

Outline

- motivation: <sup>metaphys (subject of knowledge)</sup> epist (warrant for knowledge) vs methodology (ways of achieving that warrant)

⇒ theory is what articulates, expresses & captures what is warranted, arrived at by the appropriate method - thus analysis of theory from perception to math structure

- the book itself: profound & revolutionary 1st in many respects

deeper than Peirce, theory inspired by it

- deep application of formal logic to knowledge in physics (as 'On Duty' was 1st application of logic to analysis of language & relation to epist of everyday life)
- formal disjunction of modern QM & GR, based on logical analysis
- articulation of structuralism
- articulation of modern empiricist tract of distinction between observable of theoretical, and in a way more sophisticated than many of those inspired by it (log P.s.)
- articulation of problem of scientific theories, in modern form (inspired by Peirce)

- chs. XVIII - XXII: "analysis of theory from perception to <sup>math's struc</sup> math's struc"  
- start w/ perception (acquaintance vs description, ostensive def'n, observable vs theoretical)

- types of inference, correctness of types of error
- 'unperceived' (and so imperceptible) entities → inference
- 'central problem' in analysis of matter: justification in belief of permanence
- grounds knowledge (theoretic) in phys
- causal theory of perception as sci'e hypothesis, and limited of ground for sci'e, theoretic knowledge
- we know (infer) only struc in perception of external

Notes for <sup>Anti Matter</sup> Russell, Sem / Struc Theors, Lecture

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Outline cont.

- based on continuity of causal chains
- ~~matter (in phys) vs 'substance' (percept)~~
- objectivity from commonality of experience
  - ground for hypothesis that we know only struc (not-yetly qualitative)
  - based on 'similarity' of percepts (descriptions thereof)
  - ⇒ theory (descriptions) as structure (similarity of relations)
- this 'general law' is domain of science (almost a tautology)
- 'substance' (percept) vs 'matter' (phys)
  - 'object' unnecessary for analysis of substance
  - ⇒ so we ~~infer~~ <sup>work on</sup> analysis of sci'e knowledge for which also unnecessary
- structure
  - from hypothesis of 'similarity' of cause & effect (causal theory of perception)
  - ⇒ theor'l knowledge in physics, <sup>is math'l</sup> ~~not~~ percept gives only mathematical (structural) knowledge

Notes for Russell's Intro / Intro Thers Lecture ①  
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= his knowledge by acquaintance vs by description (ostensive def'n vs intelligible ground of knowledge being)

→ precursor of object (theoretical distinction domain)  
 later debates  
 → importance of which description one gives (what things) (p. 183)  
 - start: what is his motivation? when start when he does, w/ ordinary sense-perception?  
 → much of his discussion is based on what re physiology w/ nervous constitution predispose us to do - shades of Painet, ed of Kant [our reversed central capacities ground the possibility of knowledge we can have] -

→ not a 'way' of describing - propriety of description as basis for knowledge  
 - what he takes 'inference' to be here, when he says that knowledge of tables, etc., is one

p. 184: no need for things to "describe" properties  
 experience - basis for division - epistemic & methodological

he then gives a nice sketch of discussion in Princ in IX, pp 190-191 Ch. XIX

→ it's introductory (end of XVIII), the Art of Acq. -  
 Russell's 'infer' is behavioristic (p. 147, fn)

emphasis on perception as basis of analysis of experience  
 date - I suspect this was largely due to historical circumstances that date back then as of - form - gathered by such instruments - as to require direct visual inspection of technical manipulation to read & interpret - I don't think Russell would claim 'reading off a screen' as the sure kind of epistemic basis for the content of exper. knowledge - he would recognize the factoring of the machines themselves, as the ~~content~~ in conjunction of these parts of things regard for their design at the intp of their results as content (collected data analysis)  
 - but he is not a naive 'materialist', taking direct percepts as only possible evidence of grounds (p. 215, IX) - he believes in 'accepts, continuity of the world - cannot continuity

perception invariance of Englished - it accepts in 'obj'

ground of knowledge inspired by Nietzsche

Notes for Russell, <sup>Amel Matter</sup> Sense / Straw Thesis Lecture

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Intro of 'unperceived entities' as inference, ch. XIX p. 191  
(and inference is always questionable, more or less certain, but never indubitable)

The 'central problem' of the analysis of matter:

p. 192 "inquiry into <sup>the</sup> justification of belief in permanence of perceived objects" - how seriously to take this?  
Is this really the job of science? If thought it was to make predictions possible based on assess of our certain, clear knowledge the ordinary life can provide

Begin at point at end of XVII, p. 177, making ourselves 'not what physics asserts, but what justification it has for what it asserts' - for this is what the analysis of theory explicitly enters

→ it thus leaves the inference to permanence of matter grounds the rest of our theoretical knowledge in sci (grounds it epistemically, methodologically, inferentially, causally, --)

⇒ XIX

p. 197: 'physics world collapse, epistemically, w/o inference to external obj's as cross of perception', the theory of causal theory of perception

- "external": shared shareability of perception by multiple people  
⇒ epistemic basis for 'causal theory of perception'

- my marginal note on p. 199, on Russell's method of going for causal perception, as analogous to Newton on I of simple homogeneous rays of light (a paradigm of scientific experiment) (more interesting to me than the contents of the theory)  
⇒ acceptance of a theory is provisional, conditioned on present state of theory and reach of our exps (more importantly)

ex. - the 'scientific action' needed to push out phenomena theory (only percept 7)

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Notes for Russell, Sem/Stone Thers Lecture

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- 'matter' (extent of satisfying laws of physics),  
as inferred by  $\&$  by causal theory perception,  
begins w/ 'common sense' inferences to extend  
stuff  $\&$  independently of us

