his aims are. He might choose to concentrate on the spoken practice or cover the written form as well, and the problem arises of whether the two aspects should be dealt with separately, particularly in the case of an ideographic writing system. But even with an alphabetically written language it may be advisable to present two different analyses, at least for some of the moneme classes. In standard written French, personal endings may differ from one verb to another. For present indicative 1., 2., 3. sg, there is for *dorer* 'to gild,' *-e*, *-es*, *-e*, in *je dore*, *tu dores*, *il dore*, but, for *dormir* 'to sleep,' *-s*, *-s*, *-t* in *je dors*, *tu dors*, *il dort*. In daily oral practice, all these endings are silent and all the forms sound /dɔr/ (note, with linking, the same pronunciation /dɔrtil/ for *dore-t-il*? 'does he gild?' and *dort-il*? 'does he sleep?'). This means that one has to operate, in one case, with two different conjugations, in another, with verbs with the same radical throughout versus verbs with varying radicals: cf. e.g., *nous dorons* 'we gild' /dɔr-/ versus *nous dormons* 'we sleep' /dɔrm-/. Here is a situation where the distinction between spoken and written coincides with two different levels, one more solemn and one more spontaneous. But these are not necessarily confused: to familiar and slangy forms normally correspond written renderings, and rhetoric and ritual usages often present some specific oral features. All of this goes beyond grammar, involving, as it does, phonetics, phonology, and vocabulary, but it includes it.

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American Structuralism

John G. Fought

The main focus of this article is a theory of language and a corresponding view of linguistics associated primarily with Leonard Bloomfield (1887–1949), to a lesser extent with Edward Sapir (1884–1939), and with their students. Some key elements of their views, however, can be found in the work of Franz Boas (1858–1942), the principal founder of modern American anthropology and the mentor of generations of linguistic anthropologists, including Sapir. It is less well known that Boas was also a friend and mentor of Bloomfield (cf. Bloomfield 1943).

The history of American structural linguistics is often sketched as a mostly linear development from an early, intuitive, anthropological, Boas–Sapir style to a later, more explicitly formal Bloomfieldian style exemplified by Bloomfield himself and his students (cf. Hymes & Fought 1981). This article emphasizes that Sapir and Bloomfield, who had similar backgrounds and were only three years apart in age, also had fundamentally similar approaches to linguistics and, further, that both were strongly influenced by Boas. Finally, it suggests that the main discontinuities in theory and practice within the American structuralist community appeared later, between the group made up of Boas, Bloomfield, and Sapir together with certain of their early students and followers and the younger group of distributionalist structuralists rather misleadingly known as 'Bloomfieldians,' including Bernard Bloch, Martin Joos, Henry Lee Smith, George Trager, and Zellig Harris, whose influence was greatest in the late 1940s and 1950s.

The principal disciplinary contributors to the formation of American structuralist linguistics were the mature fields of dialectology and comparative Indo-European philology and the linguistic side of the young discipline of anthropology. From the first of these came an emergent notion of language structure, exemplified, for instance, in the doctrine of regular, conditioned sound change in comparative philology and of regular phonetic correspondence in dialectology; from linguistic anthropology came an emphasis on the study of spoken language in use within the speech community and a relativistic view of linguistic and cultural categories.

Native American languages have had an important role in giving American structuralist linguistics its dis-

tinctive character. The number and diversity of languages that continue to be spoken in North America in Native American speech communities is much greater than those that comprise the linguistic landscape of Western Europe. Native American languages, poorly documented and relatively accessible, have presented a continuing challenge and opportunity to North American scholars.

1. Franz Boas

In the last quarter of the nineteenth century, Boas developed an approach to linguistics that was shaped by his field studies of Native American languages and cultures. Unlike the leaders of European structuralism, he had no academic training in philology, though he apparently studied some standard works on his own (Stocking 1974: 455). His approach to these unwritten languages called for the elicitation, transcription, and analysis of large quantities of spoken discourse of ethnographically significant content. It emphasized proficiency in phonetic transcription that achieved phonetic accuracy but also reflected sound categories relevant to the speakers of the language. In 1889, he published a seminal paper, 'On alternating sounds,' in which he argued that certain apparently variable speech sounds reported for Native American and other 'exotic' languages (such as the range of sound types including both *r* and *l* that make up a phonological unit in Japanese) were actually artifacts of the observers' own categorizations of their perceptions rather than of the subjects' 'primitive' sound systems. Indeed, this was so much the case that the native language of an observer could in some instances be determined from a careful examination of such reports.

Wells (1974) summarized this paper and put its argument in the context of the linguistics and anthropology of the time. Stocking wrote (1968: 159) that it is 'impossible to exaggerate the significance of this article for the history of anthropological thought.' It is

> ... much more than a critical or methodological exercise. It in fact foreshadows much of Boas' later criticism of late nineteenth-century racial thought and his work in physical anthropology. More importantly, it foreshadows a great deal of modern anthropological thought on 'culture.' At least by implication, it sees cultural phenomena in terms of the imposition of conventional meaning on the flux of experience. It sees them as historically conditioned and transmitted by the learning process. It sees them as determinants of our very perceptions of the external world. And it sees them in relative rather than in absolute terms. Much of Boas' later work, and that of his students after him, can be viewed simply as the working out of implications present in this article.

It must be emphasized that what Boas (and Stocking) say here of culture applies equally to language. It was Boas who made linguistics one of the 'four fields' of anthropological study, along with archaeology, cultural anthropology, and physical anthropology. One especially salient feature of American structuralism traceable to his influence is relativism, the view that cultural and linguistic categorization is imposed on experience in ways that differ, sometimes radically, from culture to culture and from language to language and that these different categorizations have equal claims on the attention of science. In this approach to linguistic description, pioneered and taught by Boas to generations of students, methodological primacy was given to fieldwork as a source of data, that is, to directly observed and carefully recorded speech and behavior, and to methods of analysis and description intended to be free of preconceptions about the nature and interrelationships of specific fundamental categories. Boas emphasized the importance of collecting ethnographically relevant text material by transcribing it phonetically and explicating its form and content with the help of native speakers. By systematically paraphrasing and altering portions of the text after elicitation, and observing the covariation of the meanings and forms in the text, Boas and his students worked out the phonological and grammatical structures of the target languages. 'Perhaps his greatest contribution to science,' wrote Bloomfield (1943: 198) in his deeply felt obituary of Boas, '... was the development of descriptive language study.' And further, 'Boas amassed a tremendous body of observation, including much carefully recorded text, and forged, almost single-handed, the tools of phonetic and structural description.'

