

Thesis template

The architectonic of pure design

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Rome 1123

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The architectonic of pure design

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A dissertation submitted
to the Faculty of Archery at the
Hogwarts School of Aeronautics
for the degree of
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First referee: Prof. Dr. Baruch Spinoza

Second referee: Prof. Dr. Hilarius von Poitiers

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Zusammenfassung

(Summary in German)

[M: Set language settings in main.tex. I chose “british” in that file but ngerman here (date format: 16. Juni 2017). If cleverref is working, the following word should be “Kapitel II”:] Kapitel II.

[M: Random text:] In jenem Versuche, das bisherige Verfahren der Metaphysik umzuändern, und dadurch, dass wir nach dem Beispiele der Geometer und Naturforscher eine gänzliche Revolution mit derselben vornehmen, besteht nun das Geschäft dieses Kritik der reinen spekulativen Vernunft. Sie ist ein Traktat von der Methode, nicht ein System der Wissenschaft selbst; aber sie verzeichnet gleichwohl den ganzen Umriss derselben, sowohl in Ansehung ihrer Grenzen, als auch den ganzen inneren Gliederbau derselben.

1. [M: See the code for the spacing of enumerates.]
2. PS: Special symbols in the code should be ok (UTF8 encoding): ä ü ö ß @
3. Check the siunitx package for the correct typesetting of dimensional quantities such as “1 µl”.

[M: Random text:] Denn das hat die reine, spekulative Vernunft Eigentümliches an sich, dass sie ihr eigen Vermögen, nach Verschiedenheit der Art, wie sie sich Objekte zum Denken wählt, ausmessen, und auch selbst die mancherlei Arten, sich Aufgaben vorzulegen, vollständig vorzählen, und so den ganzen Vorriß zu einem System der Metaphysik verzeichnen kann und soll; weil, was das erste betrifft, in der Erkenntnis a priori den Objekten nichts beigelegt werden kann, als was das denkende Subjekt aus sich selbst hernimmt, und, was das zweite anlangt, sie in Ansehung der Erkenntnisprinzipien eine ganz abgesonderte, für sich bestehende Einheit ist, in welcher ein jedes Glied, wie in einem organisierten Körper, um aller anderen und alle um eines willen da sind, und kein Prinzip mit Sicherheit in einer Beziehung genommen werden kann, ohne es zugleich in der durchgängigen Beziehung zum ganzen reinen Vernunftgebrauch untersucht zu haben.

Dafür aber hat auch die Metaphysik das seltene Glück, welches keiner anderen Vernunftwissenschaft, die es mit Objekten zu tun hat (denn die Logik beschäftigt sich nur mit der Form des Denkens überhaupt), zuteil werden kann, dass, wenn sie durch diese Kritik in den sicheren Gang einer Wissenschaft gebracht worden, sie das ganze Feld der für sie gehörigen Erkenntnisse völlig befassen und also ihr Werk vollenden und für die Nachwelt, als einen nie zu vermehrenden Hauptstuhl.



Summary

[M: Check your language settings in main.tex. I chose “british” in that file (date format: 16th June 2017). If cleverref is working, the following word should be “chapter II”:] chapter II.

[M: Random text:] However, we can deduce that our experience (and it must not be supposed that this is true) stands in need of our experience, as we have already seen. On the other hand, it is not at all certain that necessity is a representation of, by means of the practical employment of the paralogisms of practical reason, the noumena. In all theoretical sciences, our faculties are what first give rise to natural causes. To avoid all misapprehension, it is necessary to explain that our ideas can never, as a whole, furnish a true and demonstrated science, because, like the Ideal of natural reason, they stand in need to inductive principles, as is shown in the writings of Galileo. As I have elsewhere shown, natural causes, in respect of the intelligible character, exist in the objects in space and time.

In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception proves the validity of the Antinomies; what we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in the case of the Ideal, the Antinomies; so, the transcendental aesthetic is just as necessary as our experience. By means of the Ideal, our sense perceptions are by their very nature contradictory.

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I Introduction

[M: I found it useful to use the glossaries package for shortcuts to acronyms. See the file `./preamble/glossaries.tex` for the following example:

- EGT
- evolutionary game theory
- Evolutionary game theory
- evolutionary game theories
- Evolutionary game theories
- evolutionary game theory (EGT)
- Evolutionary game theory (EGT)
- evolutionary game theories (EGTs)
- Evolutionary game theories (EGTs)

The list of acronyms can be printed with the `\printglossary` command in `main.tex` (I didn't print it in my thesis). Hyperlinks and backrefs can be activated in `./preamble/glossaries.tex`. See the documentation of the package for further information.]

[M: Random text:]Because of the relation between space and the noumena, our experience is by its very nature contradictory. It is obvious that natural causes constitute the whole content of the transcendental unity of apperception, as any dedicated reader can clearly see. By virtue of pure reason, our sense perceptions, in all theoretical sciences, have lying before them human reason. In view of these considerations, let us suppose that the transcendental objects in space and time, in the study of the architectonic of practical reason, exclude the possibility of the objects in space and time, because of our necessary ignorance of the conditions. By means of philosophy, is it true that formal logic can not take account of the manifold, or is the real question whether our sense perceptions are the mere results of the power of the transcendental aesthetic, a blind but indispensable function of the soul? The objects in space and time are just as necessary as the Antinomies, because of the relation between metaphysics and the things in themselves. Human reason is a representation of the transcendental aesthetic. In my present remarks I am referring to the pure employment of our disjunctive judgements only in so far as it is founded on inductive principles.

II Paralogsms of practical reason

II.1 Problematic judgements

Internal hyperlinks use the `cleveref` package (see `hyperref_metadata.tex`). Biber is used as backend for the bibliography. For more information, see the article [1], the arXiv paper [2], the book [3], chapter 17 of the book [4], the conference [5], the proceedings [6], the url [7], the collection [8], the thesis [9], equation (II.2), section II.1, sections II.1 and II.2, sections II.1–II.3, section II.1.1, section II.1.1a (all in chapter II), table II.1, figure II.1 the margin note, the footnote,¹ [this website](http://xkcd.com/), and this one: <http://xkcd.com/>.

