

Michaelmas Essays  
2025 - 2026

*Assignment 1*

The Genesis of Convenience:  
*Why Localising Poincaré's Aesthetic  
Conventionalism Matters*

R.T. van Vroonhoven

Wordcount:



UNIVERSITY OF  
CAMBRIDGE

# Assignment 1

## ESSAY TITLE

The Genesis of Convenience:  
*Why Localising Poincaré's Aesthetic Conventionalism Matters*

## CHOSEN QUESTION

What role does Poincaré think beauty plays in scientific practice?

This essay engages directly with the question of beauty in Poincaré's philosophy of science by examining how aesthetic values — specifically beauty and convenience — function within his epistemology.

Rather than treating these values as merely decorative or peripheral, Poincaré presents them as central to scientific reasoning and theory selection. Drawing on Milena Ivanova's interpretation, this essay explores how these aesthetic criteria are best understood as epistemic tools, embedded within specific historical and disciplinary contexts.

The essay proceeds to offer a critical extension of this position. By situating Poincaré's aesthetic conventionalism within a broader framework informed by critical theory — especially Foucauldian insights into discursive power — I argue that aesthetic judgements in science are not epistemically neutral.

On the contrary, they are historically produced and potentially ideological. The essay thus interrogates the philosophical implications of aesthetic values in science, showing that, while beauty plays a powerful guiding role in scientific practice, its authority must be carefully delimited to avoid naturalising contingent norms as necessary truths.

In this way, the essay both explicates Poincaré's view and critically assesses its scope and potential risks, thereby fully addressing the essay question while offering a theoretically enriched perspective.

# **The Genesis of Convenience:** *Why Localising Poincaré's Aesthetic Conventionalism Matters*

- R.T. van Vroonhoven

## **Abstract**

If beauty and convenience play a role in finding truth or understanding, how are they shaped? This essay explores the role of aesthetic values, particularly those of beauty and convenience in the philosophy of science of Henri Poincaré. Building on Milena Ivanova's interpretation of aesthetic judgement as an epistemic virtue, this analysis highlights how these aesthetic values are guides to understanding rather than indicators of truth.

This essay then extends Ivanova's localisation of aesthetic criteria, by introducing a Foucauldian discourse analysis. 'If beauty and convenience are guides to understanding, how is our understanding of these values shaped?' I argue that aesthetic preferences in science are historically contingent and discursively shaped, rather than universally valid or epistemically neutral. If this is true, then these values may risk legitimising dominant norms under the guise of rational necessity.

By reframing beauty and convenience as properties that emerge from discourse and contingency, the essay calls for a cautious and context-sensitive deployment of aesthetic reasoning within scientific practice and beyond.

## **Introduction**

The question that lies at the heart of a long-standing philosophical debate on truth is this: "What role do aesthetic values like beauty, simplicity and convenience play in scientific reasoning? Are they just heuristic aids, mental shortcuts, or do they possess genuine epistemic significance—do beauty and convenience point us toward a deeper truth?"

Henri Poincaré offers a unique answer to this question: for him, aesthetic values such as beauty, unity, elegance, and 'economy of thought', or simplicity are not decorative. They are criteria that legitimately guide the choices made in regard to conventions and theories. Poincaré is able to make this point because he argues that science aims at being an intelligible, relational structure, rather than direct access to things-in-themselves. (Poincaré 1902; 1905)

This elevation of aesthetic judgement does come with a risk: if beauty and convenience are treated as if they expressed rational necessity, what does that mean for the historically local or culturally dominant standards of f.e. a concept like elegance? Does this epistemic authority risk quietly marginalising some forms of knowledge? (Ivanova, 2017)

Ivanova addresses this tension by offering an important intervention: in her reconstruction of Poincaré, she argues that while aesthetic values are relevant tools for understanding, they need to be localised within particular epistemic cultures and historical contexts. This move avoids inflating aesthetic judgements to universal guides of truth.

