Compound-forming *ware*

Janet DeCesaris
Universitat Pompeu Fabra Barcelona, Spain
janet.decesaris@upf.edu

0. Introduction. In this paper I would like to analyze the behavior of the element *–ware*. First I will discuss the morphological characteristics of *-ware* and of the words which contain it as a result of productive word-formation. Although *–ware* has been used to form compounds in English for generations, only rather recently has it acquired a new sense, that which is found in words such as *shareware* or *spyware*. In my view, *-ware* has developed into two different, currently productive compound-forming elements, one meaning goods, and the other meaning computer software. The morphological characteristics of *–ware* are rather similar to those of the putative suffix *–gate*, which since the 1970s has been used to refer to political scandals, especially in American English. Curiously, -ware*e* has received much less attention in the linguistics literature than has *–gate*. Elements like *–ware* or *–gate* provide somewhat of a challenge to morphological analysis, because these elements show characteristics of both derivational suffixes and of compound-forming elements, which is problematic for frameworks of morphology that hold that derivation and compounding are two different sorts of word-formation processes. After my discussion of the lexicological nature of *–ware* and of the words containing it, I will discuss dictionary representation of this element and of word-forming elements in general. I hope to show that, in general terms, dictionaries do not provide an informative description of elements that play a crucial role in English word-formation such as prefixes or suffixes, or even neoclassical combining forms, and that the description of *–ware* in dictionaries is generally poor.

1. Characteristics of *–ware*. According to the Oxford English Dictionary,[1] *-ware* as a collective noun referring to articles of merchandise or manufacture is attested in English since the 11th century, and as early as the late 14th century it has been used with what the OED terms a "defining word" that immediately precedes it. Examples of early words following this pattern are *earthenware*, *hardware*, and *stoneware*. As collective nouns, these combinations with *–ware* are generally syntactically singular. The plural *wares* is attested early on, with the OED providing several examples starting in the 15th century (in addition to one example from the 11th century). Although the combinations with "defining words" are usually singular, at least one common word, *housewares*, is generally used in the plural. For our purposes, we may summarize the treatment of *ware, n*[3] in the OED (2nd ed., 1989) as follows:

Summary of *ware, n*[3] in the OED

5 main senses, with sub-senses, for a total of 16 meanings

- Sense 1:

1. A collective term for: Articles of merchandise or manufacture; the things which a merchant, tradesman, or pedlar, has to sell; goods, commodities.

a. collective singular
b. plural

Citations from 11th century – 20th century

- Sense 2:

2. With defining word, as *dye*, *dyeing-*, †*fell-*, […]
Also HARD-WARE, HOLLOW-WARE, IRONWARE, †LENTRINWARE, SMALL-WARE(S, TABLEWARE, and others mentioned in 3.
Citations from 14th century – 19th century

- Sense 3:

3. In *spec*. uses. **a**. Vessels, etc, made of baked clay. Chiefly with defining word, as *brown, china-, Delf-, glass-, Japan, porcelain, pottery, Queen's, Staffordshire, Wedgewood ware*, […] EARTHENWARE, STONEWARE.
Citations from 18th century – 20th century

[1] The *–ware* that concerns us in this paper is the third noun entry for *ware* in the OED.

Morphological analysis of words included in this entry indicates that *–ware* forms compounds in English, as both elements are words (as opposed to an affix plus a root). The "defining word" is usually a noun, as in *ironware*, *tableware*, *glassware*, and *stoneware*, but note that this is not always the case. From early on, *-ware* has also combined with adjectives, such as *hard* in *hardware* and *earthen* in *earthenware*. In addition, we note that there exist several words first attested in the 20th century in which the "defining word" is a verb; *bakeware* (1946) and *cookware* (1953)[2] fit this pattern. Finally, note that *–ware* also combines with proper nouns, such as *Japan*, *Stratfordshire* and *Wedgewood*, all of which are listed as examples in sense 3 of the OED entry summarized above.

The fact that *–ware* combines with defining words to name different types of vessels and pottery is, I believe, responsible for the fact that several manufacturers of sets of pans and/or dishes have used *–ware* as part of the proprietary name of a new product. This has been particularly true of products developed in the United States, where we can find Farberware® (patented in 1937), Revere Ware® (1939), and Corningware® (1958), and, of course, Tupperware® (1956). In addition, we may note the "department store" use of several words containing *–ware*, as stores often use these words to name product areas. Some examples would include *glassware*, *flatware*, *barware*, *stemware*, and *dinnerware*.

The word *hardware* was first used in the field of computing in 1947 (Ayto 1999:280), to refer to the machine and equipment used in data processing. On the pattern of *hardware*, *software* was created to refer to the programs that control the *hardware*. In turn, on the basis of the word *software* numerous other words and expressions have been created, all of which are semantically directly related to *software*. Some common examples of these creations are *adware*, *courseware*, *demoware*, *freeware*, *groupware*, *malware*, *shareware*, and *spyware*. Currently *–ware* is a quite productive compound-forming element in computer science; many of these words may be classified as informal in nature and are often humorous in

[2] These dates are according to Merriam-Webster's Collegiate Dictionary.

nature (e.g. *shelfware*, which refers to unused software that is consequently left on a shelf).