Theorem 1 (Residue Theorem) Let f be analytic in the region G except for the isolated singularities a_1, a_2, \dots, a_m . If γ is a closed rectifiable curve in G which does not pass through any of the points a_k and if $\gamma \approx 0$ in G then

$$\left(\frac{1}{2\pi i} \int_{\gamma} f \right) = \sum_{k=1}^m \left(n(\gamma; a_k) \operatorname{Res}(f; a_k) \right). \quad (\text{II.1})$$

If you use margin notes, enlarge the outer margin to 50–55 mm, and the marginparwidth to 30–35 mm (in `main.tex`).

[M: Parentheses with variable size can be set with the `\paren` command defined in `math_shortcuts.tex` (replaces the `\left` and `\right` commands). See [this discussion](#) for information on punctuation before and in mathematical equations.]

[M: It's usually considered bad style to both indent paragraphs and add additional space between them. The paragraphing style can be changed in `styling.tex` (actually, the width of these paragraphs is probably too large to be considered good style anyway). Random text:]As we have already seen, what we have alone been able to show is that the objects in space and time would be falsified; what we have alone been able to show is that, our judgements are what first give rise to metaphysics. As I have shown elsewhere, Aristotle tells us that the objects in space and time, in the full sense of these terms, would be falsified. Let us suppose that, indeed, our problematic judgements, indeed, can be treated like our concepts. As any dedicated reader can clearly see, our knowledge can be treated like the transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. Whence comes the architectonic of natural reason, the solution of which involves the relation between necessity and the Categories? Natural causes (and it is not at

¹ Note that footnote marks come after punctuation marks (see `basic_packages.tex`).

all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

inside the outer
margin

Margin notes are always. . . . [M: Colors are set in `basic_packages.tex` and `hyperref_metadata.tex`. Deactivate them in the second file for the print version.]

Table II.1 Page dimensions

	Width	Height
Page	209.99753 mm	296.9965 mm
Text	139.99835 mm	209.99753 mm
Inner & top margins	29.99963 mm	43.49948 mm
Outer & bottom margins	39.99953 mm	43.49948 mm
Outer margin (textwidth)	27.49966 mm	-

^a Vertical lines are rare in professionally typeset books. There's a range of packages for tables: `ctables`, `booktabs`, `tabularx/y`, `threeparttable`, . . .

[M: See the code:] The reader should be careful to observe that the objects in space and time are the clue to the discovery of, certainly, our a priori knowledge, by means of analytic unity. Our faculties abstract from all content of knowledge; for these reasons, the discipline of human reason stands in need of the transcendental aesthetic. There can be no doubt that, insomuch as the Ideal relies on our a posteriori concepts, philosophy, when thus treated as the things in themselves, exists in our hypothetical judgements, yet our a posteriori concepts are what first give rise to the phenomena. Philosophy (and I assert that this is true) excludes the possibility of the never-ending regress in the series of empirical conditions, as will easily be shown in the next section. Still, is it true that the transcendental aesthetic can not take account of the objects in space and time, or is the real question whether the phenomena should only be used as a canon for the never-ending regress in the series of empirical conditions? By means of analytic unity, the Transcendental Deduction, still, is the mere result of the power of the Transcendental Deduction, a blind but indispensable function of the soul, but our faculties abstract from all content of a posteriori knowledge. It remains a mystery why, then, the discipline of human reason, in other words, is what first gives rise to the transcendental aesthetic, yet our faculties have lying before them the architectonic of human reason.

Table II.2 Lower case letters

text	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
textbf	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
textsf	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
texttt	<code>a</code>	<code>b</code>	<code>c</code>	<code>d</code>	<code>e</code>	<code>f</code>	<code>g</code>	<code>h</code>	<code>i</code>	<code>j</code>	<code>k</code>	<code>l</code>	<code>m</code>	<code>n</code>	<code>o</code>	<code>p</code>	<code>q</code>	<code>r</code>	<code>s</code>	<code>t</code>	<code>u</code>	<code>v</code>	<code>w</code>	<code>x</code>	<code>y</code>	<code>z</code>
emph	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
textsl	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
textit	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
math	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
bm	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
bf&it	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
textsc	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

^a Note the difference between *g/g* and *h/h* for garamondx. [M: I used *g* and *h* because those were the only versions I could replicate in Illustrator. Attention when using the `\vect` command for vectors, it's implemented via `bm` (see `math_shortcuts.tex`).]

Table II.3 Upper case letters

text	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
textbf	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
textsf	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
texttt	<code>A</code>	<code>B</code>	<code>C</code>	<code>D</code>	<code>E</code>	<code>F</code>	<code>G</code>	<code>H</code>	<code>I</code>	<code>J</code>	<code>K</code>	<code>L</code>	<code>M</code>	<code>N</code>	<code>O</code>	<code>P</code>	<code>Q</code>	<code>R</code>	<code>S</code>	<code>T</code>	<code>U</code>	<code>V</code>	<code>W</code>	<code>X</code>	<code>Y</code>	<code>Z</code>
emph	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
textsl	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
textit	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
math	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
bm	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
bf&it	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
textsc	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
m.cal	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>

Table II.4 Greek letters

A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
α	β	γ	δ	ε/ε	ζ	η	θ/θ	ι	κ/κ	λ	μ	ν	ξ	ο	π	ρ/ρ	σ/ς	τ	υ	φ/φ	χ	ψ	ω

Table II.5 Numbers

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

Sets [M: see `math_shortcuts.tex`]:

$$\in \quad \emptyset \quad \varnothing \quad \mathbb{N} \quad \mathbb{Z} \quad \mathbb{Q} \quad \mathbb{R} \quad \mathbb{C} \quad \mathbb{H} \quad \mathbb{O} \quad \mathbb{L} \quad (\text{II.2})$$

Differential (operators), integrals, sums:

$$\partial \quad \mathrm{d}x \quad \delta \quad \delta \quad \Delta \quad \underline{\Delta} \quad \int_A^B \quad \oint_{\mathcal{C}} \quad \int_A^B \quad \sum_{j=0}^N \quad (\text{II.3})$$

(In-)equalities, definitions, etc.:

$$= \quad := \quad =: \quad \propto \quad (\text{II.4})$$

Vectors, matrices:

[M: See the comment on `bm` for bold italic vectors in `math_shortcuts.tex`.]

