We are here dealing with the constrained motions of falling bodies corresponding to those sliding on inclined planes all joined at their highest points. Such sliding motions are subject to the acceleration of gravity, and hence are slow in starting, but later attain high velocities. Since the falling body is air which is displacing warmer, and hence lighter, air-layers, in the case of the glacier its motions are further modified as a result of adiabatic changes, and, since large quantities of moisture are involved, by important transformations of sensible and latent heat. The source of this moisture is believed to be largely the ice-needles of the cirri.

The tendency to produce centrifugal surface-air circulation above the glacier (anticyclonic movement) is promoted by quiet conditions of the atmosphere, since the measure of contact cooling of the surface layer of air over the ice is a direct function of time. The halting of this circulation or the induction of any reverse centripetal movement of the surface air (cyclonic movement) is an inverse function of the time, since it is a direct function of the *distance* the air currents descend vertically during their outward

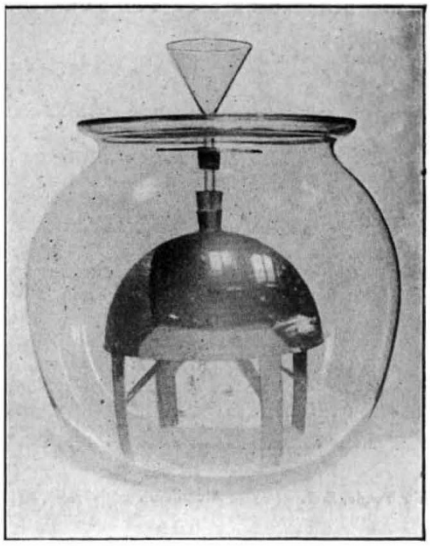

FIG. 2.—Device used to produce anticyclonic circulation in air above a cold dome.

movement. Each of these movements is, however, modified by the transformations of sensible and latent heats of fusion and evaporation of the water brought in in the form of the ice-needles of the cirri.

The beginning of the glacial blizzard, slow by reason of the flattish surface of the ice dome and the acceleration of gravity, is also retarded by the necessity of fusing and vaporising the ice-needles high up in the vortex of the forming anticyclone, which causes *abstraction* of heat and local displacements of air; whereas heat is *evolved* near the end of the blizzard, when fresh snow is precipitated near the glacier surface. Both these transformations of sensible and latent heat will operate so as to add their effect rather than to counteract that due to cooling or to adiabatic effect. They thus tend to cause blizzards to develop gradually and to end suddenly. The halt—the end of the stroke of the refrigerating glacial engine—comes about as soon as the rapid descent of the air carried out by the blizzard has, through its adiabatic effect, quite overcome the surface cooling due largely to the earlier calm. The length of the blizzard, if it precipitates fresh snow, should therefore be adjusted in a measure to the expanse of the glacier surface over which the currents of air must slide before gaining the two miles of descent on the dome, in addition to that which takes place in the "eye" of the anticyclone.

WM. H. HOBBS.

Ann Arbor, Michigan, U.S.A., June 17.

The Diamagnetism of Hydrogen.

THE fact quoted by Dr. Oxley in his letter to NATURE of July 8, that the diamagnetism of hydrogen becomes less as the temperature is raised, seems to be in favour of a kinetic hypothesis of the diamagnetism of that gas rather than against it.

If a magnet starting from rest is made to oscillate it remains paramagnetic until the oscillations on either side of the position of rest become 130°, after which it behaves as a diamagnetic body, the diamagnetism increasing until rotations begin. But once in rotation the diamagnetism *diminishes* as the rotational energy increases; and when this energy is very great the magnet is nearly indifferent to a magnetic field, and it appears to be non-magnetic. If it is allowable to treat temperature as a measure of this energy, then this result means that the diamagnetism should become less as the temperature is raised, and this is what has been observed.

Since the paramagnetism of a rotating magnet is found only for oscillations of less than 130°, the kinetic energy must be comparatively small, and in the case of hydrogen a change from diamagnetism to paramagnetism can be expected to take place only when the temperature is very near to the absolute zero.

Apart from the kinetic hypothesis, the fact that there is any change at all of the diamagnetism of hydrogen with temperature is opposed to the accepted view which regards true diamagnetism as independent of temperature.

J. R. ASHWORTH.

July 14.

Occurrence of Ozone in the Atmosphere.

WITH reference to the lecture of Lord Rayleigh published in NATURE of July 8 on "The Blue Sky and the Optical Properties of Air," the conflicting results obtained by chemical methods in the estimation of atmospheric ozone are recalled. I beg to direct attention to my paper on "The Occurrence of Ozone in the Upper Atmosphere" (Proc. Roy. Soc., 1914, A, vol. xc., p. 204), in which it is shown that a reagent of potassium iodide solution can be made to provide a basis for the distinction of ozone and oxides of nitrogen at high dilutions and enable the approximate estimation of the former. By this method it is shown that, in accordance with the conclusions of Lord Rayleigh, ozone is present in the upper atmosphere, the amount present at an altitude of 10,000 ft. being *of the order of* 5×10^{-6} parts per unit volume. Measurements made with sounding-balloons up to altitudes of 20 km. also showed the presence of definite amounts of ozone, but no detectable increase between 4 km. and 20 km. The view was put forward that this amount of ozone must be taken into account in considering the optical properties of the sky.

An extension of these measurements was made with greater precision at the Mosso Laboratory on Monte Rosa at an altitude of 15,000 ft., where an average proportion of about 1×10^{-6} parts per volume of ozone was found.

J. N. PRING.

The Victoria University of Manchester,
July 14.