COMMENTS
by Readers

Elementary zoology books and descriptive handbooks, some of comparatively recent date, retain the use of semantically poor thermal terminology. Similarly, inadequate or even misleading statements are used to describe the body temperature of reptiles. It is commonly stated, for example, that "reptiles have the temperature of the surrounding air." This is only vaguely true. It would seem desirable to eliminate both the semantic difficulty and the misleading statements in new and revised editions of the books.

Birds and mammals are usually referred to as warm-blooded organisms, partly because they are capable of maintaining temperatures that are ordinarily higher than that of the circumambient air, and partly because of the assumption that bird and mammal temperatures are higher than those of the so-called cold-blooded animals. Because temperatures of the air or the substratum on occasion may be higher than the body temperatures of the "warm bloods," the term loses some of its force. However, it is particularly misleading when the usage implies that modern reptiles habitually operate at lower body temperatures than the mammals. Most diurnal lizards function within an optimal range of 36–42°C. (R. B. Cowles. *Amer. Nat.*, 1940, **75**, 542–561; R. B. Cowles and C. M. Bogert. *Bull. Amer. Mus. nat. Hist.*, 1944, **83**, 265–296), which is fully as high as that of many mammals and more than equals the temperature of the more primitive birds. By this criterion, some birds, and probably no mammals, are entitled to the term warm blooded.

Wherever the terms warm blooded or cold blooded are replaced by the descriptive terms homoiotherm and poikilotherm, the concepts evoked are more nearly accurate, but it is still misleading because many lower vertebrates living in caves, all tropical fishes, and completely aquatic amphibia and reptiles are all probably more nearly homoiothermic than are many birds and mammals. In both groups of homoiotherms there are forms in which seasonal or diurnal fluctuations are characteristic physiological traits. In fact, all birds exhibit considerable rhythmic diurnal fluctuations, and many hibernating mammals as well as monotremes, marsupials, and at least some edentates are characterized by one or another type of temperature variation.

Although the nature of organisms defies our attempts to place them in unvarying categories, the most significant thermal difference between the poikilotherms and homoiotherms is the major reliance of the so-called warm-blooded animals on endogenous, internally generated sources of heat. It is for this reason that these animals were originally given the term endotherm. Conversely, since the cold-blooded animals derive practically all of their effective heating from outside the body, where it is absorbed either directly from the sun (heliothermic types) or indirectly through contact with adjacent substances (thigmothermic types), collectively they were designated as ectotherms. It is believed that the use of these terms evokes a more accurate concept of the real differences underlying the thermal physiology than do the words in current use.

Possibly as a result of the semantic inadequacy of the older terms, it is customary to state that the cold bloods—that is, the poikilotherms—live at the temperature of their environment. In a broad sense this is true, but it is misleading. The body temperature of the ectotherm is derived from its environment, which in diurnal species consists of the sunlight, the substratum, and to a less extent the circumambient air. Furthermore, if the animal is moving, the environment will differ from moment to moment. The extent to which a broad statement can be meaningless is illustrated by the following extreme example. A small lizard, *Uta stansburiana hesperis*, was captured on a windy day while it was basking in a rock crevice exposed to full sunlight. The air temperature was 13°C., but the cloacal temperature was 38°C. In this case the temperature of the lizard was the product of the environment, which consisted of the heat absorbed from the sun, heat loss to the rock on which it was perching, and to a lesser extent loss to the air. A closer analysis undoubtedly would have revealed that the air film on the lizard's body was somewhat less than 38°C., and that the air 1 mm. away would have been cooler, while that at a foot or two away would be nearer 13°C., the temperature of the uninterrupted stream of air. (R. B. Cowles, *University of California, Los Angeles*, and C. M. Bogert, *American Museum of Natural History, New York.*)

The issue of *Science* for August 2, 1946, appropriately printed a letter by Edward J. Van Liere, pleading the cause of new physiological terminology, and suggesting a distinction between asphyxiate and anoxiate. I have for some time considered the possibility of two coined words that should be of use to medical entomologists:

Transstadial. Terminology of the relationship of insects and their allies to harbored disease organisms has in the past been encumbered with such awkward terms as "stage-to-stage transmission," "generation-to-generation transmission," or the inappropriate "hereditary transmission" of disease agents in their arthropod hosts. Lately the descriptive phrase "transovarial transmission" has come into increasing favor in reference to passage of the agents from one generation to the next. As a corollary, the term "transstadial transmission" should also be concise and useful as denoting persistence or passage of such agents through the various stages of a given generation of the host. "Interstadial" would be more euphonious but less exact in combination with "transmission."

Nosarthrology. The recent war has emphasized the important field of medical entomology having to do strictly with arthropods as vectors of disease agents. The recently evolved word "virology" is a somewhat parallel case in the broader field of bacteriology. "Nosarthrology" is suggested as an appropriate term for the science of transmission of disease agents by insects and their allies which could be used in a more restricted sense than the broader current conception of medical entomology. (Col. Cornelius B. Philip, *U. S. Public Health Service, Hamilton, Montana.*)