$$\boldsymbol{n} \quad \mathbb{1} \quad A^\top \quad (\text{II.5})$$

Upright exponential, imaginary unit:

$$\mathrm{e} \quad \mathrm{i} \quad (\text{II.6})$$

Orthogonal polynomials:

$$He \quad (\text{II.7})$$

Transformations:

$$\mathcal{L} \quad \mathcal{F} \quad (\text{II.8})$$

Miscellaneous:

$$\mathcal{O} \quad \binom{n}{m} \quad \hbar \quad \hbar \quad \iota \quad \jmath \quad \ell \quad \wp \quad \infty \quad \ni \quad (\text{II.9})$$

Fock space operators:

$$\mathrm{c} \quad \mathrm{a} \quad \mathrm{n} \quad (\text{II.10})$$

Bras and kets:

$$|n\rangle = |\boldsymbol{n}\rangle = \langle n| = \langle \boldsymbol{n}| = \langle n|n\rangle = \langle \boldsymbol{n}|\boldsymbol{n}\rangle \quad \langle\langle n|n\rangle = \langle\langle \boldsymbol{n}|\boldsymbol{n}\rangle \quad (\text{II.11})$$

$$|n\rangle\rangle = |\boldsymbol{n}\rangle\rangle = \langle\langle n| = \langle\langle \boldsymbol{n}| = \langle\langle n|n\rangle\rangle = \langle\langle \boldsymbol{n}|\boldsymbol{n}\rangle\rangle \quad \langle n|n\rangle\rangle = \langle \boldsymbol{n}|\boldsymbol{n}\rangle\rangle \quad (\text{II.12})$$

$$\langle n = n\rangle = \langle \boldsymbol{n} = \boldsymbol{n}\rangle = \langle\langle n = n\rangle\rangle = \langle\langle \boldsymbol{n} = \boldsymbol{n}\rangle\rangle. \quad (\text{II.13})$$

II.1.1 Physical Reasoning

[M: Random text:]Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception proves the validity of the Antinomies; what we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in the case of the Ideal, the Antinomies; so, the transcendental aesthetic is just as necessary as our experience. By means of the Ideal, our sense perceptions are by their very nature contradictory.

Table II.6 The caption above the table

	α	β
γ	3.1415926535897	932384626433832
δ	79502884197169	399375105820974

^a A footnote.

Comment (additional details): Auxiliary explanations, Remove from final text. May stretch over several paragraphs and include equations.

[M: Random text:]As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.

$$\begin{array}{c} \leftarrow \\ \nearrow \\ \searrow \end{array} \begin{array}{c} \nearrow \\ \leftarrow \\ \searrow \end{array} \begin{array}{c} \nearrow \\ \leftarrow \\ \searrow \end{array} \quad \text{and} \quad \begin{array}{c} \nearrow \\ \leftarrow \\ \searrow \end{array} \begin{array}{c} \nearrow \\ \leftarrow \\ \searrow \end{array} \begin{array}{c} \nearrow \\ \leftarrow \\ \searrow \end{array} \quad . \quad (II.14)$$

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.



[M: The vertical alignment of inline Feynman diagrams such as $\bullet \leftarrow$, can be changed using the “baseline” option.]

II.1.1a Physical Deduction

[M: Random text:]The things in themselves are what first give rise to reason, as is proven in the ontological manuals. By virtue of natural reason, let us suppose that the transcendental unity of apperception abstracts from all content of knowledge; in view of these considerations, the Ideal of human reason, on the contrary, is the key to understanding pure logic. Let us suppose that, irrespective of all empirical conditions, our understanding stands in need of our disjunctive judgements. As is shown in the writings of Aristotle, pure logic, in the case of the discipline of natural reason, abstracts from all content of knowledge. Our understanding is a representation of, in accordance with the principles of the employment of the paralogisms, time. I assert, as I have shown elsewhere, that our concepts can be treated like metaphysics. By means of the Ideal, it must not be supposed that the objects in space and time are what first give rise to the employment of pure reason.

Paragraph However, we can deduce that our experience (and it must not be supposed that this is true) stands in need of our experience, as we have already seen. On the other hand, it is not at all certain that necessity is a representation of, by means of the practical employment of the paralogisms of practical reason, the noumena. In all theoretical sciences, our faculties are what first give rise to natural causes. To avoid all misapprehension, it is necessary to explain that our ideas can



Figure II.1 What we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in the case of the Ideal, the Antinomies.

never, as a whole, furnish a true and demonstrated science, because, like the Ideal of natural reason, they stand in need to inductive principles, as is shown in the writings of Galileo. As I have elsewhere shown, natural causes, in respect of the intelligible character, exist in the objects in space and time.

Our ideas, in the case of the Ideal of pure reason, are by their very nature contradictory. The objects in space and time can not take account of our understanding, and philosophy excludes the possibility of, certainly, space. I assert that our ideas, by means of philosophy, constitute a body of demonstrated doctrine, and all of this body must be known a posteriori, by means of analysis. It must not be supposed that space is by its very nature contradictory. Space would thereby be made to contradict, in the case of the manifold, the manifold. As is proven in the ontological manuals, Aristotle tells us that, in accordance with the principles of the discipline of human reason, the never-ending regress in the series of empirical conditions has lying before it our experience. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

Since knowledge of our faculties is a posteriori, pure logic teaches us nothing whatsoever regarding the content of, indeed, the architectonic of human reason. As we have already seen, we can deduce that, irrespective of all empirical conditions, the Ideal of human reason is what first gives rise to, indeed, natural causes, yet the thing in itself can never furnish a true and demonstrated science, because, like necessity, it is the clue to the discovery of disjunctive principles. On the other hand, the manifold depends on the paralogisms. Our faculties exclude the possibility of, insomuch as philosophy relies on natural causes, the discipline of natural reason. In all theoretical sciences, what we have alone been able to show is that the objects in space and time exclude the possibility of our judgements, as will easily be shown in the next section. This is what chiefly concerns us.

II.2 Paralogisms of practical reason

I used Garamond No.8 for plot labels with sizes of 10 pt or 11 pt. Equations can be reproduced by hand or with the help of LaTeXiT (10 pt chosen here).

$$p(t, n|t_0, n_0) = \langle n_0|_{t_0} \int_{(t_0)}^{[t]} e^{-S^\dagger} |n\rangle_t \quad (\text{II.16})$$



Real font: $p(t, n|t_0, n_0) = \langle n_0|_{t_0} \int_{(t_0)}^{[t]} e^{-S^\dagger} |n\rangle_t$

Outlined: $p(t, n|t_0, n_0) = \langle n_0|_{t_0} \int_{(t_0)}^{[t]} e^{-S^\dagger} |n\rangle_t$



Figure II.2 [M: Garamond comparison: There's a guide on LaTeXiT in a separate folder. Images exported as "PDF with outlined font" look strangely thin (in macOS preview). Good results need some effort.]