→ p. 207: we share perceptions "in common"  
(based on similarity), so accept something 'out there',  
but lack of 'identity' makes us reject 'naïve  
common sense reason' (direct, immediate perception of  
external obj's, w/o causal mediation)

pp. 216-217 - causal continuity (including transformation of  
'material (or causal) processes' (e.g., light wave in  
air to its reception and ~~transfer~~ stimulation of  
nerve impulses in the eye) as 'most likely hypothesis')  
to explain  $\&$  of 'unperceived stuff' (Given that  
direct perception provides strongest warrant)  
→ ground of possibility of physics, and this is  
articulated and expressed in the theoretical part of  
phys - so it is both ground  $\&$  for physics, and  
expression of highest, most abstract result of physics  
recept  $\&$  theory

XXI

p. 222 objectivity: <sup>the</sup> more correct inferences we can draw from percept  
to other events in same group (still continuity, proximity)  
the more objective is the inference  
⇒ now: how to extend this to objects of scientific theory  
and theories themselves, and remove ourselves from percept  
⇒ objects ⇒ 'groups of events arranged around a center'  
→ structure

Notes for Russell, Sens/Space Thers Lecture

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Objectivity

⇒ necessary cond for objectivity is agreement, commonality of ~~data~~ correct inferences drawn by multiple percipients

p. 226 ↓ by tracing & controlling for 'errors' that decrement objectivity (physical, physiological (sensory, cerebral)) we proceed ~~to~~ from 'precarious inferences of common sense' to 'more reliable inferences of sci'

⇒ controlling, accounting for error in ~~in~~ inference lies at heart of security of, warrant for, scientific knowledge

[So Russell should have seen that it is experiment, not perception, that most ably does this - and so dropped the ladder of perception as warrant when we reach science]

possibility of <sup>basic</sup> inference, based on causal theory of percept, sufficient for yielding knowledge about the structure of perceptual stimuli ⇒ content of theory is account of structure of external objects/events

since nothing in phys depends on quality of stimulus, we } because objectivity is commonality of experience, defined by similarity of percepts captured & expressed

⇒ But: the initial intro of - 1-1 relation between stimulus & percept does not suffice for inference of structure - see my marginal note p. 227 - the inference to structure must be based on fact that the 1-1 relationship arises in virtue of the structure, in such a way as to license the inference - at least is this to be justified? (sameness of description of structure as similarity of rel'ns)

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# Notes for Russell, Sens/Struc Thems Lecture

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intro of structure: <sup>theories</sup> articulation and expression of knowledge of <sup>the</sup> unperceived and imperceptible, generalized into abstract laws capturing the principles 'governing' their behavior, which we can know only structurally, not in its "intended thinghood"

## XXII - Grounds for assuming general laws

p. 229 → - is grounded in our physiology, ultimately, part of part of what motivates of grounds belief in induction and enables us to learn from experience

- method: exceptions spur us to develop new, more adequate generalizations (Newton's 4th Rule; remark on <sup>errors</sup> misunderstanding of 'exception proves the rule')

- ground/warrant for this?

p. 232 - evidence for particular general law is not evidence for ~~the method~~ general laws in general, much less for the method

"general law": must be <sup>capturing</sup> something structural, as nothing necessarily all stuff under scope of law has quantitatively in common

remarkable reign of simple laws [quote p. 232]

⇒ warrant for this? the very experience of surprise [the mark, note of erroneous perception?] when we realize how often the 'simplest' works best?

p. 237 ⇒ justification forms it to be tautological? science is creature w/ rule of (simple) laws

And Matter  
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XXIII 'Substance' vs 'matter' (latter is rep  
in physics)

"Substance" as question: logical, physical, epist  
→ we are concerned w/ last, relation of perception  
to world

(mediated by, articulated & expressed by theory)

- most important question (pp. 243-244): substance  
'permanent' or evanescent in individ events?  
why?

recall: phys objects as inferred from perception are  
'groups of events arranged about a center' (244)  
→ structure

p. 244 → how much can this be carried over into physics?  
and is this structure ending? evolving?

→ the 'object' at the center is irrelevant to science,  
since it can be dismissed w/o loss of theoretical  
knowledge, since the same percept can be produced  
w/o it (244)

⇒ can this conclusion be carried forward to matter  
in physics?

⇒ yes, in modern physics, where a 'thing' is a  
245-246 succession of events, a world line

[So, brief digression on this in GR]  
whose persistence is characterized by cluster of events  
at each pt satisfy some pde, i.e., having some  
'structure' in their sense

→ since perception (analysis of) can do w/o 'objects' we look  
for in terms of physics that can do same, and we find it  
(method based on epist)



Notes for Russell, Sems / Struc Thors. Lecture

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XXIV struc in sci'e inference (from percept to phys)

- primary assumption: similarity in struc between cause of effect (stimulus of percept)

- sketch def'n of 'sameness/similarity' of struc

(extensibility of relations, 1-1 mapping between domains preserving the satisfaction of rel'ns)



"sameness of struc  $\Rightarrow$  identical logical properties"

- crucial because inferences from perceptions to causes concern logical properties (i.e., those expressible in formal predicate calculus of relations)

e.g. if angular rel'ns in phys need be similar in no way to those in visual field except logical similarity, in order to provide empirical support for inferences about physical angular rel'ns because of assumption about 1-1 relation between stimuli and percepts

logical analysis - application of formal logic - to analysis of knowledge of science (physics)  
 $\rightarrow$  revolutionary

p. 257  $\rightarrow$  "short knowledge of physics is matrix, coz no non-matrix properties of phys'k world can be derived from perception"  $\parallel$   
 $\rightarrow$  dismiss