SCIENCE NEWS

METEORIC SHOWERS

Science Service

EVERY year from about November 13 to 27 meteors in unusual numbers may be expected due to the appearance of two periodic showers, the Leonids and the Andromedes, named for the constellations from which they appear to radiate.

To see the Leonids one must be up before sunrise about this time and look in the general direction of "The Sickle" in Leo which will be seen in the eastern heavens at five o'clock in the morning. It is not possible to predict how great a display one will see because the intensity of the swarm varies from year to year. The Leonids are traveling in an orbit that crosses the earth's orbit at a point which our planet passes through about November 15 each year. The meteors, which are merely the dust of a disintegrated comet, are not evenly distributed around the orbit but are more or less bunched. Every thirty-three years exceptionally dense swarms of Leonids are to be expected. Such swarms appeared in 1833 and 1866 and would, doubtless, have occurred in 1900 if the great planet Jupiter, the mischief-maker of the solar system, had not chanced to be in a position to greatly perturb their motion and throw them out of their course.

The Leonids are noted for their rapid motion relative to the earth, their intense blue or bluish-green color and their brilliant, persistent trails. In the early morning hours we are on the "fore" side of the earth as it advances in its orbit and so we meet the Leonids "head on." This accounts for their rapid motion with respect to the earth. In the evening hours we are on the "following" side of the earth and so the meteors we meet then are the ones that overtake the earth. As a result, swarms of meteors that are met in the early evening hours are characterized by sluggish motions, reddish color and trails that soon fade away. Such are the Andromedes that appear in greatest numbers about November 24, but which may be seen any time between the seventeenth and the twenty-seventh. They can be observed only in the early part of the night as they come from the direction of the constellation of Andromeda, which will be found a little to the east of the meridian in the early evening in the latter part of November. That the meteors appear to radiate from a definite point in the heavens which is called their "radiant" is simply a matter of perspective. In reality all meteors are moving in nearly parallel lines in their orbits as they cross the orbit of the earth.

The minute, dust-like particles of which a swarm of meteors consists do not in general weigh individually as much as a single grain. They would appear merely as a cloud of dust reflecting the sunlight if we could view them outside of our own atmosphere. It is only the friction produced by their passage through the earth's atmosphere that raises them to luminescence.

These shooting stars, as they are sometimes misleadingly called, are always noiseless in their flight. In this respect they differ from the large meteorites or fire-balls that rush through our atmosphere accompanied by loud explosions and intensely brilliant flashes of light, finally falling to the surface in small fragments or large masses weighing a number of pounds or even tons. The small particles of which these periodic swarms consist are completely consumed by friction soon after entering the earth's atmosphere. It is probable, however, that both the noiseless meteors, or shooting stars, and the noisy meteorites have a common origin and are but fragments of comets that have gradually become disintegrated and scattered along their orbits.

U. S. NAVAL OBSERVATORY

ISABEL M. LEWIS

MAGNETIC OBSERVATORY IN NORTHERN GREENLAND

Science Service

THE northernmost magnetic observatory in the world has just been established by the Carnegie Institution of Washington and the Macmillan Arctic Expedition at Refuge Bay, northern Greenland. The beginning of observations by R. H. Goddard, of the institution's staff, is announced in a relayed radio message from Donald Macmillan, leader of the expedition, to Dr. Louis A. Bauer, director of the department of terrestrial magnetism of the institution.

The observatory consists of an especially designed wooden building encased by a snow house to protect the instruments from temperature changes. Its location is 550 miles north-northeast of the magnetic north pole and some 700 miles south of the geographic north pole, in latitude 78 degrees, 3 minutes north, and longitude 72 degrees, 27 minutes west. The taking of observations there is part of a comprehensive plan for a world-wide study of the intensity and variability of the mysterious force which causes the compass to point either east or west of true north to an extent depending upon the position of the observer. The data collected may also throw light on any possible connection between these variations in the earth's magnetism and northern lights, sun spots and "static" which often interferes with radio communication.

The building which houses the instruments for making continuous photographic records of the variations of the magnetic elements and the variations of the atmospheric electric potential gradient is especially designed to preserve a constant temperature. Its parts were made in Wiscasset, Maine, and assembled on the present site in the far north, where the observations will probably be made until the expedition returns to this country next September.

The importance of data in regard to the earth's magnetism is indicated by the fact that while all our commerce on the seas is largely dependent upon the compass, the compass can not be safely used in navigation unless it is known how much the needle is deflected from

the true north. In sailing from Alaska to San Francisco, for instance, a ship might be some distance west of California toward the Hawaiian Islands if allowance were not made for the changes in compass direction.

