Knowledge, Truth, and Mathematics

Philosophy 405
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Class #16: Quine's Two Dogmas of Empiricism

The Indispensability Argument

- Two premises
  - ‣ Major: we should believe that mathematical objects exist if we need them in our best scientific theory.
  - ‣ Minor: we do in fact require mathematical objects in our scientific theory.
  - ‣ Conclusion: we should believe in the abstract objects of mathematics.

- No canonical version of the argument

- Two Dogmas version
  - ‣ As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries -not by definition in terms of experience, but simply as posits... Physical objects, small and large, are not the only posits. Forces are another example... Moreover, the abstract entities of mathematics -ultimately classes and classes of classes and so on up -are another posit in the same spirit. Epistemologically these are myths on the same footing with physical objects and gods, neither better nor worse except for differences in the degree to which they expedite our dealings with sense experiences ("Two Dogmas" 167-8)

Ontology

what we believe exists

- A core claim of Quine's indispensability argument is that all of our ontology is determined by looking at the posits of our best theory.

- A radical methodological break from his empiricist predecessors
  - ‣ Locke through the logical empiricists

- For earlier empiricists, our ontology was determined by examining our sense experience, our ideas or our sense data.

- For Quine, the question of ontology is deferred to empirical science and the methods of constructing scientific theories.

- We construct a theory which best explains our sense experience, and then look to that theory to determine what it says exists.

- The first step in Quine's argument is to argue that the classic empiricist reductionist methodology is flawed.
  - ‣ The goal of "Two Dogmas"

- We'll look at Two Dogmas now and then turn to the indispensability argument in more detail after break.

The dogmas

- D1. There is an analytic/synthetic distinction; and

- D2. Reductionism: statements can be translated to terms which refer only to immediate experience.

- Quine concludes that the two dogmas are essentially the same.

- Reductionism entails that statements are confirmed (or disconfirmed) individually by the experiences that justify them.
  - Locke and Hume: all ideas must derive from initial impressions.
  - Carnap and Ayer: the meaning of a statement is the method we use to verify that statement.

Atomism and the Analytic/Synthetic Distinction

- Statements are confirmed individually, by the experiences we take to justify them or give them meaning.

- Atomism is essential to logical empiricism.

- "The notion lingers that to each statement, or each synthetic statement, there is associated a unique range of possible sensory events such that the occurrence of any of them would add to the likelihood of truth of the statement..."

- "As long as it is taken to be significant in general to speak of the confirmation and infirmation of a statement, it seems significant to speak also of a limiting kind of statement which is vacuously confirmed, *ipso facto*, come what may; and such a statement is analytic."

Quine Rejects
the Analytic/Synthetic Distinction

- Compare
  - ‣ Bachelors are unmarried.
  - ‣ Bachelors are unhappy.

- They seem to differ in kind.

- Quine argues they differ only in degree of empirical confirmation.

- "It is obvious that truth in general depends on both language and extralinguistic fact. The statement "Brutus killed Caesar" would be false if the world had been different in certain ways, but it would also be false if the word "killed" happened rather to have the sense of "begat." Hence, the temptation to suppose in general that the truth of a statement is somehow analyzable into a linguistic component and a factual component. Given this supposition, it next seems reasonable that in some statements the factual component should be null; and these are the analytic statements. But, for all its a priori reasonableness, a boundary between analytic and synthetic statements simply has not been drawn."

Characterizing Analyticity

A1. Truth in all possible worlds

A2. Can not be false/true

A3. Denial as self-contradiction

A4. Conceptual containment

A5. Truth in virtue of meaning

A1 and A2

A1. Truth in all possible worlds
A2. Can not be false/true
A3. Denial as self-contradiction
A4. Conceptual containment
A5. Truth in virtue of meaning

- Quine traces A1 and A2 to Leibniz's distinction between truths of reason and truths of fact.

- The notion of possible worlds is metaphorical and will not suffice as a foundation for analyticity.

- Quine charitably interprets A1 as A2, which we can see in Hume's distinction between relations of ideas and matters of fact.
  - ‣ Also in Kant's work.

- Truth is a metaphysical rather than semantic notion.

- A1 and A2 are not useful as explanations of analyticity at all.

- They concern whether statements are necessary or contingent.

