SCIENCE NEWS

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THE EARTH'S GREATEST WATERFALLS

Two "fossil Niagaras" once roared in the Grand Coulee, a deep, wide gorge that lies about half-way between Spokane and Seattle. These extinct cataracts, now represented only by lines of towering dry cliffs, have been studied by Professor J. Harlan 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 half-way down its course dividing it into an Upper and 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.

Professor 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 a 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. It was once an island, first on the brink, as Goat Island stands on the brink of Niagara to-day, then left isolated as Goat Island would also be if the American and Horseshoe Falls receded at equal rates.

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.

PITUITARY GLAND SECRETION AND MILK PRODUCTION

MILK was produced in the mammary glands of experimental animals—even including males—when a newly isolated extract of the anterior lobe of the pituitary gland, considered to contain a new hormone which has been named "prolactin," was injected into their bodies. The experiments leading to this result, which is expected to have much clinical importance, were performed at Cold Spring Harbor by Dr. Oscar Riddle, Dr. Robert W. Bates and Simon W. Dykehorn, of the department of genetics of the Carnegie Institution of Washington. The same hormone also causes the production of pigeons' "crop milk," with which they nourish their young.

The anterior part of the pituitary gland, a small body nestling on the under side of the brain, has already been shown to produce two important hormones or internal secretions. One of these is important in governing the body's growth rate, while the other stimulates the activity of the sex glands. The importance of the pituitary gland in the production of milk was already known, but it had been assumed that one of the two hormones already discovered was responsible for this, and only the finding of the new third hormone has brought about a change in this belief.

Female guinea-pigs and rabbits, injected with prolactin, began the production of milk immediately. The secretion of milk in the mammary glands of male guinea-pigs was made possible only after the animals received a preliminary injection of another hormone derived from the sex-glands of female animals which stimulated their development.

These new results were greatly facilitated by the earlier studies of Dr. Riddle and Miss Pela Fay Braucher, who found, a year ago, that the crop-gland of pigeons forms and functions under the influence of some substance produced in the anterior pituitary gland. In the present studies it was soon learned that neither of the two earlier known pituitary hormones had the slightest effect on the crop-gland, so that this structure provides a quick and definite test for the presence of prolactin in any extract or chemical fraction of the pituitary gland.

DEVELOPMENT OF PIGMENT UNDER X-RAYS

GOLDFISH have been given x-ray tests to shed light on the little-understood subject of the cause of the formation of pigment-carrying cells in man and lower animals. In man, these pigment-carrying cells erupt in the skin, forming unsightly dark blue patches. Sometimes these

patches are birth-marks, sometimes acquired later, as the result of injuries or irritations.

Results of the goldfish experiments are reported to *The American Journal of Cancer* by Dr. George Milton Smith, of the Yale University School of Medicine. In order to x-ray only one side of forty-seven lively fish, Dr. Smith anesthetized his small subjects. After five or six days of carefully regulated x-ray treatment, the exposed side of each fish began to erupt tiny cells carrying dark coloring matter. These made splotches of black under the transparent outer skin of the fish, and formed interlacing patches against the dark red bodies of the fish.

After the treatments, the dark patches remained for almost two weeks and then took from eleven days to about a month to disappear, leaving the fish in the same state as before the experiment—except for four subjects that were so acutely affected that they died, apparently from a secondary infection.

Why x-ray exposure causes goldfish to respond by mobilizing these dark, color-carrying cells in the skin, is not yet clear, Dr. Smith reports. There is, he suggests, some connection with repair and defense processes. The whole matter is important to physicians because of the possible connection of the formation of these pigment cells or melanophores with the development of pigmented tumors.

A MILLION VOLT X-RAY TUBE

THE new million-volt x-ray tube of the California Institute of Technology is now being operated regularly and at a potential up to 1,200,000 volts. The research staff in charge of the large tube, headed by Dr. Charles C. Lauritsen, has made careful measurements of the intensity of the radiation produced and the limit of the length of short-wave radiation has been determined by means of a specially designed crystal spectrograph.

In quality of radiation produced, the million-volt tube equals many times the amount of radium available for medical use in the world at present, the intensity being twenty roentgens at a distance of seventy centimeters from the target. This is equivalent, according to measurements made at the New York Memorial Hospital, to the raying power of at least two kilograms of radium, which would cost at present prices about $120,000,000.

The shortest wave-length radiation produced is twelve x-units, which is less than most of that produced by radium.

Some research is now being done on the effects of the x-rays from this tube upon animals. The tube is to be used especially for biological work.

The million-volt tube is essentially a large and much modified edition of the conventional x-ray tube used in medical radiology, but is operated with alternating current. In this it differs from tubes of lower voltages at the Memorial Hospital in New York City and at Schenectady. To supply the tube with current at a million volts potential, large transformers were built to order. These deliver sufficient current to light three hundred 100-watt lamps.

ITEMS

THE high temperatures of 1931, warmest year on U. S. Weather Bureau records, still persist, but not to the sweltering extent of the record year. "Temperatures so far during 1932 have had a general tendency to range above normal, though not markedly so most of the time," said J. B. Kincer, chief of the division of agricultural meteorology of the U. S. Weather Bureau. "Only one month, March, had decidedly sub-normal temperatures while three months, January, February and July, were abnormally warm over much of the country. January and February, however, were decidedly cold west of the Rocky Mountains, and July had nearly normal warmth over a large area. Moderate temperatures tending to be somewhat warmer than normal were recorded for the other three months, April, May and June."

BORELLY'S periodic comet, an occasional visitor to the neighborhood of the sun, was sighted by Dr. George Van Biesbroeck, of Yerkes Observatory, early on Saturday morning, July 30. The information was forwarded to the American clearing house for astronomical news at Harvard College Observatory. When first observed, the comet was of twelfth magnitude, far below naked-eye visibility, and had no tail. Its position, in the astronomical equivalents for latitude and longitude, was right ascension 5 hours 31 minutes 54.7 seconds, declination plus 13 degrees 2 minutes 13 seconds. This puts it in the neighborhood of the zodiacal constellation Taurus, the bull, near the very bright star Aldebaran.

THE ancient lady of Lloyd's, the skull previously famed as the oldest Londoner, has become the oldest known true human being of the species *Homo sapiens*. She was so pronounced by Professor G. Elliot Smith, British anthropologist, speaking at the congress of prehistoric and protohistoric sciences. Professor Smith finds the Lloyd's skull, discovered in 1925, is modern in type but probably contemporary with early Mousterian times and therefore by many thousands of years the oldest known *Homo sapiens*. The skull when first found was assigned to the late Stone Age or upper paleolithic period and Professor Smith's new pronouncement probably more than doubles its previously accepted age of about twenty thousand years. *Homo sapiens* is the species to which the existing races of men belong. The Neanderthal race is widely found and known from skeletons that have been excavated in Europe. These ancient men lived in Mousterian times, contemporaneously with the race represented by the Lloyd's skull.

EXPOSURE to the fumes of sulphur dioxide, used commonly as a refrigerant, does not constitute a health hazard to workers, in the opinion of Drs. Robert A. Kehoe, Willard F. Machle, Karl Kitzmiller and T. J. LeBlanc, of the University of Cincinnati, as reported to *The Journal of Industrial Hygiene*. After a study of one hundred men who had worked in the fumes for varying periods, some as long as twelve years, it is concluded that frequent and more or less continuous exposure to endurable amounts of the fumes causes no permanent damage to the system, and that the effects of exposure to unendurable concentration under conditions which allow of quick escape are negligible.