A short History of Morphological Theory*

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Interest in the nature of language has included attention to the nature and structure of words — what we call Morphology — at least since the studies of the ancient Indian, Greek and Arab grammarians, and so any history of the subject that attempted to cover its entire scope could hardly be a short one. Nonetheless, any history has to start somewhere, and in tracing the views most relevant to the state of morphological theory today, we can usefully start with the views of Saussure.

No, not that Saussure, not the generally acknowledged progenitor of modern linguistics, Ferdinand de Saussure. Instead, his brother René, a mathematician, who was a major figure in the early twentieth century Esperanto movement (Joseph 2012). Most of his written work was on topics in mathematics and physics, and on Esperanto, but de Saussure (1911) is a short (122 page) book devoted to word structure,[1] in which he lays out a view of morphology that anticipates one side of a major theoretical opposition that we will follow below.

René de Saussure begins by distinguishing simple words, on the one hand, and compounds (e.g., French *porte-plume* 'pen-holder') and derived words (e.g., French *violoniste* 'violinist'), on the other. For the purposes of analysis, there are only two sorts of words: root words (e.g. French *homme* 'man') and affixes (e.g., French *-iste* in *violoniste*). But "[a]u point de vue logique, il n'y a pas de différence entre un radical et un affixe [...] [o]n peut donc considérer les affixes comme des mots simple, et les mots dérivés au moyen d'affixes, comme de véritables mots composés. Il n'y a plus alors que de deux sortes de mots: les *mots simples* (radicaux, préfixes, suffixes) et les *mots composés* par combinaison de mots simples."[2](de Saussure 1911: pp. 4f.) The simple words are then treated as 'atoms', each with an invariant sense and potentially variable content, and the re-

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*I am grateful to the editors and two referees for comments. The present chapter is almost entirely devoted to the line of development, primarily in America, that has led to the views on morphology associated with Generative Grammar, generously construed. Other chapters in part II of the present *Handbook* present a broader range of theories in more detail, including some (such as "Natural Morphology," chapter 17) that fall largely outside these geographical and theoretical bounds. For some remarks on the nature and development of the notion of "morpheme" in a variety of traditions, see Anderson 2015.

[1] I am indebted to Prof. Louis de Saussure of the University of Neuchâtel for access to a copy of this work, found in the library of his father, the late Antoine de Saussure (son of Ferdinand's brother Louis-Octave de Saussure). This item appears to have gone unnoticed by linguists of the time or of ours, although it contains many ideas that would later come to prominence: for instance, the notion of hierarchical inheritance as the basis of semantic networks, and a clear statement of the "Right-hand Head Rule" that would later be formulated by Williams (1981).

[2] From the point of view of logic, there is no difference between a root and an affix. Affixes can thus be considered as simple words, and affixally derived words as really compound words. There are therefore only two sorts of word: *simple words* (roots, prefixes and suffixes) and *compound words* made by combining simple words.

mainder of the work is devoted to the principles by which these atoms are combined into 'molecules', each a hierarchically organized concatenation of the basic atoms.

While the notion of the linguistic sign as an arbitrary and indissoluble unit combining form and meaning would be associated as an innovation with his bother Ferdinand, René here lays out a picture of word structure as a matter of structured combination of basic signs, units corresponding to what would later be called morphemes. His principal interest is in providing an analysis of the content of these basic elements from which it is possible to derive the meanings resulting from their combination, but this is grounded in a picture of complex words as essentially syntactic combinations of units that cannot be further decomposed. The word *violoniste* is thus composed of two equally basic units, both nouns: *violon* 'violin' and *-iste* 'person, whose profession or habitual occupation is characterized by the root to which this element is attached.'

This may seem rather straightforward, and indeed much subsequent thinking about morphology would take such a position as virtually self-evident, but it can be contrasted with the view of complex words taken by René's brother Ferdinand. Rather than treating all formational elements found in words as equally basic units, and complex or derived words as combinations of these, de Saussure (1916 [1974]) distinguishes basic or minimal signs from relatively or partially motivated signs. Thus, *arbre* 'tree' and *poirier* 'pear tree' are both signs. The former is not further analyzable, and thus basic, but in the case of the latter, the form and content link it to other pairs such as *cerise* 'cherry', *cerisier* 'cherry tree'; *pomme* 'apple', *pommier* 'apple tree', etc. It is the parallel relation between the members of these pairs that supports (or partially motivates) the meaning of *poirier* in relation to that of *poire*, not the presence of a structural unit *-ier* 'tree, whose product is characterized by the root to which this element is attached'.

Ferdinand de Saussure was clearly familiar with the equivalent in various languages of the German word *morfem* 'morpheme' which appeared in the earlier work of Jan Baudouin de Courtenay (Anderson 2015) in much the same sense as René de Saussure's 'simple words'. He does not use it, however, and does not present the analysis of complex derived words as a matter of decomposing them into basic units or minimal signs. Rather, he treats morphological structure as grounded in the relations between classes of words: similarities of form reflecting similarities of content and *vice versa* directly.

The two brothers were no doubt familiar to some extent with one another's views, but there is no evidence that Ferdinand was persuaded to adopt René's mode of analysis. Although much later writing would identify the notion of the morpheme as it emerged with the minimal sign of de Saussure (1916 [1974]), and thus assume that "Saussure's" treatment of morphologically complex words involved breaking them down into components of this sort, such an analysis is really most appropriate for the work of René de Saussure, and not for Ferdinand. In the work of the two, we can already discern a difference between something in René's work corresponding to what Stump (2001) would later call a *lexical* theory and something in Ferdinand's that could be called an *inferential* one.

