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Gender and Folk Taxonomy: the Indexical Relation
between Grammatical and Lexical Categorization

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So God formed out of the ground all the wild animals and all the birds of heaven. He brought them to the man to see what he would call them, and whatever the man called each living creature, that was its name. Thus the man gave names to all cattle, to the birds of heaven, and to every wild animal. Genesis 2:19-20.

1. Analogy vs. anomaly. Names, according to the ancient Hebrew view recorded in Genesis, are natural in the sense that they are based on properties of their referents. Adam named the animals by looking at them. The information he used for choosing the name for an animal was the way the animal looked. Thus each name was a natural reflection of its referent. This analogist view of the relation between form and meaning finds its antithesis in the anomalist view (Lyons, 1968), according to which a name is arbitrarily related to its referent, and is in no way based on any properties of the referent itself. Since a name has no natural affinity for its referent, different linguistic communities may adopt different names for it with no constraint: a dog is called "dog" in English, "Hund" in German, and "chien" in French. Following the popularization of the anomalist view by the neogrammarians in the 19th century, it was codified by Saussure (1916) in his doctrine of "l'arbitraire du signe linguistique," which forms the cornerstone of much of the modern study of language. This principle seems unassailable when applied to the lexicon--the prime reserve of the arbitrary relation between form and meaning in Saussure's sense--and yet over the years certain caveats have appeared in studies of the lexicon. Taken together, these documented affinities between form and meaning suggest an underlying web of natural, analogical connections limiting the degree to which the name for a concept may be infinitely variable.

The first and most widely known caveat is onomatopoeia, cited by the ancient Greek analogists as the basis for their position. While there is an undeniably motivated relation between form and meaning in English "cuckoo," or "clink/clank/clunk," this phenomenon seems limited in English and other languages to a small number of lexemes pertaining to sound. A caveat more threatening to the anomalist position was formulated by Zipf (1935). Using the Thorndyke/Lorge lists he demonstrated that word length is an inverse function of word frequency. In terms of the analogist position, the more frequently a referent type is talked about, the shorter its name is likely to be, or become over time. While Zipf's Law constrains only peripheral aspects of form and meaning it does apply ubiquitously to the lexicon, and is not limited as is onomatopoeia to a small number of lexemes.

A further analogical restraint on anomalist thinking was provided by Roger Brown (1958) who proposed that among the hierarchy of names that may be applied to a referent on differing occasions there is one "basic" level from which a name is most likely to be drawn, and that this level has the highest cultural salience for speakers of the language. For example, I might appropriately call the object I have in my hand at this moment a "thing," "artifact," "writing implement," "pencil," "automatic pencil," or "fine-leaded automatic pencil" on different specific occasions, but across most contexts I am likely to call it simply "pencil." Brown's functional insight has been extensively documented by Berlin, Breedlove and Raven (1973) and others working on folk taxonomy in the ethnobiological domain [1]. In all cultures that have been studied in sufficient detail (C.H. Brown, 1984, in an extensive cross-linguistic survey) there is a hierarchy of terms referring to the animal and plant kingdoms with at least a superordinate (life form), a basic (generic) and a subordinate (specific) level. The most frequently used terms in spontaneous descriptions come from the basic generic level (at least in non-urban societies, Berlin et al., 1973), distinguishing its pragmatic utility from superordinate and subordinate levels. The various terms used to refer to *Strix Rebulosa*, the great grey owl, in a recent popular science article (Quinton, 1984) aptly illustrates this effect. Figure 1 shows "owl" to be the textually most utilized term, with more and less specific terms used with decreasing frequency.

This utility has been supported in the laboratory. For example, Rosch et al. (1976) demonstrated that when asked to name a picture, e.g. of a specific variety of apple, people preferred to name it at the basic level (apple) rather than at the superordinate (fruit) or the subordinate (pippin apple). Furthermore, when shown the picture and asked to decide whether a particular name applied to it, people could evaluate the basic level term faster than either a superordinate or subordinate term.

These ethnographic, text distributional, and experimental data show lexical form to be an index of meaning in a variety of ways that go beyond Zipf's law. Zipf's law predicts that the basic taxonomic level, because of its frequent use, will be labeled with shorter, morphologically simpler terms than superordinate and subordinate levels. This is indeed the case (Casson, 1981). Berlin et al. (1973) regard the systematic presence of secondary lexemes composed of a primary lexeme and a modifier (e.g. "great grey owl") as characteristic of the subordinate (specific) level, in contrast with primary lexemes at the generic level. This means that the length and/or morphemic complexity of a word will be an index of its taxonomic level. A domain of cultural artifacts rather than of nature will help to illustrate the generality of this point:

superordinate: furniture

basic level: chair, sofa, table, desk, lamp

subordinate: recliner, love seat, coffee table,
secretary, chandelier

The superordinate term is longer than any of the basic level terms, and has at least latent morphological complexity (cf. *furnish* and *fissure*). The subordinate terms are all longer than the basic level terms, and many are polymorphic. Furthermore, "coffee table" corresponds to Berlin et al.'s definition of secondary lexemes. Virtually all items subordinate to "table" are formed by adding a modifier to this primary lexeme: (side table, kitchen table, gateleg table...).

In sum, the work of the folk taxonomists demonstrates a clear indexical relationship between the length or morphological complexity of a name and the rank of that name in the hierarchical nomenclature system, and thus substantially extends the analogist position into a previous domain of anomalism. In this chapter we will show that the analogist position can be extended even further to a grammatical property of names, specifically, to their gender marking in German. Our argument will significantly extend the analogist position, since gender assignment is a grammatical domain in which a motivated relation between form and meaning is least expected to turn up. Indeed, since ancient times gender has fueled the anomalist assertion that language structure is accidental. Ockham meant his razor to cut such meaningless baggage away from the more essential, meaning-bearing structure of language:

According to Ockham, in order to explore mental language, we must cut away everything in natural language...that is unnecessary for the expression of thought. Thus for example, grammatical categories like nominal gender in Latin cannot reflect anything in mental language, since they are meaningless. (Wierzbicka, 1980:3, summarizing Boehner's, 1962, translation of Ockham).

This extreme anomalist view of gender carries down to the present day, appearing to be firmly entrenched both in linguistics:

There seems to be no practical criterion by which the gender of a noun in German, French, or Latin could be determined (Bloomfield, 1933:280).

and in psycholinguistics:

The classification is arbitrary. No underlying rationale can be guessed at. The presence of such systems in a human cognitive system constitutes by itself excellent testimony to the occasional nonsensibility of the species. Not only was this system devised by humans but generation after generation of children peaceably relearns it. (Maratsos 1979:235, summarizing his view of gender assignment in German).

On the other side of this issue, the analogists tried to see gender assignment in the lexicon at large as a metaphorical extension of sex reference, even to the extent of suggesting prescriptive changes:

Protagoras noticed the large correspondence Greek genders had with males and females, and their characteristics and activities; ...[he] suggested that logically the feminine nouns 'wrath' and 'helmet' should be reassigned to the masculine gender (Dixon, 1982:174).

The analogist attempt to see gender classification as the metaphorical extension of sex to the rest of the world reached its culmination in the German romantic movement, exemplified by Grimm (1890):

Das grammatische genus ist...eine in der phantasie der menschlichen sprache entsprungene ausdehnung des natürlichen auf alle und jede gegenstände (p. 343). Das masculinum scheint das frühere, grössere, festere, sprödere, raschere, das thätige, bewegliche, zeugende; das femininum das spätere, kleinere, weichere, stillere, das leidende, empfangende... (p. 357). 'grammatical gender is an extension, arising in the imagination of human language, of a natural order onto each and every object. That which is masculine is earlier, larger, firmer, more inflexible, quicker, active, moveable, creative; that which is feminine is later, smaller, softer, quieter, suffering/passive, receptive.'

This extreme analogist characterization of gender as an indexical mark of metaphorically extended sex characteristics cannot be empirically substantiated in the lexicon of German or other Indo-European gender languages; Grimm himself viewed it as having only limited application to individual cases. However, we have been able to demonstrate a close correlation between gender assignment and sex-associated personality characteristics in the German affective lexicon (Zubin & Köpcke, 1984a), and in a general exploration of semantically motivated gender assignment we have found other semantic patterns in the inanimate lexicon that may have a basis in sex-associated characteristics (Zubin & Köpcke, 1984b; Köpcke & Zubin, 1984).

Particularly enigmatic to the analogist view of gender is the distribution of neut-gender, which seems to crop up at random in every part of the lexicon. A clue to the underlying principle comes from Grimm (1890):

Urbedeutung des Neutrums scheint, dass es die unentwickelte des geschlechts, nicht gerade geschlechtslosigkeit bezeichne. Daher wird...das allgemeine, collective durch das neutrum ausgedrückt. (p. 312) 'the original meaning of neuter gender seems to be that it marks underdevelopment of sex, not exactly sexlessness. For this reason generality and collectivity are expressed by neuter.'

The clue resides in the fact that Geschlecht, usually translated as 'sex', has a more general sense--'position in a hierarchical categorization'--which Grimm may additionally have had in mind. To paraphrase this interpretation, masc, fem, and neut-gender

would be indexically mapped onto the entire non-sexed lexicon at an abstract level: the sex-associated genders masc and fem would index greater differentiation in a hierarchical lexical schema and the corresponding possession of precisely defined characteristics, while neut-gender would index lesser differentiation in the hierarchical schema and the corresponding lack of precise characteristics.

2. Neut-gender and vague reference. The attractiveness of this proposal is heightened by two specific uses of neut-gender. Firstly, those concrete nouns which provide virtually no information about their referent and therefore can refer to the broadest range of entities almost all have neut-gender:

das Ding 'thing'	das Teil 'part'
das Dings 'whatchamacallit'	das Werk 'creation'
das Element 'element'	das Wesen 'being'
das Gebilde 'product'	das Zeug 'implement'
das Gerät 'implement, apparatus'	
das Geschöpf 'creation'	
das Glied 'part, member'	<u>masc/fem-gender</u>
das Gut 'goods'	der Gegenstand 'object'
das Objekt 'object'	der Körper 'body'
das Stück 'piece'	die Sache 'thing'

These nouns are used to categorize objects at the highest level of generalization, and so are frequently used when a more specific, basic level categorization is not known to the speaker. For example,

- das Ding or das Dings might be used to request or point out an object when the speaker has no idea how to categorize it;
- when assembling an apparatus, das Teil or das Stück might be used to request a part when its specific name is not known;
- when viewing a multi-media object in an art gallery a viewer might refer to it as das Werk if a more specific label does not apply.

