During the past few months there have been large railroad shipments of Casinghead Gasolene from Texas to California. Because of its high specific gravity, this gasolene expands greatly with increase of temperature. In making arrangements for these shipments, the Bureau of Explosives, maintained by the railroad companies, found it necessary to fill the tank cars only to a certain capacity, owing to the high temperatures encountered by those cars in passing through the hot deserts, under the cloudless skies of the Southwest.

At Greenland Ranch, in Death Valley, California, the air temperature, as recorded by a tested maximum thermometer exposed in a standard instrument shelter, rose to 100° or higher on 23 days during June, and on every day during July, 1920. The extreme maximum was 125°, recorded on the last day of July.—

On July 10, 1913, the temperature there reached 134° F., the highest officially recorded air temperature in the world.[1]—*A. H. Palmer.*

MONTHLY WEATHER REVIEW, JUNE, 1920 (ISSUED AUG. 30, 1920).

The June issue of *The Monthly Weather Review* contains 20 contributions and 11 notes and abstracts, in addition to the usual material—bibliography, special (solar) observations, and weather, river and earthquake phenomena of the month. A third of the contributions are of appreciable length. The contributions are as follows:

***Relation between the annual precipitation and the number of head of stock grazed per square mile.** J. WARREN SMITH. Pp. 311–317.

(See this BULLETIN, May, 1920, p. 55.)

***New aerological apparatus.** S. P. FERGUSSON. Pp. 317–322, 20 figs.

(See this BULLETIN, May, 1920, p. 52.)

***A general theory of halos.** C. S. HASTINGS. Pp. 322–330, 8 figs.

[The general theory of halos developed in this paper rests on the assumption that two kinds of simple ice-crystals—elongated hexagonal rods and hexagonal plates—are occasionally present in a tolerably transparent atmosphere; moreover, that these crystals subsiding in quiescent air would necessarily fall into four groups.

The first portion of the paper establishes the validity of the assumption by reference to well-recorded observations.

The second portion is devoted to a development of the consequences from the presence of each of these groups for various altitudes of the sun. It is there shown that all the authenticated features of complex halos are naturally explained (excepting certain rare multiple concentric circles) as inevitable consequences of the hypothesis. In addition, this portion gives a new means of classifying the various phenomena, showing unsuspected relationships as well as essential diversity in certain other cases where common origin was formerly assured.—*Author's synopsis.*]

A beautiful halo display observed at Ellendale, N. Dak. F. J. BAVENDICK. Pp. 330–331, fig.

The Boulder halo of January 10, 1918. E. W. WOOLARD. Pp. 331–332, 3 figs.

The Grand Junction halo of March 3, 1906. E. W. WOOLARD. P. 332, fig.

Outline showing the formation of the elements of a halo complex. E. W. WOOLARD. P. 332.

*[These four short papers are included in the separate of Professor Hasting's article, as they are largely descriptive of actual occurrences of halo complexes covered by his theoretical discussion.]

[1] See *Mo. Weather Rev.*, June, 1915, Vol. 43, pp. 278–280.

Simultaneous occurrence of halos and coronas. Discussion by C. NEGRO, E. W. WOOLARD, and C. F. BROOKS. P. 333.

Iridescent clouds. C. F. BROOKS. P. 333–334.

[The alternating reddish and greenish bands sometimes observed parallel to the border of a smooth lenticular cloud are ascribed to the increasing size of the cloud droplets inward from the edge, which places the successive zones in the cloud within diffraction rings differing in color.]

Some observations on a free-balloon flight made from Aberdeen Proving Ground, Md., June 3, 1920. DON MCNEAL. Pp. 334–335.

[The balloon got into a thunderstorm cloud and ascended rapidly—apparently being lifted by the rising air as well as by release of ballast. At a height of about 5,200 feet the balloon emerged into the sunlight. Moderate-sized hailstones were seen passing down by the balloon. The heating of the gas in the balloon lifted it to 8,200 feet before it again entered the cloud. Now it descended precipitately in spite of the expenditure of more ballast. Heavy rain and cool air were cooling the gas, and descending winds seemed to hasten the downward motion. After several contacts with tree tops a safe landing was effected in a grassy field.—*C. F. B.*]

Daytime wind turbulence in a mountain valley. B. M. VARNEY. Pp. 336–337, fig.

[An unusual example of wind turbulence in the daytime air stream in mountain valleys is found near Yosemite Valley, Calif. The stream as it flows east up the valley in the afternoon divides through two branch canyons, the current in the southeasterly branch turning sharply round a steep mountain spur. This spur and the configuration of the canyon walls sets up a rotation of air in the lee of the cliffs about an inclined axis, the lower end of which is at the spur, the upper end about a mile away to the east, the general trend being parallel to the side of the canyon. The path of an air particle near the periphery of this roll was found, by observations on the drift of tissue papers, to be that of a great spiral, the diameter of which seems to vary from nothing at the spur to perhaps 2,000 feet at the east end. Observed variations in the form of the spiral are due to changes in the local winds under the influence of topography.—*Author's synopsis.*]

A fog phenomena of San Francisco Bay. B. M. VARNEY. Pp. 337–338, fig.

