This work has shown that the estimates received from the general public on spectacular meteors are subject to large systematic errors, which make the velocities much too high. If a sufficient amount of information is at hand, however, a person familiar with these psychological errors can eliminate most, and determine a path reasonably close to the truth, even from the information received by letter. Some of the more famous meteors of years ago have been studied in the light of this information.

Orbits have been calculated recently for a number of spectacular meteors; and six have been selected as representative. The first four are recent ones falling in the middle western United States, for which the paths and velocities are based on personal interviews, as explained above. The four meteors selected fell in the months of August, July, January and November, respectively. Numbers (2) and (3) fell in the evening hours, number (4) fell in the early morning hours just before dawn, and number (1) dropped meteorites in broad daylight.

The fifth meteor, which fell on February 9, 1913, in Canada, was selected because it is referred to as one whose path through the atmosphere was several thousand miles long. The information collected by Professor C. A. Chant, however, was sufficient to determine a reasonably accurate path, whose length was calculated as 116 miles.

The sixth meteor, which dropped meteors at Pultusk, in Poland, on January 30, 1868, was selected because it is referred to as coming in from the distance of the fixed stars. Dr. J. G. Galle, the discoverer of the planet Neptune, collected a great amount of material on this meteor. From this information we have calculated the elements of the orbit.

Table 1 gives for the orbits of the six representative bright meteors, the period in years, the mean distance from the sun in millions of miles, the inclination of the orbit to the orbit of the earth and the eccentricity.

TABLE 1

	(1)	(2)	(3)	(4)	(5)	(6)
Period in years..	1.87	1.70	1.92	3.59	1.62	2.37
Mean distance ..	141	133	143	217	128	165
Inclination	7°.6	1°.9	7°.0	0°.9	17°.5	0°.8
Eccentricity	0.47	0.36	0.55	0.78	0.33	0.46

For comparison we give the same information in Table 2 for three of the closer asteroids.

TABLE 2

	Adonis	Eros	1932 HA
Period in years	2.55	1.76	1.80
Mean distance	173	135	137
Inclination	1°.4	10°.8	6°.4
Eccentricity	0.76	0.22	0.56

In Table 3 we give also this information for Encke's comet, which has the shortest period of any known comet, and for Halley's comet, which has the shortest period of any bright comet.

TABLE 3

	Encke	Halley
Period in years	3.3	76.4
Mean distance	205	1670
Inclination	12°.9	162°.3
Eccentricity	0.85	0.97

For an object coming from the distance of the fixed stars, the hypothesis favored by Schiaparelli and some later astronomers, the period would be millions of years (or infinity), and the eccentricity would be 1.00 or greater.

A comparison of the values shows that the orbits of these bright meteors resemble the orbits of the nearer asteroids much more closely than they resemble the orbits of the closer comets. Obviously, none came from the distance of the fixed stars or even from the distance of the average comet.

SCIENTIFIC EVENTS

THE NEW FISHERY RESEARCH LABORATORY IN PUERTO RICO

METHODS for the development of a modern fishing industry in Puerto Rico, which at present imports about 90 per cent. of the cured and canned fish used in local consumption, will be sought, according to *The Fishery Service Bulletin,* through scientific research by the U. S. Bureau of Fisheries.

With recent tabulations indicating that about 36,000,000 pounds of cured and canned fish are imported into Puerto Rico annually, it is obvious that many new avenues of employment would be provided if the fisheries industries of the island were expanded.

Preliminary plans call for the construction of a new $25,000 laboratory building on a site yet to be selected, where special studies may be made of fish preserving and marketing problems confronting not only Puerto Rico, but also the Virgin Islands and the Latin-American republics.

Situated at the "cross-roads" between North and South American waters and as the result of recent investigations by the President's Educational Commission on Puerto Rico, the new laboratory is designed to serve as the focal point for all fisheries research in the tropical areas.

Benefits from the research work of the laboratory

will be made available to Latin-American republics through a program of cooperation being worked out with the Puerto Rican Government's fisheries division and educational institutions. Under the plan, student assistants will be employed in the laboratory investigations, and, after two years of research work, should be in a position to aid their own governments in solving fisheries problems. As a result, the studies, covering the development of methods for preserving and marketing fishery products, as well as biological and fish cultural investigations, are expected to contribute to the economic welfare of all the Latin-American countries.