Such a basic dichotomy of morphological theory is not the only anticipation of later distinctions that we can find in work of the early twentieth century. In both the practice of the grammars that appear in the *Handbook of American Indian Languages* and its introduction (Boas 1911: see also Anderson (1985: chapter 8)), Franz Boas maintains a theory of morphology with some distinctly modern features. In particular, the treatments of morphological structure in these descriptions are divided into two parts: on the one hand, an inventory of the *grammatical processes* employed in the language (e.g., prefixation, suffixation, internal modification such as Ablaut, etc.), and on the other,

an inventory of the *ideas expressed by grammatical processes,* such as number, tense or aspect, causativity, etc. In practice, this division was deployed in much the same way as under the *Separation Hypothesis* of Beard (1995), according to which a language's morphology consists of a collection of possible formal modifications any of which can be used to express any of the categories of content signaled by the form of a word.

1   Antecedents of Generative Morphology

However interesting it may be to find such precursors of contemporary issues in views more than a century old, there was not in fact very much continuity between those discussions and the American Structuralist[3] linguistics of the late 1930's and beyond that served as the direct ancestor of the picture of word structure that emerged in generative theories. After a brief look at the history of the period, we turn to those views.

1.1   Edward Sapir

A major figure in our field whose work has connections to that of Boas is Edward Sapir. Most of Sapir's writing was focused on descriptive problems, primarily in the native languages of North America. Apart from this, Sapir is best known for his focus on language as a component of the mind, including some important papers on phonology and the psychological nature of phonological structure (Anderson 1985: chapter 9), issues that do not directly concern us here. Apart from what one might conclude from his descriptive practice, however, Sapir did provide a view of morphology in the context of a typology of morphological structure across languages that appears in his little general audience book *Language* (Sapir 1921: cf. also Anderson 1990).

   Sapir's intention is to improve on the kind of typology inherited from nineteenth century philology that differentiated languages as 'analytic' or 'isolating' *vs.* 'synthetic', and among synthetic languages as 'agglutinative', 'polysynthetic', and 'inflecting' or 'fusional' — categories that are rather imprecise and difficult to apply in a consistent way across a language. Sapir substitutes a descriptive framework based on three dimensions. One of these refers to the degree of internal complexity of words, corresponding to the traditional scale running from 'analytic' through 'polysynthetic'; he has little to say about this, and it will be ignored here. Rather more interesting are his other two dimensions.

   These derive fairly directly from Boas' early form of the Separation Hypothesis noted above:

> The question of form in language presents itself under two aspects. We may either consider the formal methods employed by a language, its "grammatical processes," or we may ascertain the distribution of concepts with reference to formal expression. What are the formal patterns of the language? And what types of concepts make up the content of these formal patterns? The two points of view are quite distinct. (Sapir 1921: 57)

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[3]The linguists who saw their approach to language as originating in the work of Leonard Bloomfield referred to it as "Descriptivist" linguistics; "American Structuralism" was a term introduced by their detractors. Nonetheless, it has become the standard label, and we follow that usage here. The limitation of the discussion below to American work is grounded not in the lack of anything of interest in other parts of the world, but rather in the fact that ideas about morphology in later generative work can be derived almost exclusively from American precedents.

As possible grammatical processes that might serve as the signal for concepts, Sapir offers a list:

- Word order

- Composition (compounding of stems)

- Affixation (prefixation, suffixation, infixation, etc.)

- Internal modification (vocalic or consonantal Ablaut, Umlaut, consonant mutation, etc.)

- Reduplication

- Variations in accent (pitch, stress, etc.)

It will be seen that in addition to signalling content by the combination of minimal sign-like units ("morphemes"), Sapir envisions a variety of ways in which systematic modification of the shape of a base can be used to indicate additional conceptual material. As a typology, the granularity of this classification is clearly much finer than that of whole languages, and it should rather be thought of as a way to characterize individual morphologically significant relations. As a theory of morphology, this is fairly clearly an inferential rather than a lexical one, in the terms of Stump (2001).

Sapir's other significant dimension, that of concepts, distinguishes four basic types:

- Basic (radical) concepts

- Derivational concepts

- Concrete relational concepts

- Pure relational concepts

The last two are essentially the sorts of thing that are generally ascribed to inflection, and the difference between them corresponds to the distinction between inflectionally significant properties that also bear semantic content (e.g. grammatical number) and those with purely grammatical significance, such as the use of the Latin Nominative to mark subjects. Every language has to have Basic and Pure relational concepts (even if the latter are signalled only by word order, and not by formal modification), but languages can differ as to the degree of elaboration of the other two types.

Rather interestingly, Sapir takes the grammatical form of a sentence to be described in a way that attends to the distribution of relational concepts without reference to its actual morphological or semantic content. Thus, after comparing the two sentences *The farmer kills the duckling* and *The man takes the chick,* he observes that

> we feel instinctively, without the slightest attempt at conscious analysis, that the two sentences fit precisely the same pattern, differing only in their material trappings. In other words, they express identical relational concepts in an identical manner. (Sapir 1921: 85)

The relevant grammatical patterns, then, are to be described independently of the concrete lexical (and morphological) material that will instantiate them. As far as the actual apparatus of syntactic description, Sapir's view is no more fleshed out than others of the period prior to the focus on syntax associated with the rise of generative grammar, but it does not seem unfair to characterize it as a precursor to subsequent "Late Insertion" theories such as those of Otero (1976), Anderson (1992), Halle & Marantz (1993) and others.

