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

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1. Higher-order quantification

Quantification into predicate and sentence position.

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

Generalisation: e is a type (syntactic category). For any $n \geq 0$ and types $t_1 \ldots t_n$, $\langle t_1 \ldots t_n \rangle$ is a type. Sentences are expressions of type $\langle \rangle$: if α is of type $\langle t_1 \ldots t_n \rangle$ and $\beta_1 \ldots \beta_n$ are of types $t_1 \ldots t_n$, $\alpha(\beta_1, \ldots, \beta_n)$ is a sentence. There are variables of every type, which can be bound by quantifiers.

2. Priorian Nominalism

One role for property-talk: a stipulative *scheme for pronouncing* higher-orderese.

According to the Priorian Nominalist, everything is concrete. The only true reading of 'Socrates has a property' is the one captured by the stipulative scheme, where it is is equivalent to '$\exists F(F(\text{Socrates}))$'.[1]

What to make of ordinary talk of propositions, properties, 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": much of it is literally true, e.g. 'The property of being square is instantiated' is equivalent to 'something is square'. But certain grammatical sentences are really nonsensical, e.g. 'The property of being square is[/is not] negatively charged', 'Some dogs are instantiated'..
(iv) [Fancier options]

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[1] See A.N. Prior, *Objects of Thought.*

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

First stab: ordinary objects are sets of spacetime points (or alternatively: sets of ⟨particle, instant of time⟩ ordered pairs).

> *Objection:* distinct objects can be permanently coincident. But if objects are sets of points, permanently coincident objects have the same members, and no two sets have the same members.

> *Objection:* one object can be contingently permanently spatially within another. But if objects are sets of points, x is permanently spatially within y iff x is a subset of y, and the question whether one set is a subset of another is non-contingent.

Second stab: ordinary objects are *properties* of spacetime points (or relations between particles and instants, or temporary properties of particles)

> One natural way of developing the view: instants of time are also properties of spacetime points. For x and y to spatially overlap at t is for some spacetime point to instantiate, x, y, and t; similarly for other topological and geometric relations.[2]

Third stab: quantification over ordinary objects is higher-order quantification (of type ⟨e⟩ or maybe ⟨e,e⟩).

On the strict understanding of 'everything' (as a type-*e* quantifier) something like 'everything is a spacetime point' or 'everything is a particle or instant of time' is true.

> *Objection:* not a priori, so not true. *Response:* metasemantics doesn't work like that. Questions of "logical form" in the relevant sense are not a priori.[3]

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

A less familiar ontology: *state-space supersubstantivalism.*

All there are are *instants of time* and *points of state space*. Amongst the fundamental relations[4] is a "spotlit-at" relation, which exactly one point of state space bears to each instant.

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[2] 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?

[3] 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'.

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

Some examples: (a) classical version where state space is configuration space; (b) classical version where state space is phase space; (c) quantum version where state space is Hilbert space.[5]

State space has a rich intrinsic geometry, much richer than that of a mere high-dimensional Euclidean space.[6]

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 3N-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.

A strategy for reconstructing talk about particles in 3-space:

- identify points of 3-space with degenerate points
- understand 'for some particle' as a higher-order quantifier of type ⟨e,e⟩ restricted to "particle-foliations": equivalence relations which partition configuration space into parallel 3N–3-dimensional subspaces, with the property that there is a 3D-subspace F such that all points in F are almost-same, and each equivalence class 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 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 Axp and Byp and Czp.

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.

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[5] In the setting of quantum mechanics, another option is to go supersubstantivalist about *configuration* space and replaces 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.

[6] Following David Albert, many people who like 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 is not compulsory.

Should we be concerned about the fact that there are many options and no grounds for deciding on one of them? No. It would be fine to appeal to vagueness to justify refusing to commit to a particular view.

5. Some variants and alternatives

Gunky state-space supersubstantivalism. All there are are *instants of time* and (positive-volume) *regions* of state space. Many regions are "spotlit-at" each instant—exactly one of any two regions one of which is the complement of the other.

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.

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*.[7]

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).[8]

6. 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-$\langle\rangle$ quantifier.

Ordinary objects live somewhere in the *pure* type hierarchy: $\langle\rangle$, $\langle\langle\rangle\rangle$, $\langle\langle\rangle,\langle\rangle\rangle$, …, $\langle\langle\langle\rangle\rangle\rangle$, … Maybe they are of type $\langle\langle\rangle\rangle$ (like negation) or $\langle\langle\rangle,\langle\rangle\rangle$ (like conjunction).

Where proponents of state-space or history-space substantivalism would talk about fundamental *relations*, Priorian Nihilists will talk about fundamental *polyadic operators*.

> Should the Priorian also say that the *propositions* that are points of state/history space are fundamental? There is pressure to do so, since these propositions do not *supervene* on the totality of facts predicating operators like betweenness. This suggests towards some interesting objections to the view, from parsimony (better to have fewer fundamental relations, including 1-ary and 0-ary relations) and combinatorialism (the fundamental relations are modally independent).

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[7] One could also consider throwing away all but the dynamically possible histories; but this reduction of ontology may make 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 one keeps the dynamically impossible histories, one must choose whether to take "dynamic possibility" as an additional fundamental property, or to think of laws like 'the dynamical possibilities are the extrema of the action-function' as reductive definitions?

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

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 $\neg\exists x_e(x_e=x_e)$.

(ii) There was never such a form of quantification to begin with. We have been subject to an illusion of understanding.

7. Haecceitism without things?

Some questions that arise in the haecceitism debate:

> Could two particles have swapped masses, charges, all spatial relations to other particles, etc.?

> Could everything have been one metre (in a certain direction) from where it actually is?

> Could the values of the metric, electromagnetic, … fields all have been redistributed according to some diffeomorphism (or other bijection?) from the set of spacetime points to itself?

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

Priorian Nihilism is *compatible* with haecceitism in this sense (though it does not require it). There could be nontrivial permutations of state space that preserve all the "geometric" relations while mapping the true point to a false point.[9]

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 *very hard*. The quotient spaces have an intricate structure that is hard to capture intrinsically.

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[9] A terminological complication: if you define 'haecceitism' as the view that there are distinct possibilities where the same qualitative propositions are true, and define 'qualitative proposition' as 'proposition that is not about any object', and understand 'about an object' in such a way that Nihilism entails that no proposition is about an object, then you will regard nihilism as inconsistent with haecceitism. Moral: haecceitism in the defined sense is stronger than haecceitism in the sense people in this debate care most about. You can be an anti-haecceitist in the defined sense while believing that, in addition to all of the familiar qualitative propositions that supervene on the pattern of geometric, electromagnetic, mass-theoretic….relations, there are a host of additional propositions which can be permuted while keeping the familiar pattern the same.