For Boas and his first generation of students, much more than for anthropologists since, language lay near the heart of anthropology. Linguistic methods, therefore, were part of the foundation of anthropological training as he organized it. He communicated his emphasis on native classification by generalizing it from his view of linguistics; within linguistics, he extended his conception of the nature of language from its sources in phonology:

> As the automatic and rapid use of articulations has brought it about that a limited number of articulations only, each with limited variability, and a limited number of sound-clusters, have been selected from the infinitely large range of possible articulations and clusters of articulations, so the infinitely large number of ideas have been reduced by classification to a lesser number, which by constant use have established firm associations, and which can be used automatically. (Boas 1911: 21)

Notice first the equal weight given to sounds and ideas in this passage and the notion applied to both of structure emerging from social interaction: systematization through classification, constant use, firm associations, and automaticity. Later American structuralists, however, continued to pay particular attention to phonological structure in developing a model of language, both as a practical matter in analyzing

and describing so many hitherto undocumented languages and as a theoretical tenet, whereby a model of structural elements and relations based on phonology was projected into other levels of structure. The structure of semantics, by contrast, remained a mostly anthropological concern.

Since native classifications are imposed on the raw stuff of experience and of language by individuals and are propagated through language use in everyday interactions, there is no reason to expect that different cultures will develop the same scheme of classification. Instead, variation in all aspects of structure from community to community is to be expected. Boas gave expression to this community-oriented relativism in a frequently cited passage from the introduction to the *Handbook* (1911: 39).

> We conclude . . . that in a discussion of the characteristics of various languages different fundamental categories will be found, and that in a comparison of different languages it will be necessary to compare as well the phonetic characteristics as the characteristics of the vocabulary and those of the grammatical concepts in order to give each language its proper place.

One offshoot of the linguistic version of cultural relativism was the interpretation of language in culture that came to be known as the Sapir–Whorf hypothesis. This topic has spawned a considerable literature of its own. Hoijer, in an influential symposium volume he edited on this topic (1954), traces this hypothesis to two paragraphs written by Sapir in 1929. The last sentences of each give the idea: 'The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached,' and 'We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation' (Sapir 1929, cited in Hoijer 1954: 92). The original formulation claims significantly less than many later, oversimplified paraphrases, whose purport is that language predetermines rather than predisposes. In any event, the close kinship between this view of Sapir's and the corresponding relativism of Boas's linguistic anthropology is manifest.

This relativism implies that individuals may also differ from one another in their personal category systems in the same ways that communities do, but this individual aspect of relativism was kept subordinate in theory to the unity supposed to arise from sharing a common culture or a common language. The largely tacit agreement maintained among most anthropologists and linguists to leave individual variation out of the domain of theory and description, to leave it uncovered, as it were, by the doctrine of cultural and linguistic relativism, has had serious consequences for descriptive practice in both fields. In linguistics, this omission has been a textbook example of anomaly in the sense of Kuhn (1962). Some consequences of the omission of individual variation from structural descriptions are discussed below, in connection with Bloomfield's descriptive work on Algonquian.

A still later sequel to the Boas–Sapir approach to language in culture is the development within American anthropological linguistics in the late 1940s and early 1950s of a structuralist approach to semantics, known as 'componential semantics' and 'ethnoscience' (cf. Goodenough 1956; Lounsbury 1956, 1964). This approach, which simply applied the same analytical tools to meaning that had long been applied to sound, was in sharp contrast to Bloomfield's radically nonstructural view of meaning. This steadfast lack of parallelism between structuralism in language form and atomism in semantics remains the most puzzling aspect of Bloomfield's thinking. At times he came very close to adopting a structural view of semantics, but he apparently never took the final step. Writing in 1927, for instance (1927: 179–80), he evidently relied to some extent on dictionary meaning, even for grammatical formatives and categories. He mentioned numerical systems and botany and kinship terminologies as complex in their relationship to cultural and material realities, 'with troublesome refinements,' such as degrees of affection, respect, and the like. This is an amazingly exact prefiguration of the reasoning that led to structural analyses of these semantic domains, and also of the reaction against those analyses within anthropology when they finally came about 25 years later.

2. Edward Sapir

Both Sapir and Bloomfield produced a large body of published work, including collections of text and analytical studies on a number of Native American languages (see Mandelbaum 1949). Sapir worked especially on the Athabaskan and Uto-Aztecan families. He too published a general book on linguistics, *Language* (1921); like Bloomfield's, it is still in print. Sapir also developed an interest in psychology, which brought him into a close working relationship with Harry Stack Sullivan, whose view of psychology focused on social interactions; from this interest Sapir launched the anthropological subfield of culture and personality studies in the 1930s.

Sapir's and Bloomfield's styles of description are sometimes contrasted as 'item and process' versus 'item and arrangement,' to use terms later introduced by Charles Hockett; in another publication (1970), however, Hockett pointed out that the two models are equivalent in power and descriptive capability. Zellig Harris also noted that Sapir's model of language structure relied on notions of 'pattern' and 'configuration.' Sapir's model of language structure continues the use of processes as one among many of the features of Boas's system. Its reliance on processes rather than on the relational counterparts introduced in later

theoretical works by Bloomfield and others is doubtless an important reason for the usual perception of Sapir as an antecedent of Bloomfield.