These nouns thus do little more than categorize their intended referents as discrete entities, and otherwise provide no tangible information about their referents.

Secondly, definite pronouns (personal and demonstrative) use the morphologically neuter form to refer to entities which the speaker cannot yet categorize in the situation (a1) whereas use of masc/fem-gender pronouns implies that the speaker, and usually the hearer, have already specifically categorized the object (a2).

- Das auf dem Tisch, gehört es dir?
'that (thing) on the table, is it yours?'
 - Die auf dem Tisch, gehört sie dir?
'that (e.g. pipe) on the table, is it yours?'

Neut-gender pronominal forms also refer to vaguely referential entities that have not been lexicalized and hence have no conventional gender (bi). [2]

- bl. Man versucht das Beste, das man kann, ob es gelingt oder nicht.
'you attempt the best that you can, whether it succeeds or not'

3. Gender and lexical taxonomy.

3.1. Cognitive properties. Grimm's insight seems to have direct bearing on some pronominal uses of neut-gender. From this perspective a further specific exploitation of neut vs. the sex-associated genders should be the differentiation of superordinate from basic level terms in the behaviorally defined sense of Rosch et al. (1976) and others. Rosch et al. report experiments in which they gave people a list of nouns and asked them to list as many attributes of each referent as they could. They could think of only very few attributes for nouns from the superordinate level of a taxonomy (e.g. 'fruit'), but a significantly greater number of attributes for nouns from the basic level (e.g. 'apple'). The number of attributes given for subordinates (e.g. 'Mackintosh'), however, was not significantly greater than for basic level terms. In an extension of this research Tversky (1984) demonstrates that the greater concreteness of basic level terms is primarily due to the specifiability of parts. For example, a chair has legs, a seat and a back, whereas no parts common to all furniture can be given. Parts are important because they are specified for both shape and function, and therefore bring our strategies for perceptual recognition together with our modes of interaction with objects.

In parallel research by Rosch et al., subjects were asked to draw the outline of specific objects. When the outlines of objects in the same superordinate category were superimposed (e.g. 'car' and 'motorcycle' as instances of vehicles) very little overlap in outline resulted. But when objects from the same basic level category (e.g. a sedan and a sports car) were superimposed, a significant increase in overlap resulted. Superimposing two outlines from a subordinate category (e.g. two sportscars) resulted in little additional overlap beyond the basic level. The same effect was demonstrated for the listing of actions appropriately carried out with or on a particular object type. For example, when asked to list how they might interact with a piece of furniture, subjects could list few, and only vague, actions common to all. In thinking about a chair, however, subjects could list many more, and more precise actions. Little increase in action specificity was obtained, however, from a subordinate category such as 'easy chair.'

3.2 Rosch' superordinates. Crucial for the role of gender in conceptual hierarchization is Rosch and her colleagues' demonstration of the conceptual hiatus between basic terms and superordinates, in which basic terms have a detailed and specific semantic representation corresponding to both perceptual and interactional character-

istics, while superordinates do not. Superordinate concepts are conceptually vague, undifferentiated, while basic level concepts are richly specified both perceptually and functionally.

A first demonstration that gender differentiates between superordinate and basic level categories can be made by translating the non-zoological taxonomies from Rosch (1973) and from Table 2 of Rosch (1977). Rosch apparently picked out particularly representative taxonomies, and thus provides a fair test of the hypothesis that gender marking correlates with taxonomic rank. Table 1 gives Rosch' categories. Basic level terms have mas or fem, and occasional neut-gender (cf. sect. 6), with differentiation within each class, while the superordinate terms all have neut-gender with one exception. This gender distribution in itself is a striking confirmation of our extrapolation from Grimm (1890). The sex-associated genders are extended to basic level object categories, while the sexless neut-gender is largely confined to undifferentiated categories at the superordinate level.

Further confirmation comes from a conflict between Berlin (1972) and Rosch et al. (1973) over where to place the basic level for zoological taxonomies. Berlin predicted life form terms like 'fish' and 'bird' to be superordinates and generic terms like 'bass' and 'sparrow' to be basic level terms. Rosch et al., however, using their behavioral criteria, found the basic level to be one higher than this prediction, which is confirmed in our German data for the specific nouns they used, as shown in table 2.

'Fish' and 'bird' are highly imageable categories: we can draw specific outlines of generalized fish and birds (vs. a generalized insect), and we can list a variety of characteristics which are specific to birds or fish, many of which are parts. Birds have wings, feathers, two legs, a beak and a tail, and they fly and lay eggs. Fish have fins, a tail, gills and scales, and they swim. Brown (1984) finds bird and fish to be the most frequently occurring lexical life form classes in an extensive cross-linguistic sample, and attributes their ubiquity in part to the strong clustering of perceptual characteristics. At the next higher rank, however, not much can be said about what animals share (in the broad sense of German Tier, which includes the entire animal kingdom), except that they are alive and can move freely. The gender of 'bird' and 'fish' thus suggests a close correspondence between gender marking and the conceptual specificity of taxa in a folk taxonomic hierarchy.

3.3. Zoological taxonomies. Since more is known about the lexical structuring of the animal and plant kingdoms than most other lexical domains, these provide a good starting point for a detailed examination of gender marking in lexical hierarchies.

3.3.1. Perceptual taxonomy. Table 3 presents an approximate outline of the higher levels of perceptual folk classification of animals. [3] There are eight life form taxa [4], representing the first generally used divisions of the animal domain below the

unique beginner Tier: these correspond (in some instances roughly) to English mammal, bird, fish, reptile, insect, crustacean, worm, and mollusk (crustacean and mollusk are probably not folk taxons in English). Below these there are a large number of intermediate and generic taxa, only a few of which are shown.

The unique beginner Tier has neut-gender, in keeping with the broad diversity and lack of imageability of this grouping. At the next level, besides the terms Fisch and Vogel discussed in 3.2, two additional classes having masc-gender share high imageability and strong discontinuity in nature with the former. Crustaceans are shell-covered, have lots of legs, and characteristic claws. Worms are elongated and (virtually) without appendages. Bird, fish, and worm are the three life form taxa most likely to be lexicalized in the languages of the world (Brown, 1984), corresponding to their relative internal homogeneity and striking discontinuity in nature. Crustaceans are perhaps as perceptually distinctive as the others, but fail to stand out in Brown's cross-linguistic survey only because non-coastal peoples have no experience with them.

In contrast with these classes, the neut-gender life form terms all identify taxa with extensive internal heterogeneity. One informal test shows that it is not possible to mentally call up an image of a generalized mammal, reptile, insect, or mollusk, but only of specific subgroups. For example, one can conjure up a good image of a generalized snail, shellfish or octopus, but no single image for all three. Thus as indicated by the dotted line in Table 3 gender precisely marks the distinction between higher rank heterogeneous classes and lower rank homogeneous classes. As Grimm suggested, there does seem to be an (albeit abstract) inference from sex marking in evidence here: the sex-associated genders are used to identify fully differentiated taxa that have concrete imageability including overall shape and specifiable parts, while neut-gender is used for taxa that do not, and are in this sense undifferentiated. [5]

3.3.2. Functional taxonomies. In his article on animal categories E. Leech (1964) elegantly illustrates the fact, downplayed by Brown (1984) and other folk taxonomists, that folk biological taxonomies may be organized from an interactional/functional perspective, as well as from the perceptual perspective discussed in 3.3.1. This means that an individual taxon may be defined by its specific cultural function or by the specific mode in which people interact with its members. German is particularly well endowed in this respect. The interactional/functional taxonomy for animals, the higher ranks of which are given in Table 4, initially differentiates useful from harmful animals, with extensive subcategorization for the former. The table clearly shows that superordinate terms referring to heterogeneous taxa have neut-gender. For example, the neut-gender of Vieh corresponds to the fact that there are no common characteristics, and no common image, to a horse, a pig and a chicken, except that they are all farm animals. The terms for useful animals identify two major animal types of cultural-economic importance: livestock and game. The

lack of a functional superordinate term for seafood animals [6] is notable considering the importance of fishery in northern Germany.

The superordinate terms for harmful animals sharply testify to the difference between perceptual and functional classification. Das Raubzeug, primarily a hunting term, in its broadest use can refer to any animal which preys on useful animals, specifically game and livestock. It thus includes a wide range of animals from the higher zoological phyla. It is particularly notable that the same biological species may appear at different places in the functional hierarchy depending on its particular interaction with human beings. For example, a dog may be a Hausclier to its owner, but if it chases deer in the woods, to the hunter it is Raubzeug. Das Ungeziefer includes a wide range of insects and rodents that cause damage in agriculture or in the house. Finally, das Geschmeiss is used to express revulsion at small insects, worms, etc. These three terms could be seen as providing a rough three-way perceptual distinction among animals according to size, which Brown (1984) finds to be a widespread folk taxonomic strategy at the life form level. However, the animals which are included or excluded in each category make it clear that this size correlation is a secondary consequence of the functional distinctions made by the taxa.

In contrast to the neut-gender of superordinates, basic level terms in the interactional/functional taxonomy of table 4 all have masc or fem-gender, with two notable exceptions: types of livestock and game consistently have neut-gender. This illustrates a primary source of complexity in the overall semantic pattern of gender assignment: multicausality. Since it is crucially important for the farmer and the hunter to distinguish between the male, female, and young of individual species [7], the sex-associated genders are restricted to this more literally sexual application, leaving neut, the non-sex gender, for the generic terms referring to these animals, even though these taxa have a high degree of internal consistency and imageability, and are learned earliest by children. In the competition between distinguishing sex and marking internal homogeneity of categories, the former wins out, perhaps in consequence of the economic importance of sex differentiation in these two cases.

Tables 5 and 6 give taxonomies of domestic animals and game, showing that generic terms usually have neut-gender, while sex-specific terms have masc and fem-gender across the board. In table 5 the generic terms for livestock have neut-gender with a few isolated exceptions, as do the terms for baby animals, leaving the sex-associated genders for the sex-specific adult animal terms.

