last was a method of reducing excess weight which was free from serious after-effects. The drug burns the extra body fat and carbohydrate without affecting the protein, the medical journal says. However, reports of its toxic effects have already persuaded many doctors to stop its use until the results of further studies are known.

Skin rashes are among the unpleasant and sometimes alarming after-effects of the use of the drug. It seems to have no bad effect on the liver or on the circulation, but investigators believe it needs careful watching as to possible injury to the red blood cells.

The drug can be purchased at any corner pharmacy, and the medical journal regrets the fact that no restrictions have been placed upon its sale. One of the big points in its favor when the use of the drug as a reducing method was first announced was the ease of its administration. The fat man or woman merely swallowed three capsules a day and within three months or so normal weight was achieved.

The editor of the medical journal urges that the sale of alpha-dinitrophenol be restricted to that ordered by doctors' prescription and that its use by medical men be carefully supervised. Probably it should be used by the physician, the Journal states, only when reduction of weight is important for health and when ordinary dietary methods have failed.

Science News Letter, February 2, 1935