MASS NOUNS AND STUFF

The Beginning of a New Treatment

By

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A thesis submitted to the Department of Philosophy
In conformity with the requirements for
The degree of Master of Arts

Queen’s University
Kingston, Ontario, Canada
September 2007

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Abstract

This paper attempts to clarify the role mass nouns play in our language, including what they designate and how they designate it. In particular, this paper focuses on demonstrating that mass nouns do not individuate the stuff they designate and consequences for this non-individuative theory.

In order to demonstrate that mass nouns do not individuate, I examine grammatical rules for mass nouns and contrast them with rules for singular and plural count nouns. Furthermore, I examine several possible truth conditions for sentences involving mass nouns and demonstrate that no truth conditions which individuate are acceptable.

Once this lack of individuation has been demonstrated, I examine issues that arise in language and metaphysics. This examination is necessary because most of our understanding of language and metaphysics centers around medium sized objects. Since mass nouns do not individuate, they are not designating medium sized objects.

When examining developments in language, I suggest that the term “the” does not imply uniqueness but rather exhaustiveness and there is already an intuitive way to capture this in first order logic using universals. Furthermore, I suggest that stuff designated by mass nouns cannot be directly referred to and hence cannot occur in a singular term in first-order logic. Finally, I suggest that identity statements should be treated without the identity relation and instead using a biconditional and a universal.

When examining developments in metaphysics, I suggest that there cannot be a criterion of identity for stuff because a criterion of identity asks what a single instance is and stuff does not occur in individual instances. Furthermore, I suggest that identity and
persistence conditions differentiate for stuff in a way that they do not for individual things.

Finally, I address what more must be done in order to have a complete treatment of mass nouns and stuff. This section focuses primarily on first-order logic and how to make stuff a value of a variable while maintaining ontological import. Work in this area still needs to be done and is, I believe, of significant importance.
Acknowledgements

Above all, I would like to thank my supervisor, Henry Laycock, for his guidance, patience, and enthusiasm for philosophical discussions.

I am grateful for my committee who gave me support and insight.

I would also like to thank Octavian Busuioc, Patrick Moran, and Clifford Roberts for many evenings spent discussing “coffee” over cups of tea.

Finally, I would like to thank my parents for attempting to learn philosophy so that they would understand the jokes I make and for laughing even when they didn’t.
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Section 1.0: The Problem of Mass Nouns

There have been great leaps in our understanding of metaphysics, logic and language in the past century. However, this understanding has tended to focus on individual objects and the words that designate them, count nouns. In contrast to the clarity of count nouns, we have the murkiness of mass nouns. Elucidating mass nouns and the stuff they designate is the purpose of this paper.

To do so it is important to clarify the differences between count nouns and mass nouns. Examples of count nouns are “cat” and “apple”. They designate individual objects in the world. The category of count nouns can be further broken down into singular nouns such as “cat” and plural nouns such as “apples”. Singular count nouns and individual objects have been the focus of investigation of the past century. We understand what is being designated when a singular count noun is used. We understand how to individuate different instances of the same kind. We understand what individuation of individual objects is. The term “individuation” means that we understand what counts as one instance of a kind and what counts as another of the same kind. “Individuation” means that there is something which counts as one instance of a kind. This individuation is found in the kind and is reflected in our language. This reflection comes from the fact that singular nouns designate individual objects and hence singular nouns have individuation built into them. We understand truth conditions for sentences which feature singular count nouns as the grammatical subject and the logical form of that sentence. We understand synchronic and diachronic identity conditions of an individual thing.
In contrast, our understanding of the semantic content of mass nouns has been flawed. Mass nouns designate stuff such as water and mud. It is important that we gain clarity on mass nouns and the stuff they designate the same way we have gained clarity on singular count nouns and individual things. This means determining what a mass noun designates, the logical form and truth conditions for sentences involving mass nouns and what are identity conditions for stuff. While mass nouns have been investigated by some philosophers in the past, the purpose of this chapter is to examine the solutions offered by these philosophers and demonstrate why they have not fully grasped mass nouns.

Section 1.1.0: Strawson’s Solution

Strawson does not use the term “mass nouns”; instead he uses “material names” or “feature universals”. Material names are similar to substance names (kind terms like “(an) apple”) and property names (properties or qualities such as “redness”) because they are all general nouns. Material names are partitive nouns. Substance names are articulative nouns and property names are abstract nouns. These general nouns are contrasted with particular nouns such as proper names.¹

For Strawson, a particular is an instance of a kind designated by a general term. He remarks that “This truth is too old to need the support of elaboration”.² Furthermore, a particular has a criterion of distinctness and a criterion of identity. The criterion of distinctness means that one can distinguish one instance of a kind from other instances of

¹ Unless otherwise noted, all of the positions I attribute to Strawson can be found in “Particular and General”.
² Strawson, “Particular and General” pg. 136
the same kind. The criterion of identity means that one can recognize the same instance of a kind at different times.

These two criteria for particulars demonstrate why mass nouns cannot designate particulars. It is not metaphysically possible to distinguish one instance of water from other instances since there is no built in individuation (nothing counts as one water whereas something counts as one apple). If it is not possible to tell what one instance is, then it is not possible to differentiate one instance from other instances. Hence, the stuff designated by mass nouns does not have a Strawsonian criterion of distinctness. Furthermore, since mass nouns do not have individuation, it is impossible for the stuff they designate to have a Strawsonian criterion of identity.³ If nothing counts as one instance of water, then we cannot identify the same instance over time.

Strawson also notes that substance names in contrast to material and property names do function as “an indefinite designation of an individual instance.” “An apple” means the same thing as “an instance of an apple”. This is not the case for material names or properties. Gold is not the same as an instance of gold and redness is not the same as an instance of redness. This further supports Strawson’s idea of categorizing mass nouns as not designating something particular.

Since mass nouns are non-particular according to Strawson’s criteria, Strawson instead treats them as designating universals. Furthermore, he uses them as a way to introduce particulars into thought. He states that sentences using materials names can occur at a pre-individuative level of thought such as “There is water here” or “Snow is falling”. These sentences do not introduce particulars and are called “pre-individuative

³ The way Strawson is using this term is specific to him. There are broader ideas of what criteria of identity are which will be examined later. This is why I state that mass nouns cannot have a Strawsonian criterion of identity.
sentences” or “feature-placing” sentences. This provides the basis for introducing particulars. It is possible to replace these sentences with phrases such as “this snowfall” or “this puddle of water”. These phrases introduce particulars. “(A) snowfall” and “(a) puddle” are substance names and not material ones. According to Strawson, these feature-placing phrases are incomplete without saying something about the particular such as “This puddle of water is shallow”.

Strawson notes that the basis for a criterion of distinctness is already present in feature placing sentences since it is possible to say “there is water here and here” or “it snowed twice today”. These use multiplicity of the material name which when discussing particulars becomes the criteria of distinctness for substance names. There is water here and here becomes there are two pools of water once particulars are introduced. Similarly, it snowed twice today becomes there were two snowfalls. The ability to determine that there is water in two locations or snow was falling at two different times becomes the ability to distinguish different instance of the same kind once particulars are introduced.

I believe the kindest way to interpret Strawson’s theory is as allowing for a non-particular level of existence which stuff occupies. Strawson is often interpreted as claiming that particulars are ontologically basic. “Ontologically basic” in this case is commonly understood as being the basis of reality or the primary constituents which make up the world. However, interpreting Strawson in this fashion leads to difficulties given his belief that pre-individuative sentences which are about the world do not introduce particulars. If we were to understand Strawson as suggesting that particulars
are the basic material which the world is composed of, then pre-individuative sentences could not be about the world because they do not use particulars.

Rather than using the term “ontologically basic”, Strawson actually uses the term “ontologically prior”. In using this term, Strawson is talking about material bodies being ontologically prior to other particulars in terms of identification and individuation. They are basic particulars. By “ontologically prior” or “basic particular” Strawson means that they are the framework for our conceptual scheme.\(^4\) All other concepts of types of particulars rest on the concepts of material bodies and persons.

It is important to note that he is not asserting that particulars in general are basic but that material bodies and persons are basic for all other particulars.\(^5\) I believe some of the misunderstanding has come from the fact that Strawson occasionally drops the “for all other particulars” and just calls material bodies basic or ontologically prior.\(^6\) However, as we have seen, if Strawson actually meant that these particulars were ontologically and conceptually prior to material names, then his views would be contradictory. He would be claiming that feature-placing sentences involving stuff are the way that we get to more complex sentences involving particulars and yet also that particulars are the framework for our conception of stuff. Hence, the most coherent way to interpret Strawson is that he is arguing for the primacy of material objects and persons in our conceptual scheme for particulars but stuff is ontologically and conceptually prior to both material objects and persons.

\(^4\) Strawson, *Individuals*, Pg 50
\(^5\) Ibid, Pg xv-xvi
\(^6\) Ibid, pg 28
Section 1.1.1: Problems with Strawson’s Solution

The main problem which arises with Strawson’s solution involves the distinction between mass nouns which designate a kind and mass nouns which designate a concrete instance. Since Strawson treats mass nouns as designating feature universals and as general terms, sentences which use them involve universals. Hence, “snow is falling” is talking about the universal “snow”. This creates a problem. First of all, it suggests that there is such a thing as a concrete universal. Secondly, it suggests that the universal itself is falling, not just an instance of it, which leaves us with some fusion of all snow across space and time falling in one location. Hence, “snow” cannot be a universal in this sentence.

This problem is created by the fact that Strawson does not separate mass nouns from kind terms. “Snow” can designate actual concrete snow or it can designate the kind snow. In the latter case, it makes sense to treat this as a universal, the same way you would with count nouns. For example, “dog” in “dog is man’s best friend” involves a universal. In the same way, “water” in “water is H2O” involves a universal. This does not mean that every instance of the word “water” or “dog” should be treated as designating a universal, however.

Finally, it is worth noting that Strawson, when discussing mass nouns, only examines pre-individuative sentences. Pre-individuative sentences do not exhaust the types of sentences in which mass nouns appear. Examining different types of sentence which use mass nouns might provide us with other concerns which need to be addressed. A satisfactory treatment of mass nouns will have to examine sentences where mass nouns appear to be used in other ways, such as “this water is cold”.
Section 1.2.0: Quine’s Solution

Quine uses the terms “bulk terms”, “mass terms” and “collective terms” for what I call mass nouns, although, there is a minor distinction. Quine includes not only nouns in this category (“red” is an example of a mass term for Quine). Quine separates mass terms from other terms by the criterion that mass terms refer cumulatively, meaning that the sum of any parts which are water is also water. Quine believes that when we first learn mass terms they do not fit into a singular/general dichotomy. However, they are retrospectively placed into the singular/general dichotomy after we begin to learn individuation. Furthermore, mass nouns provide the basis for our understanding of abstract singulars.

This distinction of treatment for mass terms is based on Quine’s criteria for singular and general terms. Singular terms, according to Quine, have only one grammatical form and do not take any article in English. They purport to name just one object and do not divide their reference. General terms admit the definite and indefinite articles and plural endings and can be true of any number of objects. For Quine, general terms generally occur after the copula in sentences and singular terms occur prior to it.

Mass terms have only one grammatical form and do not take the indefinite article. They also do not divide their reference. However, Quine notes that they do not always purport to name just one object. Given the criteria for singular and general terms and

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7 All positions attributed to Quine can be found in “Speaking of Objects” unless otherwise stated.
8 Quine continually uses “red” as an example of a mass term in Word and Object. For example, see page 104.
9 Quine, Word and Object, Pg 91
10 Ibid, Pg 90
11 Ibid, Pg 97
12 Ibid, Pg 91
how mass terms do not fit clearly into either category, Quine distinguishes between singular and general for mass terms by where the copula is.