Semantics and Metaphysics

- To understand why Quine would make the serious error of blurring semantic questions with metaphysical ones, one has to recognize that Quine is responding directly to the logical empiricists.

- The logical empiricists followed Frege in rejecting Kant's claim that arithmetic is synthetic *a priori*.
  - Adopting Frege's plant-in-the-seed notion of analyticity
  - Returning to the Humean view that the denial of a necessary proposition had to lead to a contradiction.
  - For a statement to be necessary, it would have to be analytic.
  - There are no necessary matters of fact.
  - The analytic statements are precisely the same as the necessary ones.

- Conversely, all analytic claims are taken as necessarily true since experience cannot disconfirm an analytic truth.
  - The truth of an analytic statement depends only on the meaning of its symbols.

Cleaving Necessity from Analyticity

- Some people think that there are necessary but not analytic claims.
  - ‣ Kripke: theoretical identifications (e.g. water is H_2O)
- Analytic statements that are only contingently true is more difficult.
  - ‣ Putnam's 'cats are animals'.
- In any case, Quine is not concerned with the cleavage of analyticity and necessity.
- He follows the logical empiricists in identifying the two.

A3

A1. Truth in all possible worlds
A2. Can not be false/true
A3. Denial as self-contradiction
A4. Conceptual containment
A5. Truth in virtue of meaning

- A3 characterizes Hume's relations of ideas as well as Frege's version of analyticity.

- Quine notes that A3 is in need of explanation just as A1 and A2 were.

- It is fairly easy to characterize the sentences whose denials are false.

- But, self-contradiction is trickier.
  - ▸ "This definition has small explanatory value; for the notion of self-contradictoriness, in the quite broad sense needed for this definition of analyticity, stands in exactly the same need of clarification as does the notion of analyticity itself. The two notions are the two sides of a single, dubious coin" (2D 155).

- We do have a logical notion of self-contradiction.
  - ▸ P • ~P

- But some statements are contradictory without having that form.
  - ▸ Fred is a married bachelor.

- We need a broader notion of self-contradiction.

- That is just another way to state the original problem of characterizing analyticity.

A4 and A5

A1. Truth in all possible worlds
A2. Can not be false/true
A3. Denial as self-contradiction
A4. Conceptual containment
A5. Truth in virtue of meaning

- Ambiguous between Frege's plant-in-the-seeds analyticity and Kant's beams-in-the-house version

- Quine presents two problems with containment.
    1. The presumption that all statements are best understood in subject-predicate form.
    - All swans are white.
    - 7 > 5
    2. The vagueness of the metaphor.

- Quine understands Kant to mean that an analytic statement is true in virtue of meanings and independently of facts in the world.

- Thus, Quine takes analyticity in the form A5 as his quarry.
    A5 is broader than the traditional A4.
    It coheres neatly with the logical empiricists' claim that analytic sentences are true independent of facts.
    If Quine can argue that there are no statements which are analytic A5, it would cover A3 and A4 too.

Analyticity and Logical Truth

- We can distinguish two types of analytically true statements.

- Logical truth
  - ▸ No unmarried man is married.
  - ▸ $(\forall x)(\sim\sim Mx \supset Mx)$
  - ▸ True under any interpretation of the predicates

- Merely analytic
  - ▸ No bachelor is unmarried.
  - ▸ $(\forall x)(Bx \supset \sim Mx)$
  - ▸ Has false interpretations

- Quine has no complaint about logical truth.

- But that concept is too narrow.

From Analyticity to Synonymy

- ‘No bachelor is unmarried’ can be turned into a logical truth by substitution of synonyms.
  - ‣ We can replace ‘bachelor’ with ‘unmarried man’.
- To make such a substitution, we require an explanation of the synonymy.
- The bulk of “Two Dogmas,” then, is an attempt to discredit synonymy.

Synonymy

- Quine tries three possibilities to characterize synonymy:
    - S1. Logic (meaning postulates)
    - S2. Dictionary definition
    - S3. Interchangeability (substitutivity) salva veritate

S1: Logic

- Carnap tries to use meaning postulates to characterize synonymy.

- If we want to say that 'Fx' and 'Gx' are synonymous predicates, within the theory, we add an axiom, or semantic rule:
  - ▸ $(\forall x)(Fx \equiv Gx)$

- To model a theory, we consider state-descriptions.

