

**THE CONSERVATION AND
IMPROVEMENT OF TIDAL RIVERS:
CONSIDERED PRINCIPALLY WITH
REFERENCE TO THEIR TIDAL AND
FLUVIAL POWERS**

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The Conservation and Improvement of Tidal Rivers: Considered Principally with Reference to Their Tidal and Fluvial Powers by Edward Killwick Calver

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EDWARD KILLWICK CALVER

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THE
CONSERVATION AND IMPROVEMENT
OF
TIDAL RIVERS,

CONSIDERED PRINCIPALLY WITH REFERENCE TO THEIR TIDAL
AND FLUVIAL POWERS.

BY
EDWARD KILLWICK CALVER, R.N.,
ADMIRALTY SURVEYOR.

"In the search after Truth, it is better to take hold of broad and established facts, than to be perplexed among the depths and difficulties of those things which are theoretical and empirical."

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JOHN WEALE, 59, HIGH HOLBORN.
M.DCCC.LIII.

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TO

CAPTAIN WASHINGTON, R.N., F.R.S.,

THIS BRIEF TREATISE

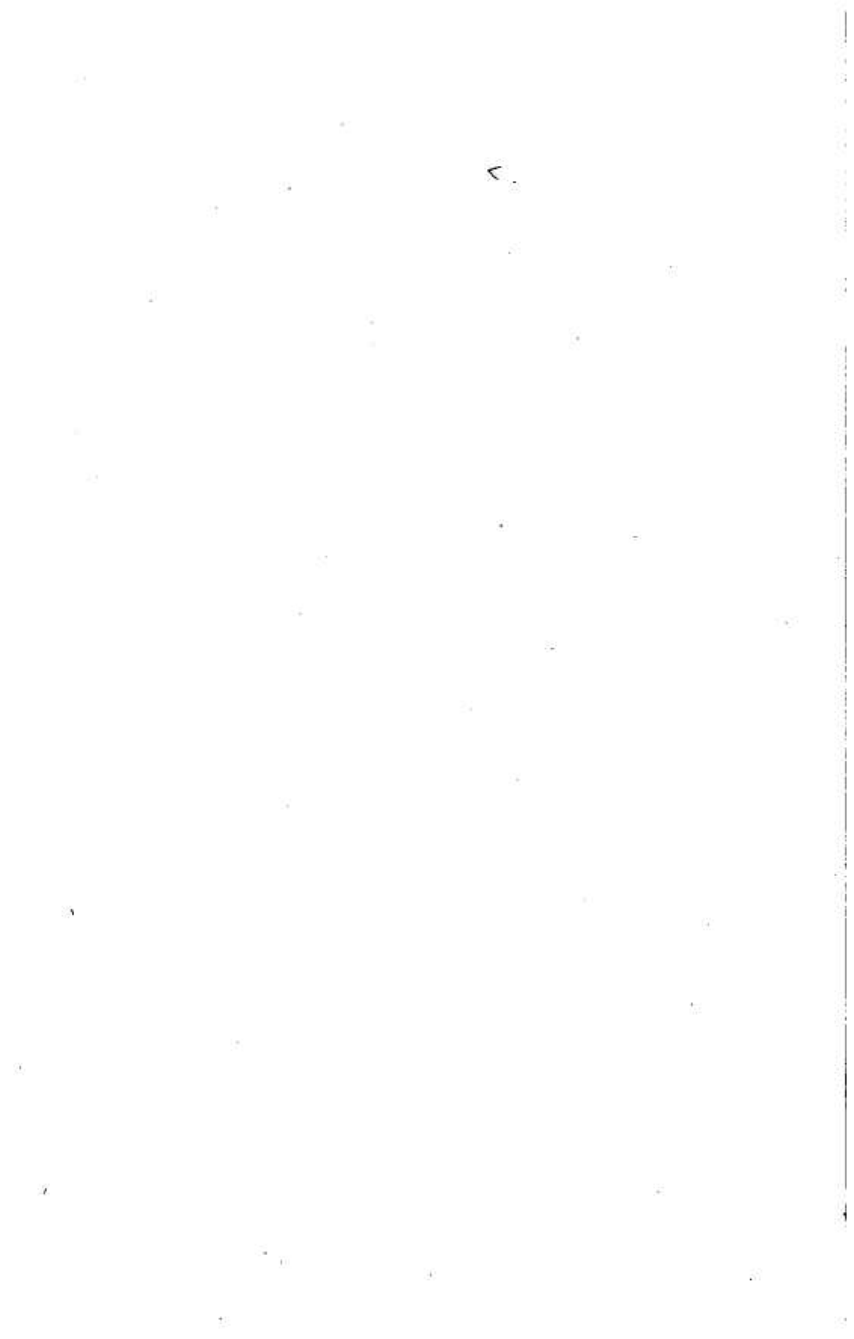
UPON A SUBJECT OF INCREASING IMPORTANCE,