Construction of the new laboratory building in Puerto Rico was made possible by a recent grant of Public Works Administration funds.

THE EXPEDITION TO WESTERN COLORADO OF THE FIELD COLUMBIAN MUSEUM

A NUMBER of important fossil finds of the Field Museum Paleontological Expedition to Western Colorado have been reported by Bryan Patterson, assistant curator of paleontology.

These include a skeleton of a prehistoric animal called Taeniodont, a representative of a small early group of hoofed mammals—a forerunner of a similar but larger creature excavated by Mr. Patterson in 1933 and known as Barylambda. The present specimen, according to Mr. Patterson, may constitute a new genus. He writes: "We have been on the track of this beast since 1932, but until now have never found more than a few fragments of it."

Other specimens collected by the present expedition include multituberculates (a group of small rodent-like animals characterized by many cone-like prominences on their teeth) and prehistoric turtles. Work has been begun on the excavation of a fossil crocodile, and a large collection of small fossil animals has been made.

Mr. Patterson is accompanied by James H. Quinn, a member of the staff, and by several volunteer collectors. The official announcement states that

> The field of operations lies in Mesa, Garfield and Gunnison counties, where an extensive series of formations belonging to various periods and eras in the earth's history is exposed. The work is mainly in late Paleocene and early Eocene deposits (the opening epochs of the Age of Mammals), with some attention also being paid to the late Cretaceous formations (the closing period of the Age of Reptiles). The main objective of the expedition is to collect fossil mammals from the Paleocene and Eocene. Specimens from these early horizons are of great interest to students of mammalian evolution. The dinosaurs and other reptiles that had previously dominated the earth were but a short time extinct (geologically speaking), and the mammals were just getting well under way. Many groups that no longer survive were flourishing, and several of the dominant mammalian types of the present time were represented by exceedingly primitive ancestors. Thus, for example, the horses of the early Eocene were small creatures no larger than foxes, and they possessed four toes in contrast to the modern horse's one.
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> In addition to the work on vertebrates, attention is being given to geological observations and to the collecting of fossil plants. It is hoped that by means of the latter it will be possible to make somewhat more precise age determinations and correlations of the late Cretaceous formations than has hitherto been done.

HURRICANE WARNINGS OF THE U. S. WEATHER BUREAU

THE U. S. Weather Bureau has issued a statement describing the methods used to chart storms during the hurricane season, which in the United States runs usually from July to October.

The hurricane warning service, according to F. W. Reichelderfer, chief of the bureau, is more efficient this year than ever before. Observations are taken twice daily from over eighty stations in the West Indies and the Caribbean, and two to four times daily from vessels in the Gulf of Mexico, Caribbean and West Indian waters. These observations are in addition to the reports from the regular system of stations in the United States and vessels in the North Atlantic.

Whenever there are indications that a tropical cyclone or hurricane is forming, special observations made at two to three hour intervals by ships and stations in the region of the hurricane are sent in so that the four forecast centers of the hurricane warning system—Washington, Jacksonville, New Orleans and San Juan—have information as to the location of the hurricane and its intensity long before it enters American waters or approaches the coast.

The effectiveness of this system was demonstrated recently in the case of the small hurricane which crossed the Florida Peninsula on August 11 and 12. This hurricane was first detected and warnings issued from the Jacksonville center on August 8 when it was located 175 miles northeast of San Juan. Subsequent advisory information was issued every six hours until the storm neared the Florida coast, after which the advices were increased to hourly broadcasts by radiophone until the storm passed across the Peninsula into the Gulf of Merico.

Mr. Reichelderfer points out that:

> These advices serve as examples of the remarkable accuracy with which the movement and intensity of violent storms can be foretold by means of the hurricane warning system. Many studies have been made of the formation and behavior of hurricanes which have moved toward our Atlantic and Gulf coasts during the past fifty years or more. Severe hurricanes do not often reach our coasts. But the Weather Bureau, through its system of hurricane