This essay tentatively extends this localisation by introducing a Foucauldian critique. Drawing on Michel Foucault's theories of discourse and power (Foucault, 1977), I argue that aesthetic values in science are not just local, but also potentially politically loaded. They are shaped by historically specific discursive formations, ways of understanding the world, that delimit what we find intelligible, acceptable, and authoritative within scientific practice. Even localised aesthetic norms may function ideologically if their conditions under which they emerge are left uninterrogated. By 'ideological', I do not mean they are necessarily false or deceptive, but norm-producing. Aesthetic values shape what is recognisable as legitimate knowledge.

This essay does not seek to offer an alternative epistemology of aesthetic judgement, but a speculative meta-level intervention, analysing how epistemic values may acquire normative force within scientific discourse. The claim is not that Foucauldian analysis replaces epistemology, but rather that epistemic accounts of aesthetic value remain incomplete if their emergence, uptake and authority are not examined.

This essay asks: Under what conditions do aesthetic values in science—such as beauty and convenience— acquire epistemic authority, and when do they become ideologically operative?

To arrive at the conclusion that aesthetic values must be understood as historically contingent and discursively produced to mitigate the political stakes of overgeneralising them, this essay moves through four sections. The first reconstructs Poincaré's view of aesthetic judgement, the second analyses Ivanova's contribution, focusing on her localisation thesis. The third section offers a critical extension via Foucault, showing how aesthetic values are shaped, and the final section reflects on the risks of abstracting aesthetic norms beyond their historical context.

## **Poincaré and Epistemic Aesthetics**

In *Science and Hypothesis* and *Mathematical Discovery*, Henri Poincaré argues that aesthetic values such as beauty and convenience play a vital role in scientific reasoning, not as accidental, decorative qualities, but as actual cognitive tools that guide how theories are selected and mathematics are discovered.

For Poincaré, scientific beauty is not something we indulge in, but a way of forming knowledge; an epistemic intuition. By following our sense of order, harmony, and elegance, the mind is able to discern meaningful structures amidst complexity. Poincaré describes this as ‘special aesthetic sensibility’ that allows f.e. mathematicians to recognise generative combinations. “The useful combinations are precisely the most beautiful... those that can most charm that special sensibility that all mathematicians know” (Poincaré, 1908, p. 387). This aesthetic feeling does epistemic work: it allows one to see the argument “at a glance” rather than recall its individual parts (Poincaré, 1908, pp. 382–383).

In that same sense, Poincaré considers convenience as an epistemic guide; convenience here does not mean subjective ease, but conceptual tractability- the ability of a mathematical or physical principle to organise the world in a way we can understand it. This is brought to light in his description of the choice between Euclidean and non-Euclidean geometries: they can both equally truthfully represent the same physical facts, thus we choose the most convenient. (Poincaré, 1905, ch. 1). This grounds a conventionalist view in pragmatic understanding, rather than metaphysical realism, and means that Poincaré here treats aesthetic judgement as an important instrument in navigating undetermination— the idea that multiple theories can explain the same phenomenon.

The question this then produces is how the criteria of beauty, simplicity and elegance are established. While Poincaré defends their scientific legitimacy, he leaves their philosophical grounding — and potential risks — largely unexplored.

## **Ivanova’s Contribution: Localising Aesthetic Judgement**

Milena Ivanova refines Poincaré’s idea of aesthetic values, by grounding it in specific historical and epistemic contexts. This breaks with the classical assumption that beauty in science is a universal, timeline indicator of truth. In her 2017 paper, she argues that aesthetic judgement should be understood as local—that is, shaped by particular epistemic cultures, periods, and practices (Ivanova, 2017, p. 2582). Ivanova reframes beauty as a regulative ideal— a way to discern scientifically generative ideas from complexity that cannot support metaphysical conclusions.