Sapir (1921: 61–62) listed six types of grammatical processes: word order, composition, affixation, internal modification, reduplication, and accentual differences (in stress and pitch). He explained that composition 'differs from the mere juxtaposition of words in the sentence in that the compounded elements are felt as constituting but parts of a single word-organism' (1921: 64). It is easy to misunderstand his rhetoric of feeling and organism as a kind of naive psychologizing. However, the examples that followed made it clear that compared with mere juxtaposition, semantic changes, stress patterns, and affixation to the compound stem are characteristic of compounds. As usual, Sapir writes of psychology and offers evidence from linguistics. Harris (1951a) commented on this.

> A detailed examination of Sapir's use of *psychology* and kindred words shows they refer not to some new forces within the individual which can affect his language, culture, or personality, but simply to the fact that the individual participates in linguistic, cultural, and personality patterns.

Sapir himself was explicit on this:

> The unconscious nature of this patterning consists not in some mysterious function of a racial or social mind... but merely in a typical unawareness on the part of the individual of outlines and demarcations and significances of conduct which he is all the time implicitly following.

This passage is also an important and eloquent expression of the Sapir–Whorf hypothesis.

One of the aims of his popular book was to classify languages in their patterns of use of the various formal processes as a means of expressing concepts and grammatical relations of different types. His treatment of affixation is an exemplary presentation in terms of process. Distributionalists wedded to item and arrangement descriptive styles often alleged that historical metaphor was inevitable with process descriptions, that process, in other words, always amounted to process through time. Harris did not accept this view:

> The difference between two partially similar forms is frequently described here as a process which yields one form out of the other. Thus when bases or themes have several vocalic forms, the various forms are said to be the result of vowel-change processes operating upon the base or theme (∂ 6:2, 22:28). The difference between a base and a base-plus-suffix is described as the result of the process of suffixation (∂ 6:1, 20:11). This is a traditional manner of speaking, especially in American Indian grammar (e.g., in the Handbook edited by Boas). It has, of course, nothing to do with historical change or process through time: it is merely process through the configuration, moving from one to another or larger part of the pattern. (Harris 1944: 199)

Although Harris never studied with Sapir, he read his work carefully and wrote penetrating appreciations of Sapir's collected writings and of Stanley Newman's study of Yokuts, as a representative of Sapir's mature style of description. He emphasized the importance of Sapir's notions of configuration and pattern in understanding the approach:

> The relations between elements in the configuration are always described in terms of the pattern. Therefore Newman says: 'In order to preserve that inflexible rule of Yokuts syllabic structure which does not permit the juxtaposition of two vowels, the glottal stop is interposed as a hiatus-filler between two vowels that should morphologically follow each other' (§ 1:13)[...]. Since the elements are observed only as parts of the system, and occur only in the positions which are mentioned when the system is described, one can picture the configuration as determining the nature of its elements (requiring or employing them): 'The strict vocalic and syllabic requirements of the base do not apply to the theme' (§ 12:1). (Harris 1944: 198)

As in Bloomfield's work, both forms and meanings are related to each other as elements of the pattern: 'The configuration is treated as though it were a pattern of meanings as well as, basically, of forms. Summaries are offered of the meanings of various formal parts of the pattern' (Harris 1944: 199).

3. Leonard Bloomfield

The early career of Leonard Bloomfield was representative of the overall development of linguistics as a discipline in America. His early writings, including his first general book, the *Introduction to the Study of Language* (1914), and his reviews of Braune (1912) and Wundt (1913), show very strong influences from contemporary European work.

However, this same period in American linguistics was also marked by the appearance of descriptive studies of Native American and other non-European languages. Under the editorial and intellectual direction of Boas, the *International Journal of American Linguistics* began to appear in 1917, dedicated to Native American languages; a carefully orchestrated campaign of field studies of selected languages by Boas's closely supervised students resulted in sketches and longer descriptions collected and published in the three volumes of the *Handbook of American Indian Languages* (1911, 1922, 1934). One of these studies was Sapir's landmark dissertation on the Takelma language of Oregon (completed by 1909, published in 1922). Also at about this time, Bloomfield began descriptive linguistic work on Fox by studying texts collected and published by others (Hockett 1970: 94n). Very soon after, he began an analysis of Tagalog, based on elicitation and transcription of material from a native speaker then studying at the University of Illinois. After about two years of part-time work on the language, he published *Tagalog Texts* (1917), his

first major venture outside the Indo-European language family and an already mature exercise in the text-based descriptive technique of the time. By some at least, this study is still regarded as the best available description of a Malayo-Polynesian language. During the 1920s, he further shifted the target of his descriptive work, concentrating thereafter on the Algonquian languages.

3.1 Bloomfield's Theoretical System

A characteristic tenet of American structuralism virtually absent from European linguistics is the primacy of the sentence over the word as the basic analytical element. This was asserted by Boas (1911: 23): 'Since all speech is intended to serve for the communication of ideas, the natural unit of expression is the sentence; that is to say, a group of articulate sounds which convey a complete idea.' For both Boas and Bloomfield, this perspective presumably drew support from the analytical techniques worked out for describing languages whose combinations of meaningful elements straddled the range of complexity from word-like structures to sentence-like structures. Sapir (1921: 32–33) takes a broader view of this question, representing the morpheme and the sentence as elements and a range of intermediate formations as more or less relevant to the configuration of a particular language. Bloomfield gave the primacy of the sentence much clearer expression after explicitly rejecting his earlier Wundtian view of the word as fundamental (cf. 1914 [1970: 43]), pointing out the inconsistent and arbitrary aspects of conventional word division in European languages, and the lack of clear criteria of any kind for word division in Native American languages (Bloomfield 1927 [in Hockett 1970: 180–81]). Moreover, Bloomfield put this notion into a carefully articulated theoretical and operational context.