THE VOLTAGE OF THUNDERBOLTS

Science Service

SCIENCE has measured the thunderbolt. The voltage of an average lightning flash has been determined to be about 100,000,000 volts, Dr. F. W. Peek, Jr., engineer in charge of the General Electric Company's high-tension laboratory at Pittsfield, Mass., reported to members of the Franklin Institute in a lecture delivered there on November 15. The voltage was not measured directly but by comparison with phenomena observed in the study of artificial lightning.

It was found that when one of these made-to-order thunderbolts struck the ground at a distance from a transmission line corresponding to a real lightning flash at a distance of 1,000 feet, that a voltage of approximately one per cent. of the flash was induced in the transmission line. Measurements of induced voltages in real transmission lines following lightning flashes show them to be of the order of 1,000,000 volts; hence the deduction is made that the force of a real bolt is 100 times that amount.

The lightning generator devised by Mr. Peek for the investigation of these problems has produced as much as 2,000,000 volts at millions of horse power.

"Bolts from the generator have all the characteristics of real lightning. Large wooden posts are splintered and blown apart and miniature houses destroyed when unprotected by lightning rods. Even the thunder is simulated. When a bolt of real lightning strikes a sandy place its path is defined by a glass-like tube of fused sand called a fulgurite. These tubes have also been produced with artificial lightning."

The purpose of these investigations was to find means of remedying the danger to high-power transmission lines from lightning strokes near-by. It is not necessary for lightning to strike such a line to cause trouble. A lightning stroke a mile away may cause very high voltages in the line by induction, and these induced strokes, which travel over the line with the velocity of light, are in fact the cause of most of the trouble. In order to study these effects a model section of country was constructed with transmission line, cloud and lightning stroke all built very accurately to scale.

THE DANGERS OF FAT

Science Service

"EAT, drink and grow fat, and to-morrow you die," according to Dr. K. H. Beall, of Fort Worth, Texas, who spoke on this subject recently before the Southern Medical Association. Excess fat is a parasite which saps the health and strength of its victims and predisposes them to disease and to premature old age.

"We are all acquainted with the lean, long-waisted individual who spends his life in trying first one treatment and then another in a vain effort to get fat. He ought to be thankful to be able to remain thin. If tuberculosis doesn't get him before he is 40 he is reasonably sure to live to old age and finally to succumb not to any particular disease but rather to a general sort of mild decay.

"Time was when fat was an asset to a man. It was a valuable reserve to carry through periods of famine. The need for it has been banished by civilization."

Men of middle age who are more than 25 pounds overweight have an expectancy of life of only 15 years as compared with an expectancy of 35 years in thin people, he continued.

"A four-inch excess in a man's waist line and 25 pounds extra fat reduces his probable length of life by 40 per cent. We may well say that a man's belt is his life line."

Dr. Beall said that in view of the fact that there had been no extension of life after middle age for a century, and that the degenerative diseases were nearly all due to overweight, the complacency of the medical profession toward obesity was inexcusable. Laymen understood the risk nearly as well as doctors did.

A man 30 pounds overweight carries around 25 miles of additional blood vessels to nourish and maintain the "excess baggage" on his person, and this extra strain is the cause of heart and kidney breakdowns in later life. Overweight was a handicap in all infectious diseases and especially in pneumonia; and fattening of tuberculous patients beyond normal was condemned. As for diabetes, he said, "We may well say that to get diabetes you must first get fat."

In the ensuing discussion, Dr. Beall's conclusions were commended and Dr. Seale Harris, of Birmingham, said that his paper should have wide publicity because of the importance of the subject and the need of arousing the public to the dangers of overweight.

DRY WINTER PREDICTED IN SOUTHERN CALIFORNIA

Science Service

TOURISTS who expect to visit Southern California this winter may expect an unusually dry winter season if the forecast of Dr. George F. McEwen, of the Scripps Institution for Biological Research at La Jolla, is verified. As the result of studies made on the relation between the temperature of the ocean water during the late summer on the rainfall of the following winter, he predicts a deficit of from 20 to 30 per cent. in the precipitation during the coming season.

Cold ocean water means that more rain than usual may be expected, while warm water along shore in the late summer means a lack of rainfall inland during the usual rainy season. The water temperature the past summer exceeded that for any summer of the past seven years and indicates a rainfall in the lowlands of Southern California this winter of only 8 inches as compared with a normal of from 10 to 12 inches.

Investigation has shown that the cooling of the water along shore is present at all seasons, but especially so in the summer when it is due to the winds blowing out of a center of high atmospheric pressure far at sea, whip-

ping away the relatively warm surface water and permitting the upwelling of the cold water from the depths of the sea. The temperature of the inshore water is thus a measure of the strength of the high pressure area hundreds of miles at sea.