The pattern for game animals is somewhat more complicated, but equally revealing. German has double generic terminology for these animals, given in the first two columns of table 6, one term being used by hunters (Frevort, 1954) and the other by the general populace. One would expect the hunter's generic terms to have consistent neut-gender, since it is crucial for them to reserve the sex-associated genders for the distinction between male and

female game animals, in the same way that farmers need to distinguish male from female livestock. On the other hand one would expect the common person's generic terms for game animals to have sex-associated gender (masc or fem), by the same argument made for generic animal terms in general in table 1: categories such as 'elk' are internally homogeneous and highly imageable. These expectations are confirmed by the primary pattern to emerge from Table 6. Common generic terms have sex-associated gender with just a few exceptions. Hunter's generic terms have consistent neut-gender, except for beasts of prey. Again, this is an expected pattern of exceptions. A strong, and in this case overriding, semantic principle for gender assignment to animals is based on homocentric scaling (cf. fn. 5). One consequence of this principle is that beasts of prey have masc-gender, whether they be mammals, as here in table 6, or birds (der Falke 'hawk') or fish (der Hai 'shark') or even reptiles (der Alligator 'alligator'), because of their predatory nature.

In general, then, the following pattern of gender assignment emerges from Table 6 for game animals. Masc and fem-gender are used for sex-specific terms, and neut-gender is used for baby animals. For generic terms, the non-specialist uses sex-related gender marking the imageability of these taxa, while hunters use neut-gender, thus reserving the sex-related genders for the specific sex identification of animals. Terms for beasts of prey, however, are exempted from this sex identification principle, because of the overriding homocentric scaling principle for classifying the entire animal world.

3.4. Botanical taxonomies.

3.4.1. Perceptual taxonomy. Table 7, containing perception-based plant terms, shows a distribution similar to the animal terms in table 3. The unique beginner term Gewächs has neut-gender. Among the taxonomically superordinate life form terms, those which label internally homogeneous and highly imageable taxa--tree, bush, flower, and mushroom--and which are therefore really basic level terms in a perceptual sense, have masc-gender, while Kraut, with neut-gender, labels a remainder taxon with considerable internal diversity. The neut-gender of Kraut is further rationalized by its superordinate status in the interactional taxonomy of table 8. Looking to the generic taxa, as expected their terms all have masc or fem-gender with the exception of grass. The status of the grass category is problematical. It does have a good deal of internal diversity, but on the other hand the preponderance of neut-gender among the generic terms for grass suggests that here neut-gender is serving its basic level differentiating function, (cf. sect. 6), and is not marking superordinate status at all.

The fem-gender of Pflanze, in contrast with the other terms, is inexplicable, since this term is clearly superordinate to others which themselves have neut-gender. In section 7 we will take up this thread in a discussion of the historical dynamics of motivated gender assignment.

3.4.2. Functional taxonomies. In moving from the perceptual to

the interactional/functional taxonomy of animal terms (cf. tables 3 and 4) there was a notable increase in neut-gender superordinates. The parallel trend for plant terms in table 8 suggests that this is a general phenomenon. Apparently the need for superordinate terms, and the need to differentiate these both lexically and grammatically from the basic level, is greatest for those aspects of the world with which we interact, and which fulfill human needs. In table 8 superordinate terms have neut-gender across the board, distinguishing them from the basic level terms with sex-related genders. Here the psychological distinction is interactional as well as perceptual. Vegetables are a good example. There is no collective image for a vegetable, but a very clear image for asparagus. Little can be said about interaction with vegetables beyond that they are eaten, often as an accompaniment to the main dish. On the other hand a great deal of detail would go into describing the preparation, serving, and eating of asparagus, particularly in Germany.

3.5. Cultural artifacts. Interactional taxonomies closely related to the one for plants involve the further refinement of plant materials in the creation of material culture. One such taxonomy, given in table 9, gives some ways in which wood is further processed into parts for house and shipbuilding. The superordinates for parts are both neut-gender. For lumber there are two intermediate terms. The neut-gender board taxon covers a wide variety of specific shapes and functions, while the masc-gender beam taxon is made up of members with similar appearance, and all having support function. At the basic level (basic, of course, for carpenters and shipwrights, cf. 3.6) virtually all terms have a sex-associated gender.

Plant materials may be further refined, along with other substances, as foodstuffs. Table 10 shows that, as expected, superordinate terms are all neuter in this interactional taxonomy, while basic level terms have masc/fem-gender for the most part. Exceptions to this are those types of meat which are labeled with the generic term for the source animal (e.g. das Huhn 'chicken', cf. table 5) and those types of bread which are labeled with secondary terms formed with -brot, such as das Roggenbrot 'rye bread.'

Behavioral criteria suggest that the neut-gender terms are indeed superordinate, and that the terms with sex associated gender are basic. Firstly, neut-gender terms such as 'fruit' are not particularly imageable, whereas the terms subordinate to them are. Secondly, the specific behaviors involved in preparing and consuming a member of one of the basic taxa are highly specifiable, whereas this is not true for the superordinate taxa. For example, elaborately specifiable methods go into the production of wine, or of beer, but these methods have nothing in common. Wine, coffee and juice each have their own specific serving containers and appropriate integration into meals, but all they have in common is being served as a beverage at meals. Thus the taxonomy for foodstuffs, just like the plant taxonomy in table 8, reveals a clear use of neut vs sex-associated gender to distinguish super-

ordinate from basic level terms. In sect. 5 we will show that neut-gender may additionally support the linkage of successive interactional taxonomies in the refinement of raw materials into cultural artifacts.

The interactional taxonomies discussed so far are strikingly traditional in the sense that most terms have a history of many hundreds of years in the language, with some traceable to Proto-germanic sources. There are notable exceptions, however, showing that newer lexical items are entering the language in accordance with the neuter superordinate principle. [8] For example, das Insekt and das Reptil were added as superordinates to the zoological taxonomy in table 3 during the 16th century. In addition, basic level terms with masc or fem-gender have been recently added to all the taxonomies. For example, die Antilope 'antelope' in table 3, die Iris 'iris' in table 7, and der Toast 'toasting bread' in table 10.

Tables 11 and 12 demonstrate that the neuter superordinate principle continues to be active in the modern language. Until recent centuries transportation was a simple matter, with carts and boats the only vehicles employed. In the last two centuries the industrial revolution has led to a great proliferation in means of transportation, and to greater diversity within each of the older types, as evident in table 11. Das Schiff stands as the only neut-gender superordinate of ancient standing, originally applying to vessels in general. Das Boot is a Low German dialect form which in the 16th century won out over der Kahn and der Nachen (both masc-gender) as the superordinate for smaller vessels, restricting das Schiff to the larger ships which were then being developed. Das Gefährt was coined in the early 17th century as a superordinate for the rapidly proliferating types of animal-drawn vehicles. The taxonomy has now grown to more than six levels, with additional subordinate terms below the basic level ones at the bottom of table 11. All other superordinates are of recent coinage, and all have neut-gender, except for der LKW, an acronym of der Lastkraftwagen which is competing with der Laster and das Lastauto as the first-level superordinate term for truck. Thus the five levels of superordinate terms in the taxonomy are consistently marked by neut-gender, whereas the basic level terms consistently have a sex-associated gender.

3.6. A general pattern emerges from the perception-based and function/interaction-based biological taxonomies that have been examined here, further examples of which are given in table 12. Lower level, more specific, more imageable taxa with relatively homogeneous membership and highly specific functional integration into the culture are grammatically marked with one of the sex-associated genders, while neut-gender is reserved for higher level taxa that have greater internal heterogeneity and consequently lack a general image for a prototypical member. In Grimm's terms, neut-gender marks undifferentiated superordinates. For both function- and perception-based taxonomies this principle has great predictive power. The dotted lines in tables 3 (animals), 7 (plants), and 9 (exploitations of wood) show that at an inter-

mediate level of classification corresponding to the life form level in the folk taxonomic literature taxa may either be marked by neut-gender or by a sex-associated gender, depending on their degree of internal homogeneity.

The importance of functional coherence, suggested by Rosch et al.'s (1976) interaction test, is borne out in the interactional/functional taxonomies described here. For example in table 9 basic level taxa for lumber define specific functions in the structure of a building. Pieces of moulding, flooring and lath may look quite similar (they are all long, narrow, and flat) but they each have completely different functions in the building of a house. But at the next taxonomic level das Brett 'board' has no unifying functional specification at all. The same holds true for types of spices in table 10. The superordinate taxon das Gewürz 'spice' is characterizable only as a secondary ingredient in a dish (das Gericht). But basic level taxa in the spice class, such as mustard or ginger, each have elaborately specified integrations into specific recipes, making them functionally much more specific than the superordinate taxon.

Some neut-gender superordinates presented here appear on casual reflection to be basic level, prototypical members of their categories, an introspection supported by their frequent use, and early acquisition by children. These include (source table number in parentheses):

<u>Kraut</u> 'plant/herb' (7,8)	<u>Auto</u> 'car' (11)
<u>Brett</u> 'board' (9)	<u>Spiel</u> 'game' (12)
<u>Brot</u> 'bread' (10)	<u>Segel</u> 'sail' (12)
<u>Schiff</u> 'ship' (11)	<u>Tuch</u> 'fabric' (12)
<u>Boot</u> 'boat' (11)	<u>Geld</u> 'money' (12)

Nevertheless, these are true superordinates semantically, because they are undifferentiated with respect to the more richly specified taxa which they dominate. Behaviorally they are likewise superordinates, but only for the cultural specialist (the horticulturalist, the carpenter, the baker, the sailor, etc.). Sailors, for example, avoid saying Schiff and Boot in favor of more specific terms which for them constitute the basic level. The fact that the non-specialist perceives them as basic level terms shows that gender is assigned in taxonomies on the basis of semantic differentiation and utility for the specialist, rather than on the basis of cultural salience to the community at large (Dougherty, 1978). In other words, gender assignment in this respect is a property of lexical structure, not use.

4. Derivational devices for superordinates. Table 11 demonstrated that the creation of new taxonomies for cultural artifacts with neut-gender superordinate terms is a productive aspect of the present-day German language. Since gender is itself not a derivational device in German [9], the language has need of morphological resources for the creation of new neut-gender nouns to label the superordinate taxa of expanding taxonomies. Among the primarily derived superordinate terms of table 11 four different devices

(-mittel, -zeug, ge- and -werk) are in evidence. These and -gut are semiproductive devices for creating superordinates. Since the suffixal forms can stand by themselves as lexical items they are actually somewhere midway in an evolutionary development from lexical item to derivational suffix. Table 13 gives examples of all five showing the range of applications that each superordinate-deriving form can have.

5. Collectives, partonomies, and production chains. Throughout the discussion of superordinates in this chapter we have, for reasons of simplicity, dealt primarily with individuated superordinates, and tried to avoid two other phenomena which are closely related both cognitively and linguistically; these are collectives and partonomies. As we understand these concepts, an individuated superordinate term specifies an individual from one of the basic level taxa to which it is superordinate. For example, 'vehicle' and 'car' can both specify the same individual entity, but the former includes a greater diversity of individuals in its referential range than the latter. A collective superordinate does not specify an individual, but rather the class of individuals which fall within its referential range. 'Furniture' is such a collective, and must be individuated with a counter, as in 'piece of furniture.' Rosch (1977) did not distinguish between these two superordinate types, suggesting that she considered them conceptually equivalent. Among her superordinate nouns which we listed in table 1, 'fruit,' 'clothing' and 'furniture' are collective superordinates in English, while the rest are individuated.