[Occasionally when ocean fog is covering the land and the Golden Gate west of San Francisco Bay, a local "fog bank" forms along the eastern shore of the bay while the rest of the region remains clear. Conditions of air and water temperature and of typography being seemingly unfavorable to the formation of fog in this zone, it is suggested that the fog may be due to forced rising of the humid westerly winds over convection currents, themselves cloudless, on the plain east of the bay, condensation resulting from this forced rise. This local fog bank disappears in the latter part of the day, due to the breakdown of the convection currents.—*Author's synopsis.*]

***Measurements of solar radiation at Madison, Wis., with Callendar pyrheliometer.** E. R. MILLER. Pp. 338–343, 5 figs.

[Results of observations extending over nine years are summarized, and data of related phenomena of duration of bright sunshine and of cloudiness are given. A midsummer depression in the annual march of midday normal intensity is ascribed to a maximum of haze at that time, due in turn to the increased evaporation of water and stronger convection. Spring and autumn depressions in the annual march of sun and sky radiation upon a horizontal surface are explained as arising from the double maximum in the annual march of frequency of "Colorado lows." The suggestion is offered that this double maximum is produced by the most efficient coöperation at intermediate seasons of the stationary barometric depression in Northern Mexico and the eastward drift of the atmosphere, the annual oscillations of which are in opposite phases.—*Author's synopsis.*]

***Some characteristics of the Callendar pyrheliometer.** E. R. MILLER. Pp. 344–347, 3 figs.

[Theory of the Callendar automatic pyrheliometer. The indications of the Callendar pyrheliometer differ from the calculated intensities of radiation upon a horizontal surface on account of (1) greater sensitiveness for low intensity than for high; (2) selective absorption of short-wave radiation by platinum compensating grids; (3) internal reflection of light from glass cover to grids; (4) selective absorption by cover glass of ultra-violet and infra-red radiation from sun, and total absorption of radiation from grids; (5) grid surfaces not geometrical planes; (6) lag of registration behind radiation.—*Author's synopsis.*]

***Suggestions concerning Dr. C. G. Abbot's program for four world observatories for the observation of extra-terrestrial solar radiation.** C. DORNO. Pp. 348–351, 3 figs.

The scientific and practical importance of the above program is emphasized. On account of the inadequacy of existing meterological records, special observations, including detailed cloud records, are necessary before sites for solar observatories are finally decided upon. To obtain these cloud records an instrument which has been employed at the Davos observatory since October, 1919, for recording the illumination of a horizontal surface by the sun and sky may be utilized.

Since, at night, the radiation to the sky varies with zenith distance but not with azimuth, it becomes possible to use for the measurements a blackened hollow sphere as an absolute black body, such as Ångström's "Tulipan." This seems to meet Abbot's objection that the absorption of blackened surfaces for wave lengths greater than 15 μ is not well known, and, in consequence, measurements by instruments like Ångström's pyrgeometer contain an unknown error. Comparisons between the pyrgeometer and the Tulipan, however, show a reasonably constant ratio.

The importance of ascertaining the ozone content of the atmosphere is emphasized, and it is pointed out that photoelectric intensity measurements with the cadmium cell of the spectrally decomposed ultra-violet radiation may help to solve this difficult problem.

It is suggested that for investigations in the infra-red bacteria may be used in place of photographic plates. Also, the Ångström's nocturnal radiation measurements of 1913 should be repeated in optically undisturbed times.—*H. H. K.*

A waterspout in the Adirondacks. P. 351.

Tornado in Union County, N. C., June 20, 1920. G. S. LINDGREN. Pp. 351–352.

[Includes descriptions by eye-witnesses of the beginning and progress of the tornado and its funnel cloud. No thunder, rain nor hail accompanied it.]

Tornado in southeastern Wyoming. P. 352.

[Accompanied by large hailstones—biggest ones about 7 inches in circumference. Steel roofs of railway coaches dented.]

Cold shore water owing to off-shore winds. C. F. BROOKS. Pp. 352–353.

[In view of the very unusual frequency and preponderance of off-shore winds on the New Jersey coast during June and July, 1920, it seems reasonable to ascribe the reported coldness of the water largely to their action in blowing the warm water out to sea. On the coast of Massachusetts the water was reported 10 degrees below normal. In this region the off-shore winds had not been so unusually greater than normal as in New Jersey. June, however, was 25 per cent cloudier than normal, and the coldness of last winter must have started the water unusually cold this spring. Thus, cold water in spring, warmed but moderately in early summer, and then largely blown out to sea, left for bathers the still colder ocean water creeping up from the depths of the Labrador current.

Among the abstracts are three on meterological factors in the production of earthquakes.

*Starred titles indicate articles of which separates are being printed—apply to U. S. Weather Bureau, Washington, D. C.