2. Linguistic analysis of words with *-ware*. Despite its presence in common words and proper names, *-ware* has not generated much interest in previous linguistic analyses. It seems to have gone unnoticed by many linguists studying the history and structure of English morphology, probably because *–ware* has formed compounds and as such has never really been classified as an affix. The descriptions of compounding in Bauer (1983), Plag (2005), and Harley (2006) also omit discussion of *–ware* words. We note that neither Marchand (1960) nor Stein (2007) include *–ware* as an affix; neither do Stockwell and Minkova (2001) in their textbook treatment of this topic, although they do specifically list *shareware* as a compound (2001:67).

Marchand (1960:290) describes a class of word-formation element that he calls "semi-suffix" which would seem to cover the use of *–ware* (both the historical use and the more recent use in computer science). He defines semi-suffixes as elements "midway between full words and suffixes. Some are only used as second words of compounds, though their word character is still clearly recognizable." Some examples of semi-suffixes given by Marchand are *–like*, *-worthy*, *-monger*, *-way*, *-ways*, and *–wise*.

The fact that *–ware* is not included in Stein (2007) is somewhat surprising for two reasons. On the one hand, Stein is working at a time in which both senses of *–ware* are active (the software sense is not applicable to Marchand's work). On the other, her definition of suffix is quite broad and covers items such as *–ways*, and *–wise*, both of which exhibit characteristics that are reminiscent of those of *–ware*.

Adams (2001) observes that morphological productivity can sometimes by linked to specific cultural factors. She goes on to state

> "Examples of probably very transient productivity include [...] the *ware* of *software* (after *hardware*) in *censorware, familyware, groupware, netware, shareware, webware.* [...] These elements are all rather specific in meaning, and hence rather limited in the bases with which they are compatible and the occasions on which their use is appropriate. [...] But none of these elements seems likely to develop any greater degree of productivity, as has happened in the past with a few compound constituents which have lost or are losing their semantic autonomy to become suffixes, such as *–dom*, *-hood*, *-less* and *–like*. (2001:148-9)

As the computer software industry has developed, Adams prediction concerning the limited productivity of software-related *–ware*, at least in current informal speech, seems to be incorrect. A search for **ware* in www.onelook.com yielded over 2000 items containing *–ware*, most of which were related to the computing industry and many of which were proprietary names in that field, e.g. *Authorware*, *Memoware*, or *NetWare*.

The analysis I would like to suggest for *–ware* in current English is that there are two different compound-forming elements *–ware*, one corresponding roughly to the meaning of merchandise or goods, and the other corresponding to computer software meaning. I believe that both *-ware*s are compound-forming elements because in neither case is it possible to identify a single lexical class to which the element attaches; in other words, the fact that both *–ware* elements attach to nouns (*ironware*, *groupware*), adjectives (*flatware*, *freeware*) and verbs (*cookware*, *shareware*) indicates that *–ware* has not yet become a suffix, because suffixes in English typically attach to a single class of lexical stem. We should posit two compound-forming elements because the semantics of *-ware*[1] (goods) is much broader than that of *ware*[2] (software).

Compound-forming *-ware* (or *–ware*s, according to the analysis presented here) exhibits behavior similar to *–gate*, another word that has entered into word-formation processes in English in the 20th century. The element *–gate* detached from a compound, *Watergate*, and is now conventionally described as a new derivational affix in English (cf. Harley (2006), Booij (2007) or Stein (2007), meaning a "scandal involving alleged illegal acts and often a cover-up, especially by government officials:

Irangate."[3] Szymanek (2005: 435-6) terms this phenomenon 'affix secretion', defined as "a case where a new affix has established itself because speakers start to perceive it in a group of borrowed words or because seakers reinterpret a particular existing word (which can be native or foreign). [...] Initially, the use of such a newly established affix may be attributed to analogy." The difference between both *–ware*s and *–gate* is that *–gate* attaches to noun (and preferably proper noun) stems, whereas compound-forming *–ware*s still retain more of their word-like status and consequently are able to attach to a wider variety of stem classes. I believe both *–ware*s are better described as a type of combining form, at least at this point in English.

3. Dictionary treatment of *–ware*. A search for words ending in *–ware* on www.onelook.com shows that the software-related compound-forming element is present in 58 of the 126 common (=non-proper noun) nouns. We would thus expect this meaning to be present in current dictionaries of English that contain entries for word-formation elements (prefixes, suffixes, or combining forms). Some English dictionaries do not include the software-related sense:

a. Merriam-Webster Online Dictionary.

