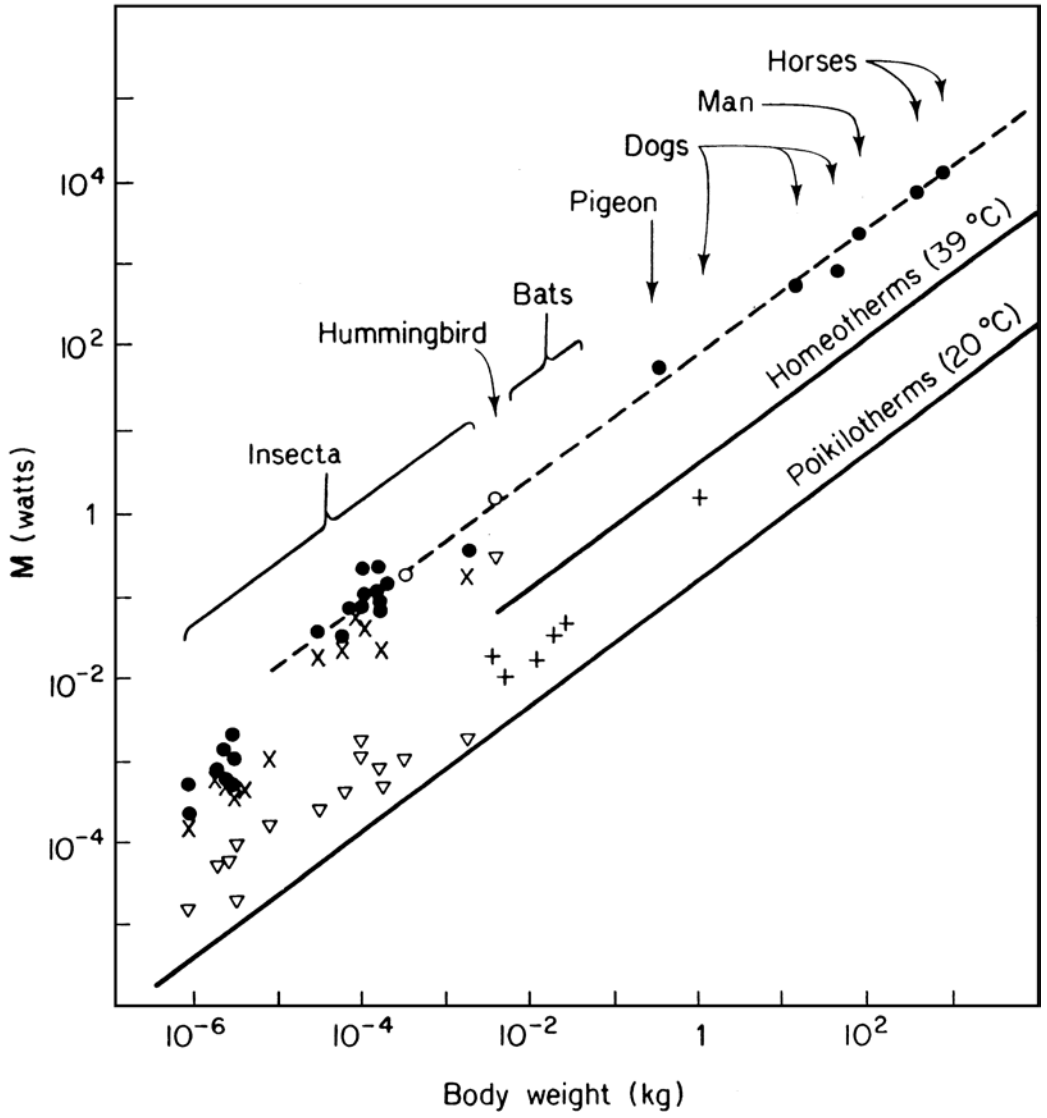

Figure 14.1 Relation between body weight and basal metabolic rate (BMR) of homeotherms (upper continuous line), maximum metabolic rate for sustained work by homeotherms (upper pecked line), and basal rate for poikilotherms at 20 °C (lower continuous line) (from Hemmingsen, 1960).