Once the mass nouns are placed into the singular/general dichotomy, every occurrence of the term before the copula is singular and every occurrence after the copula is general. Hence, sentences like “Water is a liquid” are treated equivalent to “Agnes is a lamb.” Sentences like “This puddle is water” are treated like “This apple is red”. In the first sentence, “water” is to be understood as referring to a scattered particular. The term “water” refers to all the water in the world when used before the copula. In the second sentence, the term “water” is to be read as “a bit of water”. In this case, “water” is true of each part of the world’s water excluding parts too small to count, namely atoms.13 In this same fashion, when the term “water” is used within a larger phrase, such as “pool of water” it should also be seen as a general term.

For most sentences, the placement of the copula will suffice to demonstrate how the term “water” should be read. However, there is an exception, notably in the expressions “this water” and “that water”. In these expressions, “water” is a general term regardless of where the copula is in relation to the mass noun. In this case, “water” amounts to “body of water”.14 This again matches with Quine’s belief about general terms where the term “apple” in “this apple is red” is a general term because it divides reference. From using terms such as “this water” or “that water” we can get to using the term “the water”. “Water” in the term “the water” should be treated in the same fashion as with “this water”. It stands for “body of water” and is a general term.15

13 Ibid, Pg 98
14 Ibid, pg 101
15 Ibid, pg 102
Section 1.2.1: Problems with Quine’s Solution

Quine, like Strawson, does not distinguish between mass terms and kind terms. When “water” is a singular term, it refers to all the water in the world. When “water” is a general term, it is property which an object has, specifically the property of being “a bit of water”. When a mass term is combined with “this”, “that” or “the”, it is a general term to be understood as “body of water”. This exhausts the ways in which “water” is used for Quine. However, this means that there are no kind terms for mass nouns on their own. “Body of water” and “bit of water” can be seen as kind terms which have instances, specifically this body of water or that bit of water. This does not mean that mass nouns are ever treated as kind terms in their own right. At most, they are stand-ins for a more complex kind term such as in the examples above. This seems unreasonable since some things are necessarily true or true by definition about water itself, such as it being liquid and it being H$_2$O. Sentences such as “water is liquid” are not contingent and are not about bits or bodies of water. What they are expressing is not something about an object in the world but something about the kind water. It is also not about bits of water or bodies of water but about water itself. It is not necessary for water to actually exist for them to be true. It is true by definition. This means in sentences such as “water is H$_2$0”, “water” should designate the kind water and not bodies or bits of water.

Also, understanding mass terms before the copula as singular may have undesirable effects for sentences such as “Man is mortal”. If one were to treat it in the same fashion as “water is liquid” it would appear that it is a singular term possibly referring to all men in the world or to a specific man named “Man”. Quine may not have a problem with “man” being a singular term which refers to all men in the world, despite
the fact this would break his distinction about singular terms purporting to refer to one object. However, “man” in the above sentence is not commonly understood as a singular term.\textsuperscript{16} Hence, for many people it could be seen as an undesirable consequence of Quine’s theory that “man” would be treated in this fashion.

Furthermore, there is a strong argument to be made that “man” and also “water” cannot be singular terms referring to all men/water in the world in the above sentences. This is because the truth conditions of these sentences do not rely on men or water existing. They are true by definition and hence do not rely on existence. In these sentences, “water” and “man” designate kinds rather than a concrete object. Hence, “man” and “water” may not always be thought of as singular terms in sentences where they occur prior to the copula.

Instead of treating “man” as a singular term, the common understanding of the sentence “Man is mortal” is that “man” means the kind \textit{man}. What “man” in “Man is mortal” means is any instance of the kind. It is describing a common property of all instances and not talking about any particular instance. It seems preferential to treat “water” in “water is liquid” in the same way because “water is liquid” has more in common with “man is mortal” than with “Mama is big.” In both cases, the grammatical subject can also be used as a predicate in other sentences and there are logical inferences based on this relationship. For example: Socrates is a man. Man is mortal. Therefore, Socrates is mortal. This argument can be paralleled using mass nouns. This puddle is water. Water is fluid. Therefore, this puddle is fluid. There is no similar argument which uses the sentence “Mama is big.” This makes it more likely that the sentence

\textsuperscript{16} It has been pointed out to me by Professor Laycock that one can read Quine’s chapter on indeterminacy of translation as suggesting that “man” can be read as “all men in the world”.
“Water is fluid” is using “water” as a kind term and not to refer to all the water in the world. This does not mean that every sentence involving the word “water” is about the kind nor that “water” always designates the kind and never some concrete instance.

A further problem occurs when one considers Quine’s suggestion that “water” in “is water” is a general term and should be understood as “is a bit of water”. While “a bit of water” may be a general term, “water” within that general term does not have to be. If one were to say that “this leg is a part of Agnes”, “Agnes” is still a singular term. Given Quine’s beliefs, there is no reason to prefer treating “water” differently in this case than “Agnes”. Given that “Agnes” is always a singular term, then “water” should also always function as a singular term. Sometimes we may use it to stand in for a general term, specifically when “water” stands for “is a bit of water”. However, this would be just a façon de parler.

A further problem for Quine is that the exact opposite argument can be made, namely that “water” is always a general term according to Quine’s own rules. By treating “water” as meaning “all the water” when used as a singular term, Quine contradicts what he says about using mass terms with the word “the”. When a mass term is preceded by “the”, the mass term is a general term. This treatment suggests that “water” in “is water” is singular and that “water” in “all the water in the world is fluid” is general. These sentences use the term “water” in two different ways yet the first sentence is supposed to be equivalent to the second sentence. Furthermore, in sentences with the term “the” followed by a mass term, the mass term should be understood as “body of x” where x is the mass term. This understanding will again be susceptible to the point raised.

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17 This argument has already been made by Prof. Laycock in “Some Questions on Ontology” but is worth re-stating.
above where the mass term can still function as a singular term within a general term. “The body of Agnes” still has “Agnes” as a singular term. Therefore, according to Quine’s views, mass terms should always be general terms and never singular terms yet also always be singular terms and never general.

There is a further problem with thinking that “water” when used as a singular term refers to all the water in the world. The amount of water in the world is constantly changing due to the water cycle and human consumption. The problem rests in the fact that water has no form. With common individual objects, the identity conditions of the object are related to the form of the object. Hence, I can stay the same person despite the fact that all my matter has changed in the past 7 years. What allows me to remain the same person is that I have maintained the same form. However, water has no form and hence in order to stay the same water must remain the same matter. In remaining the same matter, the water must continue to be the same amount. If Quine treats all the water in the world as a single scattered object, then when I utter “water is liquid” at two different times I will be referring to two different objects. This is because the amount of water is not the same at the two different times. Therefore, the same sentence uttered at two different times will be referring to two different things. Hence, “water” cannot be treated like “Agnes” since “Agnes” purports to refer to only one thing over time, while “water” can never refer to the same thing over time.

A final problem with treating “water” as “all the water” in the world has to do with how the reference is divided. Quine says that “pools and glassfuls are sundry parts of all the water in the world”¹⁸. He takes this to mean that smaller things (parts) add together to become a bigger thing (all the water in the world). However, care is needed

¹⁸ Quine, *Word and Object*. Pg 121.
here. There are two ways to understand the term “pool of water”. In one case, pool is the thing being talked about and consisting of water is a characteristic of this pool. In the other case, the water which constitutes the pool is what is being talked about. In most conversations, this distinction does not matter since the pool has many of the characteristics of the water such as being warm or cold, clean or dirty. However, this is not always the case. More obvious examples occur when talking about a thermos of coffee. One can say that “this thermos of coffee is cold”. This can mean two things. It can mean “amazingly, the thermos is cold while the coffee may be hot” or “disappointingly, the coffee inside the thermos is cold regardless of the temperature of the thermos”. When the properties of the container and the liquid differ, it is important to know which thing is being referred to by the term “thermos of coffee” since the truth conditions change depending on which sentence is expressed. With the term “pool of water”, separation of properties may also occur. One can say that “the pool of water is deep”. In this case, one must be talking about the pool and not the water since how can water be deep? A body of water may be deep but not water itself. Water does not have shallowness or depth as characteristics.

Since we have seen that “pool of water” may mean the pool or it may mean the water which the pool is made of, it is important to determine which Quine means when he says that pools and glassfuls of water are parts of all the water in the world. There is a problem if he means to speak of the pool when he uses the term “pool of water”. A pool is not part of water. It is neither bigger nor smaller than water. Rather the water in the pool is less than all the water in the world. Again look at a different example, a bottle of water where the term “bottle of water” refers to a bottle which contains water is not part

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19 Hacker, P.M.S. “Substance: The Constitution of Reality”, pg 253
of water. It is part of all the bottles in the world but not all the water in the world. The water in the pool and the water in the bottle are parts of all the water in the world.

Perhaps Quine wants us to understand “pool of water” as the water that the pool is made of. This could be suggested by his using the term “glassful” which suggests an amount rather than “glass” which suggests a thing. However, this is not without problems also. The water in the pool is not a thing or at least has not been proven to be a thing by Quine. The water in the pool is not obviously a particular. This means that you may have several non-objects which are parts of a scattered object. The scattered particular is composed of non-particulars. This may be possible but some account must be given of how. If the water in the pool is a particular, then you start to develop a regress whereby while not being scattered at the moment, it must have the possibility of being scattered. This is because the water remains water even if it is separated into two pools. Hence, it must be composed of further particulars which have the possibility of being scattered. This would eventually lead to a theory like Cartwright’s or Chappell’s where the water in the pool is divisible in an uncountable number of ways. As we will see in the next section, these theories are not without their own problems.

In summary, Quine’s approach of separating mass terms into singular and general terms by placement of the copula and usage of the words “this”, “that”, and “the” is highly flawed. In the end, it appears that mass terms must be always singular yet always general according to Quine’s criteria. Also, Quine has not distinguished between mass terms used to designate a concrete substance and mass terms when used as a kind term. Furthermore, there are implications to Quine’s view which may be seen as undesirable to some philosophers such as a different understanding of the word “man”.
Section 1.3.0: Chappell’s and Cartwright’s Solutions

I have grouped Chappell’s and Cartwright’s solutions together because I believe that Cartwright’s solution is the more evolved version of Chappell’s. However, I will examine both separately and then demonstrate why Chappell must believe Cartwright’s elucidation to be true. Furthermore, the two solutions are grouped together because they both are susceptible to the same problems.

Chappell starts out his theory by saying that one can view mass terms either as designating concrete particulars which Quine does or as designating universals which Strawson does. He states that he agrees with Strawson in that mass terms designate universals for some of the same reasons which I stated above as to why Quine’s solution is incorrect. Also, Chappell uses the sentences “Gold is a kind of metal” to imply that gold must also be a kind.

This means that gold is a universal term which by definition has instances. These instances, for Chappell, are parcels. “Parcel” is Chappell’s term which provides a count noun which is true of all stuff. Parcels are indifferent to form but each parcel must have some form. Furthermore, parcels lack unity. One parcel can be broken down into many pieces but remain the same parcel. It can also be merged with other parcels and still be the same parcel. The term “parcel” functions as a mereological fusion for Chappell. Furthermore, “parcel” satisfies two criteria for Chappell. The first criterion is an identity criterion: with any sentence “this is identical to that”, where “this” and “that” refer to stuff, “this parcel is identical to that parcel” is also true. The second criterion is an individuating criterion: all parcels of stuff can also be called other individuating phrases such as “pieces”, “lumps” or “bits” and vice versa.