- State-descriptions ascribe truth values to atomic sentences of a theory.
  - ▸ If the cat is on the mat, we take 'the cat is on the mat' to be true.
  - ▸ If the cat is not on the mat, we take 'the cat is on the mat' to be false.

- We can build complex sentences using logical particles and the constraints of the semantic rules.

- Carnap's analytic sentences are those that come out true on every state-description.

- Synonymy rules preserve analyticity.

Problems with Meaning Postulates

- Quine wants to define analyticity, to express its essence.

- Carnap presents a list of semantic rules of synonymy, and their consequences.

- There are two types of semantic rules.
  - ‣ The first type specify, recursively or otherwise, which sentences are analytic.
  - ‣ The second type says that those statements specified are among the truths.

- We can define analyticity as 'true according to the semantic rules'.

- In both cases, we would like an explanation of the semantic rules themselves.

- We want to know why certain semantic rules are picked out as special.
  - ‣ "Semantical rules determining the analytic statements of an artificial language are of interest only in so far as we already understand the notion of analyticity; they are of no help in gaining this understanding" (2D, 163).
  - ‣ "All snidges are thrumplike"

S2: Truth By Definition

- The lexicographer is a sociologist,who reports synonymy, and so can not ground it.
- Terms are found to be synonymous, not made so by fiat.
- Explication, which adds clarifying information to the definition, relies on other, preexisting synonymies.
- Only when a term is created explicitly to act as a synonym (e.g. an abbreviation) do we have a definition that does not rely on synonymy.
- For example, scientists might name a planet, or molecule.
- But these exceptions are rare.

S3: Synonymy as Substitutivity

- S3 comes from linguistics.

- Quine presents a few silly examples of failure of substitutivity.
  - You can not substitute 'unmarried man' for 'bachelor' in
    - When I graduated, I received a bachelor of arts diploma.
    - 'Bachelor' has eight letters.
  - You can not substitute 'unadorned' for 'plain' in
    - Burlington is on the shores of Lake Champlain.

- We can easily appeal to the notion of a word or term to block the above objections.

- We should only expect substitution of terms for terms.

- 'Bachelor of arts' is a complete term, and the 'bachelor' within it is just part of a term.

- Similarly, 'plain' in 'Lake Champlain' is not a whole term.

- Scare quotes provide a context of indirect reference.

- We should not expect interchangeability in any of these examples.

The Hocus-Pocus Argument Against Substitutivity

- Quine pretends to attempt to defend substitutivity salva veritate by appealing to modal contexts.

- The idea is that we can isolate synonymous expressions as those whose identities are necessary.
  - Necessarily, bachelors are unmarried men.
  - Necessarily, anything plain is unadorned.

- We thus explain that the terms are synonymous *because* their identities are necessary.

- But, this procedure explains one intensional idiom (synonymy/analyticity) in terms of another (modality).

- What Quine wants is to explain synonymy without appealing to any other intensional contexts.

- He wants a reduction of the intensional.

- But, to what?

Extensional Reductions

- In a purely extensional language, we would get interchangeability for all coextensive terms.

- But
  - ‣ 'creature with a heart' and 'creature with kidneys'
  - ‣ 'square circle' and 'short tall hairy bald man'

- Interchangeability in an extensional language is different from the version we need to explain cognitive synonymy.

- We need a cognitive synonymy that doesn't merely get us the truth of 'no bachelor is married', but its analyticity, as well.

- We need something stronger than extensional equivalence.

No Reductions

- It may not be possible to reductively analyze meaning.

- But, without a reduction, the explanations seem question-begging.

- 'Necessity' presupposes analyticity, so we get a kind of circle.

- "Our argument is not flatly circular, but something like it. It has the form, figuratively speaking, of a closed curve in space" (2D, 68).

Virtuous and Vicious Circles

- If we had a set of inter-theoretically linked intensional terms, we could justify the whole group by appealing to their systematic virtues for the intensional idioms themselves.

- We'll look at the form of this argument at the very end of the term

Quine's Argument Against the Analytic/Synthetic Distinction

- QD1. If there is an analytic/synthetic distinction, there must be a good explanation of synonymy.

- QD2. The only ways to explain synonymy are by interchangeability *salva veritate*, dictionary definition, or meaning postulates.