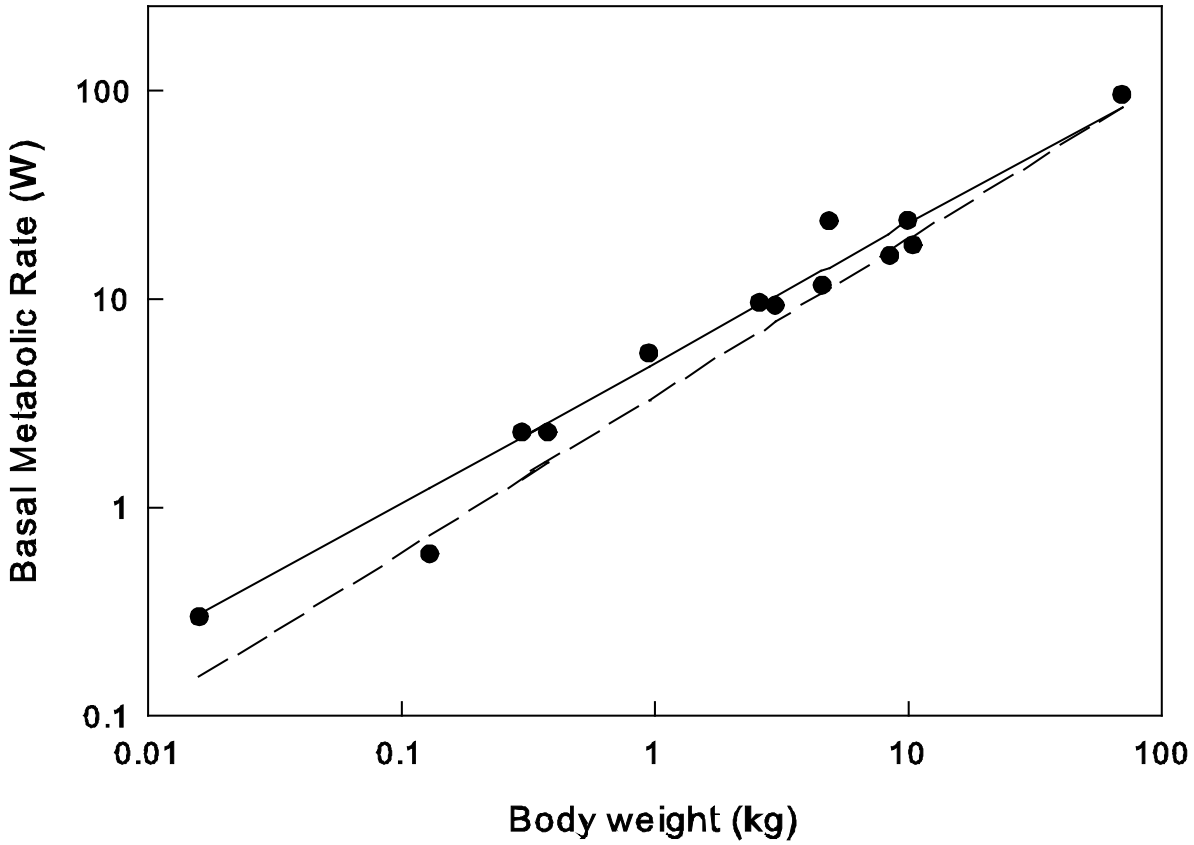

Figure 14.2 Relation between basal metabolic rate (BMR) of mammals and body weight. Data points represent BMR for animals ranging in size from a mouse to a human. The continuous line is the relation with $\mathbf{M} \propto W^{2/3}$ proposed by Roberts et al. (2010); the dashed line is the relation with $\mathbf{M} \propto W^{3/4}$ as proposed by Kleiber (1965).

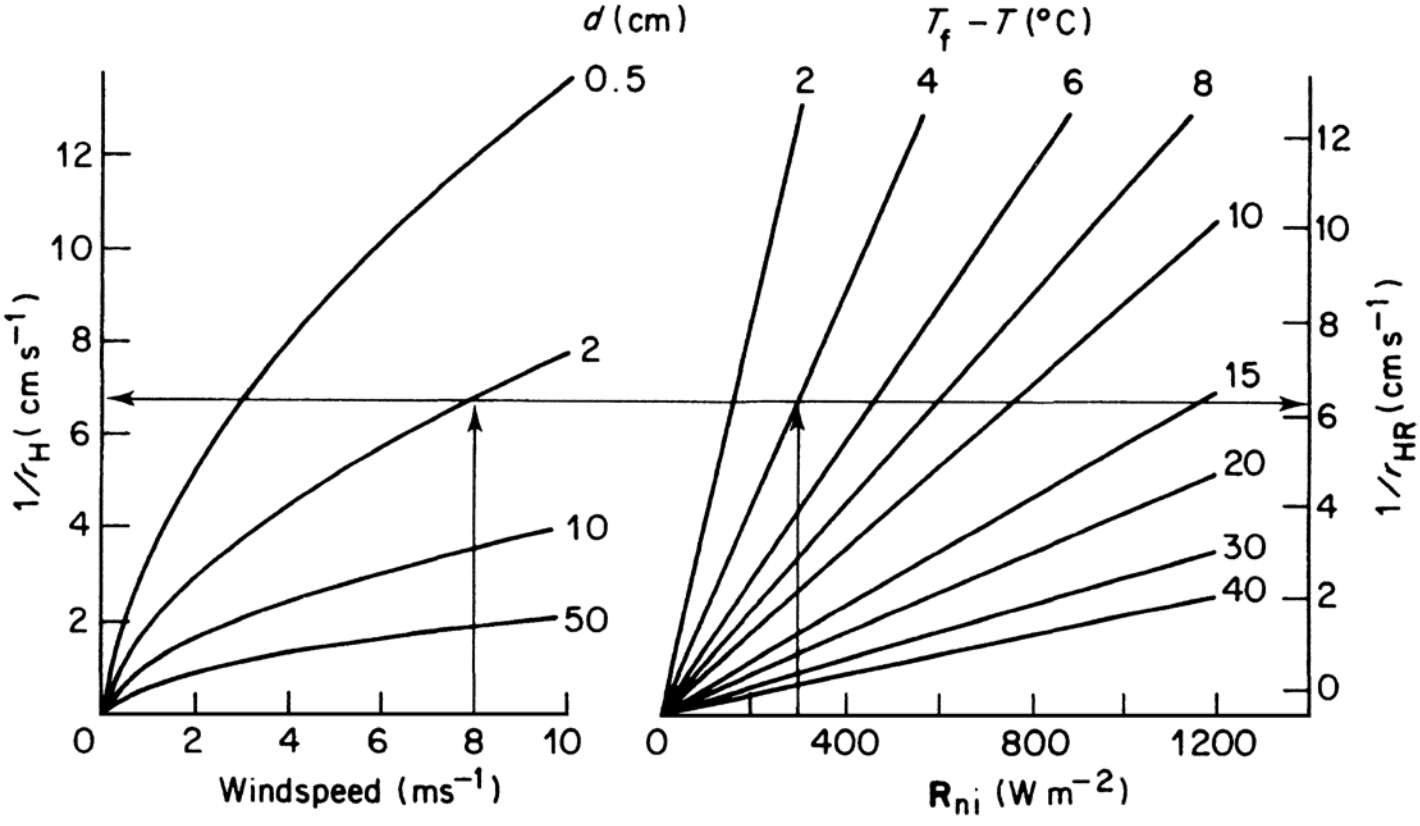

Figure 14.3 Diagram for estimating the thermal radiation increment (see text and p. 262) when windspeed, body size, and net radiation are known. For example, at 8 m s^{-1} an animal with d = 2 cm has r_H^{-1} = 6.7 cm s^{-1} and r_{HR}^{-1} = 6.2 cm s−1. When $\mathbf{R}_{ni}$ = 300 W m^{-2}, $T_f - T$ is 4 °C.