Had Sapir been as engaged by morphology as he was by phonology, the typological framework he developed in Sapir (1921) suggests that the theoretical position he would have arrived at would have been quite interesting in contemporary terms. However, there is little evidence of a continuing interest in these issues in his later work. In any event, his conception of language as an aspect ot the mind put him rather at odds with the emerging positivist climate of the 1920s and 30s; while linguists continued to recognize his importance, he had little influence on the views that came to define Structural Linguistics.

1.2   Leonard Bloomfield

Much more central to the field of Linguistics as it developed an identity independent of its origins in Classical Philology and in Anthropology were the proposals of Leonard Bloomfield.[4] Although his textbook (Bloomfield 1933) bears the same title as Sapir's earlier work, the views of the subject matter expressed in the two works were vastly different.

As opposed to earlier linguists whose conception of language was shaped in large part by traditional grammar of the European sort, Bloomfield was strongly influenced by his study of the Sanskrit grammarians. Where traditional grammar largely saw morphological relations as grounded in paradigmatic relations among word forms, the Sanskrit view emphasized breaking complex words down as combinations of basic parts, and Bloomfield pursued this program of analyzing words as structured arrangements of irreducible morphemes.

He defines the morpheme as "a linguistic form which bears no partial phonetic-semantic resemblance to any other form" (Bloomfield 1933: 161), that is, a meaningful component of a word that cannot be analyzed into smaller meaningful sub-parts. This requires that phonetic and semantic resemblances among words are correlated, and the 'morphemes' are the units that result when further sub-division would destroy that correlation. This includes not only roots, but also affixes of all kinds; and the *lexicon* of a language is precisely an inventory of all of the morphemes of all kinds that can be identified. The grammar of the language is largely the set of principles by which these morphemes are arranged into larger constructions.

Bloomfield's definition leads to a variety of problems, including the proper analysis of "phonæsthemes" and some of the phenomena referred to in the literature as ideophones (Kwon & Round 2015). For example, the set of English words including *glow, gleam, glisten, glitter, glimmer, glare*, etc. share phonetic material (the initial *gl-* and semantics ('light emitting from a fixed source'), but the notion that these facts motivate positing a

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[4]Matthews (1993) shows that Bloomfield's actual views on morphology, and the history of those views, should be understood as significantly more complex and nuanced than the version in which they were understood by the "neo-Bloomfieldians" who developed the theoretical position to be outlined below in section 1.3. The presentation here is intended to represent the picture of morphology that was attributed to Bloomfield and that served as the basis for later theorizing.

morpheme {gl} with that meaning seems wrong to virtually all linguists. Similarly, pairs of words in Korean such as *piŋkɨl/peŋkɨl* 'twirling of a larger/smaller object', *pipi/pɛpɛ* 'state of bigger/smaller things being entwined', *cilcil/calcal* 'dragging of a heavier/lighter object', etc. differ systematically in that the difference between high and non-high vowels in the word corresponds to a difference between relatively larger and smaller referents. Again, treating the vowel height dimension as a separable morpheme would be broadly rejected, despite the presence in such cases of a "partial phonetic-semantic resemblance" among the words.

It would appear that Ferdinand de Saussure's notion of word structure, grounded directly in relations among forms rather than on their decomposition, could describe such phenomena without particular problems, but phonaesthemes in particular pose a serious issue for the position Bloomfield wished to maintain. In fact, going back to his earlier work (as noted by Matthews 1993), he enumerates a number of such examples in English which he characterizes (Bloomfield 1933: 245) as constituting "a system of *root-forming morphemes*, of vague signification," though he does not elaborate on the problems they pose for his definition of the morpheme.

Bloomfield's morphology was a fairly pure example of a lexical theory; indeed, he introduced the term "lexicon" to designate the inventory of a language's morphemes, the analysis of which constituted the basic task in grammatical analysis. His definition, however, appeared to present a number of technical difficulties, and the attempts of his followers in the Structuralist tradition to identify and deal with these led to slightly different theories within the same general range.

1.3   Classical American Structuralism

One problem that Bloomfield's definition of the morpheme appeared to present was that it relied on an association of specific phonetic material with specific semantics, thereby assuming that morphemes have determinate phonetic content. In many cases, though, we wish to say that we have to do with a single morpheme even when multiple distinct phonetic forms are involved. For example, surely there is a single plural morpheme to be found in the English words *cats, dogs,* and *horses,* but not only are the surface forms [s], [z] and [ɨz] distinct, they are also phonemically distinct in the terms of the analyses of sound structure prevalent at the time. Now in fact Bloomfield's practice quite freely allows such identification: he treats *duke* and *duchess* as sharing a single morpheme with two *alternants,* but his definition does not make clear the basis for such a description.

This was addressed directly, initially by Harris (1942), who proposed to consider the sound side of the morpheme not as a single phonetic (or phonemic) shape, but rather as a *set* of such shapes, each associated with the same semantics and in a relation of *complementary distribution* such that (ignoring the issue of free variation), each member of the set is associated with particular environments, where the environments linked to any two member of the set are disjoint. The individual phonological forms are then referred to as the distinct *allomorphs* of the morpheme.

The notion that morphemes are realized by members of a set of allomorphs standing in complementary distribution is obviously quite similar to that of phonemes as realized by phonetic segments that constitute the set of their allophones, also in complementary distribution. Indeed, the American Structuralists of the 1940s and 1950s saw the discovery and analysis of phonemes, minimal contrastive units of sound structure, as probably their most important contribution to the science of language, and plunged with alacrity into a

view of morphemes as entirely parallel minimal units of word (and ultimately sentence) structure. The view of the morpheme as an analytic unit entirely like the phoneme, but constituting the next level up of abstraction, was developed in various papers throughout the period by linguists such as Bloch (1947) and Nida (1948), reaching its most explicit formulation in the definitive work of Harris (1951).

