

From these widely diverse sources of information, it appears that the optimum temperature for the human being is in the neighborhood of 18° C.

NOTE ON DR. GRIFFITH TAYLOR'S CLIMOGRAPH CHARTS.

A note from Dr. Griffith Taylor, of Melbourne, Australia, calls attention to an unintended implication in a sentence in an abstract of a note by Sir Napier Shaw on "Climograph Charts," (MO. WEATHER REV., July, 1919, p. 494), calling attention to use of the essential principle of the climograph by Dr. John Ball before Dr. Taylor's use of it. The sentence referred to which states that this "is a fact that should be noted," was not intended to discredit Dr. Taylor's independent invention of the climograph. In fact, there is no copy of Dr. Ball's article in the Royal Society's or any of the other large libraries in Victoria. Moreover, Dr. Taylor's climograph has wet-bulb temperatures plotted against humidity, which seems to give a better climograph than Dr. Ball's dry-bulb temperatures plotted against humidity.

EFFECT OF HIGH TEMPERATURE, HUMIDITY, AND WIND ON THE HUMAN BODY.¹

By C. W. B. NORMAND.

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Under climatic conditions such that air temperature is above blood heat the gain of heat to the human body through convection may exceed the maximum cooling power derived from perspiration. As the rate of gain of heat through convection increases with wind velocity, while the rate of perspiring has a definite limit, it follows that, under given conditions of relative humidity, to each air temperature above blood heat there must, theoretically at least, correspond a certain critical value of wind velocity which, if exceeded, will produce a net gain of heat to the body. Under these conditions it is assumed that continued existence becomes impossible. The greater the air temperature the lower this critical wind velocity becomes.

The human body may be regarded as somewhat similar in action to a wet-bulb thermometer, which maintains its temperature by a balance between convection and evaporation. In the paper a curve is worked out by means of the wet-bulb formula, showing the conditions of air temperature and relative humidity under which a wet-bulb thermometer at blood temperature neither gains nor loses heat in a given wind velocity. Under all conditions of temperature and humidity which represent points on the diagram on one side of the curve there will be a net gain of heat, and under conditions representing points on the other side a net loss. The human body can not supply perspiration at more than a certain rate, which is analogous to a wet-bulb thermometer having a definite fixed maximum rate of supply of water. The modification in the above curve introduced by this condition is investigated. By this means the conditions of temperature, relative humidity and wind under which human life is possible are indicated with such accuracy as our present knowledge of the different conditions involved allows. As an example, with temperature at 122° F. and humidity at 8 per cent, life becomes impossible with a wind velocity above 15 meter-seconds. The fatal simoon may be explained by this means.—*J. S. Dines.*

THE EXTENSION OF KATA-THERMOMETER OBSERVATIONS.

[Reprinted from Meteorological Office Circular, Mar. 1, 1919, pp. 3-4.]

Dr. Leonard Hill, F. R. S., Central Staff Medical Research Committee, the inventor of the kata-thermometer, is anxious for its use to become general. The advantage of this instrument is that the readings show the combined effect of wind, temperature, sunshine, and humidity in a way comparable to the experience of the human body. The kata-thermometer is simply an ordinary thermometer of known dimensions which has to be warmed to 100°, so that the time of cooling from 100° to 95° may be observed. It is suggested that the merits of, say, Skegness and Torquay as health resorts for people of different types could be compared more satisfactorily by kata-thermometer readings than by any other observations. From the official point of view the observations are subject to the defect that the records depend so largely on exposure; in fact, they provide a measure of exposure, formulæ for estimating the speed of the wind in the immediate neighborhood from the comparison of kata-thermometer readings with the air temperature and humidity having been developed. Accordingly in publishing results it would not suffice to indicate Skegness and Torquay as the meteorological stations; the localities, sea front, inclosed garden, or what not would have to be specified. Two or three stations would really be desirable in a single health resort. It may be possible, however, to make suitable arrangements for publication if the observations become general. * * *

It should be mentioned that Dr. Hill is also asking for measurements of the temperature reached by black bodies exposed to the wind as well as to the sun or sky shine. For this purpose he uses a piece of black fur, the temperature of which is ascertained by stroking it with a small-bulbed thermometer until steady readings are obtained.

THE IMPORTANCE OF AIR CONTROL IN HOSPITALS.

The Modern Hospital, for April and May, 1920 (vol. 14, pp. 271-275; 348-353), contains two articles of timely interest by Prof. Ellsworth Huntington, of Yale, dealing with the control of air in hospitals and other public buildings. The first installment treats especially of the purpose of controlling the air, and the second chiefly of the methods employed to control the air and the results that have been attained. One of the outstanding points mentioned by Prof. Huntington is the importance of small variations in the temperature, humidity, and movement of the air, in their effect upon human life.

The most important atmospheric factors are temperature, humidity, purity, movement, and variability. In most ventilating systems, however, the most attention is paid to the question of temperature and that usually to the end of producing constant temperature. The importance of humidity is recognized, also, but it is only a perfunctory recognition and, as a rule, the steps taken to control the humidity are entirely inadequate. Purity is easily controlled, partly because nature is constantly striving to produce pure air, and partly because artificial contamination by dust is easily prevented. Movement and variability are often neglected because they are frequently construed to mean drafts and hence colds. But experiment has proved that, with all other conditions the same, the patient who spends his time where the air can move over him in variable gusts with consequent short-period variations of temperature stands better chance of

¹ Roy. Met. Soc. Quart. Jour., Jan., 1920, 46: 1-11; discussion, 12-14.