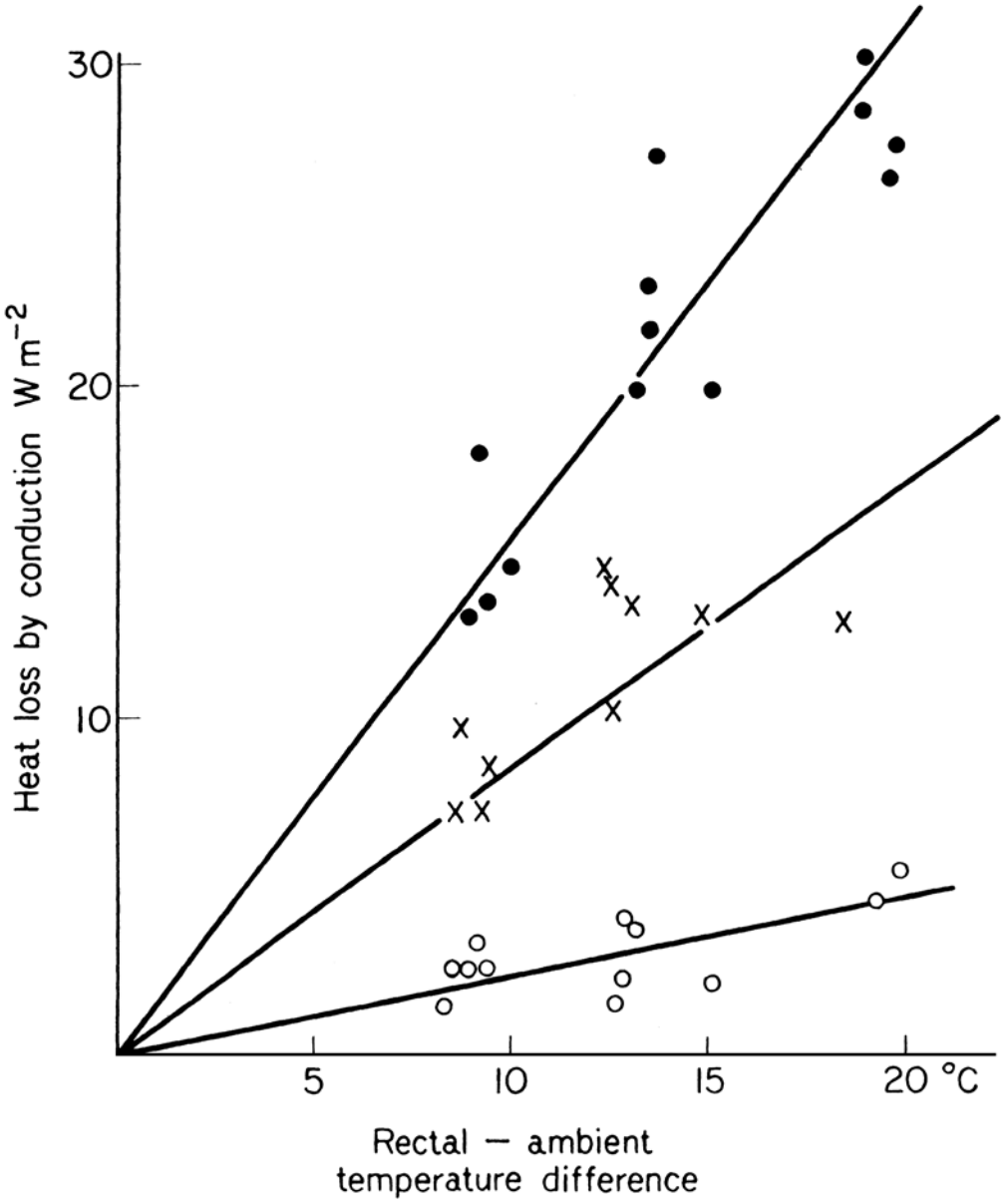

Figure 14.4 Measurements of heat lost by conduction from a pig to different types of floor covering expressed as watts per square meter of total body area (after Mount, 1967). •—concrete; X—wood; o—polystyrene.