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20 All positions attributed to Chappell can be found in “Stuff and Things”.
Chappell is very clear that while all stuff is designated by mass nouns, not all mass nouns designate stuff. The only mass nouns that Chappell is interested in are the ones which designate stuff. The criteria which he uses to differentiate mass nouns which designate stuff from mass nouns which designate other things such as characteristics are based on the particular instances of these kind terms. A parcel of stuff has the properties of collectivity and dissectivity. Collectivity means that one parcel of a certain kind can be combined with other parcels of the same kind to form a bigger parcel of that same kind. Dissectivity means that a parcel of stuff can be divided into two or more parcels of the same stuff. These two properties distinguish stuff and the mass nouns that designate them from all other substances and mass nouns.

For Chappell, a mass noun is a singular term when it is referring to the kind, such as in the sentence “Water is liquid”. When it is referring to actual concrete instances, the mass noun actually means a parcel of the stuff designated by the mass noun. Hence, when someone utters a sentence such as “Snow is falling” what is meant is “A parcel of snow is falling”. Anytime a sentence is referring to concrete stuff, it will be implicitly stating that a parcel of stuff is x, where x is a predicate. Furthermore, while the term “gold” in the phrase “this gold” is general, the overall phrase is singular and hence can be used to refer.

Cartwright appears to take a very similar stance. She believes that mass nouns are universal sortal terms and instances of these mass nouns are quantities in a special usage of the word “quantity”. The term “gold” does not individuate gold but it does individuate quantities of gold.

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21 All positions attributed to Cartwright can be found in “Quantities” unless otherwise noted.
Cartwright makes this argument by creating an analogy with plural nouns and sets. When someone talks about the cats here being the same as the cats there, there are several valid inferences to be drawn. First of all, they are talking about a certain number of cats although which number is not known. Secondly, the truth of this sentence can be known without adding a specific individuating phrase such as “breed” or “litter” in front of “cats”. Cartwright suggests that although we do not know how many cats there are, we do know that there is one set of cats and this set is the same here and there. Cartwright holds that the term “set” is “tailor made” to say what there is one of in identity statements and identity statements require there to be one of something.

In the same way that the term “cat” individuates sets of cats, “gold” individuates quantities of gold. In a statement which talks about gold here being the same as gold there, several inferences which are comparable to the inferences involving plural count nouns can be drawn. According to Cartwright, in understanding that there is gold, we understand that there is an amount of gold, although we do not know what the amount is. Also, it is not necessary to place a specific individuating phrases such as “veins” or “lumps” in front of the term “gold” to understand whether the gold is the same or not. This means that there is a single individuating phrase which is non-specific and can be placed in front of all mass nouns. Hence, in the same way that we understand that the cats are the same because the set is the same, we understand that the gold is the same because the quantity (understood in a sense which is similar to Chappell’s parcel) is the same. Quantity in this sense is to be understood as the one thing which stuff constitutes. Cartwright states that a quantity must be theoretically measurable and comparable in
amount to other quantities. This means that Cartwright is only talking about mass terms which are measurable (not snow or sunshine).\textsuperscript{22}

Cartwright holds, like Chappell, that quantities are form-indifferent and have collective and disective properties. The main difference between them is that quantities are not fully disective according to Cartwright. At some point, one reaches an amount where it is not clear whether it is a quantity or not a quantity. A quantity of water is water and a quantity of a quantity of water is water but that does not mean that quantities can be constantly broken down. At some point, it will questionable whether it is appropriate to call the amount “a quantity” and at this same point, it will be questionable whether it is water.

Section 1.3.1: Problems with Chappell’s and Cartwright’s Solutions

The first problems to note are with Chappell’s treatment. This problem will lead Chappell to Cartwright’s stance. Just as quantities cannot always be broken down into further quantities, parcels cannot always be broken down into further parcels. There will be a case where it is questionable whether the amount is sufficient to be a parcel. Hence, Chappell will have to accept Cartwright’s idea that there are borderline parcels/quantities and that stuff is not wholly disective. At some point, the amount becomes too small to be considered a parcel of stuff and to be stuff it is necessary that it is a parcel of stuff.

Cartwright, herself, raises several objections to Chappell’s theory.\textsuperscript{23} The main objections have to do with Chappell’s individuating criterion. This criterion states that

\textsuperscript{22} It is important to note that a quantity must be theoretically measurable, meaning that it is metaphysically possible to measure it. This ensures that stuff which is pragmatically unmeasurable but in theory could be measured is still stuff. Hence, Cartwright’s point is a metaphysical one and not an epistemic one.

\textsuperscript{23} Cartwright’s objections can be found in “Chappell on Stuff and Things”.
being a lump, piece, ring, or …of stuff is sufficient and possibly necessary for being a parcel of stuff. She believes it is impossible to fulfill this criterion while fulfilling Chappell’s identity criterion. This criterion she understands as the truth of “this is the same gold as that” is necessary and sufficient for the truth of “this parcel of gold = that parcel of gold”. Furthermore, she believes that whatever technical term (parcel for Chappell and quantity for Cartwright) which is invented to individuate stuff should fulfill the identity criterion “if generalized with sufficient caution”.

Cartwright first points out that there are cases where one may want to use the term “parcel of gold” where no other individuating phrase would apply. One such example would be if the gold was dissolved into a solution. There is no term such as “vein”, “lump” or “piece” which applies to the dissolved gold. However, there is still a parcel or quantity of gold. If Chappell insists that there is not in fact a parcel of gold when gold is dissolved, then he begs the question of whether the second criterion is a valid one. This means that being a piece, lump, ring or …of gold is not a necessary condition for being a parcel of gold.

Cartwright also argues that not every lump, vein, ring or … of gold is a parcel of gold and hence being a lump, vein, ring or …of gold is not a sufficient condition for being a parcel of gold. This argument highlights the same issues I raised earlier with Quine and pools of water. A pool of water is not identical with the water in the pool. In the same way, a ring of gold is not identical with the gold in the ring. The ring may be coated with a black substance and hence the ring would be black but the gold is not. The gold has properties that the ring does not, such as having an atomic structure, and the ring has properties which the gold does not, such as being circular. Hence, the ring of gold is
not a parcel of gold. The gold in the ring is a parcel of gold. This same argument can be made for lumps, veins and other common individuating phrases. Hence, being a lump, vein, ring, or other individuating phrase of gold is not a sufficient condition for being a parcel of gold because being a lump of gold is not being a parcel of gold at all; being gold in a lump is being a parcel of gold.

Given Cartwright’s objections, I believe that Chappell would reject the individuating criterion. Instead, I think he would follow Cartwright’s lead and use “parcel” in the same way that she uses “quantity”. This seems to be reasonable because he claims that he wants to use “parcel” like “quantity” himself.\textsuperscript{24} use the term “parcel” in the same way in which Cartwright actually uses the term “quantity”, which is what he stated he was doing to begin with. From now on, I will speak of problems with Cartwright’s solution with the understanding that what I say also applies to Chappell’s.

There are further problems with Cartwright’s treatment. First of all, Cartwright assumes that if a sentence has a form which confirms identity, then the identity must be confirmed for a single object.\textsuperscript{25} For example, “the cats today are the same as the cats yesterday”, must be talking about a single object, namely a set. It is the set which is identical. I believe Cartwright’s need to have a single object which is identical stems from the idea that identity relations are one to one relations. Hence, the logical identity relation (\(=\)) should not be used unless it is a one to one relation. This stance, I believe, is to comply with Leibniz’s Law which is designed for individual objects. Even if it is necessary for individual objects to be on either side of the identity relation, one does not have to follow Cartwright and thereby talk of sets and quantities as flanking the identity

\textsuperscript{24} Chappell, “Stuff and Things” pg. 66.
\textsuperscript{25} Cartwright, “Quantities” Pg 27.
relation. An alternative approach would be to change the logical translation of identity statements involving plural count nouns and mass nouns so that they do not use the identity relation. For the rest of this section, I will show why using sets and quantities is undesirable. and therefore add support to the idea of changing the logical translation instead.

The first problem occurs when a mass noun is used with the term “the” preceding it. “Gold” means “quantity of gold” when the sentence is about a concrete instance. Hence, the sentence “The gold here is pure” become “The quantity of gold here is pure.” When one applies Russell’s theory of definite descriptions, the sentence becomes “there is exactly one quantity of gold here and it is pure.” From this you can infer “there is exactly one quantity of gold here.” Since gold is disective, this is not the case. Within a single quantity, there are numerous other quantities. Hence, when one uses the term “gold” one cannot be talking about only one thing. At best, one is talking about quantities of gold or the largest quantity of gold which fits the rest of the description, in this example, “being here”.

If one is talking about quantities of gold, then it is no longer the case that one is talking about one thing. It is no longer a one to one relation which is being stated in an identity statement involving stuff. This is undesirable for Cartwright since she believes that there must be one thing which is identical. Cartwright, however, can reply that the identity statement is talking about the set of quantities of gold. It is this set which occurs on either side of the identity relation. Unfortunately, sets will again be susceptible to

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26 This argument is derived from one in Laycock’s Words Without Objects.
27 There may be an argument which could state that if the amount of gold was the smallest possible to count as a quantity then there is exactly one. However, this exception does not refute the argument since I am looking at logical inferences. For the logical inference to be valid, it would have to always be the case that there is exactly one quantity of gold here.
Laycock’s argument which has been stated previously. If one says “The cats here are purring”, then it becomes for Cartwright, “The set of cats here are purring” which becomes “there is exactly one set of cats here and it is purring.” One problem is that there is more than one set of cats here. If a set has 3 members, then there are 7 subsets also. These subsets contain none or some of the members of the original set but not all of them. This means that there is more than one set of cats here. There is only one set which contains all the cats. Hence, Cartwright must mean the largest set of cats here.

If Cartwright does mean the largest set of cats or the largest quantity of gold which fits the rest of the description (being here), then there are further problems. First of all, this seems to be an unnecessarily complex way of saying “all cats here are purring” or “all gold here is pure”. There needs to be some argument why introducing sets and quantities is logically and metaphysically clearer. Perhaps, it is because talking of the largest set or quantity maintains the one to one relation of identity statements.

However, maintaining the one to one relation comes at a cost. Cartwright is quite clear that the amount in a quantity or the members of a set cannot change. The quantity is defined by the amount and a set is defined by its members. It is not possible for the membership or amount to change because then one is talking about a different quantity or a different set. However, if “gold” means “the largest quantity of gold” then its amount is constantly changing. This will have the same problems which Quine’s solution had. Just like how “water” cannot refer to all the water in the world, “gold” cannot refer to the largest quantity of gold.

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28 This does not mean that the actual amount cannot change through temperature variations or being placed under pressure but rather that nothing can be added or taken away from it. If more material is added, the largest quantity prior to the addition stays the same amount that it was and more quantities are created.

29 Cartwright, “Quantities” Pg 32.
Also, understanding “gold” as “the largest quantity of gold” is problematic when one realizes that there is a difference between identity and ceasing to be for stuff. Ice is the same ice as long as all of it persists. This is again because ice has no form to create its identity conditions. Since there is no form, the ice must rely on being the same matter in order to be the same ice. This is not problematic for Cartwright. The largest quantity of ice at T1 = the largest quantity of ice at T2. However, the ice has not ceased to be until all of it has ceased to be. This means that the ice exists as long as any quantity of ice exists not necessarily the largest quantity. There is no way to understand this when one attempts to treat mass nouns as individuating the largest quantity of stuff designated by the mass noun. For a single object, being identical and continuing to exist is the same thing. For a cat to persist, it must be identical to itself. Hence, if one wants to understand “ice” as “largest quantity of ice” then being identical and continuing to exist are the same thing. The ice exists as long as the largest quantity of ice exists. However, this is obviously not true. The ice has not ceased to exist until all of it has. This is not the same thing as some of the ice ceasing to exist. Some of the ice ceasing to exist is sufficient for the largest quantity of ice to cease to exist. This problem will occur any time one wants to treat the ice as an individual object.

