**Quine on Naturalism, Nominalism, and Philosophy’s Place within Science**

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(Forthcoming in *Synthese*)

**Introduction**

W.V. Quine’s views in ontology and philosophical methodology are enormously influential in contemporary philosophy. He is a well-known proponent of naturalism, the view on which reality is described only in science. He is also well-known for arguing that our current scientific theories commit us to the existence of abstract objects and for recommending that we continue to accept theories that commit us to abstract objects. Given the fundamental importance of science to naturalists, it is tempting to believe that the naturalistic philosopher should think that scientists outside of philosophy are in the best position to assess the merits of revising our current commitment to abstract objects. But Quine rejects this view. On the reading of Quine’s philosophical methodology that I defend in this paper, the naturalistic philosopher like other scientists applies scientific method with the aim of making our system of scientific theories simpler and clearer. The naturalistic philosopher not only may assess the merits of revising the commitments of our scientific theories, but also will recommend we make such revisions if doing so simplifies and clarifies our science. To develop my reading, I will examine John Burgess and Gideon Rosen’s book *A Subject with No Object.* In that book, they defend a version of naturalistic methodology in ontology inspired by Quine but on which philosophers are not best placed to assess revisions to our commitment to abstract objects. By explaining how Quine’s naturalism differs from the anti-revisionist, deferential naturalism in the philosophy of mathematics that Burgess and Rosen advance, I seek to clarify and advance contemporary debates on naturalism.

**1. Burgess and Rosen on Nominalism and Naturalism**

Let us start with Burgess and Rosen’s book *A Subject with No Object* (Burgess and Rosen 1997). The book is about *nominalism* – the thesis that there are no abstract objects. In their introductory chapter, Burgess and Rosen claim that we are up to our neck in commitments to abstract objects in ordinary life and in scientific theorizing. They say, for example, that we commit ourselves to the existence of the abstract entity that is a novel and the abstract entity that is the number six in saying that six is the number of novels Jane Austen wrote.[[1]](#footnote-1) They say that we commit ourselves to the existence of the abstract entities that are prime numbers when we say that there are infinitely many prime numbers. We thus are committed to the existence of abstract objects – as they put it, we are committed to *anti-nominalism*.[[2]](#footnote-2)

Burgess and Rosen know most of us usually do not reflect on the existence of abstract objects. They know that scientists who talk about numbers and sets, such as mathematicians, usually do not reflect on the existence of numbers and sets. Although mathematicians use theories which entail that abstract objects such as numbers and sets exist, they rarely raise the question “Do numbers or sets exist?” in their published research or in their mathematics courses. Mathematicians who do reflect on the topic may accept that numbers or sets exist but claim they are not abstract – Burgess himself in (Burgess 2003) challenges a mathematician’s nominalist claim that numbers are ideas. Nevertheless, on Burgess and Rosen’s view, we and mathematicians alike are committed to the existence of abstract entities because claims stating they exist are logically implied by the theories we affirm “without conscious mental reservation or purpose of evasion” (p. 10).[[3]](#footnote-3)

Because we are committedto anti-nominalism, it follows that any *nominalistic* theory - a theory failing to entail the existence of abstract objects - is a revision of our theories. How, then, are we to determine the merits of nominalistic theories? Burgess and Rosen endorse a philosophical methodology inspired by Quine’s naturalism. As Quine summarizes it, naturalism is “the recognition that it is within science, and not in some prior philosophy, that reality is to be identified and described” (1981a, p. 21). Here is how Burgess and Rosen read Quine’s naturalism:

Quine…abandon[s] as futile if not meaningless the traditional **alienated** conception of epistemology, on which the epistemologist remains a foreigner to the scientific community, seeking to evaluate its methods and standards—a conception that presupposes other methods and standards of evaluation, outside and above and beyond those of science. (Along with it, he abandons any robust sense of truth.) In its place he advocates a novel **naturalized** conception of epistemology, on which the epistemologist becomes a citizen of the scientific community, seeking only to describe its methods and standards, even while adhering to them. (p. 33)

According to Burgess and Rosen, the naturalistic philosopher denies there are methods and standards of evaluation “outside and above and beyond those of science.” In doing epistemology, she is to be a “citizen” of the scientific community who describes those methods.

In the concluding chapter of their book, they explain how they believe a naturalistic philosopher should assess the merits of nominalistic theories. On their view, the naturalistic philosopher believes that the “question” of the scientific merits of such theories “is really not ours as philosophers to answer” (p. 206):

For ultimately the judgment on the scientific merits of a theory must be made by the scientific community: the true test would be to send in the nominalistic reconstruction to a mathematics or physics journal, and see whether it is published, and if so how it is received. This, however, is a test to which reconstructive nominalists have been unwilling to submit …. And that raises a rather delicate question …: in what sense can philosophers proposing a revision of science claim to be judging by scientific standards, if they will not leave the merits of their proposal to be judged by practicing scientists? (*Ibid.*)

Burgess and Rosen think that “ultimately” it is the scientific community who should judge the merits of nominalism – it is not “really” the naturalistic philosopher’s job to do so. But it is not just any members of the scientific community who do the judging. As the above passage indicates, Burgess and Rosen believe the naturalistic philosopher must leave the assessment of the merits of nominalistic theories “ultimately” to scientists who work in fields with heavy use of mathematics – mathematics itself, physics, and perhaps other fields. This is also indicated by their discussion of what they call “descriptive methodology” – the study of the standards and methods of the scientific community and how scientists in fact or would apply them. Engaged in descriptive methodology, Burgess and Rosen conjecture that mathematicians and physicists would not find much if any merit in nominalism. Burgess and Rosen think that editors of mathematics and physics journals would likely reject any given nominalistic theory “as a curiosity if not simply as a particularly clumsy notational variant of current theory” (p. 210). They believe the history of science at least indicates that scientists such as mathematicians and physicists do not “strive” after economy of abstract objects in the way nominalists often do.[[4]](#footnote-4) This indicates to them that philosophers who offer nominalistic theories weigh certain standards such as economy more heavily than non-philosopher scientists do. For these reasons, Burgess and Rosen think we currently have no reason to revise our current commitment to anti-nominalism by adopting such theories.