Within traditional grammar (and to some extent in the linguistics of the early years of the twentieth century), the theory of word structure, morphology, was primarily a matter of characterizing the relations among surface words, especially word forms that together constituted a paradigm. In contrast, the American Structuralist theory of morphology was centrally a theory of the morpheme, and that in turn broke down into two aspects: *allomorphy,* or the characterization of the relations in form among the allomorphs of individual morphemes; and *morphotactics,* or the characterization of the combinatory principles that group morphemes together into larger units.

The resulting view involves a commitment to several basic principles:

- Morphemes are indivisible units of linguistic form linking some component(s) of meaning with a set of mutually exclusive allomorphs that express it, similar in nature to Saussurean minimal signs.

- Each morpheme has a determinate semantic content, and each allomorph has a determinate phonological form.

- Words are composed exhaustively of morphemes.

- Each morpheme in a word is represented by one and only one allomorph; and each allomorph represents one and only one morpheme.

Once such principles are made explicit, it becomes clear that many situations in actual languages are not directly analyzed in such terms. Hockett (1947: cf. also Anderson 2015) discusses a number of these, including discontinuous morphological expression, zero morphs and their counterparts empty morphs, portmanteaux, replacive and subtractive morphs, etc. Somewhat puzzlingly Hockett seems to treat the identification of these anomalies as constituting their resolution, but in any event, an agenda of potential problems for the structuralist conception of morphological structure had been laid out.

2 Morphology in Classical Generative Grammar

With the rise of generative grammar in the 1950s and 60s came a rather precipitous decline of interest in morphological issues *per se.* This was largely a consequence of the absorption of much of the territory of morphology into other aspects of grammar. As phonological theory discarded the limitations imposed by the definition of the phoneme as a unit of surface contrast, and allowed for rather more abstract phonological representations, virtually all of the treatment of allomorphy apart from pure suppletion came to fall within phonology. On the other hand, as substantive theories of syntax emerged, these were considered to govern the distribution of morphemes directly, leaving nothing of consequence for a distinct domain of morphotactics. This latter development was really just a turning on its head of the existing view: where structuralists had imagined that morphotactics, once extended above the level of the word, would provide a framework for syntax, the new theories presumed that syntax extended to domains smaller than

the word would account for what had been called morphotactics. As a result of these combined developments, though, there was very little of interest left for a morphological theory to account for.

2.1   Early Transformational Grammar

The notion that classical generative grammar did not really have a theory of morphology, however, is somewhat over-simplified.[5] As a student of Zellig Harris, Chomsky brought with him assumptions about word structure similar to those laid out in Harris 1951, apart from the effort in that work to ground those conception in discovery procedures that would lead from a corpus of surface forms to an analysis. In particular, from his earliest significant publication in syntax, Chomsky (1953) assumes that the fundamental units of syntactic analysis (and of the internal form of words) are morphemes, each of which is a link between determinate components of meaning (semantic or grammatical) and a set of their surface phonological instantiations, with explicit references to Harris's work. Chomsky's earlier exploration of the morphology of Hebrew (Chomsky 1979 [1951]) led him to maintain a much more complex and abstract notion of the relation between morphemes and their phonological realizations than that of Harris (1951), but morphemes were nonetheless an unquestioned component of an analysis.

In the central work of this early period, Chomsky (1985 [1955-6]) lays out an analysis of the structure of natural language in terms of a number of significant levels, each with its own primitives and systematic connections with adjacent levels. One of these is the level **M**, where linguistic objects are represented as complexes of morphemes. The elements of **M** on the one hand largely correspond to the terminal elements of Phrase Markers (on the level **P**). On the other hand, representations on the level **M** correspond to words (on the level **W**, ultimately mapped onto phonological form by a system of morphophonemic rules.

In this theory, then, morphemes correspond to the objects whose distribution is governed by the syntax. This fact is quite essential, since it is on this that the analysis of English auxiliary sequences by means of the transformation which has come to be known as "Affix Hopping" crucially depends. In that analysis auxiliaries such as Perfect *have,* Progressive *be,* etc. are introduced in phrase structure in combination with morphological markers (*-ed* 'Past Participle', *-ing* 'Progressive', etc.). "Affix Hopping" then permutes these markers with a following verbal element to attach them as suffixes to it, yielding a compact and appealing account of the dependencies within the auxiliary sequence in a way that depends crucially on the ability of syntactic rules to refer directly to morphemes. It is probably no exaggeration to say that this analysis (as it was presented in Chomsky 1957) was more influential in attracting other linguists of the period to the emerging theory of Transformational Grammar — and to the set of assumptions it relied on.

The role of morphemes as syntactic primitives in this view is clear, but it is also compromised to a limited extent in a way that elicited little if any discussion. Chomsky (1985 [1955-6]: 168) notes that some elements on level **M** play a role in word structure, but not in the syntax: his example is the *-ess* of *actress, lioness, mistress,* etc. On this basis he distinguishes the set of syntactically relevant morphemes as a level $\overline{\mathbf{M}}$ "embedded into the level [of phrase structure] **P**," where the elements of $\overline{\mathbf{M}}$ are a proper subset of the elements of **M**. The difference between $\overline{\mathbf{M}}$ and the remaining elements of **M** (e.g., *-ess*)

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[5]The discussion of these matters below is based on the somewhat fuller treatment in Anderson (forthcoming).

is said to approximate the traditional distinction between inflection and "composition," thus leaving the door open for a theory of derivational morphology that would not be part of the syntax but rather of word structure, but this possibility was not explored. Syntacticians had more important matters to occupy their attention.

