

# The Canadian Engineer

*A weekly paper for engineers and engineering-contractors*

## STREAM FLOW INVESTIGATIONS

NOTES ON METEOROLOGICAL PHENOMENA WITH REFERENCE TO GOVERNMENT POWER AND STORAGE INVESTIGATIONS OF THE BOW RIVER—FROM REPORT OF M. C. HENDRY, CHIEF ENGINEER.

THE various relations which exist between precipitation, altitude, run-off, temperature, evaporation, etc., make the study of stream flow exceedingly complex. While the influence of each is not in all cases a direct one it is frequently of such magnitude that to regard it lightly leads to inaccuracies of serious nature. In hydro-electric development work all factors influencing the discharge of the river or stream demand closest investigation over a period of years in order that

question soon reveals the fallacy of this assumption, for the relationship is anything but simple, being influenced by a great many physical features of a rather indeterminate nature.

The collection of precipitation data all over the country has been carried on for a comparatively long term of years, whereas data regarding the run-off of streams are rather meagre. If, therefore, some general relation can be established between rainfall and run-off, the study

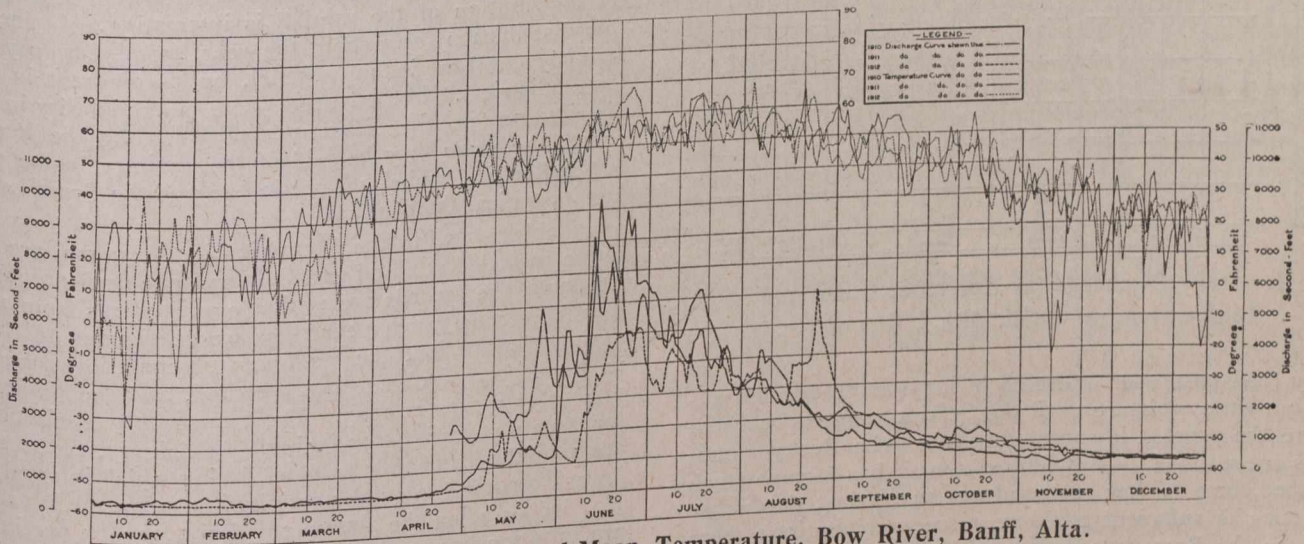


Fig. 1.—Daily Discharge and Mean Temperature, Bow River, Banff, Alta.

their valuable characteristics may be measured to a degree providing mathematical limits within which lie the data to form the basis of the proposed design. The value of an exhaustive study of these physical characteristics and their causes, is rightly emphasized by Mr. M. C. Hendry in his recent report on the power and storage investigations of the Bow River. These investigations were made by him under the direction of Mr. J. B. Challies, Superintendent of Water Powers in the Dominion. In our issue of last week the work which the Water Power Branch has accomplished on the water resources of the Bow River basin was chiefly outlined. The following notes respecting meteorological phenomena are from the above report.

The importance of a study of precipitation in connection with the flow of streams cannot be emphasized too much; its influence on stream flow is a very direct one and, without study, the erroneous conclusion is reached that the relation between precipitation and run-off is a simple one. A little time spent in the study of the

of the streams from the standpoint of power production can be placed upon a more satisfactory basis. In the West, run-off data have been collected for a very short term of years, and only during the last three has a continuous record of the discharge been kept; thus the importance of a general relationship between recorded precipitation and run-off is all the more apparent.

The distribution of rainfall in any district or part of the country is not uniform. The records throughout Canada, generally, except in the eastern provinces, do not extend over a sufficiently long period, nor are the stations widely enough scattered to define areas in which certain amounts of rainfall may be expected. In the West, an examination of the available records seems to indicate a general conformation to conditions found to the south, in the United States; that is, that the lines of equal rainfall are generally north and south, or roughly parallel to the mountain ranges. There are, of course, divergences due to local influences.