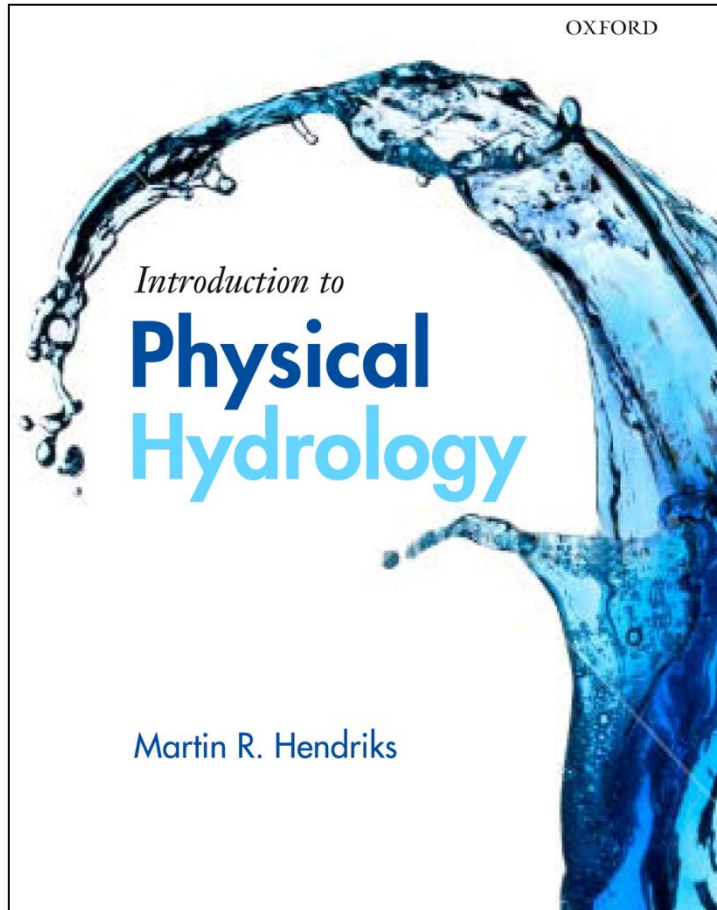


Surface water



Paperback | 351 pages
Follow the book's didactic concept!

- Hydrological cycle
 - Drainage basin
 - Water balance
-
- Energy equation
 - Flow equation
 - Continuity equation
-
1. Introduction
 2. Atmospheric water
 3. Groundwater
 4. Soil water
 5. **Surface water**

