SOUNDING-BALLOON RELEASING DEVICE

By L. T. SAMUELS

A very satisfactory device has been designed by Mr. Berlin Pugh, of the Royal Center aerological station, which permits the balloon, after bursting, to detach itself from the parachute and meteorograph. This results in a much more satisfactory rate of descent of the instrument and consequently a more accurate record.

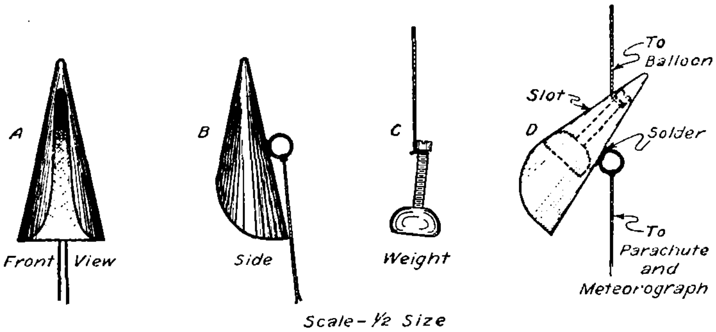

FIGURE 1.—Device for releasing parachute and meteorograph from sounding balloon after latter bursts

This device is shown in Figure 1 and consists of two parts, one, an aluminum slotted cone and the other, a brass weight. In Figure 1 *d* is shown how the two parts are used in an observation. One end of a cord is tied to the brass weight and the other end to the balloon. The brass weight is held inside the cone by the upward pull of the balloon. When the latter bursts, the brass weight slips out of the cone and the parachute is then free to operate during the descent of the instrument. A small wad of paper is put into the pointed end of the cone to prevent the brass knob from sticking.

The parachute used by the Weather Bureau is simply a square yard of bright red China silk. Cords are fastened to each corner and to the center. The other end of the cord attached to the center of the parachute is fastened to the aluminum cone. A light wire hoop about 1 foot in diameter is tied to the four cords attached to the corners of the parachute and prevents them from tangling and assures the opening of the parachute.

These devices were used with excellent results during a sounding balloon series at Royal Center, Ind., during February, the international month for 1931.

PYRANOMETER RECORDS ASSIST IN DISTINGUISHING BETWEEN HAZE AND CLOUDS

By A. F. GORTON, Associate in Meteorology, and S. W. CHAMBERS, Associate in Physical Oceanography

[Scripps Institution of Oceanography, La Jolla, Calif.]

The thermoelectric pyranometer [1] has a decided advantage over the standard Friez Weather Bureau sunshine recorder in that the record is strictly numerical or quantitative. The extreme range of the Engelhard recorder in use at the Scripps Institution of Oceanography, La Jolla, Calif., is 0-30 microamperes.[2] The maximum value for clear skies is a little over 20 microamperes (66.7 scale divisions) attained in June. Momentary readings as high as 25 microamperes (82.5 scale divisions) have been observed, due to radiation reflected from broken clouds. During the winter season lower values are reached, the record running between 12.5 and 13 (about 42 scale divisions) in the middle of the day, with clear skies.

The Kimball-Hobbs pyranometer at La Jolla has been functioning continuously for over two years, and a summary of the data has been published in the MONTHLY WEATHER REVIEW each month. In reviewing the accumulation of daily charts, the writers have been impressed by the fact that they apparently enable one to distinguish between days marked by *haze* and those marked by *scattered* or *continuous clouds* of considerable density, including "high fog."

Accompanying this note are sample charts which illustrate quite clearly the point in question; i. e., that the instrument easily distinguishes between what we may term "vapor," filmy cloud such as light cirrus, and clouds of material density. To be specific, that portion of the record of an apparently flawless day which is marked by a solid but jiggly line is due to what we have here called "vapor." This vapor or haze is often absolutely invisible to the eye. On the other hand, when scattered clouds of more or less density are present, the record jumps very erratically, changing as much as 4 to 8 microamperes in a few minutes' time. Furthermore, on days marked by dense cloud and rain, it is noticed that the line traced by the instrument is rather continuous but lies close to zero—in fact, the intensity may be six, four, or even less, scale divisions,[3] as is well shown by the records for May 5 and 16, reproduced in Figures 1-A and 2, respectively.

As previously stated, the instrument responds to scattered clouds by fluctuating between wide limits (figs. 1-B and 3), and on very bright, clear days makes a trace which is quite solid, i. e., *continuous*, but varies as much as 5 or 6 per cent during time intervals as short as 10 to 20 minutes. As illustrations of this point we cite the records for the afternoon of May 5 and 22, Figures 1-C and 4, respectively.

Finally, we have noticed another peculiarity of the instrument; that is, a tendency when scattered clouds are present for the record to exceed by as much as 2 to 3 microamperes the very maximum for a normal clear day. (See records for May 5 and 28, reproduced in Figures 1-B and 3, respectively.)

It is recognized, of course, that various types of haze, fog, and cloud exist, and here on the Pacific coast it is often difficult to distinguish precisely between them. We have observed, however, that variations of as much as 5 microamperes may be caused by what most people term "high

[1] Kimball, Herbert H. and Hobbs, Hermann E.: A new form of thermoelectric recording pyrheliometer. Monthly Weather Review, May, 1923, vol. 51, p. 239.

[2] It would be preferable to state the output of the thermocouple system in millivolts, but the latter may be calculated from the relation: E. M. F. in microvolts=412×current in microamperes. To reduce microamperes to gram-calories per minute per square centimeter, multiply by 0.055. Thus, 30 microamperes equals 1.65 gr.-cal./min./cm², and 20 microamperes equals 1.10 gr.-cal./min./cm². Also, scale readings on the record sheet may be reduced to gr.-cal./min./cm² by multiplying by 0.0165. A recent test by the Scripps Institution shows that the register has not changed in the three years it has been in service.

[3] Kimball, Herbert H.: Records of Total Solar Radiation Intensity and Their Relation to Daylight Intensity. MONTHLY WEATHER REVIEW, October, 1924, vol. 52, p. 473, fig. 5.