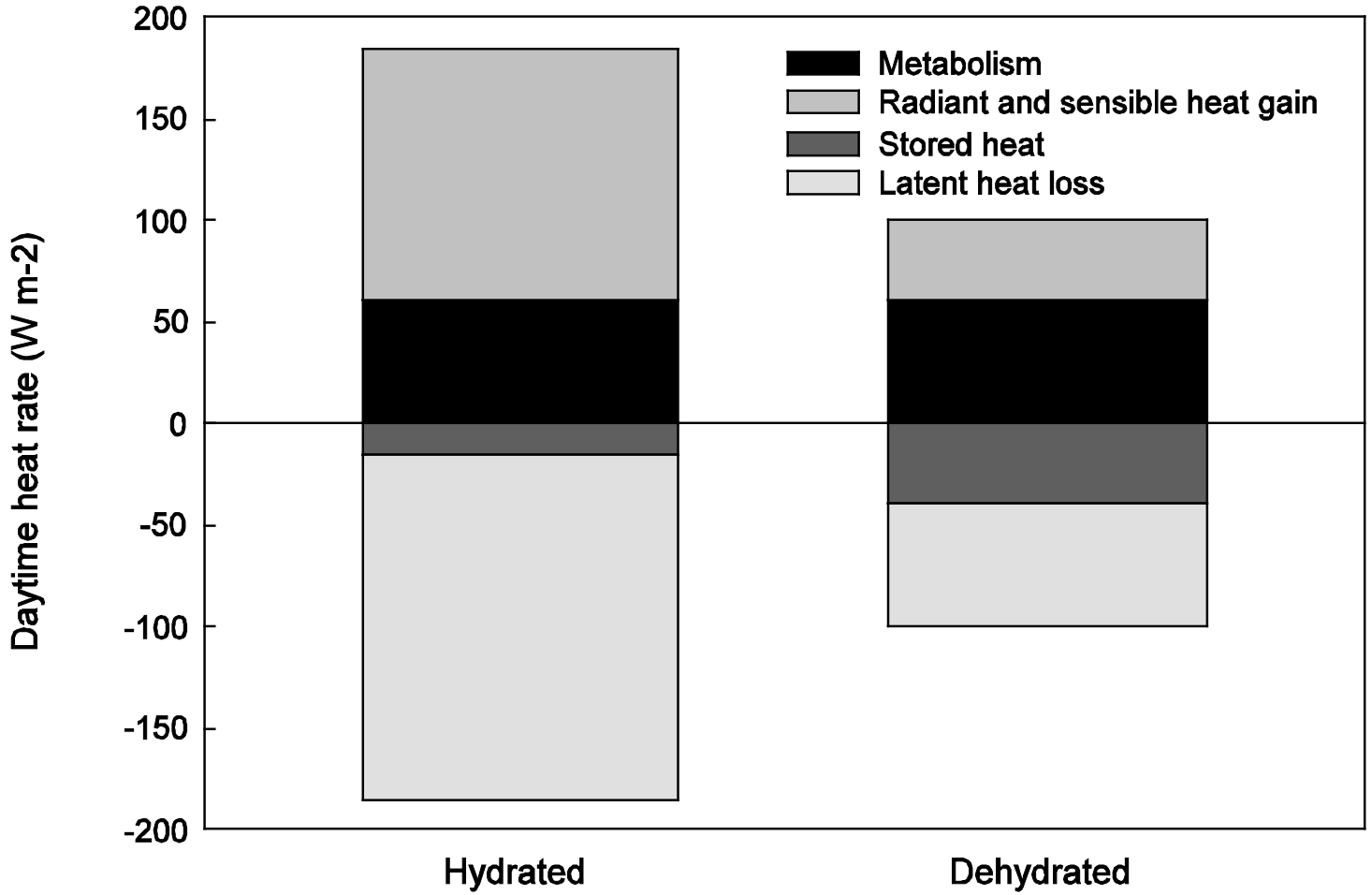

Figure 14.5 Heat balance components of a camel in a desert environment when hydrated and dehydrated, expressed as mean heat rates *(*W m^{-2}*)* over the 10 h during which external heat loads were largest (based on data from Schmidt-Neilsen et al. 1956).

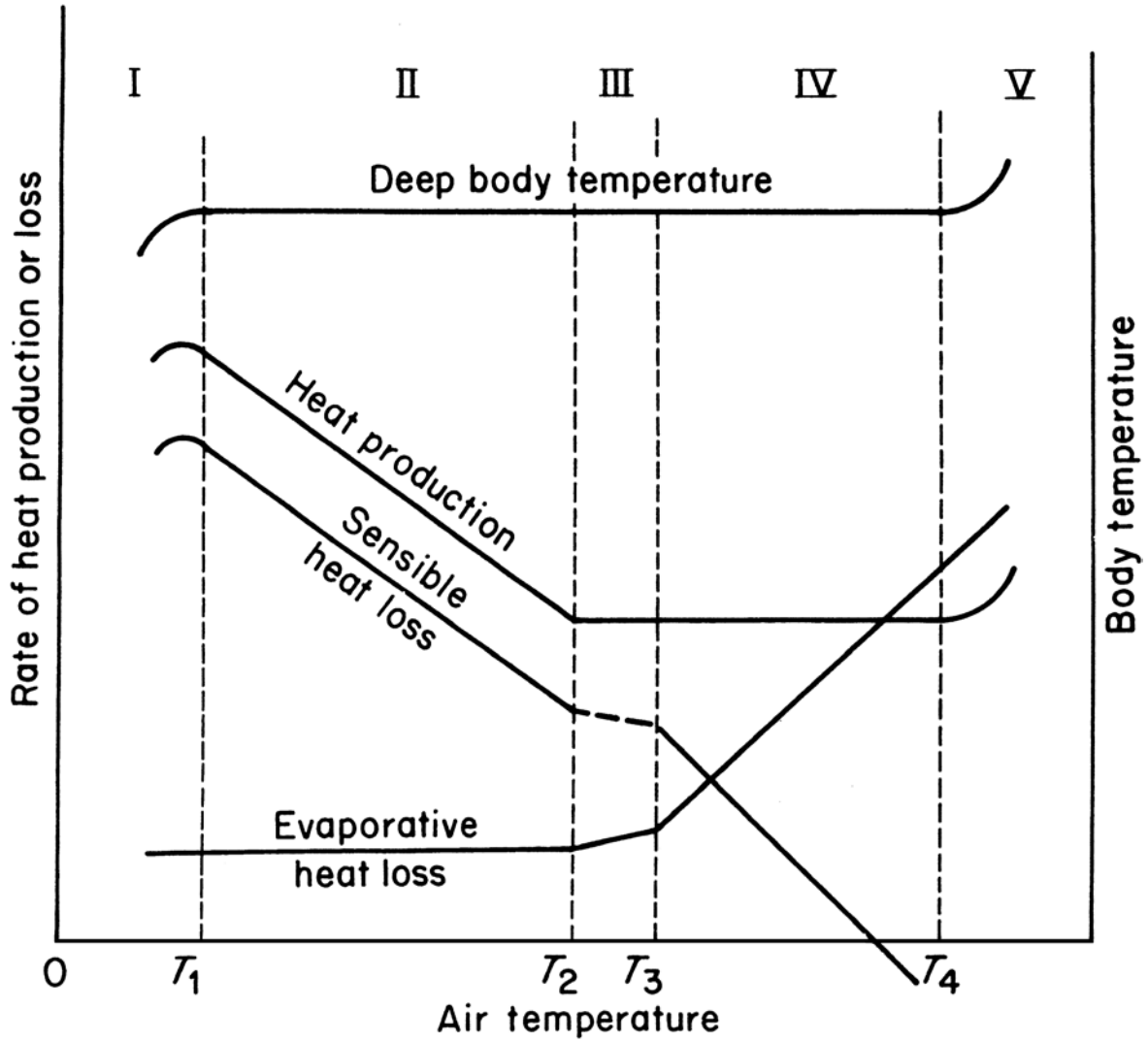

Figure 14.6 The thermo-neutral diagram: a diagrammatic representation of relations between heat production, evaporative, and non-evaporative heat loss and deep-body temperature in a homeothermic animal (from Mount, 1979).

