

IV The grammar in terms of the variants

0. Sentences which contain no reductions are accounted for in Ch. II above. Those whose form is due to one reduction are accounted for in Ch. III. Below we consider forms which are due to more than one reduction (some of these have been touched upon in Ch. III). Although the explanations are in most cases very sketchy, the analyses given below, together with those of Ch. II, III, cover in gross the bulk of English sentence-structures and transformations. A great many details and special forms are of course missing from this survey.

1. Sentence types.

1.1 Assertion. Assuming that a discourse ends with a period-intonation (which one can consider to be imposed by the zeroable I report, I say), we begin with unreduced sections connected by the O_{00} and, for (II 5.1). The and, for can impose period intonation on their first operand (III 2.2 end) and can then themselves be zeroed as having virtually unlimited selection (III 3.3). Sentence sequences with different intonations seem to belie this, but the and appears when the source of the intonation is supplied: I want it. Please get it. has no ~~∫~~ I want it and please get it. But the and appears in I want it and I request that you please get it.

1.2 Question. Beginning with I ask you whether X is here or Y is here, we collect corresponding-addressed arguments if any (zeroing III 1.2.1 and permuting residue III 2.4.2) to I ask you whether X or Y is here, which is pronounced into I ask you who is here, with the first wh pronoun being at the start of the sentential operand who is here (compare: I ask you whom he saw, I ask you who saw whom). If there were no corresponding arguments to collect, we have I ask you whether John is here (or not (or: or Mary left)). The sentential operand receives a question intonation (III 2.2) with dropping of whether and permuting of tense and subject (III 2.8.2, if there is a subject word),

yielding I ask you: Whom did he see?, I ask you: Is John here? The I ask you is then zeroed as being performative (III 1.4.6).

Among the many forms which support this analysis, note the special relations of the question form to or and especially to or not and its related any.

1.3 Imperative. Beginning with I request you that you (please) go (without tense because the sentential operand is necessarily after the request, IV 2.7), we replace that you by the imperative intonation (III 2.2), and zero I request you (III 1.4.6). The selection of the imperative (e.g. which verbs are more, and less, likely to appear in the imperative) is approximately that of I request you (which verbs are more, and less, likely to appear under I request).

1.4 Other intonations, to the extent that they exist, e.g. in Would that he were here! can be similarly obtained from an appropriate operator.

In He said: "The hour is late" (which asserts that these words were said) as against He said that the hour was late (which does not assert that), we have a comparable zeroing (of the III 1.4.6 type) for word: He said the words which are the hour is late He said the words "the hour is late" He said "The hour is late".

The sentence form of He should go. is perhaps best obtained not from I say but from I prefer (or: suggest) and I expect (for the two meanings, of desirability and of expectability of his going).

2. Tense

2.1. Tense from time-order.

Every operator in a text or text-section is under some other operator, up to a highest operator I report (or: say to you) or the equivalent (without need for explicitly stated now), which is later zeroable qua "performative". Tense affixes are explainable syntactically not as being (or being derived from) morphemes for subjective time (past, present, future), but as reductions of the

operators before, after, simultaneous with (which express linear order, including time-order) when used on a pair of verbs. The tenses of English (and so in other languages) can be accounted for if we start, for a given verb-occurrence in a text, with a time-order connective, e.g. before, to another verb-occurrence, ultimately to the initial I report of the text. The two verbs may also be related in the text by a connective O_{00} , or by one verb (V) having the other as its subject or object; in that case the two relations between the verbs --time-order and the other-- are connected by wh. The tense on V_i is the variant of is before/after/simultaneous with V_j when this latter is operating on V_i ; ^{but the relevance to V_j is obscured in} the cases when V_j is zeroable.

Thus, we will obtain He arrived by starting with I report his arriving and His arriving is before my reporting (where is has morphophonemic, not time, tense III 2.9), with two sameness operators - one O_{00} (II 7) for the two occurrences of his arriving, and upon this an O_0 (II 6) for the two occurrences of I report:

I report his arriving, with argument 1.2 being the same as argument 2.1

in His arriving is before my reporting, has 1.1 and 1.1.1 the same as 1.2.2.

Here the sameness $-O_{00}$ is with argument 1.2 the same as argument 2.1 in, where the addresses relative to the sameness $-O_{00}$ refer to his arriving. The sameness $-O_0$ is has 1.1 and 1.1.1 the same as 1.2.2. Its argument (1) is the sameness $-O_{00}$; under that 1.1 is report; under report 1.1.1 is I. The second argument of the sameness $-O_{00}$ is 1.2 before; under that 1.2.2 is my reporting.

The wh-pronounings and zeroings of these two sameness-operators yield I report his arriving which is before(hand). The which is is zeroable by III 1.3.2, and an -ed variant is added to before (III 2.1), which with accompanying change of operand-indicator yields I report that he arrived before. Here we can zero before (III 1.3.4) and I report (III 1.3.3), leaving He arrived.

Although the term "source" will be used for convenience (for the relation of before, etc., to the tenses), the intention here is not to propose a sole descriptive derivation, much less a historical derivation, but to show that there exists a sentence constructed by the operators of II which differs from He arrived only by the variants listed in III, and is a paraphrase of He arrived.

2.2. Tense on tense. In the tense-source presented above, if V_j is not the ultimate I report but some intermediate verb of the text, the V_i receives its tense in respect to the V_j .

A crater's forming is because of a meteor's striking, with argument 2 the same as as argument 1 in:

The meteor's striking is before (up to the time of) the crater's forming, has 1.1 the same as 2.2. (1.1 and 2.2 are crater's forming) →

A crater's forming is because of a meteor's striking beforehand (up to then). →

A crater's forming is because a meteor struck (has struck).

(Note that, especially when the V_j which has been zeroed is not the ultimate I report, we can have beforehand or before that instead of before, and afterwards or after that instead of after. That, -hand, -wards are pronouns of V_j , indicating that the tense is relative to V_j .)

This can be said whether the context shows the crater-formation to be thought of as being in the (far) past or the (far) future or as being at all times. More precisely, the statement preceding the first example above should begin: "The tense placed on V_i and on any verb-occurrences which have received a tense in respect to V_i is ..." That is to say, if, as is usually the case, this V_j gets a tense due to its time-order relation to operators on it in turn, ultimately to I report, the tensing on V_j operates also on the tenses that have been produced due to the V_j (in this case the V_i), yielding on V_i a tense-on-tense. Writing wh plus parentheses instead of the sameness operator:

I report ((a crater's forming is after my reporting) wh (a crater's forming is because a meteor has struck,)) →

I report a crater's forming [which is] because a meteor has struck is after [my reporting] →

A crater will form because a meteor will have struck.

Tense-on-tense is clouded in English because not many tense morphemes are available for the various distinctions. Following are the main ones:

If V_j receives the has -en tense, then V_i is as V_j yields V_i ed and was V_i ing. And V_i is after V_j yields will V_i .

If V_j receives the -ed tense, then V_i is as V_j yields V_i ed and was V_i ing; V_i is up to V_j yields had V_i en, V_i is before V_j yields V_i ed and had V_i en; V_i is after V_j yields would V_i .

If V_j receives the will tense, then V_i is as V_j yields will V_i and will be V_i ing; V_i is up to V_j yields will have V_i en; V_i is before V_j yields V_i ed; and V_i is after V_j yields will V_i .

Examples: He has said that he will leave (some time after speaking); He said that he would leave (some time after speaking); He will have left by the time she will arrive. The fact that the tense on V_i is determined not simply by its subjective time (for the speaker) but also by the time-order of V_i to V_j shows that the tense is derived from a time-order operator between verbs.

The tense form on V_i is determined not by the speaker's subjective time but by the tense on V_j , which in turn is ultimately determined by its time-order to I report as the final (free) operator of each discourse. This is seen in those cases where the V_j does not carry the tense corresponding to its subjective time. In such cases the V_i , which is time-ordered to V_j , gets a tense not on the basis of the time-relation of V_i to the speaker but on the basis of the tense morpheme found on V_j . E.g. "When the agreements ran into

trouble, as they almost certainly will sooner or later, the governments that had provided contingents would not want to oppose whichever side they thought was right." Here want carries would not will, for "as though" reasons (IV 2.5), hence the will is not transmitted to the other verbs. Thus, ran is after the speaker's reporting (hence will), but is in the past tense because it is before want; thought is before want but presumably after the reporting, and of unknown relation to ran; provided is before ran before want (hence the had), but in fact after the reporting (which was written before any of the events described had occurred).

"Even without the prospect of hunters shooting scores of cut-off elephants as they tried to escape..." Here prospect indicates that the following events are placed after the reporting. Hence shooting is future, but carries no tense; and tried is before shooting and hence has past tense, even though tried is also part of the future prospect.

It follows from this description that when a sentence is operated on by a further operator the sentence does not first have a time-tensed form whose tense is then lost. For example, frequent operates not on a tensed They visited to yield Their visits were frequent, but on the untensed They visit (with the morphophonemic present tense from absence of time-order operator, III 3). In a succession of operators, the time-tense arises only when the time-order operator is met. The present tense in ...his arriving which is before my reporting (in the first example above) is this morphophonemic form, as can be seen also from the fact that it is paraphrasable by ...his arriving which was before my reporting.