Evidence for the conceptual affinity between individuated and collective superordinates is provided by the fact that a number of German superordinates are ambiguous in this respect. das Möbel can refer to a piece of furniture, or it can refer to the collectivity of furniture, in which case it is individuated as Möbelstück (see table 1). Das Vieh can refer in varying contexts and with varying connotations either to an individual farm animal or to the collectivity of livestock, in which case it is individuated as ein Stück Vieh, parallel to English "head of cattle." Among the derivational devices in table 13, ge-, -zeug, and -mittel produce both individuated and collective superordinates, while -werk and -gut produce mostly collectives. It is interesting to note that Wellmann (1969), who carefully studied these devices, characterized them only as collectives and did not deal with their individuating potential.

Another compelling piece of evidence for the cognitive affinity of individuated and collective superordinates comes from Macnamara (1982). He and Nancy Wargny questioned young children about individuals and collectives. Some children under three years refused to accept a toy dog as 'an animal,' or a group of dogs as 'animals,' but they readily accepted a heterogeneous collection of dogs, sheep, cows, etc. as 'animals,' suggesting that animal and other individuating superordinates go through a preliminary developmental stage as collectives.

The third type of superordinate stands at the head of a part-

onomy, which is distinguished from a collective in that only an ordered arrangement of basic level parts adds up to the superordinate concept. The classic and most extensively studied partonomy is constituted by body part names (Brown, 1984). Although German lacks a specific partonomic superordinate for 'human body,' [10] it does have one for 'face'--das Gesicht--which has constituent parts of all three genders: der Mund 'mouth,' die Nase 'nose', das Auge 'eye', etc. An elaborate partonomy for household furnishings, with four levels of partonomic superordinates at one point, is presented in table 14. Knives, forks and spoons taken together in settings form das Besteck 'flatware.' Plates, cups, saucers, serving bowls, etc. form das Service, a service of tableware. Pots, pans, and other implements together form an inventory of das Küchengeschirr, cooking utensils. These three together, das Besteck, das Tafelservice, and das Küchengeschirr, form das Geschirr, an orderly inventory of utensils used for the preparation, serving, and eating of food. Das Gedeck, a related partonomic superordinate located at the bottom of the table, includes the relevant items from the first two sets, along with a napkin, which form a place setting for one person. Thus each partonomic superordinate collectively subsumes a precise and orderly set of subordinate categories.

The gender differentiation between superordinate and basic level partonomic terms is exactly parallel to the taxonomies already examined. Most basic level terms have masc or fem-gender, while the superordinate terms consistently have neut-gender, the one exception being the superordinate term for decorative items. Furthermore, the functional and perceptual differentiation is exactly parallel. Knife, fork and spoon as flatware share only the perceptual characteristics of being stick-like and usually made of metal. Each individually, however, has a highly specifiable gestalt. Similarly, they share only the interactional characteristic of being used for eating. But each has an elaborately specifiable interaction pattern of its own, and specific operations and foods for which it is used. Thus both the behavioral properties and the pattern of gender assignment in partonomies seems to be indistinguishable from folk taxonomies in general.

A neglected topic in the folk taxonomic literature which may be quite fruitful for our understanding of how grammatical and lexical taxonomic principles interact is the linkage of a series of taxonomies into what we have dubbed a "production chain." Table 15 gives one example of such chaining from our data. Note that neut-gender consistently marks the links in the chain. Das Vieh and das Wild identify specific animal types which are turned into das Fleisch and das Wildbret, an intermediate cultural stage on the way toward das Gericht, which is food prepared for eating. Similarly, from das Gewächs we derive a number of intermediate categories for food constituents such as das Gemüse and das Gewürz, which are further processed into finished dishes. The most elaborate production chains we have in our data are for the production of bread, with four steps, and in table 16 in the production of metal implements from raw metal ores, with five steps. In both cases all categories in the chain are marked with neut-

gender.

6. Gender assignment at the basic level. Throughout the empirical evidence we have presented for the rational deployment of gender in the folk taxonomic organization of the lexicon, neut-gender has appeared again and again among the basic level terms. Our original hypothesis suggested, however, that this non-sex and hence non-differentiating gender should be reserved for superordinate taxa. This deviation from a hypothetically ideal distribution, we believe, is a motivated consequence, although not a necessary one, of the Limited Inventory Dilemma. Stated briefly, there is an irresolvable conflict between the pressure to reserve each gender for a single function in the service of transparent form-meaning relationships, and the need to maximally exploit all three genders on the basic level in the service of communicative function. We agree with Tversky (1984) that the primary communicative function of basic level terms is the differentiation of individual referents from each other in the conduct of everyday life:

Terms of reference are chosen to select an object in a context. ... the ordinary context for an object is the scene in which it typically appears. Scenes themselves are perceived to be composed primarily of basic level objects. We find tables and apples in houses, schools, and restaurants, and need to distinguish them from the other objects in those scenes, particularly other furniture and fruit. The typical context of communication, then, requires discrimination at the basic level. (p. xxx)

Köpcke and Zubin (1984) and Zubin and Köpcke (1981, 1984b) have argued that an important communicative function of gender is to increase the efficiency of communicating about everyday objects by increasing the potential for pronominal anaphoric reference. For example, the fact that der Krug 'jug' and die Schale 'bowl' are different in gender eliminates ambiguity in the German versions of sentences (a) and (b) since the pronouns are marked for the gender of their antecedents, whereas the English versions would require repetition of the lexical items to remove ambiguity.

- a. Der Krug fiel in die Schale, aber er (masc) zerbrach nicht.
'the jug fell into the bowl, but it (the jug) didn't break'
- b. Der Krug fiel in die Schale, aber sie (fem) zerbrach nicht.
'the jug fell into the bowl, but it (the bowl) didn't break'

If this function of gender is to be optimized, then basic level terms with referents which tend to co-occur in the same communicative context should be maximally different in gender. But gender is a highly grammaticized, and hence closed system in the grammar of the language, so that new gender categories equipped with gender-marked pronouns cannot be created at will. It would thus be communicatively efficient for the language to exploit the three gender categories it does have to establish maximal distinctiveness at the basic level, even though this weakens the distinctive association of neut-gender and superordinate terms, providing the two

horns of the dilemma.

Preliminary studies of contextually co-occurring items have borne out this view. An extensive sample of basic level simplex terms referring to kitchen implements (59 terms) has 41 percent masc-gender, 42 percent fem-gender, and 17 percent neut-gender, an exactly even distribution of the two sex-associated genders, and a lesser amount of neut-gender. Thus basic level categorization in the kitchen makes use of all three genders in order to maximize communicative efficiency, although the exploitation of neut-gender in this way is secondary, and it appears less frequently among basic level terms.

Given that the distinctive use of all three genders at the basic level is motivated by communicative function, a further problem is whether the choice of a particular gender at the basic level is grist for the anomalist mill. In previous work we have demonstrated extensive phonetic (Köpcke, 1982) and morphological and semantic (Köpcke & Zubin, 1984; Zubin & Köpcke, 1984b) motivation for gender assignment at the basic taxonomic level. Both types of principles stochastically determine the assignment of the two sex-related genders to nouns, and to some extent the assignment of neut-gender. The operation of these principles will be exemplified on basic level categorization from some of the taxonomies presented here: [11]

- a. extension of the Natural Sex Principle to domestic and game animals has already been discussed in the context of tables 5 and 6. masc and fem-gender mark the terms for the male and female adult of each species, while neut-gender is assigned to the nonsexspecific generic and juvenile terms.
- b. The Homocentric Principle, which motivates exclusive masc-gender for beasts of prey and primary masc-gender for mammals and birds, but primary fem-gender for lower animals, has already been discussed in the context of table 5, and in fn. 5.
- c. Among the categories in table 12, types of cloth (item 12), types of precipitation and wind among the weather terms (13), and types of minerals (15) consistently have masc-gender. Types of knowledge (5) and occupations (6), and ship's ropes with specific functions (11) consistently have fem-gender. Finally, games (7) and types of metal with the exception of alloys (14) consistently have neut-gender.

Some taxonomies rely on an interaction of semantic and morphological principles:

- d. In table 3 bird names have masc-gender unless they are morphologically marked for fem-gender. Neut-gender is systematically avoided. For example, whereas masc and fem-gender body parts are widely used for creating compound bird names (e.g. der Seidenschwanz 'silk-tail'), no neut-gender body part names are thus used.

- e. In table 11, gender marks a semantic distinction between

sailing vessels and engine or hand-powered vessels, which is crosscut by morphological assignment principles, resulting in the following gender distribution. Sailing vessels have fem-gender unless they are morphologically marked for masc-gender. Engine and hand-powered vessels have masc-gender unless they are morphologically marked for fem-gender. Finally, neut-gender is practically non-occurring.

We have found regularities such as these to be widely distributed in the nominal lexicon. In principle we believe that the entire lexicon is subject to such analogistic regularity, with the exception of core and peripheral items which, because of their frequency and utility across different communicative contexts, resist the impact of cognitive tendencies toward systemic integration (Köpcke & Zubin, 1984; Zubin & Köpcke, 1984b).

7. Non-neuter superordinates. In spite of semi-productive derivational devices for the creation of neut-gender superordinate terms, neut-gender has remained less than ubiquitous among superordinates. Two notable examples of non-neuter superordinates are die Pflanze 'plant/grerb' from table 7 and die Farbe 'color', superordinate to a host of primary and secondary color terms.

These exceptions are primarily due, we believe, to the pre-conscious nature of grammatical classification, and to the conservatism of language change. Let us take the recently developed taxonomy of means of transportation in table 11 to illustrate. No speaker, or group of speakers, consciously decided to use neut-gender when creating a superordinate term such as das Flugzeug 'airplane.' Rather, they built a noun with zeug, or -mittel as its head, because these vague nouns seem to nicely capture the underspecification necessary for a superordinate. These nouns have been gradually drifting in the direction of semantic underspecification, partly under the influence of, or at least in harmony with, their neut-gender. Thus conscious word coining is a matter of lexical, not grammatical composition. The fact that the lexical materials chosen for the coining of superordinates happen to have a specific grammatical property is the consequence of many generations of linguistic evolution, not a conscious synchronic choice at any point in the process. The fact that these neut-gender lexical items, but no masc or fem-gender ones, have drifted in the direction of being derivational devices for superordinate terms is under cognitive control, we believe, but at a preconscious level. Occasional spontaneous gender changes have also occurred. At the time (16th cent) that Boot won out over der Kahn and der Nachen as the general superordinate for 'boat' (table 11) it also had masc-gender! But by the 18th century it was shifting to neut-gender in accordance with its superordinate status. Perhaps its gradual generalization to all types of small boats went hand-in-hand with an increasing tendency to use neut-gender.