Table 14.1 Cold Limit and Lower Critical Temperature for Three Species (from Mount, 1979) with Corresponding Values of $r_t M$ (see text)

	Cold limit T_1 (°C)	**Critical temperature T_2 (°C)**	**$r_t M_{max}$ (kJ m^{-3})**	**$r_t M_{min}$ (kJ m^{-3})**
Human newborn	27	33	15	6
Mature	14	28	35	14
Pig newborn	0	34	56	5
Mature	−50	10	131	41
Sheep newborn	−100	30	206	11
Mature	−200	20	355	86

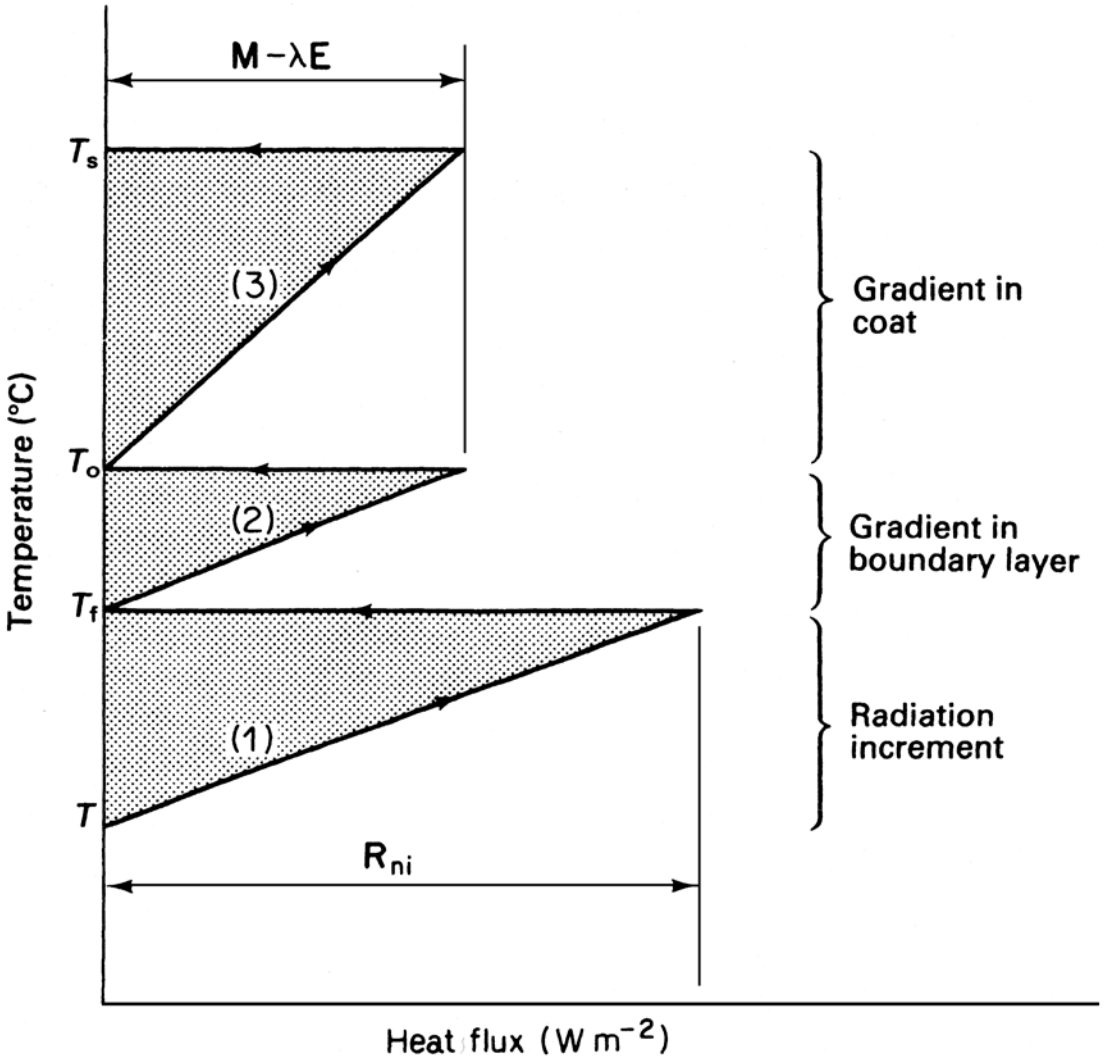

Figure 14.7 Main features of temperature/heat-flux diagram for dry systems. T_s is skin temperature, T_0 is coat surface temperature, T_f is effective environment temperature, and T is air temperature.