Another aspect of morphological theory in this early work, partially taken over from Harris but largely based on his own experience in analyzing Hebrew, was the rather abstract nature of the relation between morphemes and their phonological realizations. While Bloomfield and at least some of the structuralists had seen the allomorphy of individual morphemes as somewhat limited, Chomsky (1957: 69, fn. 2) explicitly allows for analyses such that "[i]n the morphophonemics of English we shall have rules: *wh + he* → /huw/, *wh + him* → /huwm/, *wh + it* → /wat/*", and the analyses of Hebrew in Chomsky (1979 [1951]) are even more abstract. There is thus no obvious constraint on the relation between sequences of morphemes and their phonological realization in words.

Early generative theory, then, was not without a theory of morphology: a rather rich and substantive theory was in fact taken for granted, though this was based on premises inherited with little examination from earlier structuralist views. The lack of attention to these matters in theoretical discussion was surely a result of the fact that developments in syntax and in phonology were much more dramatic and therefore captured most of the attention. But as a result, a version of the structuralist morpheme and its attendant assumptions about the structure of words persisted into linguistic theory without explicit justification.

2.2 The *Aspects* Theory

The important re-formulation of syntactic theory in Chomsky (1965) also introduced some changes in the treatment of word structure within generative grammar, though the assumptions about the internal form of words remain largely the same. One important modification had to do with the place of words in the grammar relative to the syntax. In earlier work such as Chomsky (1957), words were introduced into sentences directly by rules of phrase structure. In order to capture restrictions on the occurence of particular words in context (e.g., the fact that *know* can have a human but not an abstract subject), this required a division among the rules introducing lexical items that corresponds to the division of words into lexical categories and subcategories. Because these categories cross classify, however, rather than falling into a strict hierarchy, such a set of rules cannot in general be stated in a natural way.

To remedy this difficulty, Chomsky proposed that the categorization of lexical items be represented as a set of features they bear, rather than as membership in a phrase structure category; and that the terminal nodes of phrase markers be not lexical items themselves, but rather complex symbols including these same features. An operation of Lexical Insertion then establishes correspondence between words and positions in syntactic structure whose features are compatible with those of the words themselves.

A result of this was a revision in the conception of the lexicon: instead of consisting solely of a listing of the language's morphemes, as on Bloomfield's view, the lexicon now lists full words. These were still to be entered in general as complexes of morphemes: *destruction* was to appear as *nom⌢destroy*, for example, where *nom* is a nominalizing morpheme introduced by a transformation converting verbal expressions into nominals. Nonetheless, the presence of whole words in the lexicon opened other possibilities. In particular, Chomsky (1965: 187) notes that in attempting to deal with limited produc-

tivity in some derivational formations, "it may be necessary to extend the theory of the lexicon to permit some 'internal computation,' in place of simple application of the general lexical rule." As remarked below in section 3.1, taking this possibility would have important consequences for both syntax and morphology.

For readers today, perhaps the most surprising point found in this work was an argument in the final chapter. Discussing the treatment of inflected forms in German such as *(der) Brüder* '(the) brothers (Gen)', he compares two possible analyses. One of these regards *Brüder* as *Bruder⌢DC1⌢Masculine⌢Plural⌢Genitive* where each of these elements is regarded as a single morpheme (*DC1* being a kind of "class marker"). The other analysis, which he sees as capturing the paradigmatic treatment characteristic of traditional grammars, treats the word as the lexical item *Bruder* in association with a complex symbol containing features [+Masculine, +Plural, +Genitive, 1 DC, . . .], with rules of interpretation operating on the word *Bruder* in the context of these features so as to yield the surface form. He then provides arguments against the morphemic account, and in favor of the paradigmatic alternative that dispenses with inflectional morphemes:

> For one thing, many of these "morphemes" are not phonetically realized and must therefore be regarded, in particular contexts, as zero elements. In each such case a specific context-sensitive rule must be given stating that the morpheme in question is phonetically null. But this extensive set of rules is entirely superfluous and can be omitted under the alternative paradigmatic analysis.
> [. . .]
> More generally, the often suppletive character of inflectional systems, as well as the fact that (as in this example) the effect of the inflectional categories may be partially or even totally internal, causes cumbersome and inelegant formulation of rules when the representations to which they apply are in [the form of morpheme sequences]. However, suppletion and internal modification cause no special difficulty at all in the paradigmatic formulation, Similarly, with morphemic representations, it is necessary to refer to irrelevant morphemes in many of the grammatical rules. [. . .] But in the paradigmatic representation, these elements, not being part of the terminal string, need not be referred to at all in the rules to which they are not relevant. Finally, notice that the order of morphemes is often quite arbitrary, whereas this arbitrariness is avoided in the paradigmatic treatment, the features being unordered.
> I know of no compensating advantage for the modern descriptive reanalysis of traditional paradigmatic formulations in terms of morpheme sequences. This seems, therefore, to be an ill-advised theoretical innovation.
> (Chomsky 1965: 173f.)

