Ockham's Razor in Russell's Philosophy

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The concern for simplicity is a unifying theme in much of Bertrand Russell's philosophical works; particularly in his theory of definite descriptions, logical atomism and neutral monism. The latter two theories' connection with simplicity-considerations will be briefly mentioned, while special attention will be given to the resolution of the three central puzzles in Russell's 'On Denoting'. Last, Russell's justifications for the use of Ockham's razor will be considered.

The importance of simplicity in philosophical and logical thought has been articulated as early as Aristotle[1], though it is recognized most often as Ockham's razor: "entities should not be multiplied unnecessarily."[2] This formulation clearly is of ontological significance, but many versions place emphasis on epistemic simplicity (e.g. *ceteris paribus*, the simpler theory is to be preferred over the more complex). The former is referred to generally as parsimony; the latter, elegance (Baker, 2005).

Russell, as we shall see, was concerned with both elegance and parsimony throughout his philosophical career. To demonstrate this, let's first turn to his theory of definite descriptions as articulated in 'On Denoting'.

Simplicity in 'On Denoting'

In 'On Denoting', Russell proposes solutions to three puzzles exemplified respectively by the following statements:

1. "Scott was the author of *Waverley*."
2. "The present King of France is bald."
3. "The golden mountain does not exist."[3]

All of these involve denoting phrases (meaning they involve "picking-out" or referring to the things they describe or name) that are philosophically problematic.

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[1] "We may assume the superiority *ceteris paribus* of the demonstration which derives from fewer postulates or hypotheses." - Aristotle, *Posterior Analytics,* c. 350 B.C.E.

[2] While attributed to William of Ockham (c. 1287-1347) and in the spirit of his nominalism, it is not found in his writings (Thornburn, 1918).

[3] This statement was not in the original 1905 paper, but it presents the same problem posed there.

The first statement involves a problematic application of identity: "If *a* is identical with *b,* whatever is true of the one is true of the other, and either may be substituted for the other in any proposition without altering the truth or falsehood of that proposition" (Russell, 1905a). A puzzle arises when contrasting the original statement with the identity substituted version. One may legitimately inquire as to the truth of the statement 'Scott was the author of *Waverley*', but, given the free substitution of 'the author of *Waverly*' with 'Scott', we have the statement 'Scott was Scott', which is tautologous. How is it that the first may be subject to question but the second may not, when they are equivalent? Is a query about the truth of the statement 'Scott was the author of *Waverley*' the same as inquiring about identity (a=a)?

The second puzzle arises from the interaction of the law of excluded middle (either *a* is true or *not a* is true, but not both) with the false statement 'The present King of France is bald'. Accordingly, either `the present King of France is bald' or `the present King of France is not bald' must be exclusively true. However, "if we enumerated the things that are bald, and then the things that are not bald, we should not find the present King of France in either list" (Russell, 1905a).[4] This violates the law of excluded middle, since neither a nor not a is true. How may we avoid this violation?

The third statement poses a problem about non-existent entities. Surely 'The golden mountain does not exist' is true, but how can a non-entity be the subject of a proposition? For an object to lack a property, we may think, the object must exist: "For what does not exist must be something, or it would be meaningless to deny its existence; and hence we need the concept of being, as that which belongs even to the non-existent" (Russell, 1903). How do non-existent entities "exist" and is there any way to avoid this need for their paradoxical non-existent existence?

The resolution of the first problem has the least significance for Russell's views on simplicity, but is integral to his analysis of language. Descriptive phrases like 'the author of *Waverly*', according to Russell, are part of the sentence, and do not have meaning (or reference) on their own; rather, they are what he came to call "incomplete symbols" in contrast to logically proper names like "this" or "that" and definite descriptions, which

[4] Here Russell quips "Hegelians, who love a synthesis, will probably conclude that he wears a wig." Even this bit of humor trades simplicity's *prima facie* plausibility and the folly of its violation.

uniquely individuate the thing to which it refers. In short, "we must abandon the view that denotation is what is concerned in propositions which contain denoting phrases" (Russell, 1905a).