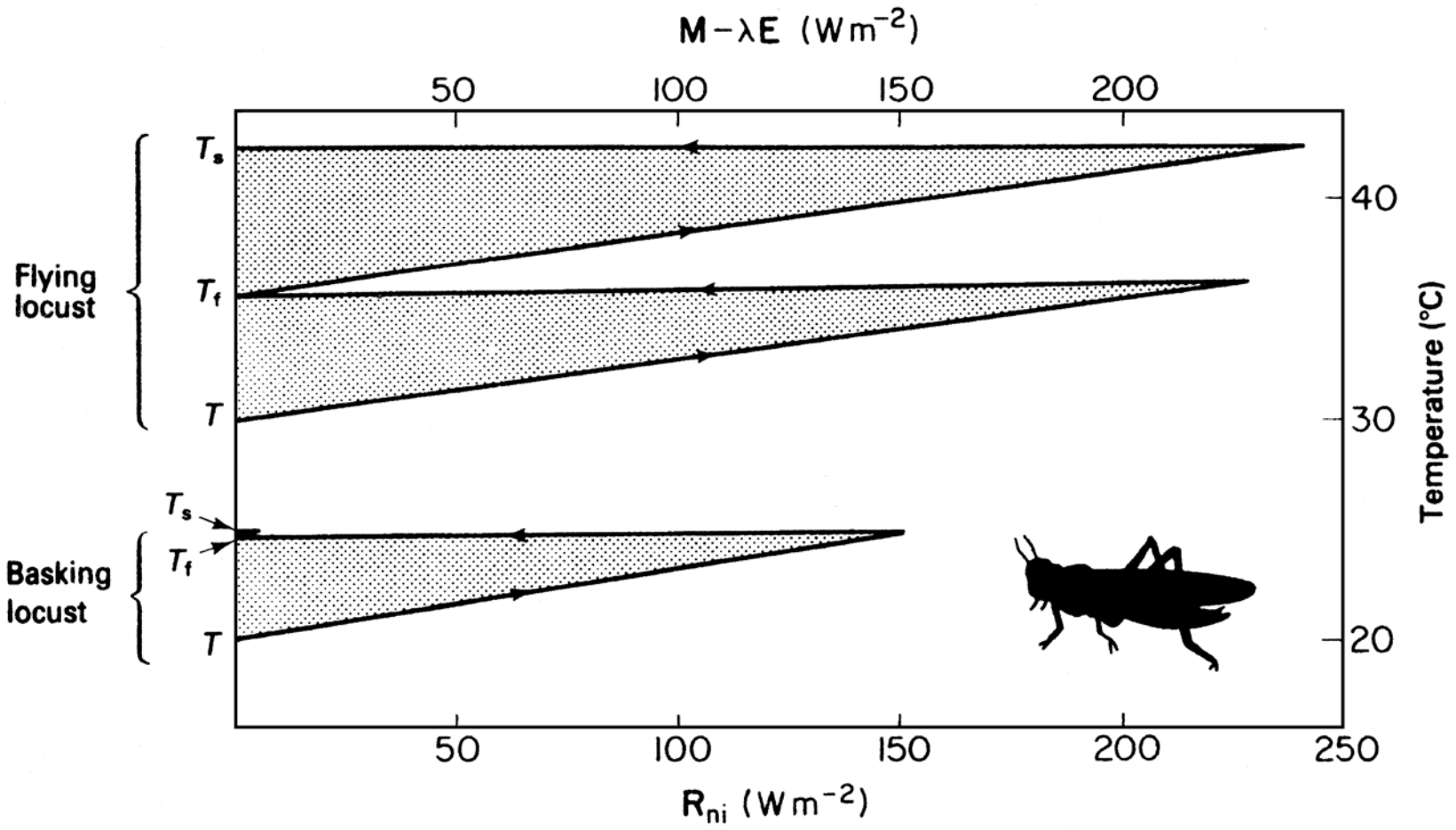

Figure 14.8 Temperature/heat-flux diagram for locust basking (lower section of graph) and flying (upper section).

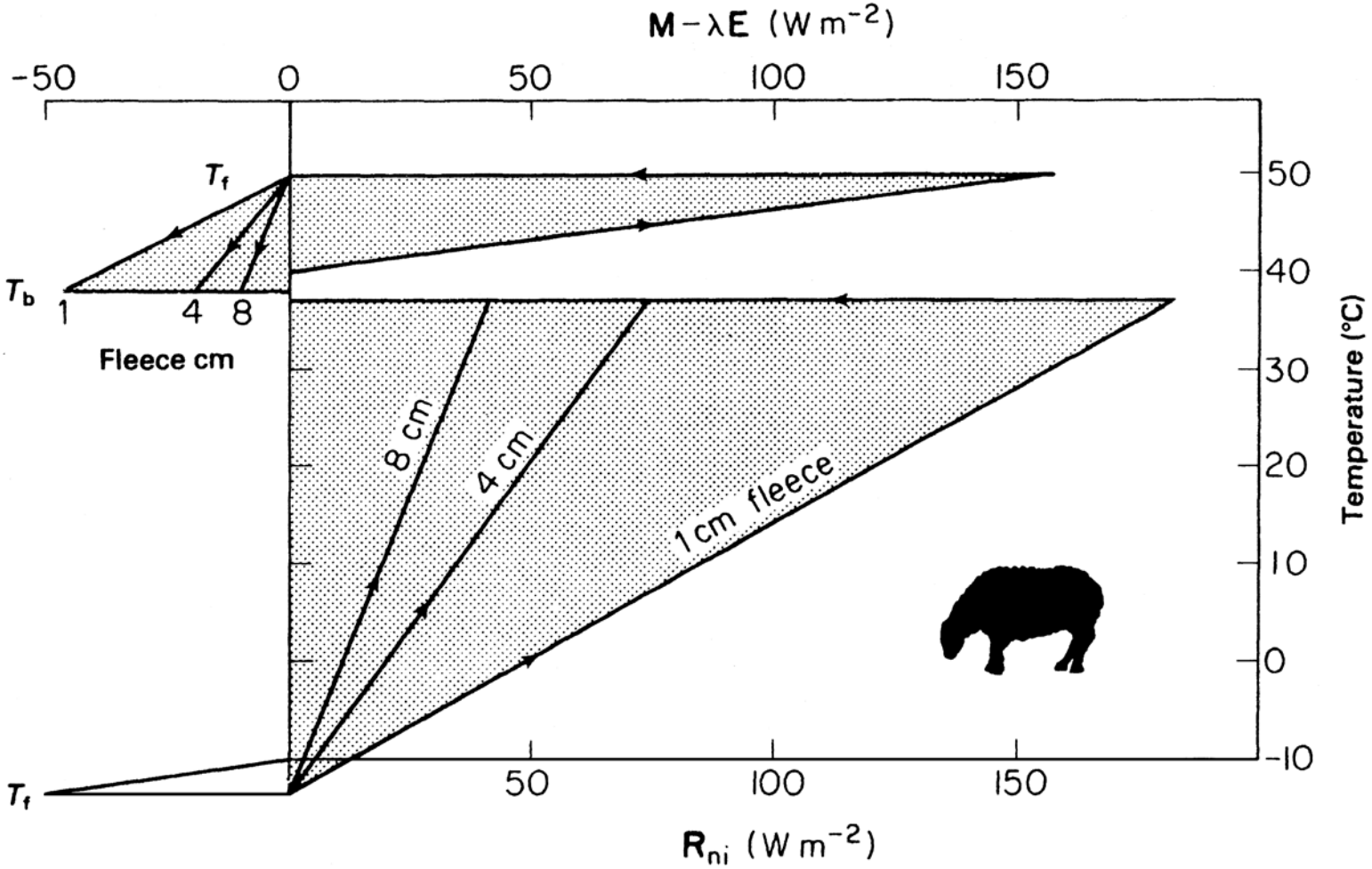

Figure 14.9 Temperature/heat-flux diagram for sheep with fleece lengths of 1, 4, and 8 cm exposed to air temperatures of −10 °C and net radiation of −50 W m^{-2} (lower section); and 40 °C with net radiation 160 W m^{-2} (upper section).