In retrospect, it is possible to see this line of reasoning as following from the picture of morphophonemics presented in Chomsky (1979 [1951]), but in context it appears somewhat out of the blue. More importantly, perhaps, this approach to inflectional morphology was not followed up either in the syntactic literature or in phonology, where e.g. Chomsky & Halle (1968) present straightforwardly morphemic accounts of word structure. Perhaps this is attributable to the fact that English, the major focus of work both in syntax and in phonology at the time, is less subject to the difficulties presented by such a representation. Nonetheless, it is quite striking that the arguments in the passage

just quoted were not apparently taken seriously in the field until they were rediscovered in later work focused directly on morphological theory.

3   The Rediscovery of Morphology

It is clear that generative linguistics as the field developed in the 1950s and 1960s was not without a theory of morphology, although the assumptions about words and their structures were largely implicit and not the focus of much attention in themselves. This began to change somewhat, however, as morphological issues came to attract attention in themselves, initially in connection with the structure of the lexicon..

3.1   Lexicalism in Syntactic Theory

In the fall of 1967, Chomsky gave a series of lectures at MIT (later published as Chomsky 1970: henceforth, "Remarks") whose primary focus was on restricting the power of transformational operations in syntax, limiting the semantic adequacy of underlying forms, and in general countering the proposals of the emerging theory of Generative Semantics. For our purposes, the primary interest of the program initiated there lies in its consequences for morphology and the theory of the lexicon.

In previous work, as noted above, Chomsky had assumed that nominalization constructions were uniformly to be derived in the syntax, with an underlying verbal structure transformed by the introduction of a nominalizing morpheme which served both as the source of the surface morphology and as the trigger for the shift of category membership. In "Remarks," however, he discusses significant differences between two types of nominalized constructions in English: *gerundive* nominals such as *John's refusing the offer* and *derived* nominals such as *John's refusal of the offer*. He notes a number of ways in which the internal structure of nominals of the latter type reflects basic structural characteristics of NPs, as opposed to the gerundive nominals, whose internal structure is much more like that of sentences.

On this basis, he suggests that "we might allow the base rules to accommodate derived nominals directly." That is, we could allow the relation between Verbs and associated derived nominals to be described not in the syntax, but rather in the part of the grammar that is responsible for providing words to the syntax: the lexicon. On this view, while *refusal* is of course related to the verb *refuse,* that relation is established within the lexicon; as far as the syntax is concerned, it is nothing but a noun, and thus naturally appears as the head of structures with all of the characteristics of NPs.

This looks at first glance like a rather modest suggestion about the analysis of a single construction in English, but in fact it had much broader ramifications. Picking up on the suggestion in Chomsky 1965 about "extend[ing] the theory of the lexicon to permit some 'internal computation'," the proposed account of derived nominals introduces a new class of rules into the theory of grammar. Such lexical rules would not be part of the syntax, but something else: an entirely distinct class of rules, rules of word structure.

There is little said in *Remarks* about the specific form and distinctive properties of such rules, but other writers took up this challenge in more detail (e.g., Jackendoff 1975, Wasow 1977, Anderson 1977) in ways that eventually led to renewed interest in morphology as a distinctive aspect of grammatical theory. The thrust of that work was the recognition of principled differences between (morphological) rules that govern the internal form of words and (syntactic) rules that group words into phrases.

This contrast led to a distinctive approach to syntax (and morphology) known as "Lexicalism," grounded in the distinction between lexical processes relating words to one another and syntactic processes governing phrase markers. Various implementations of the basic underlying principle have been explored, some of which are described in other chapters of the present volume. One particularly restrictive formulation is the **Lexical Integrity Hypothesis**, according to which the syntax neither manipulates not has access to the internal form of words. On this view the only way the syntax can affect the form of a word is through manipulation of the complex symbol with which lexical insertion has associated it, while the only aspects of a word's structure that are accessible to the syntax are those reflected in the featural content of that complex symbol. Some implications of this approach to grammar are discussed by Lieber & Scalise (2006), a review that also summarizes evidence which they feel might compromise the hypothesis in its strong form.

3.2 Generative Morphology Comes into its Own

The Lexicalist literature brought morphological issues into consideration from the point of view of syntactic theory, but the proposals of Halle (1973) represented a more direct re-emergence of morphology as a separate area of inquiry in grammatical theory, not simply a sub-field of syntax or phonology.

Halle begins from the fairly straightforward neo-Bloomfieldian assumption that the grammar of a language "must include a list of morphemes" including both roots and affixes "as well as rules of word formation or morphology." He assumes that in principle, the rules for combining morphemes apply freely, thus accounting for all of the productive formations in the language, but he supplements these components of the grammar with a "dictionary," or list of all of the actual words. Since idiosyncratic information can be associated with entries in the dictionary, this allows for the description of non-compositional aspects of word meaning and form. By serving as a filter on the output of the processes of morpheme composition, the dictionary also provides an account of non-productive formations: all possible combinations of listed morphemes can be built, but only those combinations listed in the dictionary are available for use by the syntax.

Given the apparent duplication in this view of information represented by the effects of word formation and information directly encoded in dictionary entries, it was not directly pursued, but Halle's consideration of whole words (and not only morphemes) as the potential locus of significant information was taken up by Aronoff (1976) in a widely read work that attracted much attention to morphology as a distinctive field of inquiry.

Continuing Halle's assumption of a list of full words in the grammar, the major innovation in Aronoff's work was the notion that the "rules of word formation" were not rules combining morphemes from a separate list into larger structures, but rather rules relating (structurally defined classes of) words directly to one another. This rests in part on the observation that some classes of words that should be regarded (for phonological purposes) as internally complex cannot be sensibly constructed from independently listed meaningful parts: e.g. English prefix+stem structures such as *deceive, receive, perceive*, etc. In addition, some words with idiosyncratic, holistically assigned meanings (e.g. *transmission* 'the gearbox that uses gears and gear trains to provide speed and torque conversions from a rotating power source to another device' [Wikipedia]) should nonetheless be regarded as consisting of multiple parts (/trans+mit+ion/), despite the fact that the combination of those parts is not compositional.

