

THE DESIGNING AND CONSTRUCTION OF STORAGE RESERVOIRS

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The Designing and Construction of Storage Reservoirs by Arthur Jacob & E. Sherman Gould

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ARTHUR JACOB & E. SHERMAN GOULD

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OF
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BY
ARTHUR JACOB, B. A.,

LATE EXECUTIVE ENGINEER FOR IRRIGATION H. M.
BOMBAY SERVICE.

SECOND AMERICAN EDITION.

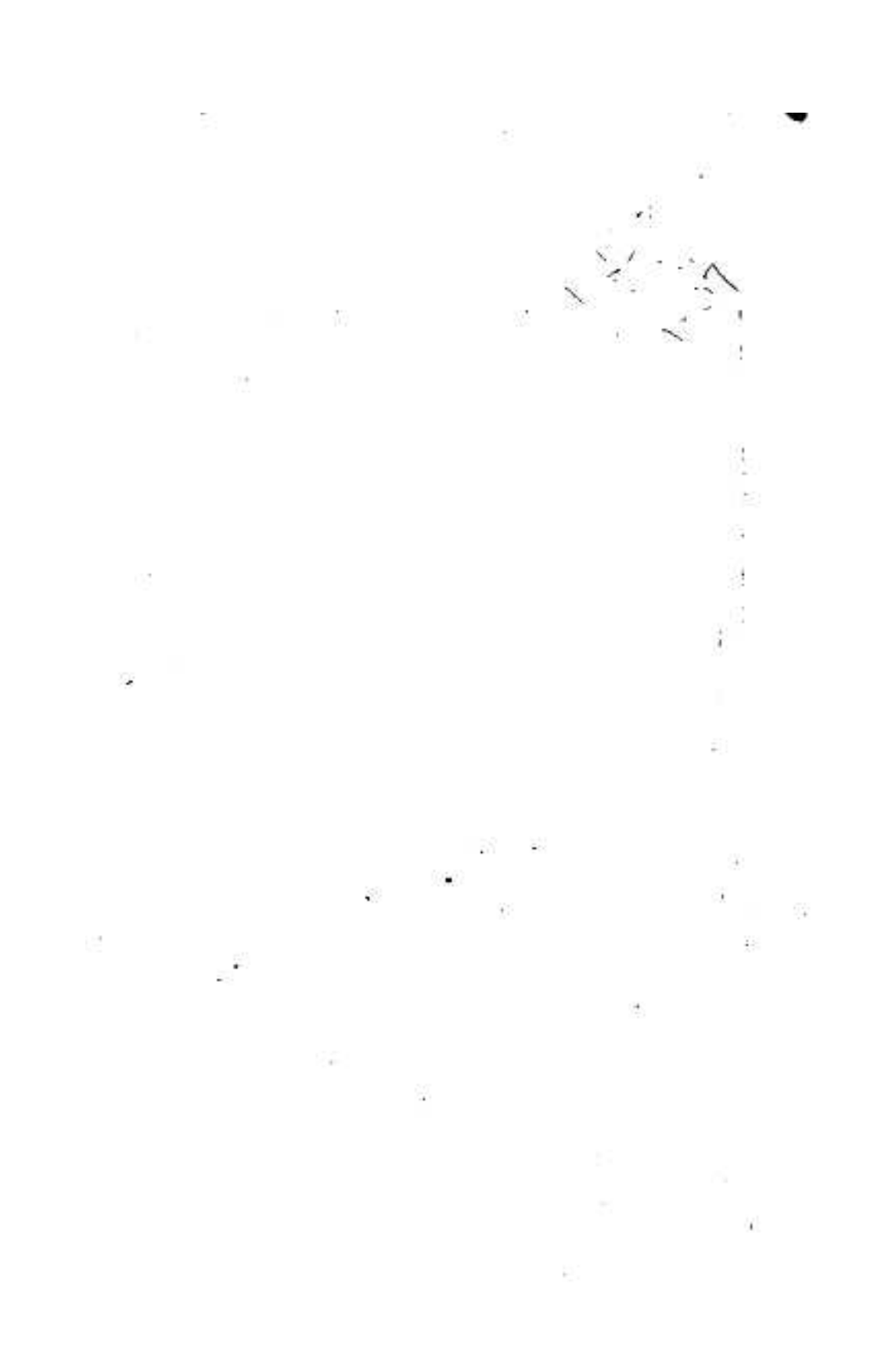
REVISED AND EXTENDED BY
E. SHERMAN GOULD, M. Am. Soc. C. E.,
CONSULTING ENGINEER FOR WATER WORKS.



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1897.





EDITOR'S PREFACE

TO FIRST EDITION.

In preparing a revised edition of "Jacobs's Storage Reservoirs," it was considered best, in view of the standard character of the work, to present it in its original form, with all additional matter separate from the text.

All of the editorial work, therefore, in the present volume, appears in the shape of foot-notes, and the additional pages appended to the original discussion.

E. S. G.

SCRANTON, PA., *January*, 1888.

Preface to New Revised American Edition.

In the present edition occasion has been taken to correct a few misprints which occurred in the first revised American edition of the original work, as well as to make such numerous changes and additions in the notes and "Additional Remarks" at the end of the book as seemed necessary at this later date. These new features are in many cases of considerable importance.

It remains to add that somewhat extensive and unacknowledged appropriations of original matter which appeared in the first American edition of this book have been made by the author of a recently published "Manual of Irrigation Engineering." Reference to this fact is reluctantly made with the sole object that, should the similarity of language in the two books be noticed, no doubt may exist as to which is the original.

E. S. G.

YONKERS, N. Y.

December, 1896.



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Before entering upon such considerations as affect the selection of reservoir sites and their construction, a brief allusion to some of the most ancient works for impounding water may not be uninteresting. Of these the most prominent examples are undoubtedly to be found in Hindostan, where the magnitude and antiquity of the storage works cannot fail to arrest attention. These great works, surpassing in their immensity what are conventionally esteemed to be the wonders of the world, the production of other countries and nations, took their origin in the necessities of the people and the

variableness of the climate of India, and were, in fact, great public works on which the welfare of the people mainly depended. The climate of India, although singularly uniform in some respects from year to year, is remarkably variable as regards the rain-fall ; and in order to guard against the disasters of famine and sickness, inevitably attendant on a scanty monsoon, the native princes were wont to make such provisions as large resources and an almost unlimited power enabled them, in order to obviate the difficulty that they had to contend with.

The rain records of India for several years past show that a scarcity of rain is indicated by periods of about five years, or that every fifth or sixth year is marked by a scanty rainfall over certain districts. The recurrence of these periods is, of course, not very clearly marked, but still it is sufficiently so to warrant, with approximate correctness, the prediction of scarcity and famine ; and such deplorable recurrence is, as all are aware, now reigning in India, and visiting with destruc-

tion, by sickness and hunger, some thousands whose sole dependence is upon a fair season of rain and the successful maturing of their little crop of grain.

The natural expedient for guarding against the recurrence of these periodical calamities was evidently to be found in husbanding a scanty supply of rain-water for the purpose of irrigation, and this the people of India appear to have understood. They took advantage, in certain districts, of every nook and ravine, whether large or small, and converted them into storage reservoirs by throwing across banks of earth, or bunds, as they are termed, producing, in certain districts, such an elaborate and complete system of irrigation as can only be compared, for cost and completeness, to our railway system in England. Taking fourteen districts in the Madras Presidency, where tank irrigation was most generally relied upon, the records of the Indian Government show that there are no less than 43,000 irrigation reservoirs now in effective operation, and as many as 10,000