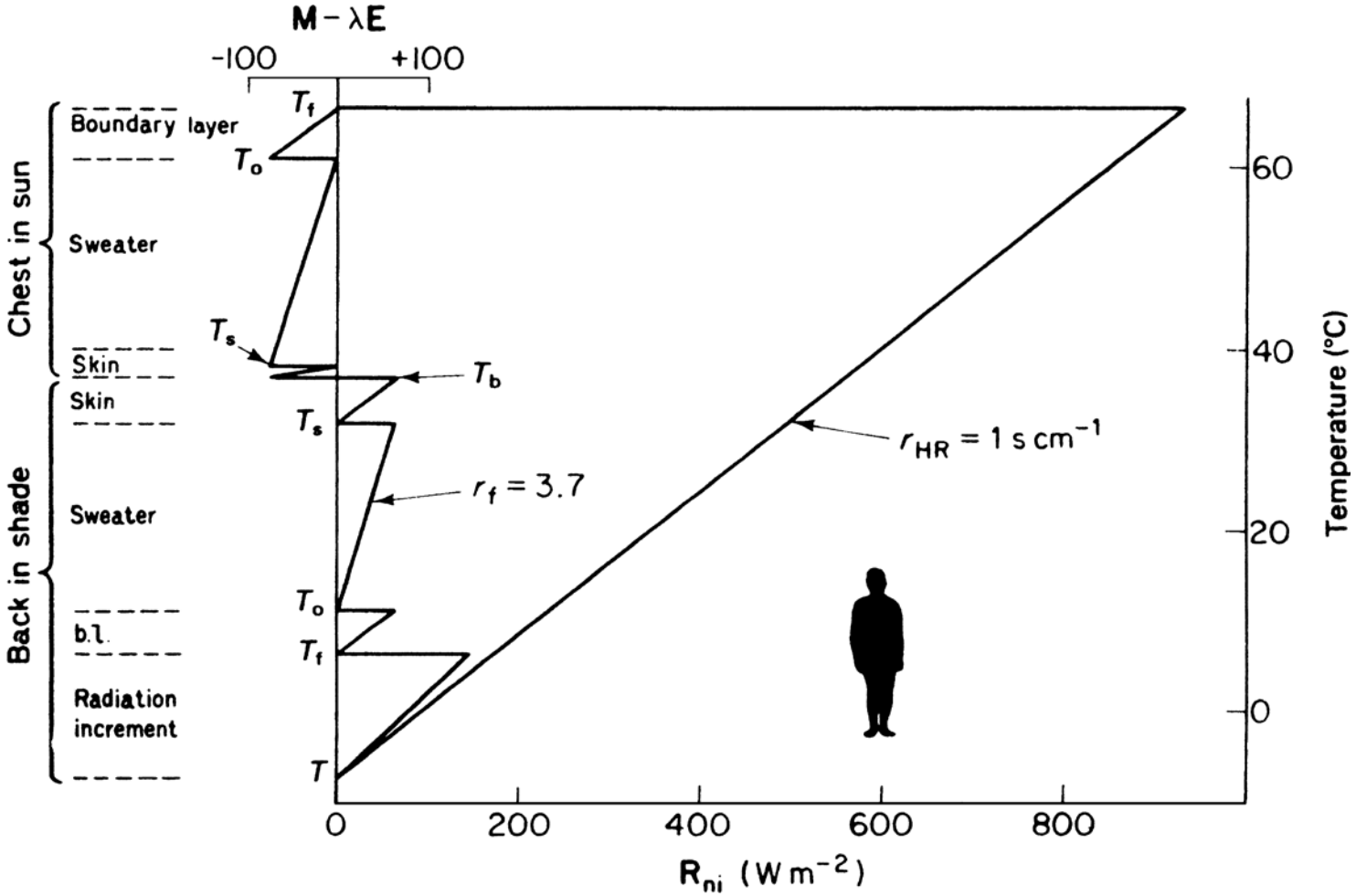

Figure 14.10 Temperature/heat-flux diagram for a man wearing a black sweater exposed to arctic sunlight and air temperature of −7 °C. The lower part of the diagram shows the equivalent temperature and sweater surface temperature on his back (in shade) and the upper part shows the same temperature on his chest (in full sun).