Hence, it seems that quantities and sets are not desirable when it comes to discussing mass nouns. Cartwright has to either use the plural forms “quantities” and “sets” in identity statements rather than maintain a one to one relation or to deny that there is a difference between identity and ceasing to exist for stuff. This means that not only are there significant drawbacks to maintaining the one to one relation for identity

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30 This argument is adapted from Laycock’s “Words Without Objects”. In this book, Laycock uses this argument to demonstrate why “the ice” cannot be a semantically singular description.
statements, one must also deny obvious truths about the nature of stuff in order to do so. This suggests that perhaps an alternative translation of identity statements into logical form is required.
Chapter 2: The Beginnings of a New Solution

Section 2.0: Similarities between Mass, Plural, and Singular Count Nouns

Along with understanding the problems with previous treatments of mass nouns, it will be beneficial to provide an examination of how mass nouns relate to singular and plural nouns. One way to do this is by examining what grammatical rules there are for different uses of the nouns. Grammar often reflects how we understand the terms being used. By examining the similarities and differences between mass, plural and singular nouns, we will have a better understanding of how mass nouns function in sentences and of what they designate. The grammatical rules will lend support to understanding mass nouns in a certain way. However, the grammatical rules may be an idiosyncrasy of the English language so further argument will be needed. This section is designed to compare and contrast the grammar of mass, plural and singular nouns.31

First of all, there is a similarity between all three types of noun, singular, plural and mass. They all can be preceded by the term “the”. Examples of this are “the apple”, “the cattle” and “the water”. This suggests that all three can function as definite descriptions but perhaps not with the logical form suggested by Russell. Furthermore, all three types of nouns can be preceded by possessives such as “my” or “our”. This further supports the idea that all three types of nouns are used as definite descriptions. They also can all be preceded by the words “any” or “no”.

31 All the following observations can be found in Laycock’s “Words Without Objects” and Hacker’s “Substance: The Constitution of Reality”. I re-state them here to elucidate why mass nouns could be seen as neither plural nor singular and to provide us with a start for a closer examination of how mass nouns work and what they designate.
The next similarity is between plural and mass nouns. In both cases, the noun can be preceded by the quantifiers “some” and “all”, for example, “some apples” or “all water”. The singular noun cannot. One cannot use these quantifiers with singular nouns because singular nouns are *singular*; they designate only one object. Plural nouns are obviously not singular and this grammatical point also suggests that mass nouns are also not singular.

Another grammatical point which suggests this is that both mass and plural nouns can be preceded by phrases designed to quantify amounts or numbers. For example, one can say “there are enough apples in the pie” or “there is enough water in the pool”. Other phrases include: “lots of”, and “a good deal of”. Singular nouns cannot be immediately preceded by these phrases. They require the addition of words such as “the”. For example, “A good deal of the apple is rotten.” Adding the word “the” changes the truth conditions and logical translation of the sentence significantly and will be dealt with in chapter 3. The inability to use “lots of”, “enough” or “a good deal of” immediately prior to a singular noun is because singular nouns designate only one thing. This supports the idea that mass nouns are not singular, meaning they do not designate a single object.

This does not mean that mass nouns are plural, however. Both singular and mass nouns are typically followed by “is” in sentences, whereas plural nouns are followed by “are”. Plural nouns are followed by “are” because they typically designate more than one thing and the conjugation of the verb “to be” dictates that when more than one thing is designated the proper form is “are”, such as “we are” or “they are”. This suggests that mass nouns do not designate more than one object either.
A similar pattern is found when examining demonstratives and nouns. Singular and mass nouns are preceded by “this” and “that”. Plural nouns are preceded by “these” and “those”. Again, this is due to the fact that they typically designate more than one object. This adds support to the idea that mass nouns are not plural; they do not designate more than one object.

This appears to leave us with a contradiction. Grammar suggests that mass nouns do not designate a single object but also do not designate more than one object. Perhaps mass nouns do not designate objects at all. Furthermore, what they designate should not be thought of as plural or singular. What the above grammatical points suggest is that stuff is actually innumerable. It is not countable and the reason why mass nouns are neither singular nor plural nouns is because what they designate is innumerable.

There is one further grammatical point which supports this idea. Both singular and plural nouns can be preceded by numbers, one, in the case of singular nouns and any number higher than one in the case of plural nouns. Furthermore, despite not being preceded by “one”, plural nouns can be preceded by “one of the”. This suggests that there is individuation given with both plural and singular nouns; to understand the word “apple”, one must know what count as one apple. To understand the word “cattle” it is not enough to know what counts as cattle but also what counts as one of the cattle. Nothing counts as one water or one of the water. This suggests that what mass nouns designate is not countable and hence is neither one thing nor more than one thing. The only way that stuff cannot be one thing nor more than one thing without a contradiction is if stuff is not a thing at all. Hence, stuff is innumerable stuff.
Section 2.1.0: Truth conditions with the indefinite article

While grammatical rules suggest that mass nouns are innumerable, they do not guarantee it. It may just be an idiosyncrasy of the English language that created the grammar rules as they are. This means it is worthwhile to examine other ways that demonstrate that mass nouns do not designate individual objects. One of these ways is by examining truth conditions for sentences using mass nouns and contrasting them with sentences using plural or singular nouns. To understand what is meant by a sentence it is necessary to understand what must obtain in the world for that sentence to be true. What must obtain in the world for a sentence to be true are the sentence’s truth conditions. By examining the truth conditions for sentences, we will be able to see a) what a person must comprehend in order to understand the sentence and b) what the different types of nouns designate and how they do so.

I will begin by examining statements using the indefinite articles “a” and “an” in existential sentences. In existential sentences, these articles are designed to talk about a single object although they do not refer to any object in particular. Sentences using the indefinite articles most commonly involve normal count nouns such as “apple” or “cat”.

Statements with the indefinite article “a” followed by a singular noun such as, “A cat is on the table” are true if there is at least one cat which is on the table being denoted. When using the term “a” with singular nouns, the statement will be true as long as at least one object designated by the singular noun fulfills the predicate of the statement. The “a” directly limits the singular noun being used. By “directly limits” I mean that if I were to ask the question, “What is there at least one of which fulfills the predicate?” the answer
would be the singular noun in the statement. The indefinite article provides a limitation on how few cats there can be on the table in the example given above.

In the case of mass nouns, it is grammatically incorrect in English to use the indefinite article immediately followed by a mass noun. However, in colloquial conversation this expression does occur, as in “A water is on the table.” In these cases, the term “water” which is normally a mass noun is being used as a singular count noun. It is important to determine what this singular count noun is designating. It may be possible that water is somehow being individuated in this sentence. If this is the case, stuff is not innumerable but rather a single thing.

For the statement, “A water is on the table” it is not possible to determine what the truth conditions are without it being placed in a context. I cannot know whether what the speaker intends to express is true without knowing the context of the statement. This means that even in colloquial conversation, “water” does not take the indefinite article in the same way that “cat” does. If someone says the statement above, then it is reasonable to ask for clarification as to what the term “a” directly limits. If I were in a restaurant, then “a water” probably means “a glass of water”. In this case, the term “a” provides a limitation to how few glasses of water there can be on the table, meaning the truth conditions would be that there is at least one glass of water on the table. If I were at a sports game, “a water” probably denotes “a bottle of water”. If one were to ask, “What must there be at least one of which is on the table?” the answer would be bottles of water. In this case, the truth conditions would be there is at least one bottle of water on the table. The “a” in both these cases directly limits the singular noun which precedes “of water” in
the statement. “A” in an existential sentence means that there is at least one of that object which contains water and fulfills the predicate of the statement.

Another suggestion is that the context is not important and the more general phrase “a container of water” will suffice. Even if this is the case, the “a” directly limits the number of containers of water not the water itself. Furthermore, while the suggestion that the phrase can be broader works with the term “water”, this may not be the case with all mass nouns used as count nouns. In all cases where mass nouns are being used as count nouns immediately preceded by “a” or “an”, the indefinite article will be directly limiting a further count noun such as “container” or “piece”. Whenever a mass noun is being used as a count noun with the indefinite article, there will be an unstated individual object which is directly limited by the indefinite article. Furthermore, the stuff designated by the mass noun is not individuated in these contexts. The unstated individual object which precedes “of x” where x is the mass noun, is individuated. It is only when the context makes it obvious which individual object is individuated that the singular noun referring to it can be removed from the statement explicitly said. Knowing which object this is will be necessary to determine the truth conditions for that statement. In order to understand the term “a water”, it is necessary to understand which individual object is contextually being referred to in the statement.

In terms of plural nouns, it is possible to talk of “one beans and two fries” in certain contexts, such as a restaurant setting.\(^\text{32}\) In this case, the plural noun is again being used as a singular count noun in the same fashion that mass nouns are used as singular count nouns. What are individuated are boxes or orders of fries and beans. In the case of the indefinite article, one could say “can I get a scrambled eggs?” where again the plural

\(^{32}\) I am indebted to Professor Laycock for pointing out this possible usage of plural nouns.
noun is being used as a singular count noun and what is individuated is plates or orders. The indefinite article directly limits the number of orders or plates and not the scrambled eggs.

Well-formed sentences in English cannot contain a plural or mass noun used as such immediately preceded by the indefinite article. This means that while the indefinite article allows a person to talk about an individual thing without denoting a particular, it does not allow one to talk about individual stuff without denoting a particular. If mass or plural nouns do individuate, it is not demonstrated by using the indefinite article. This further supports the idea that mass nouns are not singular, at least not in a simple sense.

Section 2.1.1: Truth conditions for So Called Pre-Individuative Statements

Statements using the indefinite article are common when used with a singular noun. It is now worth examining a common type of statement which uses plural and mass nouns. A common usage of these nouns occurs in the same type of sentence, namely so called pre-individuative statements. These are statements such as “There is water here.” Strawson calls these statements pre-individuative because he believes that they do not introduce particulars and hence occur at a pre-particular level of thought. These statements are not simple existential statements because they place features (stuff) in a location or time. According to Strawson, stuff is not individuated in these sentences, but rather time and space (in order to allow for multiplicity: it is possible to say “there is water here and here”). While this supports the idea that stuff is not individuated, it is

33 The term “pre-individuative” and the statements to be examined are derived from Strawson in “Particular and General”.
34 Strawson, “Particular and General” Pg 139.
worthwhile to examine what other ways have been suggested to understand these sentences and their truth conditions.

Singular nouns, in their semantic understanding, do not occur in these pre-individuative statements. A statement like “There is cat here” will in fact be using ‘cat’ as a mass noun rather than as a singular noun. This statement means that there is cat-matter here and not that there is an individual cat here. The statement “There is a cat here” uses “cat” as a singular noun and asserts that there is an individual cat. I have already examined statements using the indefinite article. Furthermore, pre-individuate statements do not contain singular nouns so I will not be examining singular nouns in this section. Hence, pre-individuative statements occur only with mass and plural nouns.

I will be using “water” as the mass noun for the pre-individuative statement. What are the truth conditions for “There is water here”? One suggestion is that there is a pool, puddle, or some other individuating phrase of water here. This would make the truth conditions context dependent and would rely on the individuating phrase to introduce the individuation. In some cases, one would mean “there is a puddle of water here”. In other cases, one would mean “there is a container of water here”. Furthermore, in some cases, more than one individuating phrase may apply. Water can be in a puddle and a pool at the same time. This would mean there would have to be a way to distinguish which individuating phrase is meant in these situations. However, it seems that we can understand the sentence “there is water here” without knowing which specific individuating phrase would precede “water”. Since understanding a sentence’s meaning is sufficient for knowing its truth conditions, the truth conditions for “there is water here” cannot involve a specific individuating phrase such as “pool”, or “puddle”. These
phrases are context dependent and not necessary to understand what is meant by “there is water here”.