In the situation above, given O₁ before O₂ we obtain O₁ed before O₂, and if then this O₂ gets the future tense (via I report O₂ which is before my reporting), the whole becomes will have O₁en before will O₂. A different situation for O₁ before O₂ arises when the I report...before operates not on

O_2 but on the whole O_1 before O_2 . Then the past-tense which is a reduced form of I report...before (my reporting) is located on the whole O_1 before O_2 , i.e. on each of O_1 and O_2 . The meaning in this case is that O_1 before O_2 is seen as a single situation which is being reported. Thus He caught the glass before it broke is obtainable by reduction from I report his catching the glass before its breaking, which is before my reporting (which does not state that the glass broke), but also from I report his catching the glass, which is before my reporting, before its breaking, which is before my reporting (this states that the glass broke). Some sentences of this form have only the first source and meaning, their word-choice excluding the second, e.g. He died before He died before he finished the work.

2.3. Aspect. There is an additional consideration, which connects tense with aspect. The major time-order morphemes, before, after, simultaneous with are known elsewhere in the language. They are operators with two noun arguments: moment, period, etc.; or point, segment, etc.; or presumably nouns for any physical objects. There is no need to say that when used for time-order between verbs these morphemes belong to a different class, namely of bisentential operators O_{00} . Instead we can say, as in the case of the comparative, that these operators operate on verbs via intermediate operators, which we will call PN_{asp} , e.g.

I report ((his arriving is at a moment) wh [(the moment is after the moment) wh (I report at a moment)]) \longrightarrow

I report his arriving is at a moment which is after the moment at which I report (am reporting). \longrightarrow

I report his arriving is after I report.

I report that he will arrive (after my reporting).

The zeroing here is at a moment which is...the moment at which; this is an "appropriate" zeroing when moment, etc., are on operators and under after,

before, as (III 1.4.3), P here is the O_{on} operator, moment its second argument.

It is found that there are only a few PN_{asp} aside from synonyms, and that each verb occurs normally with (is selected by) only certain of them. It is this selection which may be called aspect: it is important because it is necessarily present (syntactically) under tense, and imposes a classification of sorts upon the set of verbs, and is a factor in the morphophonemic determination of tenses and time-conjunctions.

The major PN_{asp} are at a moment, throughout a period. These occur on what may be called perfective (PF, momentaneous) and imperfective (IPF, durative) verbs, respectively: His arriving was at a moment, His working was throughout a period. This classification however is selectional, and not sharp. Many IPF verbs yield PF sentences when they occur with any definite object or with particular objects. Certain IPF verbs when operated on by certain prepositions yield a PF (e.g. drink--drink up). PF verbs yield IPF sentences when their subjects or objects are pluralized --i.e. when the action happens more than once. Some PF verbs take the imperfectivizing operator iterate only with difficulty (e.g. arrive); others take it readily and even zero it so that they appear as IPF also (with zeroed iterate), e.g. jump: He jumped (repeatedly) for two hours; ~~?~~ He arrived repeatedly for two hours. Some PF verbs also appear as IPF not in the special sense of "iterate" but in the characteristically IPF sense of "continue", e.g. fall: He fell for 25 seconds. In contrast, some IPF verbs occur occasionally with at a (certain) moment, hence as PF: e.g. laugh. Then there are verbs with mixed properties, such as know, which though obviously durative does not occur comfortably with throughout a period. And the non-verb predicates, which are very durative, nevertheless rarely occur with throughout a period (perhaps because that is superfluous). This list of conditions for selection of at as against throughout permits a grading of verbs into a certain number of aspectual grades,

e.g.: arrive/jump/fall/laugh/work/know/blue/father/mammal.

In addition to the fact that some of the verbs above are uncomfortable under both at and throughout, there are certain sentences which can hardly be used under these: e.g. He worked a lot. There are also certain aspectual operators (2.4 below) like have a which when operating on extreme IPF verbs (like live, sleep) cannot occur under either at or throughout: He had a hard life, He had a good sleep. These can occur, however, under from a moment, to a moment, or the sequence of these two: He worked a lot from that time on, He had a hard life from childhood until middle age. This from...to... can serve as another PN_{asp} bridge to the time-order verbs:

I report that his working a lot is from a moment which is before the moment at which I report. →

He worked a lot.

This PN_{asp} could be called bounded (BD).

The verbs which occur with different PN_{asp} also occur with in part different time-adjuncts (PN_t) tomorrow, at noon, for 3 days. These PN_t can be readily obtained via wh:

I report [(his arriving is at a moment after the moment I report) wh (the moment is 3 P.M.)] →

He will arrive at 3 P.M.

Or: I report [(his arriving is ...after... I report) wh (his arriving is at 3 P.M.)].

Verbs that occur with the PN_{asp} at a moment occur also with at 3 and the like, while verbs which occur with throughout a period also occur with for 3 days, all week, etc. Apparently all verbs can occur with tomorrow, in November, and such dates.

2.4. Aspectual operators. On many verbs we find the operators have a, make a, do a, take a, give a, etc. These can be considered as reductional

forms from one or more operators, is bounded or the like, on these verbs. These aspectual O_0 do not operate on the most PF verbs (e.g. come, arrive, presumably because they are too momentaneous to be bounded) nor on the most IPF types (such as know, presumably because they are intrinsically unbounded); the restrictions here are clearly selectional in nature. The more restricted ones, such as take a, and even more so break into, etc., occur on particular few verbs and clearly involve some additional operator (both because of their special selections and because of their special meanings).

When these aspectual O_0 operate on a PF they yield a PF: He gave a jump at that moment, He took a fall just then. When they operate on a mild IPF they yield a sentence which can be both PF and BD: He took a walk at 3, He took a walk from 3 to 5, but ~~3~~ He took a walk throughout the afternoon. When they operate on a strong IPF they yield a BD: He had a good sleep until late morning, ~~3~~ He had a good sleep throughout the night. All this means that when the PN_{asp} select these operators, they do so not on the basis of the operator take a, etc. alone but on the basis of what it has operated on in turn.

There are other operators, V_{asp} , which have aspectual character. They select their operands in roughly the way the PN_{asp} do.

Some, including iterate, repeat operate only on PF and BD sentences and yield an IPF (iterate may then be zeroed): He jumped all day.

Others, including begin, start, stop, discontinue, resume operate only on IPF (and not on the double-IPF: continue), and yield PF: He began working at 3, He began stopping at 3 (where stopping is either iterated or protracted, ~~3~~ He began arriving, ~~3~~ He began to continue working. Of these, begin and probably stop are zeroable in certain situations, e.g. after before, after respectively: This happened before Napoleon was emperor. He returned to his desk after he slept.

Others operate on IPF and yield IPF (or doubly-strong IPF): He continued

throughout the day to work assiduously. Here, as with ordinary verbs, the PN_{asp} select the operator alone, without regard to what its operand in turn is. (Of course, the operand is of a determinate type for these V_{asp} , so there is nothing to select there.)

Another operator involved in aspect and time is be -ing. It can be derived from an operator such as is in process (is on. II 2.6), and normally selects under it all verbs except certain of the most IPF (know, own; to a lesser extent think, believe, feel, fear; etc.), and the nonverb predicates (is here, is blue, is clever, is a father, etc.). In English as is well known it seems to have usurped the present tense, and is considered to be a continuous present. But if we consider it closely we see that it does not change PF into IPF: ~~is~~ He is arriving throughout the morning. The effect it has on PF verbs is to refer to a minute span of time during which the activity takes place: i.e., it represents them as being not really momentaneous but of a small duration. Furthermore, it has this effect primarily in the present: He is arriving right now, at this moment, and secondarily to indicate simultaneity in past and future: He was arriving right on time when he slipped on the ice and fell, He will be coming just when he said he would.

This situation is explainable by the proposed source: PF verbs are uncomfortable in the present tense, because the source states that the moment of the PF verb is simultaneous with the moment of speaking, something which is a rather imprecise claim for the speaker. In English the is -ing reduced form of is on, is in process is used to give a minimal duration to the PF verb, so that this duration can include the moment of speaking. It is for this reason that although the is -ing has brought in an etymologically and semantically durative operator, the resultant of is -ing on PF verbs is selected by the momentaneous PN_{asp} : He is arriving at this moment. This also fits the (less frequent) use of is -ing in past and future for simultaneity in those times.

This analysis of the English is -ing also fits the fact that is -ing is not used on timeless, process-less, sentences. Thus Two plus two equals four, ~~‡~~ Two plus two is equalling four; This road leads to the beach, ~~‡~~ This road is leading to the beach (except in special contexts indicating a process). Also, it cannot be used with the non-verb operators, which are relatively timeless (IV 3.1). Here, since morphological classes are involved, we have a grammatical rule: Circles are round, ~~‡~~ Circles are being round. Note the exception in such sentences as He is being clever (or: cagey). Sapir had noted that this means something like He is acting clever (or: cagey), though not quite. Here there is no sense of durative or process. But if is -ing is commonly used to indicate a brief duration that includes the (relative) present, its use on clever implies that clever is here not timeless but present and of short duration. This contrasts with the ordinary occurrence of He is clever, He is cagey as timeless characterizations of a person. It is the occurrence of what is supposed to be a property of a person as a short-lived action, in present time, that gives the note of dissembling or insolidity which Sapir noticed.

