GEOLOGY

Sinking of Earth's Crust Near Boulder Dam Expected

MAN at last has a chance to determine whether the earth's crust—from 17 to 75 miles thick—will bend under a great weight. Theory says it will, but until the construction of Boulder Dam was undertaken, no way seemed possible to prove the answer.

Scientists of the U. S. Coast and Geodetic Survey are planning to make accurate surveys of the region around Boulder Dam to see if the weight of the dam and the huge lake it will store up are sufficient to compress the underlying rock of the great continental shields.

The estimated weight of the lake alone is placed at 41,500,000,000 tons. Never before has man placed such an enormous weight on one spot of the earth's crust.

Theory says the solid layers on the outside of the earth really float on a much heavier material which lies below in a plastic state. The condition is much like a woven raft of logs afloat on a lake. If a heavy weight is placed on such a raft, it submerges partially.

It is thought that the weight of mountains similarly submerges the bottom of the solid crust into the underlying plastic material.

Behind the plans of the Coast and Geodetic Survey is the thought that an additional increase in weight at one spot will further sink the floating crust until equilibrium is established.

Engineers expect that the elastic compression of the rock in the earth's crust will cause an area of twelve square miles to sink six-tenths of a foot in from two to three years.

The sinking of the solid crust into the plastic matter beneath may cause an additional two-foot drop over an area of 150 square miles. How long this lowering will need to occur, is not known.

Eventually, however, bench marks soon to be established will tell the story.

Science News Letter, August 3, 1935

ENGINEERING

Steam Engine Replaced Camel; Now Diesel Replaces Steam

LOCOMOTIVES with Diesel engines are replacing those propelled by steam on the desert railways of Turkmenia, U.S.S.R., just as steam engines once replaced the camel.

Because steam locomotives were forced to carry heavy tanks of water necessary for the journeys across the sun-baked sands, Soviet engineers tried out Diesel-locomotives as an experiment. Tests having proved them to be more powerful and speedy in addition to needing little water, at present 18 powerful Diesel-locomotives are in use between Krasnovodsk and Chardzhuy, a distance of about 709 miles. Formerly 30 steam locomotives were necessary to haul the heavy trainloads of oil, cotton, grain, fruit, and other cargo over the same distance.

In a recent test, Soviet engineers claim that a Diesel locomotive built at the Kolomna plant near Moscow covered a distance of over 3,700 miles without taking on water or refueling on the way, pulling a freight train. Because of their success in Turkmenia, where all locomotives will soon be those of the Diesel type, the Kolomna plant is being enlarged with the idea of replacing steam locomotives in other parts of the U.S.S.R.

Science News Letter, August 3, 1935

ASTRONOMY

Sunlight Studied to Find Cause of Storms on Sun

THE CAUSE of mysterious storms that rage in spots on the sun is being sought by sunlight analyses being made by Drs. G. G. Cillie and Donald H. Menzel of Harvard Observatory.

Some form of super-excitation of the hydrogen and helium in the sun are believed to cause the storms, Dr. Cillie told the Massachusetts Institute of Technology spectroscopy conference. But what causes this unusual excitation is still a mystery.

It may be exceptionally strong ultraviolet light which scientists have not found, due to its being screened out of the sunlight by the ozone gas surrounding the earth. But both Drs. Cillie and Menzel feel sure that whatever causes the storms comes directly from the surface of the sun and not from the solar atmosphere as other astronomers have suggested.

Tremendous heat might also cause this high excitation, but scientists have discounted this theory since it would require a sun having a temperature of more than ten thousand degrees Centigrade. This is nearly twice as hot as the accepted measurement of six thousand degrees which scientists believe to be fairly accurate.

Science News Letter, August 3, 1935

CONSERVATION

Pressure of Population Cited as Cause of Erosion

"EROSION" is the answer returned by Dr. W. C. Lowdermilk of the U. S. Department of Agriculture to the ancient question, that might appropriately have been asked by the Great Sphinx, half-buried in drifted desert dust: What caused the fall of ancient nations?

In a study presented to the Society of American Foresters, Dr. Lowdermilk cites his own explorations in northwestern China, and backs up his personal conclusions with the opinions of other scientists on the causes of the fate that overtook the civilizations of Asia Minor and North Africa, Peru and Yucatan. (*Journal of Forestry*, June)

Air photographs of ruins in these lands, he says, are strikingly similar. "All such ruins are in regions of scarce vegetation, bare hillsides, and rocky lowlands. History tells of vast armies surging back and forth across these regions. They must have been entirely dependent for food upon the surrounding country. Yet now these barren, dry lands scarcely sustain the scattered native populations.

"The great despoiler of civilizations and landscapes is soil erosion, by wind and water. It is a disease which has followed man throughout the centuries in his exploitation and destructive treatment of the good earth from which he received his sustenance—a disease, difficult to discern at first and responsive to treatment in the early stages, but absolutely fatal to civilizations in its final stages."