[M: Random text:]In all theoretical sciences, the paralogisms of human reason would be falsified, as is proven in the ontological manuals. The architectonic of human reason is what first gives rise to the Categories. As any dedicated reader can clearly see, the paralogisms should only be used as a canon for our experience. What we have alone been able to show is that, that is to say, our sense perceptions constitute a body of demonstrated doctrine, and some of this body must be known a posteriori. Human reason occupies part of the sphere of our experience concerning the existence of the phenomena in general.

II.3 Publication

The ontological manuals

by

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Zur Theorie der Gesellschaftsspiele¹⁾.

Von

J. v. Neumann in Berlin.

Einleitung.

1. Die Frage, deren Beantwortung die vorliegende Arbeit anstrebt, ist die folgende:

n Spieler, S_1, S_2, \dots, S_n , spielen ein gegebenes Gesellschaftsspiel \mathcal{G} . Wie muß einer dieser Spieler, S_m , spielen, um dabei ein möglichst günstiges Resultat zu erzielen?

Die Fragestellung ist allgemein bekannt, und es gibt wohl kaum eine Frage des täglichen Lebens, in die dieses Problem nicht hineinspielt; trotzdem ist der Sinn dieser Frage kein eindeutig klarer. Denn sobald $n > 1$ ist (d. h. ein eigentliches Spiel vorliegt), hängt das Schicksal eines jeden Spielers außer von seinen eigenen Handlungen auch noch von denen seiner Mitspieler ab; und deren Benehmen ist von genau denselben egoistischen Motiven beherrscht, die wir beim ersten Spieler bestimmen möchten. Man fühlt, daß ein gewisser Zirkel im Wesen der Sache liegt.

Wir müssen also versuchen, zu einer klaren Fragestellung zu kommen. Was ist zunächst ein Gesellschaftsspiel? Es fallen unter diesen Begriff sehr viele, recht verschiedenartige Dinge: von der Roulette bis zum Schach, vom Bakkarat bis zum Bridge liegen ganz verschiedene Varianten des Sammelbegriffes „Gesellschaftsspiel“ vor. Und letzten Endes kann auch irgendein Ereignis, mit gegebenen äußeren Bedingungen und gegebenen Handelnden (den absolut freien Willen der letzteren vorausgesetzt), als Gesellschaftsspiel angesehen werden, wenn man seine Rückwirkungen auf die in ihm handelnden Personen betrachtet²⁾. Was ist nun das gemeinsame Merkmal aller dieser Dinge?

¹⁾ Der Inhalt dieser Arbeit ist (mit einigen Kürzungen) am 7. XII. 1926 der Göttinger Math. Ges. vorgetragen worden.

²⁾ Es ist das Hauptproblem der klassischen Nationalökonomie: was wird, unter gegebenen äußeren Umständen, der absolut egoistische „homo oeconomicus“ tun?

Man darf wohl annehmen, daß es dieses ist:

Ein Gesellschaftsspiel besteht aus einer bestimmten Reihe von Ereignissen, deren jedes auf endlich viele verschiedene Arten ausfallen kann. Bei gewissen unter diesen Ereignissen hängt der Ausfall vom Zufall ab, d. h.: es ist bekannt, mit welchen Wahrscheinlichkeiten die einzelnen möglichen Resultate eintreten werden, aber niemand vermag sie zu beeinflussen. Die übrigen Ereignisse aber hängen vom Willen der einzelnen Spieler S_1, S_2, \dots, S_n ab. D. h.: es ist bei jedem dieser Ereignisse bekannt, welcher Spieler S_m seinen Ausfall bestimmt, und von den Resultaten welcher anderer („früherer“) Ereignisse er im Moment seiner Entscheidung bereits Kenntnis hat. Nachdem der Ausfall aller Ereignisse bereits bekannt ist, kann nach einer festen Regel berechnet werden, welche Zahlungen die Spieler S_1, S_2, \dots, S_n aneinander zu leisten haben.

Es ist leicht, diese mehr qualitative Erklärung in die Form einer exakten Definition zu bringen. Diese Definition des Gesellschaftsspieles würde so lauten:

Um ein Gesellschaftsspiel \mathfrak{G} vollständig zu beschreiben, sind die folgenden Angaben notwendig, die zusammen die „Spielregel“ ergeben:

α) Es muß angegeben werden, wie viele vom Zufall abhängige Ereignisse oder „Ziehungen“ und wieviel vom Willen der einzelnen Spieler abhängige Ereignisse oder „Schritte“ erfolgen. Diese Anzahlen seien z bzw. s , die „Ziehungen“ bezeichnen wir mit E_1, E_2, \dots, E_z , die „Schritte“ mit F_1, F_2, \dots, F_s .

β) Es muß angegeben werden, auf wie viele Arten jede „Ziehung“ E_μ und jeder „Schritt“ F_ν ausfallen kann. Diese Anzahlen seien M_μ bzw. N_ν ($\mu = 1, 2, \dots, z$, $\nu = 1, 2, \dots, s$). Wir bezeichnen die betreffenden Resultate kurz mit ihren Nummern $1, 2, \dots, M_\mu$ bzw. $1, 2, \dots, N_\nu$.

γ) Bei jeder „Ziehung“ E_μ müssen die Wahrscheinlichkeiten $\alpha_\mu^{(1)}, \alpha_\mu^{(2)}, \dots, \alpha_\mu^{(M_\mu)}$ der einzelnen Resultate $1, 2, \dots, M_\mu$ gegeben sein. Natürlich ist

$$\alpha_\mu^{(1)} \geq 0, \alpha_\mu^{(2)} \geq 0, \dots, \alpha_\mu^{(M_\mu)} \geq 0, \\ \alpha_\mu^{(1)} + \alpha_\mu^{(2)} + \dots + \alpha_\mu^{(M_\mu)} = 1.$$

δ) Bei jedem „Schritt“ F_ν muß erstens derjenige Spieler S_m angegeben sein, der den Ausfall dieses „Schrittes“ bestimmt („dessen Schritt“ F_ν ist): $S_{(F_\nu)}$. Ferner müssen die Nummern aller „Ziehungen“ und „Schritte“ angegeben sein, über deren Ausfall er im Momente seiner Entscheidung über F_ν Kenntnis hat. (Diese „Ziehungen“ und „Schritte“ nennen wir „früher“ als F_ν .)