The reduction to is -ing does not occur after the reduction to has -en (below): ~~‡~~ I am having spoken. This is the most stringent restriction, since it is a relation between two reductions, and it is in the reductions that the restrictions come about.

Since is -ing on PF takes the PN_{asp} at the moment (though also another PN_{asp} including the moment) we may call it Band-PF. On IPF verbs, is -ing yields both IPF and Band-PF.

There remains one other relevant operator in English: has -en.
I had arrived at that moment, I have been ill all week. It does not seem to fit well into the set of PN_{asp} , because there is no easy way in which it could

bridge between a verb and a time-order operator. We could say that has -en

It selects virtually all predicates. When it operates on a PF verb it yields a PF, also with partly bounded PN_{asp} : by, and when it operates on an IPF it yields an IPF, again with partly bounded PN_{asp} : since, by, even though some PN_{asp} are uncomfortable on has -en:

was equivalent to a PN operator up to a moment:

I report ((his arriving is up to a moment) wh (a moment is before/
simultaneous with/after the moment) wh (I report at a moment)

He had arrived (by then)/has arrived (by now)/will have arrived (by then).

But it would not be simple to have the PF or IPF nature of the operand verb show through the has--en. In any case, it is not just an aspect indicating "accomplished", as we see in He felt better for having not spoken.

One might wish to think of it as a V_{asp} which in turn receives a tense (has--en, had -en, will have -en); but, differently from the V_{asp} , this operator clearly connects two verbs, as in 2.2 above, or in He felt better for having spoken. When we have has--en with only one verb, the connection was to I report, which precisely fits the meaning and the by now/then:

I report his arriving is at a moment which is up to the moment at which
I report.

He has arrived (by now).

This is then precisely a time-order operator, like the sources of the tenses, and it indeed fits the time-order meaning of has -en in English. It also fits the time-locational as against durational meaning of has -en, for the meaning of He has arrived is not of course that his arrival lasts until now, but that the arrival is located at some not further specified moment in the period which continues up to now.

On this analysis, we don't have have -en plus the 3 tenses on it. Rather, have-en is a reduction of period (or: moment) is up to moment; e.g. in the example about the crater (2.2): $(V_1 \ 0_{00} \ V_2)$ wh $(V_2 \text{ is in period } \underline{\text{up to moment}} \text{ of } V_1)$ $V_1 \ 0_{00}$ having V_2 en. Then has -en is the tensed form deriving from up to moment at which I report. And had-en and will have -en derive from up to the moment at which V_1 -past/ V_1 -future; i.e. they result when has -en is in relation to a past or future verb.

2.5. Evidential (as against time-order) meanings. If we derive the tense morphemes from the before/after/simultaneous with/ up to operators (possibly with the PN_{asp}), we find that certain ones of these morphemes also occur in environments which don't fit the meanings of those operators (see: Claris). Thus in If he is drinking, it will be sherry (said by one Oxford don to another, passing under the lit window of a third), The will cannot be derived from after I report since the drinking referred to is presnet not future. So also when a person, hearing a knock on the door, says: That will be Tom, looking for you. In He is running for office next year, the presnet tnese on be cannot be derived from simultaneous with my speaking since the running is entirely in the future. In Atlases would be in the second aisle on the right (said by a salesclerk who isn't getting up to go over with the purchaser), the would could not derive from a past operating on a future, since the time-meaning is the present. Also, in some languages the past tense (especially a past continuative) is used to indicate contrary-to-fact: I was going this very moment if... meaning I would have gone this very moment were it not that...; here the past tense cannot be derived from before since the time-reference is present.

In these and similar cases, we see that the tense morphemes have come to be used in meanings that do not refer to the time of the verb but to some other property, largely the speaker's evidence or attitude to the verb. We can see that these new meanings are related in a certain way to the time-meanings, as being evidentially similar to them. Thus we could say that the will above means as unconfirmed (though in present time) as what is after my saying. The is above means as confirmed, as much in the bag (though in future tense) as what is simultaneous with my saying. The was above means as non-extant as what is before my saying (though in this case the event is now non-extant not because it is past but because it is contrary-to-fact).

In terms of the history of language use, we can say that these are extensions of the use of the tense-morphemes, from time-meanings to speaker-attitude meanings which have certain similarities to the corresponding time-meanings in respect to the evidential status of the verbs.

As to the grammatical source: Since a tense-morpheme nevertheless exists in each of these forms, it must have been derived from a time-order operator. But the meaning is not the actual time-order meaning of before, etc., but an associated meaning that rather the evidential (or subjective) status of an event, which is associated with its time. When a verb is in future tense, it automatically carries certain evidential properties of future events. If it is then under operators indicating that it is not in future time, the meaning of the tense is only its evidential properties. When the further time operators conflict with the tense, it is equivalent to having is as (though) operating on the after, before, which are the source of the tense. Then If he is drinking, its being sherry is as though after I say, meaning: its being sherry, which I am here asserting, is nevertheless as unconfirmed as if it was after my present speaking. Similarly He is running for office next year \approx His running for office being on next year is as though simultaneous with my saying, i.e. as confirmed as though it was right now.

The would, could, etc. is a more special case. In I can still work as against Last year I could still work, we see that could occurs as can plus past tense: my working being a capability is before my reporting. In other cases, could is not past: I can go right now if he wants me to, I could go right now if he wants me to. Here the effect of the past tense is to weaken the can. It is equivalent to My going being a capability being before my saying is (only) as though, i.e. My going being a capability is as not really present, but rather as though it were merely in the past. When the whole is under an explicit (or implicit) operator such as right now, it is clear that

the past tense morpheme (or its time-order source) must have had its past-time meaning nullified, therefore only the associated evidential meaning remains.

It should be remembered that will occurs also as a verb, as well as a tense-morpheme. As verb, it can occur with present tense, with no need to appeal to the as though effect.

Among the many different, and mostly obsolescent, uses of will as verb, there is the sense of habitual action: These days I will often stand for hours at a time watching them. Under past-time (before I say) we get: In my childhood I would often stand ...

2.6. Time-conjunctions. Kittredge has shown that when the time-order operators occur on tensed sentences, i.e. as conjunctions (before, after, etc), they require the tenses on their two arguments to be the same, and accept only a PF verb (or sentence) as their second argument (even if the PF verb has been zeroed, as in It didn't come until after she was asleep ...until after she began to be asleep, fell asleep). In the verb-forms which are the source of these time-conjunctions, the interdicted combinations can be found.

Thus I worked before he left, I will work until he will arrive (here also present tense for future time: I will work until he leaves), but ~~I~~ I worked before he will leave; However, we do find the fuller forms from which this should have been zeroed:

I worked throughout a period which is before the moment at which he will leave;

My working before my speaking (or: in the past) is before his leaving after my speaking (or: in the future).

Similarly, we do not have ~~I~~ He arrived until I worked (with a PF first argument), but we have the "source":

His arrival before my speaking lasted (or: dragged on) throughout a period until the period throughout which I worked.

What has happened here is that only the intermediate operators of high likelihood are zeroable. In the duration operators: only period before until, only moment after before, after, until, etc. (e.g. a moment until is far less likely to be said than a period until). In the time-operators: (1) working in the future before leaving in the past is most unlikely for obvious reasons, though it can be said not only in fairy-tales but also in discussion of time. But more interestingly, (2) working in the past before leaving in the future is less likely to occur than (3) working in the past before leaving in the past, etc., because the before is so explicitly redundant in (2). Here, something which in meaning might be thought most obvious is in language not likely to be said. Hence the time-indicators in the future (or, better, after my speaking), etc., are not reduced to tense-affixes in (1) or even in (2), but are reduced in (3) to He worked before he left.

It should be noted, however, that restricting the reduced form (tense) to the more likely occurrences (same time-order) is not a graded and individually decidable matter as is selection. It is a grammatical rule, stating the conditions under which an operator may receive the reduced form. Even if in a given discourse doing something in the past before doing something else in the future were much discussed, the two different time-indicators would not be tensed around before. All that can perhaps be done is to insert a pause:

∃ He worked, before he will leave, (or better: He will leave, after he worked); but this is zeroed from He will leave and his leaving is after he worked and not from a form like (2) above.

2.7. Subjunctive. A different situation in which the most likely operator is reduced is seen in what is called the subjunctive. In the case of English (somewhat differently from other languages), there are certain Q_{H0} operators whose second operand is virtually always after them, and O_{00} operators whose second operand is necessarily after the first operand, in time: e.g. request,

cause (I request your leaving after my request, His phoning caused her departure after his phoning). In these situations, the second operand receives not the future tense (relative to its operator or to the first operand) but should, or no tense, or the operand indicator for... to...: I request that you should leave, I request that you leave, I request you to leave, His phoning caused her to depart, His phoning made her depart. Since the special reason for leaving no tense here is the necessary time-order of the second operand to its operator or first operand, not the subjective futurity of the second operand, the subjunctive form supports the analysis that tense comes not from past or future time-location of a verb, but from its time-order to the operator or operand to which it is connected.

