Review

Rainfall and Runoff by Edgar E. Foster. pp. XIX and 487.
(New York: The Macmillan Company, 1948).

Until recently hydrology has not had much recognition as a distinctive science, and it is only during the last two decades that very considerable developments, especially in America, have been made in the field of hydrology, particularly in view of the big and numerous water projects. An idea of the magnitude of the projects can be obtained from the fact that the appropriation for 1947 for flood control in America was about 300 million dollars, and the cost of three of the water projects in India, viz. Bhakra, Damodar and Hirakud, may be over 200 crore rupees.

Previously, empirical processes and rules were used, but application of statistical methods including the theory of probability in hydrology, developed and extended considerably during the last 20 years, is being increasingly used by engineers.

The developments in hydrology are, however, given in the journals, reports and special publications of the societies and organisations and are not easily accessible, and a book in which an account of the developments in America is given in a collective form, is very welcome.

In the book, the author has dealt in a concise manner with the following:

Demands of water resources, scope of hydrology, treatment of hydrological data; statistical methods used in hydrology—average, standard deviation, moments, frequency distribution— normal and skew, binomial law, Gram Charlier series, logarithmic transformations, Poisson's function, correlation, regression line, measure of precision; graphic presentation and treatment of hydrologic data; atmospheric moisture and humidity, correlation of humidity on successive days, precipitation, measurement of precipitation, relation between precipitation and temperature; climate; descriptive graph of climate; air masses, their properties, fronts, thunderstorms—their occurrence, causes, distribution and frequency; cyclones—tropical and extra-tropical; precipitation, monthly means, diurnal variation, distribution in storms, depth-time curves, variation and trends in annual precipitation; isohyetal maps, Thiessen method, peak, shift and correlation of precipitation, frequency of rainfall, fitting of Slade curves and goodness of fit, intensity of rainfall, distribution of rainy days, the station-year method; snow-measurement surveys, effect of melting, floods; evaporation—effect of temperature, wind and insolation; formulae for calculating; run-off, rating of gaging stations, sources of run-off, infiltration, unit hydrograph, distribution factors—determination and variation effect of snow; floods—causes, frequency determination—approximate and probability methods, flood peaks, computation of frequency curves (Slade), Comparison of frequency moments, probable maximum floods, frequency by Foster's method, Fisher's function; ground water, springs, movement, wells, replenishment, water table, composition; utilization of hydrologic data—urban water supply, irrigation, water power, flood control and drainage and storm sewers, major hydrologic problems, supply of water, minimum flow, evaporation losses, distribution of supply, duration curve, flow summation curve, flood frequency and loss, rain frequency and intensity, and flood design. He has also given a large amount of data and worked out many examples illustrating the use of statistical methods.

There are 92 tables and 179 figures. There is also a long bibliography containing 200 references, but these are limited to American publications and authors. It would enhance the value of the book if in the next edition a brief account of the work done in other countries is also included.

The author's purpose, as stated by him, in writing the book was twofold. Firstly to present a reasonably complete picture of the science of hydrology as related to rainfall and run-off, including the more important and well established principles that have been developed within the past two decades and secondly to introduce into hydrological practice the use of the methods of statistical analysis. His purpose has been very well achieved and he has succeeded in giving a clear exposition of the fundamentals of hydrology, rainfall and run-off. The book will be found very useful by practical hydrologists and students of hydrology.

S.K.P.

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Vol. I. No. 2, page 150 under 'ADMINISTRATION REPORT ETC.' para 2, line 6, for '59000' read '65000' and for '2400' read '33000'.