AND ONE WHICH IS SO GREATLY INDEBTED TO HIS SEARCHING INVESTIGATIONS
AND UNTIRING LABOURS,

IS BY PERMISSION INSCRIBED

BY HIS OBLIGED SERVANT,

E. K. CALVER.



P R E F A C E .

A few prefatory remarks only are necessary to explain the origin of the present work, and the plan on which it is constructed.

The writer has been employed for many years in the Hydrographic branch of the Naval Service, and has been engaged upon Surveys of most of the Ports between the North of Scotland and the River Thames. Without having any preconceived notions of his own upon the subject, he has carefully observed the distinctive features of the several Harbours,—the works which have been adopted for their improvement, with the measure of success attending them,—and he has not failed to perceive (what indeed will be generally admitted), that owing apparently to the absence of a well-digested code for general guidance, Hydraulic Engineering, as applied to marine works, has not kept pace with the other branches of practical science.

The writer cannot supply this desideratum, nor does he propound any new theory; but as an extensive field of observation has enabled him to form general views upon the subject, and a late work of examination in which he was engaged having satisfied him of their soundness, and given them consistency, he commits them to the press, as his mite of information, where so much is needed. The small amount of leisure at the writer's disposal precluded his attempting more than a brief explanation of certain examples, and

the lessons they convey; but, with his views of usefulness, he felt he could not do less: for, as Professor Robison remarks, "It is not improbable but that, in the solutions which may be obtained of particular cases, circumstances may occur which are of a more general nature. These will be so many laws of Hydraulics to be added to our present very scanty stock; and these may have points of resemblance, which will give birth to laws of still greater generality." The intention of the act will disarm criticism; and if it be the means only of inducing others to detail their experience, a grain of truth may be culled here and there, and something definite, intelligible, and authoritative may at length be evolved out of the mists and mazes with which the subject is still surrounded.

One leading point has been kept constantly in view in this Treatise, viz., that at the present time, when the laws of Hydro-dynamics are only sketched out rather than filled up, practical examples are the safest finger-posts on the road to Truth, for Nature will answer faithfully if we interrogate her,—*not if we interrogate ourselves.* These pages, embodying the experience of seventeen years, are only offered as a reasonable discussion of points of major importance, and upon which opinion is still much divided. An extensive sphere of observation has been mentioned as the writer's warrant for treating upon the subject, and more than a passing reference might also be made to those instances where his opinions have received the sanction of experience, were the subject not personal, and the act therefore liable to be misconstrued. Many of the views are peculiar, but they are not urged in any spirit of hardy dogmatism: if they are sound, they will be useful; if otherwise, they will do no harm, and will soon be forgotten.

As the work is particularly addressed to unprofessional readers,

all unnecessary technicality, all cumbrous formulæ, and all theory not strictly applicable to the case, have been carefully avoided. Executed as a winter-evening recreation, only the more important points have been touched upon; and, keeping in view the practical end proposed, the aim has been, to give more attention to the logic of facts than to the rigid fitness of a word, or to the construction of a sentence. Incompleteness must needs be a prominent feature of such a work, but it is trusted it will not be found unaccompanied in this instance with materials for thinking. The deep interest the writer takes in the subject for its own sake, may, however, have betrayed him into indiscretion, and the reader's indulgence is therefore requested for any undue earnestness of expression in this well-meant attempt to treat a 'vexed question.'

Sunderland, May 10th, 1853.