2.8. Various details follow from the above analysis. One is that will is syntactically, today, not in the set of auxiliaries (can, may, etc. III 2.6) but a tense: its relation to other operators (including not) is as a reduction of after and not like the auxiliaries.

Another is an explanation for the lack of pronouncing on tenses. The operators of which tense is a reduced form can be pronounced: His phoning after my reporting is because of her phoning after my reporting can be pronounced to His phoning after my reporting is because of her doing so then. But the tense is not a different operator but just a reduced form which is not pronounced: He will phone because she will phone is pronounced only to He will phone because she will do so.

Several of the observations given above, especially in respect to aspect and to evidential meanings, are due to Jean-Max Claris.

3. Word Classes.

The present theory recognizes operator classes, on the basis of their argument requirements. Traditional grammar deals with "parts of speech" such as verb (V) adjective (A), noun (N), preposition (P). These word classes are

operators which are distinguished from each other, in the present theory, by their relation to the time-order and durational (aspect) operators. As to the elementary arguments, those are another set of N. In addition, there are adverbs (D) and subordinate conjunctions (C_s), which will be seen below to be second operators under wh. The coordinate conjunctions and, or have been seen in II5, and the pronouns in III 1.1. The article, and the quantifiers, will be reached in 6.4.5.

3. 1 A, P, N. In 2., the tense morphemes have been derived from time-order operators between two operands, rather than from time-location operators on a single operand (e.g. His arriving is in the past). One of the advantages of this is that it brings out a distinction between verbs (e.g. talk) and other operators (e.g. large, mammal, fact). For while all operators can be in the past or in the future (John's talking at the meeting was in the past, The new airport's being large is in the future, The mammoths' being mammals was in the past), some are much more likely than others to be spoken of as being before or after some other event (John's talking at the meeting was before her appearing there, but hardly ~~3~~ The new airport's being large will be after the building of access-roads: ~~3~~ The mammoths' being mammals was before their extinction). In keeping with the reduced form for high likelihood-in this case, it will be reduced distance-we can say that the operator which have a high likelihood of occurring in the first argument of before, after, as get the tense form attached directly to them (talked, will talk), while those which have a smaller likelihood get the tense form before them (in a III 2.6 position) attached to a carrier be (will be large, were mammals). The former are then what we call verbs; the latter, A, P, and N operators.

There remain differences among A, P, and N. The A and N have a clear difference in durativity, which appears in the grammar not as sharply as the PF-IPF differences among verbs (IV 2), but more subtly in the likelihood of

having durative operators like still, more, etc. (Operators which are themselves very durative, like mammal, are less likely to have durative operators on them.) The durativity difference is seen directly in the A (large, important) in contrast with N (mammal, fact), and also in the affixation effect (IV 4): an adjectivized N is less durative than the N (She is sisterly, She is a sister); a nominalized A is more durative than the A (It is magnificent, It has magnificence); and of course adjectivized and nominalized verbs are more durative than the V (He thinks, He is thoughtful). As to the P, these are a few short operators with extremely wide selection, each of them likely to occur on, or between, any more arguments than is any V, A, or N. When A, N have two arguments they have a P before the second; but only some V do this, and P gets a second P only in a few cases: He is father of John, He is out of jail.

The differences in likelihood under time-order, durativity, width of selection are all graded. However, the reduced forms -the carrier be, plural or a for N, etc. -are assigned to particular lists of operators. For many operators the assignment in terms of the difference in properties is obvious: arrive is V, mammal is N. But there are always borderline cases, where the assignment in a given language is decidable only by a list of what operators get what reduced forms: (the directly or the indirectly attached forms) sleep is V, ill is A. In these cases, languages having essentially the same distinctions often disagree: in some other languages sleep may be treated as A, or ill as V.

3.2 Auxiliaries. The peculiar English words can, may, etc., have to be analyzed as aspectual V (V with subject reference, hence getting the III 2.6; permutation) plus tense: present can, and possibly past could. (That they carry a tense is indeed historical.) Nothing else will explain their restrictedness. These tenses cannot be removed from them; hence in the untensed form

(under various operators) and under the future operator (including the subjunctive form, 2.7), they have to be replaced by a transform-paraphrase: He can go, His being able to go is important, He will be able to go.

There is one other verb which takes present and past but not future, or the zeroed future of the subjunctive (2.7), or tenselessness: The bomb is to go off at 3, The bomb was to go off at 3, ~~The~~ The bomb will be to go off at 3.
~~I~~ I prefer for the bomb to be to go off at 3; very rarely a form like The bomb's being to go off at 3 was discovered by chance (see Jespersen V 238). Here the reason is not the unremovability of the tenses, as above, but the fact that be to includes futurity and is therefore unlikely to occur with a future operator. Such unlikely cases would be said with the full after operator, but the reduction to tense does not occur in this instance.

3.3 Subordinate conjunctions. All conjunctions except and, or (II5) and the few "coordinate" conjunctions related to them, are derivable directly from (or are paraphrases of) O_{OO} operators (generally, verbs), by extending their selection (many conjunctions have broader meaning--broader selection--than their "source verbs), by tensing both their operands. Intermediate forms have the tense on only one operand or the other. Given:

(1) I report his returning which is because of their telephoning.

if the first operand is tensed we have:

I report his returning before my report which is because of their telephoning.

which yields, with tensing (2.1) and zeroing of which is (III 1.3.2.):

I report that he returned because of their telephoning.

then:

He returned because of their telephoning.

where the verb-form is because of is changed by zeroing of is to a preposition-form because of.

If only the second operand is tensed, we have:

(2) I report his returning being because of their telephoning before he returned.

which yields:

I report his returning being because they telephoned.

His returning was because they telephoned.

where, interestingly enough, the form was because has no name in the traditional grammar (because it has no one-word members).

If both operands are tensed we have:

(3) I report his returning before my reporting, which is because of their telephoning before his returning.

which yields:

I report that he returned which is because they telephoned.

He returned because they telephoned.

With the zeroing of which is the operator plus second operand, because they telephoned (or, as above, because of their telephoning) becomes available for the III2.5 permutation, hence we obtain:

(4) Because they telephoned, he returned.

Because of their telephoning, he returned.

and even (with permutation to before the immediate first argument):

He, because they telephoned, returned.

He, because of their telephoning, returned.

It should be stressed that the which is because form is required only as a source for the forms in which the is has been lost, as (1), (3) above, or permutation has occurred, as in (4). Clearly, the form without which exists (His returning is because of their telephoning), it is the source of the which form: (I report his returning) wh- (his returning is because of their

telephoning), and it appears for example in (2) above.

As to the permutation, the alternative to deriving it from zeroed which is would be the commonly assumed ad hoc permutation: $S_1C_S S_2 C_S S_2 S_1$. However, this does not account for all the permuted positions. Consider the case of $S_1C(S_2C'S_3)$, where the parentheses indicate that one conjunctive resultant has become the operand of another conjunction: e.g. I'll go if (they send a car because I can't walk), i.e. if that is the reason for their sending a car. Under the special permutation we would get:

$S_1C(C'S_3S_2)$: I'll go if because I can't walk they send a car.

$C(S_2C'S_3)S_1$: If they send a car because I can't walk, I'll go.

$C(C'S_3S_2)S_1$: If because I can't walk they send a car, I'll go.

In the which is analysis, the source is S_1 which is if (S_2 which is because S_3). Zeroing the which is with optional permutation to before the antecedent (III 2.5), yields S_1 if (S_2 because S_3), and also the three forms above: S_1 if (because S_3S_2); If (S_2 because S_3) S_1 ; If (because S_3S_2) S_1 .

But now consider the case of (S_1CS_2) as the first operand of $C'S_3$: (I'll go if they send a car) because I can't walk, i.e. the reason why my going depends on a car is that I can't walk. The ad hoc permutation gives:

$C'S_3(S_1CS_2)$: Because I can't walk, I'll go if they send a car.

$(CS_2S_1)C'S_3$: If they send a car I'll go, because I can't walk.

$C'S_3(CS_2S_1)$: Because I can't walk, if they send a car I'll go.

It cannot give $S_1C'S_3CS_2$, which nevertheless exists as a transform of this sentence: I'll go, because I can't walk, if they send a car. We contrast this with the which is analysis. Here the source: (I'll go which is if they send a car) wh- (I'll go which is because I can't walk), i.e. the two parenthesized sentences are connected by a sameness-operator on the I'll go. Here zeroings of wh without permutation yield S_1 if S_2 because S_3 . With which is-permutation (III 2.5) in the first parenthesized sentence only: If S_1S_2 , because S_3 ; in

the second only: Because S₃, S₁ if S₂; in both: Because S₃, if S₂S₁.