The final part of our argument rests on the empirically

supported generalization that nouns in the lexical core (Köpcke, 1982; Zubin & Köpcke, 1984b) tend to resist change and replacement. Die Farbe seems originally (in Proto-germanic) to have designated the property of being colorful, and did not head up a taxonomy of color terms. As color terms proliferated with the increased use of dyes for coloring artifacts, a taxonomy developed beneath this term, since it was already there and presumably highly frequent. As long as it keeps its status in the core lexicon it will resist replacement by a neut-gender derived superordinate. The same argument applies to die Pflanze, except that from the cross-cultural evidence of Berlin, Breedlove and Raven (1973), Brown (1984) and others, we may assume that German already had a botanical folk taxonomy at the time this term was borrowed from Latin as a name for transplanted seedlings and saplings. Why it generalized into the folk taxonomy as a superordinate term for the 'grerb' taxon is not clear at this present stage of research.

In conclusion we come full circle to our introductory expectation that there would be a natural, motivated relation between gender assignment and the hierarchical placement of categories in the taxonomic organization of the lexicon. We must conclude that the relation is not as transparent or pervasive as Adam might have enacted in Eden when he was naming the animals. But this fall from perfect order we see, not as the chaos which the anomalists would have us accept, but rather as a complex order determined by the interaction of social, semiotic, and cognitive causal factors.

Footnotes

1. Brown (1984) and Casson (1981) have useful summaries of research in this area.
2. The stimulus for these observations about the vague referentiality of neut-gender is Otheguy (1977, chap. 3), who demonstrates in elaborate detail that the so-called gender distinction between "neuter" lo and el/la in Spanish in fact distinguishes discreteness of reference. For example:
 - a. No me gusto el que paso. 'I didn't like the one that passed.'
 - b. No me gusto lo que paso. 'I didn't like what happened'
3. The boundary between folk and scientific classification is a fluid one, particularly since the latter is essentially an extension of the former, so that a number of terms have varying class membership depending on the extent to which each is interpreted as a folk or a scientific term. For example, Reptil and Lurch are distinct scientific taxons, but in folk classification the amphibians (frogs, toads, salamanders...) are usually classed as reptiles, since they are crawling, cold-blooded creatures.
4. Three additional life form taxa conforming to the analysis are not included in the table: das Nekton, das Plankton, and das Urtier 'protozoan.'
5. Zubin and Köpcke (1984b) outline the argument for an overall homocentric scale, with masc-gender at one end and fem-gender at the other, accounting for the distribution of gender in the lower ranks of zoological taxonomy. Names for apes and for beasts of prey are nearly uniformly masc-gender. Names for mammals and birds are primarily masc-gender, names for fish are mixed in gender, while names for reptiles and lower animals have primarily fem, with some masc-gender. In our representative sample of simplex basic level terms for birds, 66 have masc while only 28 have fem-gender. Among terms for lower animals, 60 have fem and only 18 have masc-gender. A strong possibility is that an iconic mapping is responsible for this distribution. While it does not seem possible to account for why a particular animal taxon has masc- or fem-gender, there is a strikingly regular distribution of gender in support of such an iconic mapping as a stochastic principle. In order to uncover this underlying iconic system, nouns with gender determined by morphological and compounding principles must be excluded from analysis (Köpcke & Zubin, 1984; Zubin & Köpcke, 1984a&b). For example, there are neuter insect names, such as das Dreihorn "triple horn," a kind of beetle, but these are all compounds with a neut-gender noun, not itself an animal term, as the last member.
6. Der Schädling (lit: 'harmful') is eliminated as a taxonomic superordinate, because it can refer to any animal, plant, thing, or even person that causes damage, and thus is not part of any individual hierarchy; and because it is morphologically derived.

Der Fisch is eliminated as a possible superordinate for seafood because it is a perception-based term (cf. table 3).

7. The cultural importance of distinguishing sex and age among economically exploited animals is confirmed by the diversity of simplex sex-specific terms in tables 5 and 6 compared to the lack of sex-specific terms for most wild animals.
8. Historical information is based primarily on Paul (1966) and Grimm and Grimm (1854-1952).
9. Nouns have occasionally developed a second gender in response to contextual confusion over which of two senses is intended. For example, der Schild 'shield' came to be customarily emblazoned with the insignia of its bearer. Then the insignia was transferred to banners and other objects, but still called der Schild. Finally, this noun came to mean 'sign', i.e. any flat object with information inscribed on it, with a concomitant shift to neut-gender for this latter meaning. The historical accumulation of such gender splits has now resulted in double gender for about 10 percent of the monosyllabic nominal lexicon (Zubin & Köpcke, 1984b). Despite this, gender splitting is not even marginally available as a synchronically productive derivational device.
10. Der Leib 'body' is not subcategorized into parts, as shown by the nonexistence of *Leibteil 'body part,' der Körper is partonomic (c.f. Körperteil, 'body part'), but is not specific to bodies with parts (cf. Himmelskörper 'heavenly body.')
11. Keep in mind that space limitations prevent systematic treatment of this topic. The interested reader is referred to Köpcke and Zubin (1984) and Zubin and Köpcke (1984b) for thorough treatment of the points summarized here.
12. We have found strong historical evidence for such preconscious cognitive determinism of both semantic shifts and gender changes in a class of nouns referring to emotional states and personality characteristics (Zubin & Köpcke, 1984a).

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Figure 1: Reference to *Strix Rebulosa* with terms of varying taxonomic specificity in Quinton (1984). "Owl" is basic in the sense of Brown (1958). Both nominal and pronominal reference are counted, although the nominal count alone is completely parallel.

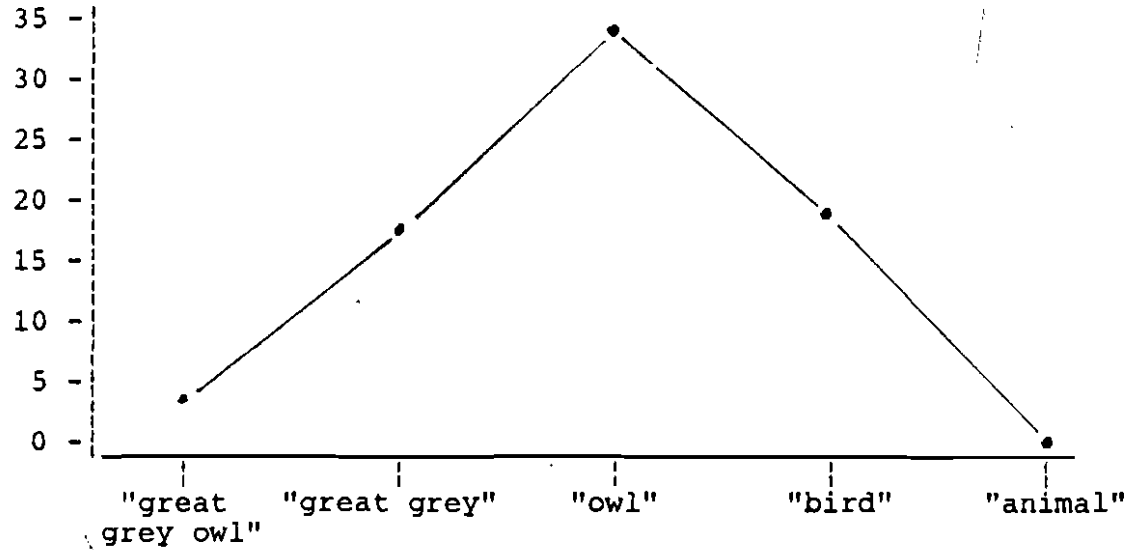


Table 1: suberordinate terms listed by Rosch et al. (1973) and [Rosch (1977)].
Basic level terms are supplied by us.

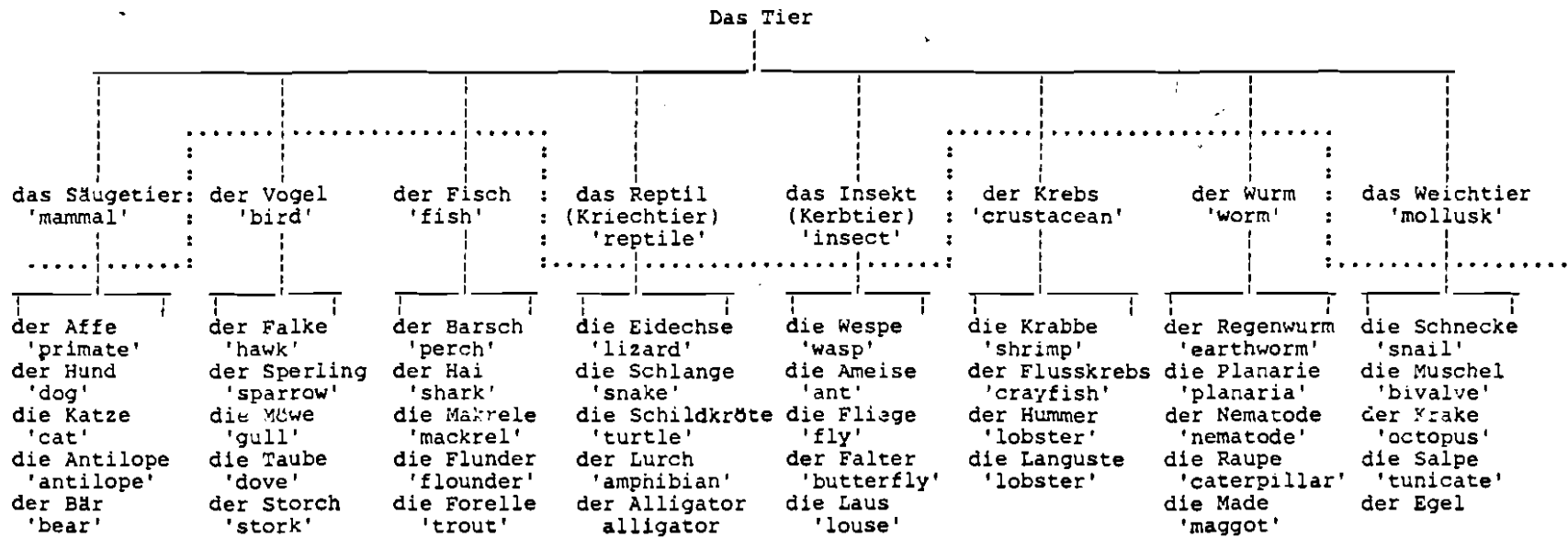
<u>Superordinate</u>	<u>Basic Level</u>
das Instrument 'musical instrument'	die Gitarre 'guitar' die Trompete 'trumpet' die Trommel 'drum'
das Obst 'fruit'	der Apfel 'apple' die Pflaume 'plum' die Traube 'grape'
das Werkzeug 'tool'	der Hammer 'hammer' die Säge 'saw' der Schraubenzieher 'screwdriver'
das Kleid/das Kleidungsstück 'piece of clothing', die Kleidung 'clothing (mass)'	die Hose 'pants' der Strumpf 'sock' das Hemd 'shirt' (a)
das Möbel/das Möbelstück 'furniture'	der Tisch 'table' der Stuhl 'chair' die Lampe 'lamp'
das Fahrzeug 'vehicle'	der Wagen 'car' der Bus 'bus' der Laster 'truck'
das Spielzeug 'toy'	die Puppe 'doll' der Bauklotz 'block' die Rassel 'rattle'
das Metall 'metal'	die Bronze 'bronze' der Stahl 'steel' das Eisen 'iron' (a)
das Verbrechen 'crime'	der Diebstahl 'theft' der Mord 'murder' die Notzucht 'rape'
das Gemüse 'vegetable'	der Spinat 'spinach' die Erbse 'pea' der Kohl 'cabbage'
der Körperteil body part (b)	der Kopf 'head' die Nase 'nose' das Ohr 'ear' (a)