- QD3. Interchangeability can not explain synonymy.

- QD4. Dictionary definition can not explain synonymy.

- QD5. Meaning postulates can not explain synonymy.

- QD6. Thus, there is no good explanation of synonymy.

- QDC. And thus there is no analytic/synthetic distinction.

Meanings Skepticism

- The argument against synonymy entails a corollary: meanings themselves are called into question.

- Quine has Ockhamist concerns about meanings as spooky entities.

- First, if we are to posit an object, it must have clear identity conditions.
  - ▸ We must be able to determine when two meanings are identical.
  - ▸ Elsewhere, Quine urges that we should admit "no entity without identity".

- Second, meanings are otiose.

The third realm

- Meanings, e.g. Frege's propositions, inhabit a third realm, like mathematical objects (e.g. sets).

- Quine defends beliefs in sets, since they are construed extensionally, with clear identity conditions.

- Sets are identified with their members; two sets with exactly the same members are the same set.

- But, he believes that the empiricist can avoid intensional objects.

- We don't know when two meanings are the same.

- "There seems little hope of erecting a fruitful science about them. It is not even clear, granted meanings, when we have two and when we have one; it is not clear when linguistic forms should be regarded as *synonymous*, or alike in meaning, and when they should not."

Meanings are Otiose

- What we need from meanings is an explanation of synonymy and analyticity.

- If we can get these without meanings, then we don't need them.

- "If a standard of synonymy should be arrived at, we may reasonably expect that the appeal to meanings as entities will not have played a very useful part in the enterprise. A felt need for meant entities may derive from an earlier failure to appreciate that meaning and reference are distinct. Once the theory of meaning is sharply separated from the theory of reference, it is a short step to recognizing as the business of the theory of meaning simply the synonymy of linguistic forms and the analyticity of statements; meanings themselves, as obscure intermediary entities, may well be abandoned."

Ockham wielding razor

Meanings and Essence

- The spookiness of meanings is related to the spookiness of essences.
  - ▸ "Meaning is what essence becomes when it is divorced from the object of reference and wedded to the word."
- For Aristotle, objects had essential characteristics, and accidental ones.
  - ▸ Persons had essential characteristics (e.g. rationality)...
  - ▸ ...and accidental ones (e.g. two-leggedness).
- This difference now supposedly goes into the meaning of a term.
  - ▸ The meaning of 'biped' includes being two-legged but the meaning of 'man' may not.
- Kripke's rehabilitation of essences and necessity were of course unwelcome to Quine and Quineans.

Empiricism Without the Dogmas

- Quine presents skepticism about intensional objects: there are no meanings.
- Quine defends meaningfulness without meanings.
- Further, meaning is the property of a much larger unit than the word (as Locke and Hume held), or even the sentence (as Frege and the logical empiricists held).
- The unit of significance, for Quine, is one's entire theory, the whole of science.

Confirmation Holism
sentences are confirmed or disconfirmed as a whole body

- Ayer characterized analytic statements as those onto which we hold come what may.

- In the absence of an analytic/synthetic distinction, there are no sentences that are immune from revision or abandonment.

- We can hold on to any statements we want, as long as we adjust our body of knowledge and the logical framework along with it.

- The claim that any sentence may be held immune from revision because no sentence is absolutely immune, is called confirmation holism.

- Confirmation holism follows from the failure of the analytic/synthetic distinction, and the identities of necessity with analyticity and contingency with syntheticity.

- One can also argue for confirmation holism from weaker premises.

- It is just a point of the logic of theory construction.

Semantic Holism

the unit of meaning is the entire language

- To find meaning, Quine appeals to the theory which best accounts for our sense experience.

- Quine compares our scientific beliefs to a giant web.

- Experience forms the boundary conditions on the web of belief.

- Peripheral statements are those most closely tied to sensory experience.

- Central statements are those about logic, mathematics, and the self, the guiding principles of science, highly theoretical statements.

- The web is like a field of force.

- Experience forces us to adjust and readjust the whole field, not one sentence at a time, but altogether.

Underdetermination

- The underdetermination of the field by boundary conditions gives us play among the statements.

- We can hold to the truth of any statement, come what may, by merely adjusting other statements.

- Some conflicts may require large scale adjustments, others minor ones.

