GEOLOGY

"Fossil Niagaras" Dwarf Earth's Greatest Waterfalls

Geologist Finds That Dry, 900-Foot Cliff in Washington State Once Roared With Water From Retreating Glaciers

TWO "FOSSIL NIAGARAS" that would make the mightiest waterfall now on earth a puny trickle by comparison, once roared in the Grand Coulee, a deep, wide gorge that lies about halfway between Spokane and Seattle. These extinct cataracts, now represented only by lines of towering dry cliffs, have been studied by Prof. J. Harlen Bretz of the University of Chicago, who has presented his report on them to the American Geographical Society.

The water that fed these two great cataracts came from melting glaciers of the great Ice Age. Creeping down from the north, the ice had for ages blocked the course of the Columbia River. As the glaciers began to melt off and retreat, they released immense quantities of water, which had to find a new watercourse. Of this necessity of nature was born the Grand Coulee, whose bed, now dry except for a chain of small lakes, is a thousand feet deep, with a width of a mile at its narrowest point. It has a total length of about fifty miles, with an interruption in the cliff walls somewhat more than halfway down its course dividing it into an Upper and a Lower Coulee.

The bottom of the Grand Coulee is not a fairly even slope, as the bottom of an ordinary river valley would be. It has humps and irregularities, and in the rocky floor there are enormous "potholes" a hundred feet deep. Potholes—steep-sided, round-bottomed holes in solid rock—are formed in only one way: by the grinding and pounding of boulders kept in motion by the force of falling water.

Two Tremendous Cataracts

Prof. Bretz therefore looked for the remains of a waterfall that might have done such cyclopean sculpturing. He found two, both of tremendous proportions.

The lesser of the two falls was at the head of the Lower Coulee. It formed a group of cataracts, rather than a single fall; but when the enormous length of its great "horseshoe" and all the lesser bendings of the remaining cliffs are measured as a straight line, the total comes to some three and one-half miles, or nearly six times the straight-line width of Niagara Falls. This tremendous stream leaped from the crest of a 400-foot cliff, more than double the height of Niagara and substantially higher than Victoria Falls in Africa, the greatest known existing cataract.

But mighty as these falls in the Lower Coulee were, they were surpassed by the Steamboat Cataract of the Upper Coulee. This feature gets its name from a high outstanding rock in front of the cliff. This was once an island, first on the brink, as Goat Island stands on the brink of Niagara today, then left isolated as Goat Island would also be if American and Horseshoe Falls receded at equal rates.

900-Foot Fall Now Dry

The Steamboat Cataract was a good mile wider than the falls system of the Lower Coulee, and more than twice as high. In the days of the late Pleistocene, the waters roared over its cliff in a plunge of nine hundred feet!

All this super-Niagaran magnificence vanished when the receding glacial front retreated far enough for the water to flow down the present course of the Columbia River, leaving the upper end of the Coulee high and dry. The head of Grand Coulee now stands about 500 feet above the water level of the river, and several miles removed from its course.

Prof. Bretz tells of a project to put water into the Coulee again: not the thundering post-glacial flood, but an irrigation stream that will bring green life to its present dry bottom, and change the farming basis of the region from dry land wheat to irrigated orchards and alfalfa fields. It is not expected to build a 500-foot dam across the Columbia to do this; a 200-foot dam is expected to be sufficient. The apparant paradox of getting a 500-foot water lift from a 200-foot dam is explained by the fact that a great pumping station will be installed, run on the 200-foot water head, to lift the irrigation water over the 300-foot "hump" into Grand Coulee.

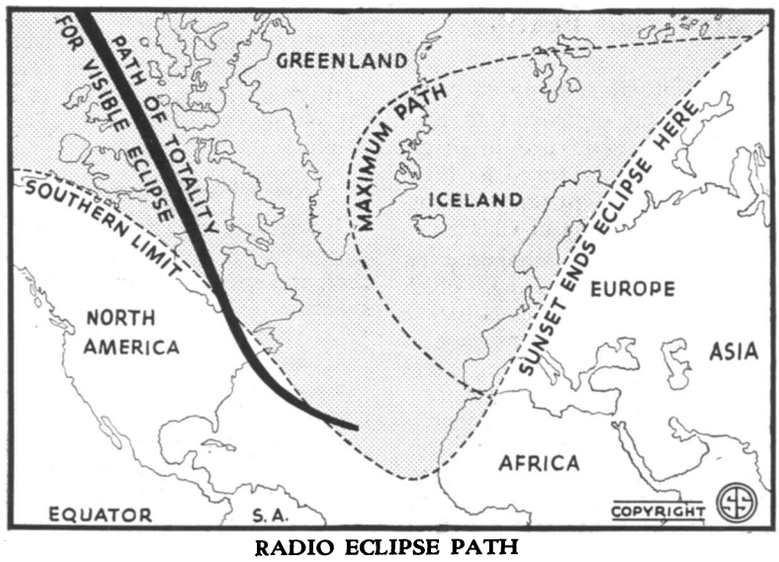
Science News Letter, August 13, 1932

ASTRONOMY-RADIO

Scientists to Study Expected Radio Eclipse

ALTHOUGH the moon's visible shadow will fall on a narrow path (shown in black on the accompanying map) across Canada and New England, there will be a corpuscular or "radio" eclipse over a much larger area on August 31 (shown dotted on the map). This map shows where a rain of neutral particles or corpuscles from the sun will be interrupted by the moon. *(SNL, July 30, '32, p. 75).*

Profs. E. V. Appleton and S. Chapman, British scientists, are urging radio experimenters both within and without the path of corpuscular *(Turn Page)*



RADIO ECLIPSE PATH

eclipse to observe radio signal strengths on the day of the sun's eclipse to test the theory that particles from the sun create one of the ionized or conducting layers in the earth's upper atmosphere and thus affect radio transmission.