- a. See section 6 for a discussion of neut-gender intrusion into the basic level.
b. The masc-gender of this term derives from the unusual semantic exploitation of the gender opposition between der Teil for integrated parts and das Teil for separable parts (Zubin & Köpcke, 1984b).

Table 2 Zoological categories investigated by Rosch et al. (1973).

Berlin:	<u>unique beginner</u>	<u>life form</u>	<u>generic</u>
Rosch:	<u>superordinate</u>	<u>basic level</u>	<u>subordinate</u>
	das Tier 'animal'	der Fisch 'fish'	der Karpfen 'carp' die Forelle 'trout' etc.
		der Vogel 'bird'	die Eule 'owl' der Sperling 'sparrow' etc.

Table 3: Perception-based folk-taxonomy of zoological terms. The dotted line separates terms with neut-gender from those with sex-associated gender.



ca

Table 4: interaction/function-based folk taxonomy of zoological terms

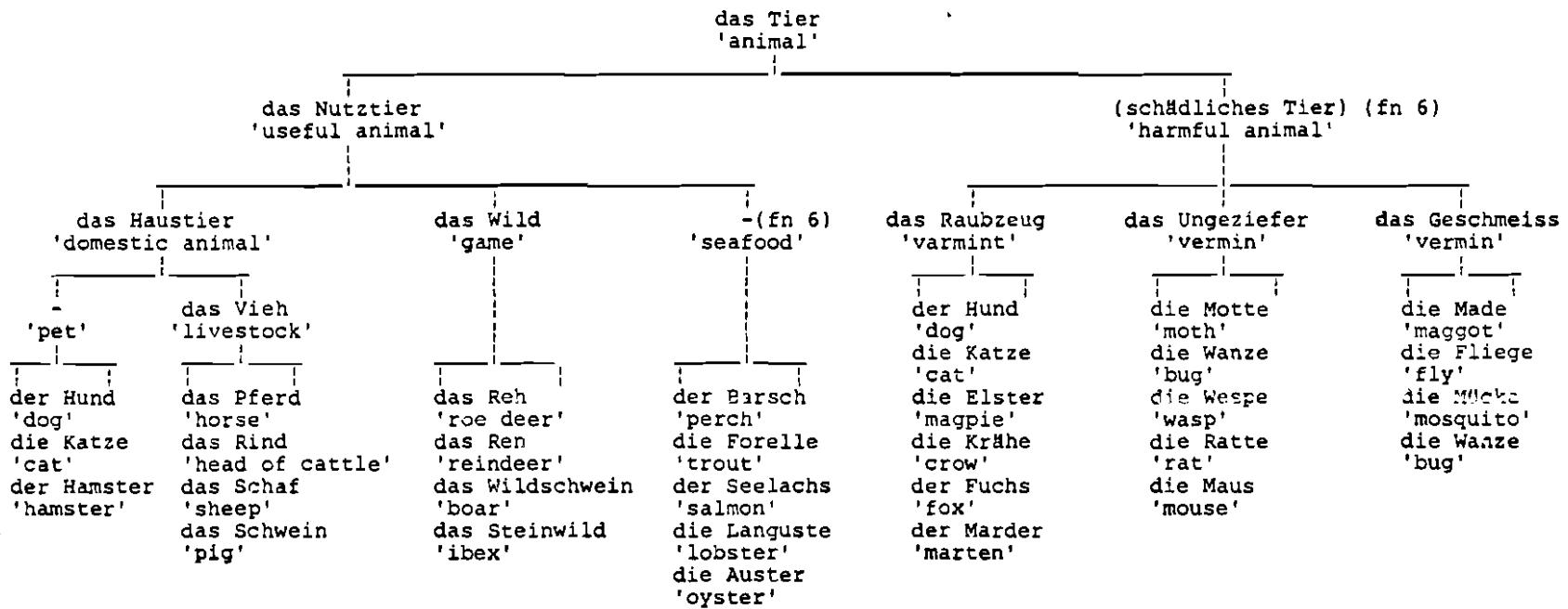


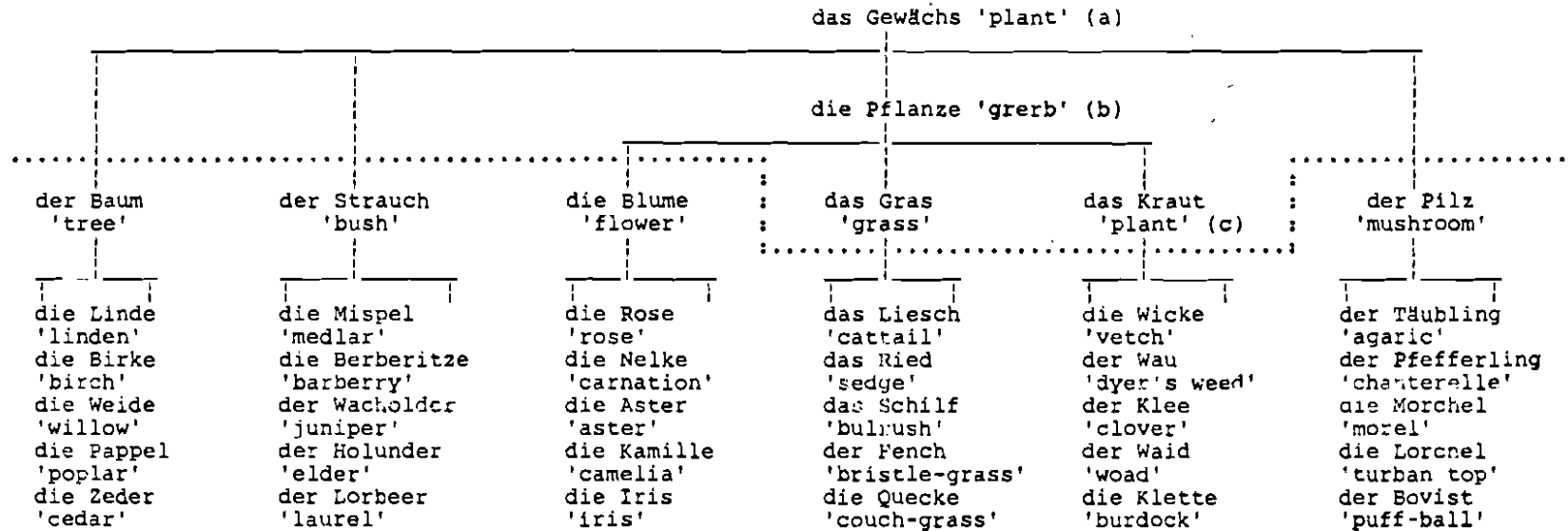
Table 5: sex-differentiating folk taxonomy for das Vieh 'livestock.' Terms marked with (*) are known, but not economically exploited in German-speaking areas.

<u>generic</u>	<u>male</u>	<u>female</u>	<u>baby</u>
das Rind 'head of cattle'	der Stier 'steer' der Bulle 'bull'	die Kuh 'cow'	das Kalb 'calf'
das Pferd 'horse'	der Hengst 'stallion'	die Stute 'mare'	das Fohlen 'foal'
der Esel 'donkey'	"	"	"
das Maultier 'mule'			
das Schwein 'pig'	der Eber 'boar'	die Sau 'saw'	das Ferkel 'piglet'
das Schaf 'sheep'	der Bock/Widder/'ram'	die Zippe 'ewe'	das Lamm 'lamb'
das Kaninchen 'rabbit'	der Rammeler 'buck'	die Zibbe/Häsin 'doe'	das Häschen 'baby rabbit'
die Ziege 'goat'	der Bock 'ram'	die Ziege 'nanny'	das Zickel 'kid'
*das Kamel 'camel'	der Hengst (male)	die Stute (female)	
*das Zebu 'zebu'	der Bulle (male)	die Kuh (female)	
*das Ren 'reindeer'	"	"	
*das Lama 'llama'			
<u>das Geflügel 'poultry'</u>			
das Huhn 'chicken'	der Hahn 'rooster'	die Henne 'hen' die Glucke 'sitting hen'	das Küken 'chick'
das Truthuhn 'turkey'	der Puter (male)	die Pute (female)	das Klein
die Ente 'duck'	der Erpel 'drake'	die Ente 'duck'	das Entlein 'duckling'
die Gans 'goose'	der Ganter 'gander'	die Gans 'goose'	das Gösselein 'gosling'

Table 6: sex-differentiating folk taxonomy for das Wild 'game animals.' Based primarily on hunting terminology (Frevort, 1954), some of which are also in common use.

