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A DISCUSSION OF

"Potential of Physical Models for Achieving Better Understanding and Evaluation of Watershed Changes"

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I can attest, from personal experience, to the difficulties of constructing physical models of watersheds. Further, I am in complete accord with Dr. Eagleson in his contention that there must exist scaling relations or some type of similar performance relations between laboratory catchment studies and natural watersheds. Such relations are necessary if the information gained in laboratory studies is to be extrapolated to the real world situations. I am convinced that it is impossible to maintain dynamic similarity in general models of a watershed, and Dr. Eagleson has convincingly argued the very limited class of hydrologic models in which dynamic similarity can be maintained to an acceptable degree. However, is dynamic similarity the only useful relation between laboratory studies and the real world? Barr (1), in a discussion of Eagleson's paper, "Scale Model of Urban Runoff from Storm Rainfall," said of modeling relations, "... once true dynamical similarity is lost, a hydraulic model becomes a hydraulic analog, and that it is then important to adapt vigorous procedures regarding the meaningful putting together of the elements of the analog." My own efforts with a physical watershed model have led me to think in terms of analogous performance between the laboratory system and the real world system and of analogous performance criteria relating the two. But I must add that I think the laboratory models (or analogously performing catchment systems) can only be useful in developing mathematical models which all eventually must be verified with real world data. Thus, there is a potential of physical models not developed by Dr. Eagleson. I have indicated that it is the mathematical model that is of ultimate importance, and I think Dr. Eagleson also infers this when he concludes that the digital computer has a greater potential usefulness in hydrologic studies than have physical models. I agree with this opinion in the sense that there is no need for further proliferation of physical models—rather develop the existing facilities to their fullest. These facilities can then, to some extent, aid in the development of mathematical models which can be solved by the electronic computers for the benefit of society.

REFERENCE CITED

(1) Barr, David I. H. "Discussion of 'Scale model of urban runoff from storm rainfall.'" *ASCE, Journ. Hydraulics Div.*, 94 (*HY* 2), 586-588 (1968).

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