Things, stuffs, and coincidence

A non-ontological point of view

Nikos Psarros

Abstract: In this article the problem of the so-called 'coinciding objects', *i.e.* the question whether a substantially homogeneous thing is something ontologically different from the corresponding 'piece of stuff' it is made of or not, is examined from a pragmatical and language-analytical point of view. Instead of recurring to ontological assertions, I propose to regard 'stuffs' or 'substances' as a mode of speaking about things that fulfil the condition of being homogeneous in respect to a certain kind of properties that are called substantial properties. The coincidence problem is resolved by demonstrating that terms for substantially homogeneous things and the corresponding 'pieces of stuff' are predicative expressions in an Aristotelian genus-species relationship.

Keywords: *stuffs*, *substances*, *coinciding objects*, *abstraction*, *predication*.

1. Coinciding objects

An artist melts a bronze bar, pours the liquid into a mould, and thus creates a statue. Both the bronze bar and the statue are in a sense the same 'piece of bronze'. On the other hand, the statue as a form is something completely different than the bronze bar. Are we then entitled to assert that – at least concerning homogeneous things like bronze statues, iron nails, or gold coins – we are confronted with two different objects that coincide in occupying the same space at the same time, namely the artifacts described by their predicates (statue, nail, coin) and the corresponding 'pieces' or 'portions' of the substance they consist of? Or it is rather so, that the form and the material of a thing are just two aspects of a single entity?

In their argumentation in favor of rejecting 'coinciding objects', Michael E. Burke (1997) and Dean W. Zimmerman (1997) both agree that substances or 'stuffs' should not be regarded as 'material objects' in contrast to things. However, whereas Burke tries to justify this assertion by claiming that a substance like copper is a plurality composed from a vast amount of copper at-

oms and thus not a single thing – in other words, that it is a non-thing – Zimmerman regards this solution a "fall back" since "the bronze of the statue *is* something (it can be referred to, named, it is self-identical but not identical with the statue, *etc.*)" (Zimmerman 1997, p. 22). He also rejects an even more radical strategy proposed by Chappell (1973) regarding substances merely fictitious entities, because "it does not so much eliminate the masses of stuff of which things are constituted, as postulate that these things pop out of existence when they come – as we would normally say – to constitute more complex things. And of course that is the essence of Burke's fall back position" (Zimmerman 1997, p. 26).

In the following, I will try to introduce the concepts of 'substance' and 'stuff' without recourse to any metaphysics of existence. I think that Michael Burke's strategy to circumvent the coincidence problem by regarding »substance« as a 'mass term'[1] that denotes an amount of identical atoms or molecules is not philosophically fruitful since it relies on our empirical and hence fallible knowledge about these entities. The concept of substance should, however, be defined in such a manner that it enables the *philosophical* solution of the coincidence problem independently from any particular *empirical* theory of matter. Nevertheless, Zimmerman's assertion that »stuff« refers to something concrete does not hold either, for the following reasons: Obviously the words »substance« and »stuff« mean something. But this fact and the fact that in English »stuff« is grammatically a noun does not imply that the word »stuff« refers to something in the world in the same sense as the word »statue« refers to things of given shape and of definite social and cultural function. It is also undeniable that a concept like 'stuff' or 'bronze' fulfils the conditions that it is self-identical and distinguishable from the concepts of 'thing' or 'statue'; but these are logical conditions that every concept must fulfil in order to produce meaningful sentences. At no instance does this justify treating the term in question as systematically referring to a thing, even if it has the grammatical form of a substantive.

2. Concreteness and abstractedness

The first step of clarifying the relationship between 'substance' ('stuff') and 'thing' is to place a restriction in the use of the word »reference«. According to the traditional use, reference is a relation between a single object and a nominal, an indicative, or a definitely descriptive expression. Thus, the second planet of the solar system is the referent of the name »the planet Venus«. It is possible to extend this relation also to 'classes' of objects, so that words like »statue«, »thing«, or »(to) jump« have their referents in the statues and

the things that surround us, and in the movements that are described by »to jump«. This second kind of words are called *general terms* or *predicators*,[2] the kind of reference between a predicator and an object that falls into its scope is called *predicative reference*.

Predicative reference can be established ostensively, *i.e.* by pointing to a thing and pronouncing the word for it (*e.g.* »tree«, »car«), or by saying »this is a tree« *etc.* There are, however, some other methods for establishing the meaning of predicators except ostentation. Predicators can be introduced imperatively, by requesting the addressee to perform an action, or to bring something, *e.g.* »jump!« or »tile!«. Predicators that are more general can be introduced by means of *meaning postulates* of the form:[3]

$$x \, \varepsilon \, P \; \Rightarrow \; x \, \varepsilon \, Q$$

For instance: If a thing (x) is a statue (P), then it is [also] a work of art (Q).