Perhaps the problem is that all the individuating phrases introduced above are too context specific. Maybe the truth conditions for “there is water here” is that there is an amount of water here. “Amount” is to be understood in the same sense as Cartwright’s “quantity” and Chappell’s “parcel”. This seems to have some initial plausibility.

Suggesting that water means an amount or quantity of water does not make the truth conditions context dependent. Furthermore, we have no issue with determining which individuating phrase precedes “water” since it is always “an amount”.

It also seems that in every case where one would say “there is water here”, there is a determinate, measurable amount of water. This includes situations where one is talking about water in the ground or in the air. However, saying “there is a determinate amount of water” does not treat the amount as an actual object. To treat amounts as objects is to accept a mereological position on stuff, where any way you can group stuff of the same kind will be an actual object: the grass on my front lawn and the grass on Parliament Hill form an object which is an amount of grass. It seems preferable not to increase our ontology this way unless necessary.

The final suggestion for truth conditions which introduce individuation is “there is water here” is true iff there is at least one water molecule here. The problem with this is that a water molecule does not have the same properties that water does. A water molecule does not boil or freeze. It is not liquid. Hence, “water” cannot be understood as “at least one water molecule” since the properties are not the same. Furthermore, people can understand the statement “there is water here” without knowing anything
about water molecules. Hence, the statement cannot be talking about molecules. If it was, then people who do not know about molecules could not understand the sentence.

If one were to come up with another suggestion for truth conditions which stated that the term ‘water’ individuates, it would fall prey to the objections raised above. This is because when we talk about water _qua_ water, we are not talking about an individual object; we are talking about stuff. Hence, understanding pre-individuative statements does not require individuation of objects, only individuation of space and time. Therefore, the truth conditions for pre-individuative statements do not individuate objects. The truth conditions for “there is water here” are that there is water here; there is stuff of the kind water in the location designated by “here”.

These truth conditions make understanding the sentence simpler even than understanding “there is a cat here”. This seems reasonable because pre-individuative statements appear to be simpler than statements using the indefinite article and as Quine and Strawson suggest require less experience to understand. There is no need to know how much counts as one and how much counts as another. This is required for statements with the indefinite article since these sentences pick out one object. Furthermore, the truth conditions for “there is water here” reflect the lack of individuation of water. The term “water” does not individuate because the stuff, water, is not individuated.

Based on the above examination of truth conditions and semantic readings, it is reasonable to suggest that mass nouns do not individuate on their own. There is no individuation inherent in the term “water”. This is because what it designates is not individuated either. Nothing counts as one water. Although it is possible to talk about

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35 See Quine’s “Speaking of Objects” and Strawson’s “Particular and General”
one bottle of water, this does not individuate water; it individuates bottles of water.

There is a lack of individuation when using mass nouns which reflects the nature of what they designate. It is now possible to examine how this lack of individuation will affect our understanding of mass nouns and stuff in contrast to singular nouns and individual objects.
Chapter 3: Developments in Language and Logic

Section 3.0: Sentences Using “the”

As shown in the previous chapter, mass, plural and singular nouns can all occur in definite descriptions. However, this does not mean that they can all be understood based on Russell’s theory of definite descriptions. Russell’s theory states that when the term “the” is being used in the singular, it implies that there is at least one and at most one object. However, plural nouns imply *at least one object* and not *at most one object* and mass nouns do not imply there is *at least one object nor at most one object*. While plural nouns designate objects, they do not designate one particular object. Therefore, there cannot be at most one object. Plural nouns designate at least one object and possibly more. Hence, any sentence in which “the” precedes a plural noun cannot be talking about at most one. For stuff, there is no individual object and hence, not at least one object nor at most one object.

In sentences where “the” immediately precedes a mass noun, we cannot be talking about uniqueness since there is not an individual object to be unique. An example used by Sharvy and Laycock is “The coffee in the room is black”. The coffee is not an individual object in the room. It could be in two cups. However, even if it is in one cup, every section of coffee in the cup is coffee in the room. We can talk about the top half of the cup as containing coffee in the room and the bottom half of the cup as containing coffee in the room. This is because stuff has relative dissectivity. It is not infinitely divisible but it is divisible to a point while still being the same stuff.

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36 Russell, B. *Introduction to Mathematical Philosophy*. Chapter 16 Pg 167
37 See Laycock’s *Words Without Objects* and Sharvy’s “A More General Theory of Definite Descriptions”.
In sentences where “the” immediately precedes a plural noun, again we cannot be talking about uniqueness because plural nouns do not designate individual objects. An example of a definite description using a plural noun is “The goats in the field are hungry”. “The goats” does not designate an individual object. The goats may be in two packs but even if they are not, the goats in the front half of the pack are goats in the field and the goats in the back half of the pack are goats in the field. “Goats” does not individuate goats.

It is worthwhile to acknowledge once again that even if one believes in sets and quantities, they will not suffice as individuating phrases for plural nouns and mass nouns respectively. This is because there is more than one set containing goats in the field and more than one quantity containing coffee in the room. Furthermore, talking of sets of goats and quantities of coffee is not helpful since these phrases are still not uniquely referring and do not pick out one object. Talking of the largest set of goats and the largest quantity of coffee will tie together existence and identity in a way which contradicts the fashion in which plural and mass nouns work. The goats in the field will not have ceased to exist until all of them do, not just the largest set of them. The coffee in the room will not have ceased to exist until all the coffee has, not just the largest quantity. Since there is no obvious other way to create an individual object using plural and mass nouns, it is necessary to re-examine definite descriptions themselves.

Russell’s theory appears to be (more or less) right for singular definite descriptions. In these cases, the statement is uniquely denoting. There is exactly one object designated which has the predicate stated. However, this is not the case for plural or mass definite descriptions. Hence, I want to examine the similarities between definite
descriptions using each type of noun to determine what “the” actually means in these descriptions.38

Given that one can say “The kings of Orient are happy”, and “The king of Orient is happy”, it seems clear that “the” does not imply uniqueness in all cases. The first sentence is a definite plural sentence and the second sentence is a definite singular sentence. The definite singular sentence implies uniqueness. The definite plural sentence does not. Given that the only difference between the two is the number of objects the noun designates (correspondingly the conjugation of the verb also differs), it must be the singular noun which implies the uniqueness (that there be no more than one). This means that “the” does not imply that at most one object be designated. It seems reasonable to understand uniqueness as implying that the object is the one and only object which fits the predicate. The fact that it is one object comes from the singular noun being used in a definite description. The fact that it is the only object comes from the “the” in a definite description. What this would mean is that “the” implies exhaustiveness. To say that “They are the kings of Orient” is to say that “they are the only kings of Orient”. There are no other kings of Orient. “The kings of Orient are happy” means “The only kings of Orient are happy”. The clearest way to remove the “the” and maintain the exhaustiveness is to replace “only” with “all”. Exhaustiveness means that “All kings of Orient are happy” and that “they are all kings of Orient”. Hence, it is possible to see why Russell’s theory of definite descriptions is correct for singular terms and incorrect for mass or plural terms and what “the” implies in definite descriptions.

38 The following examination and conclusions drawn from it are derived from Laycock’s “Words Without Objects”. I re-state the argument here to provide a basis for understanding the logical translation which I will suggest for the term “the”. While the logical translation I suggest follows naturally from Laycock’s argument although he did not suggest in Words Without Objects.
Given that mass and plural definite descriptions do not imply uniqueness, it is necessary to come up with a different logical translation of definite descriptions. Ideally, this translation will be able to accommodate singular, plural and mass nouns and their differences. What is necessary is to determine what quantifiers and logical connectives create exhaustiveness. Obviously, using just the existential will not be sufficient since the existential is commonly thought of as “at least one”.

The replacement of “only” with “all” suggests the start of a logical translation for “the”. It seems reasonable to think that one can use the universal quantifier to create exhaustiveness. Following this route, it will also be necessary to use the conditional or biconditional to ensure that we designate certain kinds and not everything in the world. Hence, the initial step for translating “The coffee in the room is black” is “for all x, if x is coffee and x is in the room, then x is black”. Similarly, “The kings of Orient are happy” become “for all x, if x is a king of Orient, then x is happy”.

This suggested translation is lacking in two areas. First of all, it does not allow one to infer that there is at least one king of Orient nor does it allow one to infer that there is coffee in the room. Secondly, it will allow for sentences such as “the author of *Principia Mathematica* (PM) was a philosopher” to come out true. This sentence would be translated as “For all x, if x is an author of PM, then x is a philosopher”. The problem

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39 I will be using logical terms from first order logic to elucidate the differences and suggest logical translation of sentences. However, I do acknowledge that there is a problem with treating mass nouns and plural nouns in first order logic. This problem has to do with our understanding of the existential and what is an acceptable value for a variable. For now, it will be necessary to accept that first order logic can be changed to deal with mass and plural nouns. I will examine the problems with first order logic more carefully in chapter 5.

40 There are problems with Russell’s theory which I will not address directly in the body of this paper. Most notably, there is the fact that uniqueness is contextual. I am using sentences where I do not believe this problem will arise. Also, I think it will be possible to solve this problem in my theory the same way you would in Russell’s theory, however that may be.

41 This point is raised by Sharvy in “A More General Theory of Definite Descriptions” with regard to his own initial theory of definite descriptions. It seems to be one of the harder problems to deal with when creating a theory of definite descriptions for singular, plural and mass nouns.
is that there is no one author of PM. It was written by both Russell and Whitehead. If the sentence were “the authors of PM were philosophers”, then the translation is less problematic. However, as stated so far, this translation of “the” does not allow for the uniqueness of singular descriptions.

Both of these problems are solved with the same step. Following the universal, it is necessary to add a conjunction with an existential quantifier. For mass and plural nouns, it will simply be: “there exists x such that x is a king of Orient or x is coffee.”

For singular nouns, it will be necessary for the second conjunct to imply that there is exactly one object and hence will follow Russell’s theory of definite descriptions. For example, “there exists x such that x is author of PM and for all y if y is author of PM then x=y”. This is because the singular noun implies that there is exactly one and this needs to be accounted for in a statement which uses the existential quantifier. The first problem is solved because it is possible to infer that there is at least one king of Orient and that there is coffee in the room from the second conjunct in definite descriptions using mass or plural nouns. Furthermore, “The author of PM was a philosopher” will come out false because the second conjunct is false since there is not exactly one author of PM and “author” is a singular noun. Hence:

“The kings of Orient are happy” becomes “for all x, if x is a king of Orient then x is happy and there exists x such that x is a king of Orient”.

“The king of Orient is happy” becomes “for all x, if x is a king of Orient then x is happy and there is exactly one x such that x is a king of Orient”.

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42 I understand that existential quantifiers are more commonly read as “there exists an x such that”. However, this highlights individuation and suggests that all values for x must be singular. Whether some article should occur between “exists” and “x” will largely depend on how we understand the values of variables. For now, I believe it to be unproblematic to simply work without an article between “exists” and “x”.
“The coffee in the room is black” becomes “for all x, if x is coffee and x is in the room then x is black and there exists x such that x is coffee and x is in the room.”

This suggestion for the logical translation of “the” does complicate how singular definite descriptions are translated in comparison to Russell’s theory. However, it does more adequately represent what the term “the” implies. The complication is due to the fact that singular nouns are in fact more complicated than plural and mass nouns since singular nouns require individuation whereas plural and mass nouns do not. The benefits of adequately translating what “the” means, providing an amount of uniformity to the translation and maintaining the logical inferences associated with definite descriptions outweigh the cost of complication for singular nouns.