3.2 The Introduction to the Study of Language (1914)

The *Introduction* of 1914 feels like a very different book from the *Language* of 1933. The most striking difference between them is in the role played by psychology. The earlier book is a 'traditional' treatment of language, in which language forms are presented as expressing mental acts. The later book is 'formal,' in that language forms are themselves the focus, with types of semantic elements established in correlation with the linguistic forms but left almost completely empty. While this difference affects the exposition in many significant ways, it is the theoretical consequences that were presumably most important for Bloomfield and were certainly the most important in shaping reactions to his later work. In *Language*, Bloomfield advocated basing linguistic analysis on the overt forms of language, using their similarities and differences as the guide to organizing and presenting the grammar and syntax and to establishing the fundamental categories of the structure of each language. It was this, more than anything he said or did about the meaning of linguistic forms or the psychology of language, that ran directly counter to the familiar and dominant pattern of thought in linguistics. For others, as for the younger Bloomfield, it was the presumed underlying mental activities that gave shape and significance both to what was said and to the academic study of language. Moving these putative mental acts away from the focus of linguistics and concentrating instead on overt forms as both the target of analysis and the decisive manifestation of language structure may have been the real motivation for the persistent charges, so puzzling to Bloomfield, that he ignored meaning. His change in orientation toward psychology in linguistics must have taken place not long after the 1914 book was written. It was probably due to several factors; the stimulus of independent descriptive field work in the Boas style and the personal influence of Boas were likely to have been among the more important. Weiss's behaviorist psychology eclipsing the influence of Wundt's system on Bloomfield was also important but must have had its impact somewhat later, after his move to Ohio in 1921.

In any event, as Hymes & Fought (1981) argued, his linguistic practice was scarcely affected by this change in outlook. Bloomfield's approach to linguistics was formed very early in his career, in nearly its full power and generality, but it could only emerge fully through descriptive work. For instance, Moulton remarked (1970: 516) on the courage (and seeming arrogance) of the opening paragraph of 'Etymologisches' (1912), a paper based on Bloomfield's dissertation on 'secondary ablaut' and published in German in the premier Germanistic journal when he was only 24. In this paper, Bloomfield stated bluntly that previous treatments of the topic were guilty of either of two errors: treating the vowel alternations of the specific vocabulary sets as instances of sound symbolism or of ad hoc sound laws. Though 'ablaut' patterns of root-vowel alternation are very common in the Germanic vocabulary, comparisons show that many do not date back to proto-Germanic times. Instead, the newer sets of forms were modeled analogically on the older patterns, an example of the 'creative' uses of language to which Bloomfield turned a number of times.

3.3 Language (1933)

The descriptive theory of grammar and syntax expounded in Bloomfield's *Language* (1933) was hierarchical and relational, with elements of form at each level paired with elements of meaning. His methodological precepts made it clear that the formal elements were paramount and the meanings interpretive. Nowadays, the architecture of his theory may seem deceptively familiar in outward appearance. Primary phonemes made up morphemes; morphemes were free

or bound, making up words and phrases; these in turn made up constituents and sentences, these last defined (following Meillet) as maximum free forms. To many of his influential contemporaries, however, the book was shocking, despite its evident borrowings from traditional grammar and from the Pāṇinian tradition of Indian grammar. A closer look at the system outlined in *Language* will help to show why; it is also helpful to compare the less complex theoretical systems of later American structuralists with Bloomfield's to see what features of his system they dispensed with and what they changed.

In his system, there was a hierarchy of grammatical forms as well as the bound and free morphemes; like them, each grammatical form was paired with a semantic unit. Thus, it was not the morphemes themselves that made up grammatical forms; rather, they were the substance of those forms. Bloomfield identified four types of elements of grammatical form, or 'taxemes': these were 'modulation,' 'phonetic modification,' 'order,' and 'selection.' Modulation was the use of secondary phonemes—features of stress, pitch, and intonation—which later, in other structuralist approaches, came to be called suprasegmental phonemes. Phonetic modification was a change in the primary (i.e., segmental) phonemes of a morpheme. Morphemes, for Bloomfield, were composed of primary phonemes and had a single phonemic shape except under 'sandhi,' that is, when occurring with taxemes of modulation or phonetic modification. Taxemes are analogous to phonemes in that they are meaningless elements whose combinations are meaningful. These combinations are 'tagmemes.' Thus, phoneme is to morpheme as taxeme is to tagmeme; just as morphemes are paired with 'sememes,' so tagmemes are paired with 'episememes.'

Bloomfield used the utterance *Duchess!* of the lexical form *duchess* to illustrate his analysis of grammatical form. Each utterance, he emphasized, contains at least one grammatical form; these are arrangements of phonetic (i.e., lexical) forms, not mere naked occurrences of them. His phonemic representations, though interesting, are not the main point here: he transcribed *duchess* ['doces], and its constituent lexical forms *duke* and *-ess* were [djuwk] and [es]. A taxeme of selection establishes the specific form class—subclass of male personal nouns—occurring with *-ess* and the co-occurrence with *-ess*; their sequence is established by a taxeme of order. A taxeme of modulation gives heavy stress to the noun and leaves the affix unstressed. Ironically, in view of later developments, Bloomfield and Noam Chomsky both place stress assignment rules within grammar. Finally, a taxeme of phonetic modification replaces the 'compound primary phoneme' [juw] of [djuwk] with [o], as Bloomfield represented schwa, and the [k] with [c]. These, together with the taxeme of exclamatory final pitch and the taxeme of selection of a substantive expression, make up the utterance *Duchess!*. In this way, every phonological, morphological, and grammatical aspect of the utterance is accounted for.

This system is like the Boas–Sapir model in that selection, modulation, and phonetic modification are used as if they were processes; Bloomfield describes them as taxemes, however, as elements of form, using relational rather than process terminology. The affixation of *-ess*, for instance, is achieved by a taxeme of selection of a form class and a taxeme of order, not by a process of affixation. Later models of grammar developed by distributionalists (especially Harris) minimized or eliminated these higher order grammatical forms, dealing instead entirely with arrangements of one or more morphemes, some of them grammatical in meaning, some lexical, and some having both kinds of function. As Wells (1963) noted, Harris reduced Bloomfield's four types of grammatical form to one: order.

