that at 93 feet above. But in fact there is always a strong radiation to the ground from a layer of cloud. The sun heats the upper surface of the clouds, and by convection the influence of this heat is felt at the lower surface, which latter is also warmed or cooled, as the case may be, by radiation between it and the ground. One may often notice how rapidly the ground dries up as the fog lifts, although the sun is still invisible. It is evident that something of this kind took place in the present case since the lower thermometer was warmer than the upper thermometer by a quantity that kept on increasing up to 3 p. m. and then rapidly diminished. The wind near the ground was too feeble to nullify the radiation from the lawn. It was much stronger at the 93-foot level. The upper thermometer gave the temperature of a general layer of wind; the lower thermometer had a temperature due to radiation from the lawn, and not necessarily the temperature of the lower air.

In conclusion we may say that this unusual difference of from 4° to 6° in a vertical distance of 90 feet, even if it were demonstrated by unexceptionable apparatus to really exist is not an *inversion*, as the observer called it, of the ordinary vertical temperature gradient. The ordinary gradient is defined as being a diminution of temperature with increasing height above ground, and that is what was recorded in the present case. An *inversion* is an increase of temperature with height above ground, such as occurs during a few hours in the early morning under a clear sky, and especially when hoar frost is deposited from still air.

When the vertical gradient is a diminution at the rate of 1° C. for 99 or 100 meters, or 1° F. for 183 or 187 feet, this is called the adiabatic gradient and the air is said to be in a state of neutral equilibrium, because a mass of it raised or lowered by any number of feet will be cooled by expansion or warmed by compression to such an extent as to have the same temperature as the surrounding air in its new locality; hence the air whose location has thus been changed has no tendency to move from the place to which it has attained. On the other hand, if the rate of diminution with ascent is greater than 1° for 187 feet, as in the present case, where it was, at 3 p. m., 1° for 16 feet, then the upper air has a tendency to descend, and the lower air a tendency to ascend and to keep on ascending or descending indefinitely, so that the air is said to be in a condition of unstable convective equilibrium, such as occurs in the hotter portion of every clear day near the surface of the earth.

If the rate of descent is less than 1° for 187 feet, and especially if it becomes negative, that is to say, colder below and warmer above, then the air is in a state of stable equilibrium, and if raised or lowered tends to return to its original position.

UTILIZATION OF FOG.

On page 101 of this number of the MONTHLY WEATHER REVIEW we publish an interesting article by Mr. A. McL. Hawks, C. E., of Tacoma, Wash., on the subject of the utilization of fog for irrigation on the coast of southern California. His communication was suggested by the remarks of the Editor, published in the MONTHLY WEATHER REVIEW for October, 1898. Mr. Hawks states very truly that expensive mechanical means for collecting the fog will not be practicable. Indeed, the Editor substantially said the same thing in October, and suggested that some simple method be devised for catching the fog and forcing it to drip to the roots of the plants as useful water.

The use of liquid air, as suggested by Mr. Hawks, would undoubtedly be one of the most expensive methods of catching the fog and there is room for grave doubt whether any fog at all could be condensed by its use. Liquid air is the remarkable product of a powerful steam engine and appropriate apparatus. When manufactured, even on a large scale, it is not likely to cost less than 25 cents a gallon or to be sold for less than double that price. If one simply needs to have a cooling agent in order to condense the fog into drops, one might, far more economically, make use of artificial ice or the original brine bath and the ammonia coils of a refrigerating apparatus. The evaporation of liquid air back into the free atmosphere, which is the experiment that is now being daily shown to hundreds of people, does not produce the least sensible influence on the temperature of the audience chambers where the experiments are performed and would have still less effect over the orchards of southern California.

Mr. Hawks suggests a second method for attacking the problem, viz, the construction of a flue or smokestack leading from the cooler air above the fog down through the warm air to the earth's surface, in order that the cold air may descend through it to the ground. But the upper cold air really does not need any such conducting flue, it will descend of itself if the conditions are proper; otherwise, it can not be brought down except by the use of some extraneous expensive force and if brought down would be warmed up so much by the compression due to the greater barometric pressure near the earth's surface that it would not produce rain, but become a veritable warm, dry chinook.

But there is a third and most valuable suggestion in the letter of Mr. Hawks. He has observed that shiny black-painted iron or shiny freshly painted boards exposed horizontally are great moisture gatherers. It is evident from his statements that a concave painted board or a concave sheet or trough of painted iron will collect much moisture. If such a concave surface has a gentle inclination toward the ground, the moisture should drip in a steady stream all night long from the lower end, and can, therefore, be gathered in reservoirs or pails or led directly to the roots of the plants. This drip, as we stated in the October REVIEW, is that which maintains the verdure of Green Mountain on the Island of Ascension. It is well worth while for the agriculturists of southern California to follow out this line of experiment in the matter of utilizing the fog.

THE BLUE COLOR OF THE SKY.

The March report of the Montana section contains an interesting article by A. H. Thiessen, on the cause of the blue color of the sky. This was first explained by Rayleigh as probably due to the so-called selective reflection of the blue light in a beam of sunshine by the finest particles of aqueous vapor and dust. Mr. Thiessen gives a very simple statement of Rayleigh's explanation and we quote the following from his article:

On a cloudless day when looking away from the sun toward the sky we observe its blue color. We are then looking into space, but our line of sight is intercepted by a multitude of dust particles suspended in the air. The color of these particles is observed to be blue. This is due to their reflecting to our eyes the blue rays against which they form an effective barrier, while the red or coarser waved rays pass on.

The color of skylight is due then to the reflection of the shorter wave lengths to the eye. The air itself has no power to reflect light, but it contains innumerable dust particles which present a vast reflecting surface to the light waves. That the dust reflects back only the blue rays is due to their microscopic size. The finer the dust then the purer is the blue which is reflected or scattered. One may expect then to find the bluest skies in those places where the dust particles are smallest, and it is true that the blue of the sky as seen from the tops of mountains is deeper and purer than that seen from a lower altitude. This is due to the fact that the air is very rare at great heights and can only sustain the finer particles of dust, while the coarser particles abound at the lower levels. The sky of Italy is noted for its clearness. The blue is deeper, not because the dust there is finer than in the northern countries, but because in the countries of the north, due to the greater