Another relevant distinction involves the difference between primary and secondary occurrences of descriptions. A description has a primary occurrence in a sentence if that sentence is false if and only if there is something that satisfies the description but does not have the trait being predicated of it. In contrast, a description has a secondary occurrence in a sentence if that sentence is false if and only if nothing satisfies the description. Using the above distinctions (descriptive phrases, proper names, etc.) and the corresponding tools of modern logic (including variables, quantifiers and predicates), Russell refines his analysis accordingly.

The proper analysis of 'Scott was the author of *Waverley*' is not simply $a = b$, but a statement of existence, such that there is a unique author of *Waverly*, who happens to be Scott. Thus, the proper name 'Scott' is held quite distinct from the description 'the author of *Waverly*' in Russell's analysis. In modern logical terms 'Scott was the author of *Waverley*' becomes $\exists x[Axw \ \& \ \forall y(Ayw \rightarrow y=x) \ \& \ x=s]$, where Axw is the relation of authorship to *w Waverly* and *s* is Scott. Thus, the occurrence of Scott is *not* substitutable for the author of *Waverly*, as is suggested by the surface grammar of the sentence. Thus, problem in inquiring as to the truth of "Scott was the author of Waverly" dissolves.

Russell's second solution, like the first, results from new distinctions. 'The present King of France is bald' presents a difficulty when understood under the theory that "[b]eing is that which belongs to every conceivable term, to every possible object of thought" (Russell, 1903). This early (pre-1905a) view of Russell's is much like that of Alexius Meinong, whom Russell explicitly repudiates in 'On Denoting'.

Meinong's theory of objects held that the `prejudice in favour of the existent' must be rejected because existents are only an infinitesimal part of the objects of knowledge (Russell, 1905b). The importance of nonexistent things in knowledge and the apparent need for their "being" in some sense to allow them to be objects of knowledge, led Meinong to propose that nonexistent objects subsist. Subsistence is the kind of being that

nonexistent objects have (Meinong, 1904).[5] Moreover, the last two puzzles seem to suggest that the "being" of nonexistent things is needed to avoid contradicting the law of excluded middle and to make sense of statements about nonexistent things, respectively.

Meinong and early Russell's views regarding "being" clearly had ontological import; if nonexistent things have being, innumerable things have been admitted into their ontology. Intuitively, the principle of parsimony dictates that this outcome be avoided unless it is necessary. Russell shows that there is a beautifully parsimonious alternative to the Meinongian view.

Recall that either `the present King of France is bald' or `the present King of France is not bald' must be true on pain of contradicting the law of excluded middle. There are two ways of reading this negation: understanding it to apply to the putative baldness, or understanding the negation to hold over the whole of the statement. This distinction corresponds to differences in primary and secondary occurrence of descriptions.

Let's compare the two readings unpacked like the first problematic statement. Similar to the previous unpacked problem, 'the present king of France is bald' amounts to 'There is an x such that x is a present king of France and x is bald, and for all y if y is a present king of France then $y = x$'. Expressed in logical notation and under the primary occurrence reading, it amounts to the following: $\exists x[(Kx \,\&\, \forall y(Ky \rightarrow y{=}x)) \,\&\, Bx]$ and the negation $\exists x[(Kx \,\&\, \forall y(Ky \rightarrow y{=}x)) \,\&\, {\sim}Bx]$. On this reading of denial (or negation), both statements are false, but do not conflict with the law of the excluded middle, because they are not logical contradictories. On the secondary occurrence reading it becomes $\exists x[(Kx \,\&\, \forall y(Ky \rightarrow y{=}x)) \,\&\, Bx]$, and ${\sim}\exists x[(Kx \,\&\, \forall y(Ky \rightarrow y{=}x)) \,\&\, Bx]$. The first statement is false and the second true, in accordance with the law of the excluded middle (as they are contradictory statements).

