the British Admiralty. The new pamphlet contains charts which show the variations, the position and the intensity of the anti-cyclonic areas, and their relation to the doldrums, the distribution of gales, fog, etc. Gales reach the South Atlantic by crossing the southern part of South America, or by rounding Cape Horn to the eastward. Fogs are rarely found north of the thirtieth parallel, except near the land on either side of the ocean, but it is increasingly frequent in higher latitudes.—*Nature,* January 11, 1906.

METEOROLOGICAL SERVICES IN SOUTH AMERICA.

THE latest information regarding meteorology in South America may be found in the *Monthly Weather Review* for September, 1905. Previous accounts of the South American meteorological services are those of A. Lawrence Rotch, 'The Meteorological Services of South America,' *American Meteorological Journal,* XI., 1894–95, 187–191, 201–211; and R. DeC. Ward, 'Meteorology in South America,' SCIENCE, N. S., V., 1897, 523–525.

PROTECTING CRANBERRIES FROM FROST.

A CRANBERRY grower at Cameron, Wis. (Mr. A. C. Bennett), protects his cranberries against frost in the following way. The marsh is surrounded by banks twenty-five to thirty-five feet high, with sloping sides. The principal reservoir is northwest of the plantation, and a trout stream is diverted around and outside of the marsh, forming a succession of reservoirs entirely surrounding the latter, from five to thirty rods wide. As the cold air descends from the high surrounding banks it must cross these reservoirs of water and pass over the dams before it can reach the vines.—*Mo. Wea. Rev.,* Oct., 1905.

NOTES.

PROMPTED 'by what has been urged against it by English physicists and others,' and 'by the inconclusive nature of the supposed results obtained by those who approve of it,' J. R. Sutton, of Kimberley, South Africa, has devoted some time to the black bulb thermometer *in vacuo.* His results have been published in *Trans. So. Afr. Philos. Soc.,* XVI., Part 2, Oct., 1905.

THE typhoon of June 30 and July 1, 1905, is discussed in the *Bulletin* of the Philippine Weather Bureau for July, lately received. Curves showing the barometer readings at Aparri and at Santo Domingo (the latter a barograph curve) are given. Students of tropical cyclones will find the frequent discussions of individual typhoons which are published in these *Bulletins* of great interest.

ANOTHER account of a tropical cyclone is a very much belated one of the West Indian hurricane of August 11, 1903, by Maxwell Hall, in the *Monthly Weather Review* for September, 1905. Several sets of barometer readings during the passage are given.

THE rapid progress which is being made in the exploration of the free air is evidenced by the fact that the British *Weekly Weather Report* for January 6 contains, for the first time, observations made during kite ascents during the first week in January.

R. DEC. WARD.

FREDERICK C. PAULMIER.

FREDERICK C. PAULMIER, Ph.D., zoologist to the New York State Museum, died in New York, March 4, in the thirty-third year of his age. Dr. Paulmier was a graduate of Princeton University of the class of 1894 and received the degree of M.S. in 1896. He held a university scholarship in zoology at Columbia in 1896–97, was appointed to a fellowship in 1898–99, was assistant in zoology in 1899–1900 and received the degree of doctor of philosophy in 1900. In the same year he became assistant in zoology at the New York State Museum at Albany, and in 1904 was appointed to the position that he held at the time of his death. During his connection with the museum he published a number of systematic zoological papers including catalogues of the reptiles and batrachians of the state (in conjunction with E. C. Eckel), of the higher crustacea of the region of New York City, and of the squirrels and other rodents of the Adirondacks (now in press). He also published papers on the crab fisheries of Long Island and on the life-history of the edible crab. His most considerable contribu-

tion to zoology was, however, an earlier paper (published as his doctor's dissertation) on the Spermatogenesis of *Anasa tristis*, which formed one of the first careful studies of the history of the 'accessory chromosome' since its discovery by Henking, and which gave important data for the general study of the reproduction problem in animals. He was a good observer, an enthusiastic field naturalist, and a master of the finer laboratory technique. He bore with cheerful courage a malady that for many years formed an obstacle to his scientific activity and at length caused his death. He had many interests outside the field of his special work and was a generous and helpful friend.

E. B. W.

MECHANICAL FLIGHT.

MESSRS. ORVILLE WRIGHT and Wilbur Wright, of Dayton, Ohio, under date of March 12, 1906, have addressed the following statement to the Aero Club of America:

Though America, through the labors of Professor Langley, Mr. Chanute, and others, had acquired not less than ten years ago the recognized leadership in that branch of aeronautics which pertains to bird-like flight, it has not heretofore been possible for American workers to present a summary of each year's experiments to a society of their own country devoted exclusively to the promotion of aeronautical studies and sports. It is with great pleasure, therefore, that we now find ourselves able to make a report to such a society.

"Previous to the year 1905 we had experimented at Kitty Hawk, North Carolina, with man-carrying gliding machines in the years 1900, 1901, 1902 and 1903; and with a man-carrying motor flyer, which, on the 17th day of December, 1903, sustained itself in the air for 59 seconds, during which time it advanced against a 20-mile wind a distance of 852 feet. Flights to the number of more than 100 had also been made at Dayton, Ohio, in 1904, with a second motor flyer. Of these flights, a complete circle made for the first time on the 20th of September, and two flights of 3 miles each made on the 9th of November and the 1st of December, respectively, were the more notable performances.

"The object of the 1905 experiments was to determine the cause and discover remedies for several obscure and somewhat rare difficulties which had been encountered in some of the 1904 flights, and which it was necessary to overcome before it would be safe to employ flyers for practical purposes. The experiments were made in a swampy meadow about 8 miles east of Dayton, Ohio, and continued from June until the early days of October, when the impossibility of longer maintaining privacy necessitated their discontinuance.

"Owing to frequent experimental changes in the machine and the resulting differences in its management, the earlier flights were short; but, towards the middle of September, means of correcting the obscure troubles were found, and the flyer was at last brought under satisfactory control. From this time forward almost every flight established a new record. In the following schedule the duration, distance and cause of stopping are given for some of the later flights.

"It will be seen that an average speed of a little more than 38 miles an hour was maintained in the last flight. All of the flights were made over a circular course of about three fourths of a mile to the lap, which reduced the speed somewhat. The machine increased its velocity on the straight parts of the course and slowed down on the curves. It is believed that in straight flight the normal speed is more than 40 miles an hour. In the earlier of the flights named above less than 6 pounds of gasoline was carried. In the later ones a tank was fitted large enough to hold fuel for an hour, but by oversight it was not completely filled before the flight of October 5.

"In the past three years a total of 160 flights have been made with our motor-driven flyers, and a total distance of almost exactly 160 miles covered, an average of a mile to each flight, but until the machine had received its final improvements the flights were mostly short, as is evidenced by the fact that the flight of October 5th was longer than the 105 flights of the year 1904 together.

Sept. 26	17,961 meters (11⅛ miles)	18 min. 9 sec. Exhaustion of fuel.
Sept. 29	19,570 meters (12 miles)	19 min. 55 sec. Exhaustion of fuel.
Sept. 30	.....	17 min. 15 sec. Hot bearing.
Oct. 3	24,535 meters (15¼ miles)	25 min. 5 sec. Hot bearing.
Oct. 4	33,456 meters (20¾ miles)	33 min. 17 sec. Hot bearing.
Oct. 5	38,956 meters (24⅕ miles)	38 min. 3 sec. Exhaustion of fuel.