

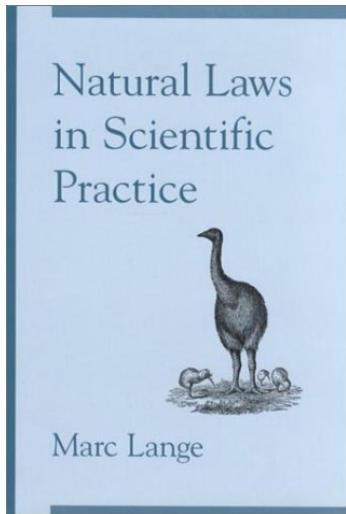
Lange 1

Laws versus Accidents

(pp. 11–12)

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Philosophy 471

Fall 2006



We are accustomed to thinking of the universe as governed by various “laws of nature” and of science as aiming to discover these laws. What is it that science thereby aims to discover? What is it for there to be a certain “law of nature”? (p. 3)

Oxford University Press
2000

Examples of laws and non-laws

Some laws (of nature)

- **Newton's law of gravitation:** All bodies attract one another with a force proportional to the product of their masses and inversely proportional to the square of the distance between them.
- **Law of conservation of energy:** The total energy of a closed system remains constant.
- **Boyle's law:** For a fixed amount of gas at constant temperature, pressure is inversely proportional to volume.

Some scientific discoveries that are not laws

- The dinosaurs' extinction was caused by Earth's collision with a large rocky body.
- There is a mountain on Venus at 38 degrees 20 minutes north, 63 degrees 14 minutes west.

Hypothesis: “Law” means a general fact

- In the preceding examples, the laws are general or universal, and the non-laws are aren't.
- Hypothesis: What it means for something to be a law is that it is a fact that is general or universal.
- Some eminent philosophers (e.g., Hempel, Carnap) defended this view.

Popper's counterexample

Moas are extinct birds that lived in New Zealand. They were like ostriches or emus (see dust jacket of Lange's book). Suppose their biology would allow them to live to 60 under good conditions but they all died before 50 due to viruses or other causes. Then the statement:

All moas die before age 50

is a fact, and general, but not a law.

Reichenbach's counterexample

All solid gold cubes are smaller than one cubic mile.

Probably true, and general, but not a law even if true.

So there can be a general fact that is not a law.
Hence "law" does not mean a general fact.

An **accident** is a fact that is not a law or implied by the laws.

Examples (assuming they are facts)

- The dinosaurs' extinction was caused by Earth's collision with a large rocky body.
- There is a mountain on Venus at 38 degrees 20 minutes north, 63 degrees 14 minutes west.

An **accidental generalization** is an accident that is general.

Examples (assuming they are facts)

- All moas die before age 50.
- All solid gold cubes are smaller than one cubic mile.

Questions

- 1 Give an example of (a) a law of nature and (b) a fact that is not a law of nature.
- 2 Does the term “law of nature” mean a general fact? Justify your answer.
- 3 In philosophical discussions of laws of nature, what is meant by the term “accident”? Is a traffic accident an “accident” in this sense? Justify your answer to the latter question.