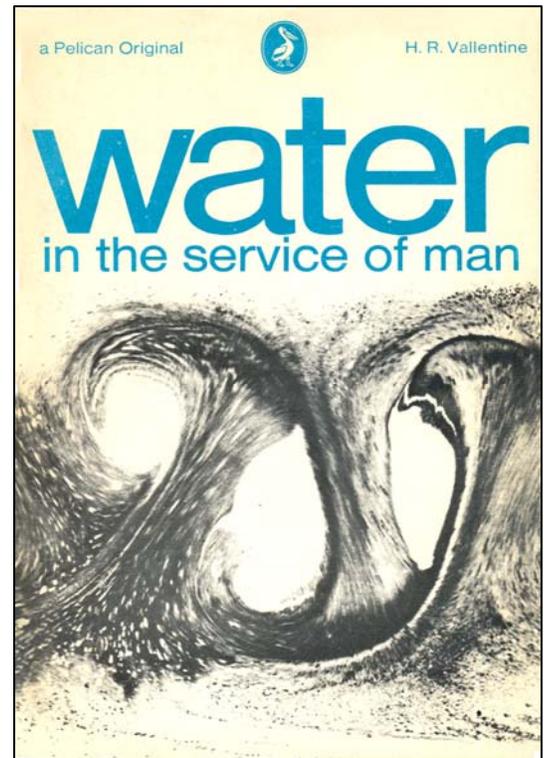


title **Water in the Service of Man**

author **H. R. Vallentine**
A civil engineer, was Chair of Civil Engineering,
University of New South Wales

category Instructional history of water science and
engineering

publisher Penguin Books, A Pelican Original
1967 paperback edition, 224 pages
ASIN: BOOBDVMK8



who will be interested in this book?

Anyone interested in the science and engineering aspects of water given in a very readable, condensed text book form.

why read this book?

From water at rest, water in motion, flow in pipes, rivers and canals, waves, pumps and turbines, hydrology, this book gives the reader an overview of water science and engineering. Vallentine presents technical information in a readable manner, and states in the preface *“This essay is intended to arouse the curiosity of the general reader in the behaviour, the use and abuse of a commonplace yet vital substance. Although it has a technical background, the book is certainly not an engineering text; nor does it pretend to be comprehensive, profound or wholly serious. Mathematics has been kept to a minimum and most of it has been confined to footnotes, to be by-passed by those who prefer facts to figures”*

review / outline by Lance Brown, vistadelsol@telus.net

Overview

Written in 1967, this book is a ‘mini’ text book covering all the basics of water.

Sixty-eight figures and eight black and white photos are given to assist in the technical explanations. It has a bibliography and index.

Chapters & Points of Interest

1. *Introduction*

- of all the resources in nature, the most important for the welfare of mankind is water
- water – what it means to different people
- water is both non-uniform (unevenly distributed over the earth’s surface) and unsteady (delivery rate fluctuates with time)
- knowledge of water is drawn from a jumbled accumulation of thousands of years of engineering experience; a few hundred of scientific analysis; a few score of experiments; and just a few years with modern techniques
- water is used as a scientific standard for mass, specific gravity, temperature, heat, and viscosity

2. *Ancient Water Practice*

- water use in ancient Egypt, Babylonia, Crete, Greece, Rome
- Plato, Aristotle, Archimedes

3. *The Development of Theory*

- Roger Bacon, L. da Vinci, , Simon Stevin, Francis Bacon, Galileo, Isaac Newton, Bernoulli, Euler, Chezy, Lgrange,
- Continuity Equation, Laws of Motion, Equations of Acceleration, Velocity of Flow in rivers and canals
- early civil engineering works

4. *Water at Rest*

- study of pressure forces in a fluid at rest- hydrostatics; in motion – hydrodynamics
- buoyant forces; pressures; dams; accelerating motions; flotation

5. *Effects of Viscosity*

- laminar flow; turbulent flow; boundary layer; viscosity

6. *Water in Motion*

- uniform and non-uniform flow
- basic tools are continuity (Continuity Equation), energy (Bernoulli Equation), momentum (Momentum Equation)

7. *Flow in Pipes*

- pipe strength; head; energy loss; Reynolds number; hydraulic gradient; branching pipes; water hammer; rising mains (pumped water);

8. *Flow in Rivers and Canals*

- laminar or turbulent; uniform or non-uniform; steady or unsteady; sub-critical or super critical
- Manning formula for flow; hydraulic jump

9. *Waves*

- effects of wave extend below the surface; wave velocity; types of wave motion; effect of water depth; wave changes at beach and vertical wall

10. *Pumps and Turbines*

- types and operation; horsepower required

11. *Hydraulic Models*

- use of laboratory models to predict unknowns

12. *Hydrology*

- hydraulics deals with fundamental mechanics of water movement – the rules of water's behaviour
- hydrology deals with water origins, occurrence in various forms and places, its transportation on earth – describes behaviour under natural circumstances
- hydrologic cycle

13. *More Hydrology*

- evapotranspiration; infiltration; runoff; hydrograph; ground water and aquifers; percolation

14. *Water Resources Engineering*

- engineering and economics; water supply engineering; waste-water disposal; irrigation engineering; river engineering; water-resources planning

15. *Conclusion*

- in underdeveloped countries – problem of regulation of water resources for the sake of the people
- in developed countries, problem of the regulation of the people for the sake of their water resources