Bloomfield's episememes, never used in his own practical work, had no counterpart at all in the later model. The *Duchess!* example is also accompanied by a paragraph on semantics that is so typical of his theoretical treatment of meaning that it deserves to be quoted in full (1933: 168):

> If some science furnished us with definitions of the meanings of the units here concerned, defining for us the meanings (sememes) of the two morphemes (*duke* and *-ess*) and the meanings (episememes) of the three tagmemes (arrangement of *duke* and *-ess*; use of exclamatory final pitch; selection of a substantive expression), then the meaning of the utterance *Duchess!* would be fully analyzed and defined.

Bloomfield was a careful writer indeed. The science he mentioned here was not linguistics. He tenaciously held the position that linguistic meaning awaits an exhaustive account of impersonal reality, to be furnished by natural science. Nothing less would be satisfactory. This passage also furnishes an excellent example of the deliberate Pāṇinian concision of Bloomfield's writing. He had noted explicitly earlier (1933: 166) that tagmemes are composed of taxemes, just as morphemes are composed of phonemes. This relationship is implied but not mentioned here by first stating that there are three tagmemes, and then by identifying each of the features of grammatical form in the discussion of the example in such a way that we can see it is a simple taxeme. Consequently, each of these units is a tagmeme made up of a single taxeme.

Bloomfield placed both modulation and phonetic modification within grammar, outside of morphology. Later American structuralists dealt with what he called phonetic modification as a part of morphology, namely, 'morphophonemics.' About the specific grammatical functions of suprasegmentals most had relatively little to say. The explicit identification of these as elements of grammatical form within a system in

which individually meaningless components form meaningful combinations is generally absent from the writings of later structuralists. They treated syntax in terms of morpheme order and selection alone. In these later works, grammatical form is a kind of epiphenomenon of combinations of morphemes; all or nearly all meaning is associated with individual morphemes.

Bloomfield's separation of form and meaning into parallel hierarchies was either rejected or misunderstood by Kenneth Pike, whose system of structural linguistics, called Tagmemics, branched off from a fundamentally Bloomfieldian approach on this issue. Pike's system closely associates each form with its meaning but uses a familiar stock of grammatical functions and categories with which each form class (a filler class in tagmemics) is also associated. Except for the lack of relativism about the fundamental categories, the system is like Bloomfield's in the prominence it gives to named constructions and their grammatical meanings (see *Tagmemics*).

There is another parallelism in Bloomfield's system as well, that between word-formation and sentence-formation, or morphology and syntax. The classification of forms in each is more elaborate than the traditional typology of simple, complex, compound, and compound-complex sentences, but it does include such types. Like many American structuralists, Bloomfield paid considerable attention to morphology both in his theorizing and in his descriptive work. There was an obvious reason for this, namely, that the languages he was most concerned with—the older Germanic and the Algonquian language families—had abundant morphologies, compared with that of modern English.

3.4 Bloomfield's Descriptive Linguistic Work

The theoretical system outlined by Bloomfield does not fully prepare the reader for the particular uses he made of it in his descriptive work. It does not presuppose any particular scheme of morphological and grammatical categories. These are expected to arise out of the analysis of forms and meanings in each language. In the analysis of Tagalog, for instance, there are no nouns or verbs. Instead, categories of expressions are built up directly from the formal elements of the language as he segmented and interpreted them. What is most striking about the morphological and syntactic analyses of Tagalog in the *Texts* is their accessibility and apparent simplicity. This is even more striking in the later and much briefer *Outline of Ilocano Syntax* (1942). The descriptive statements are ordered by generality, with the most general given first and the exceptions organized under it, in the method followed by generations of Indo-Europeanists and traditional grammarians as well. There is a straightforward mechanism for supporting cross-references but almost none of the often elaborate notational and classificatory apparatus of later structuralists or of the equally obtrusive and abundant notional terminology of traditional general grammar, as found, for instance, in Bloomfield's own *Introduction* of just three years before. Nevertheless, some major categories are carried forward from that work: the same three major grammatical relations of 'attribution,' 'predication,' and the 'serial relationship' are found in both. Instead of referring to forms by means of a system of hierarchical category labels, however, as many did and still do, Bloomfield cites the forms themselves, often mentioning their category membership just once, the first time they appear. Much use is made in the illustrations of a very few forms that are used many times, each in whatever fresh context or combination is required for illustration. Examples are abundant and are always accompanied by translations. As one moves forward through the syntactic section, they grow progressively longer and more challenging without ever completely abandoning the small, core set of lexical items he chose for this purpose. The text also includes implicit justification for some of the analytical steps taken. For example, Bloomfield refrained from referring to what later scholars call the focus-marking particles of Tagalog as case markers. The examples he cited 'make it possible to speak, in a very wide sense, of three "cases" in which an object expression may stand... but it is to be observed that these "cases" are not confined to any class of words, but appear in any word or phrase when it stands in the object construction' (1917: 161). In a note to this passage, he further observed that these Tagalog constructions are 'so different from what is ordinarily understood by cases that the above terminology has been avoided...' To Bloomfield at least, these language-specific categories are not simply new labels for old distinctions that could just as well have been called case markers, nouns, and verbs or the like. Instead, they reflect the different structural map of Tagalog, which is unlike European languages in many important respects. It was this aspect of Bloomfield's freedom from preconceptions that seems to have been most irritating to scholars already accustomed to working with a language in terms of traditional (that is, European) grammatical and notional categories. Blake (1919), in his review of the *Tagalog Texts*, complained of such terms as 'static word' and 'transient word' (instead of 'noun' and 'verb'); in his analysis of Ilocano (1942) Bloomfield replaced these by 'object expression' and 'open expression' but not by noun and verb.

