



THIEVING RIVER

The nation's capital was fortunate among the flooded cities, but here also "That Ole Man River" took his toll among the industrial plants of the Georgetown riverfront. The troubled waters in the foreground are those of the river itself, but at the left, equally wet, is a business street. This photograph and the one on the front cover were taken by the U. S. Army Air Corps.

METEOROLOGY-CONSERVATION

## Floods and Dust Storms Children of the Same Folly

### Destruction of the Living Sod and Its Spongy Layer Of Top Soil Lets Dust Blow and Water Run Away

By **PROF. PAUL B. SEARS**, of the University of Oklahoma, Author of "Deserts on the March."

**N**ATURE has again been good enough to warn us, by a perfectly synchronized drama of dust-storms in the West and disastrous floods in the East, of the wrath that is brewing against our Western civilization unless we mend our ways. The two extremes, seemingly unrelated, are absolutely facets of the same picture.

The dust storms are not simply a matter of unavoidable drought, but a result of the destruction of the living sod which alone can bind the looser soil types of the semi-arid high plains. This destruction has had a two-fold source. The range has been stubbornly overloaded with cattle almost ever since the extermination of the great buffalo herds. Wise cattlemen know the danger of this, but the pressure to liquidate their heavy debts often leads them to take a disastrous chance. The sod, cropped too close, affords too little protec-

tion against the prevalent winds of late winter and spring.

Even more serious is the second source of trouble—the attempt to farm the high plains in wheat, using power machinery. Even this year, with the somber warnings of last year's dust storms, there have been men who continued the losing gamble—one operator for example having set out not less than seven thousand acres of wheat. The wheat is as a rule unable to gain sufficient foothold during the winter months to protect the soil. Comes spring with its high winds, and the terrific dust-storms arrive.

What has this to do with the destructive floods that recently raged throughout the East? Recently travelling through the oldest agricultural states of the Union, the writer has scarcely seen a place where the old top layer of soil is left. Careless methods of farming have allowed it to wash away in the past two and three centuries. The insidious thing is that this has taken place

without much sculpturing of the ground, so that unless one is a trained observer who knows what the soil should be like, he is unaware of the profound destruction that has been wrought.

It is this dark, spongy, top layer of soil—what the specialists call the A-horizon—which is our only effective protection against flood. One can build dams downstream, construct mazes of levees and ditches, and still not touch the source of trouble. The water must be caught where it falls, and the one thing that can arrest it and hold it in place is the dark A-horizon of the soil. This layer has been made into a perfect sponge by ages of accumulation of plant material. It will retain the water, filter it, and slowly release it in a limpid stream.

Unless we take measures, through proper use of the soil, to restore this layer—no easy task—we may expect a recurrence of disaster every time there are continued heavy rains. The problem is more a matter of biology than of engineering, and the sooner we realize it the better. Our present tactics, if we could really see them as they are, would make the wise men of Gotham blush.

Modern medicine has learned that pestilence is easier to prevent than cure. Proper land management will vaccinate our land against future floods. Nothing else will.

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ENGINEERING

### 16-Mile Long Bridge May Link Denmark and Sweden

**A** GIGANTIC engineering project which will link Denmark and Sweden with a 16-mile long bridge, provide a super-high-speed highway across the island of Zealand on which Copenhagen is situated, and also span the Great Belt separating Zealand from Funen and the rest of Denmark, has been proposed by three Danish construction firms.

The Danish parliament is reported to be considering the plan with favor, although its total cost will be 628,000,000 kroner, or approximately \$150,516,000.

Construction would employ 12,000 workmen during a ten-year period.

Especially favored by Scandinavian industrial and business circles is the 16-mile long bridge which would join Copenhagen in Denmark and Malmoe in Sweden, across the Ore Sund. Its estimated cost of \$33,744,000 would be borne jointly by the two countries.

The great high-speed motor highway across the island of Zealand would cost \$48,618,000, and the bridge over the

Great Belt would cost \$57,054,000.

Denmark, according to the plan, would pay its cost by money raised one-third by loan, one-third by motor taxes and one-third through government subsidy, especially to railroads.

The estimated annual construction

costs would actually be less than the yearly cost of present road maintenance in Denmark.

Construction materials, including steel and coal for fuel, would be purchased abroad at a cost of \$20,102,000; the rest would be from Denmark itself.

