held at the Hotel Astor on December 15. The retiring president of the academy, Dr. Horace W. Stunkard, professor of zoology at New York University, will make an address on "Parasitism and Evolution," and Barnum Brown, curator of fossil reptiles at the American Museum of Natural History, will speak on "Recent Dinosaur Discoveries by the American Museum-Sinclair Dinosaur Expedition."

THE Society of American Bacteriologists will hold its thirty-ninth general meeting on December 28, 29 and 30, in Washington, D. C., at the Mayflower Hotel, under the presidency of Dr. James M. Sherman, of Cornell University. The program includes groups of papers in the fields of general, medical, agricultural and industrial bacteriology. Symposia have been arranged on the subjects of antigenicity, gonococci, filterable viruses, bacterial metabolism and fermentation. Round-table discussions on the following topics will be held: poliomyelitis, bacteriophagy, coliform bacteria and the history of food bacteriology.

THE American Society of Agricultural Engineers met at Chicago during the last week in November. The subjects discussed included farm power and machinery, farm structures, rural electrification and soil and water conservation.

THE SMITH-REED-RUSSELL SOCIETY of the George Washington University Medical School held its annual banquet on November 27. Dr. Warren T. Vaughan, of Richmond, specialist in internal medicine and allergy, was the principal speaker. Dr. Earl B. McKinley, dean of the medical school, introduced the speaker and other guests. Lawrence Thomas, president of the society, presided. Guests of honor at the banquet included: Dr. Ludvig Hektoen, executive director of the National Cancer Advisory Council; Dr. James F. Mitchell, emeritus professor of clinical surgery at the George Washington University; Dr. F. R. Moulton, permanent secretary of the American Association for the Advancement of Science; Dr. Charles R. Reynolds, surgeon general of the Army; Dr. Perceval S. Rossiter, surgeon general of the Navy; Colonel Joseph F. Siler, director of the Army Medical School; and Captain Harold W. Smith, director of the United States Medical School.

THE United States Civil Service Commission announces an open competitive examination for the position of associate biochemist (syphilis research) in the U. S. Public Health Service at a salary of $3,200 a year. Applications must be on file with the commission at Washington, D. C., by December 28. The work consists in conducting investigations in antibody chemistry, pollen chemistry, the chemistry of the arsphenamines, or related problems. A vacancy exists in the Syphilis Research Center at the Johns Hopkins Hospital, Baltimore. For the position of junior scientific aid (fossils) in the U. S. National Museum, with a salary of $1,400 a year, applications should be received by December 13.

A LIMITED number of post-doctorate fellowships in the natural sciences (physics, astronomy, mathematics, chemistry, geology, paleontology, physical geography, botany, zoology, agriculture, forestry, anthropology and psychology) will be available through the National Research Council for the academic year 1938–1939. These fellowships carry stipends from $1,600 upwards, and are open to citizens of the United States or Canada under the age of thirty-five years, for study in the United States or, under special conditions, in Europe. Applications for appointment to these fellowships should be filed with the secretary of the National Research Fellowships Board in the Natural Sciences, National Research Council, 2101 Constitution Avenue, Washington, D. C., on or before February 1, 1938.

WILLIAM H. DONNER, retired steel manufacturer, who founded the International Cancer Research Foundation in 1932 with a gift of $2,000,000, has presented to the University of Pennsylvania the sum of $200,000 to enable the University Hospital to establish a new radiological and x-ray department for the study of malignant diseases. The gift is "contingent upon the university's providing satisfactory quarters in a new building with reasonable room for expansion."

DISCUSSION

A BRILLIANT HYPERBOLIC DEW-BOW

ON the morning of October 16, 1937, the writer observed a remarkable optical phenomenon on the surface of Pocono Lake in Pennsylvania, 100 miles north of Philadelphia. The day was cold and clear, temperature about 25° F., with heavy frost on the ground. The lake was uncommonly still and glassy with a strange appearance as if the whole surface were covered with dust. Suspecting that a thin film of ice had formed during the night, the writer examined the water and found that it was not frozen and that what appeared to be dust was, in all probability, myriad droplets of dew resting on the surface of the lake.