The above demonstrates that it is not necessary to require the existence or subsistence of the present king of France to render the statement 'the present king of France is bald' meaningful. Nor is it necessary to avoid conflict with the law of the excluded middle. Russell's parsimonious alternative to subsistence is vindicated in this case. The next statement illustrates much the same.

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[5] See Smith, 1985 for a close and sympathetic analysis of Meinong's views in contrast to Russell's.

Like the previous statement, the Meinongian reading of 'the golden mountain' does not exist' demands that the golden mountain subsist for the statement to have meaning. Russell denies that the denoting phrase 'the golden mountain' needs a referent for it to be intelligible. Rather, the description viewed from as a secondary occurrence, yields the following formalization: $\sim \exists x(Gx \ \& \ Mx)$. This is false if and only if nothing satisfies the description, making it perfectly intelligible as a statement without the requirement of the denoting phrase's subsistence.[6]

Russell's theory of definite descriptions is an excellent example of a theory that is both elegant and parsimonious. It is elegant in the relatively small set of components (variables, predicates, quantifiers, etc.) needed for its representative and analytical capacity; it is parsimonious in its elimination of an infinite number of subsistent entities. Frank Ramsey presciently declared Russell's theory of descriptions a 'paradigm of philosophy'. Indeed, Russell further developed the method of analysis exhibited in 'On Denoting', as he considered other problems in logic, epistemology and metaphysics.

Further Influence of Simplicity on Russell's Philosophy

Russell's analysis of language in 'On Denoting' is only one relatively early example of Ockham's razor as a guiding methodological principle in his work. This implicit appeal to parsimony and elegance in 'On Denoting' became more explicit in later works on logical atomism and neutral monism. What follows is a brief survey of the influence of Ockham's razor on some of Russell's subsequent philosophical views.

Russell recounts in his essay 'My Mental Development' his conscious use of Ockham's razor in *Principia Mathematica*, where he understood Ockham's razor as a metaphysical "principle of parsimony as regards 'entities'" (Russell, 1944). Through his work on *Principia Mathematica* (1910, 1912, 1913), he began to realize the significance of what he called "minimal vocabularies", meaning a vocabulary in which no word can be defined in terms of others.

It is worth noting that the solutions to the three puzzles were not the only portions of 'On Denoting' relevant to Ockham's razor. The idea nascent in the following quote was to have a great impact on simplifying epistemological theory: "…in every proposition

[6] As Quine put it "To be is to be the value of a variable" .

that we can apprehend (i.e. not only in those whose truth or falsehood we can judge of, but in all that we can think about), all the constituents are really entities with which we have immediate acquaintance" (Russell, 1905a). Following this insight, Russell developed his famous distinction between "knowledge by acquaintance and knowledge by description" (1910). Knowledge by acquaintance is that which is known non-inferentially in immediate awareness, like the appearance of a table in its texture, color, smoothness, etc. These things known to the senses are generally referred to as sense data, by Russell. Knowledge by description involves phrases of the form 'a so-and-so' or 'the so-and-so' (1912).

Using the knowledge by acquaintance/knowledge by description distinction, Russell proposed that "[t]he fundamental principle in the analysis of propositions containing descriptions is this: *Every proposition which we can understand must be composed wholly of constituents with which we are acquainted*" (1912, italics original). Here we see that the seed of his logical atomism was present early in his writings. In the same work, Russell argues that Ockham's razor compels us to reject radical skepticism and accept the existence of the material world:

> … every principle of simplicity urges us to adopt the natural view, that there really are objects other than ourselves and our sense-data which have an existence not dependent upon our perceiving them. . . . Since this belief does not lead to any difficulties but on the contrary tends to simplify and systematize our account of our experiences, there seems no good reason for rejecting it. (Russell, 1912)

Later, in his 1918 lectures on logical atomism, Russell argues that the world itself consists of a complex of logical atoms (essentially, sense data) and their properties. Together logical atoms form the atomic facts which combine to form logically complex objects. Inferred entities like tables and other physical objects are then understood to be "logical constructions". The same year, Russell declared a formulation of Ockham's razor to be the supreme maxim of scientific philosophizing: Wherever possible, logical constructions are to be substituted for inferred entities." (Russell 1918a).[7] Thus, logical constructions served to minimize entities in the spirit of Ockham's razor.

