HYDRAULICS OF RIVERS, WEIRS AND SLUICES. THE DERIVATION OF NEW AND MORE ACCURATE FORMULAE, FOR DISCHARGE THROUGH, RIVERS AND CANALS OBSTRUCTED BY WEIRS, SLUICES, ETC., ACCORDING TO THE PRINCIPLES OF GUSTAV RITTER VON WEX

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649523573

Hydraulics of Rivers, Weirs and Sluices. The Derivation of New and More Accurate Formulae, for Discharge Through, Rivers and Canals Obstructed by Weirs, Sluices, Etc., According to the Principles of Gustav Ritter von Wex by David A. Molitor

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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FIRST EDITION

FIRST THOUSAND

NEW YORK

JOHN WILEY & SONS

LONDON: CHAPMAN & HALL, LIMITED

1908

Stanhope Press
F. H. GILSON COMPANY
BOSTON, U.S.A.

TO THE MEMORY OF

GUSTAV RITTER VON WEX

THIS WORK IS
DEDICATED

Hofrat Gustav Ritter von Wex
was aulic counsellor and chief director of the
Danube River regulation and improvement at Vienna;
knight of several imperial orders; and member
of many scientific societies. He was born
1811 and died Sept. 26, 1892,
in Ischl, Austria.

PREFACE

It seems strange that the earnest efforts of so high a technical authority as Hofrat von Wex should have failed to interest hydraulic engineers the world over. A careful search through the leading hydraulic literature, with one exception, did not reveal a single comment regarding either the man or his work. Prof. I. P. Church says in his "Mechanics of Engineering," 1906 ed., foot of page 688, "Herr Ritter von Wex in his Hydrodynamik derives formulæ for weirs, in the establishing of which some rather peculiar views in the mechanics of fluids are advanced."

The unquestioned ability of Hofrat von Wex and his very extensive practical experience along the lines he has treated, place his work in the front rank of technical achievement in the specialty of river hydraulics. His views and theories on this subject, while radically different from those of his time, are most rational and sound, and merit the respect and approval of all practical hydraulic engineers.

With a thorough conviction of the high value of the Wex theories, the author has ventured to place them before his profession in a form which he hopes will prove most practical and acceptable.

The general status of our knowledge respecting hydraulics generally, and particularly the subject of weirs, is very unsatisfactory, to say the least. Hence any progress, if it be real progress, means a radical departure from former conceptions.

It is the rule that new and progressive ideas are received with more or less suspicion, which Professor Church expresses in the word "peculiar." As such ideas become more generally known they receive a more charitable reception and are soon tolerated. When all opposition fails they are crowned by final acceptance. May the present work advance to this final state.

At this age of water power development, this little book should enjoy a hearty welcome. It was prepared with the utmost care, and while theoretical in its nature, it was written for the practical man. Simplicity and clearness were the first requirements, followed by a logical and practical arrangement in the presentation of the subject.

It was not deemed advisable to enlarge the work by the addition of mathematical tables as is usually done. On the contrary, such tables are of little value when dealing with general problems and in the author's opinion the most useful aid to the solution of the formulæ here given is a copy of Barlow's tables of squares, cubes, square roots and cube roots, and Zimmermann's Rechentafel, being a multiplication table of all numbers from 1 to 1000 by all numbers from 1 to 100. These universal tools should occupy a prominent place on every engineer's book shelf, and nothing better can be proposed here as labor saving devices.

Attention is called to the valuable information collected in Appendix A, which constitutes a most complete exposition of all known older formulæ for overfalls. This in itself is the best argument which can be presented in defense of the new formulæ to which this work is devoted.

Appendix B contains the solution of a novel problem in Hydraulics, which, so far as known, has never heretofore been solved in any satisfactory manner. The solution there given is theoretically correct, and probably more accurate than the knowable accuracy of the empiric coefficients would really justify.

In Appendix C, all the new formulæ are arranged in tabulations for ready reference, thus avoiding loss of time in picking out special cases from the text. It is believed that this offers a very attractive summary of the most useful contents of the book.

The author here wishes to acknowledge his indebtedness to Herr Wilhelm Engelmann, of Leipzig, Germany, for many favors extended and advice given prior to undertaking the present work. Also to Professor Gardner S. Williams and Mr. Allen Hazen, members Am. Soc. C. E., for their kind permission to use the

tabulations relating to effect of weir crests as published in their "Hydraulic Tables," pp. 71–75.

In conclusion he wishes to express his obligation and thanks to Mr. Alex. Ilich Wolkowyski, C. E., Ass't Eng'r, Isthmian Canal Commission, for valuable assistance rendered in the preparation of this work, also to Messrs. John Wiley and Sons for the most excellent manner in which they have accomplished the publication.

DAVID A. MOLITOR.

WASHINGTON, D.C., December 5, 1907.