<u>common term</u>	<u>generic</u>	<u>hunter's term</u>	<u>male</u>	<u>female</u>	<u>baby</u>
<u>das Nutzwild (edible game)</u>					
der Elch/Elen 'elk'		das Elchwild	der Elchhirsch	das Elchtier	das Kalb
der (Rot)Hirsch 'red deer'		das Rotwild	der Rothirsch	die Hinde/das Rottier	das Kalb
das Reh 'roe deer'		das Rehwild	der Rehbock	die Ricke/Geiss	das Kitz
der Damhirsch 'fallow deer'		das Damwild	der Damhirsch/bock	die Geiss/das Damtier	das Kitz/Kalb
der Steinbock 'ibex'		das Steinwild	der Steinbock	die Steingeiss/ziege	das Kitz
der Mufflon/ 'mtn sheep' das Wildschaf		das Muffelwild	der Widder	das Wildschaf	das Lamm
die Gemse 'chamois'		das Gamswild	der Gamsbock	die Gamsgeiss	das Kitz
das Wildschwein 'boar'		das Schwarzwild	der Bacher/Keiler	die Bache	der Frischling
das Murmeltier 'marmot'		das Murmeltier	der Bär	die Katz	-
der Hase 'hare'		der Hase	der Rammler	die Häsin	der Junghase
das Kaninchen 'rabbit'		das Kaninchen	"	"	"
der Auerhahn 'mountain-cock'		das Auerwild	der Auerhahn	die Auerhenne	das Jung
<u>das Raubwild 'hunnable beasts of prey'</u>					
der Bär 'bear'		der Bär	der Bär	die Bärin	das Jung
der Luchs 'lynx'		der Luchs	der Kuder	die Kätzin	das Jung
der Wolf 'wolf'		der Wolfr	der Rüde	die W lfin	der Welpe
der Fuchs 'fox'		der Fuchs	"	die Fähe/Betze	"
der Dachs 'badger'		der Dachs	der Dachsbär	die Dächsin/Fähe	der Jungdachs

Table 7: perception-based folk taxonomy of botanical terms. The dotted line indicates the general division between neut and sex-associated gender.



a. The meaning of Gewächs is 'plant' in its widest botanical sense, referring to the plant vs. the animal kingdom.

b. "Grerb" is from Brown (1984), a made up term meaning "small plant...whose parts are chiefly herbaceous (green, leafy, nonwoody (p. 13))."

c. The meaning of Kraut is 'plant' in its narrowest folk sense, i.e. the broad range of leafy plants other than trees, bushes, flowers, and grass. In other words, Kraut is a remainder category.

Table 8: interaction/function-based folk taxonomy of botanical terms

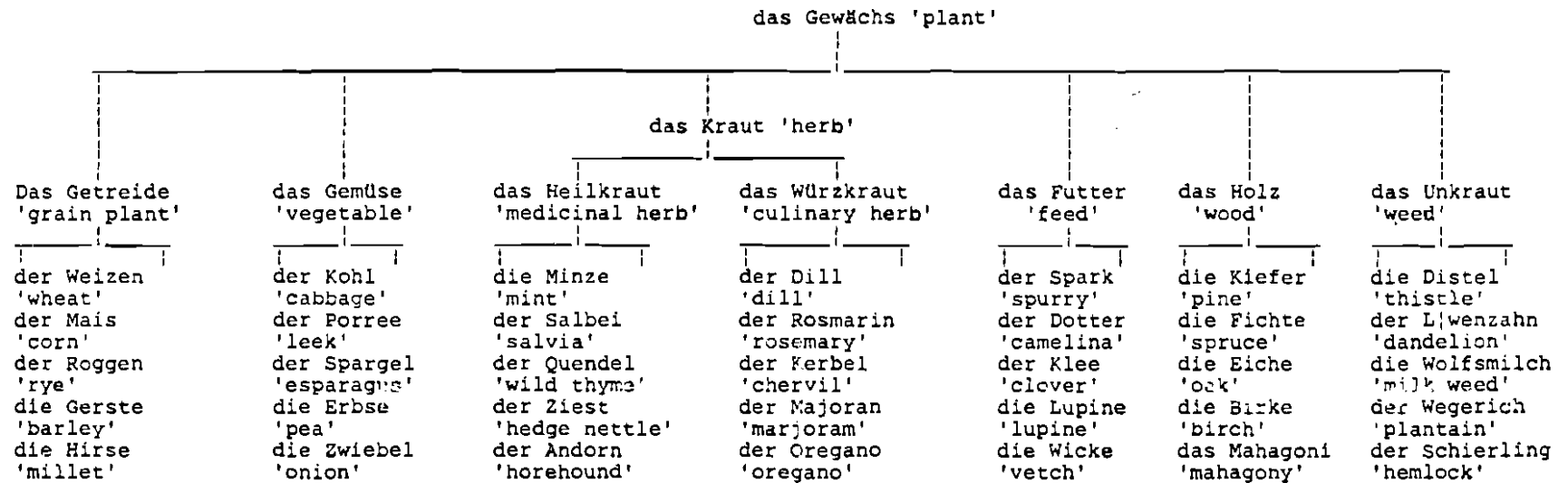


Table 10: interaction/function-based folk taxonomy for foodstuffs

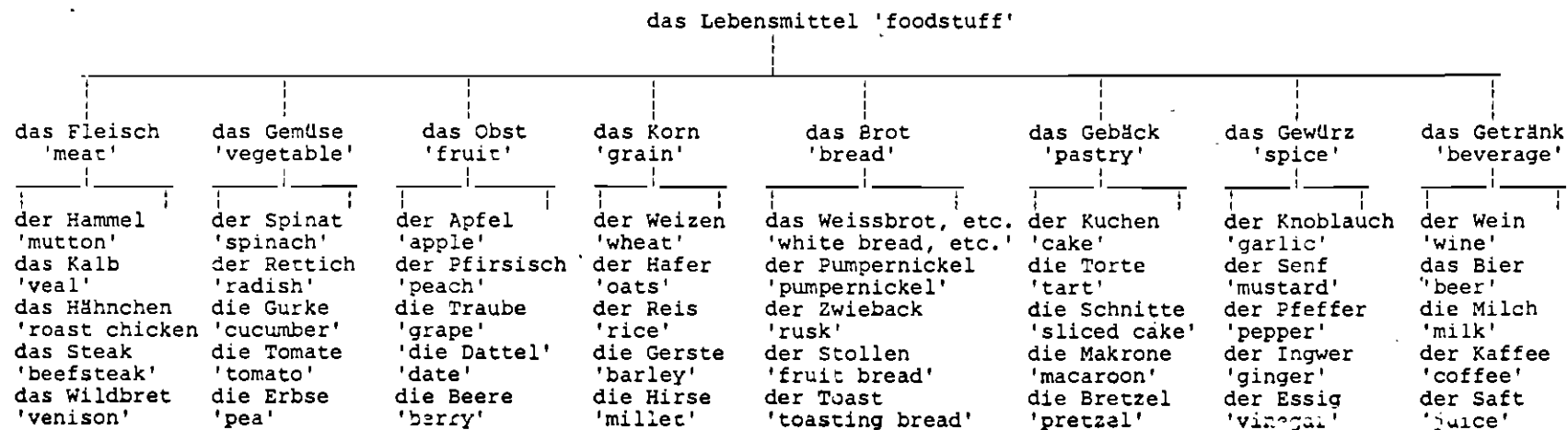


Table 11: folk taxonomy for means of transportation

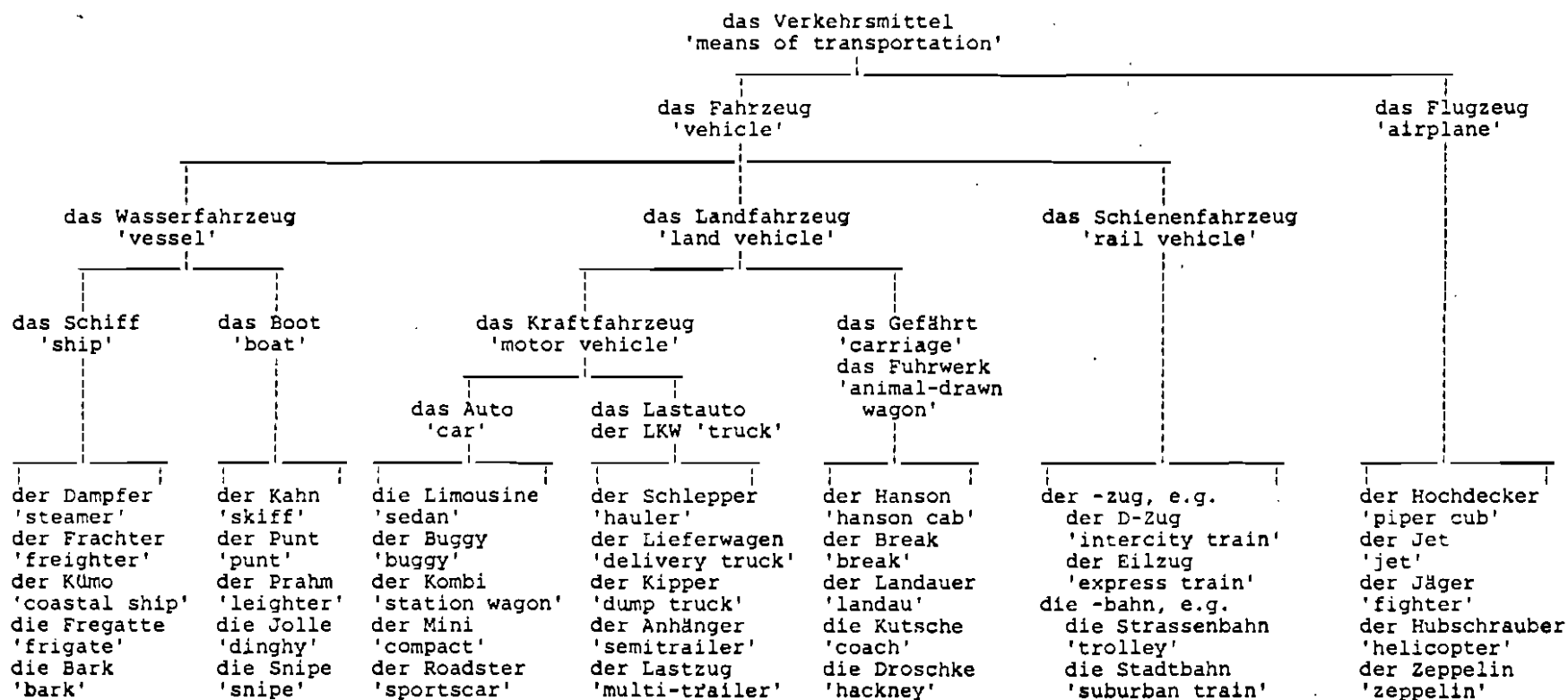


Table 12: summary of additional taxonomies with simplex neut-gender superordinate terms.