While listing items in the lexicon as whole words, Aronoff retains the assumption that

these are structured combinations of morphemes, and that this structure can be referred to by word formation rules. This is apparent in the claim that one of the operations word formation rules can perform is the deletion ("truncation") of a specific morpheme in conjunction with the addition of another morpheme, as in formations such as *nominee* from *nominate, operable* from *operate*, and others where a morpheme *–At* is apparently removed from a verbal stem in association with the addition of other elements.

Another strand of thinking with respect to word formation emerged not from the mainstream generative literature, but rather from the effort to incorporate insights from traditional treatments into contemporary thinking. Matthews (1965) discussed the approach of "Word and Paradigm" analysis, a view grounding morphological structure directly in the relations among words within an inflectional paradigm, making no direct and essential reference to internal components such as the structuralist morpheme. Matthews (1972) develops a theory of inflectional structure more generally on a similar basis, presuming that words have an abstract representation in terms of a set of properties related in regular ways to the phonological realization of surface indicators of those properties, in ways that again do not rely on the assumption of anything like morphemic structure. Anderson (1982) pursued an approach to inflection converging with this, grounded in the proposals of Chomsky (1965) discussed above in section 2.2. This line was further extended to derivation and other types of word formation in Anderson 1992, where the view of morphology as in general "a-morphous" (in the sense of not being based on morphemes) was argued. Similar approaches to inflection and other areas have been pursued by various scholars.

The approach to morphology initiated by Halle & Marantz (1993), "Distributed Morphology" (see Siddiqi's chapter in the present volume), in contrast, is strongly committed to a morpheme based view, and to the pre-*Aspects* conception of morphological combination (morphotactics) as entirely the responsibility of the syntax. On the other hand, this theory also provides for a rich morphological component that takes the result of syntactic formations as its input and manipulates this in a variety of ways prior to phonological realization. As a result, the relation between the output of the syntax and the input to the phonology is effectively unconstrained, and the substance of the claim that the syntax was responsible for forming morphologically complex words is unclear. Further discussion of these matters is beyond the scope of the present article, however. As far as the history of morphology is concerned, an important consequence of the emergence of Distributed Morphology is the fact that substantial numbers of syntacticians have adopted that theory, and with it, an understanding that morphology is indeed something to be taken seriously.

4   Conclusion: Varieties of Morphological Theory

By the 1980s and 1990s, as a result of developments including those discussed section 3.2, morphology had emerged from under the waters of syntax and phonology and once again taken a place as a legitimate — and substantive — domain of inquiry within grammatical theory. This was further confirmed by the appearance of textbooks specifically devoted to morphology, such as Scalise 1984 and Spencer 1991; dedicated journals such as the *Yearbook of Morphology* (first published in 1988; later renamed as *Morphology*); handbooks such as Spencer & Zwicky 1997, specialized conferences, and other manifestations.

As with any part of the field in which there is considerable activity, there is also

substantial diversity of opinion about the appropriate approach to morphology. A basic division goes all the way back to the difference suggested in the introduction above between the views of the two Saussure brothers. Some theorists see the analysis of words as basically a matter of the analysis of minimal meaningful pieces of form — morphemes — as René de Saussure did, and the principles for combining these elements as essentially continuous with the regularities of the syntax. Such "syntax of words" theories would include work by scholars such as Selkirk (1982), Lieber (1980, 1992), and Williams (1981), among others. The alternative on which morphology is described directly as a matter of relations between words not mediated by combination of basic atomic elements like morphemes is typified by the proposals of Zwicky (1985), Anderson (1992), Stump (2001) and others.

As already noted in the introduction, Stump (2001) distinguishes theories of the former kind, based on the combination of morphemes or similar elements drawn from an inventory or lexicon, as *lexical* theories, as opposed to *inferential* theories treat "the associations between a word's morphosyntactic properties and its morphology" as "expressed by rules or formulas". He also introduces an orthogonal distinction between *incremental* theories, on which a word bears a given content property exclusively as a concomitant of a specific formal realization; and *realizational* theories, on which the presence of a given element of content licenses a specific realization, but does not depend on it. Most lexical theories tend to be incremental in nature, but Distributed Morphology, for example (by virtue of the complexity of the relation between syntactic output and phonological realization that it posits) fits the characteristics of a lexical realizational view. Filling out the typology, Steele (1995) argues for a view that is inferential but incremental in nature, though that approach has not been substantively pursued in the subsequent literature.

More explicit characterizations of theories such as those discussed above and others is the business of other chapters in the present *Handbook*, especially those of part II, and will not be essayed here. What is reasonably clear is that theoretical inquiry into the principles governing the structures of words and relations among them is a matter that extends back into the earliest periods of the systematic study of language. While that subject matter has at times been subordinated to other areas of grammar, morphology is alive and well as a distinct field of study within contemporary linguistics.

References

Anderson, Stephen R. 1977. Comments on Wasow: The role of the Theme in lexical rules. In Peter Culicover, Thomas Wasow & Adrian Akmajian (eds.), *Formal syntax*, 361–377. New York: Academic Press.

Anderson, Stephen R. 1982. Where's morphology? *Linguistic Inquiry* 13. 571–612.

