

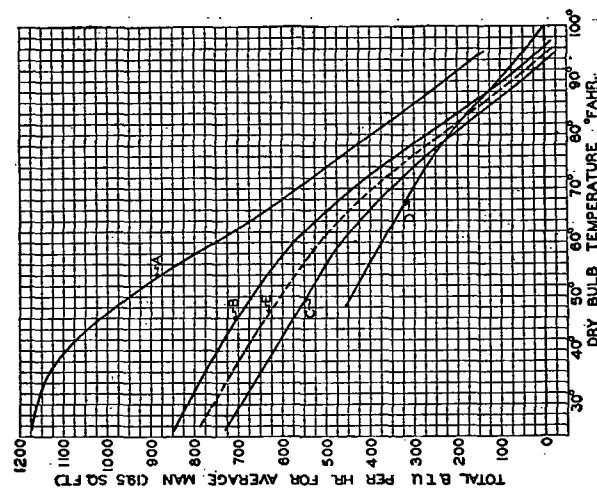


FIG. 9. RELATION BETWEEN SENSIBLE HEAT LOSS FROM THE HUMAN BODY AND DRY-BULB TEMPERATURE FOR STILL AIR

*Curve A—Men working 66,150 ft.-lb per hour. Curve B—Men working 33,075 ft.-lb per hour. Curve C—Men working 16,538 ft.-lb per hour. Curve D—Men seated at rest. Curves A and C drawn from data at a dry-bulb temperature of 81.3 F only and extrapolating the relation between curves B and D which were drawn from data at many temperatures.

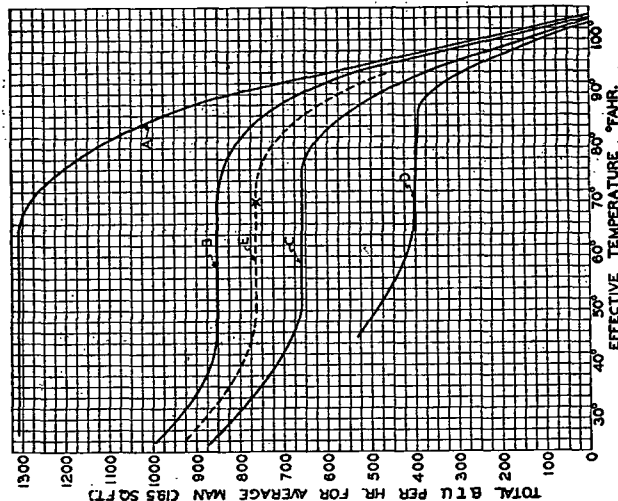


FIG. 8. RELATION BETWEEN TOTAL HEAT LOSS FROM THE HUMAN BODY AND EFFECTIVE TEMPERATURE FOR STILL AIR

*Curve A—Men working 66,180 ft.-lb per hour. Curve B—Men working 33,075 ft.-lb per hour. Curve C—Men working 16,538 ft.-lb per hour. Curve D—Men seated at rest. Curves A and C drawn from data at an effective temperature of 70 deg only and extrapolating the relation between curves B and D, which were drawn from data at many temperatures.

CHAPTER 3. PHYSICAL & PHYSIOLOGICAL PRINCIPLES OF AIR CONDITIONING

TABLE 6. DEGREES OF PERSPIRATION FOR PERSONS AT WORK UNDER VARIOUS ATMOSPHERIC CONDITIONS

Work Rate 33,000 Ft Lb per Hour

DEGREE OF PERSPIRATION*	ATMOSPHERIC CONDITION					
	95 Per Cent Relative Humidity			20 Per Cent Relative Humidity		
	E. T.	D. B.	W. B.	E. T.	D. B.	W. B.
Forehead clammy.....	59.0	59.4	58.3	69.5	80.5	56.5
Body clammy.....	50.0	50.2	49.3	57.0	61.6	44.2
Body damp.....	60.0	60.3	59.3	62.5	69.6	49.5
Beads on forehead.....	68.0	68.5	67.5	76.0	91.0	63.4
Body wet.....	69.0	69.6	68.5	71.0	82.8	53.0
Perspiration on forehead runs and drips.....	78.5	79.3	78.0	82.0	100.5	70.2
Perspiration runs down body.....	79.0	79.8	78.5	81.0	99.8	69.0

*Forty per cent of subjects registered degree of perspiration equal to or greater than indicated.

supply, which can be obtained more conveniently from the increase in moisture content of the ventilating current.

HEAT AND MOISTURE GIVEN UP BY HUMAN BODY

In conditioning air for comfort and health it is necessary to know the rate of sensible and latent heat liberation, from the human body, which in conjunction with other heat loads (see Chapters 5 and 7) determine the capacity of the conditioner. The data in common use are those of the A.S.H.V.E. Research Laboratory⁴⁶ shown in Figs. 8, 9, 10 and 11. Other useful data are given in Tables 4, 5 and 6, which are self-explanatory.

ULTRA-VIOLET RADIATION AND IONIZATION

In spite of the rapid advances in the field of air conditioning during the past few years, the secret of reproducing indoor atmospheres of as stimulating qualities as those existing outdoors under ideal weather conditions, has not as yet been found. Extensive studies have failed to elucidate the cause of the stimulating quality of country air, qualities which are lost when such air is brought indoors and particularly when it is handled by mechanical means. Ultra-violet light and ionization have been suggested but the evidence so far is inconclusive or negative⁴⁷.

⁴⁶Thermal Exchanges between the Bodies of Men Working and the Atmospheric Environment, by F. C. Houghton, W. W. Teague, W. E. Miller and W. P. Yant (*American Journal of Hygiene*, Vol. XIII, No. 2, March, 1931, pp. 415-431).

⁴⁷Changes in Ionic Content in Occupied Rooms, Ventilated by Natural and Mechanical Methods, by C. P. Yaglou, L. C. Benjamin and S. P. Choate (A.S.H.V.E. TRANSACTIONS, Vol. 38, 1932, p. 191). Physiological Changes During Exposure to Ionized Air, by C. P. Yaglou, A. D. Brandt and L. C. Benjamin (A.S.H.V.E. TRANSACTIONS, Vol. 39, 1933, p. 357). Diurnal and Seasonal Variations in the Small Ion Content of Outdoor and Indoor Air, by C. P. Yaglou and L. C. Benjamin (A.S.H.V.E. TRANSACTIONS, Vol. 40, 1934, p. 271). The Nature of Ions in Air and Their Possible Physiological Effects, by L. B. Loeb (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 101). The Influence of Ionized Air upon Normal Subjects, by L. P. Herrington (*Journal Clinical Investigation*, 14, January, 1935). The Effect of High Concentrations of Light Negative Atmospheric Ions on the Growth and Activity of the Albino Rat, by L. P. Herrington and Karl L. Smith (*Journal Ind. Hygiene*, 17, November, 1935). Subjective Reactions of Human Beings to Certain Outdoor Atmospheric Conditions, by C.-E. A. Winslow and L. P. Herrington (A.S.H.V.E. TRANSACTIONS, Vol. 42, 1936, p. 119).