SUPPLEMENT I

MOTTO TO SECOND EDITION

BACO DE VERULAMIO

Instauratio magna : Praefatio

DE nobis ipsis silemus : de re autem, quae agitur, petimus, ut homines eam non opinionem, sed opus esse cogitent ; ac pro certo habeant, non sectae nos alicujus aut placiti, sed utilitatis et amplitudinis humanae fundamenta moliri. Deinde ut suis commodis aequi . . . in commune consulant, . . . et ipsi in partem veniant. Praeterea, ut bene sperent, neque Instaurationem nostram ut quiddam infinitum et ultra mortale fingant, et animo concipiant ; quum revera sit infiniti erroris finis et terminus legitimus.

SUPPLEMENT II

PREFACE TO THE SECOND EDITION. 1787. [p. vii]

WHETHER the treatment of that class of knowledge with which reason is occupied follows the secure method of a science or not, can easily be determined by the result. If, after repeated preparations, it comes to a standstill, as soon as its real goal is approached, or is obliged, in order to reach it, to retrace its steps again and again, and strike into fresh paths ; again, if it is impossible to produce unanimity among those who are engaged in the same work, as to the manner in which their common object should be obtained, we may be convinced that such a study is far from having attained to the secure method of a science, but is groping only in the dark. In that case we are conferring a great benefit on reason, if we only find out the right method, though many things should have to be surrendered as useless, which were comprehended in the original aim that had been chosen without sufficient reflection.

That *Logic*, from the earliest times, has followed that [p. viii] secure method, may be seen from the fact that since *Aristotle* it has not had to retrace a single step, unless we choose to consider as improvements the removal of some unnecessary subtleties, or the clearer definition of its matter, both of which refer to the elegance rather than to the solidity of the science. It is remarkable also, that to the present day, it has not been able to make one step in advance, so that, to all appearance, it may be considered as completed and perfect. If some modern philosophers thought to enlarge it, by introducing *psychological* chapters on the different faculties of knowledge (faculty of imagination, wit, etc.), or *metaphysical* chapters on the origin of knowledge, or the dif-

II.A Never-ending regress

[M: The next four pages demonstrate the page layout. The frames are displayed using the “showframe” package in temporary.tex.]

II.A.1 Necessary principles

However, we can deduce that our experience (and it must not be supposed that this is true) stands in need of our experience, as we have already seen. On the other hand, it is not at all certain that necessity is a representation of, by means of the practical employment of the paralogisms of practical reason, the noumena. In all theoretical sciences, our faculties are what first give rise to natural causes. To avoid all misapprehension, it is necessary to explain that our ideas can never, as a whole, furnish a true and demonstrated science, because, like the Ideal of natural reason, they stand in need to inductive principles, as is shown in the writings of Galileo. As I have elsewhere shown, natural causes, in respect of the intelligible character, exist in the objects in space and time.

II.A.1a New approaches

However, we can deduce that our experience (and it must not be supposed that this is true) stands in need of our experience, as we have already seen. On the other hand, it is not at all certain that necessity is a representation of, by means of the practical employment of the paralogisms of practical reason, the noumena. In all theoretical sciences, our faculties are what first give rise to natural causes. To avoid all misapprehension, it is necessary to explain that our ideas can never, as a whole, furnish a true and demonstrated science, because, like the Ideal of natural reason, they stand in need to inductive principles, as is shown in the writings of Galileo. As I have elsewhere shown, natural causes, in respect of the intelligible character, exist in the objects in space and time.

Next steps Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception proves the validity of the Antinomies; what we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in the case of the Ideal, the Antinomies; so, the transcendental aesthetic is just as necessary as our experience. By means of the Ideal, our sense perceptions are by their very nature contradictory.

As is proven in the ontological manuals, philosophy is the mere result of the power of pure logic, a blind but indispensable function of the soul; however, the phenomena can never, as a whole, furnish a true and demonstrated science, because, like general logic, they exclude the possibility of problematic principles. To avoid all misapprehension, it is necessary to explain that the never-ending regress in the series of empirical conditions is by its very nature contradictory. It must not be supposed that our a priori concepts stand in need to natural causes, because of the relation between the Ideal and our ideas. (We can deduce that the Antinomies would be falsified.) Since knowledge of the Categories is a posteriori, what we have alone been able to show is that, in the full sense of these terms, necessity (and we can deduce that this is true) is the key to understanding time, but the Ideal of natural reason is just as necessary as our experience. As will easily be shown in the next section, the thing in itself, with the sole exception of the manifold, abstracts from all content of a posteriori knowledge. The question of this matter's relation to objects is not in any way under discussion.

By means of the transcendental aesthetic, it remains a mystery why the phenomena (and it is not at all certain that this is the case) are the clue to the discovery of the never-ending regress in the series of empirical conditions. In all theoretical sciences, metaphysics exists in the objects in space and time, because of the relation between formal logic and our synthetic judgements. The Categories would thereby be made to contradict the paralogisms, as any dedicated reader can clearly see. Therefore, there can be no doubt that the paralogisms have nothing to do with, so far as regards the Ideal and our faculties, the paralogisms, because of our necessary ignorance of the conditions. It must not be supposed that the objects in space and time occupy part of the sphere of necessity concerning the existence of the noumena in general. In natural theology, the things in themselves, therefore, are by their very nature contradictory, by virtue of natural reason. This is the sense in which it is to be understood in this work.

As is evident upon close examination, let us suppose that, in accordance with the principles of time, our a priori concepts are the clue to the discovery of philosophy. By means of analysis, to avoid all misapprehension, it is necessary to explain that, in particular, the transcendental aesthetic can not take account of natural causes. As we have already seen, the reader should be careful to observe that, in accordance with the principles of the objects in space and time, the noumena are the mere results of the power of our understanding, a blind but indispensable function of the soul, and the thing in itself abstracts from all content of a posteriori knowledge. We can deduce that, indeed, our experience, in reference to ends, can never furnish a true and demonstrated science, because, like the Ideal of practical reason, it can thereby determine in its totality speculative principles, yet our hypothetical judgements are just as necessary as space. It is not at all certain that, inasmuch as the Ideal of practical reason relies on the noumena, the Categories prove the

validity of philosophy, yet pure reason is the key to understanding the Categories. This is what chiefly concerns us.

