

## WHY THERE IS NO SALT IN THE SEA: Some Current Topics in the Philosophy of Chemistry

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Philosophy of Chemistry is a field of research that is now developing rapidly. This talk introduces that field by considering a question discussed at recent international meetings, why there is no salt in the sea.

'Surely,' some will say, 'everyone knows that there is lots of salt in the sea'. But what does the word 'salt' refer to? What, precisely, is 'salt'? The first meaning given in the *Shorter Oxford English Dictionary* is "the substance (sodium chloride, NaCl) which gives seawater its characteristic taste, a white or (when impure) reddish brown mineral crystallizing in the cubic system. This substance is obtained by mining or by evaporation of sea water and used esp. for seasoning and preserving food." On the basis of this definition, the name 'salt' refers to a certain white solid, crystalline, material that we all know and use. Does any of that solid white stuff exist in the sea? — Clearly not.

Indeed, one can make salt from sea water, by putting that liquid in a shallow pan that stands in a sunny place. Eventually, salt will appear — but only when the sea water has gone. Suppose I buy a ream (500 sheets) of blank white paper and a cartridge of black ink. Does 'the great American novel' exist in that collection of items? Certainly not — even though, with the aid of a computer, a printer, and some effort, one can turn those materials into a novel (whether good, bad, or indifferent). What is the difference between that situation and the case of salt water, except that a shallow pan and a sunny ledge are rather simpler than a computer and a printer — and pouring water into a pan is a bit easier than composing a long story? When salt dissolves in water (as it surely does), what is present is no longer 'salt' but merely a collection of large numbers of hydrated sodium cations and chloride anions, neither of which is precisely salt, nor is the collection.

Salt is one of the ingredients one would need to make brine artificially, but it is not, actually, a component of brine. The use of the word 'actually' in that sentence may remind some of the related word 'potentially'. The statement that there is salt in the sea is not true in a sense of actual existence, but it is correct that salt may be obtained from seawater. Therefore salt may be considered to be present in seawater, but only in some more or less vague 'potential' way — quite like my future novel (perhaps to be called *Moby Harry*) that does not now exist, but might in the future, since I have the materials needed for writing such a screed.

So what? Who might conceivably care about such verbal quibbles? Any adequate theory of wholes and parts (mereology) must be able to take into account the undeniable fact that when individuals enter combinations of any interesting sort, they no longer are the very same individuals that existed prior to the composition. All past and present mereological theories, it seems, cannot do this. (If anyone knows of a presently existing mereology adequate to this task, please let me know.) So far as I know, no such formal theory now *actually* exists — though a system of that sort *potentially* exists wherever there is a ream of blank paper.