So far, the forms are as obtained above. But in addition, the permutation of III 2.4 (wh-residue to after antecedent) yields the otherwise unobtainable S₁, because S₃, if S₂.

The tensing-relation of C_S to bi-sentential verbs O₀₀ is inescapable if we don't want to lose the transformational connection between He returned because they telephoned and His returning was because of their telephoning. However, for most O₀₀ verbs only the first operand can take the reduction to tense form: Their phoning implied his returning; That they phoned implied his returning; They phoned, implying his returning. If the second operand is tensed it is only with the indicator that, for those O₀₀ which impose this indicator (IV 2.5): They phoned, implying that he returned. To get a tensed second operand without the indicator, we will in most cases have to find suppletive paraphrastic transforms, namely the conjunctive morphemes. Nevertheless, such morphemes, though phonemically unrelated to the bi-sentential verbs, have the same syntactic relation to them as because has to is because of. Some conjunction morphemes indeed have a lost historical verb-source; and some bi-sentential verbs are now in process of becoming pure conjunctions: e.g. He will leave providing they will telephone, He will leave provided they will telephone.

3.4 Adverbs. Adverbs are O₀ operators which enter the sentence via zeroed which is (III 1.3.2). This is seen in the non-occurrence of denial-adverbs. We do not find, e.g., ~~⊗~~ He falsely arrived, but ⊗ He truly arrived; and ~~⊗~~ He unusually works here although ⊗ He usually works here; ~~⊗~~ He improbably will win, but ⊗ He probably will win; ~~⊗~~ He doubtfully erred, but ⊗ He doubtlessly erred. This non-occurrence is not because these denials don't occur on these verbs, for we have: ⊗ That he arrived is false, For him to work here is unusual, His winning is improbable, That he erred is doubtful.

Nor is it because the adverb form does not exist for these denials: it occurs in special situations (Improbably enough, there he was.), and as adverb of manner (He spoke falsely, he hesitated doubtfully). The non-occurrence is explained if we take a which is source. Then:

- (I report his arrival before my reporting) wh-(His arrival is true)
 → I report his arrival which is true before my reporting
 → He arrived truly; He truly arrived.

But in:

- (I report his arrival before my reporting) wh-(His arrival is false)
 → ~~I~~ I report his arrival, which is false, before my reporting

The rejection of which is false is due to a strong selectional rejection in respect to the first argument of the wh- sameness-operator, namely I report plus tense (i.e. plus the statement of occurrence in a given time-order). Sameness is not asserted of something stated to occur and of something stated to be false or improbable as to occurrence.

A similar situation arises in the O_{no} . We have, e.g.,

- (1) I know that the book is costly.
- (2) I deny that the book is costly.

From (1) we have:

The book, I know, is costly; The book is costly, which I know←(The book is costly) wh-(I know that the book is costly).

The book is, to my knowledge, costly.←(The book is costly) wh-(The book's being costly is to my knowledge).

None of these further forms hold for (2): ~~I~~ The book, I deny, is costly.

The sameness-operator rejects the selection.

The which is, upon being zeroed, explains the permutation of the adverbs (III 2.5). When the which serves as pronoun of a nominalized sentence, the adverbial-operator is historically * A-like, in A form, or PN; the former

becomes the adverb Aly when the which is zeroed. Thus:

His leading the group, which was obvious, was helpful.

His obviously leading the group was helpful.

When the antecedent of the which is tensed, the permutation can be to before the whole antecedent, as in 2.3:

He led the group, which was obvious → Obviously, he led the group.

He led the group, which was with difficulty → With difficulty, he led the group.

When the which pronouns are N_s (fact, process, manner, etc.) operating on the nominalized sentence, and in most cases becoming a suffix of its operator (III 2.3, IV 4), the adverbial operator remains an adjective in form:

The event of his singing, which was occasional, was applauded.

His occasional singing was applauded.

The intermediate N_s operators between the sentence and the O_o adverb-source is clearest in the adverbs of manner. These adverbs do not occur on the N's Ving N nominalized sentence, only on N's Ving of N or the like: His writing of term-papers is sloppy; but ~~?~~ His writing term-papers is sloppy, However with the word manner we have both: The manner of his writing of term-papers is sloppy, The manner of his writing term-papers is sloppy. We have to say that the source has manner, which is zeroable after of has been added (III 1.3.3). Another indication of zeroed N_s is seen in the fact that He writes extensively means to an extensive degree, whereas He farms extensively may mean to an extensive degree or else in an extensive manner. However, one can also say He writes in an extensive manner, the only difference being that in this case manner is not zeroed. This is a case of appropriate zeroing (III 1.4) whereby an intermediate operator is zeroable if it has high likelihood of being the intermediate operator between the particular operator over it and argument under it.

Adverbs are "of fact," "of occurrence," "of degree," "of manner" depending upon the N_s (possibly zeroed or reduced to a suffix) between them and the sentence under them. From the fact that reductions are made only when the operator and argument meet, it follows that the permutation of adverbs is nested. From He signed the paper, which is obvious we can obtain He obviously signed the paper. From He signed the paper, which was in a careful manner we can obtain He carefully signed the paper. From (He signed the paper, which was in a careful manner) → (He carefully signed the paper) wh- (He carefully signed the paper, which obvious) we get Obviously he carefully signed the paper or He obviously carefully signed the paper, but not ~~He~~ He carefully obviously signed the paper, because the new adverb can permute only outside the permutation that has been taken by the previous adverb. Aside from connecting the positions of adverbs in a sentence with their successive entry into it, this also indicates the relative positions of different types of adverbs. The N_s fact can operate on manner (That something was done in a certain manner is a fact), but manner can hardly operate-selectionally-on fact: therefore fact-adverbs are farther from the verb (in the same direction, and barring commas) than manner adverbs (as above).

3.5 Sentence nominalization. There are two contributions to the shape which a sentence takes when it is under a further operator. One is the matter of operand-sentence having tense or not: Those further operators which have a good likelihood of being under different time-order operators than their own sentence-operand allow their operand to take tense: His returning is important, That he returned is important, That he returned will be important later, I learned of his going, I learned that he will go. So also the O_{oo} which become subordinate conjunctions. These further operators impose whether on their tensed operand under the conditions of II 5.2, and subjunctive under the conditions of IV 2.7. Under the other operators, an operand sentence

cannot have a separate tense: either only the further operator is tensed (His driving was slow, His playing is frequent, Their getting together will be in London), or only the operand is tensed (He drove slowly, He plays frequently, They will get together in London).

Some of the O_{no} operators which permit the tenseless (subjunctive) reduction also permit zeroing of the for: I prefer that he go, I prefer for him to go, I prefer him to go. Others do not: I insist that he go, less comfortably I insist for him to go, ~~I insist him to go~~. Under order, command, and such operators which are both O_{no} and O_{nno} , we have O_{no} : I order that he go, I order for him to go. But I order him to go is obtained not by zeroing the for but by reduction from the O_{nno} : I ordered him something which is for him to go.

In such ways the particular sentence-nominalizations under particular operators-- O_o , O_{no} , etc.--can be accounted for. In many cases this fits the particular semantic capabilities of the operator.

The other contribution to shape is the permutation of the arguments of the operand sentence when it receives an operand indicator (II 4). The permutation in which the second argument comes first is important because it provides the base for the passive and the passive like nominalizations (e.g. the prisoner's acquittal by the judge). It is not clear what are the grounds for this (which is generally associated with by before the original first argument), and for the other permutations.

There are various situations in which a sentence is nominalized (e.g. the Her cooking type in 6.1), and also ones in which the arguments of the nominalized sentence are permuted. Further operators (aspectual and others) may then de-nominalize the form. This is seen not only in the passive, or in such sentences as Kissinger is the appointee of Nixon, but also in John's orders from me are to go, John has my orders (or: orders from me) to go from I ordered John to go, I gave John orders to go, and John has my promise to go

from I promised John to go. Note that the antecedent of the zeroed subject of go (III 1.2.4) is not affected by the permutation: it is the second argument of order (John) and the first argument of promise (I).

Aside from the question of permitting independent tense on the operand, there is one other contribution to shape in the operand sentence which depends upon the further operator on it. This is the lost intermediate operator. Certain further operators act directly on the operand sentence: is a fact, is obvious, is important; know, believe, hope, deny, doubt; is because of, implies, reveals. The others have strong selections to particular N_S , these N_S being themselves operators on sentences: Thus is frequent, is on Tuesday, is in London, is at a moment, lasts throughout a period, is sometimes, repeats, can occur directly on a sentence operand, or else on an intervening event, occasion, process, etc. as N_S . And is pleasant, is good, is protracted can occur on condition, quality as N_S . And imitate, is slow, is hesitant, on manner as N_S . As was seen in IV3.4 and III 2.3, these N_S can be zeroed (III 1.4) because of this strong selection, and in most cases these N_S are reduced to being suffixes on their argument (III 2.3, IV 4).

