BOOK REVIEWS

Biological Effects in the Hydrologic Cycle
Edited by E. J. Monke. Department of Agricultural Engineering, Purdue University, West Lafayette, IN 47907 392 p. 1971.

This book is the Proceedings of the Third International Seminar for Hydrology Professors held at Purdue University on 18-30 July 1971. The 30 short papers that comprise this text are directed toward the terrestrial phase of the hydrologic cycle. Four specific objectives of the seminar are stated in the introduction:

1) To establish the role of biology in the hydrological cycle, to stress the subordinate nature of the hydrological cycle with respect to the ecosystem, and to present the philosophy that the ecological system might well be the policy criterion base for future planning and development of our water resources.

2) To reexamine the biological-physical interactions in the hydrological cycle, at least where the biological input is significant.

3) To discuss problems in identifying and quantifying the biologically affected hydrological variable, particularly with regard to hydrologic systems analysis, and to acquaint participants of recent developments in assessing the effect of vegetative cover by remote sensing.

4) To examine case studies of management schemes in which the biological component is altered to obtain the select watershed response, and to discuss decision making with respect to alternatives.

To achieve these objectives, the selected papers encompassed a range of topics from ecology, demography, politics and recreational management to the study of specific hydrologic processes such as evapotranspiration, infiltration and overland flow, and the modeling and simulation of hydrologic and sediment transport. The individual papers are generally informative and clearly and simply written. Most papers are understandable in a single reading and the readers tend to avoid the excessive use of scientific terms peculiar to their specific discipline. However, the organization of papers within the proceedings, and the orientation and integration of papers necessary to meet the stated seminar objectives were inadequate.

The rationale behind the organization of papers within the proceedings was unclear. The hydrologic simulation and modeling papers were logically organized and grouped, yet papers relating to another phase might be inexplicably separated. For example, “Problems in Decision Making in Hydrology” by M. L. Johnson and “Environmental Policy and Political Decisions: The Role of Facts, Values and Interests” by N. E. Wengert are separated by nearly the full length of the book and a number of totally unrelated papers. This can create some difficulty for the reader who is interested primarily in a single topic.

The lack of orientation of many individual papers toward seminar objectives and the heavily preferential emphasis on selected objectives were also apparent. Some authors selected and listed objectives that were only remotely related to the seminar objectives while others simply did not meet the seminar objectives. The emphasis in many papers is weighted heavily to objective 2, particularly as related to the interception of rainfall and snow, infiltration and interflow, and overland flow. Because of this orientation, the emphasized biologic-hydrologic interaction is the effect of vegetative cover on evapotranspiration, runoff and infiltration. The reverse effect; i.e., the effect of hydrology on biology, receives very little treatment. Obviously, “stressing the subordinate nature of the hydrologic cycle with respect to the ecosystem” as stated in objective 1, is not likely to be a realistic result of this approach.

In my opinion, the basic underlying problem, of which the previously stated criticisms are a part, is philosophic. In comparing the objectives and the text, it appears to emphasize the achievement of largely interdisciplinary objectives by a multidisciplinary approach. This requires that either the objectives or approach be changed. The advantage of the interdisciplinary approach is it provides a means to investigate the interface between disciplines. By this, the participants hope to establish some basic and common definitions to open up true communications. Their objective is to subordinate disciplinary goals for interdisciplinary goals to achieve a common solution. In contrast, the multidisciplinary approach emphasizes that each discipline is paramount, although hopefully the disciplines can be organized in such a way as to achieve overall program goals. This approach is not likely to be successful unless overall goals are essentially combinations of close related to individual goals. Even so, if the organizers fail to impose program goals and establish the role and objectives of each participant within this overall framework, the seminar becomes a collection of individual papers. This is the basic weakness of this proceedings. The reader interested in either selected individual papers or a brief, well-written, generalized treatment of hydrologic modeling and of the behavior of hydrologic components could find this book a welcome addition to his library. However, the reader primarily interested in the selected historical information, improved photographs, and updating in many areas are all significant improvements.

The strength of the book lies in its relative breadth of coverage and the technical accuracy of the discussion that equals or excels any other general treatment of soils we have examined. This strength, however, is a cause of the book’s major weakness when used as a text in an introductory soil’s course. The depth of discussion and detail often overwhelms the beginning student of soils. For example, the latest revision in the chapter on “Forms of Soil Water . . .” provides a host of new terms and concepts, beyond that needed for a basic understanding of water behavior in soil-plant systems. The instructor in such a course must extract and synthesize the concepts and components to master rather than depending upon individual study of the material. This is not necessarily bad, but more demanding of the instructor.

The sequence of subjects is reasonable, but we have long felt most of the material in Chapter 2 (Supply and Availability of Plant Nutrients . . .) was out-of-place and should not precede the discussion of soil reaction, cation exchange capacity, and base saturation which is inappropriately segmented among three chapters. Also the chapters on soil formation and classification should ideally follow the excellent treatment given to physical properties of soils rather than being discussed late in the text. More descriptive illustrations on cation exchange capacity could greatly aid the introductory student in understanding cation exchange. Some confusion in terms has crept in with revision, such as the name for the new soil classification system and the use of differing values for field capacity tension in text versus illustrations. However, we are sure the author will remedy these with revisions as users keep him advised of the difficulties.

Even with some expansion in subject matter, editing of obsolete and unnecessary material has resulted in a text of comparable length to the seventh edition.

This book continues to be a valuable text in college-level, introductory soils courses as well as a useful reference on general soils information for advanced students, or any one interested in our valuable resource, the soil.—W. W. McFEE and G. E. VANSCOYOC, Agronomy Department, Purdue University, West Lafayette, Indiana 47907.

The Nature and Properties of Soils, 8th Edition

Old books are not necessarily like wine, improving with age, but this 8th edition by Nyle C. Brady is an improvement in the basic soils text that has been widely used since the first version by W. L. Littleton Lyon and Harry O. Beaman in 1922. This revision cannot be considered major but does update and add some new emphasis to the soil’s role in waste disposal, pollution of the environment and its vital position in the ecosystem. Increased readability, added historical information, improved photographs, and updating in many areas are all significant improvements.

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