# SOLUTIONS OF EXAMPLES IN ELEMENTARY HYDROSTATICS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649460182

Solutions of Examples in Elementary Hydrostatics by W. H. Besant



Edited by Trieste Publishing Pty Ltd.
Cover @ 2017



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Trieste

[Flux, Sir Alfred William]

# SOLUTIONS OF EXAMPLES

IN

# ELEMENTARY HYDROSTATICS

BY

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CAMBRIDGE:
DEIGHTON, BELL, AND CO.
LONDON: G. BELL AND SONS.

1891


Cambridge:
PRINTED BY C. J. CLAY, M.A. AND SONS,
AT THE UNIVERSITY PRESS.

# PREFACE.

I HAVE been frequently asked to produce solutions of the examples in my Treatise on Elementary Hydrostatics, but the pressure of other work has prevented me from undertaking the task of preparing them.

These solutions have been almost entirely drawn up by Mr A. W. FLUX, Fellow of St John's College, and I am much indebted to him for the labour which he has bestowed upon the work.

I hope that they will be found to be useful and helpful, both to teachers and to students.

No figures have been given, but the student will find no serious difficulty in drawing figures for himself when necessary, and he will find it greatly to his advantage to do so.

W H. BESANT.

*January* 1891.

# INTRODUCTORY NOTE.

IN these solutions the expression employed for the weight of a volume $V$ of fluid is sometimes $wV$ and sometimes $g\rho V$.

It must be borne in mind that when $wV$ is used, $w$ is the intrinsic weight, that is the weight of unit volume of the fluid, expressed in pounds weight, so that $wV$ is the number of pounds weight of the volume $V$ of fluid. When $g\rho V$ is employed the unit of force is the poundal, that is, the force required to produce the unit of acceleration in the unit of mass.

If we take one foot, one second, and one pound as the units, the poundal is roughly equal to the weight of half an ounce.

It must be clearly seen that the poundal is an absolute unit of force, independent of time and place, whereas the weight of a pound, that is, the attraction of the Earth upon a pound, combined with the effect of the Earth's rotation, is both local and temporary;

it is different at different places, and it changes at the same place from time to time.

The Earth is not homogeneous, nor is it a sphere, and it is not at rest, but is in a state of rotation about its axis; hence it is that weight depends upon locality.

Further, changes are perpetually taking place in portions of the masses which constitute the Earth, both upon its surface, and beneath its surface; hence it is that the weight of a body at the same place is not an absolutely fixed quantity.

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