Exercises

Stage - discharge relation



Water level
Stage



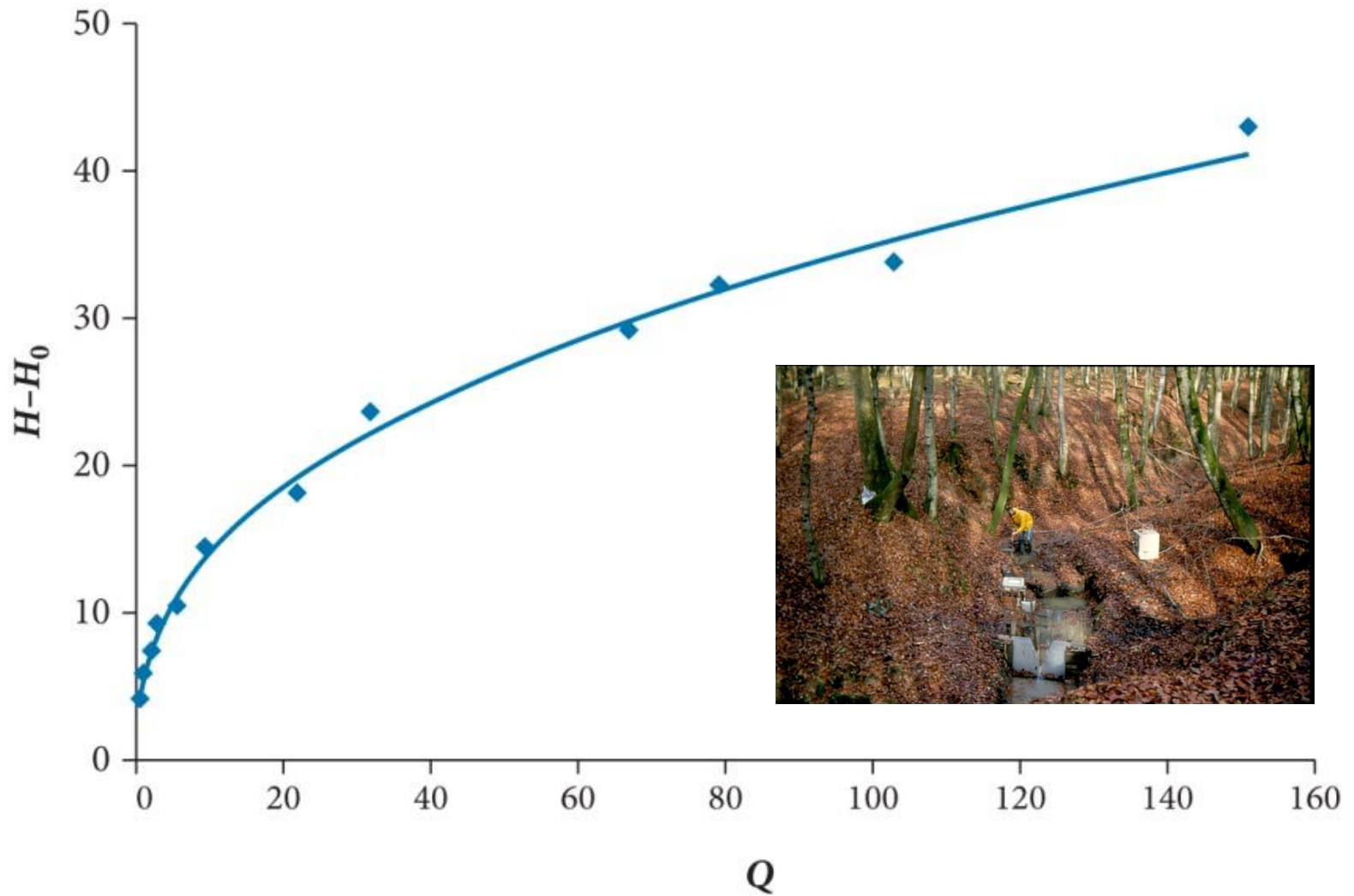
$Q-H$ relation
Stage - discharge relation

V-notch weirs



Straight upstream reach of some length leading to the construction
Stage measurement at a distance of 2 to 3 times the maximum water level in the crest