Meaning postulates have the function of language norms. In our example, a meaning postulate allows a speaker who has predicated »statue« of an object as also to predicate »work-of-art« of the object.[4]

If we turn now our attention to the manner in which words like »substance«, »stuff«, or »bronze« are introduced, we will notice that it is not possible to establish their meanings ostensively, imperatively, or with the aid of a meaning postulate. It is, for example, not possible to introduce the word »water« solely by pointing to a pond and pronouncing »water«. What we point at and what we see are liquid things called »pond«, »river«, »drop«, »the ocean«, but not water. Similarly, when we order wine or water in the restaurant, we do not get wine or water as such, but always a glass or a bottle, that is a definite volume, of the requested liquids. So we have a paradox: words like »stuff«, »water«, or »bronze« do not refer to a single thing or to a category of similar things or animals, like »teapot«, »cat« or »animal«. On the other hand, sentences that contain words like these are not at all meaningless, although these words lack the kind of 'concreteness' proper as compared to »pond«, »statue« or »stone«.

In our effort to introduce the word »substance« and the 'substance names' (»water«, »copper«, »gold«, *etc.*) we undertake a reformulation: Instead of saying »there is a chair made of wood« we can also say »there is a wooden chair«. Similarly we can substitute every substance noun by an appropriate substance adjective – although this is not usual in contemporary English –, and still retain the original meaning of this sentence. Such *appredicators*[5] are words that are used for the classification of things; *i.e.* they cannot be used alone in a predicative sentence, although they refer in general to 'something', namely to properties of things. The reference problem arises here again: Albeit appredicators like »red«, »rapid«, »heavy« can be introduced ostensively or imperatively[6] and hence possess a reference similar to that of predicators, this

is not the case for our substance adjectives. It is not a single referable property, but merely a property of a property that makes a thing wooden or 'coppern', namely the property of being *homogeneous* in respect to a number of particular properties. Being homogeneous means here that randomly cut parts of a thing match in a specific kind of properties. Properties sharing the feature that a thing can be homogenized or be regarded as homogeneous with respect to them I call *substantial* properties. Examples for such properties are aggregate state (solid, liquid, gaseous), color, taste, smell, the ability to give a sound when struck, hardness, density, inflammability, electrical conductivity, refractive index *etc.* Examples of non-substantial properties are shape, weight, velocity, or temperature. Things that are homogenized or regarded as homogeneous with respect to the state of aggregation and to one of the other substantial properties I call *substantially homogeneous*.

The final step from substantially homogeneous things to statements about the substance they are made of is done by establishing an equivalence relation[7] between substantially homogeneous things, the relation of being *equisubstantial*. This is the case when two substantially homogeneous things match in their state of aggregation and in one or more other substantial properties. We can then introduce an expression – the word »substance« or its synonym »stuff« – that denotes this relationship without taking into consideration the rest of the properties of those things. Statements about the substance a thing is made of are true for every thing that is equisubstantial with it. The concepts of substance or stuff do not have the semantic function of a predicator, but that of an *abstractor*.[8]

The procedure outlined here for the introduction of the concept of substance is an application of the general abstraction scheme that has been proposed by Paul Lorenzen (1969) and recently refined by Dirk Hartmann (1993). According to this scheme, an abstractor is introduced by three steps:

1) Establishment of an equivalence relation ($\sim$) between concrete objects within a range of values (B).

2) Definition of an open sentence A(x) that is *invariant* (inv) with respect to $\sim$:[9]

   $$\text{»A(x)« inv »}\sim\text{«} =_{\text{def}} \bigwedge a,b.\ a \sim b \rightarrow (A(x/a) \leftrightarrow A(x/b))$$

3) Conditional definition of the abstractor ($\widetilde{x}$):[10]

   $$A(\widetilde{x}) =_{\text{def}} A(x)\ |\ B(x) \wedge \text{»A(x)« inv »}\sim\text{«}$$

i.e. under the condition that A(x) is invariant with respect to $\sim$, it is allowed to state for an object of B that A($\widetilde{x}$) instead of A(x).

Similarly the abstractors »copper«, »marble« *etc.* can be introduced by establishing particular equivalence relations with definite values of the selected substantial properties. For instance, all solid things that are homogeneously

of a dark brown color, are reflecting light, have an average density of 8.92 g/cm³, give a characteristic sound, are covered with a greenish layer when exposed for a long time to the weather *etc.*, are made of the stuff or the substance called »copper«.