- In the face of an odd sense experience, we can, drastically, claim hallucination, or revise logic.

- People may revise the same theory in different ways.
  - "Different persons growing up in the same language are like different bushes trimmed and trained to take the shape of identical elephants. The anatomical details of twigs and branches will fulfill the elephantine form differently from bush to bush, but the overall outward results are alike" (*Word and Object*, 8).

Ontology and posits

- Along with the loss of reductive justifications of particular sentences, we lose a straightforward method for determining our ontology.

- Instead of direct lines from physical objects to sense data to singular terms, we have to determine our ontology by appeal to the whole of science.
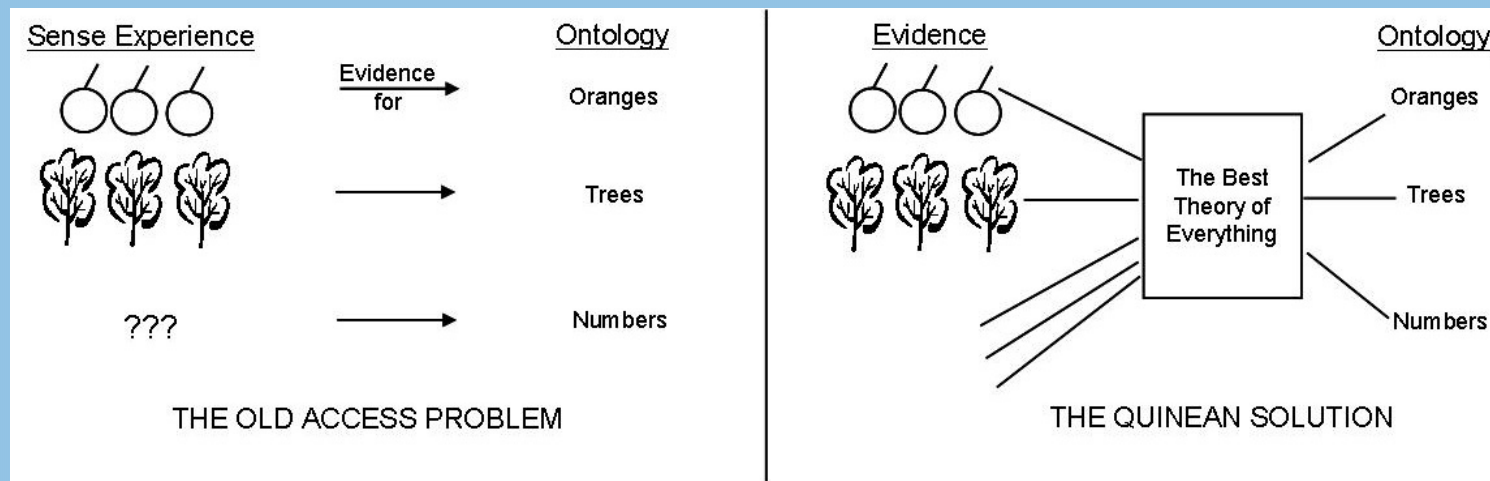
Posits

- Science is a tool, for predicting future experience in the light of past experience.
- Physical objects are convenient posits, "[C]omparable, epistemologically, to the gods of Homer."
  - ‣ "Ontological questions, under this view, are on a par with questions of natural science" (2D 168).
- We already accept an ontology of posits for distant objects and very small objects, like electrons.
- Quine argues that all our ontology is of that form.
  - ‣ "To call a posit a posit is not to patronize it" (*Word and Object*, 22).
- The method of positing is just a result of the failure of reductionism and the turn towards holism.
- The difference between questions of the existence of sets, say, or quarks, and questions of the existence of houses is only one of degree, not of type.
- Posits are accepted or rejected according to pragmatic considerations of theory construction, as well as their coherence and consistency with our broader theory, the web of belief.

Quine's Procedure
for Determining our Commitments

QP1: Select a best scientific theory, one which balances simplicity, strength, and fit with sense experience.

QP2: Regiment that theory in first-order logic with identity.

QP3: Model the resulting formal theory.

QP4: Examine the domain of quantification of the theory to see what objects the theory needs to come out as true.

The Point of All of This

Quine uses QP to reconcile mathematical ontology with empiricist epistemology.