Q - H rating curve



Stage, velocity and discharge



Water velocity measurement



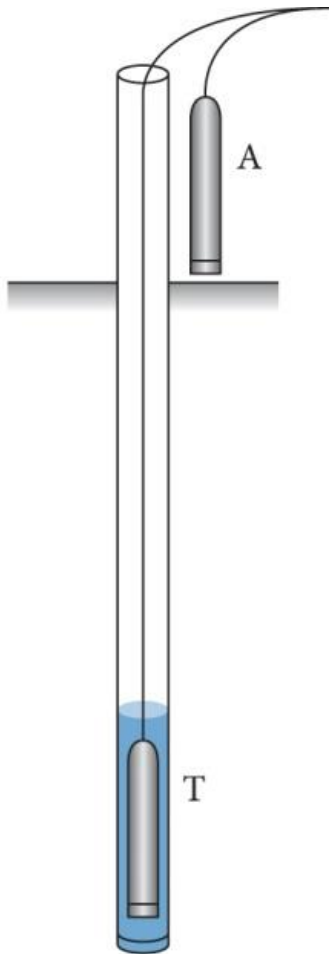
Discharge measurement



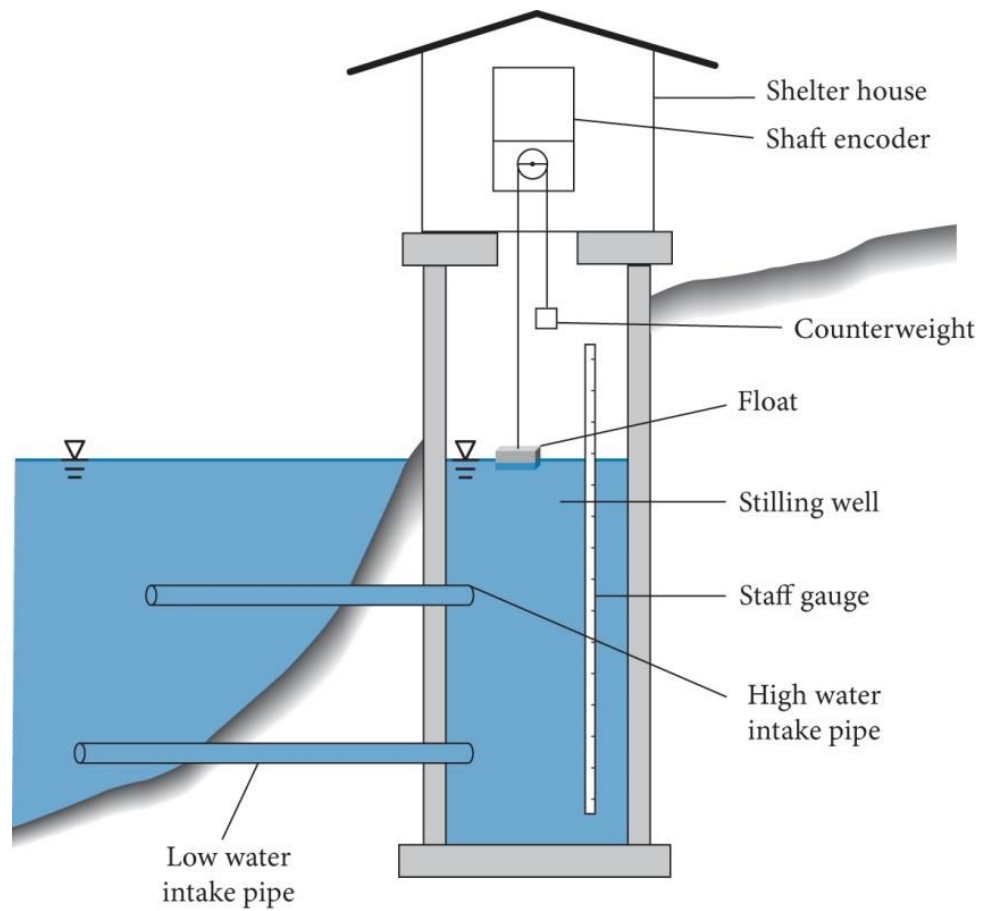
Stage measurements



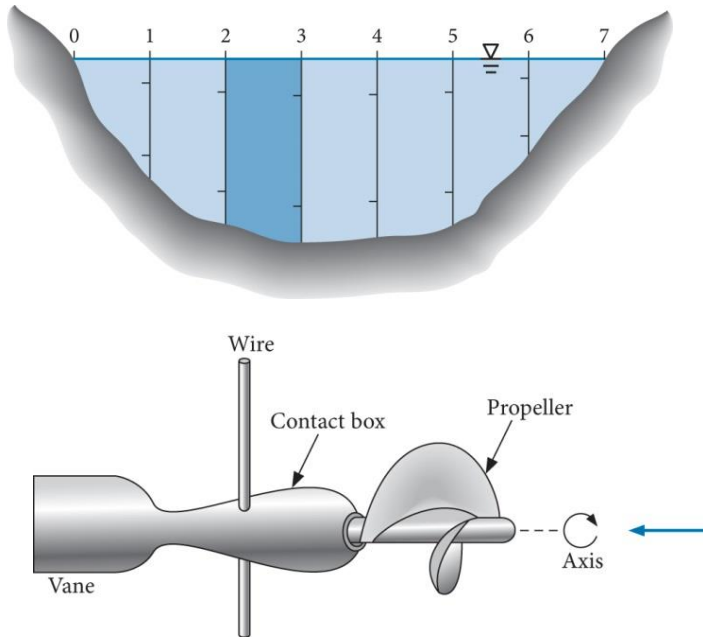
Water level registration



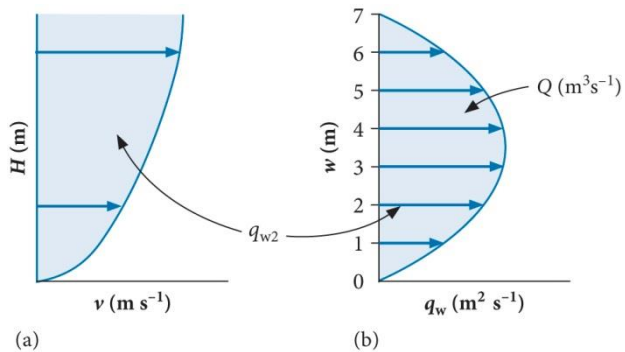
Stilling well construction



Discharge measurement

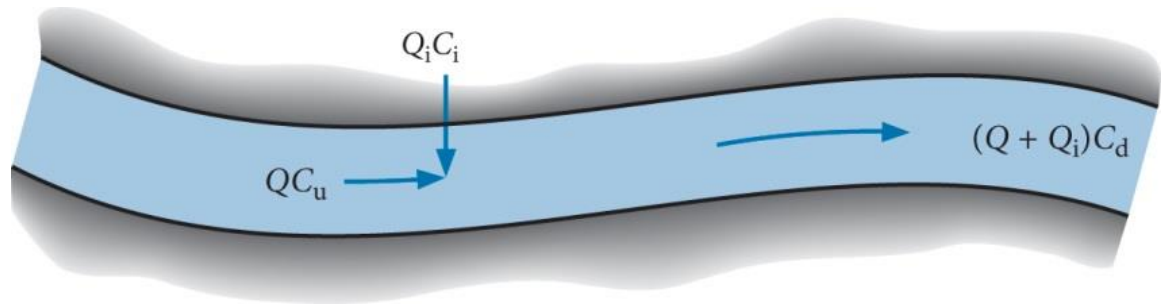


$$Q_{23} = \left(\frac{\bar{v}_2 + \bar{v}_3}{2} \right) \left(\frac{H_2 + H_3}{2} \right) (w_3 - w_2)$$