Main Entry: ware
Function: *noun*
Etymology: Middle English, from Old English *waru;* akin to Middle High German *ware* ware and probably to Sanskrit *vasna* price — more at venal
Date: before 12th century
1 a : manufactured articles, products of art or craft, or farm produce : goods —often used in combination <tin*ware*> b : an article of merchandise
2 : articles (as pottery or dishes) of fired clay <earthen*ware*>
3 : an intangible item (as a service or ability) that is a marketable commodity

[3] This definition is from The American Heritage Dictionary of the English Language, 4th edition. Other examples, in addition to *Irangate*, would include *Whitewatergate* or *Monicagate*.

b. American Heritage Dictionary of the English Language, 4th edition.

-ware
suff.
1. Articles of the same general kind, made of a specified material, or used in a specific application: *hardware*; *silverware*.
2. Software: *groupware*; *shareware*.
[From ware1. Sense 2, from (soft)ware.]

c. Cambridge Advanced Learner's Dictionary

-ware suffix
used, often in shops, to refer to objects of the same material or type, especially things used in cooking and serving food
tableware
the kitchenware department

d. The Chambers Dictionary (2008)

ware[1] […] combining form articles of a specific type or material, as in *hardware*, *earthenware*; used to denote categories of material used in computer processing, as in *hardware*, *software*, and various forms of *software*, as in *shareware*.

e. The Oxford Dictionary of English (2nd ed.)

-ware *combining form*
1) Denoting articles made of ceramic or used in cooking and serving food: *tableware*, *bakeware*.
2) Denoting a kind of software: *groupware*.

f. Oxford English Dictionary, ADDITIONS SERIES 1993

ware, n.3
Add: [2.] b. transf. in Computing, originally in SOFTWARE n. (after HARDWARE n. 1 c), used in words describing components of a computer system or software of a specified type, as *COURSEWARE n., LIVEWARE n.,
shareware n. s.v. *SHARE v.2 8, etc.

We note that two dictionaries do not include the software-related sense of –ware (Merriam-Webster and Cambridge). American Heritage classifies -ware as a suffix, as it uses a very broad definition of suffix (including non-neoclassical combining forms). To my mind, the current Chambers

and Oxford dictionaries provide the most accurate treatment by separating the senses (Chambers uses a semi-colon, Oxford provides numbered senses). The fact that morphological analysis led me to posit two *–ware* combining forms for current English does not mean that the dictionary representation must represent that analysis. Presumably, these dictionaries include both senses in the same entry because of etymological criteria, as we know that software-related *–ware*[2] arose from *software*, which arose in contrast to *hardware*, which is a quite old word the meaning of which was extended at one point to computer equipment. Although the software-related sense is relatively recent, it was included in the OED in 1993, which makes the omission of this meaning in other dictionaries rather curious. Perhaps the meaning is too colloquial, or possibly considered too ephemeral, for dictionary inclusion; nevertheless, words like groupware and spyware seem to be a permanent part of the English lexicon.

The fact that many dictionaries do not have a separate sense for *-ware* as a compound-forming element may also be related to the difficulty of describing word-formation elements in a dictionary context. General language dictionaries designed to be printed on paper—a description which applies to the dictionaries listed above—are ill-equipped for representing word-formation because word-formation is a dynamic process that involves a large number of factors. Amongst these are the grammatical and semantic characteristics of the stem, the grammatical and semantic characteristics of the affix, and the degree of productivity. Dictionaries are not grammars, and word-formation cannot be explained without constant referral to grammar. To date, dictionaries generally provide little information about the lexical category of the stem to which a stem or a combining form attaches to; note that none of the dictionary entries specify that *–ware*[1] ("goods" sense) attaches to words belonging to three different categories (nouns, adjectives, and verbs). They also generally provide little information about the pragmatic conditions of use,

although in this case the Cambridge Dictionary stands out for highlighting the use of *-ware* in shops.

We might ask if dictionaries should provide information on word-formation in the first place. I do not have a firm answer to this question because I believe it depends on the specific dictionary project at hand. I would like to suggest, however, that the following points need to be considered:

- The amount of grammatical information in general language dictionaries is increasing as these dictionaries take on many of the characteristics formerly only associated with advanced learner's dictionaries for non-native speakers. Exactly how much grammatical information, and what sort of grammatical information is best suited to dictionary representation is an open question at this point.
- Dictionaries designed for electronic consultation do not depend on linear presentation of information, which should result in a change of the way grammatical and usage information is presented.
- General language dictionaries as we conceive of them today are about words with lexical content. Words with grammatical content have always proved problematic for dictionaries because they defy definition. Parts of words (affixes and combining forms) have both lexical and grammatical content. Dictionaries must attempt to explain both of these facets, if they aim at providing an accurate description of word-forming elements such as affixes and combining forms. If they only provide semantic information, the entries corresponding to affixes and combining forms will be incomplete.

4. Conclusion. This paper has argued that current English has two combining forms *–ware*, one referring to goods and one referring to types of computer software. Both combining forms may be used to produce compounds in contemporary English, and both have been used to create

propriety names. The more recent sense of *–ware* is not included in some current dictionaries of English, even though it is well attested in texts. Dictionaries should consider improving their description of word elements such as *–ware*, if they include affixes and combining forms as headwords.

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