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#### PHYSIOLOGY

## Nerves Can Double for Others In Controlling Heart Action

### Tiny Fibers Heretofore Not Understood by Science May Act for Nerves Which Affect Heart Beat

SCIENCE'S first step toward an understanding of recently discovered nerve fibers for speeding up heart action, a discovery which may lead to their identification as hitherto unknown sympathetic nerves, was announced to the New York Academy of Sciences by Dr. Lucien A. Brouha of the University of Liège, Belgium.

Discovered at the University of Ghent in 1934 by Jourdan and Nowak, the tiny fibers have remained pretty much of a mystery to science, the only definite fact known about them being their position alongside the vagi nerves which run from the brain to the heart and which serve to retard the cardiac beat.

Even now, Dr. Brouha explained, little is known of their function in the normal body, but in dogs whose sympathetic nervous system has been removed these new nerve fibers take its place. Indeed, so successfully do they substitute for the missing nerves that Dr. Brouha finds it absolutely impossible to distinguish a normal dog from one without its sympathetic system.

This finding is in direct contrast to results obtained with cats by Dr. Walter B. Cannon at the Harvard Medical School, for removal of the sympathetic system in these animals made them distinctly apathetic, incapable of exertion to any marked degree.

It was the ability of the new nerves to replace the sympathetic system in dogs that led Dr. Brouha to his conclusions concerning the possible function of the nerves as a substitute for the removed system. In the normal body, he believes, the nerves may aid heart regulation to a very small extent, although he said that in all probability they have additional functions as yet undiscovered by science.

In research leading to these results, Dr. Brouha conducted pioneer treadmill tests on dogs both before and after removal of the sympathetic system. The experiments were performed in cooperation with Dr. David B. Dill of the Harvard University Fatigue Laboratory where Dr. Brouha is carrying on his investigations this year.

Outstanding among his finds were that the general behavior of a dog whose sympathetic chains have been removed remains normal, although the heart beat of the animal at rest is slightly less than normal, and that emotional excitement produces the usual definite cardiac acceleration.

#### ANATOMY

## Nose Grows Longer With Age, Mouth Gets Wider

WHEN a human face grows old, the features actually change in pattern. The nose grows wider and longer. Ears lengthen. Mouth spreads wider.

These signs of age, which almost defy beauty camouflage, are detected by anthropological measurements, reported by Dr. Ales Hrdlicka, well-known anthropologist of the Smithsonian Institution. People are vaguely conscious of the altered pattern when they greet old friends, and cannot account for a familiar face seeming somehow strange.

Dr. Hrdlicka bases his conclusions on measurements of thousands of "Old Americans" that is, Americans who have three or more generations of ancestry in this country, and also on study

If the dog takes light exercise, Dr. Brouha found, the cardiac rhythm remains below the normal rate, even during a long experiment in which the total amount of exercise done is considerable. When this exercise becomes more intense, however, the cardiac acceleration occurs in proportion to the intensity of the exercise—exactly as it does in the normal animal.

Another important find was that the capacity to stand very intense exercise is not at all diminished three months after the removal operation, that time being necessary for the dog to recover from the effects of the operation.

Experimentally checking the possible influence of a rise in body temperature or muscular metabolism, Dr. Brouha found that they are definitely not responsible for the accelerated heart beat. Nor are adrenalin or sympathin, for with the removal of the sympathetic system, these hormones are not secreted into the blood stream.

This leaves only increased activity of the cardio-accelerator fibers of the vagi nerves to explain heart regulation. The activity of these fibers, Dr. Brouha says, is also accompanied by a reduction in activity of the retarding fibers of the vagi nerves whose functions along these lines are well known.

Testing the sugar and lactic acid content of the blood and the alkaline reserve of sympathetomized dogs, he found them all to vary within normal limits.

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of Indians, Eskimos, and Negroes.

The mouth begins to widen from early life and continues to change, the anthropologist finds. Effects of age on this feature are more marked than the changes in the nose.

Although women have smaller mouths than men, women's mouths are really larger in relation to their body height.

A nose alters mainly by widening, though there is some increase in length.

Dr. Hrdlicka's measurements confirm the point that people in hotter climates have broader noses than people in cold climates. It is believed that this is an adaptation to the breathing needs in different climate surroundings.

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