4. Affixes.

All suffixes (except the operand-indicators, and those which were excepted in III 2.3), and no prefixes, can be obtained as reduced forms of operators which have been permuted to after their arguments by the compound-stress of III 2.5.1. All prefixes are stress-reduced and attached forms of operators which are before their arguments. In such an analysis the great bulk of affixes have entirely different phonemic shape than the free operators whose reduced forms they are said to be.

4.1 Suffixes.

4.1.1 Event-nominalization. N's Ving N is an event, process, occasion, relation, etc. Under a further operator, this receives an operand-indicator

(nominalization): The process of (one's) storing perishables is complicated.

Under the compound permutation: The storing-process of perishables is

complicated. With affixal reduction: The storage of perishables is complicated.

Morphologically, these produce noun-forms from operators (mostly V): sale,

prophecy, exposure, candor, bribery, dependence, condescension, survival,

management, warmth, are examples containing suffixes which, on various

operators, can be syntactically related to these N_G . The zero suffix in

a walk can also be considered an event-nominalization.

4.1.2 Quality-nominalization. The N_G here are condition, quality, state,

etc., and their argument often A or N rather than V. The transformations are

as in 4.1.1, the resulting suffixes are seen in childhood, Christendom,

friendship, goodness, opacity, consistency. The N_G manner (IV 2.4) is not

treated here because it does not become an affix, but only causes the adding

of of in its sentence-operand (a variant somewhat similar to that in III 2.1).

4.1.3 Product-nominalization. Here we have not an N_G but an elementary

argument N (of wide selection) such as product, place under an O_{ON} operator:

N's Ving N has a product, N's Ving N is in a place. When this is the second

operand-sentence of a sameness operator (wh-) in respect to product, place,

etc. (with the first being say, The product is heavy) we obtain The product

which is of N's Ving N is heavy. Under product, the object (second-argument)

in the operand sentence is, naturally, normally indefinite and zeroed. We

get The product of N's Ving is heavy → N's Ving-product is heavy, the compound

being then affixed. Thus from The product of his purchasing is heavy we

obtain, with zero suffix, His purchase is heavy. Among words with product-

suffixes we have: opinion, prophecy, error, utterance, acquittal; among

place-suffixes depository, anchorage. Amount, quantity, degree and moment,

period may also be N of a product- type of nominalization.

4.1.4 Agent-nominalization. Certain N_S indicating regularity (and occupationality) of the operand-sentence in respect to its own first argument are subject to the III 2.6 "aspectual" permutation. Thus: John's teaching math is regular (or: occupational) for the subject → John is regular in teaching math. Under the compound, this would yield * John is a teaching-regular of math. → John is a teacher of math. Other such suffixes are seen in servant, changeling. If the operand sentence has been nominalized with permuted arguments the suffix is -ee: nominee (III 2.8.1, IV 3.5) but there are problems about this.

4.1.5. Affixed appropriate operator. If a word is a second argument of an appropriate (to it) operator (i.e. of high likelihood in respect to it, and wide selection) of the form A or N, then a compound-permutation becomes immediately available because of the intervening P: It is full of grace → * It is grace-full → It is graceful. He specializes in (or: adheres to) the piano (or: Darwin) → He is a pianist (or: a Darwinist, a Darwinian) In this way are formed a vast number of adjectives and nouns by suffixes to nouns. Adjectives: bloody, moneyed, suburbanite, suicidal, metallic, graceless, waterproof, earthy, earthly; Nouns: magician, a Japanese.

When the appropriate operator is a verb, this produces a compound in which the verb is attached as suffix to its second argument. Since the verb is zeroed, all that is suffixed is its tense, thus making a verb out of the object: He occupied himself with fish He fished; He committed sin He sinned; The sky took on clouds The sky clouded. He used his eyes on the animals He eyed the animals; He used his gun on the animals He gunned the animals; He dealt with the dust on the table He dusted the table; He dealt with the weeds in the garden He weeded the garden; He used (put) dust on the crops He dusted the crops; She used (dealt with) powder on her nose She powdered her nose. Whether the new verb is negative (dusted, weeded) or positive

(clouded, dusted, powdered) follows from whether the appropriate verb for the given argument pair is negative (dust, table; weed, garden) or positive (sky, cloud; dust, crops; powder, nose). The marginal quotation form as in Don't "diamond" me is similarly from Don't speak of diamonds to me, with the appropriate verb speak of being suffixed in zero form to its object, with quote intonation (III 2.2).

4.1.6. Aspectual A. Many wide-selectional adjective O_0 take the aspectual permutation, like the nouns in 4.1.4, and then undergo compound permutation and affixing: * His acting is in tendency → * He tends (is prone) to act → * He is acting-prone → He is active. It goes without saying that the words proposed here make no claim to any special relation with active; only the possibility of the various grammatical forms is relevant here. Some of the many suffixes that are found here may be seen in: resentful, articulatory, influential, defiant; on permuted operand-sentence: changeable, broken (but note the non-passival, on unpermuted operands: perishable, outspoken); on adjective operand: youngish, sickly.

4.1.7. Aspectual V. A particularly important set of suffixes comes from aspectual verbs (became, realized) on operands containing A or N operator: Its being hard came to be, via aspectual-permutation and then compounding, to It hardened. Here would be the great number of verbs with zero suffix, -ize, -ate, -en, -fy, etc., from A, N operators, meaning in general to become A, N.

4.1.8 Causative. As in the case of 4.1.5 no reduction other than the compound (and affixing) is needed for reducing make or the like (O_{no} and O_{oo}) into an affix (usually zero, sometimes phonemic changes): He made them sit, He gave them to sit → He seated them. There is a peculiar step here: when the argument (here: sit) permutes ^{w/} with its operator make to produce a compound, the argument does not carry its own argument (here: them) with it; hence that

word becomes the second argument of the new compounded verb. (In contrast, He is the director of my former school→He is my former school director, where the wh- modifiers my former are carried by school when it permutes.) This compounding with make occurs above all with the resultants of 4.1.7: He made it harden→*He harden-made it→He hardened it; and with operands containing appropriate verbs, where the intermediate step of making the object of the appropriate verb into a verb (4.1.5) may not exist independently: He made the animal be in a tree→He treed the animal.

4.1.9 Suffix without compound. In authoress, booklet, princeling we have a suffix attached not to an operator or its second argument, but to any noun, via wh. This apparently does not go via compound permutation. In (The book arrived) wh (The book is of a small kind) we obtain The book of small kind arrived, in which of small kind is directly reduced to suffix -let (The booklet arrived), as prefixes are directly reduced. But this analysis is uncertain.

4.2. Prefixes. These arise by reduction in situ, from appropriate or high-likelihood operators (especially prepositions) and causative operators which are before their arguments, and from aspectual operators (especially negative ones) and modifiers which have been permuted to be before their arguments.

4.2.1 Appropriate operators. He is in bed→He is abed, It is an opponent of toxin→It is an antitoxin. An intermediate phonemic stage is seen in He is against war→He is anti-war, which is not a product of the compound permutation. Of course, many occurrences of the prefix morphemes, e.g. anti-, are not syntactically prefixes in English, as in antipode.

4.2.2 Causative operator. The operators make and, in this case also reverse, act like make in 4.1.8, but without compounding, hence as prefixes: The illness made John feeble→The illness enfeebled John. They reversed the

body's being interred They disinterred the body. Reverse has V as operand (contrasted with 4.2.4) and occurs more commonly with zeroed indefinite subject in its operand: He reversed (or: terminated) someone's inviting John→He disinvented John; He reversed someone's doing the knot→He undid the knot; He reversed someone's freezing the food→He defroze the food.

Since the syntactically different negative prefixes have quite different meanings, there is an advantage in deriving them from free words: for we can select in each syntactic situation a different free word source, and so do not need any meta-grammar discussion to point out the different meanings (thus reverse in 4.2.2, wrongly in 4.2.3, short of in 4.2.4).

4.2.3 Negative on verbs. O_0 operators in opposite direction, wrongly, in the contrary take the III 2.6 "aspectual" permutation and are reduced to prefixes: My judgement was wrong→I misjudged; I directed him wrongly→I misdirected him; Its firing was wrong→It misfired; He is guilty of practicing wrongly→He is guilty of malpractice; His having comfort is to the contrary→He has discomfort.

4.2.4 Negative on adjectives. The O_0 operator is short (of), is less, on operands which are A, takes the III 2.6 permutation and yields un-: *His being musical is short→He is short of being musical→He is unmusical. Similarly, He is unwise, unjust, untruthful. Note that ~~is~~ unfoolish, unfalse, etc. Taking a free word such as short of as source explains why this acts on A (and not on V), and above all why it selects adjectives at the favored end of the scale, such as wise as against foolish.

Other negative operators in this situation yield other negative prefixes: is regularly not (mostly on N arguments) yields non-; is lacking yields a-; etc. But of course the paraphrases are approximate, and a single paraphrase may not correspond to all occurrences of a prefix. Thus we have non-skid, non-stop (from something like Its skidding is regularly not the case), as well as non-member,

non-church (from He is regularly not of the church); and asexual, anhydrous.