 Here is how I read Burgess and Rosen’s argument. When they say that the question of nominalistic theories’ merits is “really” not theirs to answer and that judgments of nominalism’s merits are “ultimately” to be made by scientific community, I read them as affirming what I will call the *Reliance View:*

*Reliance View:* Philosophers may not make confident judgments about the merits or demerits of nominalistic theories without support and corroboration from other scientists, especially mathematicians and physicists; it is these scientists, and not philosophers, who are best positioned to assess those theories’ merits or demerits.

I call their position the Reliance Viewsince, according to it, philosophers must rely upon other scientists to make confident judgments on the merits or demerits of nominalistic theories. (For ease, I will use ‘merits’ as short for ‘merits or demerits’ when discussing nominalistic theories in the foregoing). To assess the merits of nominalism given the Reliance View, Burgess and Rosen seek to determine what mathematicians and physicists say about nominalistic theories. But given that mathematicians and physicists often do not have anything currently to say about nominalistic theories, they have to speculate about what mathematicians and physicists *would* say. For that reason, they look to descriptive methodology, and speculate that it does not bode well for the properties of nominalistic theories that nominalists tend to cite as merits of those theories, such as economy. Given this, they judge that we should retain our commitment to anti-nominalism.[[5]](#footnote-5)

Why do Burgess and Rosen accept the Reliance View? To support the Reliance View, **Burgess and Rosen need to explain why a naturalistic philosopher is not in a good position to judge for herself, on scientific grounds, the merits of nominalism. If she were in such a position, then of course her judgments about nominalism, say, would be scientific judgments, methodologically on a par with those of other scientists, even if her judgments about nominalism differ from those of other scientists. She therefore need not rely on the judgments of other scientists on this question in the way that Burgess and Rosen claim she must. If she were in such a position, she would be a “citizen” of the scientific community who not only describes the methods and standards of science but also uses them to assess nominalistic theories. If Burgess and Rosen are to support the Reliance View, then, they would need to provide good reasons for concluding that a naturalistic philosopher is not a “citizen” of the scientific community who is in a position to judge for herself, on scientific grounds, the merits of nominalism.**

Note that there is something odd about the Reliance View in combination with the fact that mathematicians and physicists rarely discuss ontological issues. Typically, inquirers are in the best position to assess the merits of a theory only if they actively work on assessing that theory, or similar theories on that theory’s general topic. But, as we saw above, mathematicians and physicists usually do not actively work on nominalism or similar ontological theses.

But let us set this oddity aside. Can we find passages from (1997) where Burgess and Rosen defend the Reliance View? We might try to find their reasons for it toward the end of their introductory chapter when they elaborate upon the commitments of the naturalist. There, they say:

The naturalists’ commitment is at most to the comparatively modest proposition that when science speaks with a firm and unified voice, the philosopher is either obliged to accept its conclusions or to offer what are recognizably scientific reasons for resisting them. (p. 65)

Presumably, they think that science “speaks with a firm and unified voice” in favor of anti-nominalism. Thus, they believe that the philosopher is either “obliged to accept” anti-nominalism or “to offer what are recognizably scientific reasons for resisting it.” But this does not establish the Reliance View. If we grant that science “speaks with a firm and unified voice” in favor of anti-nominalism, why could not a philosopher be a citizen of the scientific community who is in a position to offer a “recognizably scientific reason” to revise the “firm and unified voice” of science? After all, a “recognizably scientific reason” is a reason based on the standards of the scientific community, standards the naturalistic philosopher as citizen of the scientific community uses.

We might try to find support for the Reliance View in looking at what Burgess and Rosen call a “stereotype” of the naturalistic anti-nominalist position. According to that stereotype, although we who are naturalistic philosophers are willing to revise our commitments, a heavy burden of proof is on the nominalist to support her revision. They continue:

…we anti-nominalists hold the onus probandi to be on the advocates of revision; and in practice the historical record of philosophical and theological ‘corrections’ to science and mathematics, from Bellarmine's ‘correction’ of Galileo onwards, has been so dismal that we will demand very good reasons indeed from anyone who comes before us with another such philosophical claim of massive ‘error’ in science… (p. 34)

For Burgess and Rosen, accepting nominalism as a philosopher is similar to “Bellarmine’s ‘correction’ of Galileo onwards” – declaring that a “massive ‘error’” in science exists by challenging what science accepts “with a firm and unified voice.” The track record of philosophy, they think, shows that philosophical arguments proposing to revise science are likely doomed to failure. Burgess and Rosen say David Lewis provides an example of this naturalistic viewpoint when he says that it is “absurd” and laughable for a philosopher to try to convince a mathematician that abstract objects such as classes do not exist because “[m]athematics is a going concern” and, as history shows, “[p]hilosophy is as shaky as it can be” (Lewis 1991, 59).

But these arguments do not support the Reliance View. Since the naturalistic philosopher recognizes no standards “outside and above and beyond science,” she will regard the bad, extra-scientific philosophy of the past as mistaken. Hence, any argument she endorses in light of the standards she accepts will *not* be like corrections of science such as Bellarmine’s or the “shaky” philosophy of the past. So, our question remains: why cannot the naturalistic philosopher be a citizen of the scientific community who may make confident assessments of the merits nominalistic theories without leaving it to other scientists?[[6]](#footnote-6)

Given what we have seen, Burgess and Rosen have not supported the Reliance View. In Section 4, I will speculate more about their reasons for it. But first, I will show that their version of naturalism and naturalistic methodology in ontology is not Quine’s – if they aim to match Quine’s views, they have failed to do so. Quine would deny the Reliance View. On his view, the philosopher is not reliant upon other scientists to make confident judgments of nominalism’s merits. Let us first investigate Quine’s naturalistic methodology to see why.