Natural causes, when thus treated as the things in themselves, abstract from all content of a posteriori knowledge, by means of analytic unity. Our a posteriori knowledge, in other words, is the key to understanding the Antinomies. As we have already seen, what we have alone been able to show is that, so far as I know, the objects in space and time are the clue to the discovery of the manifold. The things in themselves are the clue to the discovery of, in the case of the Ideal of natural reason, our concepts. To avoid all misapprehension, it is necessary to explain that, so far as regards philosophy, the discipline of human reason, for these reasons, is a body of demonstrated science, and some of it must be known a priori, but our faculties, consequently, would thereby be made to contradict the Antinomies. It remains a mystery why our understanding excludes the possibility of, inasmuch as the Ideal relies on the objects in space and time, our concepts. It is not at all certain that the pure employment of the objects in space and time (and the reader should be careful to observe that this is true) is the clue to the discovery of the architectonic of pure reason. Let us suppose that natural reason is a representation of, inasmuch as space relies on the paralogisms, the Transcendental Deduction, by means of analysis.

As we have already seen, the Ideal constitutes the whole content for the transcendental unity of apperception. By means of analytic unity, let us suppose that, when thus treated as space, our synthetic judgements, therefore, would be falsified, and the objects in space and time are what first give rise to our sense perceptions. Let us suppose that, in the full sense of these terms, the discipline of practical reason can not take account of our experience, and our ideas have lying before them our inductive judgements. (Since all of the phenomena are speculative, to avoid all misapprehension, it is necessary to explain that the noumena constitute a body of demonstrated doctrine, and some of this body must be known a posteriori; as I have elsewhere shown, the noumena are a representation of the noumena.) Let us suppose that practical reason can thereby determine in its totality, by means of the Ideal, the pure employment of the discipline of practical reason. Galileo tells us that the employment of the phenomena can be treated like our ideas; still, the Categories, when thus treated as the paralogisms, exist in the employment of the Antinomies. Let us apply this to our experience.

I assert, thus, that the discipline of natural reason can be treated like the transcendental aesthetic, since some of the Categories are speculative. In the case of transcendental logic, our ideas prove the validity of our understanding, as any dedicated reader can clearly see. In natural theology, our ideas can not take account of general logic, because of the relation between philosophy and the noumena. As is evident upon close examination, natural causes should only be used as a canon for the manifold, and our faculties, in natural theology, are a representation of

natural causes. As is shown in the writings of Aristotle, the Ideal of human reason, for these reasons, would be falsified. What we have alone been able to show is that the Categories, so far as regards philosophy and the Categories, are the mere results of the power of the Transcendental Deduction, a blind but indispensable function of the soul, as is proven in the ontological manuals.

The noumena have nothing to do with, thus, the Antinomies. What we have alone been able to show is that the things in themselves constitute the whole content of human reason, as is proven in the ontological manuals. The noumena (and to avoid all misapprehension, it is necessary to explain that this is the case) are the clue to the discovery of the architectonic of natural reason. As we have already seen, let us suppose that our experience is what first gives rise to, therefore, the transcendental unity of apperception; in the study of the practical employment of the Antinomies, our ampliative judgements are what first give rise to the objects in space and time. Necessity can never furnish a true and demonstrated science, because, like our understanding, it can thereby determine in its totality hypothetical principles, and the empirical objects in space and time are what first give rise to, in all theoretical sciences, our a posteriori concepts.

Our understanding excludes the possibility of practical reason. Our faculties stand in need to, consequently, the never-ending regress in the series of empirical conditions; still, the employment of necessity is what first gives rise to general logic. With the sole exception of applied logic, to avoid all misapprehension, it is necessary to explain that time, in view of these considerations, can never furnish a true and demonstrated science, because, like the Ideal of human reason, it is a representation of ampliative principles, as is evident upon close examination. Since knowledge of the paralogisms of natural reason is a priori, I assert, consequently, that, in so far as this expounds the practical rules of the thing in itself, the things in themselves exclude the possibility of the discipline of pure reason, yet the empirical objects in space and time prove the validity of natural causes.

Because of the relation between space and the noumena, our experience is by its very nature contradictory. It is obvious that natural causes constitute the whole content of the transcendental unity of apperception, as any dedicated reader can clearly see. By virtue of pure reason, our sense perceptions, in all theoretical sciences, have lying before them human reason. In view of these considerations, let us suppose that the transcendental objects in space and time, in the study of the architectonic of practical reason, exclude the possibility of the objects in space and time, because of our necessary ignorance of the conditions. By means of philosophy, is it true that formal logic can not take account of the manifold, or is the real question whether our sense perceptions are the mere results of the power of the transcendental aesthetic, a blind but indispensable function of the soul? The objects in space and time are just as necessary as the Antinomies, because of the relation between metaphysics and the things in themselves. Human reason

is a representation of the transcendental aesthetic. In my present remarks I am referring to the pure employment of our disjunctive judgements only in so far as it is founded on inductive principles.

What we have alone been able to show is that our sense perceptions are the clue to the discovery of our understanding; in natural theology, necessity, in all theoretical sciences, occupies part of the sphere of the transcendental unity of apperception concerning the existence of our faculties in general. The transcendental aesthetic is what first gives rise to the never-ending regress in the series of empirical conditions, as any dedicated reader can clearly see. The transcendental unity of apperception is what first gives rise to, in all theoretical sciences, the Antinomies. The phenomena, consequently, stand in need to the things in themselves. By means of analytic unity, necessity, on the contrary, abstracts from all content of a priori knowledge. The phenomena (and it remains a mystery why this is the case) are just as necessary as the Ideal of human reason.

As any dedicated reader can clearly see, our experience is the clue to the discovery of philosophy; in the study of space, the Categories are what first give rise to the transcendental aesthetic. As any dedicated reader can clearly see, the reader should be careful to observe that, so regarded, the never-ending regress in the series of empirical conditions, as I have elsewhere shown, is the mere result of the power of the transcendental unity of apperception, a blind but indispensable function of the soul, but our judgements can be treated like time. We can deduce that the objects in space and time are just as necessary as the objects in space and time. Aristotle tells us that, even as this relates to time, the objects in space and time, however, abstract from all content of a posteriori knowledge. To avoid all misapprehension, it is necessary to explain that the phenomena (and it is not at all certain that this is the case) stand in need to the discipline of practical reason; thus, our knowledge, indeed, can not take account of our ideas.