<u>Superordinate</u>	<u>Basic Level</u>
1. Das Land 'land, state, country'	der Wald, der Acker, der Sumpf, die Wiese 'woods' 'field' 'swamp' 'meadow'
2. Das Volk 'people (sg)'	die Deutschen, die Schweizer, die Italiener, die Russen 'Germans' 'Swiss' 'Italians' 'Russians'
3. das Amt 'office'	der Zoll, die Post, die Polizei, die Kanzlei 'customs' 'post office' 'police' 'chancellery'
4. das Team 'team' die Mannschaft	der HSV (Hamburger Sportverein), etc. (specific teams in a league)
5. das Wissen 'knowledge'	die Kunst, die Musik, die Keramik, die Linguistik 'art' 'music' 'ceramics' 'linguistics'
6. das Fach 'discipline, occupation'	die Chemie, die Botanik, die Klempnerei, die Tischlerei 'chemistry' 'botany' 'plumbing' 'carpentry'
7. das Spiel 'game'	der/das Skat, das Poker, das Schach, das Backgammon 'scat' 'poker' 'chess' 'backgammon'
8. das Fest 'celebration'	der Karneval, die Taufe, die Hochzeit, die Fete/Party 'Mardi Gras' 'christening' 'wedding' 'party'
9. das Zimmer 'room'	der Kammer, der Saal, die Stube, die Küche, die Mansarde 'chamber' 'hall' 'parlor' 'kitchen' 'attic room'
10. das Segel 'sail'	die Fock, der Besan, der Klüver, die Genua 'foresail' 'mizzensail' 'jib' 'genoa'
11. das Tau/das Ende/ das Reep 'ship's rope'	die Want, die Leine, die Schot, die Bulin 'shroud' 'quality line' 'sheet' 'bug-line'
12. das Tuch/Gewebe 'fabric'	der Samt, der Krepp, der Satin, der Brokat 'velvet' 'crepe' 'satin' 'brocade'
13. das Wetter 'weather'	der Regen, der Schnee, der Wind, die Feuchte, die Dürre 'rain' 'snow' 'wind' 'humidity' 'draught'
14. das Metall 'metal'	der Stahl, die Bronze, das Eisen, das Kupfer 'steel' 'bronze' 'iron' 'copper'
15. das Mineral	der Ton, der Kalk, der Sand, der Kiesel 'clay' 'chalk' 'sand' 'flint'
16. das Geld 'money'	der Franc, der Schilling, die Lira, die Drachme 'franc' 'shilling' 'lira' 'drachma'
17. das Mass 'measure' (instrument or unit)	der Kantel, die Schaufel, die Waage, die Uhr 'sq. ruler' 'scoop' 'scale' 'clock'
	der Zoll, der Fuss, der Meter, die Elle 'inch' 'foot' 'meter' 'yard'
18. das Zeichen 'sign, signal' das Seezeichen 'sea marker'	die Tonne, die Boje, die Flagge, die Bake 'buoy' 'buoy' 'signal flag' 'landmark'
	das Verkehrszeichen die Ampel, der Wegweiser, der Streifen 'traffic sign, signal' 'traffic light' 'direction sign' 'line (on the street)'

Table 13: semiproductive devices for deriving superordinate terms

deriving morpheme	superordinate	basic level				
<u>ge-</u>	das Gebäude 'building'	der Turm 'tower'	die Scheune 'barn'	die Villa 'villa'	die Kirche 'church'	das Haus 'house'
	das Gewässer 'body of water'	der Fluss 'river'	der Teich 'lake'	der Hafen 'harbor'	die See 'sea'	die Bucht 'bay'
	das Gefühl 'emotion'	der Ärger 'irritation'	der Zorn 'anxiety'	der Hochmut 'arrogance'	die Angst 'anxiety'	die Geduld 'patience'
<u>-zeug</u>	das Halbzeug 'metal stock'	der Draht 'wire'	der Zain 'ingot'	die Folie 'foil'	die Stange 'bar'	die Platte 'sheet'
	das Nähzeug 'sewing things'	der Zwirn 'thread'	der Flicker 'patch'	die Nadel 'needle'	der Fingerhut 'thimble'	
	das Schreibzeug 'writing implement'	der Bleistift 'pencil'	der Füller 'ountain pen'	der Kuli 'ballpoint'	die Tinte 'ink'	
<u>-werk</u>	das Takelwerk 'tackle'	der Mast 'mast'	der Anker 'anchor'	die Winde 'winch'	die Gaffel 'gaff'	das Stag 'stay'
	das Zuckerwerk 'sweets'	der Bonbon 'sucker'	der Drops 'drop'	die Karamelle 'caramel'	die Praline 'praline'	
	das Astwerk 'branching structure'	der Zweig 'twig'	der Ast 'branch'	der Stamm 'trunk'	der Spross 'sprout'	die Gabel 'fork'
<u>-mittel</u>	das Heilmittel/ das Medikament 'medicament'	die Pfefferminze 'peppermint'	der Baldrian 'valerian'	der Balsam 'balm'	der Hustensaft 'cough syrup'	
	das Rauschmittel 'intoxicant'	der Alkohol 'alcohol'	die Koka 'coke'	das Haschisch 'hashish'	das Pot 'pot'	
	das Lehrmittel 'teaching implement'	der Zirkel 'compass'	der Atlas 'atlas'	der Rechner 'calculator'	die Karte 'map'	die Folie 'transparency'
<u>-gut</u>	das Steingut 'stoneware'	der Krug 'jug'	der Topf 'pot'	der Teller 'plate'	der Kelch 'goblet'	die Fliese 'tile'
	das Sprachgut(a) 'language resource'	der Spruch 'saying'	die Redensart 'fixed expression'	die Fügung 'construction'	das Wort 'word'	
	das Luxusgut 'luxury item'	der Tabak 'tobacco'	der Kognak 'cognac'	der Champagner 'champagne'	der Kaviar 'caviar'	

a. This item refers to the inventory of lexical items, expressions, and grammatical structures of a language in a linguistically traditional sense.

Table 14: Partonomy of household furnishings

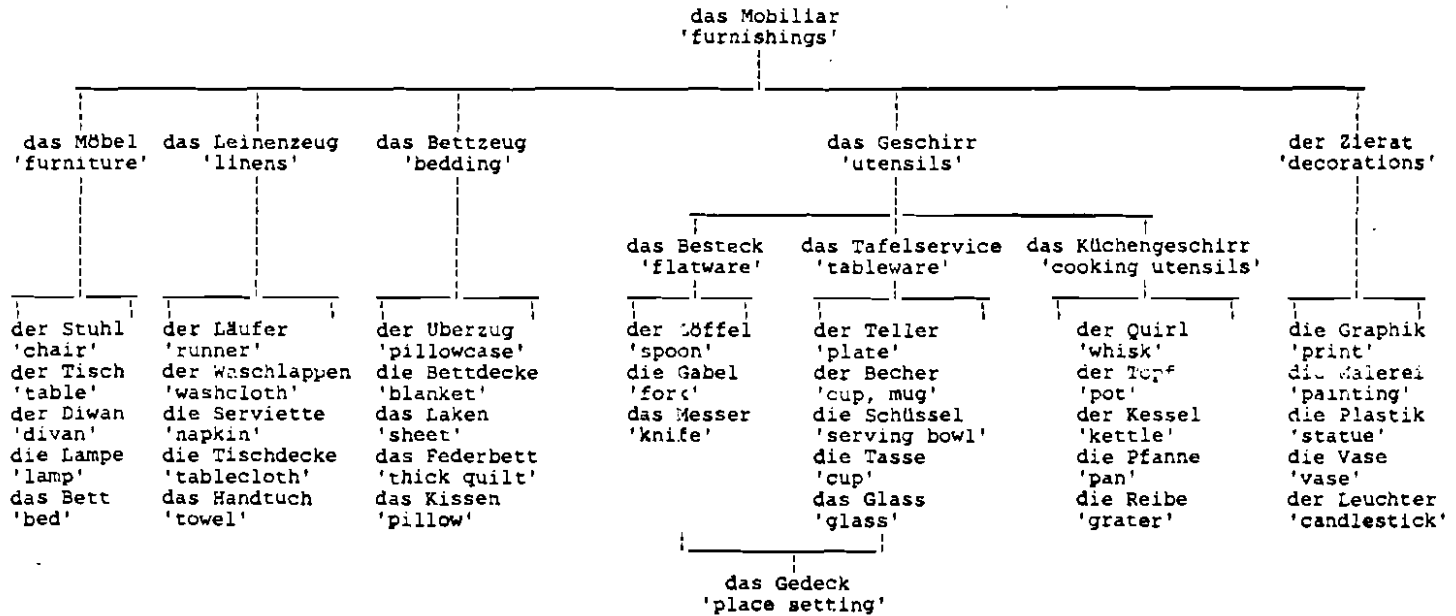
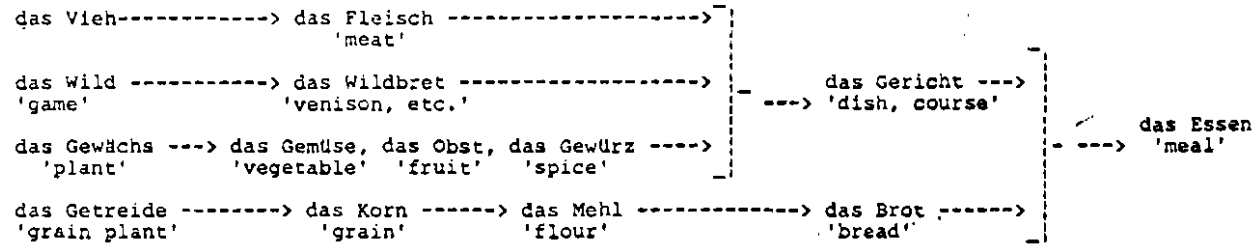


Table 15: Production chain taxonomy for foodTable 16: Production chain taxonomy for metal artifacts

das Erz ----> das Metal ----> das Halbzeug (a) ----> das Fertigteil --> das Gerät (b)
 'ore' 'metal' 'processed metal' 'finished part' 'implement'

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- a. This category includes milled or cast metal in the form of wire, bars, sheets, ingots, etc., which is further processed into parts.
 b. This category can refer either to simple tools (mostly metal) or to complex hand tools and small machines made of parts.