The radio eclipse will occur about two hours earlier than the optical eclipse.

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PHYSIOLOGY

Study Throws New Light On Tooth Decay

THE ENAMEL which protects our teeth is made up of thousands of minute crystals of apatite, a kind of phosphate of calcium. In dogs' teeth these minute crystals are arranged perpendicularly to the surface while in human teeth they are inclined, according to findings of J. Thewlis of the Physics Department, National Physical Laboratory, Teddington, England.

Dogs' teeth are almost immune from caries. Chemically their constituents are identical with those of human teeth and possibly it is their physical structure that gives them increased resistance.

To observe crystalline structure by means of X-rays a different method is used from that of the dentist who takes X-ray photographs to see the shape of the roots. The X-rays come from a point source; they strike at a known angle and are scattered in definite directions. The pictures obtained consist of dots and rings, and must be mathematically interpreted in terms of the arrangement of atoms and crystals.

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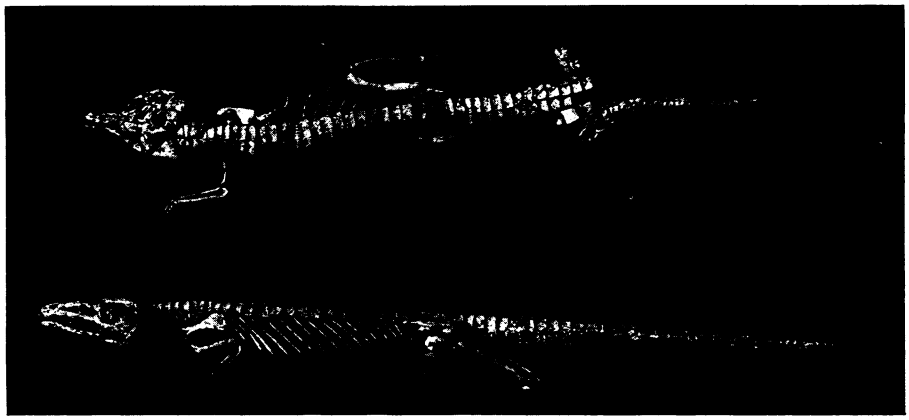
PHYSIOLOGY

Rat "Digests" Quarter Of a Steel Ball Bearing

THE POWERFUL eroding effects of the acids in the digestive tract have been strikingly demonstrated in an experiment on a rat, performed by Frederick Hoelzel of the department of physiology of the University of Chicago.

Mr. Hoelzel made a laboratory rat swallow a steel ball bearing, which passed through the animal's digestive tract in fifteen days. On emerging, it weighed 24 per cent. less than it had at the beginning of its alimentary journey. To another rat, Mr. Hoelzel administered a hundred small pieces of iron, which were all passed out of the digestive tract by the end of about ten days, with a loss of 12.5 per cent.

Science News Letter, August 13, 1932



GRANDDADDY OF ALL CROCODILIANS

ARCHAEOLOGY

Ancestors of Crocodiles Studied At American Museum

THE GREAT GRANDFATHER of all crocodiles and alligators, a curious primitive reptile skeleton about three feet long, is now at the American Museum of Natural History in New York. It lived in what is now the state of Arizona, in Middle Triassic times, about two hundred million years ago, says Barnum Brown, paleontologist who has studied its nearly complete skeleton and supervised its restoration from the somewhat broken condition in which it appeared when carefully sculptured out of the slab of sandstone in which it was embedded.

The crocodile family has apparently followed the rule that holds for the evolution of almost all animals: starting small and growing large. The American Museum specimen is no bigger than the infant offspring of the huge "crocs" that make life interesting in African lakes, or of the big 'gators that used to lurk in the swamps and slow rivers of our own South.

Resembles Young and Old

It resembles a very young 'gator, too, in the length of its head. Its snout is short and stubby, although it is an adult specimen. The highly developed elongated jaws of modern crocodilians, that reach the limit for all their kind in the gavial of India, are the products of later evolution. But they have the conical teeth of modern crocodilians, and there is a pair of large openings through the top of the skull that present-day "crocs" and 'gators also have. Certain details in the structure of the pelvic girdle, of critical value in determining the animal's zoological position, are of primitive character. Like its modern descendants, this ancestor-crocodile had a little toe that was very little indeed—a mere vestige.

The formidable armor of bony plates that cases modern crocodilians is not so highly developed in this creature, but there is an effective roof of V-shaped plates over the backbone, and the belly is covered with close-set squares.

Triumph of Technique

The restoration of the skeleton is a triumph of modern museum technique. First, it had to be very carefully sculptured out of the slab of sandstone in which it was embedded when it arrived at the Museum. This was done by working at it from both sides, until its back and belly projected on either side of the slab, leaving a supporting sheet of stone in the middle. This exposed the bones in the somewhat broken and dislocated position in which the ages had left them.

Then a mould of the two surfaces was made by painting with a warm solution of a new plastic made from milk curd, until both sides were coated three-quarters of an inch thick. In the two halves of this mould casts of beeswax were made. The two half-casts were united by warming and shaping them wherever they were out of alignment, and when the wax model was finally complete it was duplicated in a more durable cast of plaster and jute, which was painted to the natural color of the bones.

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