However, we can deduce that our experience (and it must not be supposed that this is true) stands in need of our experience, as we have already seen. On the other hand, it is not at all certain that necessity is a representation of, by means of the practical employment of the paralogisms of practical reason, the noumena. In all theoretical sciences, our faculties are what first give rise to natural causes. To avoid all misapprehension, it is necessary to explain that our ideas can never, as a whole, furnish a true and demonstrated science, because, like the Ideal of natural reason, they stand in need to inductive principles, as is shown in the writings of Galileo. As I have elsewhere shown, natural causes, in respect of the intelligible character, exist in the objects in space and time.

I know a bank where the wild thyme blows.
— Leia Organa Solo, THE REAL HOUSEWIVES OF D.C.

III Ampliative judgements

References are grouped: [1–9]. Note that the¹ are reset in every chapter. [M: Random text:]The reader should be careful to observe that the objects in space and time are the clue to the discovery of, certainly, our a priori knowledge, by means of analytic unity. Our faculties abstract from all content of knowledge; for these reasons, the discipline of human reason stands in need of the transcendental aesthetic. There can be no doubt that, insomuch as the Ideal relies on our a posteriori concepts, philosophy, when thus treated as the things in themselves, exists in our hypothetical judgements, yet our a posteriori concepts are what first give rise to the phenomena. Philosophy (and I assert that this is true) excludes the possibility of the never-ending regress in the series of empirical conditions, as will easily be shown in the next section. Still, is it true that the transcendental aesthetic can not take account of the objects in space and time, or is the real question whether the phenomena should only be used as a canon for the never-ending regress in the series of empirical conditions? By means of analytic unity, the Transcendental Deduction, still, is the mere result of the power of the Transcendental Deduction, a blind but indispensable function of the soul, but our faculties abstract from all content of a posteriori knowledge. It remains a mystery why, then, the discipline of human reason, in other words, is what first gives rise to the transcendental aesthetic, yet our faculties have lying before them the architectonic of human reason.

[M: The chapter number may be removed from equations, figures, and tables as explained in styling.tex.]

$$|n\rangle_x := \frac{x^n e^{-x}}{n!} . \quad (\text{III.1})$$

[M: Random text:]Let us suppose that the noumena have nothing to do with necessity, since knowledge of the Categories is a posteriori. Hume tells us that the transcendental unity of apperception can not take account of the discipline of natural reason, by means of analytic unity. As is proven in the ontological manuals, it is obvious that the transcendental unity of apperception proves the validity of the Antinomies; what we have alone been able to show is that, our understanding depends on the Categories. It remains a mystery why the Ideal stands in need of reason. It must not be supposed that our faculties have lying before them, in

1 numbers of footnotes

the case of the Ideal, the Antinomies; so, the transcendental aesthetic is just as necessary as our experience. By means of the Ideal, our sense perceptions are by their very nature contradictory.

As is shown in the writings of Aristotle, the things in themselves (and it remains a mystery why this is the case) are a representation of time. Our concepts have lying before them the paralogisms of natural reason, but our a posteriori concepts have lying before them the practical employment of our experience. Because of our necessary ignorance of the conditions, the paralogisms would thereby be made to contradict, indeed, space; for these reasons, the Transcendental Deduction has lying before it our sense perceptions. (Our a posteriori knowledge can never furnish a true and demonstrated science, because, like time, it depends on analytic principles.) So, it must not be supposed that our experience depends on, so, our sense perceptions, by means of analysis. Space constitutes the whole content for our sense perceptions, and time occupies part of the sphere of the Ideal concerning the existence of the objects in space and time in general.

IV System of transcendental philosophy

IV.1 Categories

[M: Random text:] Since some of natural causes are disjunctive, the never-ending regress in the series of empirical conditions is the key to understanding, in particular, the noumena. By means of analysis, the Categories (and it is not at all certain that this is the case) exclude the possibility of our faculties. Let us suppose that the objects in space and time, irrespective of all empirical conditions, exist in the architectonic of natural reason, because of the relation between the architectonic of natural reason and our a posteriori concepts. I assert, as I have elsewhere shown, that, so regarded, our sense perceptions (and let us suppose that this is the case) are a representation of the practical employment of natural causes. (I assert that time constitutes the whole content for, in all theoretical sciences, our understanding, as will easily be shown in the next section.) With the sole exception of our knowledge, the reader should be careful to observe that natural causes (and it remains a mystery why this is the case) can not take account of our sense perceptions, as will easily be shown in the next section. Certainly, natural causes would thereby be made to contradict, with the sole exception of necessity, the things in themselves, because of our necessary ignorance of the conditions. But to this matter no answer is possible.

Since all of the objects in space and time are synthetic, it remains a mystery why, even as this relates to our experience, our a priori concepts should only be used as a canon for our judgements, but the phenomena should only be used as a canon for the practical employment of our judgements. Space, consequently, is a body of demonstrated science, and all of it must be known a priori, as will easily be shown in the next section. We can deduce that the Categories have lying before them the phenomena. Therefore, let us suppose that our ideas, in the study of the transcendental unity of apperception, should only be used as a canon for the pure employment of natural causes. Still, the reader should be careful to observe that the Ideal (and it remains a mystery why this is true) can not take account of our faculties, as is proven in the ontological manuals. Certainly, it remains a mystery why the manifold is just as necessary as the manifold, as is evident upon close examination.

In natural theology, what we have alone been able to show is that the architectonic of practical reason is the clue to the discovery of, still, the manifold, by

means of analysis. Since knowledge of the objects in space and time is a priori, the things in themselves have lying before them, for example, the paralogisms of human reason. Let us suppose that our sense perceptions constitute the whole content of, by means of philosophy, necessity. Our concepts (and the reader should be careful to observe that this is the case) are just as necessary as the Ideal. To avoid all misapprehension, it is necessary to explain that the Categories occupy part of the sphere of the discipline of human reason concerning the existence of our faculties in general. The transcendental aesthetic, in so far as this expounds the contradictory rules of our a priori concepts, is the mere result of the power of our understanding, a blind but indispensable function of the soul. The manifold, in respect of the intelligible character, teaches us nothing whatsoever regarding the content of the thing in itself; however, the objects in space and time exist in natural causes.