To this introduction of the term »substance« and the substance words via this abstraction scheme, one could object that it is not adequate since it is bound to a given state of aggregation. Everybody knows that water and ice consist of the same substance in two different states of aggregation. Thus, the definition of substance seems to be underdetermined and the reference problem arises again. The answer to this objection is that the equivalence relation of equisubstantiality is indeed primarily confined to the state of aggregation of the things considered. Ice, water, and steam *are* three distinct substances. The circumstance that melting of ice things can restore the equisubstantiality of water things (*i.e.* water volumes) is a contingent fact. Our daily world is filled with substances like honey, milk – even marble, or diamond – that cannot survive any change of aggregate state. At any case, this kind of persistence can only be determined after reconversion to the initial state of aggregation. We know that water and ice are the same substance only because we can convert the one into the other by raising and lowering the temperature. Albeit this 'interconvertibility' is an important feature for the selection of those substances that can be used for setting up a 'substance genealogy' in a chemical sense[11], as a property it is methodically secondary.

3. Conclusion

The introduction of the term »substance« or »stuff« and the substance words via the abstraction scheme enables the resolution of the problem of 'coinciding objects' by avoiding both the difficulties of Burke's approach and the claim that substances are fictitious entities. The problem arises because the expression »piece of bronze« is given the same ontological status as »bronze statue« and »bronze bar«. Since a thing called »bronze bar« can be transformed by melting and casting to a thing called »bronze statue«, whereas things called »piece of bronze« are in general not affected by such a treatment, the impression arises that pieces of bronze are something different than bronze statues and bronze bars. The introduction of the term »bronze« as an abstract substance name that does not refer to a thing, but merely to a specific way of talking about a common substantial aspect of things makes clear, however, that »piece of bronze« refers to this specific common property of both bronze statues and bronze bars, namely being made of bronze. In Aristotelian terms »piece of bronze« denotes the common *genus* of which

both bronze statues and bronze bars are *species*. In our terms, »piece of bronze«, »bronze bar« and »bronze statue« are *predicative expressions* linked by the following meaning postulates:

> x ε »bronze statue« ⇒ x ε »piece of bronze«, and

> x ε »bronze bar« ⇒ x ε »piece of bronze«

The changes caused by melting and casting affect the species level of statues and bars. On the genus level of pieces of bronze, things remain unchanged.

Notes

[1] *Cf.* Quine 1969.

[2] In contrast to predicates that are unsaturated sentences of the kind »... is moving«, »... is red«, »... goes to town« that are obtained from saturated sentences by omitting the nominal expression, predicators describe only the 'naked' fact, action, thing or property. There are several kinds of predicators depending on their type of reference (actions, things, and properties). Sentences can consist of a single predicator (*e.g.* in an imperative sentence like »go!«) or of nominal expressions and one or many predicators that are connected by *copulae* (*e.g.* »is«, »has«, »does«) and other logical particles. See also Lorenzen 1969 and 1987.

[3] ε is the *affirmative copula*, and ⇒ the so called *rule arrow*.

[4] *Cf.* Carnap 1956.

[5] This term has been introduced by P. Lorenzen (1987).

[6] In sentences like »fetch me a red tile, not a blue one!«, or »I prefer a rapid delivery, even if it is more expensive«.

[7] An equivalence relation is a reflexive, symmetrical, and transitive relation.

[8] *Cf.* Lorenzen 1969.

[9] A(x/y) and A(x/z) means that in A(x), x is replaced by a and b, both belonging to the range of values B.

[10] The *pragmatic subjunctor* »|« denotes that the statement on its left side is valid only under the condition stated on its right side. *Cf.* Hartmann 1990, pp. 61ff.

[11] Substances that fulfil this criterion I call *chemical substances*. For the reconstruction of other chemically relevant terms *cf.* Psarros 1999.

References

Burke, M.E.: 1997, 'Coinciding objects: reply to Lowe and Denkel', *Analysis*, **57**, 11-8.
Carnap, R.: 1956, *Meaning and Necessity*, The University of Chicago Press, Chicago-London.
Chappell, V.C.: 1973, 'Matter', *Journal of Philosophy*, **70**, 679-96.

Hartmann, D.: 1990, *Konstruktive Fragelogik*, BI Wissenschaftsverlag, Mannheim-Wien-Zürich.

Hartmann, D.: 1993, 'Ist die konstruktive Abstraktionstheorie inkonsistent?', *Zeitschrift für philosophische Forschung*, **47**, 271-85.

Lorenzen P.: 1969, *Normative Logic and Ethics*, Bibliographisches Institut, Mannheim-Zürich.

Lorenzen P.: 1987, *Lehrbuch der konstruktiven Wissenschaftstheorie*, BI Wissenschaftsverlag, Mannheim-Wien-Zürich.

Psarros N.: 1999, *Die Chemie und ihre Methoden*, Wiley-VCH, Weinheim *et al*.

Quine, W.V.O.: 1969, *Word and Object*, MIT Press, Cambridge/MA.

Zimmerman, D.E.: 1997, 'Coinciding objects: could a "stuff ontology" help?', *Analysis*, **57**, 19-27.

Nikos Psarros:

Institute of Philosophy, University of Leipzig, Burgstr. 21, D-04109 Leipzig, Germany; psarros@rz.uni-leipzig.de