**2. Simplifying and Clarifying the System from Within**

Note how Quine characterizes the task of the naturalistic philosopher:

The naturalistic philosopher begins his reasoning within the inherited world theory as a going concern. He tentatively believes all of it, but believes also that some unidentified portions are wrong. He tries to improve, clarify, and understand the system from within. He is the busy sailor adrift on Neurath’s boat. (Quine 1981b, p. 72)

The naturalistic philosopher “tries to improve, clarify, and understand the system from within.” She does not do so by seeking to validate our scientific practices and theories all at once. Rather, the philosopher is an engaged participant in scientific inquiry, treating its methods and theories as possibly in need of piecemeal improvement and clarification rather than wholesale legitimation. That is why Quine characterizes naturalism as “the recognition that it is within science, and not in some prior philosophy, that reality is to be identified and described” (1981a, p. 21) and as “abandonment of first philosophy” (1981b, p. 72): to reject “prior” or “first philosophy” is to reject the need to legitimate our scientific practices as a whole by means of non-scientific standards. In this respect, Quine agrees with Burgess and Rosen that the philosopher is a “citizen of the scientific community” who denies there are standards “outside and above and beyond” science – she denies scientific practice requires legitimation external to it.

One part of the naturalistic philosopher’s task in Quine’s view is that of describing scientific theories and how we theorize. This is one task Quine recommends philosophers take up that Burgess and Rosen pick up on – the task of describing science while staying within science. But another part of this task for Quine is improving and clarifying the system *itself* - by making recommendations for the *content* of the system of science the philosopher starts with rather than merely describing it as it is. On Quine’s view, the philosopher engaged in this task aims to *simplify and clarify* the broad contents of our system of theories, contents shared by most or all of the non-philosophical sciences (mathematics, physics, chemistry, biology, and so on) but which participants in those scientists do not typically evaluate. As we will see, Quine views ontology as a part of this task.

To understand this task, first note Quine’s use of the phrase “the system.” On Quine’s view, the collection of theories we each accept and treat as a going concern are organized into a *single system.* It is a single system because our theories are together organized by logic – they share the same logic and are subject to the same logical laws.[[7]](#footnote-7) Given this, logic holds a special place in the task of simplifying and clarifying the system of science. One of the main parts of this task is coming up with a way of formulating our theories in logical notation. Quine recommends that we formulate our theories so that all the sentences of our theories are built out of the same kinds of grammatical elements – so that they have the same grammar. But they do not share just any grammar – they share a *logical* grammar. The grammatical elements in question are chosen so that all sentences are constructed in a way that makes the logical relations between them manifest and enables us to apply the results of logical theory to them. When a theory is formulated with this grammar, Quine says that it is formulated in *canonical notation.* As the title of Section 47 of (1960 pp. 226-232) shows, Quine calls our canonical notation a *framework for theory*. Quine says his “doctrine” that his canonical notation is a framework for theory

is only that such a canonical idiom can be abstracted and then adhered to in the statement of one’s scientific theory. The doctrine is that all traits of reality worthy of the name can be set down in an idiom of this austere form if in any idiom. (p. 228)

Quine believes a theory in canonical notation sets down “all traits of reality worthy of the name” because of his naturalism, on which “it is within science itself…that reality is to be identified and described” (1981a p. 21). To provide the framework for our scientific theories is to provide the framework for all of our claims about reality.

What guides the selection of this framework? Quine’s answer is: the standards of simplicity and clarity. For Quine, the task of putting our theories in canonical notation is one part of theorizing like any other. He uses these standards because *any* theorizing involves simplification and clarification. As he says:

The same motives that impel scientists to seek ever simpler and clearer theories adequate to the subject matter of their special sciences are motives for simplification and clarification of the broader framework shared by all the sciences. Here the objective is called philosophical, because of the breadth of the framework concerned; but the motivation is the same. (1960, p. 161)

In general, for Quine, a theory is formulated in canonical notation when it usesonly universal and existential quantification, variables, truth-functional operators, and predicates of one or more argument places, including the identity symbol ‘=’. This is the logical grammar that all theories formulated in canonical notation share – all sentences of these theories are constructed from theseelements. This grammar is the simplest and clearest Quine thinks there is. When we show how we can take a theory *T* and put it into a theory *T\** which is formulated in canonical notation, Quine says that we have *paraphrased* the sentences of *T* into *T\*.*

To understand Quine’s views on paraphrase and canonical notation, let us briefly look at a simple example of those views – his recommendation to exclude proper names from canonical notation. Consider (Z):

(Z) 0 is a natural number.

This sentence contains a name ‘0’ and a single predicate ‘is a natural number’. But Quine believes it simplifies and clarifies our framework for our theories not to employ proper names in that framework. A statement of Quine’s preferred paraphrase of (Z) into a theory in canonical notation is the following:

There is something which is 0 and only it is 0 and it is a natural number.

As the above shows, Quine in part follows Russell’s theory of definite descriptions by replacing proper names such as ‘0’ which purport to refer to unique objects and instead using predicates such as ‘is 0’ which hold or do not hold of a unique object. On Quine’s view, just as the predicates ‘is red’ and ‘is blue’ are predicates which hold of something or not depending upon what its color is, ‘is 0’ holds of something or not depending upon what number it is. The use of English expressions here must not mislead us: ‘is 0’ is, logically speaking, a single word – an individual predicate which holds or fails to hold of objects. The above says there is one thing of which ‘is 0’ holds, and *only* one thing of which it holds (more exactly, everything of which ‘is 0’ holds is identical to it), and that thing is a natural number – there is a unique thing which is 0 and is a natural number. In logical notation, we thus get (Z\*):

(Z\*) ∃*x*(*x* is 0 ∧ ∀*y*(*y* is 0 → *y = x*) ∧ *x* is a natural number)

Quine recommends use of sentences formulated in canonical notation for a particular purpose: to state our theories in the simplest and clearest way we know how. On Quine’s view, we do not always or even often use paraphrases in canonical notation such as (Z\*) for this purpose. As he says:

Where the objective of a canonical notation is economy and clarity of elements, we need only to show how the notation *could* be made to do the work of all the idioms to which we claim it to be adequate; we do not have to use it. (1960, p. 161)

On Quine’s view, we can use sentences not formulated in canonical notation when convenient. Hence, as is often the case, we can use sentences such as (Z) containing proper names when convenient. Nevertheless, when our objective is to state our best theories, we must show there is a *paraphrase* of those sentences into canonical notation.[[8]](#footnote-8)

We need to say something about Quine’s views on paraphrase. For him, to judge that an expression *e* is a paraphrase of *e\** is to make a judgment relative to a purpose within inquiry for using either expression. To judge that *e* is aparaphrase of *e\** relative to that purpose is to judge that use of *e* better meets that purpose than use of *e\** does. Hence, when our purposes is to state our theories, Quine judges that (Z\*) better meets that purpose than (Z) does. Notice that Quine denies that methods of paraphrase provide *analyses of* *the meaning* of the sentences we use; even if they did, he does not think it matters: “[s]ynonymy…is not a notion we can readily make adequate sense of…; and even if it were, it would be out of place in [cases of paraphrase].” (1960, p. 159). When our purpose is stating the simplest and clearest system of science, all that matters to him is that it is better to use (Z\*) instead of (Z), regardless of their supposed meanings. It follows that, on Quine’s view, the philosopher does not aim to simplify and clarify science in the sense of aiming for a simpler and clearer formulation of the content of current scientific theories. Rather, she aims to *make* science simpler and clearer by devising simpler and clearer scientific theories.

For Quine, methods of paraphrase provide recipes for systematically replacing expressions with others. The method for paraphrasing proper names in the way we saw above is a recipe for replacing any given proper name within a sentence with other expressions within sentences - i.e., predicates, variables, and quantifiers. Hence, when our objective is to state our best theories, we need not go through each sentence with proper names one-by-one and get rid of proper names, but we can appeal to the recipe to show that a method exists for replacing proper names with predicates, variables, and quantifiers, and hence that a paraphrase of each sentence with proper names exists. Quine also allows for paraphrases that employ recipes for systematic replacement beyond replacing expressions within sentences with others.[[9]](#footnote-9)

To see how Quine thinks ontology is also part of the philosopher’s task of making the system of science simpler and clearer, let us first see how Quine thinks ontology and canonical notation relate. Quine recommends our ontological commitments only be determined by our theories as formulated in canonical notation. To commit oneself to the existence of, say, neutrinos is to accept a theory whose paraphrase into canonical notation entails that neutrinos exist.[[10]](#footnote-10) This allows us to define theses in ontology. To commit oneself to a *platonistic* theory (or what Quine sometimes calls a *realistic* theory – see (Quine 1939)) is to accept a theory which, when formulated in canonical notation, entails that abstract objects exist. To commit oneself to a nominalistic theory is to accept a theory which, when formulated in canonical notation, does not entail that abstract objects exist. *Platonism* (or what Quine sometimes calls *realism* – see (Quine 1960)) is the view that at least one platonistic theory is true. *Nominalism* is the view that no platonistic theories are true – i.e., that only nominalistic theories are true.

But the task of ontology is not exhausted by putting our theories in canonical notation and seeing what commitments fall out. Quine thinks the philosopher also makes recommendations for what to putinto those theories in canonical notation and what its variables range over, recommendations which require further choices for paraphrasing words into a theory couched in logical grammar beyond simply formulating that logical grammar. For example, Quine recommends we reduce all of mathematics to *set theory* – that is, to one theory of sets or another. Given this, (Z\*) is not Quine’s preferred *final* paraphrase of (Z) for the purpose of stating our theories. To reduce mathematics to set theory, he requires that we paraphrase sentences such as (Z\*) containing ‘is 0’ and ‘is a natural number’ into sentences using only the expressions of set theory – the logical symbols and the set-membership symbol ‘∈’.[[11]](#footnote-11) In general, in order to paraphrase our mathematical theories into some set theory or another, Quine provides recipes for systematically replacing the sentences of our mathematical theories with the sentences of set theory.[[12]](#footnote-12) In this way, Quine recommends that we be committed to sets. Moreover, he recommends that we take the objects of mathematics to *be* sets, since expressions for objects of mathematics are defined or paraphrased into expressions for sets. Quine’s recommendation to reduce mathematical theories to set theory thus modifies our ontological commitments. Note that, just as Quine thinks we may use (Z) instead of (Z\*) when more convenient, we may use sentences of mathematical theories other than set theory when more convenient. However, in order to state our mathematical theories, Quine recommends using sentences of set theory only.

The naturalistic philosopher does not restrict her attention just to reducing one kind of mathematical object to others – she also assesses whether the abstract objects of mathematics exist *at all.* Quine says the following toward the end of the last chapter of (1960), called “Ontic Decision”:

What distinguishes between the ontological philosopher’s concern and all this is only breadth of categories. Given physical objects in general, the natural scientist is the man to decide about wombats and unicorns. Given classes, or whatever other broad realm of objects the mathematician needs, it is for the mathematician to say whether in particular there are any even prime numbers or any cubic numbers that are sums of pairs of cubic numbers. On the other hand it is the scrutiny of this uncritical acceptance of the realm of physical objects itself, or of classes, etc., that devolves upon ontology. Here is the task of making explicit what had been tacit, and precise what had been vague; of exposing and resolving paradoxes, smoothing kinks, lopping off vestigial growths, clearing ontological slums. (1960, p. 275)

Quine says that scientists outside of philosophy – the “mathematician” and the “natural scientist” - affirm sentences which, on a natural formulation into canonical notation, entail that abstract objects such as numbers or sets exist and that physical objects exist. This is because of the ontological commitments they incur in their sciences – their commitments to the existence of wombats and cubic numbers, for example. Insofar as we affirm their theories, we do the same. We and these scientists thus accept platonistic theories, and so implicitly accept Platonism. But the “ontological philosopher” evaluates this “uncritical acceptance” of platonistic theories. This acceptance is uncritical because, at least usually, we and other scientists do not typically evaluate, much less acknowledge, our commitment to platonistic theories. The “ontological philosopher” is tasked with evaluating this commitment with the aim of simplifying and clarifying our theory - tasked with “making explicit what had been tacit, and precise what had been vague; of exposing and resolving paradoxes, smoothing kinks, lopping off vestigial growths, clearing ontological slums.” The ontologist’s aim thus is to *make* the system of science simpler and clearer - to make it simpler and clearer on matters scientists typically do not evaluate.

