

**CALCULATIONS IN
HYDRAULIC
ENGINEERING, PART II**

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Calculations in hydraulic engineering, Part II by T. Claxton Fidler

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T. CLAXTON FIDLER

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PROFESSOR OF ENGINEERING, UNIVERSITY COLLEGE, DUNDEE.
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PART II.

CALCULATIONS IN HYDRO-KINETICS

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P R E F A C E

THE calculations which form the subject-matter of this volume are those relating to the motion of water and to the design of works intended for its conveyance. The problems that most frequently arise in the design of such works are treated from a practical point of view; and the chief object of the writer throughout has been to meet the actual requirements of the hydraulic engineer in his daily practice.

In great measure these problems will have reference to the uniform flow of water in pipes and channels, and in all such questions it must be admitted that nothing like a mathematical accuracy is by any means attainable; but it will be the desire of every engineer to employ a method that shall approximate as closely as possible to the ascertainable truth. On the other hand, such calculations will often have to be repeated many scores or hundreds of times for the purposes of one work of construction; and the exigencies of an engineer's practice will almost forbid the employment of any method that involves a great complexity of calculation. The methods which have been followed in this volume will generally require the use of a table of logarithms; but if they do not quite possess the delightful simplicity of the old and well-known formula, they will certainly avoid its more serious errors, while they are capable of being applied with great facility to the questions that most frequently arise in practice. To lighten the labour of such computations, tables of discharge have been worked out for pipes and for brick culverts of circular section.

At the same time, the evidences of experiment, including recent observations, have been analyzed with the object of determining the varying values of the coefficient in the old formula, so that the familiar calculations can be worked out with a tolerable degree of accuracy, on the old lines, wherever that course may be preferred.

Another and quite a different class of problems will relate to

the motion of water as depending upon its calculable acceleration under the action of gravity; and here, of course, the question admits of a more positive solution upon well-known principles.

It would be impossible to deal with a subject of this kind without reference to information which has been contributed by writers and observers of all civilized countries, and has been embodied in a literature which extends over more than two centuries of time. To trace the accumulated evidences of experiment, and the historical development of theory, frequent reference has been made to the works of Hagen and Weisbach, of D'Arcy, Bazin, Ganguillet, and Kutter, of Beardmore, Hamilton Smith, Fanning, Osborne Reynolds, Downing, and Greenhill, as well as to the recorded observations of many engineers and hydraulicians, whose names are quoted throughout the following pages.

T. C. F.

UNIVERSITY COLLEGE, DUNDEE,
UNIVERSITY OF ST. ANDREWS,
February, 1902.

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