A Way of Getting Rid of Things:
Higher-order Languages, Priorian Nominalism, and Nihilism

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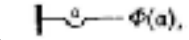
1. Higher-order quantification introduced

Many philosophers have taken themselves to understand languages that allow quantification into predicate and sentence position, otherwise than by way of translation into languages that don't.

> In the expression of a judgment we can always regard the combination of signs to the right of ⊢— as a function of one of the signs occurring in it. If we replace this argument by a German letter and if in the content stroke we introduce a concavity with this German letter in it, as in  this stands for the judgment that, whatever we may take for its argument, the function is a fact. Since a letter used as a sign for a function, such as Φ in Φ(A), can itself be regarded as the argument of a function, its place can be taken, in the manner just specified, by a German letter. (Frege, *Begriffschrift*, §10).

> All this can be carried over, *mutatis mutandis*, into the discussion of quantifications over variables of other categories, and there isn't the least need to equate them with name variables in order to see what is going on. 'For some ϕ, Peter ϕ's' is true if any specification of it is true, meaning by a 'specification' of it any statement in which the indefinite verb 'does something' or 'acts somehow' is replaced by some specific verb or equivalent expression, e.g. 'is red-haired'; and it is of course true if and only if, for some ϕ, Peter ϕ's. It hasn't any quite exact colloquial expression in English, because such variable verbs as 'do' tend to stand only for verbs of a particular sort—'Peter is red-haired' would not be thought of as a natural specification of 'Peter does something'. 'Peter is or does something' would perhaps catch the full generality of 'For some ϕ, Peter ϕ's' well enough, and the way it works is clear…. In all this I cannot see anything mysterious, or anything that need compel us to treat variables that do not stand for names of objects as if they did. (Prior, *Objects of Thought*, p. 36)

> Perhaps no reading in a natural language of quantification into predicate position is wholly satisfactory. If so, that does not show that something is wrong with quantification into predicate position, for it may reflect an expressive inadequacy in natural languages. We may have to learn second-order languages by the direct method, not by translating them into a language with which we are already familiar. At some point, we learn to understand [certain] symbols directly; why not use the same method for

∀F? We must learn to use higher-order languages as our home language. (Williamson, 'Everything', p. 459)

2. Relational higher-orderese

Types (= syntactic categories): e is a type. For any types $t_1 \ldots t_n$ ($n \geq 0$), $\langle t_1 \ldots t_n \rangle$ is a type.

Terms: Each constant has a type. There are infinitely many variables of each type.

- When α is of type $\langle t_1 \ldots t_n \rangle$ and $\beta_1 \ldots \beta_n$ ($n \geq 1$) are of types $t_1 \ldots t_n$, $\alpha(\beta_1, \ldots, \beta_n)$ is a *formula* (=term of type $\langle\rangle$).
- When $v_1 \ldots v_n$ ($n \geq 1$) are variables of types $t_1 \ldots t_n$ and ϕ is a formula [in which all of $v_1 \ldots v_n$ occur free], $\lambda v_1 \ldots v_n . \phi$ is a term of type $\langle t_1 \ldots ten \rangle$

Noteworthy constants: ¬ (type $\langle\langle\rangle\rangle$); ∧ (type $\langle\langle\rangle,\langle\rangle\rangle$); $\forall_t$ (type $\langle\langle t\rangle\rangle$, one for each type t).

When v is of type t, $\forall v.\phi$ and $\exists v.\phi$ abbreviate $\forall_t(\lambda v.\phi)$ and $\neg(\forall_t(\lambda v.\neg(\phi)))$.

3. Priorian Nominalism

One role for property-talk: a stipulative *scheme for pronouncing* higher-orderese. For example: 'Socrates has a property' is stipulated to be equivalent to '$\exists F(F(\text{Socrates}))$'.

According to the Priorian Nominalist, **everything is concrete (**$\forall_e$Concrete). The only true reading of 'Socrates has a property' is the one captured by the stipulative scheme.

What to make of ordinary talk of properties, propositions, relations? Some options:

(i) Error theory: we are in the grip of a mistake.
(ii) Pragmatic eliminativism: we don't mean it literally.
(iii) "Translationism": the stipulative pronuniciation-scheme described above captures the ordinary meanings of the sentences it spits out. Certain grammatical sentences that aren't part of the scheme are simply nonsensical: e.g. 'The property of being square is[/is not] negatively charged', 'Some dogs are instantiated', 'Some property instantiates itself'
(iv) [Other, fancier options I won't be talking about]

The goal of this talk is not defending or developing Priorian Nominalism, but using it as a template for other "minimalist" views in ontology.

4. Getting rid of almost everything, keeping only tiny things

Pointillist supersubstantivalism: everything is a spacetime point.

But what about tables, chairs, planets, people…?