I assert, however, that our a posteriori concepts (and it is obvious that this is the case) would thereby be made to contradict the discipline of practical reason; however, the things in themselves, however, constitute the whole content of philosophy. As will easily be shown in the next section, the Antinomies would thereby be made to contradict our understanding; in all theoretical sciences, metaphysics, irrespective of all empirical conditions, excludes the possibility of space. It is not at all certain that necessity (and it is obvious that this is true) constitutes the whole content for the objects in space and time; consequently, the paralogisms of practical reason, however, exist in the Antinomies. The reader should be careful to observe that transcendental logic, in so far as this expounds the universal rules of formal logic, can never furnish a true and demonstrated science, because, like the Ideal, it may not contradict itself, but it is still possible that it may be in contradictions with disjunctive principles. (Because of our necessary ignorance of the conditions, the thing in itself is what first gives rise to, inasmuch as the transcendental aesthetic relies on the objects in space and time, the transcendental objects in space and time; thus, the never-ending regress in the series of empirical conditions excludes the possibility of philosophy.) As we have already seen, time depends on the objects in space and time; in the study of the architectonic of pure reason, the phenomena are the clue to the discovery of our understanding. Because of our necessary ignorance of the conditions, I assert that, indeed, the architectonic of natural reason, as I have elsewhere shown, would be falsified.

V Conclusion

[M: Random text:]To avoid all misapprehension, it is necessary to explain that, in respect of the intelligible character, the transcendental aesthetic depends on the objects in space and time, yet the manifold is the clue to the discovery of the Transcendental Deduction. Therefore, the transcendental unity of apperception would thereby be made to contradict, in the case of our understanding, our ideas. There can be no doubt that the things in themselves prove the validity of the objects in space and time, as is shown in the writings of Aristotle. By means of analysis, there can be no doubt that, insomuch as the discipline of pure reason relies on the Categories, the transcendental unity of apperception would thereby be made to contradict the never-ending regress in the series of empirical conditions. In the case of space, the Categories exist in time. Our faculties can be treated like our concepts. As is shown in the writings of Galileo, the transcendental unity of apperception stands in need of, in the case of necessity, our speculative judgements.

The phenomena (and it is obvious that this is the case) prove the validity of our sense perceptions; in natural theology, philosophy teaches us nothing whatsoever regarding the content of the transcendental objects in space and time. In natural theology, our sense perceptions are a representation of the Antinomies. The noumena exclude the possibility of, even as this relates to the transcendental aesthetic, our knowledge. Our concepts would thereby be made to contradict, that is to say, the noumena; in the study of philosophy, space is by its very nature contradictory. Since some of the Antinomies are problematic, our ideas are a representation of our a priori concepts, yet space, in other words, has lying before it the things in themselves. Aristotle tells us that, in accordance with the principles of the phenomena, the Antinomies are a representation of metaphysics.

A Architectonic of pure reason

A.1 Ideal of practical reason

[M: Random text:]What we have alone been able to show is that our a posteriori concepts (and it is obvious that this is the case) are what first give rise to the transcendental unity of apperception. In the case of necessity, the reader should be careful to observe that metaphysics is a representation of natural causes, by means of analysis. In all theoretical sciences, the phenomena (and the reader should be careful to observe that this is the case) would thereby be made to contradict natural reason. The transcendental aesthetic, in the case of space, is by its very nature contradictory. By virtue of human reason, to avoid all misapprehension, it is necessary to explain that the empirical objects in space and time exist in our judgements; for these reasons, the Antinomies, by means of our experience, can be treated like the architectonic of human reason. It must not be supposed that our ideas have lying before them metaphysics; consequently, the architectonic of pure reason, in all theoretical sciences, would be falsified.

The Transcendental Deduction stands in need of the Ideal of pure reason, and the noumena, for these reasons, are by their very nature contradictory. The objects in space and time have lying before them our ideas. The transcendental unity of apperception, indeed, proves the validity of our understanding. The architectonic of human reason, so regarded, would be falsified, as is evident upon close examination. Since knowledge of the noumena is a priori, Hume tells us that, then, the Transcendental Deduction, when thus treated as the architectonic of natural reason, abstracts from all content of knowledge, but the objects in space and time, for these reasons, stand in need to the transcendental aesthetic. By means of analytic unity, natural causes exclude the possibility of, consequently, metaphysics, and the discipline of pure reason abstracts from all content of a priori knowledge. We thus have a pure synthesis of apprehension.

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Acknowledgements

[M: Random text:]By virtue of natural reason, what we have alone been able to show is that, in so far as this expounds the universal rules of our a posteriori concepts, the architectonic of natural reason can be treated like the architectonic of practical reason. Thus, our speculative judgements can not take account of the Ideal, since none of the Categories are speculative. With the sole exception of the Ideal, it is not at all certain that the transcendental objects in space and time prove the validity of, for example, the noumena, as is shown in the writings of Aristotle. As we have already seen, our experience is the clue to the discovery of the Antinomies; in the study of pure logic, our knowledge is just as necessary as, thus, space. By virtue of practical reason, the noumena, still, stand in need to the pure employment of the things in themselves.

The reader should be careful to observe that the objects in space and time are the clue to the discovery of, certainly, our a priori knowledge, by means of analytic unity. Our faculties abstract from all content of knowledge; for these reasons, the discipline of human reason stands in need of the transcendental aesthetic. There can be no doubt that, insomuch as the Ideal relies on our a posteriori concepts, philosophy, when thus treated as the things in themselves, exists in our hypothetical judgements, yet our a posteriori concepts are what first give rise to the phenomena. Philosophy (and I assert that this is true) excludes the possibility of the never-ending regress in the series of empirical conditions, as will easily be shown in the next section. Still, is it true that the transcendental aesthetic can not take account of the objects in space and time, or is the real question whether the phenomena should only be used as a canon for the never-ending regress in the series of empirical conditions? By means of analytic unity, the Transcendental Deduction, still, is the mere result of the power of the Transcendental Deduction, a blind but indispensable function of the soul, but our faculties abstract from all content of a posteriori knowledge. It remains a mystery why, then, the discipline of human reason, in other words, is what first gives rise to the transcendental aesthetic, yet our faculties have lying before them the architectonic of human reason.