Pressure of population, in the old lands, is what led men to strip the uplands of their protecting forests and thus release the destructive power and wind to bear the soil down the hills and spread flood and ruin in the valleys. The Maya civilization apparently had to undertake its migrations because it was "choked to death by mud washed from its own hillside corn patches."

Our own erosion problem is a result of population pressure in a somewhat different phase. It was not a population expanding "in place," but a vast, hordelike rush over lands rich in virgin fertility. Knowing nothing and caring nothing about soil conservation, since the problem simply did not occur to their age as a problem at all, the pioneers stripped the forests, grazed the prairies down to the roots, and plowed everything for get-rich-quick boom crops. They passed to their graves in the assured conviction that they were "building the country."

They did build an empire, but at the same time they planted the seeds of its destruction. And it is up to the present generation to find a way to avoid harvesting the crop of desolation which their grandsires unwittingly and for the most part innocently left in the birthright they bequeathed us.

Science News Letter, August 3, 1935

ANIMAL NUTRITION

Cod Liver Oil Injures Heart And Muscle of Farm Animals

Investigators Warn Against Feeding Large Doses To Grass-Eating Animals Pending Further Research

A DIET containing cod liver oil has been found to produce muscle and heart injuries in various grass-eating animals, according to studies covering a period of seven years recently reported by Prof. C. M. McCay, Dr. L. A. Maynard and L. L. Madsen, of the Laboratory of Animal Nutrition, Cornell University.

The injuries have been much more severe with a synthetic diet of purified food, but toxic symptoms have also been obtained with natural foods.

Rabbits, guinea pigs, sheep and goats have been found susceptible to these injuries. Sheep and goats on pasture, receiving a daily dose of 7/10 gram of cod liver oil per 1,000 grams of body weight, died within ninety-three days, showing the toxic symptoms. Animals receiving half this amount succumbed within 226 days, but an intake of 1/10 gram did not produce any observable harm over this period.

The writers point out that the levels of cod liver oil which have been found injurious are not in excess of the amounts sometimes recommended for various farm animals and for children. They suggest that the feeding of the oil to farm herbivora in any but the lowest amounts is open to question, pending further study. The writers recognize that their results have no direct bearing on the use of cod liver oil in human nutrition, but they feel that the wisdom of the use of the large intakes which have been frequently recommended should receive careful reconsideration, particularly in view of the reports by certain European investigators of heart injuries in infants receiving this oil.

Cod liver oil is used in nutrition because of its content of vitamins A and D. The writers have found no evidence that the injuries obtained in the herbivora are due to the vitamins themselves. In fact, their results show that the harmful factor lies primarily in the part of the oil which does not contain the vitamins. This means that this harmful factor is at least largely gotten rid of in the manufacture of cod liver oil concentrates which are frequently used as sources of the vitamins in place of the oil itself.

Science News Letter, August 3, 1935

CONSERVATION

Drought, Wind and Flood All Cause Soil Erosion

THREE months ago dust storms rolled over the nation from the Mississippi River valley to the Atlantic Ocean. A month ago flood waters raged on the upper tributaries of the Mississippi. Recently Montana had a tornado and New York its cloudburst-caused flood. Property damage for these scattered tragedies ran into millions of dollars.

But the one common denominator of all the disasters, in terms of dollars, was unmentioned. It was soil destruction. And the economic loss from this cause may well have amounted to more dollars than the property damage. Certainly the damage to the soil incurred was the most permanent damage.

"Houses and other property destroyed by the raging waters can be replaced; crops swept by prairie winds can be replanted. But fertile soil blown high in the air or washed by the ton into streams and rivers is lost forever," points out H. H. Bennett, Chief, Soil Conservation Service in Washington.

Dust storms are the most spectacular means by which the average man receives a token of the hazards of soil erosion. Much more serious, because of its constancy and wide spread, is the gradual washing of topsoil—the farmer's stock in trade—into streams and rivers, Mr. Bennett adds.

It is not the dramatic cloudburst, and its floods, which worry the Conservation Service as much as it is the almost invisible erosion which constantly occurs.

In a radio address delivered for Science Service over a nationwide network of the Columbia Broadcasting System, Mr. Bennett told how topsoil washing over the years is a two-way menacing problem.

First the erosion takes away the farmer's "principal"—the soil on which his crops will grow. But more than that, when the soil is washed into streams and rivers it becomes an unwanted menace. The erosion washings make a river shallower, and hence broader, since it must carry about the same volume of water.

As a result the danger of floods becomes more prevalent and the farmers along the river valley are thus "caught" in a second way.

Even the city dwellers may soon notice the effects of the erosion. Giant reservoirs which represent millions of dollars investment of their money catch the washing and gradually fill up with silt. Their capacity is lowered and the investments endangered.

Controlling erosion, said Mr. Bennett, is a nation-wide long-range problem:

"If the Soil Conservation Service can initiate erosion-control measure on all seriously erosive lands within the next ten years, if it can secure reasonable control of erosion within the next twenty years, and if it can establish preventive measures on practically all the better lands of the country within the next generation, it will have gone a long way toward a solution of the problem."

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