Aesthetic values help us better understand the world, but do not tell us what is true. This view stands in opposition to scientists such as Dirac or Heisenberg, who took beauty to reflect some intrinsic feature of nature. (Ivanova, 2017, pp. 2582–2583)

Ivanova demonstrates that for Poincaré, too, simplicity and unity are epistemic constraints that we impose, to make the world more intelligible—not properties discovered in nature itself. As she writes, “simplicity and unity are regulative principles, linked to the aim of science—that of achieving understanding of how the phenomena relate” (Ivanova, 2017, p. 2581). This reorientation avoids metaphysical inflation, and grounds aesthetic judgement in the human cognitive architecture—the way we understand the world.

Importantly, Ivanova does not reject the epistemic role of aesthetics; beauty, simplicity and elegance are able to help us understand the world, but with a limited scope. Aesthetic values are successful at guiding theory selection and scientific insight, but they do not guarantee truth. This makes Poincaré’s aesthetic conventionalism philosophically defensible—it contributes to a more understandable world, but sheds the metaphysical burden placed on aesthetic values.

What remains underexplored, however, is how such aesthetic criteria are shaped by non-epistemic forces (e.g. institutional power, discourse, or ideology). Ivanova’s localisation opens the door to the critique, and this essay tentatively explores.

## **Critical Extension: Aesthetic Judgement and Discursive Power**

Ivanova’s localisation of aesthetic judgement successfully breaks the metaphysical link between beauty and truth, the next step is to interrogate the conditions under which those aesthetic norms emerge and operate. I argue that to move further, we require a shift from epistemology to exploratory critique, specifically a Foucauldian one.

For Michel Foucault, knowledge is never produced in a vacuum; it is always embedded in discursive formations regulated by institutional norms, historical contingencies, and relations of power (Foucault, 1972). We learn what is worth pursuing by the world we inhabit, the culture that surrounds us. Foucault terms this a regime of truth (Foucault, 1980). What counts as “intelligible” or “elegant” in a given scientific moment is not epistemically innocent—it is the outcome of the world that produced the theory and aesthetic values by which it is recognised.

Applied to scientific aesthetics, this indicates that criteria like simplicity, convenience, or harmony do not simply reflect universal cognitive virtues; they reflect particular historical alignments of discourse and power, specific ideas of what is considered logical, beautiful, elegant and convenient.

Thus valorisation of “convenient” geometries or “beautiful” theories is never just a matter of local taste—it is a selection within, and often in favour of, dominant paradigms. Aesthetic values become filters through which certain forms of knowledge are legitimated, while others are marginalised or rendered unintelligible.

As Foucault emphasises, this is a subtle ideologic force; beauty is framed as a natural guide to scientific understanding, while in fact, it may also function as a gatekeeping mechanism.

If we argue that string theory is ‘almost too beautiful not to be true’, paraphrasing Brian Greene (Greene 1999; Woit 2006), we may crowd out alternative explanations, if those are grounded in empirical adequacy or even computational messiness or chaos.

Similarly, as Blaug (1992) argues, mainstream economics often prefers mathematically elegant models over descriptively adequate ones. This formalist bias may support a technocratic, theory-driven reality that risks overlooking real-world complexity.

The key claim of this essay, thus, is: even when aesthetic judgement is localised, as Ivanova suggests, it can still plausibly function ideologically unless its discursive conditions are actively interrogated. Without such critique, aesthetic reasoning risks becoming complicit in the reproduction of epistemic authority. Beauty does not merely help us understand—it helps decide what is allowed to be understood, and by whom.

## **Implications: The Danger of Overgeneralising Poincaré**

Poincaré’s view of aesthetic values, especially the epistemic value of simplicity and unity, remain relevant and generative. But as previously noted, the danger of abstracting these values from their historical and methodological contexts in which they are developed, poses certain risks. When ‘convenience’ and ‘beauty’ start being treated as transhistorical, absolute standards, they risk becoming what Foucault (1980) terms ‘naturalised norms—local preferences that are discursively transformed into apparent rational necessities.