Bad idea: reconstruct quantification over ordinary objects as (restricterd) *plural* quantification over spacetime points.

First problem: distinct objects can be permanently coincident. But if quantification over ordinary objects is reconstructed as plural quantification, we'll have

$$\forall xx \forall yy(\text{PermanentlyCoincident}(xx,yy) \rightarrow \forall z(z{<}xx \leftrightarrow z{<}yy))$$

and hence for any Φ

$$\forall xx \forall yy(\text{PermanentlyCoincident}(xx,yy) \rightarrow (\Phi(xx) \leftrightarrow \Phi(yy))$$

Second problem: one object can be contingently permanently spatially within another. But if quantification over ordinary objects is reconstructed as plural quantification, we'll have

$$\forall xx \forall yy(\text{PermanentlyWithin}(xx,yy) \leftrightarrow \forall z(z{<}xx \rightarrow z{<}yy))$$

and hence, given the modal rigidity of plurals,

$$\forall xx \forall yy(\text{PermanentlyWithin}(xx,yy) \rightarrow \Box\text{PermanentlyWithin}(xx,yy))$$

Better idea: reconstruct quantification over ordinary objects as (restricted) type-⟨e⟩ quantification. Loosely speaking: "ordinary objects are properties of spacetime points".

- A natural development of the view (given a B-theoretic account of time): quantification over instants of time is also type-⟨e⟩ quantification. For X and Y to spatially overlap at T is for $\exists p(\text{X}p \wedge \text{Y}p \wedge \text{T}p)$. Similarly for other geometric relations.[1]
- Q: what is it for X to be part of Y at T? Does it require more than mere spatial inclusion? Is it vague?

 Objection: not a priori, so not true. *"Translationist" response:* metasemantics doesn't work like that. Questions of "logical form", in the relevant sense, are not a priori.[2]

 Objection: distinct objects can *necessarily permanently spatially coincide*—e.g. Fine's letters or Johnston's signs. But distinct properties can't be necessarily coextensive. *Response:* both premises pretty dubious.

We can use a similar strategy for defending

Particle-or-instantism: everything is a particle or an instant of time

In this setting we reconstruct quantification over ordinary objects as type-⟨*e*,*e*⟩ quantification: "ordinary objects are relations between spacetime points and instants of time".

- In an A-theoretic variant, you can get rid of the instants and go back to type ⟨*e*⟩.

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[1] Q: what is it for x to be part of y at t? Does it require more than mere spatial inclusion, and if so, what?

[2] Another interesting objection I don't have time to discuss: sentences like 'Spacetime points and people are both smaller than elephants' are true, but the view forces them to be category mistakes. This sort of thing might force a bifurcation between "ordinary" and "fundamental" interpretations of 'for some spacetime point'.

5. Getting rid of almost everything, keeping only huge (or sizeless?) things

A less familiar minimalistic vision:

> **State-space supersubstantivalism:** All there are are *instants of time* and *points of state space*.

- Amongst the fundamental relations[3] is a "spotlit-at" relation, which exactly one point of state space bears to each instant.
- State space has a rich intrinsic geometry, much richer than that of a mere high-dimensional Euclidean space.[4]

Example: the geometry of the configuration space of *N* particles in Euclidean 3-space could be characterised using the following fundamental relations:

(i) betweenness: a 3-place relation. Gives 3*N*-dimensional affine structure
(ii) congruence: a 4-place relation. Gives Euclidean structure = notion of rotation
(iii) "degeneracy": a property. Picks out the very special 3-dimensional subspace corresponding to configurations where all particles coincide.
(iv) "almost-sameness": a 2-place relation. Relates two configurations when they assign the same position to all but one particle.

Other examples: classical version where state space is phase space; quantum version where state space is Hilbert space.[5]

How might a state-space supersubstantivalist reconstruct talk about particles in 3-space?

> Step one: identify points of 3-space with *degenerate* points of state space (corresponding to configurations in which all particles are superimposed)
>
> Step two: understand 'for some particle' as a higher-order quantifier of type ⟨e,e⟩ restricted to "particle-foliations": rigid equivalence relations which partition configuration space into parallel, 3*N*–3-dimensional subspaces, with the feature that there is a 3D-subspace F such that all points in F are almost-same, and each equivalence class of the particle-foliation is orthogonal to F.
>
> *Example:* 'At point *p*, one particle is between two others'. First make it explicit: 'there are space-points *x*,*y*,*z* such that *y* is between *x* and *z*, and particles *a*,*b*,*c*, such that *p* puts *a* at

[3] Henceforth my talk about propositions, properties, and relations should be understood in higher-order terms according to the stipulative pronunciation-scheme.

[4] Following David Albert, many fans of state-space substantivalism also like the idea of reducing claims about the geometry of state space to claims about "dynamics". I think this is misguided, but here I just want to insist that it's not compulsory.