Section 3.1: Direct Reference

People refer by picking out an entity directly. Definite descriptions denote an entity by setting out a group of characteristics which the entity must fulfill. Arguably, referring expressions do not need to contain characteristics; they are attached to the entity directly. Most philosophers only talk of directly referring to objects. This is problematic given the above arguments where it was shown that stuff is not an object. However, it is possible to examine whether one can directly refer to stuff.

Direct reference picks out an entity through ostension and the use of “this” or “that” or by name. It is represented logically as a singular term where you have the

43 I am using the term “entity” to avoid begging the question about whether mass and plural nouns can be used to refer directly. Although “entity” is an individuated term designating a single object, for the purpose of this paper, it should be interpreted as also designating stuff and more than one object.
44 Some philosophers argue with this suggestion. However, I believe this idea of direct reference to be relatively standard and hence one must provide an argument if one disagrees with it rather than agrees with it.
predicate letter, like “F” immediately followed by an object letter, such as “a”. Hence, “this is cold” when translated into logical form becomes “Fa” where “a” is the name of object which is referred to through use of the term “this”. Also, “Heather is cold” becomes “Fa” where a is Heather.

I will examine the two different ways that direct reference of entities occurs and show that neither is possible for stuff. If I say “this is cold” and point at a bottle of water, there are many possible meanings of the utterance. I could mean “the bottle is cold”. In this case, I am not directly referring to stuff but to the bottle and this is unproblematic. Secondly, I could mean “all water in the bottle is cold” which would be referring to stuff or thirdly, I could mean “some portion of the water which I am pointing to is cold”, which is again referring to stuff. In this case, I am not using “portion” to designate an object. “Portion” is being used in contrast to “all”. It simply means that I am not referring to all the water in the bottle but just some of it. If one were to use “portion” to designate an object, it would have the same problems as the term “quantity” or “parcel” mentioned in previous sections. If I want to discuss a specific portion of water in the bottle, it would be all water in x where x is a spatiotemporal characteristic such as the top half of the bottle.

One of the problems is that it is impossible to differentiate which is meant by “this is cold” without further explication. Since there is no object which is water, “this” is highly ambiguous. Pragmatically, we often understand “this” to refer to an object. However, in this case, there is no object that it could refer to. When further explicated, it becomes clear that the best logical translation of “this is cold” is not “Fa”. This is because there is no one entity which can be designated by “a”. If I mean “all water in the
bottle is cold”, then I am referring exhaustively. The clearest logical form for this is “for all x, if x is water in the bottle, then x is cold”. One could not translate “this is cold” as “Fa” in this case because there is more than one value for x. Water in the top half of the bottle is cold and water in the bottom half of the bottle is cold. This means that “This is cold” is actually “Fa & Fb &Fc…” where a, b and c are water designated by different spatiotemporal characteristics of the bottle.

If I am referring to some portion of the water, then I am saying that “some of all of the water in the bottle is cold”. A possible logical translation for this is “there exists x such that x is water in the bottle and x is cold”. In this case, it is important to use the existential quantifier. Since “portion” is not being used to designate an object, it would not be appropriate to translate “this” referring to a portion of water as “a”. Of course, with the use of the existential quantifier, one can infer “Fa”. However, it is worth noting that just because it is possible to infer “Fa” from this logical translation does not mean that the logical translation of “this is cold” should be “Fa”. The “a” in “Fa” when inferred from an existential quantifier has limitations which the translation of “this is cold” as “Fa” does not. Specifically, “a” cannot have appeared in any previous inferences when inferred from an existential in a logical proof. The “a” does not name any particular entity; rather it is a hypothetical entity. However, when translated from “This is cold”, the “a” does stand for a particular entity.

Similar problems arise when naming stuff. First, we will briefly go through the unproblematic case of naming an individual object. If one names a cat “Larry”, then one commits to the proposition “the cat is identical to Larry”. In logical form this is, “there is exactly one x such that x is my cat and x=a” where “a” means “Larry”. From this, using
existential instantiation it is possible to get “b=a” where b is my cat and a is Larry.

Sentences such as “Larry is warm” are translated as “Fa” where “F” means “is warm” and “a” means Larry.

If I name the coffee in my cup “Bob”, then I name all the coffee in my cup “Bob”. Hence, there is no one entity which is named “Bob”. Instead of working like a proper name and referring to one object, “Bob” applies to all and only the coffee in my cup. To say “my coffee is Bob” is to say “for all x, x is coffee in my cup if and only if x is Bob.” In “for all x, x is coffee in my cup iff x is Bob” there is again more than one value for x. The coffee in the top half of my cup is coffee in my cup and the coffee in the bottom half of my cup is coffee in my cup. It is now obvious that if we treated “x is Bob” as “x=a”, we would end up with a one : innumerable problem. A single entity, Bob, cannot be identical to stuff which is neither singular nor plural. While one can infer “b=a” where b is the coffee in the top half of my cup, one can also infer “c=a” where c is coffee in the bottom half of my cup and it is not the case that b=c. The identity relation is transitive meaning if a=b and a=c then b=c. “x=Bob” breaks the logical rules of the identity relation. Hence, “x is Bob” cannot be viewed as “x=a”. “Bob is warm” cannot be translated as “Fa” because “Bob is warm” is also “Fb” and “Fc”. Instead, “Bob” is identical to “For all x, if x is coffee in my cup then…” If I say “Bob is warm” I am also saying “all coffee in my cup is warm.” Hence, the logical translation for “Bob is warm” is “for all x, if x is coffee in my cup then x is warm” and not “Fa.”

It is impossible to name a portion (with “portion” taken in the non-object sense) of coffee. This is because the name has to apply to a particular something. Naming some indeterminate portion of my coffee “Bob” is equivalent to name some indefinite cat
“Larry”. This does not mean that “Bob” can only apply to all the coffee in my cup because it is possible to distinguish portions of coffee in my cup by spatiotemporal location. Hence, “Bob” could mean “all the coffee in the top half of my cup”. This would be treated in the same logical fashion as “all the coffee in my cup”. The point is that “Bob” will always be used exhaustively. It will be identical to “all x that is F”, where “F” is a predicate which differentiates coffee, such as a spatiotemporal characteristic.

Hence, names for stuff are not genuine proper names since they cannot directly refer. It is not possible for them to since ‘a’ in ‘Fa’ is the name of an individual object and stuff is not an individual object. Furthermore, because demonstratives do not function in the same way in sentences with mass nouns as they do in sentences with singular nouns, it is not possible to directly refer to stuff at all. Instead, stuff is always denoted by a description using spatiotemporal characteristics such as being in a container.

Section 3.2: Identity Statements

Since mass nouns cannot be translated into singular terms, a problem arises with identity statements. Normally an identity statement such as “Hesperus is Phosphorus” is treated as “a=b” where a is Hesperus and b is Phosphorus. Since the stuff mass nouns designate cannot be logically represented as “a” or “b”, identity statements cannot be “a=b” when using mass nouns. This is because within a, there will also be b, c and d which fit the criteria. An example of a mass noun identity statement would be “The gold in my watch was the gold in Aunt Suzie’s necklace”.45 Since stuff is relatively dissective, gold in the face plate of my watch is gold in my watch and gold in the clasp of

45 This example is derived from a similar one in Cartwright’s “Quantities”.
my watch is gold in my watch. This suggests that there is no single value for gold in my
watch. Hence, we must discover a new way to translate identity statements involving
mass nouns.

The first clue for translating mass noun identity statements is use of the definite
article. “Hesperus is Phosphorus” does not use “the”. However, “the gold in my watch
was the gold in Suzie’s necklace” does. This suggests that the statement is exhaustive.
All gold in my watch was gold in Aunt Suzie’s necklace and all gold in Aunt Suzie’s
necklace is now gold in my watch. The most natural way to translate this appears to be
“For all x, x is gold in my watch if and only if x is (was) gold in Aunt Suzie’s necklace”.

It is necessary that it is a biconditional since “the” is used both before “gold in my
watch” and “gold in Aunt Suzie’s necklace”. The use of “the” twice suggests that it is
exhaustive in both cases. Furthermore, the biconditional retains what was said earlier
about remaining the same amount in order to remain the same stuff. If I took the gold
from Aunt Suzie’s necklace and gold from a bracelet and melted them together to form
my watch, the gold in my watch would not be the same as the gold in Aunt Suzie’s
necklace. Similarly, if I took half of the gold from Aunt Suzie’s necklace to make a
watch, the gold in my watch would not be identical to the gold in Aunt Suzie’s necklace.
In the first case, some of the gold in my watch is the same as the gold from Aunt Suzie’s
necklace. This could be logically translated as “For all y, if y is (was) gold in Aunt
Suzie’s necklace then y is gold in my watch”. In the second case, the gold in my watch
only comes from Aunt Suzie’s necklace but it is not all the gold from Aunt Suzie’s
necklace. Hence, the gold in the watch and the gold in the necklace are not identical
because they differ in amounts. The logical translation for the second case could be “For all x, if x is gold in my watch then x is (was) gold in Aunt Suzie’s necklace”.

There is a slight problem with the above suggested translations, namely that they do not imply existence. All the statements above can be trivially true if there is no gold either in the watch or in Aunt Suzie’s necklace. The most obvious correction for this is to add a conjunct to the statements which says “there exists x such that x is gold in my watch and x is (was) gold in Aunt Suzie’s necklace”. Due to the laws for the use of biconditionals and conditionals it is not necessary that this second conjunct contain both the predicates “is gold in my watch” and “is gold in Aunt Suzie’s necklace”.

In the case where all gold in my watch is (was) gold in Aunt Suzie’s necklace and vice versa, either predicate will suffice to allow the existence of gold which fulfills both predicates. This is because if there exists x such that x is gold in my watch and all gold in my watch was gold in Aunt Suzie’s necklace then there exists x such that x was gold in Aunt Suzie’s necklace. The biconditional allows you to infer the converse as well. All gold in Aunt Suzie’s necklace is gold in my watch so if there exists gold in Aunt Suzie’s necklace then there also exists gold in my watch.

The second case where all gold in Aunt Suzie’s necklace is gold in my watch but not vice versa, the existential conjunct has to contain the predicate “is (was) gold in Aunt Suzie’s necklace”. Since all gold in Aunt Suzie’s necklace is gold in my watch, if there was gold in Aunt Suzie’s necklace then there is gold in my watch. The opposite is not the case, there can be gold in my watch without there being gold in Aunt Suzie’s necklace and the first conjunct would be true. Hence, the predicate for the existential conjunct must be “is (was) gold in Aunt Suzie’s necklace”.
In the third case, where all gold in my watch was gold in Aunt Suzie’s necklace but not vice versa, the existential conjunct must use the predicate “is gold in my watch”. This is for the same reasons as in the second case. From “there is gold in my watch”, it is possible to infer that there was gold in Aunt Suzie’s necklace. The opposite is not the case. The conditional can be true if there was gold in Aunt Suzie’s necklace but not gold in my watch.

Due to the complexity of determining which predicate needs to be placed in the existential conjunct, it is simpler to use both predicates. Furthermore, this would be a closer translation to what is meant by identity sentences. It does not make sense that someone would claim “this stuff is the same as that stuff” yet also claims that this stuff exists but that stuff does not. Similarly, anyone who is saying that some of the gold in my watch was the gold in Aunt Suzie’s necklace or some of the gold in Aunt Suzie’s necklace is the gold in my watch must believe that gold actually exists in both. It would not make sense for them to believe that a is some of b yet a does not exist and b does, or vice versa. Hence, for simplicity’s sake and for clarity of thought, it seems reasonable to suggest that both predicates will occur in the existential conjunct.