Ives Goddard, himself an Algonquianist, has provided a careful analysis of Bloomfield's descriptive and comparative work on these languages (Goddard 1987). He deals at length with Bloomfield's resolution of a fundamental dilemma of structural linguistics: how to reconcile accurate description, necessarily based on the details of language use by individual

speakers, with the notion of language as a structural system shared by a speech community. Individuals differ in their usage, not only as individuals, but from situation to situation, and so on. A collection of accurately transcribed texts representing the usage of several speakers shows variation that often seems chaotic, and is at the very least a complex descriptive problem. However, as Goddard points out (1987: 200):

> It is hard to avoid observing that Bloomfield's achievement of the goal of describing the community norm of Menominee sits uncomfortably with his exhortation that in describing the language of a community a 'linguistic observer must record every form he can find and ... must not select or distort the facts according to his views of what the speakers ought to be saying' not to mention his general condemnatory remarks about normative grammars and about the obliteration of 'linguistically valuable forms' by the over-edition of ancient texts (Bloomfield 1933: 7, 37–38, 295, 497).

Goddard is to be commended for raising this most unpopular issue. It is nearly always resolved by linguists and indeed by other social scientists just as Bloomfield did, but often apparently without reflection, and still more often without a legacy of accurately recorded raw data so that emendations can be undone. Goddard shows how Bloomfield selected and when necessary edited his Algonquian data to compose a community norm of usage, both in phonology and in morphology (Goddard 1987: 200):

> He provided an explicit account only of the pronunciations, forms, and usages that he had determined constituted the norm, an entity that was in the final analysis an abstraction based on evaluation and analysis of the raw materials collected. His editing of the texts shows that he regarded them as providing examples of Menominee that were consistent with the norm and not as attestations of varieties of actual speech.

It is worth repeating that Bloomfield should bear no more than his share of the responsibility for such emendations. Goddard notes that Bloomfield rightly decided to publish his Menominee texts before the analysis, and that unfortunately very few linguists collect or publish texts at all: 'Each age will write its own grammars, but the texts are for all time' (Goddard 1987: 201).

Bloomfield's long-standing interest in mathematics led to a manuscript of some 300 pages on mathematics as *The Language of Science* (ca.1937), in which he 'accepted the discourse of mathematicians as a corpus, and treated that corpus by much the same sort of analysis to which he subjected Tagalog or Menomini texts, or any other body of data' (in Hockett 1970: 333). Only a few pages survive but they are of the highest importance in understanding Bloomfield's thought and its place in the development of linguistics.

The work must be placed at the origin of several traditions within the field: it was apparently the most searching example of an analysis of a technical sublanguage yet produced, and it should also count as a lost forerunner of the generative approach to syntax. It was strikingly free of notational and terminological apparatus except for the mathematical terms themselves, which are after all the object language of the work. Even the few surviving scraps of manuscript make it clear that Bloomfield's work had nothing in common with the caricature presented later as taxonomic linguistics. On page 103 of the manuscript, for instance, Bloomfield is engaged in distinguishing number sequences by means of an 'immediate successor' relation. Having noted that if *two* is the immediate successor of *one*, it may still be the case that *one* is the successor of *two* or of some later number in the sequence:

> Systems of arithmetic where this is the case are *modular* systems. The number system of English and of ordinary arithmetic, by contrast, is an infinite system. For it, we must rule out the recurrence of *one* in the chain of the operator *Immediate successor of*. This demands a recursive definition of the serial operator *Sequent of*, as above given ... (Bloomfield in Hockett 1970: 335).

A later, unnumbered page deals with various ways of naming irrational numbers. In the third of these ways,

> a formula defines an infinite class of rational numbers and orders this class so as to make it approach a limit; this limit then satisfies the definition of a real number, and may be irrational.

On page 213 he describes a formula for naming circulating (i.e., repeating) decimal numbers and mentions some linguistic consequences:

> We now change to a level of discourse where the ***R***'s are thing-nouns. They are members of a class O, which is defined as follows. (1) Say *decimal point*; (2) recite any sequence of digits or none; (3) name a second sequence of digits, not all zeros, as a circulating sequence; if you want to avoid duplicates, this sequence must not be the same as the end of the sequence (2). Then any speech-form of the shape (1)-(2)-(3) or of the shape (1)-(3) is a member of the class O.
>
> Given the class O, together with a formula for well-ordering it, such as that in the above array, we can define, *as functions of O*, infinite classes of speech forms of the type *N*.

Notice that Bloomfield is here giving explicit grammatical descriptions that generate infinite classes of verbal expressions and that the semantics of these expressions is also explicit, namely, certain parts of arithmetic. It is easy to imagine how much more pretentious this treatment of mathematical English could be made through the use of a quasimathematical notation, but the use of slightly extended English as a medium of expression for the rules should not conceal their explicitness and generative power. For Bloomfield as for other structuralists, there was no necessary limitation of the scope of a description to the content of the corpus it was based on. Moreover, these frag-

ments are certainly evidence of a specific concern with the creative or generative aspect of language use, a concern already present in his doctoral dissertation some 30 years earlier on the analogic productivity of vowel alternations in Germanic vocabulary sets.

4. Distributionalism

After 1945 a new generation of linguists emerged as disciplinary leaders. Bernard Bloch, Zellig Harris, Archibald Hill, Charles Hockett, Martin Joos, Henry Lee Smith, George Trager, and Rulon Wells were prominent figures in this group.

They disagreed on many theoretical issues but shared a commitment to some form of distributionalism, holding that analytic criteria based on the distribution of linguistic forms were preferable in theory to tests of semantic sameness or difference. The distribution of a linguistic element is the sum of the environments in which the element occurs.

The distributionalist program arose indirectly out of the view of meaning as a domain of continuously variable and possibly unknowable details without verifiable internal organization that was held in common by Bloomfield and the distributionalists. Forms, unlike meanings, were observable and easily distinguishable, allowing precise distributional statements *whose outcomes were thought to be equivalent to those that would otherwise be reached through appeal to semantic tests.* Unlike Bloomfield, who made and used judgments of semantic sameness and difference as best he could, the distributionalists took this skepticism about meaning-based criteria as a warrant for relying instead on the distributions of forms alone in making analytical decisions. They were more than willing to leave analytical criteria based on sameness or difference of meaning for the indefinite future when other branches of science had supplied the knowledge necessary to illuminate every aspect of the similarities and differences of, for example, dogs and cats.

