NOTES BY THE EDITOR.

CIRCULAR BY THE CHIEF.

The following circular letter, in reference to Weather Bureau employees in the yellow fever district, is worthy of permanent record:

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU,
Washington, D. C., November 19, 1897.

The Chief of Bureau wishes to express his high appreciation of the courage and fidelity displayed by Weather Bureau officials on duty at stations where yellow fever prevailed during the late summer and autumn of 1897. More than 1,700 cases of yellow fever are reported to have occurred at New Orleans between September 6 and November 11, and at other cities in the South the disease prevailed to such an extent as to render the positions of the employees of the Weather Bureau perilous.

In the cities of Galveston, New Orleans, Memphis, Montgomery, and Mobile, there were 23 Weather Bureau employees. At Galveston but one employee asked for and received material leave of absence. At New Orleans no leaves of absence were requested; one employee was stricken with fever and survived. At Montgomery two employees made application for and were granted leave during the prevalence of the fever. At Mobile the official in charge was stricken, but at this writing is convalescent.

While no cases of yellow fever are reported to have occurred at Vicksburg or Pensacola, the proximity of these places to fever stricken towns was such as to expose the employees to danger, which was endured without complaint or effort to evade duty during the prevalence of fever in adjacent communities. At Vicksburg an employee who had been granted leave prior to the appearance of the fever declined to leave his station and requested to have his leave cancelled.

The Chief of Bureau feels that too much can not be said in praise of the action on the part of those officials who, amid constant peril, remained faithfully at their posts and performed their arduous duties under the trying circumstances with such zeal and promptness that in no instance has an important duty suffered so far as the Central Office is informed.

WILLIS L. MOORE,
Chief of Weather Bureau.

MOUNTAIN STATIONS IN NORTH CAROLINA.

Under date of October 10, Mr. Barry C. Hawkins suggests the value of establishing a station on Satulah Mountain, near Highlands, Macon Co., N. C., elevation 4,490 feet. He says:

The entire summit of this peak is reasonably level, and the distance from Highlands only one-half mile, and very accessible, only about one-fourth mile being impossible for vehicles. A small building was erected several years ago on the summit and has not been blown away. It would cost little to set up a suitable shelter for instruments, which could be visited once a week or month. No other mountains obstruct the movement of the air, and the conditions approximate those of the free air. Such stations have proved successful in South America where established by Harvard College. Why should they not be desirable here, considering the advantages, i. e., an elevation of about 5,000 feet, only 1 mile from post office, telephone, and necessary materials, and always accessible even in the worst weather?

The station recommended by Mr. Hawkins is one of the highest practicable at the southern end of the Blue Ridge, and is in the midst of the very interesting meteorological conditions to which he has referred in his article on heavy rainfall, published on a previous page of the current number of the REVIEW. A continuous record at the summit would undoubtedly contribute to the elucidation of some interesting meteorological problems if the observers were wide awake to their importance. On the other hand, in view of the many unsuccessful attempts to maintain self-registers in isolated places, without watchful observers, it would scarcely be deemed worth while to court a new failure at this place. The most that could be recommended would be the establishment of a maximum and minimum thermometer and a rain gauge, with a large attachment, so that at the end of each month a visiting observer could measure the total monthly rainfall, and reset the maximum and minimum thermometers. But to secure only these three monthly items seems to savor of meteorological curiosity rather than meteorological science, when we consider the many more important questions that are pressing upon us from all sides for a detailed investigation. Self-registering apparatus maintaining a continuous or very frequent record of temperature, pressure, wind, and rain can not be relied upon to keep in working order many days through all the variations of weather, in spite of troublesome insects, insidious rust, the drying up of the oils, the freezing of the ink, and many other vicissitudes, to say nothing of the curiosity and prying fingers of every visitor, or the superstitions of the ignorant who happen to espy the mysterious station.

A continuous record at a great elevation is one of the greatest desiderata of meteorology, and hundreds of thousands of dollars have been spent in the effort to secure a few such, but they can not be maintained without the attendance of a faithful observer. To this end the Weather Bureau for many years maintained its stations on the summits of Mount Washington and Pikes Peak; to this end the highest possible balloon ascensions are being made by international cooperation; to this end, lately, a systematic exploration, by means of continuous apparatus carried up by kites, has been begun. Eventually, these works may be supplemented by a renewed attention to the establishment of mountain stations, but that labor is too expensive to be entered into without counting the cost.

HYDRODYNAMIC EQUATIONS FOR THE ATMOSPHERE.

Under date of November 5, 1897, Dr. Charles Chree, Director of the Kew Observatory, near London, writes to the Editor as follows:

In the July number of the MONTHLY WEATHER REVIEW I notice a deduction of the hydrodynamical equations in polar coordinates, by Mr. Joseph Cottier, whose death I regret to see mentioned later in your columns. Unknown, doubtless, to Mr. Cottier, I solved the problem in practically the same way without the intervention of Cartesian coordinates, in the Proceedings Edinburgh Mathematical Society, Vol. VIII, 1889–90. My equations (22), (23), (24), l. c., p. 50, agree exactly with Mr. Cottier's (8), p. 301, so far as the hydrodynamical terms are concerned, allowing for the difference of notation (his u, v, w are equivalent to my v, w, u). Like Mr. Cottier, I had not met with Ferrel's corrected equations, but unlike him, I had not even encountered Ferrel's original equations. As Mr. Cottier refers to Basset's (Basset, Hydrodynamics, Vol. II, Equations (24), p. 245) deduction of the equations for stationary axes, it may save trouble to some of your readers if I call attention to a slight error in the third of Basset's Equations (v for w, doubtless a misprint).

The first and last of Cottier's equations (8), on p. 301, may be put in a shorter form by combining v and w terms, writing, for instance, in the first:

$$-\frac{\cot\Theta}{r_1}(v+\omega r\sin\Theta)^2 \text{ for } -\frac{v^2}{r}\cot\Theta - v\omega\cos\Theta - \omega^2 r\sin\Theta\cos\Theta$$

The viscosity terms in the equations on page 302 would, in my opinion, be more conveniently given in a purely polar form, like Basset's Equations (24). These latter equations of course, unlike Mr. Cottier's, are intended to apply to an *incompressible* fluid.

RAIN-DROPS: THEIR SIZE AND RATE OF FALL.

In the course of a detailed study of the phenomena of waterspouts, Prof. F. H. Bigelow suggests the desirability of further statistics as to the actual size of large drops of rain. This is a matter that suggests a series of beautiful laboratory experiments, and we hope that it will be taken up by some of the many physicists who are seeking to apply their skill and the resources of their laboratories to the problems whose solution will give precision to meteorology.

It is evident that the size of the drops must depend upon the surface tension of the water relative to the air or other gas through which the drops are falling; it must, therefore,