That move—from heuristic to marker of rationality— is not benign. This is precisely how power operates in knowledge production, Foucault argues. Power does not repress, it produces ‘truths’ through discursive regimes that determine what can be said, seen, and understood (Foucault, 1972). In the scientific landscape, this dynamic presents itself also ‘epistemic enclosures’; bounded spaces where only what conforms to the prevailing aesthetic standards is considered legible as legitimate science.

Here, the philosophical danger appears: when aesthetic values are detached from context and local justification, they risk becoming exclusionary. Mathematical science, for example, can be invoked rhetorically to dismiss computational or data-driven approaches that are more chaotic and lack formal sheen. This shifts the problem from an epistemic to a political terrain, where institutional authority is distributed according to these constructed norms.

Perhaps most crucially, this abstraction runs against Poincaré’s own caution; though he championed aesthetic considerations, he explicitly rejected metaphysical realism, warning that simplicity and unity are not properties of nature but regulative ideals imposed by the human mind (Poincaré, 1902 [2001]). He acknowledged that beauty in science is a tool for intelligibility, not a criterion of truth. To universalise his aesthetic standards is to misread his philosophical project.

## **Conclusion**

This essay has argued that aesthetic values in science—such as beauty and convenience—are not neutral guides to understanding, but epistemically potent and discursively shaped; far from serving as universal markers of truth or rationality, they are historically situated, culturally embedded, and conditioned by regimes of power and intelligibility (Poincaré 1902; Ivanova 2017).

It developed this claim in three steps. Firstly, Poincaré places aesthetic values at the centre of scientific practice not as ornament, but as regulative ideals that guide theory choice under underdetermination, while explicitly refusing to identify elegance with truth (Poincaré 1902). Secondly, Ivanova refines this picture by localising aesthetic judgement within specific epistemic cultures and historical conditions, preserving its heuristic utility while resisting its elevation into a universal criterion of rationality (Ivanova 2017). Thirdly, a Foucauldian lens foregrounds the discursive and political dimensions of scientific aesthetics: what counts as elegant or convenient reflects contingent norms and institutional arrangements through which aesthetic preferences can reproduce dominant paradigms and marginalise alternative ways of knowing (Foucault 1972).

As argued earlier, Ivanova's localisation already mitigates the danger of treating beauty as a universal standard, but without critical attention to the conditions under which such local norms emerge and operate, Poincaré's insights risk becoming instruments of exclusion: abstracted from their historical and discursive contexts, aesthetic values can function ideologically, as cultural preferences misrepresented as cognitive imperatives (Ivanova 2017). To treat convenience as neutral or beauty as universal, therefore, is to forget the systems from which they arise—and to risk foreclosing the very pluralism that scientific inquiry claims to enable (Ivanova 2017).

## References

**Blaug, M. 1992.** *The Methodology of Economics: Or How Economists Explain*. 2nd edn. Cambridge: Cambridge University Press.

**Foucault, M. 1972.** *The Archaeology of Knowledge*. Trans. A. M. Sheridan Smith. London: Tavistock.

**Foucault, M. 1977.** *Discipline and Punish: The Birth of the Prison*. Trans. A. M. Sheridan. London: Penguin.

**Foucault, M. 1980.** *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977*. Ed. C. Gordon. Brighton: Harvester.

**Greene, B. 1999.** *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*. New York: W.W. Norton.

**Ivanova, M. 2017.** 'Poincaré's aesthetics of science', *Synthese*, 194(7), pp. 2581–2594. <https://doi.org/10.1007/s11229-016-1069-1>.

**Poincaré, H. 1905.** *Science and Hypothesis*. London: Walter Scott Publishing.

**Poincaré, H. 1908.** 'Mathematical discovery', in *The Foundations of Science: Science and Hypothesis, The Value of Science, Science and Method*. New York: The Science Press.

**Woit, P. 2006.** *Not Even Wrong: The Failure of String Theory and the Search for Unity in Physical Law*. New York: Basic Books.