To sum up this section, the translation of “The gold in my watch was the gold in Aunt Suzie’s necklace” becomes “For all x, x is gold in my watch iff x is (was) gold in Aunt Suzie’s necklace and there exists x such that x is gold in my watch and x is (was) gold in Aunt Suzie’s necklace.” The translation of “Some of the gold in my watch was the gold in Aunt Suzie’s necklace” is “For all x, if x is (was) gold in Aunt Suzie’s necklace then x is gold in my watch and there exists x such that x is (was) gold in Aunt Suzie’s necklace and x is gold in my watch”. The translation of “Some of the gold in
Aunt Suzie’s necklace is the gold in my watch” is done the same way as the preceding translation except with the predicates reversed.

A point of interest to be raised before the end of this chapter is that the suggested logical translation of identity statements for mass nouns also works for plural and singular nouns with tweaks done to the existential conjunct. “The cat on the mat at time 1 is the cat in the hat at time 2” becomes “for all x, x is a cat on the mat at time 1 iff x is a cat in the hat at time 2 and there exists exactly one x such that x is a cat on the mat at T1 and x is a cat in the hat at T2”. The existential conjunct changes in the exact same fashion as it did for definite descriptions. This is because using a singular noun implies that there is only one cat. “The cats on the mat at T1 are the cats in the hat at T2” becomes “For all x, x is a cat on the mat at T1 iff x is a cat in the hat at T2 and there exists at least one x such that x is a cat on the mat at T1 and x is a cat in the hat at T2”. The existential conjunct in this case implies there is at least one cat which satisfies both predicates but there may be more than one.
Chapter 4: Developments in Metaphysics

Section 4.0: Terminology

Prior to beginning this section, it is necessary to carefully articulate what is meant by certain terms which will be used. In general, these terms can be used rather sloppily because they mean the same thing when examining individual objects. However, as it will be shown, care is needed when examining stuff because these terms do not necessarily mean the same thing for stuff.

Criterion of Identity: A criterion of identity is an informative and non-circular statement of identity conditions for a kind usually given in logical form. Identity conditions for a kind tell us when an entity of a kind is the same across time and what counts as one entity as opposed to two. What it is for a criterion of identity to be informative and non-circular will be examined below. To have determinate identity conditions is to always have a true or false answer to this ___ is the same as that ____.

While there is widespread discussion about the form of criteria of identity, a basic form which Lowe uses is: “If x and y are entities of kind K, then x is identical with y iff x and y stand in the relation \( R_k \) to one another.”\(^{47} \) \( R_k \) is a relation specific to the kind K which tells us what is necessary to be the same entity. \( R_k \) is obviously not the identity relation since this would make the criterion of identity circular nor does it rely on the identity of x and y to be determined. For example, if one had to first determine whether x and y were identical in order to determine if they stood in \( R_k \) to one another then the criterion of identity would again be circular. One can see how this will provide answers to the above

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46 The definitions of the terms given are primarily derived from Lowe’s *A Survey of Metaphysics* and *The Possibility of Metaphysics*. However, I believe them to relatively uncontroversial definitions.

questions. X and y can be seen as being values of the same entity at two different times (x is object ‘o’ at time 1 and y is object ‘o’ at time 2) and if x and y do not stand in the Rₜ relation to one another then they are two entities as opposed to one.

Diachronic identity conditions: Diachronic identity condition tells us what needs to be true in order for an entity to remain the same across time. They are the truth conditions for sentences about identity over time. Diachronic identity conditions are closely related to the criterion of identity.

Persistence conditions: There are two ways to understand “persistence” when discussing stuff. In one case, it can be understood exhaustively. In order for an entity to persist in this sense, all of it must persist. I can say “It’s amazing that the ice in my glass has persisted. Not a single amount has melted.” In this utterance, I mean persistence in the exhaustive sense. The second way “persistence” can be understood is existentially. An entity persists in this sense as long as it has not ceased to exist. I can utter “I don’t need any more ice. I still have some. It has persisted in my glass”. In this case, I mean “persistence” in the existential sense. This type of persistence is the persistence meant by “persistence conditions”. Persistence conditions tell us what needs to be true in order for an entity to continue to exist. They are truth conditions for sentences about existence over time.

Theories of Persistence: Theories of persistence answer the question “in virtue of what does an entity continue to exist?” or “how do entities persist?” These theories can be loosely split into two types. Endurance theories argue that entities are wholly present at every moment. Perdurance theories argue that entities have temporal parts and one of these temporal parts is what is present at any given moment. When discussing individual
objects, persistence is often combined with identity so persistence theories often attempt to answer how an entity is the same over time also.

Section 4.1.0: Criterion of Identity

Since mass nouns do not designate objects, there are limits on what a criterion of identity can look like and what a criterion of identity can do for mass nouns. The form suggested by Lowe for a criterion of identity presupposes individuation because it tells us what counts as one entity and what counts as another. It is commonly understood that a criterion of identity for kind K will provide a principle of individuation for instances of that kind. A criterion of identity for the kind, cat, will tell you what counts as one cat and what counts as another. A principle of individuation can be seen as telling us what counts as one instance of a kind. It is necessary for counting. For plural count nouns, a criterion of identity will also contain an implicit principle of individuation. This is evidenced by the fact that plural nouns can be proceeded by “one of the” or “each of the” in grammatically proper sentences. This is not the case for mass nouns. There is no individuation so a criterion of identity cannot provide a principle of individuation.

Unfortunately, our understanding of criteria of identity for individual objects motivates many philosophers to try and do the same thing for mass nouns.

Several philosophers have tried to come up for a criterion of identity which will tell us what an instance of a mass noun will look like. However, there is already a problem with attempting to answer this question. The term “instance” is individuated and stuff is not individuated. To talk of an instance is to accept the idea that we can separate one instance from another. An instance of the kind cat is a cat. However, an instance of the kind water is not a water for reasons discussed previously. Therefore, when trying to
formulate a criterion of identity for stuff, philosophers often bring in an individuating phrase to help distinguish instances. To do so, they talk of parcels, parts, sets, or quantities. An instance of the kind water is a parcel, part, or quantity of water.

There are two problems with this solution depending on how the individuating phrase is defined and used. The first problem is by trying to provide a criterion of identity for stuff using individuating phrases, they instead of provide us with a criterion of identity for the individuating phrase.

This occurs if the individuating phrase designates an actual entity and hence has metaphysical significance. In order to introduce individuation into a criterion of identity, it will be necessary to treat the individuating phrase as designating an actual object. This individuating phrase will allow us to determine what counts as one instance and what counts as another. If the individuating phrase does not have metaphysical significance, then there is still no individuation since there is not actually one of something. Examples of individuating phrases are “part”, “parcel” and sometimes “quantity” depending on how “quantity” is defined.

If the individuating phrase designates an actual object and hence introduces individuation, then this is the object that the criterion of identity is about. For example, Lowe suggests that a criterion of identity for stuff could be: “if x and y are parts of stuff of kind K, then x is the same part of stuff as y if and only if x and y consist of exactly same parts.”48 This provides us with a way to determine whether x and y are the same parts. However, it is just using stuff to help provide a criterion of identity for parts. One could replace every instance of “of stuff” with “of a pencil” and the criterion of identity would remain the same. This is because the term “of stuff” is just being used to provide a

48 Lowe, The Possibility of Metaphysics. Pg 73.
basis for talking about parts. This does not mean that it provides a criterion of identity for stuff. Lowe, himself, points out that, a criterion of identity can mention another kind within it but that it will not be providing a criterion of identity for the second kind. For example, the criterion of identity for the direction of a line, uses the term “of a line” but does not provide a criterion of identity for lines. Hence, Lowe’s suggestion for criterion of identity for stuff will give us a criterion for parts (which may possibly but not necessarily be, parts of stuff) but not for stuff. In order to provide a criterion of identity for stuff, it would have to look something like, “x is the same stuff as y iff...”.

Parcels and quantities understood as actual entities will create the same problem. Criteria of identity using parcels or quantities of stuff will provide us with a criteria of identity for parcels or quantities and as has been shown in previous chapters, stuff is not identical with parcels or quantities of stuff. This problem will occur every time someone introduces individuation through an individuating phrase designating an actual entity when attempting to provide a criterion of identity for stuff. This is because there is no actual individuation of stuff which can be expressed with an individuating phrase. No mass nouns individuate what they designate. Hence, any attempt to include individuation in the criterion of identity will shift the criterion from being about stuff to being about the individuating phrase. The criterion of identity tells us what an instance of a parcel of stuff is but not what an instance of stuff is because there are no instances of stuff.

The second problem with individuating phrases occurs when the individuating phrase is not actually designating an object. An example of this type of individuating phrase is “quantity” when understood as meaning “a determinate amount”. Understanding “quantity” as non-designating is the same as understanding “length” or
“volume” as non-designating. Using “quantity” in a non-object designating sense has some initial plausibility. It seems obvious that anywhere there is water, there is a determinate amount of water and vice versa. The same occurs with all mass nouns which designate stuff. There is a determinate amount of gold and mud everywhere there is gold and mud respectively. Perhaps one can draft a criterion of identity for stuff using “quantity” to just mean a determinate amount. Being the same quantity of water would just be being the same water. The problem arises when one tries to determine what the relation would be. Cartwright uses “quantity” for stuff as a parallel to “set” for objects. However, sets are identical or non-identical based on their members. Quantities have nothing equivalent to members. If one were to talk of sub-quantities, then this would start an infinite regress since sub-quantities are just quantities that are less in amount. Hence, despite the initial plausibility, there is no satisfactory relation which determines whether x and y are the same quantity.

The problem with attempting to come up with a criterion of identity which mimics the type used for individual objects arises from the lack of individuation. Since there is no individuation of water, the criterion of identity should not attempt to provide a principle of individuation for water. This is not to say that we do not distinguish stuff in everyday conversation. However, this distinction is pragmatic and is based on extrinsic properties. Stuff and multiple objects are “individuated” through an individuation of time or space, including “individuation” based on location in relation to an individual object. For example, when we talk about “the water in the bottle”, the bottle is individuated and

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49 An important difference between understanding “length” or “volume” and understanding “quantity” is that two things can be the same length or volume but still be two different things. This is not the case with quantity. To be the same quantity, it is necessary to be the same entity. The purpose of the analogy to “length” and “volume” is that we can talk of “a length” or “a volume” and do not mean to designate an object with the terms.
we are using the common property of being water in the bottle to talk about all and only water in the bottle. There is nothing intrinsic in the word ‘water’ that individuates in the way that ‘bottle’ does and that can provide us with a principle of individuation. Our sense of identity for stuff is based on extrinsic properties which change depending on the context. This means that there is no criterion of identity for stuff.

There is, however, something like a criterion of identity which can be provided for stuff. One way to understand the term “criterion of identity” is as a statement which tells us when an entity is a member of one kind as opposed to another, for example, when we have a cat as opposed to a dog. It is possible to generate criteria of identity which fulfill this role for different kinds of stuff. These criteria are whatever predicates necessarily apply to that kind of stuff, for example, water is necessarily H\(_2\)O. Therefore, if something is H\(_2\)O, we know that it is water and not gold. Being able to provide this type of criterion of identity does help us grasp the nature of the kind being identified. It provides us with what is essential to being that specific kind. Furthermore, it is possible to provide this type of criterion for all kinds, individual objects, multiple objects and stuff. This type of criterion, however, is not one provided solely by metaphysics. It relies on science to tell us what properties are essential for each kind.

While we cannot provide a criterion of identity which answers the questions “when is stuff the same across time?” and “what makes the water now the same water as the water 10 minutes ago?” we can answer similar questions. This answer will be a theory of persistence. We can provide an explanation for continued existence which answers how stuff persists. By providing a spatiotemporal cum causal answer to the question of persistence we are answering “in virtue of what does the water continue to be
the same water”. This is answer will be a theory of persistence and not a criterion of identity. This is because we are talking about how entities persist rather than how they are identical. We are explaining how there is continued existence for entities and not whether they are the same entity or not. The explanations for identity and persistence are closely related since if an entity cannot persist over time then it cannot be the same entity over time. However, a theory of persistence is not going to be given in the form of a criterion of identity. It is not a relation that two entities stand in to one another. It is an explanation for an entity continued existence. Furthermore, whatever answer is provided for how stuff persists should also answer how objects persist.