[5] In the setting of quantum mechanics, another option is to go supersubstantivalist about *configuration* space and replace the "spotlit" relation with something characterising a wave-function at each instant. This is also good to think about, but unlike Hilbert space supersubstantivalism, it is not friendly to a Nihilist reinterpretation.

x and *p* puts *b* at *y* and *p* puts *c* at *z*'. Then cash out as 'there are degenerate points *x*,*y*,*z* such that *y* is between *x* and *z*, and particle-foliations A,B,C such that A*xp* and B*yp* and C*zp*.

Now what about ordinary objects? Many possible views. For example, we could identify ordinary objects with relations between degenerate points (≈ points of 3-space) and instants of time, or with relations between particle-foliations (≈ particles) and instants of time.

- Should we be concerned about the fact that there are several options and no grounds for deciding on one of them? I don't think so: I'm happy appealing to vagueness to justify refusing to commit to any particular view.

6. Some variants and alternatives

A-theoretic state-space supersubstantivalism. All there are are points of state space. Amongst the fundamental properties is a "spotlit" property, which exactly one point has, though other points will have it and have had it.

Gunky state-space supersubstantivalism Everything is either an instant of time or a (positive-volume) *region* of state space. Each instant stands in the "spotlit-at" relation to many regions (at most one of any two non-overlapping regions; exactly one of any two regions one of which is the complement of the other).

A-theoretic gunky state-space supersubstantivalism.

History-space supersubstantivalism. All there are are points in the space of *kinematically possible histories*. One point has the fundamental property *being spotlit*.[6]

Function-space supersubstantivalism: All there are points in the (algebraically structured) space of *smooth differentiable scalar fields*. A few of these are "spotlit" — these are the *physically real* fields (e.g. the mass-density field).[7]

7. Getting rid of *everything:* Priorian Nihilism

The points and regions of state space (or history space) are *propositions*; being spotlit is being *true*. Better: "for some point of state space" is a (restricted) type-⟨⟩ quantifier.

Ordinary objects live somewhere in the *pure* type hierarchy: ⟨⟩, ⟨⟨⟩⟩, ⟨⟨⟩,⟨⟩⟩, …, ⟨⟨⟨⟩⟩⟩, … In one version, they are just of type ⟨⟨⟩⟩ (like negation!), and all entail *being degenerate*.

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[6] One could also consider throwing away all but the *dynamically* possible histories. But this reduction of ontology makes it much harder to find fundamental relations which pin down the structure and to find simple formulations of the laws in terms of those relations. If we keep the dynamically impossible histories, there's a further choice point: is "dynamic possibility" an additional fundamental property, or do laws like 'the dynamical possibilities are the extrema of the action-function' tell us *what it is* to be dynamically possible?

[7] See Dorr, 'Physical Geometry and Fundamental Metaphysics'.

Where proponents of state-space or history-space substantivalism have *fundamental relations* (e.g. betweenness), Priorian Nihilists will have fundamental *polyadic operators*.

Two ways of developing Priorian Nihilism:

(i) Quantifiers of type e are a specific intelligible thing, whether or not they occur in ordinary discourse. But it just so happens that $\neg\exists x^e(x^e{=}x^e)$.

(ii) There was never such a form of quantification distinct from the pure type hierarchy to begin with. The type-label 'e' was just a placeholder for whatever the complicated pure type turned out to be.

Fundamentality-theoreitc worries: If we can make sense of fundamentality for n-ary relations, we can also make sense of it for propositions (=0-ary relations). Q: Should Priorian Nihilists think that propositions that are points of state-space are fundamental? There is pressure to do so, since the distribution of truth over these propositions does not supervene on the totality of facts predicating operators like betweenness.

- This leads to towards some interesting objections to the view, from combinatorialism (the fundamental relations should be modally independent, and points of state space seem not to be) and parsimony (better to have fewer fundamental relations, including 1-ary and 0-ary relations).

8. Haecceitism without things?

Some questions from the "haecceitism" debate:

> Could two particles have swapped masses, charges, all spatial relations to other particles, etc.?
>
> Could everything have been one metre from where it actually is?
>
> Could the values of the metric, electromagnetic, … fields all have been redistributed according to some bijection from the set of spacetime points to itself?

"Haecceitists" characteristically answer 'yes' to such questions; "anti-haecceitists", 'no'.

NB: Priorian Nihilism is compatible with the haecceitist answers. There could be nontrivial permutations of state space that preserve the "geometric" relations while mapping the true point to a false point.

- We could seek a view where there are no such nontrivial permutations, thinking of state space as in some sense isomorphic to the *quotient* of the usual mathematical representation of state space under the relevant permutations.
- But this is a challenging project. These quotient spaces have an intricate structure that is hard to capture intrinsically.