

Session IX
Thermoregulatory Modelling
Abstracts 59-61

59 Modeling human exposure to thermal stress

E. H. Wissler, University of Texas at Austin, Austin, Texas USA

Physical scientists and engineers, and to a lesser degree biological scientists, rely on mathematical models to describe natural systems with which they deal. Mathematics provides both a convenient language for describing quantitatively various components of a system and logical rules for converting a given description into a form more suitable for a particular purpose. Although some may argue that the human thermal system is too complex to be described mathematically, the author would argue that such a complex system can only be described adequately in mathematical terms. To be sure, the description will be incomplete and somewhat lacking in precision, and its faults will be made obvious by the very definiteness that characterizes a mathematical model. Nevertheless, quantitative comparison of computed and measured human responses to various combinations of thermal stress and exercise provides a powerful mechanism for improving a model, and, thereby, increasing our understanding of thermal physiology,

In this paper, the author traces briefly the development of human thermal models during the past forty years, and then describes a recently developed model. A comparison of representative computed results with corresponding measured values is presented, before-typical applications are described. The paper concludes with a discussion of aspects of modelling that are in need of improvement, and a bit of speculation about the impact that new computers will have on human thermal modelling.