4.2.5 Adverbial. Adverbs can be permuted to before the verb or adjective on which they operate (IV 2.4), and certain wide-selection and phonemically simple ones among them are reduced to prefixes: He passed it by→He bypassed it; so also surpass, interleave, transship.

4.2.6 Adjectival. After the permutation of adjectives to before the noun which they modify (III 2.5), certain adjectives of very wide-selection are reduced to prefixes: This is a tax which is over (and above)→This is a surtax; similarly, superman, epicycle, coheir, forearm, etc.

5. Sentence structures affected by appropriate zeroing.

5.1 Comparative. All sentences with what is called the comparative conjunction or comparative structure are obtainable from the elementary operators more than, less than, as much as on amount, quantity, degree and on other elementary arguments (nouns); more than, etc., is connected by wh- to various sentences. The reductions which produce the comparative sentences are those that apply to wh-(permutations and zeroings as in III 1.2.2) plus two special appropriate zeroings. The first appropriate zeroing zeroes the amount, degree, etc., which mediates between more than, etc., and the sentences connected to it by wh. The other zeroes words in the second argument which are in the same position as the same words in the first, and this beyond what is done under and (III 1.2.2). The sentences connected to the two arguments of more than, etc., are very often parallel, i.e. identical or similar at each position; and because of this expectation certain repetitions are appropriate and zeroed.

Thus There are more men who read books than women who write them is a variant of Men who read books are more than women who write them which is constructed directly out of (1) (Men are more than women) wh- (Men read books) wh- (Women write books). If the last sentence were Women read books it could have had the appropriate-repetition (and- like) zeroings: (2) There are more men who read books than women. If the elementary comparative sentence is second of the three, it would be: (3) (Men read books) wh- (Men are more than women) wh- (Women read books), which yields, via the III 2.5 permutation of more: (4) More men read books than women (or: women do, depending on how much appropriate-zeroing is taken, going here a bit beyond the zeroings allowed under and). Given the maximum zeroing, the III 2.4 permutation can carry the whole wh- sentence to the antecedent, yielding: (4') More men than women read books. If the original material was: (Men read books) wh- (Books are more than

magazines) wh- (Women read magazines), it would yield in this way: (4a) Men read more books than the magazines which women read. But if it was: (Men read books) wh- (Books are more than books) wh- (Women read books), then there is zeroing to: (4b) Men read more books than women (or: women do, or: women read; but not: than women read books, this being a probably required appropriate-repetitional zeroing).

The source proposed here permits only two orders for the three source-sentences which underlie each comparative sentence: types (1) and (3) above; any other order is impossible or does not combine the three sentences into a comparative. It is therefore of interest that the comparative sentences of English have only two basic variants, types (2) and (4, 4', 4 a-d).

If the comparison is not an elementary argument but on an operator, i.e. on a sentence, the more than, etc., operates on a zeroable amount, etc. (4c) Men write more than women is from Men's writing is to an amount which is more than the amount to which women write. This differs from the cases of rather or more as a conjunction (3.3) that yields Men write, rather (or: more) than women; Men, rather (or: more) than women, write. On adjective operators, the more is reduced to -er, or permutes like an adverb: (4d) John is richer than Mary from John is rich to an amount which is more than the amount to which Mary is rich, with to an amount, the amount to which having appropriate zeroing, and is rich or rich having repetitive zeroing. More than can carry an operator by plus quantity word on it: ...richer by three dollars.... The fact that amount or the like is indeed zeroed can be seen in John is no richer than Mary. Here no would ordinarily be thought troublesome, because it occurs otherwise only on nouns: I saw no people. However, in the present derivation there is no problem, for just as John is richer by three dollars → John is three dollars richer (adverb permutation), so John is richer by no amount → John is no richer if we zero the amount.

5.2 Terminal-state zeroed. If we consider I left him happy (with zeroing of either I or he), we have a form that cannot be reproduced for many other verbs (~~3~~ I addressed him happy). A somewhat similar problem seems to arise with He died a Catholic, but ~~3~~ He was sick a Catholic. The key is in the list of verbs after which this form occurs: died, left, ended up, came, arrived, returned which have the added A or N referring to the subject; left, found which have it referring to the object (as above). Since these verbs all deal with a last (or in some cases, first) state, it is clear that we could posit an intermediate operator which would be appropriately zeroable here: His dying was in the final state of being a Catholic, His returning was in the initial state of being a hero, His finding them was in the initial state of being tanned and healthy. This operator can occur on other verbs, but it would not have special likelihood there, and would not be zeroed: They visited him in the final state of (his) being a Catholic.

At various points we come upon analyses of this kind which suggest the possibility of factoring the words such as in extracting an element of boundary from the above verbs. While such factorization may be of great interest if it can extend over large or distinguished parts of the vocabulary, it will clash with the grammar unless it is based on the selection and reductions (transformations) which the words have. Thus to factor kill into cause and die is unacceptable because it does not satisfy the final-state zeroing found here. When cause operates on die we should and do have They caused him to die a Catholic; but ~~3~~ They killed him a Catholic.

5.3 States in respect to verb-and-object. In I drink my coffee black (but not Columbian) we have a widespread and productive form which nevertheless has some restricted property: I tore the envelope open (but hardly the curtain), I pulled the curtain open (but hardly the envelope), ~~3~~ I pulled the curtain brown, but ~~3~~ I painted the curtain brown. The final A is clearly

appropriate to the combination of the verb with its second argument: black is not a type of coffee more than Columbian, but it is - in contrast to Columbian - a kind of coffee-drinking. Hence if we state this as an operator on the sentence (not just on coffee), we have: My drinking coffee is of the type (or: state, stage) which is black, where we can zero of the type as being the appropriate intermediate between drinking coffee and black. This will satisfy the cases where this construction is found, as against words for which it is not found.

5.4 Adverb on appropriate verb. There are certain adjective occurrences on nouns which are obviously adverbial, e.g. He is a weak king, meaning weak as king. If we consider these, we find that they occur when that noun is the second argument of a verb appropriate to it (even if the verb has later been zeroed): He drank a quick cup of coffee (but \nexists He broke a quick glass), He took a quick bath, He shoots a mean gun, He drives a hard bargain, She made him a good wife. Had the appropriate verb been zeroed, it would have left its tense (or its operand-marker) on its second argument, as in 4.1.5; and indeed we have He bathed, His bathing..., He bargained, marginally He gunned, but not *He cup-of-coffee (or *He coffee) or *He kinged. The further operators in a hard way, in quick order, etc. connected to these by wh-, would then have become adverbs. In the present case, the appropriate verb has not been zeroed, and we have to assume an event which is irregular for the theory but explainable in its terms: In His being (or: functioning as, constituting) king which is in a weak way was before, the zeroing of which is sends in a weak way not into being weakly before or after being (IV 2.4), but into being weak before king (III 2.5), as though the appropriate being could not comfortably take an adverb (which is, indeed, the case). Except for the weak king case, this is more or less a nonce form, and is productive only as such.

5.5 Zeroing of subjunctive nominalizer. A number of special forms, such as The man to see is John, John is easy to see, depend on the "subjunctive" nominalization For N to VN. By IV 2.7, this arises when the operand sentence is necessarily after in time to the operator on it, or to the first argument with which it is appearing. Thus by the side of His going is important, That he went is important we have also the subjunctive That he (should) go is important, For him to go is important from His going which is necessarily after is important; the necessarily after comes from necessarily after X where X (here: being important) was zeroable by repetition.

Independently of this nominalization, the operator may have acting on it a metadiscourse operator in respect to the first argument (or: of the subject), in which case it can take the aspectual permutation of III 2.6: That he went was nice of him, For him to go is nice of him. However, for a reason that is not clear, the III 2.6 permutation seems to occur only in the for to nominalization: He was nice to have gone, He is nice to go.

The operator under which a sentence received the for to nominalization may be zeroable (IV 1.4): I suggest that you should see him You should see him. In I suggest for you to see him, the I suggest will be zeroable only in the second argument of wh-, as will be seen here:

Consider: (John is the man) wh- (I suggest for you to see a man); for the, see IV 6.4. This yields John is the man who is for you to see, John is the man for you to see. If we had begun with John is a man, we would have John is a man for you to see; if we had begun with The man is John we would have The man for you to see is John.

We now use the special variant of adverb (in adjectival form) on second argument (5.4 above). If we begin with (John's being the person is right) wh- (X suggests for a person to build the house), we obtain John is the right person which X suggests to build the house→John is the right person to build the house. The adverbial source explains why only certain adjectives fit in this position.

Similarly, if we begin with (John's being a person is easy) wh- (X suggests for you to meet a person), we obtain John is an easy person for you to meet, and with zeroing of the indefinite (III 1.3.1; we can choose in the position of person here the most indefinite word available) we obtain: John is easy for you to meet. As to John is a person who is easy for you to meet, this would come from ((John is a person) wh- (a person's being someone is easy)) wh- (X suggests for you to meet someone). Note that easy does not refer to the activity of meeting but to the relative availability of John; this fits its placing in the source above.

In all for to nominalizations, if the first argument is repeated or is indefinite it plus for are zeroable, yielding John is easy to meet, etc.