Anderson, Stephen R. 1985. *Phonology in the twentieth century*. Chicago: University of Chicago Press.

Anderson, Stephen R. 1990. Sapir's approach to typology and current issues in morphology. In *Contemporary morphology*, 277–295. Berlin: Mouton de Gruyter.

Anderson, Stephen R. 1992. *A–Morphous morphology*. Cambridge: Cambridge University Press.

Anderson, Stephen R. 2015. The morpheme: Its nature and use. In Matthew Baerman (ed.), *Oxford handbook of inflection*, 11–34. Oxford: Oxford University Press.

Anderson, Stephen R. forthcoming. The role of morphology in Transformational Grammar. In Andrew Hippisley & Gregory T. Stump (eds.), *The Cambridge handbook of morphology*. Cambridge: Cambridge University Press.

Aronoff, Mark. 1976. *Word formation in generative grammar*. Cambridge, MA: MIT Press.

Beard, Robert. 1995. *Lexeme-morpheme base morphology: A general theory of inflection and word formation*. Albany: SUNY Press.

Bloch, Bernard. 1947. English verb inflection. *Language* 23. 399–418.

Bloomfield, Leonard. 1933. *Language*. New York: Holt.

Boas, Franz (ed.). 1911. *Handbook of American Indian languages, vol. 1*, vol. 40.1, Bulletin. Bureau of American Ethnology.

Chomsky, Noam. 1953. Systems of syntactic analysis. *The Journal of Symbolic Logic* 18. 242–256.

Chomsky, Noam. 1957. *Syntactic structures*. The Hague: Mouton & Co.

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on nominalizations. In R. A. Jacobs & P. S. Rosenbaum (eds.), *Readings in english transformational grammar*, 184–221. Waltham, MA: Ginn & Co.

Chomsky, Noam. 1979 [1951]. *The morphophonemics of modern Hebrew*. New York: Garland Publishing. Revision of 1951 University of Pennsylvania MA thesis.

Chomsky, Noam. 1985 [1955-6]. *The logical structure of linguistic theory*. Chicago: University of Chicago Press. Edited version of 1955-1956 manuscript, with 1979 index; earlier edition published by Plenum Press, New York, copyright 1975.

Chomsky, Noam & Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.

Halle, Morris. 1973. Prolegomena to a theory of word formation. *Linguistic Inquiry* 4. 3–16.

Halle, Morris & Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Kenneth Hale & Samuel Jay Keyser (eds.), *The view from building 20*, 111–176. Cambridge, MA: MIT Pres.

Harris, Zellig. 1942. Morpheme alternants in linguistic analysis. *Language* 18. 169–180.

Harris, Zellig. 1951. *Methods in structural linguistics*. Chicago: University of Chicago Press.

Hockett, Charles F. 1947. Problems of morphemic analysis. *Language* 23. 321–43.

Jackendoff, Ray S. 1975. Morphological and semantic regularities in the lexicon. *Language* 51. 639–71.

Joseph, John E. 2012. *Saussure.* Oxford: Oxford University Press.

Kwon, Nahyun & Erich R. Round. 2015. Phonaesthemes in morphological theory. *Morphology* 25. 1–27.

Lieber, Rochelle. 1980. *On the organization of the lexicon.* Ph.D. thesis, M.I.T. Published by Indiana University Linguistics Club, 1981.

Lieber, Rochelle. 1992. *Deconstructing morphology.* Chicago: University of Chicago Press.

Lieber, Rochelle & Sergio Scalise. 2006. The Lexical Integrity Hypothesis in a new theoretical universe. *Lingue e Linguaggio* 5(I). 7–32.

Matthews, Peter H. 1965. The inflectional component of a word-and-paradigm grammar. *Journal of Linguistics* 1. 139–171.

Matthews, Peter H. 1972. *Inflectional morphology.* Cambridge: Cambridge University Press.

Matthews, Peter H. 1993. *Grammatical Theory in the United States from Bloomfield to Chomsky* . Cambridge: Cambridge University Press.

Nida, Eugene. 1948. The identification of morphemes. *Language* 24. 414–441.

Otero, Carlos. 1976. The dictionary in generative grammar. [Unpublished manuscript, U.C.L.A.].

Sapir, Edward. 1921. *Language.* New York: Harcourt, Brace & World.

de Saussure, Ferdinand. 1916 [1974]. *Cours de linguistique générale.* Paris: Payot, critical edn. [prepared by Tullio de Mauro].

de Saussure, René. 1911. *Principes logiques de la formation de mots.* Geneva: Librairie Kündig.

Scalise, Sergio. 1984. *Generative morphology.* Dordrecht: Foris.

Selkirk, Elizabeth. 1982. *The syntax of words.* Cambridge MA: M.I.T. Press.

Spencer, Andrew. 1991. *Morphological theory.* Oxford: Basil Blackwell.

Spencer, Andrew & Arnold Zwicky (eds.). 1997. *Handbook of morphology.* London: Basil Blackwell.

Steele, Susan. 1995. Towards a theory of morphological information. *Language* 71. 260–309.

Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure.* Cambridge: Cambridge University Press.

Wasow, Thomas. 1977. Transformations and the lexicon. In Peter Culicover, Thomas Wasow & Adrian Akmajian (eds.), *Formal syntax*, 327–60. New York: Academic Press.

Williams, Edwin S. 1981. On the notions 'lexically related' and 'head of a word'. *Linguistic Inquiry* 12. 245–74.

Zwicky, Arnold M. 1985. How to describe inflection. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 11. 372–86.