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CANAL IRRIGATION IN THE PUNJAB

**An Economic Inquiry Relating to Certain Aspects of the Development
of Canal Irrigation by the British in the Punjab**

CANAL IRRIGATION IN THE PUNJAB

AN ECONOMIC INQUIRY RELATING TO CERTAIN ASPECTS
OF THE DEVELOPMENT OF CANAL IRRIGATION
BY THE BRITISH IN THE PUNJAB

BY

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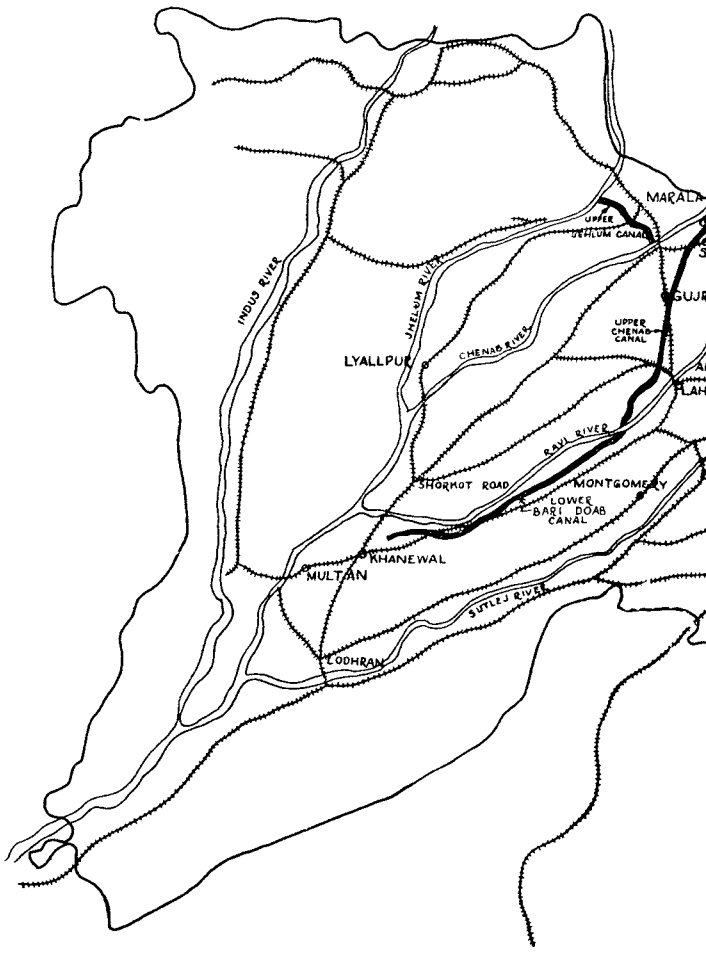
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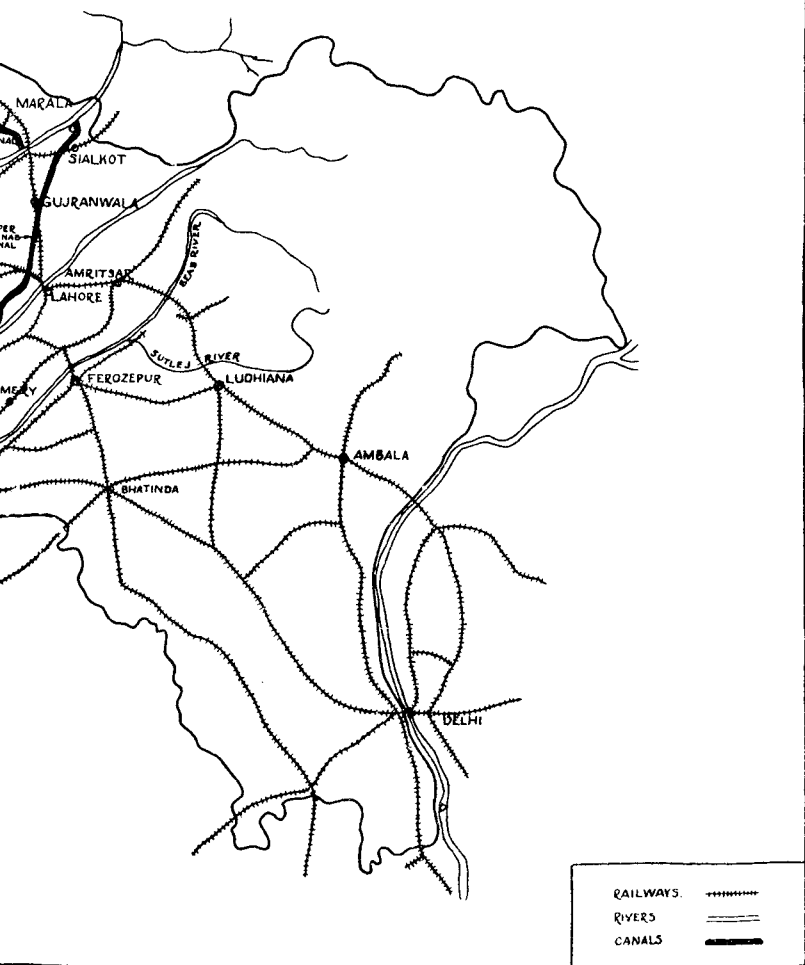
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PREFACE