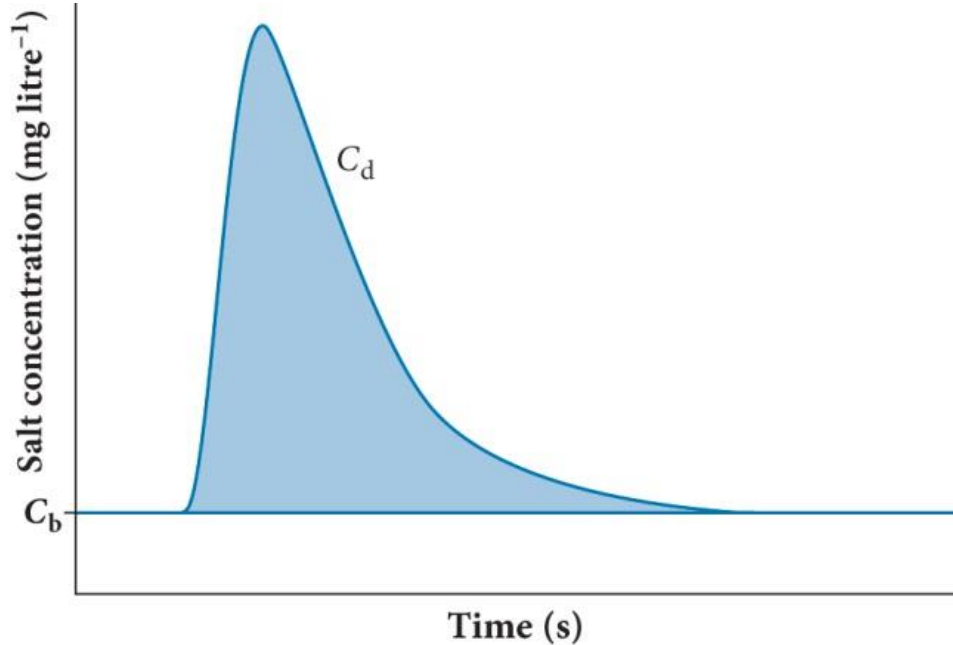


Salt dilution gauging

Constant rate injection



Slug injection

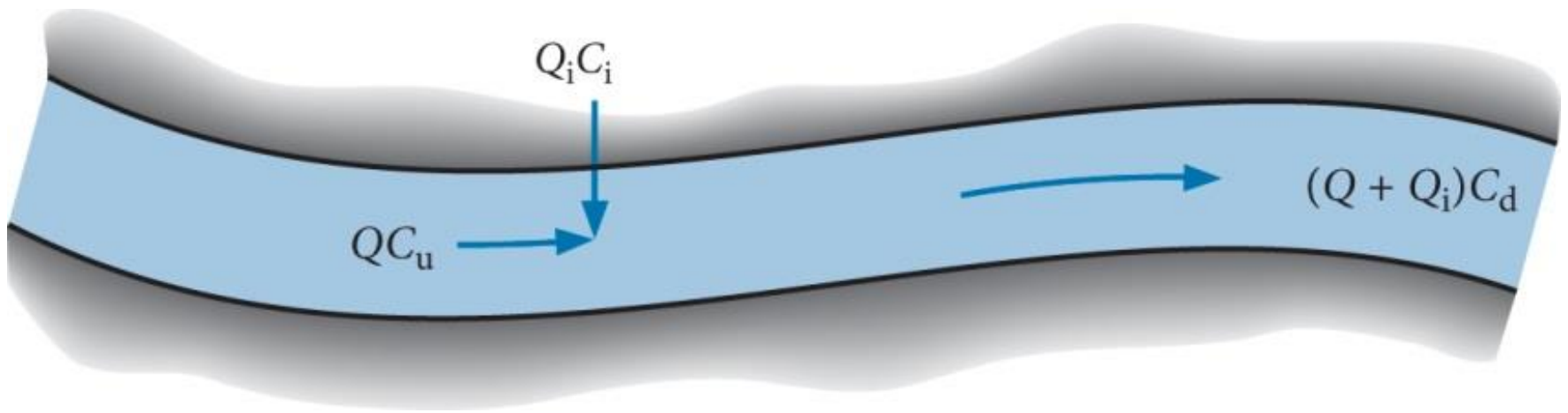


Complete mixing?