Thus, Quine as an “ontological philosopher” evaluates his commitment to abstract objects. Given his reduction of mathematics to set theory, he evaluates his commitment to set theory itself to see if nominalistic theories simplify and clarify our science. Starting very early on in his career, he was interested in the prospects of nominalism. Quine believes throughout his career that the task of the nominalist is to show how to paraphrase the sentences of science we need to fulfill our scientific purposes. As he says in Quine (1939): “nominalism can be formulated thus: it is possible to set up a nominalistic language in which all of natural science can be expressed” (1939, p. 708). Hence, in order to adopt nominalism, Quine thinks we need a method of paraphrase for systematically replacing sentences of set theory needed for science with sentences of nominalistic theories. Without such a paraphrase, we must continue to accept Platonism. As he says in (1940):

If a nominalistic theory…should be achieved, we may gladly accept it as the theoretical underpinning of our present ostensible reference [in standard mathematics and natural science] to so-called abstract entities; meanwhile, however, we have no choice but to admit those abstract entities as part of our ultimate subject matter. (p. 121)

The closest Quine comes to devising such a systematic replacement is in a paper co-written with Nelson Goodman – “Steps Toward a Constructive Nominalism” (Goodman and Quine, 1947). There, they sketch a nominalistic version of proof theory, in which claims about syntax and proofs are formulated only in terms of claims about concrete physical inscriptions. They propose to use this version of proof theory to support a formalist version of nominalism. On this version of nominalism, sentences of platonistic mathematics are systematically replaced with sentences in nominalistic proof theory about the proof of sentences of platonistic mathematics. The sentences of platonistic mathematics are treated in turn “as strings of marks without meaning” (1947, p. 111) and “like the beads of an abacus, convenient computational aids which need involve no question of truth” (1947, p. 122). Here is an example. Let us suppose that (S) is the theorem of set theory stating that there exists a set with no members, i.e.

 (S) ∃*x*(∀*y~*(*y* ∈ *x*))

Given Quine and Goodman’s nominalism, we do not use a platonistic sentence such as (S) but a statement to the effect that there is a proof of (S), i.e., something like (S\*):

(S\*) ∃*x*∃*y*(*y* is a conjunction of axioms of set theory ∧ ∃*z*(*z* is (S) ∧ ∀*q*(*q* is (S) → *q* = *z*) ∧ *x* is a proof of *z* from *y*))

To adopt Quine and Goodman’s nominalism, one can use (S) if convenient. But one does not accept the truth of (S) and so does not commit oneself to the existence of sets. Rather, one accepts the truth of (S\*) and so commits oneself to the existence of concrete physical inscriptions that are proofs and axioms. In this way, sentences such as (S) are “like the beads of an abacus.”

However, Quine came to believe that the nominalistic proof theory he worked on with Goodman did not work.[[13]](#footnote-13) He thus is left without a workable way of systematically replacing set theory with a nominalistic theory. Moreover, as he argues in “Ontic Decision,” while nominalistic theories have some merit, set theory has many theoretical merits as well. Nominalistic theories whose variables range over physical objects have some merit because of the “sheer systematic utility” of physical objects (p. 238). However, “nominalism’s claims dwindle” in opposition to Platonism because of the “systematic efficacy” and “utility for theory” set theory and its objects bring (p. 237). For these reasons, Quine by 1960 endorses set theory and thus Platonism.

**3. Why Quine Does Not Accept the Reliance View**

We now are in position to see that Quine does not accept the Reliance View – the view that philosophers may not make confident judgments of nominalism’s merits without support and corroboration from other scientists (especially mathematicians and physicists) who are best positioned to assess nominalism’s merits. As we have seen, Quine views the philosopher as a participant in the sciences who seeks to make our scientific theories simpler and clearer. That aim leads him to assess the merits of nominalism. He expresses no felt need to wait for mathematicians or physicists to assess nominalism’s merits. He rejects nominalism based on his own judgments - because he cannot see a workable way of systematically replacing mathematical theories with nominalistic ones, and because he judges there to be theoretical benefits to having platonistic theories. Thus, while by 1960 he agrees with Burgess and Rosen *both* that ordinary and scientific reasoning commit us to the existence of abstract objects *and* that abstract objects exist, he does not hold the latter view because of the Reliance View.

Why does he not accept the Reliance View? We saw above in Section 1 that Burgess and Rosen did not establish the Reliance View on the basis of the passages from (1997) quoted there because they did not rule out the possibility that the naturalistic philosopher, as “citizen of the scientific community,” may confidently assess the merits of nominalistic theories by using the standards of science. Quine rejects the Reliance View because Quine conceives of the naturalistic philosopher *as a citizen who is well placed to assess nominalism’s merits.* Let us see why.

For Quine, the task of the philosopher in examining our commitment to abstract objects is a task continuouswith the task of other scientists. The simplification and clarification of our science starts with simplifying and clarifying the logical structure of our theories by paraphrasing them into canonical notation. As we saw above, Quine thinks this task is guided by the “same motives that impel scientists to seek ever simpler and clearer theories adequate to the subject matter of their special sciences” (1960, p. 161). Given a theory in canonical notation, we then determine what our ontological commitments are. Quine then finds it simpler and clearer to reduce mathematical theories to set theory and thus reduce our ontological commitments in mathematics to sets. This naturally leads Quine to investigate whether it would be beneficial to reduce set theory to a nominalistic theory.