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[7] This quote was later featured on the first page of Carnap's *Aufbau*, which in many ways represents the culmination of Russell's logical atomism.

Russell's first endorsement of neutral monism (Russell, 1919) quickly followed his expression of logical atomism and shared its reductive and simplifying spirit. Neutral Monism is the metaphysical view that reality is ultimately unified in a neutral base. By neutral, it is meant to be neither mental nor physical:

> The data of psychology do not differ in their intrinsic character from the data of physics. I have maintained that sensations are data for psychology and physics equally, while images, which may be in some sense exclusively psychological data, can only be distinguished from sensations by their correlations, not by what they are in themselves. (Russell 1921)

It is widely recognized that Russell changed his view many times throughout his long life, the varied positions he took were deeply influenced by simplicity considerations, though he rarely wrote of them explicitly. In the case of the theory of descriptions, the elaborate metaphysics of Meinong are stripped, while logical atomism invites the reduction inferred entities to logical constructions and neutral monism unifies our conception of the mental and the physical in a neutral base.

Russell's "Justification" of Ockham's Razor

Given the central importance of Ockham's razor in Russell's philosophy and his penchant for logical analysis, one would expect a defense of its use somewhere in his writings. Interestingly, such a defense is largely absent, as is mention of the principle itself, given the great number of his philosophical writings.

One of the earliest explicit mentions of Ockham's razor in Russell's writing is as follows:

> One very important heuristic maxim which Dr. Whitehead and I found, by experience, to be applicable in mathematical logic, and have since applied to various other fields, is a form of Occam's Razor. When some set of supposed entities has neat logical properties, it turns out, in a great many instances, that the supposed entities can be replaced by purely logical structures composed of entities which have not such neat properties. In that case, in interpreting a body of propositions hitherto believed to be about the supposed entities, we can substitute the logical structures without altering any of the detail of the body of propositions

> in question. This is an economy, because entities with neat logical properties are always inferred, and if the propositions in which they occur can be interpreted without making this inference, the ground for the inference fails, and our body of propositions is secured against the need of a doubtful step. The principle may be stated in the form: 'Whenever possible, substitute constructions out of known entities for inferences to unknown entities' (Russell, 1924)

There is no explicit justification in this passage, though he suggests that it is a useful principle that helps us to avoid error. Indeed, in his other works, when it is mentioned at all, Ockham's razor is implicitly justified by its utility. For example, in his *History of Western Philosophy* of he devotes the following passage to Ockham's razor:

> Occam is best known for a *maxim* which is not to be found in his works, but has acquired the name of "Occam's razor." This maxim says: "Entities are not to be multiplied without necessity." Although he did not say this, he said something which has much the same effect, namely: "It is vain to do with more what can be done with fewer." That is to say, if everything in some science can be interpreted without assuming this or that hypothetical entity, there is no ground for assuming it. I have myself found this a most fruitful principle in logical analysis (Russell, 1945).

Aside from the above passages, he refers to Ockham's razor by name only a few other times (1918a, 1944) and never for more than a paragraph or two. He appears to never have argued for the principle, though he does articulate its appeal as a "heuristic maxim" that compels "an economy" in theory (1924) and seems to suggest that it is irrational to violate Ockham's razor ("if everything in some science can be interpreted without assuming this or that hypothetical entity, there is no ground for assuming it"). He suggested something of the illegitimacy of violating Ockham's razor when he wrote "The method of 'postulating' what we want has many advantages; they are the same as the advantages of theft over honest toil. Let us leave them to others and proceed with our honest toil" (1919, p. 71). However, none of these constitute an actual argument for its use. Despite this, as I have shown or alluded to, Russell's used the "heuristic maxim" of Ockham's razor to support his theory of definite descriptions, the existence of the material world, logical atomism, and neutral monism.

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