Salt dilution gauging

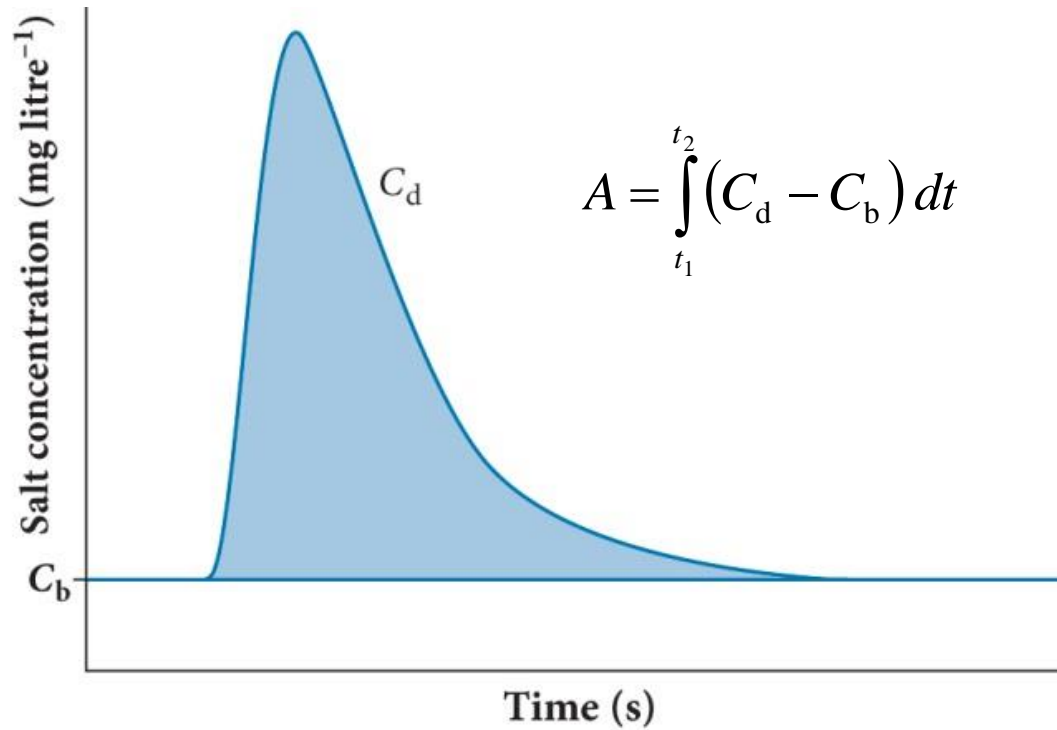
Constant rate injection



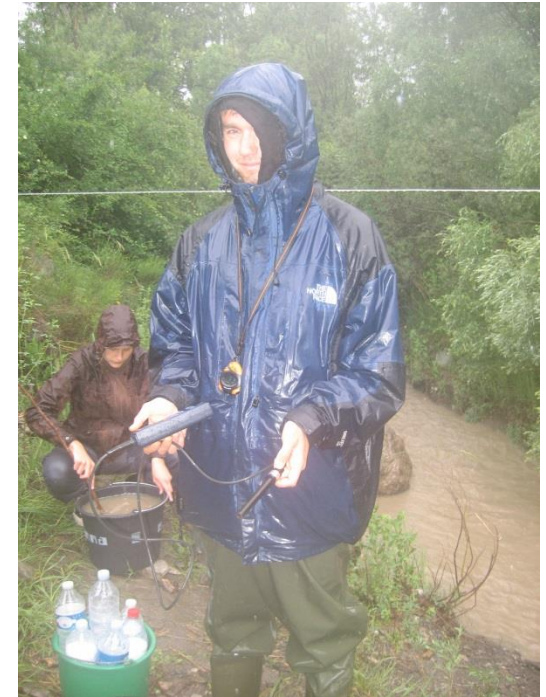
$$QC_u + Q_i C_i = (Q + Q_i)C_d$$

Salt dilution gauging