Given the Reliance View, Burgess and Rosen would recommend Quine stop his investigations before he gets to nominalism and wait for mathematicians and physicists for support and corroboration. But Quine would be puzzled by this recommendation. Should he stop earlier, after recommending a framework for our theories and his criterion of ontological commitment? As we saw above, Quine thinks such views are a matter of theorizing – a matter of recommending simpler and clearer theories continuous with that of the sciences. To offer views on ontological commitment and the logical structure of our theories is, in his view, already to make scientific recommendations to improve our science as a philosopher and scientist at the same time. Quine sees nothing stopping him from making further recommendations beyond this by recommending the reduction of all mathematics to set theory. As one can see from Section 2, Quine believes the reduction of mathematics to set theory entails modifications in our ontology. Once he has made this recommendation, he sees no way to rule out examining whether we can simplify and clarify science by replacing our commitment to set theory itself. All scientists do ontology at some level or another, as they offer theories which entail that things exist. The difference between this and a thesis in ontology in a more philosophical sense is on Quine’s view a different in degree of breadth, not in kind. Quine sees no sharp boundaries delineating how wide any given kind of scientist may go.

This does not mean that the philosopher can carry out her investigations independent of the other sciences. The naturalistic philosopher needs to have enough knowledge and expertise in a given science in order to be in a position to simplify and clarify it. She thus will need to know a good amount of mathematics in order to make recommendations for the ontology of mathematics. However, that likely does not entail she needs to be an expert in, say, topology or partial differential equations. Quine had a background in mathematics and was one of the earliest and most prominent experts in mathematical logic in America - it is on the basis of that knowledge that he recommends reducing mathematics to set theory. To reduce set theory to a nominalistic theory altogether requires some knowledge of what set theory is required in the sciences outside of mathematics itself. What knowledge is required depends upon the nominalistic proposal at hand.[[14]](#footnote-14) But there is no general boundary to be set where the naturalistic philosopher must stop.

What, then, would Quine think about the claim that accepting nominalism requires saying there is “massive ‘error’” in science? There is at least one important sense in which Quine does not view nominalism as showing that mathematics, as done by mathematicians today, is in massive error. As we saw in Section 2, Quine does not require we use the sentences of our theory in canonical notation. As we also saw in Section 2, Quine requires that the nominalist be able to paraphrase the sentences of mathematics necessary for science. Were Quine to judge nominalism to be true, he would recommend we affirm Platonistic sentences necessary for science in day-to-day scientific inquiry when more convenient. He would thus not claim there is massive error in science in the sense that he would require a change in what scientists affirm day-to-day in scientific practice. To be sure, nominalism would require a significant revision of what theories Quine takes to be true,as he would think all true theories would be nominalistic. I do not know whether Quine would say such a revision shows the science before the revision to be in “massive ‘error’.” But if, contrary to what usually is the case, a mathematician comes to recommend that platonistic theories to which she is committed remain in her overall theory in canonical notation, Quine may very well in such a scenario disagree with the mathematician and invite her to defend her recommendation. Unlike David Lewis, Quine finds nothing absurd about this possibility.[[15]](#footnote-15)

**4. The Philosopher’s Place within Science**

In this last section, I will highlight and sharpen the central philosophical upshot of my paper. Before doing so, let me be clear about what I have argued so far. I have not aimed to show that Quine thinks nominalism is true. His mature position is that it is false. Moreover, I have not even attempted to show that Quine thinks nominalism is a thesis that has merit. For I have not even attempted to show he thinks any nominalistic theory simplifies and clarifies science. What I have shown is that, contrary to Burgess and Rosen’s Reliance View, Quine thinks the naturalistic philosopher is in a position to judge whether nominalism does simplify and clarify science. As Quine’s own work shows, Quine does not merely allow the philosopher to judge whether it does, but also would recommend the philosopher judge whether it does when she has enough knowledge of the sciences relevant to a given nominalistic proposal. Hence, on Quine’s view, the naturalistic philosopher often is *best* placed to assess the merits of nominalistic theories.

The central philosophical upshot of my paper, therefore, is not a defense of nominalism. To see that upshot, let me ask my question from Section 1 again: why do Burgess and Rosen accept the Reliance View? There are two possible readings of Burgess and Rosen’s views on naturalistic methodology which would answer this question.

On the first reading, Burgess and Rosen restrict the role of the philosopher within science to the human sciences. This reading is at least suggested by their discussion in their book. Recall they read Quine as “advocat[ing] a novel **naturalized** conception of epistemology, on which the epistemologist becomes a citizen of the scientific community, seeking only to describe its methods and standards, even while adhering to them.” They do not say that the naturalistic philosopher *only* does this descriptive epistemology. However, many passages suggest they think the naturalistic philosopher *primarily* does descriptive epistemology. When describing the relation between the philosopher and the other sciences, they say:

…science is not a closed guild with rigid criteria of membership. Philosophers professing naturalism often do contribute to debates in semantical theory or cognitive studies or other topics in the domain of linguistics or psychology, even though they are not officially affiliated with a university department in either of those fields. (p. 65)

They allow the philosopher to contribute to science; however, they only cite the human sciences as placed where they “often contribute.” Moreover, they believe the study of nominalistic theories “may enlarge philosophical understanding and contribute to naturalized epistemology and cognitive studies.” (p. 239). On their view, the nominalistic theories they discuss are inferior to anti-nominalistic ones but are “in principle possible to use” (p. 243). On account of this, they believe we can learn something in the cognitive study of science by investigating nominalistic theories by seeing what “the science of alien intelligences might look like” (*Ibid.*). On the picture of the philosopher’s place within science indicated by these remarks, when the philosopher participates in science, she participates primarily just in the human sciences about science itself – as a kind of anthropologist, sociologist, cognitive scientist, or historian of science. Given this picture, the philosopher’s participation is isolated from sciences such as mathematics and physics, and so the Reliance View follows from it.