Finally, it is worth noting that determining identity is still possible without a criterion of identity. For stuff, identity is done case by case. It is possible to answer “is this water now the same as that water 10 minutes ago?” However, instead of having a criterion of identity with a certain relation determining whether this water and that water are the same, it is necessary to determine what is mean by “this water” and “that water”. As demonstrated earlier, “this” and “that” do not function in the same way when designating stuff as when designating objects.

Now I shall explain why when we answer the question “is this water now the same as that water 10 minutes ago” we are not invoking a criterion of identity. First of all, it is important to determine what is meant by “this water” and “that water”. As demonstrated in chapter 3, “this” when used to refer to a mass noun can mean an exhaustive amount defined by a spatiotemporal characteristic, such as being in a bottle. It can also mean some indefinite portion of water within a bigger portion of water which is defined by a spatiotemporal characteristic. An example would be some water in the
bottle is cold. When “this” or “that” is used with a mass noun following it, it does not seem reasonable that it refers to an indefinite portion. “This water” cannot mean some indefinite portion. Instead, “this water” is similar to “the water” in talking about all water with a certain spatiotemporal characteristic. The major difference between “this” and “the” when followed by mass nouns is “this water” implies a spatiotemporal characteristic whereas “the water” must be followed by a predicate containing the characteristic. The same is true for “that water”. Hence, it is necessary to determine what spatiotemporal characteristics are being implied.

When asking “is this water the same as that water?”, the answer will be based on whether all water designated by “this” has a certain property which all water designated by “that” has. For example, if all water in the glass now also has the property of being water in the glass 10 minutes ago and vice versa, then it is the same water. This follows from our understanding of identity statements in the previous chapter. This demonstrates why there can be no criterion of identity for stuff kinds. There is no one instance which we can compare. Identity statements involving mass nouns are exhaustive statements talking about all water with property a also being all water with property b. The identity and individuation of stuff is related to extrinsic properties.

Identity statements are context dependent because the extrinsic property meant by “this” or “that” can change depending on the situation. When we talk of stuff being identical, we are in fact saying that all stuff with one property also has a second property and vice versa. There is no formula for calculating when this stuff is the same as that stuff since it depends on which property is being highlighted.
Section 4.1.1: Identity and Persistence Conditions

Identity and persistence conditions separate when dealing with stuff, whereas they do not differ for individual objects. Before beginning, it is important to remind everyone that persistence is being understood as continued existence. Hence, if it easier, one can change “persists” to “has not ceased to exist” in every sentence where “persists” occurs. For an individual object to persist through time it is necessary for it to be identical. In order for a cat to continue to exist, it must be the same cat.

When examining stuff, this is not the case. In order for ice to be the same ice over time, it is necessary for all of it to persist because it must continue being the same amount. However, for ice to persist the only condition is it must not cease to exist. This is not the same as being identical. An example involving plural nouns would be if I have apples in a basket, as long as all the apples are there I have the same apples. If I eat one, then I no longer have the same apples (the apples post-consumption are not the same as the apples pre-consumption). The apples are no longer identical. However, the apples have not ceased to exist; they still persist while not being identical. This same separation of persistence and identity occurs with stuff. Laycock highlights this quite nicely when discussing ice in a gin and tonic.\(^{50}\) If I place ice in a gin and tonic, as soon as the ice starts to melt I no longer have the same ice because the amount has changed. However, as long as there is some ice, the ice persists; it has not ceased to exist.

This difference in persistence and identity conditions means that it is necessary to formulate new persistence conditions for stuff. For an individual object, the persistence conditions are contained within the criterion of identity. However, this is not possible for

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\(^{50}\) Laycock uses this argument to demonstrate that “the ice” does not refer to a singular entity. I believe that my logical translation of this distinction between identity and persistence is derivable from Laycock’s argument.
stuff since it can persist without being identical and there is no criterion of identity. One way to understand the difference between identity and persistence conditions is to examine the truth conditions for statements expressing both.

“A cat now is identical to a cat ten minutes ago” is true iff for some x, x is a cat now and x is a cat ten minutes ago.

“A cat persists from ten minutes ago to now” is true iff for some x, x is a cat now and x is a cat ten minutes ago.

As you can see, the conditions do not differ.

“The apples in the basket now are identical to the apples in the basket ten minutes ago” is true iff for all x, x is an apple in the basket now iff x is an apple in the basket ten minutes ago.

“The apples in the basket persist from ten minutes ago to now” is true iff it is not the case that for all x, it is not the case that x is an apple in the basket ten minutes ago and x is an apple in the basket now.

The persistence conditions for apples are equivalent to there exists x such that x is an apple in the basket ten minutes ago and x is an apple in the basket now.\(^51\) In this case, the conditions do differ.

“The ice in my gin and tonic now is identical to the ice in my gin and tonic ten minutes ago” is true iff for all x, x is ice now in my gin and tonic iff x is ice ten minutes ago in my gin and tonic.

\(^51\) I am using only universals at this time because I believe that individuation is too heavily associated with the existential. This will be explicated further later in the paper.
“The ice in my gin and tonic persists from ten minutes ago to now” is true iff it is not the case for all x it is not the case x is ice in my gin and tonic ten minutes ago and x is ice in my gin and tonic now.

These persistence conditions are equivalent to there exists x such that x is ice in my gin and tonic now and x is ice in my gin and tonic ten minutes ago.

The identity conditions ensure that all and only whatever is x now is (was) x ten minutes ago. The problem with the identity conditions is that they do not imply existence. The solution is to add the same existential conjunct as was elucidated in chapter 3. In the case of the apples, the conjunct would be “there exists x such that x is an apple in the basket now and x is an apple in the basket ten minutes ago”. In the case of the ice, the conjunct would be “there exists x such that x is ice in my gin and tonic now and x is ice in my gin and tonic ten minutes ago. The persistence conditions ensure that some of whatever is x now is (was) x ten minutes ago. There is no need to add an existential conjunct to these conditions since they do imply existence. These persistence conditions provide a better elucidation of what persistence is rather than the conditions for an individual object’s persistence. It is misleading to think that persistence should primarily be tied to identity since it is only in the case of individual objects where the two are tied together.

Identity and persistence conditions for individual objects rely on the fact that individual objects can be picked out without identifying extrinsic properties. “This water” while pointing at a bottle is not sufficient information to determine the referent. It could be all water in the top half of the bottle which is meant by “this water” or all water in the bottle. “This cat” while pointing at a cat is sufficient information to determine the
referent. Were it not sufficient, it would be easier to understand identity and persistence conditions for individual objects in a similar fashion to conditions for stuff. Identity conditions for the cat example would be: all cats with spatiotemporal characteristic ‘a’ are also cats with spatiotemporal characteristic ‘b’ and there exists exactly one cat with both spatiotemporal characteristics. Persistence conditions would be: there exists a cat with spatiotemporal characteristic ‘a’ and spatiotemporal characteristic ‘b’. It is only because individual objects can be individuated without the use of spatiotemporal characteristics that the identity and persistence conditions are those given originally.
Chapter 5: Further Developments

Section 5.0: Problems with First-Order Logic

The final issue I wish to discuss has no solution as of yet. However, I believe it to be of the utmost importance. It has been shown that we can understand stuff without individuation and in contrast to individual objects. However, this understanding relies on the ability to use logic, in particular, some variant of first-order logic when talking about mass nouns. To understand the differences between the natures of stuff, and individual objects, it is necessary to be able to discuss them in a logical language. We need to see the difference in logical form between statements using mass or plural nouns and statements using singular nouns. For stuff to have its metaphysical nature laid clear, it is necessary to have a logic which can translate sentences using mass nouns.

The current understanding of variables does not allow for stuff to be a value. It seems to be a worthwhile endeavour to attempt to expand the domain which the variables range over in a way which maintains the ontological import of the existential quantifier.\textsuperscript{52} Whether this is important to others seems to depend on the question of whether ontological import just means that there exists an object or means that something exists. Are ontologies designed to capture all the objects in the world or what the world consists of? If you believe the latter is the goal of descriptive metaphysics and logic is the best way to achieve this goal, then it is necessary to modify logic.

Part of the issue is the variable, but also part of the issue is the existential quantifier itself. The truth conditions for ‘(Ex)Fx’ are that there is at least one object

\textsuperscript{52} For the duration of this section, I talk only about the ontological import of the existential quantifier. However, I also mean its counterpart: ~(Ax)~. It seems evident that if the import is maintained in one then it is maintained in both. If, for some reason, one wanted to drop talk of one of the quantifiers altogether, then it is to remember the ontological import of the other.
such that that object is F. The existential quantifier then can be seen as affirming individual existence while allowing the possibility for more than one individual to exist. Stuff does not have individual existence. Another way to understand the existential is ‘there is something such that’ where ‘something’ does not mean an individual object. This is perhaps a better way to understand the existential quantifier. It is necessary to encourage this reading of the existential or a similar one which allows for stuff to enter into existential statements.

In order to translate mass nouns into first order logic, we require a new understanding of the values of variables. Cartwright has suggested that some water should be a value of a variable, with some water being understood as a quantity of water.\textsuperscript{53} Using the idea of some water as a value has a variety of drawbacks including the issues with the idea of “water” being understood as “a quantity of water” which have already been discussed. Furthermore, Cartwright acknowledges but has no satisfactory answer to one of the most significant problems. This problem is the fact that there will be cases where it is indeterminate if there is a quantity of water or not.\textsuperscript{54} This would require introducing a third truth value into first-order logic. I believe it is preferable not to introduce a third truth value unless absolutely necessary.

Furthermore, this suggestion of some water as a value of a variable reintroduces individuation through the idea of a quantity. As I have shown, stuff \textit{qua} stuff does not have individual existence but does have existence. Hence, the existential quantifier and values of variables should be understood to allow for “Water exists” to be translated as “(Ex)Fx” without introducing individuation. The truth conditions for “water exists”

\textsuperscript{53} Cartwright, “Heraclitus and the Bath Water” Pg 480
\textsuperscript{54} Cartwright, “Quantities” Pg 40.
should not rely on *individual* instances of water. Without a reformulation of the quantifier and variables, we are arbitrarily privileging objects over stuff because objects fit in our logic.

I believe Cartwright is on the right path. Rather than interpret “some water” as “a quantity of water” in Cartwright’s sense of “quantity”, it is possible to interpret “some water” as meaning “an amount of water” where “amount” does not have metaphysical significance. However, it is most preferable to take an understanding of “some water” where it means an amount and introduce terms which do not have individuation. I am leery to use the terms “some” and “amount” because “some” also has a meaning which is conveyed by the existential quantifier and “amount” can be preceded by “an”. Instead, I suggest that we allow actualization of water to be a value of a variable. By “actualization”, I mean concrete stuff which has (actualizes) the properties of the kind water. I chose the word “actualization” because it is not normally combined with “an” or numbers. It is bizarre to talk of “an actualization” or “two actualizations”. This makes “actualization” ideally suited for talk of stuff which also does not combine with the indefinite articles or numbers. While I cannot give a metaphysically stringent answer to what actualization of water is, I can suggest that whatever makes you answer “yes” when asked “is there water here” is actualization of water.

The suggestion of actualization of water as a value of a variable does not exhaust the work that needs to be done to make first-order logic mass noun friendly. However, it does point us on the right path. Whatever the value is understood as, it needs to be non-individuated since that is what stuff is and that is how mass nouns designate.
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