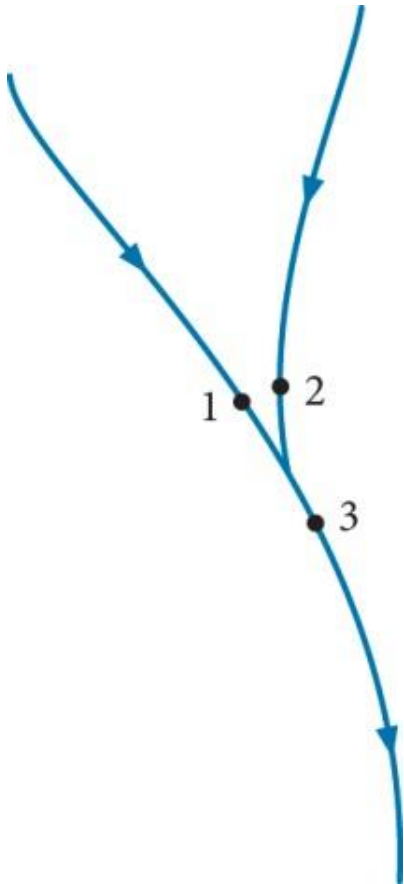
Slug injection



$$Q = \frac{M}{A}$$



EC-routing



$$Q_1 + Q_2 = Q_3$$

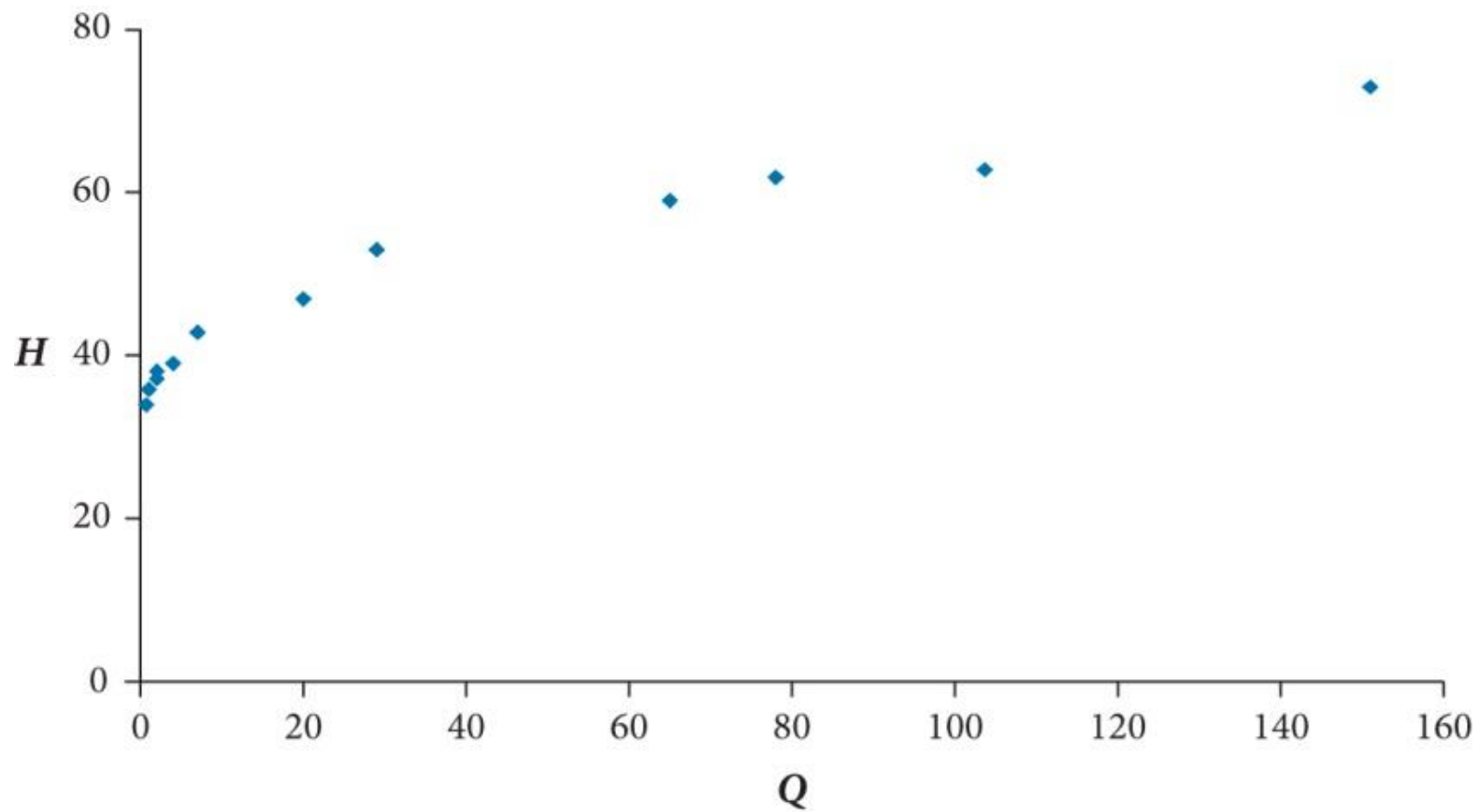
