

Anarchism versus Imperialism

BASIC FUNDAMENTAL LAWS	Specified by the axioms of the best system of the fundamental properties of the world. Call this system the SUB-SYSTEM. <i>Assumption:</i> They are the laws of Newtonian mechanics.
NON-BASIC FUNDAMENTAL LAWS	Specified by (subsets of) the theorems of SUB-SYSTEM
BASIC NON-FUNDAMENTAL LAWS	Specified by the additional axioms required by the extension of SUB-SYSTEM to the non-fundamental properties of the world. Call this system the SUPER-SYSTEM.
NON-BASIC NON-FUNDAMENTAL LAWS	Specified by (subsets of) the theorems of SUPER-SYSTEM. <i>Assumption:</i> The (basic and non-basic) non-fundamental laws include most of the generalisations called laws in the special sciences.
SPECIAL-SYSTEM LAWS	Specified by the axioms and (subsets of the) theorems of the best system of the non-fundamental properties of the world. Call this the SPECIAL-SYSTEM. <i>Assumption:</i> They include most of the generalisations called laws in the special sciences.
ANARCHISM	The basic non-fundamental laws are the SPECIAL-SYSTEM laws (Callender and Cohen, Winsberg).
IMPERIALISM	The basic non-fundamental laws are those required to underwrite the second law of thermodynamics (Albert, Loewer). Namely, they are:
PAST HYPOTHESIS (PH)	The initial macroscopic state of the universe is one of extremely low entropy.
STATISTICAL POSTULATE (PROB)	The probability that a given macroscopic state is realised by a given microscopic state is provided by the canonical statistical mechanical probability distribution for that macroscopic state, conditional on PH.
(CONTRAPTION	The conjunction of the fundamental laws, PH and PROB)

The Argument for Imperialism

- 1 CONTRAPTION makes “good empirical predictions about the values of the thermodynamic parameters of macroscopic systems” (Albert).
- 2 The empirical success of CONTRAPTION warrants belief that it is true *qua* theory of thermodynamics. (To be true *qua* theory of X is to truly specify the propositions that determine the objective chances of the X properties).
- 3 Therefore we should believe that CONTRAPTION is true *qua* theory of thermodynamics (1, 2).
- 4 CONTRAPTION has the logical consequence that probabilities are assigned to all physically possible empirical propositions and so in principle provides a “complete scientific theory of the universe” (Albert).
- 5 Therefore we should believe that CONTRAPTION is true *qua* theory of everything (3, 4).
- 6 The laws of the non-fundamental sciences are the propositions concerning non-fundamental properties that are assigned a high probability of obtaining by CONTRAPTION.
- 7 When propositions concerning laws of the non-fundamental sciences are well confirmed, we have reason to believe that they have a high probability of obtaining.
- 8 Therefore we have reason to believe that the well confirmed laws of the non-fundamental sciences are logical consequences of CONTRAPTION (5, 6, 7).
- 9 Therefore the explanatory content of the non-fundamental sciences is a logical consequence of CONTRAPTION (8).

(1-3) *What does CONTRAPTION Explain?*

SM-PROB The probability that a given macroscopic state is realised by a given microscopic state is provided by the canonical statistical mechanical probability distribution for that macroscopic state.

SM-PROB *Albert:* Falsified by the locations of spatulas. *Objection:* Only if SM-PROB is a theory of spatulas.

CONTRAPTION *Albert:* Confirmed by the locations of spatulas. *Objections:*

LEEDS' LAKE I dip my bucket in the lake, the rest of the lake contains ice. CONTRAPTION predicts no ice.

ALIENS Powerful and crafty aliens moved all the spatulas and then destroyed themselves.

Does CONTRAPTION *alone* assign ALIENS low probability?

(3-5) *Is CONTRAPTION The Theory of Everything?*

General worry: Weak inductive evidence. *Specific worries* (Callender and Cohen):

STATE SPACE Parameterized with respect to different variables.

OPEN-ENDED Realising properties may be open-ended and so not Lebesgue-measurable (also Fodor).

IMPROBABILITY Some SPECIAL-SYSTEM laws may be improbable by the lights of CONTRAPTION (also Kitcher).

AUTONOMY Failure to respect the metaphysical autonomy of SPECIAL-SYSTEM laws.

A is the instantiation of a non-fundamental non-thermodynamic property. Suppose SPECIAL-SYSTEM contains $S_1 \rightarrow S_2$ assigning probability $P_{ss}(A)$. Suppose CONTRAPTION assigns probability $P_c(A)$. *Questions:*

Q1 Why believe $P_c(S_1 \rightarrow S_2) \approx 1$?

Q2 If $P_c(S_1 \rightarrow S_2) \not\approx 1$, is $S_1 \rightarrow S_2$ nevertheless a law?

Q3 Why believe that in general $P_{ss}(A) = P_c(A)$?

Q4 If $P_{ss}(A) \neq P_c(A)$, which should be used for A-inferences? (*Or:* which assigns the correct A-chance?)

Argument for CONTRAPTION: If we knew the exact initial condition and the fundamental laws PH and PROB would be redundant. Not knowing the initial condition, we infer that it is probably one that grounds the inference to thermodynamically typical behaviour.

Transposed Argument for Anarchism: If we knew the exact initial condition and the fundamental laws SPECIAL-SYSTEM would be redundant. Not knowing the initial condition, we infer that it is probably one that grounds the inference to typical SPECIAL-SYSTEM behaviour.

(5-8) *Are All and Only the Laws Likely?*

Macrostates relative to which the CONTRAPTION-probability of the SPECIAL-SYSTEM laws is high?

HORN₁ Many SPECIAL-SYSTEM laws are highly contingent relative to CONTRAPTION and all macro-states prior to their initial instantiation (Gould, Beatty). Therefore there is no single macrostate relative to which the probability of SPECIAL-SYSTEM is high. (*Lesson:* Not all the laws are likely)

HORN₂ The natural move: "Let's say that the special science laws that hold at t are the macro-regularities that are associated with high conditional probabilities given the macro-state at t" (Loewer). Now we have trouble distinguishing law-like and accidental generalisations without resorting to SPECIAL-SYSTEM. (*Lesson:* Not only the laws are likely)

(8-9) *Does Reducing the Laws Reduce the Explanations?*

Claim: The content of SPECIAL-SYSTEM explanations partly involves the possibility of their obtaining if the fundamental laws were different. So CONTRAPTION fails to reduce the SPECIAL-SYSTEM explanatory content.