But this is not Quine’s picture. On Quine’s picture of philosophy’s place within science, the philosopher is a participant engaged within the activity of science – legitimate philosophy is a part of science. For Quine, a significant portion of the task of the naturalistic philosopher when so engaged is to recommend that science *be* a certain way. She does not simply aim to interpret or understand science. She aims to *do* science by *making* science simpler and clearer. And she may and sometimes does aim to improve the natural and mathematical sciences – not just the human sciences. Hence, on this picture, she may and sometimes does aim to assess revisions of theories in *any* type of science, without needing to rely on other types of scientists. For Quine, the naturalistic philosopher’s recommendations are not those of what Burgess and Rosen call the “**alienated** epistemologist” who “presupposes other methods and standards of evaluation, outside and above and beyond those of science.” On Quine’s picture, they are made within science itself, recommendations continuous with the other sciences. Quine would grant that naturalistic philosophers can make errors when making recommendations within science. But for him, to show a naturalistic philosopher has made an error is not to appeal to what Burgess and Rosen call “descriptive methodology” to see how *other* scientists make or would make a judgment. Rather, it is to engage in science oneself by using its methods and standards of evaluation to show that she is in error. The picture of Quine’s methodology in ontology and philosophy more generally I have just articulated is the central philosophical upshot of this paper.

To sharpen this picture, let us consider a second reading of Burgess and Rosen. On this reading, they deny that the philosopher is primarily restricted to the human sciences. On this reading, Burgess and Rosen think that, in general, (a) philosophers must wield scientific standards in evaluating theories. Nevertheless, in general, (b) those best placed to judge a theory by scientific standards are scientists other than philosophers, given their expertise with those standards. Hence, (c) philosophers should on the whole rely on other scientists to assess merits of scientific theories, even though there is some room in principle for philosophers not to rely upon them. We thus can read Burgess and Rosen believing that the Reliance View follows from, or is at least supported by, these three precepts. For them, mathematicians’ and physicists’ expertise on the relevant scientific standards shows us that it is they who are best placed to assess revisions to anti-nominalism, and not philosophers.

Quine, I submit, would agree with (a), (b), and (c). Thus, on this reading of Burgess and Rosen, there is significant agreement between Quine and Burgess and Rosen on general philosophical methodology. However, he would deny the Reliance View follows from this methodology. He thus disagrees with Burgess and Rosen on how to apply that general methodology to the case of nominalism. Quine would agree that, in a large host of cases, other scientists are best positioned to assess revision to our ontological commitments. The less broad an ontological commitment is, the more likely it is the non-philosopher scientist, and not the philosopher, who is best placed to assess revisions to ontological commitments. However, he thinks that philosophers, and not mathematicians and physicists, are generally best positioned to wield scientific standards to assess our very broad ontological commitments within science, such as our commitment to abstract objects or physical objects – recall he says that it “devolves upon ontology” to assess the “uncritical” commitment to these objects that we have. For Quine, philosophers’ confidence in their views on nominalistic theories, even when in favor of them, need not be tempered simply due to lack of corroboration from other scientists.

Note that Quine should not be read as thinking that the philosopher needs to be isolated from others in the scientific community, always making judgments confidently without input from or discussion with others. The philosopher should be open to suggestions from non-philosopher scientists. Moreover, in some instances of the kind of scenario David Lewis envisages, the Quinean philosopher may very well find that the mathematician’s view is correct. These possibilities are consistent with my reading of Quine. It is consistent with my reading that the philosopher, in some or many cases, seeks input from others to enrich her perspective on an ontological issue, and even that the philosopher realizes her position is wrong in light of that input. The point of my reading is that the philosopher is the one often best positioned to assess the merits of very broad ontological theses such as nominalism, and need not rely upon others to make confident judgments on their merits. Quine’s methodology is in line with viewing philosophers as collaborators with the scientists, working alongside other fellow sailors adrift on Neurath’s boat.[[16]](#footnote-16)

 The philosophical upshot of my paper, along with my discussion of Burgess and Rosen, shows that Quine’s naturalism importantly differs from how naturalism is sometimes understood in the literature, especially naturalism in the philosophy of mathematics. Paseau opens (2005) by defining naturalism in the philosophy of mathematics as follows:

Naturalism in the philosophy of mathematics is the view that philosophy cannot legitimately gainsay mathematics. Perhaps ‘quietism’ or ‘conservatism’ would be more suggestive labels, but ‘naturalism’ is the entrenched term of art. (p. 377)

On this characterization of naturalism in the philosophy of mathematics, philosophers cannot revise mathematical theories non-philosophers have advanced – in short, philosophy is *anti-revisionist* about mathematics*.*[[17]](#footnote-17) In Rosen (2001, p. 82), Rosen also says that naturalism is deferential in spirit. Given the Reliance View, one can see that Burgess and Rosen’s naturalistic philosophy is generally anti-revisionist and deferential about mathematics, at least when it comes to ontological issues arising in the mathematical and physical sciences such as nominalism. But Quine’s picture of philosophical methodology shows his methodology in ontology, philosophy of mathematics, and philosophy in general is not particularly anti-revisionist; nor is it particularly deferential in spirit. Since Quine accepts (b) above, his methodology is deferential in many cases. But it is not particularly deferential when it comes to the very broad parts of our science that Quine thinks the philosopher is best placed to evaluate. For Quine, all of philosophy is *within* science – he says it is *within* “science itself…that reality is to be identified and described.” It is because of Quine’s conviction that philosophy is within science that he believes that the philosopher can and does play an active role in assessing the merits of revising parts of science when she has enough knowledge of and expertise in them. It is because of this conviction that Quine is perfectly willing to revise scientific theories if he judges it simplifies and clarifies science to do so. By explaining how Quine’s naturalistic methodology in ontology differs from the anti-revisionist, deferential, “quietist,” “conservative” naturalism just mentioned, I hope to have clarified and advanced contemporary debates over naturalism. Having clarified the differences between Quine’s methodology and Burgess and Rosen’s, I leave it to the reader to judge their merits and demerits.