$$Q_1 EC_1 + Q_2 EC_2 = Q_3 EC_3$$

$$Q_1 C_1 + Q_2 C_2 = Q_3 C_3$$

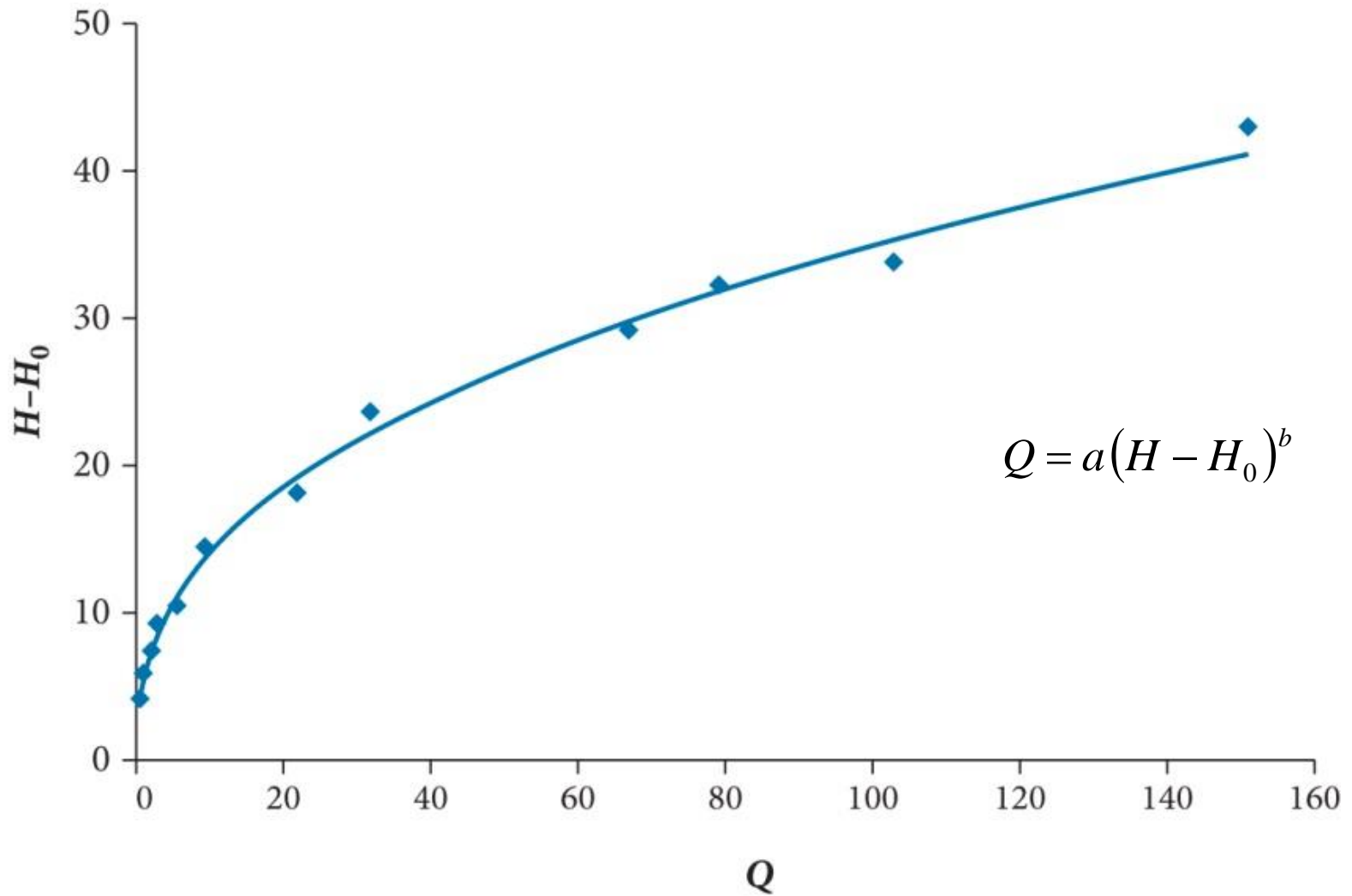


Hanna Instruments

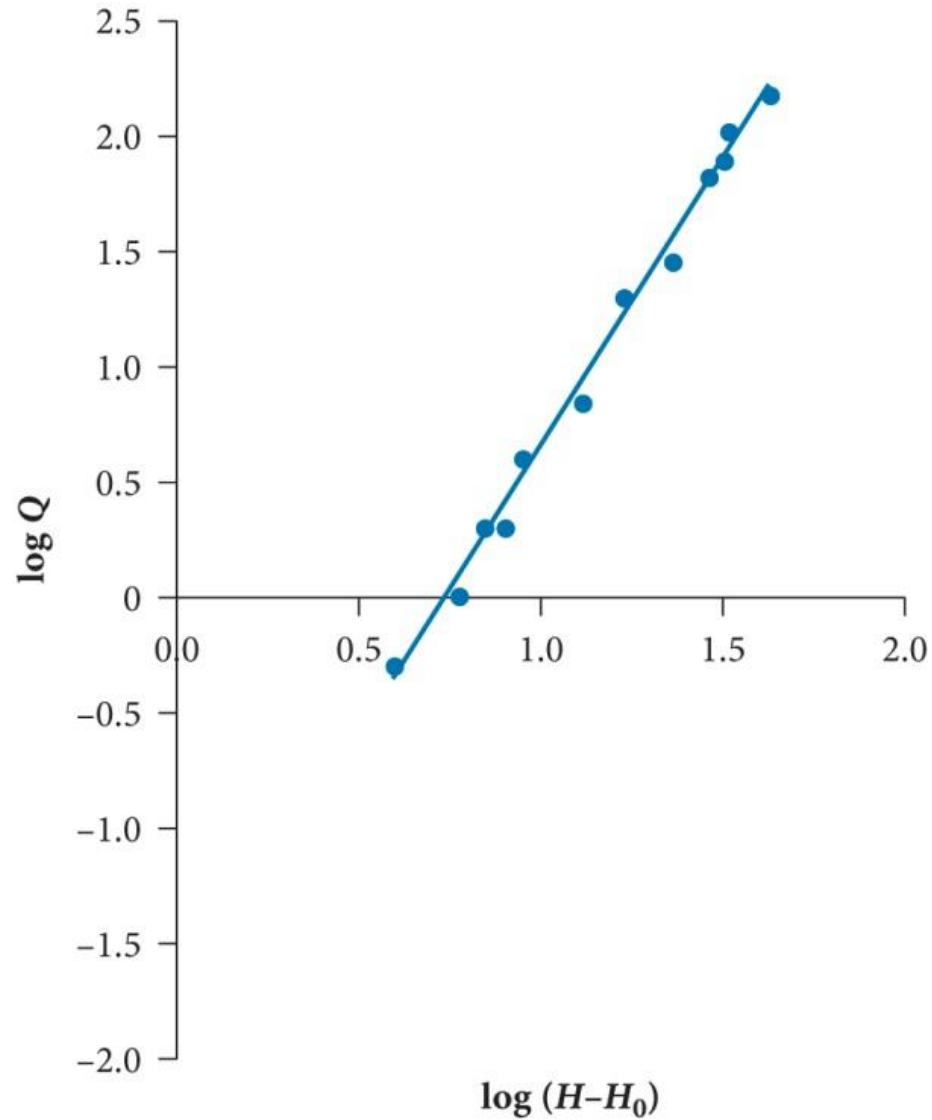
Q - H measurements



Q - H rating curve



Q-H rating curve



$$\log Q = \log a + b \log (H - H_0)$$



References

Hendriks, M.R. (2010). Introduction to Physical Hydrology. Oxford University Press.