It was astonishing to find, upon turning away from the bright morning sun, a rainbow of unusual shape and brightness *resting on the surface of the water.* The first impression was that the bow was parabolic, but "post-mortem analysis" shows that it must have followed an hyperbolic curve. Evidently it was caused by water droplets lying on a plane section WW′ of

the 41° hollow cone on which all primary rainbows lie, whose axis is the line SO drawn from the sun to the observer and whose vertex is at the eye of the observer (Fig. 1). If the elevation of the sun were exactly 41°,

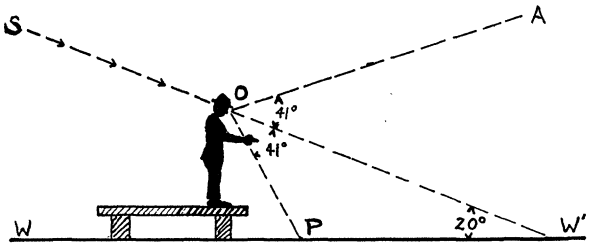

FIG. 1. Spherical water droplets resting on the plane W W′ give rise to an hyperbolic bow as a section of the cone AOP.

the element OA of the cone would then be horizontal and the section on the surface of the water would be a parabola; but at the time of observation (8 A.M.) the sun was only about 20° above the horizon, so the section must have been an hyperbola. Presumably it would be possible to have an elliptic bow if the elevation of the sun were greater than 41°. The colors in the bow were arranged in the same order as those in a primary rainbow, with red outermost. The bow was narrow and the colors were most brilliant at the vertex of the hyperbola P, where the bow met the shadow cast on the lake by the observer's knees; at more distant points the intensity gradually faded as the bow became wider, but it was clearly visible for more than 200 feet along each limb of the hyperbola.

Close examination of the water surface showed no evidence of ice crystals, but it did disclose the presence of countless drops of dew, some of which glistened individually with jewel-like brilliance when viewed at the proper angle. A rainbow is usually observed under conditions where the distances to individual particles which contribute to it are never observed directly and where, in fact, light is reflected from a considerable depth of the parent mist or fog. Hence one unconsciously projects the bow against the celestial sphere and it appears as a segment of a right section of the 41° cone; *i.e.*, circular. But in this unusual case, the reflecting droplets all lay on a single surface (which doubtless contributed to its brilliance) and the bow appeared definitely to lie upon the motionless lake.

Turning to the laboratory for verification, the writer has succeeded in reproducing a segment of such a "dew-bow" in the following manner: Water does not wet a smoked glass surface. Hence, by covering a piece of plate glass with soot from burning turpentine and then by spraying it with water from an atomizer, the surface may be covered with numerous small droplets which are virtually spherical because of their surface tension. When this surface is illuminated obliquely by a carbon arc and viewed at the proper angle, brilliant colored reflections appear. The most brilliant effects come from droplets about 0.5 mm in diameter, which appear to be of the same order of size as those observed resting on Pocono Lake.

It remains to discuss how dewdrops can possibly rest on the surface of water without coalescing. In all probability the unusual stillness of the lake had allowed a thin film of organic matter to spread over the surface so that the dewdrops failed to make intimate contact with the water. The writer has frequently observed much larger drops of water from an oar or paddle rolling over the surface of a quiet lake, in some cases for several seconds before they disappear. Small droplets of alcohol may be observed to remain for an appreciable time upon the surface of alcohol. (Incidentally, when they do dart beneath the surface, they leave behind an almost microscopic droplet which may remain until it evaporates; the liquid in the original droplet darts below the surface in a vortex ring which may be followed if the drop of alcohol has a little coloring matter in it.) Likewise, water droplets from a small jet held obliquely just above the surface of a beaker brim-full of water may be observed to roll across the top and over the edge of the beaker. The phenomenon of droplets of a liquid resting upon the surface of the same liquid is therefore an experimentally repeatable one. However, its duration must depend in large measure upon conditions of surface tension and freedom from agitation of the surface. In the case reported, where such a beautiful "dew-bow" was formed, the conditions must have been ideal.

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THE VALIDITY OF AGE DETERMINATIONS FROM THE SCALES OF LANDLOCKED SALMON

FOR a number of years the Fish Cultural Branch of the Department of Fisheries, Ottawa, has been securing eggs from the landlocked salmon of the Chamcook Lakes in New Brunswick. The salmon are trapped at spawning time in a small stream connecting First and Second Chamcook Lakes. The fish are stripped, the eggs being taken to the hatcheries and the stripped fish released into the lake. In the fall of 1931 the entire catch of two hundred and thirty salmon was tagged by the Biological Board of Canada under the supervision of Dr. R. H. M'Gonigle. Although 35.6 per cent. of the fish have never been heard of again, many of the remainder were found on the spawning grounds several years in succession. This has afforded an excellent opportunity of comparing the true age with the age shown on the scales.

The scales of young fish under three years are fairly easy to read. The growth during the summer is quite