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1. See (1997, p. 4). Seven is the number of novels Jane Austen wrote if one includes her epistolary novel *Lady Susan.* [↑](#footnote-ref-1)
2. Burgess and Rosen raise some problems for a hard and fast distinction between abstract and concrete entities, but grant for the sake of argument that stereotypical examples of abstract entities such as numbers, sets, and novels are abstract. Quine also grants this: see (1960, p. 233). [↑](#footnote-ref-2)
3. See also (Burgess 2004, pp. 53-54), where Burgess clarifies this view. He says the phrase “without conscious mental reservation or purpose of evasion” is taken from legal contexts. [↑](#footnote-ref-3)
4. See (pp. 214-225). [↑](#footnote-ref-4)
5. Let me here make two points to clarify Burgess and Rosen’s views. First, Burgess and Rosen might say it is not “really” up to philosophers to assess nominalism’s merits in order to allow for exceptions to the Reliance View. Note, however, that their discussion strongly indicates that such exceptions would have to be rare; it indicates that they do not think the philosopher *usually or mostly* is not in a position to assess nominalistic theories even though she *is* in a good position in this or that kind of case. After raising the question “in what sense can philosophers proposing a revision of science claim to be judging by scientific standards, if they will not leave the merits of their proposal to be judged by practicing scientists?”, they do not specify how, in some exceptional cases, the philosopher is permitted not to “leave the merits of their proposal to be judged by practicing scientists.” But this would be what one would expect them to do if the exceptions were not rare. So, I will assume they allow for exceptions to the Reliance View at most only rarely. Second, notice that Burgess and Rosen do judge, as philosophers, that nominalism has demerit – they believe they are committed to its falsehood. The Reliance View is about who is best posed to assess changes to that commitment. In order to change that commitment and so endorse nominalistic theories, someone has to assess them. The Reliance View says that mathematicians and physicists, and not philosophers, are in a position to assess those proposed changes. [↑](#footnote-ref-5)
6. Daly and Liggins (2011) criticize Burgess, Rosen, and Lewis’ argument (what they call ‘the track record argument’) on different grounds. Paseau (2005) also criticizes their argument (what he calls the ‘Failure Argument’); however, he criticizes it as an argument for *reinterpreting the content of mathematical theories* by means of philosophical norms. I am arguing for something different: their argument does not support the claim that a philosopher who uses scientific standards could not assess the merits of *revising mathematical theories themselves.* In Section 6 of Paseau (2007), Paseau also criticizes Burgess and Rosen’s appeal to science journals as a test of the scientific merits of nominalism. As he reads it, Burgess and Rosen think that “whether scientific grounds vindicate nominalism can simply be determined by submitting a nominalist construal of some scientific theory (e.g. Hartry Field’s nominalization of Newtonian mechanics) to a scientific journal” (p. 138). Paseau argues against this, concluding that “[f]ailure of the publication test (or a fortiori of the publication-and-reception test) is no touchstone of scientific inferiority” (p. 139). While I agree with Paseau, I here assume that Burgess and Rosen’s “publication test” is not one of their reasons for the Reliance View. I instead think their test indicates *that* they hold the Reliance View, but I assume they hold it for different reasons. [↑](#footnote-ref-6)
7. See, for example, Quine (1960 pp. 12-13). [↑](#footnote-ref-7)
8. See (Quine 1960 pp. 176-186) for Quine’s motivations for eliminating proper names, one of which is to resolve problems arising from using proper names such as ‘Pegasus’ lacking a referent. [↑](#footnote-ref-8)
9. Note that Quine does not provide strict criteria for what counts as a good recipe for systematic replacement. [↑](#footnote-ref-9)
10. This explication of what it is to commit oneself to the existence of things is informal, since for Quine implication is defined over formulae on the basis of a definition of satisfaction within a meta-language mentioning those formulae. See (Quine 1980) for details. [↑](#footnote-ref-10)
11. Paraphrases such as these which systematically replace expressions within sentences such as ‘is 0’ and ‘is a natural number’ with other expressions within sentences are what Quine calls *explications* – see (Quine 1960 pp. 257-262). [↑](#footnote-ref-11)
12. For a detailed exposition of how Quine affects these reductions, see (Quine 1963). A brief exposition of how he reduces set theory to number theory can be found in (Quine 1960 pp. 262-264). [↑](#footnote-ref-12)
13. As he explains in his intellectual autobiography: “We settled for a formalistic account of mathematics, but still had the problem of making do with an inscriptional proof theory in a presumably finite universe” (1986, p. 26). [↑](#footnote-ref-13)
14. Quine and Goodman’s nominalism does not require much knowledge of what mathematics is required in science, except for knowledge of proof theory. Since all platonistic theories are treated as meaningless marks described in nominalistic proof theory, it does not matter what platonistic theories are needed for science, as *any* platonistic theory is replaced by a nominalistic description of proofs of sentences in those theories. By contrast, Hartry Field’s nominalistic proposal in *Science without Numbers* to replace platonistic theories with theories of concrete geometrical objects requires detailed knowledge of physics. Interestingly, in the second edition to *Science without Numbers* (Field 2016), Field provides a letter from Quine in 1980 praising the first edition of the book, in which he says:

[Your book] is an impressive piece of work: reasonable, ingenious, learned and as central philosophically as can be. Moreover it appeals to my predilections, for, as you must know, I am a nominalist *manqué* from away back, and a reluctant Platonist only in honest recognition of what have seemed to be the demands of science. (p. 55) [↑](#footnote-ref-14)
15. Let me here note that Quine’s dispute with Burgess and Rosen’s Reliance View does not presuppose, as Quine sometimes seems to do in his work, that the empirical sciences take prevalence to some degree over the mathematical sciences. Whatever the relation between these two kinds of sciences, the philosopher for Quine is a participant in them who in some cases is best positioned to make revisions to them. [↑](#footnote-ref-15)
16. Thanks to two anonymous reviewers for motivating the second reading of Burgess and Rosen I give above and pressing me to state how that reading relates to Quine’s views. [↑](#footnote-ref-16)
17. See also (Paseau 2013), where he suggests that naturalism is an “anti-revisionist” doctrine. [↑](#footnote-ref-17)