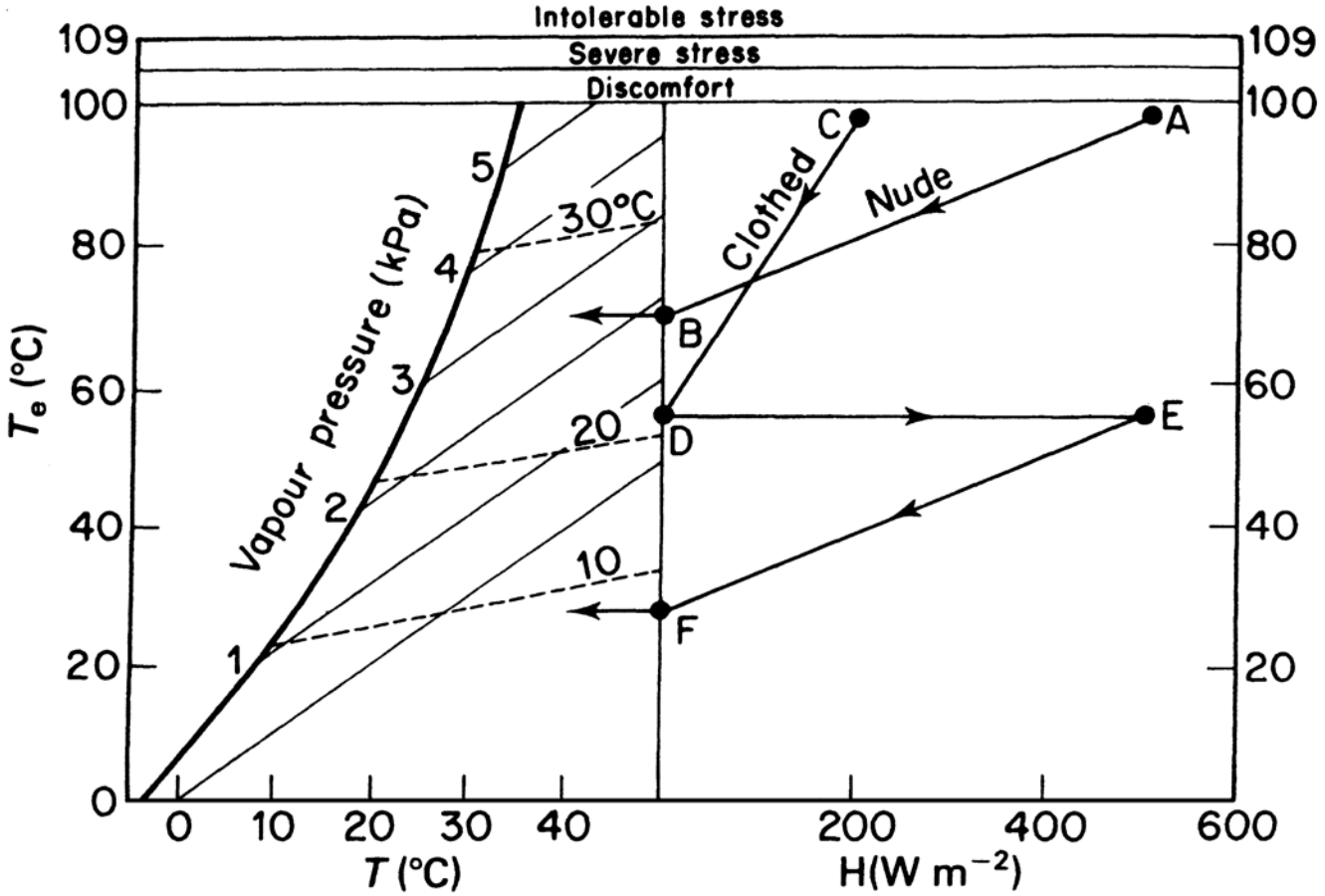

Figure 14.11 Apparent equivalent temperature and heat-flux diagram for a clothed and a nude man (right-hand section) and the relation between apparent equivalent temperature, vapor pressure, and air temperature (left-hand section). The nude man with a total heat load of 500 W m^{-2} can avoid discomfort if the apparent equivalent temperature of the environment is less than the value at B (70 °C) but the clothed man with a heat load of only 200 W m^{-2} must stay in an environment with an apparent equivalent temperature less than 28 °C (point F). The dashed lines are isotherms of wet bulb-temperature.

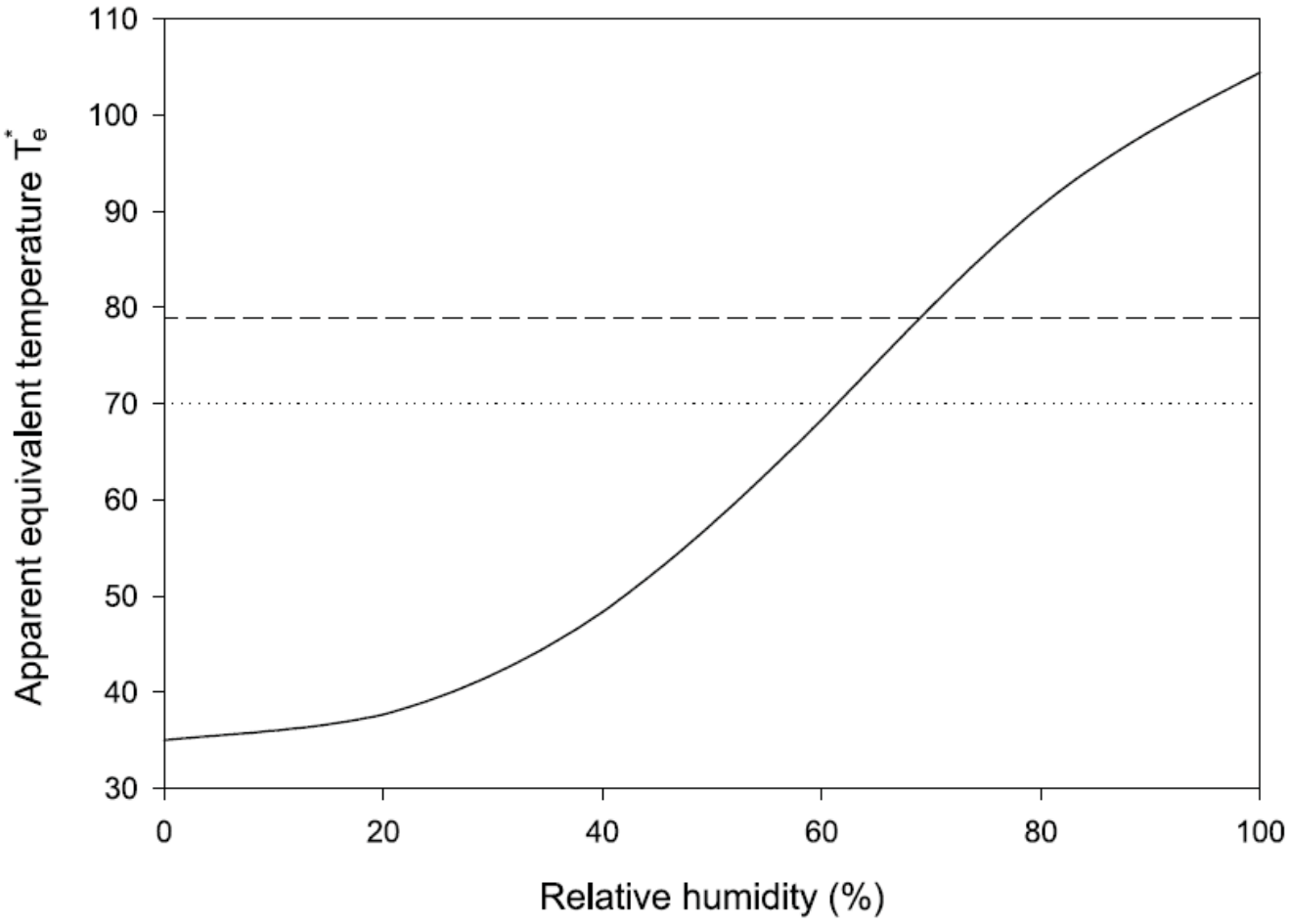

Figure 14.12 Variation of apparent equivalent temperature T_e * with relative humidity for a marathon runner when air temperature is 35 °C (see text). The dashed lines are the solutions to the heat balance equation when $M + R_{ni}$ = 780 (- - - -) and 1080 W m^{-2} *(. . . . .)*, giving T_e * = 79 °C and 70 °C, respectively.