A study such as this perhaps requires some justification. Why attempt to discover the economic effects of irrigation in the Punjab? Are the economic problems in this portion of the world different from those obtaining in other parts where recourse to irrigation is necessary in order to reclaim additional soil for increasing populations? Why should anyone study a situation so far removed from the busy intense life of what is termed western civilization?

The incentives for attempting such a study as this may be briefly summarized as follows: Comparatively little accurate information is available to persons in countries outside of India concerning Indian economic life. For the Indian student of economic conditions materials in the form of governmental reports and special studies may exist but the reports are widely scattered and comparatively little attention has been devoted to the interpretation of the data which have thus far been collected. This monograph seeks to add to that scanty information by presenting the results of an impartial and systematic study of some of the changes which canal irrigation is bringing about in the Punjab. To even the most casual traveler through this province the intruding importance of the irrigation schemes in the economic life of the Punjab must prove impressive. The motive behind this huge irrigation development in this province has been supplied chiefly by a government whose rule has not been naturally evolved from the people governed nor amicably invited by the *Punjabis*. Hence, this study may indicate, in some measure at least, the possible result of intimate contact between west-

ern initiative and eastern economic conditions, a contact which in this case may eventually cause considerable change in the culture of the eastern people thus influenced. Perhaps this study may also indicate methods which, due to an outside influence or combination of influences, are arousing a people who seem to have been in a " quiescent, indolent, uncultivated state, with all their tastes either fully satisfied or entirely undeveloped " to put forth more of their productive energies to achieve a whole series of new desires. At any rate, such a study should provoke further inquiries to support or refute some of the chief conclusions which have been reached during the process of observation, study and recording of facts.

A few words may indicate the method of procedure. The attempt has been made to cover the literature ¹ immediately relevant to the subject during a period of five years' residence in India. Considerable travel, discussion and observation in the various affected areas during four years' residence in Lahore supplemented the study of the relevant literature. Certain studies by graduate students of the Punjab University, under the direction and supervision of the writer, have afforded additional opportunities for the study of features of particular interest. It has thus been possible to check up details and points of variance discovered in the writings of others on the subject. The chief source of recorded information has been the various government reports to which frequent reference is made in this study.

No one who has attempted to study conditions amidst an environment quite foreign and about the life of a people of an alien culture will be so conceited as to place too insistent an emphasis upon the conclusions of his own study of a given situation or problem. The present monograph is submitted in the hope that it may aid in creating at least an in-

¹ Cf. appended bibliography.

roduction and perhaps an incentive for an exhaustive study of canal irrigation in the Punjab. Such an inquiry will probably require the cooperative efforts of a fairly large group of qualified Indian students of the subject attacking the problem by means of a number of intimate surveys and studies in the various canal colonies of the province. A splendid beginning in such cooperative research has been made by the Board of Economic Inquiry of the Punjab. A list of its publications is included in the appended bibliography.

Every effort has been put forth to state the problem as it exists. This study makes no attempt to exhaust the possibilities and implications of canal irrigation in the Punjab. This monograph is limited to a study of the historical development of irrigation during the period of British rule, 1849 to 1927, and of a few of its economic implications. The introduction sketches in broad outline the general geographical features of the Punjab, a brief characterization of its people and a reference to its early history. Part One is devoted to an historical sketch of the launching, development, construction and expansion of the canal-irrigation projects in the Province under British initiative. Part Two concerns itself with the effects of irrigation on the density and distribution of population in the province and incidentally with the relative growth of population and the extension of the arable area of the Punjab; the attempt is then made to present certain facts relating to increased food production and wealth directly due to irrigation. The trend of the argument in this section is that, due to the extension of irrigation, the available cultivable land area has increased more rapidly than the population has grown, thus resulting in a slightly broader base upon which to produce food for a relatively smaller number of people per cultivated acre. The last section deals with the fiscal aspects of canal irrigation. It is there shown that the

irrigation schemes of the Government have proved a decided fiscal success and that a considerable profit has accrued. The net return to the Government from the irrigation service represents a handsome return on the capital investment. The argument concludes with a brief study of the cost of canal irrigation to the Punjab peasant. The tentative conclusion at which the study arrives is that the canal-irrigation charges which are borne by the peasant are high relative to his standard of living. It is admitted that it is at present impossible to present an accurate statement of the cost of irrigation to the peasant as definitely as has been possible in the study of the Government's return from its investments in the irrigation schemes. Up-to-date detailed scientific studies of the peasants' standard of living are not yet available. The monograph closes with the suggestion that, all things considered, perhaps the cost of irrigation to the people of the Punjab is not unduly great in view of the indirect benefits accruing to the province from the efficient management of the whole canal-irrigation project under British control.

