

# How Weyl stumbled across electricity while pursuing mathematical justice

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## Abstract

It is argued that Weyl's theory of gravitation and electricity came out of 'mathematical justice': out of the equal rights direction and length. Such mathematical justice was manifestly at work in the context of discovery, and is enough (together with a couple of simple and natural operations) to derive all of source-free electromagnetism. Weyl's repeated references to coordinates and gauge are taken to express equal treatment of direction and length.

**Keywords:** Weyl, unified theory, gravitation, electromagnetism, Einstein, general relativity, gauge

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