Forms were subject to certain candidacy criteria as part of the determination of their contrastive status. These were usually standards of similarity in substance, for example, phonetic similarity among allophones of a phoneme and phonemic similarity among alternants of a morpheme (in early distributionalist theories). Complementary distribution enjoyed a special status in this approach. This is the relation of two elements such that where one occurs the other does not. Elements in complementary distribution *that also meet the criterion of similarity* are noncontrastive with each other and may be assigned to the same structural element as alternants. In other distributional relationships, elements share some or all of their environments, and may be contrastive or not.

The crucial problem of strictly distributional analysis was to decide whether forms occurring in the same environments were different (contrastive) or equivalent (noncontrastive). For example, were two words contrastive (different forms with different meanings) or synonymous (different forms with the same meaning)? For Bloomfield, the problem did not arise in this way: he used meaning as a criterion of analysis. Distribution for him was contingent on identities and differences established through assessing both formal and semantic sameness and difference. The 'Bloomfieldian' distributionalists' solution to this problem, however, was in effect and sometimes explicitly to deny that 'true' synonymy was possible. The argument was roughly as follows:

(a) Forms identical in meaning would be mutually substitutable in all environments, and thus would not differ in distribution.
(b) Forms differing in meaning are not mutually substitutable in all environments, and therefore differ in distribution.
(c) Observation shows that different forms always differ somewhat in distribution, and therefore must differ somewhat in meaning.
(d) A difference in form implies a difference in distribution and in turn a difference in meaning. There are thus no true synonyms.

The first assumption is not necessarily true: factors other than meaning that influence the co-occurrence of forms are easily brought to mind. Phonological shape, length or metrical factors, situational variables, and historical accidents leading to the fossilization of a particular expression sometimes produce minor differences of distribution that, under the distributionalist theory, must be regarded as implying minor, possibly undefinable differences of meaning.

The positions taken by the distributionalists on the proper role of meaning in linguistics nevertheless covered a wide range. Joos was actively interested in lexicology and semantic structure (1958). Bloch and many others regarded meaning as a practical shortcut to the results best obtained through more laborious but precise distributional analysis. Harris expressed a similar view, but devoted most of his *Methods* (1951a) to establishing a body of distributionally based analytical procedures. Trager was fully committed to excluding meaning from linguistics altogether.

Bloch (1948) remains the clearest statement of a distributional approach to phonology; his note on contrast (1953) was an attempt to redefine the notion distributionally. Much of Harris (1951a) was devoted to establishing methods of distributional analysis for all levels of linguistic description.

4.1 Levels of Structure, Levels of Analysis, and Levels of Description

Distributionalists typically presented language structure in levels, including phonology, morphology, and syntax. It was possible to describe an utterance in terms of the patterning of elements of sound, displaying its structure as a composite of their

paradigmatic and syntagmatic relations alone. Alternatively, one could show the same utterance in terms of its morphological elements, and their paradigmatic and syntagmatic relations. The elements belong to different sets and also to different levels; their relations of alternation and substitution are also characteristic of different levels. An utterance is a string of syllables; it is also a string of morphemes. But a syllable is not a morpheme (except by coincidence). Each layer of patterning conveys a part of the overall structure of the utterance and the language.

Wells (1963) regarded a full exploitation of the levels idea as one of the missed opportunities of descriptive linguistics. In early structuralism, there is no clear separation of structural elements into levels such as phonology, morphology, and syntax, such that an element of one type occurring on a higher level was represented by one or more elements of another type on a lower level in the way that a phoneme is represented by its allophones. Morphological and morphophonemic processes were mixed freely with word order and selection in the composition of meaningful grammatical forms. There was some variation in the handling of the levels idea among the distributionalists, but in general they treated it as proper to both analysis and description, whereas others, such as Kenneth Pike, regarded distinguishing levels of description as more important than separation of levels in the course of analysis. In analysis, he argued, structural cues of many kinds must be taken into account all at once, to be sorted out in the presentation of the structure of the language.

4.2 Zellig Harris

Harris's work deserves special attention for several reasons: it is an unusually coherent and formal statement of distributionalist structural linguistics, and it was the variety best known by Noam Chomsky, Harris's student at the University of Pennsylvania and the proofreader of Harris's *Methods* (1951a). The meaningful grammatical categories and construction types of Bloomfield and Sapir are largely replaced in Harris's work by morphemes and morpheme sequences:

> ... it suffices to define 'meaning' (more exactly 'difference in meaning') in such a way that utterances which differ in morphemic constituency will be considered as differing in meaning... Then the meaning of each morpheme in the utterance will be defined in such a way that the sum of the meanings of the constituent morphemes is the meaning of the utterance (Harris 1951a: 190).

Harris also allows for the assignment of meaning to constructions (1951a: 347–48) in instances when all occurrences of a particular construction share some feature of meaning, which is then 'taken out' and not assigned to individual morphemes; he gives a reference to Bloomfield's tagmemes. There is little or no use of this option in Harris's own work, however.

