concentrations of adrenalin or other humoral agents in the circulating blood (*4*).

Excessive increments in sweating were recorded on the nonoccluded limbs, particularly contralateral to the exercising limb (Fig. 3). Kuno (*5*), Randall *et al.* (*6*), and Collins *et al.* (*7*) have described similar observations of increased sweating at rest of the arm contralateral to the occlusion. However, our results suggest that the development of the high contralateral sweating responses is much faster in exercise than during rest. The mechanism is unexplained, but the possibility of mediation through cutaneous pressure or vascular baroreceptors, or both, must be considered.

The immediate responses of the sweat glands to stimulation by exercise indicate that the afferent side of the impulse-conduction system is dependent on a neural sensing mechanism. Our earlier data did not reveal whether this sensing mechanism was activated through factors directly related to the muscular contractions or through local heat receptors. However, it is doubtful whether enough heat can be liberated within 2 seconds after the initiation of muscular work to produce the highly augmented sweat responses. The participation of local heat receptors in muscles or veins (*3*) seems unlikely, since prevention of heat removal by circulatory occlusion did not abolish the sharp decrease in sweating after isometric exercise (Fig. 1*C*).

The demonstration by Robinson (*8*) that both internal and skin temperatures participate in the regulation of sweating during work is in accord with our findings. It appears that the various thermal parameters provide a setting of the heat-loss system for afferent impulses from the neuromuscular system. Our observations substantiate the opinions of Asmussen (*9*), Minard (*10*), Bradbury (*11*), Keller (*12*), and Nielsen (*13*) regarding the direct effect of exercise on the thermoregulatory system. Our evidence tends to refute the concept that an elevation of the hypothalamic temperature is essential for increased sweating during all physical work in a warm environment (*14*). One possible mechanism is suggested by Jackson and Hammel (*15*) who concluded after experiments on exercising dogs that there is a lowering of the thermostatic set point during exercise. The observed direct relation between the sweating responses and the work load under presumably constant thermal excitation (*16*) suggests that either muscle receptors or irradiation of motor impulses play a part in the increased excitation of the sweating mechanism.

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Cutaneous Water Loss in Reptiles

In their report on water loss in reptiles [*Science* **150**, 1547 (25 March 1966)] Bentley and Schmidt-Nielsen considerably diminish the force of their conclusions by using the very crude formula of Benedict to estimate the surface areas of the animals. No account is taken of the very different shapes of the five species or of the relatively water-impermeable shells of the turtles. The principal effects of this oversimplification are (i) underestimation (relative to the caimans and lizards) of the rate of cutaneous water loss per unit surface area in the two turtle species and (ii) underestimation (relative to *Pseudemys*) of the rate of cutaneous water loss per unit surface area in *Terrapene*. Appropriate adjustments of the data would make a strengthened case for rejecting the notion of the water-impermeability of reptilian skin, especially in the turtles, whose effective surface areas are so small. On the other hand, certain of the observed correlations with habitat will be altered, although surely not eliminated. For instance, the cutaneous water-loss rates are probably more similar for *Caiman* and *Pseudemys* and more disparate for *Terrapene* and *Iguana* than Bentley and Schmidt-Nielsen indicate.

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We are pleased that Hurlbert agrees with our case for rejecting the notion of the water impermeability of reptilian skin. We also feel that our data, which show substantial evaporative water loss from the integument of reptiles, would not be substantially strengthened by making "appropriate adjustments." Any person looking at a turtle must be struck by the difference between the hard shell and the soft skin, but, since no information is presently available on their relative permeabilities, it is unjustified to make any attempt to assess the relative roles in water loss of these two areas of the skin.

In regard to the adjustment of surface areas for the different shapes of animals, Benedict carefully reviewed the subject and concluded that attempts at determining surface areas to better than 10 or 20 percent are rather meaningless. He concluded his work with the suggestion that the same equation can be used as an approximation for the surface area for all tetrapods. Such errors as may occur, say, of a magnitude of 20 percent, are insignificant in comparison with our observed differences in water loss of several hundred percent.

We have continued our studies of water loss in reptiles, and we have included an examination of the relative permeabilities of various parts of the integument of turtles. Our main thesis, that the reptilian skin is by no means impermeable, is being amply confirmed.

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