During the period of years which have elapsed since this study was first projected materials have been collected and combined from a variety of sources. Such published records and books bearing upon this subject as have been used in specific portions of the study have been duly acknowledged in the footnotes. Certain individuals who have co-operated especially with the writer in making this monograph possible have placed him under a debt of gratitude which he desires to acknowledge: members of the staff of the Civil Secretariat Library in Lahore, India provided a most willing and pleasant aid in finding and making available for the writer the reports of the Government of the Punjab which have been so copiously utilized throughout; Professor W. E. Weld has given of his time and thought to frequent correspondence with the writer while still in India making this

study; Professor V. G. Simkhovitch, by means of his constructive criticism of the plan and content of this study on the occasion of its presentation before the Graduate Seminar in Economics, greatly influenced the writer's development of the monograph along its present lines; Dr. E. M. Burns of the Department of Economics of Columbia University has carefully read the manuscript and made valuable corrections and criticisms during the period of preparation of the same; many individuals in India and in America have unconsciously aided the writer by means of conversations and interviews on the subject of inquiry. Whatever credit may accrue as the result of this study will be shared gladly with all who have made the study possible. Any blame for its shortcomings will be privately accepted. The writer is alone responsible for the point of view and general interpretation of the problems which he has presented.

P. W. P.

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PART I

**HISTORICAL DEVELOPMENT OF IRRIGATION CANALS
BY THE BRITISH IN THE PUNJAB**

CHAPTER I

THE PUNJAB AND ITS PEOPLE

THE Punjab is one of the eleven major subdivisions established by the British Government for administrative purposes in India. The bulk of this province lies between the thirtieth and the thirty-third degrees north latitude. Its northern boundary is a series of mountain ranges belonging to the Himalayan system; these ranges also form the northeastern limit of the province which also impinges upon the United Provinces on the east; to the south and southwest the Rajputana and the Sind deserts respectively form an unfruitful boundary to the Punjab while on the northwest portion the province is bounded by the Frontier Provinces. Thus the Punjab is quite severely landlocked by mountains and deserts except for that small portion of its boundary which stretches out toward the United Provinces. This quite natural isolation of the province has permitted the development of a fairly unified culture in this section of India and is largely responsible for much of the social solidarity of the people of the Punjab.

The total area of the Punjab and its dependencies is 133,741 square miles, of which, 97,209 square miles are British territory, while native states of various areas account for the remaining 36,950 square miles. It is interesting to note that these Indian States within the Punjab are completely surrounded by British territory within the province. The province gets its name from five rivers, the Indus, Jhelum, Chenab, Ravi and Sutlej, which course through its comparatively level plain. From time immemorial this section of

India has been called the "Land of the Five Rivers."¹ This vast alluvial plain, which Mr. M. L. Darling calls "the real Punjab"² is the most striking feature of the geographical makeup of the province. Approximately three-fourths of the total area of the Punjab lies within this gently sloping plain. A glance at a map of the Punjab indicates that these rivers flow more or less parallel from northeast to southwest finally uniting their sluggish waters to increase the volume of the Indus River near Kashmir in the southwestern corner of the province. The mountain ranges on the northern and eastern boundaries of the area form a picturesque and well nigh impregnable natural line of defense while acting also as an important watershed against which the moisture-laden winds are forced to deposit, in the form of rain or snow, the water which later courses through the "land of the five rivers". The submontane tract separating the plain proper from the mountainous portion of the province breaks the otherwise monotonous terrain and presents soil and climatic conditions quite different from those obtaining on the plain.

The winters are comparatively cold and the summers are long and hot. Its inland position in connection with its sandy soil and its proximity to the Rajputana and Sind deserts gives the Punjab a climate subject to great extremes of temperature. Thus, the winter of a temperate climate is followed by a truly tropical hot season. Such a climate tends to breed a hardy martial race as various writers are

¹ The word Punjab, sometimes spelled Panjab, is derived from two Persian words, *panj* meaning five, and *ab* meaning water. Hence the Punjab is the land of the five waters.

² Darling, M. L., *The Punjab Peasant In Prosperity And In Debt* (London, 1928), p. 84. This Punjab plain is practically level. Its altitude is slightly over 1000 feet at the base of the foothills in the north and northeast, and about 700 feet in the southwestern corner of the province. The slope of the land on which most of the canals have been constructed is between two and three feet per mile.