Harris's overall strategy was to reduce grammar (cf. Wells 1963), which he considered either a body of prohibitions or the equivalent body of positive assertions. If by adroitly combining distributionally based classes, the necessary prohibitions could be reduced or made to disappear, then grammar would be reduced by that much, and linguistic elements could be combined more freely. The unattainable end point of this strategy would be a description whose elements were freely combinable without the need for grammatical rules to restrict them. This attitude is close to the surface in his treatment of Sapir's categories, when he suggests that the hierarchical system of named types of word forms could be flattened:

> In general, the technique of classification and naming can be replaced by the technique of stating relations. Thus, Newman calls a base plus non-final suffix a theme, and obtains classes of themes according to the non-final suffix which went into making them. We could just as well speak in terms of base- and base-plus-suffix, and avoid the term 'theme.' We can similarly side-step the stem-classes of bases and themes. (Harris 1944: 203)

5. Summary

Sapir and Bloomfield were much alike in their practice of descriptive linguistics, but less so in their programmatic and theoretical writings. Their styles of presentation of formal patterns differ mostly in rhetoric: form-oriented, distributionalist rhetoric in Bloomfield and psychologistic, pattern-oriented rhetoric in Sapir. But these styles clothe descriptions that are very similar in organization. Between them and the later 'Bloomfieldians,' however, there were quite significant differences. These distributionalists developed a relational mode of descriptive statement, relying on tests of noncontrastive distribution rather than sameness of meaning as a basis for grouping forms together into equivalence classes. They advocated a system of levels of analysis and description to organize distributional relationships among linguistic elements according to the level of each element. The patterning of phonological elements was not to be mixed with the patterning of morphological elements, nor either of these with syntax. An occurrence of the morpheme {pin} was not at all the same thing as an occurrence of the phoneme sequence /pin/, even though /pin/ was the phonemic shape of {pin}. The two are elements of different structural levels.

The 'Sapirians,' students and grandstudents of Sapir, diverged less from the linguistic theory and practice of their mentor, but their influence continued to diminish as linguistics lost some of its standing within anthropology after the passing of Sapir and Boas. By the late 1940s, when linguistics departments were first appearing in major American universities, linguistic anthropologists trained in the Boas–Sapir tradition found themselves scattered among anthropology departments, and deprived of their two most

prestigious leaders. Major commitments of time and resources to linguistic research within anthropology eroded, and disciplinary leadership of linguistics passed definitively to the Bloomfieldians. Bloomfield's own work had been stopped by illness in 1946; in any case his personal contribution was not as an academic political leader but as an intellectual model. This result for the Boas–Sapir–Bloomfield style of linguistic anthropological description is ironic, since all three had signed the call for a Linguistic Society in 1925 in part to ensure closer collegiality among scientists of language, who were then scattered among departments of modern and Classical languages and literatures. A decade or so after the death of Bloomfield, the influence of Chomsky's transformational approach to syntax and its theoretical matrix began to gain ascendancy within the discipline. Though in many particulars Chomsky's linguistics is a continuation of structuralist thinking, it is also in significant ways a reaction against Harris's methods, and in its wider theoretical context it represents a return of pre-Bloomfieldian views, such as mentalism, psychologism, and nativism.

Another link between descriptive structuralism and its successors is formed by the continued teaching of a descriptive approach to linguistics through the use of a number of monographs and textbooks dating from the 1920s to the 1950s until the transformational approach acquired its own in the 1960s. Carroll's collection of Whorf's papers (1956) and Sapir's beautifully written *Language* (1921) attracted many readers to linguistics courses wherever these could be found; there they were exposed to readings drawn from Bloomfield (1933), Francis (1958), Gleason (1955), Harris (1951), Hill (1958), Hockett (1958), Joos (1957), Nida (1946, 1949), Pike (1947), and Trager & Smith (1951). It is noteworthy how strongly the missionary linguistic movement is represented in the list (by Gleason, Nida, and Pike).

It was not only newcomers during the 1950s and 1960s who profited from what these books taught, but also their teachers, whether converts to a transformational approach or not, who had learned linguistics from them. These works exposed their readers to an immense fund of well-organized examples drawn from decades of first-hand experience often gained in fieldwork, an orderly, practical approach to problem solving, and a love of language study shared by all their authors. The debt Transformational Grammar and linguistics itself owes to these now maligned books and their authors is difficult to measure, but is surely far greater than has ever been acknowledged.

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Post-Bloomfieldian Phonology

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Post-Bloomfieldian phonology, also known as American structuralist phonology or Bloomfieldian phonology, is the approach to phonology which was most influential in the USA between about 1940 and 1960. It can best be characterized by two axioms: (a) linguistic description must proceed without reference to putative workings of the speaker's 'mind' (a view often referred to as 'antimentalism'); and (b) phonological analysis can only take place on the basis of phonetic properties, without reference to more abstract linguistic properties such as the meanings or internal structure of words ('no mixing of levels').

In the 1960s, it came under attack from generative phonologists, who pointed out the problems that arose in phonology from the rigorous application of certain positivist principles.

1. Leonard Bloomfield and Phonology

As its name implies, this approach owes much to the influence of Leonard Bloomfield, particularly to his attempts to apply positivist principles in linguistics. The culmination of his work was his book *Language* (1933). Followers of a great thinker often adopt a more extreme position than the thinker would himself have espoused; in some respects, post-Bloomfieldian phonology is no exception to this principle (see especially Sect. 3).

1.1 Phonemes

For Bloomfield, the only important features of sound are those which permit a speaker of a language to say whether two utterances in that language are 'the same' or 'different.' Other properties of the utterances are predictable (or 'allophonic'), and are therefore treated as having no systematic importance.

In most instances, sound differences correlate with meaning differences: in fact, a sound difference can be distinctive in a language only if it signals a change of meaning in a fairly wide range of contexts. Bloomfield was well aware of this, but took the view that an answer to the question 'Are the meanings of these utterances the same?' did not depend on a prior answer to the question 'What are the meanings of these utterances?' He held that, in the light of the then prevailing state of knowledge, this latter question would take the linguist beyond the area where solid answers could be obtained, and that, in fact, even if such answers were obtained, they could not be used as explanations for phonological facts.

1.2 Phonemic Systems

Although for Bloomfield phonemes consisted of just those features of sound which were distinctive, he did not follow Prague School phonologists (see *Prague School Phonology*) in using these features as the basis for structuring the phonemic system of a language. More important for him were the combinations into which a given phoneme of a language might enter, and in particular the place which it could occupy within a syllable. Thus, English /ŋ/ and /ʒ/ form a class because they never occur word-initially; /w/, /l/, /r/, and perhaps /j/ also form a class of consonants since they, and only they, can occur following a stop at the beginning of a syllable, for example, *twist*, *clap*, *bread*, *pure* /pjuə/.