But the intensity of this distant area of heavy, cool air is a big factor in winter rainfall along the coast, for from it must come the air which during the winter drifts inland, carrying with it the moisture drawn from the sea and which when chilled by the cold air over the winter landscape comes down as rain. Hence the cycle upon which Dr. McEwen builds his forecast. Cold water means high barometer and much rain, while relatively warm water such as has been observed this summer means just the opposite, a condition of dryness and sunshine disappointing to the farmer who depends upon the winter rains for his supply of irrigation water, but alluring to the prospective tourist and health seeker.

DINOSAUR TRACKS

Science Service

TRACKS of the long-legged dinosaur, with a stride of 56 inches, which roamed this region some 25,000,000 years before Virginia's famous first families arrived, have been presented to the United States National Museum by F. C. Littleton, who lives at President Monroe's old place near Aldie, Va.

Mr. Littleton is giving a prehistoric touch to his historic home by placing slabs containing other tracks of this ancient reptile in his front porch.

After examination of the tracks, Dr. C. W. Gilmore, paleontologist of the National Museum, said that they were probably made by one of the meat-eating species of dinosaurs. He deduced this diet from the sharpness of the claws evidenced by the imprints in the stone. The herbivorous forms had flatter, more hoof-like claws. The tracks of this three-toed monster, which apparently walked on its hind legs, were 56 inches apart. It has not yet been determined whether the reptile was running or walking, but further study and comparison with other dinosaur remains is expected to yield more exact information. The indications are that the animal was long-limbed.

This is the first time dinosaur tracks have been found in the state of Virginia. In reconstructing the porches of his house, Mr. Littleton wanted to get material like that President Monroe had used in the original structure, and suspected that these slabs were obtained from a quarry on the place. In digging the stones for the new porch, the dinosaur tracks were discovered. When the stones in the old porch were torn up, on the under side other dinosaur tracks were found.

ITEMS

Science Service

AGAR, the strange Japanese sea-weed jelly, formerly thought to be an exclusive product of the Orient, is now being produced in California commercially. Large beds of "gelidium," or jelly-producing sea-weed, have been discovered on the California coast, and the first agar factory of the western world has recently been established in Los Angeles. Agar resembles gelatin, but is produced from sea-weed instead of bones. It is edible but indigestible, passing through the digestive canal almost unaltered, and by reason of its increase in bulk when swallowed, it stimulates the muscular action of the bowels and is accordingly much used in medicine. It has long been a part of Japanese diet. The sea-weed is first cooked, forming a jelly which upon freezing loses all its water and can then be dried into a powder which upon mixing with water again assumes a jelly-like consistency. It has recently been reported that agar may be used as a basis for motion-picture film instead of the highly inflammable film material now used and its commercial possibilities may therefore be extended.

AIRPLANES will be extensively used in the continuation this winter and spring of the U. S. Navy survey of the south coast of Cuba, particularly the region of Batabano Bay and the Isle of Pines. Until the navy began the work last year there were no reliable charts of this coast and raw sugar from plantations in the neighborhood has had to be transported overland considerable distances because no vessels of any size dared risk the little-known channels. The U. S. airplane carrier *Wright* will accompany the survey ship *Hannibal* which will leave the Philadelphia navy yard on November 19. Several planes will be taken and the entire coast of this region will be photographed as a basis for charts. Photographs taken from an altitude of 10,000 feet will not only show the coast line but also the shoals at sea, which are clearly visible when viewed from a great altitude. The *Hannibal* is considered the best equipped survey vessel in the world, the equipment including the new sonic depth finder by use of which soundings can be taken while the vessel is under way. Two eagle boats will form part of the expedition as will two housed-over barges which will be towed from Key West to serve as living quarters for isolated surveying parties operating the eagle boats or smaller launches.

WITH the hope of possibly finding a basis for forecasting earthquakes in the Hawaiian Islands, the new U. S. scout cruiser *Milwaukee* is now making soundings of the depths of the Pacific to the south and southeast of the islands. The vessel is equipped with the new sonic depth finder and recently made a voyage to Australia during which soundings were made every few minutes while proceeding at full cruising speed. The work is being done under the direction of the Hydrographic Office and findings will be also reported to the Carnegie Institution of Washington.

PRAIRIE dogs in northern Arizona are eating most of the grasses which should support great herds of cattle, according to Dr. Walter P. Taylor, of the U. S. Biological Survey. At the rate these hungry rodents were eating forage on experimental plots they would have eaten grass enough on 50 sections of land to support 2,500 to 5,000 cattle, said Dr. Taylor. The prairie dogs have not a single beneficial food habit, nor are there any arguments against their eradication on all grazing lands.