6. Indefinite and 'and' zeroings.

A great number of apparently disparate transformations are produced directly by the zeroing of that which is or the like in certain situations (on the basis of III 1.3.1, 2), and others by certain zeroings around and.

6.1 Extraction. Certain transforms which seem to contain a permutation, e.g. One box is what I saw, What I saw is one box (apparently from I saw one box), can be obtained without permutation, and without any ad hoc insertion of is what, what is. We start with (One box is that) wh- (I saw that) yielding One box is that which I saw (a sentence which exists), and (That is one box) wh- (I saw that), yielding That which I saw is one box. In both, that which has the morphophonemic variant what. In other wh- words no such variant is needed: John is the one who did it, John is who did it from (John is the one) wh- (One did it). This source fits the fact that we have What I saw was large from (That was large) wh- (I saw that), but not ~~∗~~ Large is what I saw, since ~~∗~~ Large is that. It also fits the fact that there is no extraction of verbs: ~~∗~~ Saw is that; though we can say Looking is what I did and What I did is (to) look, where looking and to look are arguments of the aspectual

operator do. Finally, this source fits the fact that what or that which carries a separate tense, usually is: for we have here not simply a transform of I saw, or whatever, with its tense, but a separate sentence That is one box, etc.

A related situation arises in, for example, I never eat her cooking, where her cooking cannot be the original second argument of eat (differently from, say, I reported her cooking). We begin with (I never eat that) wh- (Her cooking is that), where Her cooking is that comes from the product-nominalization (4.1.3) Her cooking of things is (or: produces, yields) that, with the indefinite object of things zeroed. In I never eat that which is her cooking the joint zeroing of that and which is yields I never eat her cooking.

The derivations involving zeroed that which is require certain justifications, or at least habituation. Note first that the forms exist in the language in some cases, as in That which I saw was a box, What I saw was a box. Also that the source with that which is expresses closely the meaning of the reduced form: A box is what I saw means not merely I saw a box but A box is that which I saw (or: ...the thing which I saw). As to the selection, which restricts the verb (e.g. saw) to being one which selects box as object, this is assured by the wh which asserts identity of the two that.

The It-extraction (It is true that he left, It is John who left) can be obtained from it as non-referential (deictic-like) pronoun (III 1.1, end): It is true, namely that he left; It is John, namely he who left. The part introduced here by namely is in apposition to the short It-sentence, and there are some problems with the sentential form of that part and with its domain (consider It is good coming here; It is true, his leaving).

6.2 Agent-nouns, names, classifiers. Similarly, we have to explain forms like The teacher returned, since we had obtained teacher only in sentences like He is a teacher of math from He teaches math, and so for all the other nouns produced by affixes on the basis of the III 2.6 permutation 4.1.4-6). Here we begin with (Someone returned) wh- (Someone is the teacher

of something), and after zeroing the indefinite object we obtain Someone who is the teacher returned, where zeroing of someone who is yields The teacher returned.

A similar derivation could explain why proper names have no selection beyond the selection which person or the like have. For we could derive John left from A person who is called John left from (A person left) wh- (A person is called John). The zeroing of called is qua appropriate word before names, and is found also in compound nouns (III 2.5.1) where X-rays comes from rays are called X, etc. An added convenience is that proper names, which differ from the rest of the vocabulary and can be understood without being learned - because they have no individual selection - would be located in a single and appropriate syntactic spot.

It is possible, and perhaps desirable, to extend the zeroing of indefinites to apply also to the occurrence of nouns as classifier nouns, i.e. as indefinites relative to the discourse or the sentence. Such a zeroing would explain situations such as John and Frank left. The two boys were late. Here the the indicates that boys has occurred before. (One could even say: The two boys mentioned in the subject position of the previous sentence.) This type of covert reference can be obtained by the variants of III, if we begin with A boy who is called John and a boy who is called Frank left Two boys who are called John and Frank left, with two being zeroed as appropriate before the single and between (singular) nouns (6.5), and called zeroed as above, and boys who are zeroed like that which is. In The two boys were late the the then applies to the zeroed occurrence of two boys.

The problem of covert reference noted here, as well as several other observations made in these Notes, are due to Henry Hiż.

6.3 Restrictive relative clause; delays. There is a well-known problem in grammar, that the relative (wh-) clause, and the adjectives derived from it,

may be either restrictive or not: The moon, which was silvery, retreated behind a cloud (commas optional), The silvery moon retreated behind a cloud are non-restrictive; Foods which are frozen last quite long (no commas), Frozen foods last quite long are restrictive in meaning: lasting long is asserted here only for a proper subset of foods. This difference can be obtained grammatically if we use zeroing of that which is for the restrictive cases:

(The moon retreated) wh- (The moon was silvery) → The silvery moon retreated.

(That lasts quite long) wh- ((That is food) wh- (food is frozen)) →

(That lasts quite long) wh- (That is frozen food) →

That which is frozen food lasts quite long → Frozen food lasts quite long.

This analysis explains why it is that one cannot have a restrictive modifier on an unrestrictive one. One can say: Everest, which is the highest mountain, which many had tried to climb, was finally climbed by Tenzing - unrestrictive on unrestrictive: (Everest was climbed...) wh- (Everest is... mountain) wh- (Many tried to climb Everest). And one can say: People who were invited who couldn't come wrote apologies restrictive on restrictive: (Someone wrote apologies) wh- (((Someone was people) wh- (people were invited)) wh- ((people couldn't come) wh- (people were invited))); this yields (Someone wrote apologies) wh- ((Someone was people who were invited) wh- (People who were invited couldn't come)), and then (Someone wrote apologies) wh- (Someone was people who were invited who couldn't come). One can also say: Mountains which are over 25,000 ft., which were unclimbed before the 50's, were the object of many attempts - unrestrictive on restrictive: ((That was the object of many attempts) wh- (That is mountains) wh- (Mountains are over 25,000 ft.)) wh- (Mountains were unclimbed before the 50's); this yields (That which is mountains which are over 25,000 ft. was the object of many attempts) wh- (Mountains were unclimbed before the 50's). But one cannot say ~~7~~ Unions, which

are not what they were, which I most distrust are the biggest ones, where the first wh- would be unrestrictive about all unions and the second wh- restrictive about certain unions. Appropriately enough, if we try to form a source for this using that which is for the restrictive portion, we find that it cannot be done: as first sentence we would need Unions are biggest for the unrestrictive Unions are not..., but That is biggest for the restrictive That is unions which I distrust.

We have here an example of how a particular meaning effect can be due indirectly to a grammatical structure. One might have thought that the difference expressed by the restrictive wh- would be due to some element that carried the given meaning. But it turns out to be due merely to the order of operators meeting arguments. In That is frozen foods, when lasts operates on foods the foods is already carrying the operator frozen on it; hence lasts is said only of frozen foods. In The moon retreated, the retreated operates on moon independently of silvery operating on moon; hence it applies to moon without any restriction as to silveriness.

The fact that that which is delays an argument's meeting an operator until after it is carrying another operator serves for various grammatical distinctions. Thus in I almost wrote a novel there are two meanings: I did not quite write, or what I wrote was not quite a novel. These two result from different sources: (1) almost on I wrote a novel:

My writing a novel almost occurred;
and (2) almost on Something is a novel:

(I wrote something) wh- (Something's being a novel almost occurred).

6.4 The. It is possible to account for all occurrences of the by that which is, (or some such word in place of that), with zeroing of which is. Here that is not an indefinite noun, nor the specific deictic, ~~but rather a noun, nor the specific deictic,~~ but rather a noun meaning the unique bearer

of a property. The property can be occurrence at another address in the discourse (referential the), or having the name given after the which is (as in The UN), or satisfying the description following which is (generic: the country doctor), etc. - all depending on what follows the which is.

It follows from this that the the is the main noun, not a modifier, with the noun plus modifiers after it being in apposition to it; this would fit the position of the in its word-sequences.

In the man whom I met as against a man whom I met we have that which (or: the one who) is a man whom I met. In The disappearing family doctor was a valuable asset we have the non-restrictive That which is a family doctor, which is disappearing, was a valuable asset. In The disappearing family doctor is a purely urban phenomenon, in which the disappearing family doctor is obtained as in the preceding example. They escaped to the suburbs is from ...to that (unique thing) which is suburbs. He found a coin and later lost the coin is from ...lost that (i.e. unique thing) which is a coin which is same as in argument 1.2. Merely having the sameness operator without the that of uniqueness need not yield the: He found some coins and later lost a coin which is the same as in argument 1.2. → He found some coins and later lost one.

The that which is source in the sense above explains the lack of the (other than referential) in He drives at a fast speed, as against its presence in He drives at the authorized speed, He drives at the fastest speed. Also, for example, It leaves every hour on the hour, and ...on the half-hour.

It also explains the virtual requirement of the in The fact is that he left. Since fact is in O_0 , it cannot be an argument without carrying its argument in turn. Here fact cannot carry its argument (☞ The fact that S is that he left). We begin with (That is that he left) wh (That is a fact), with that as definite-pronoun for a nominalized sentence. Thence That which is a fact is that he left → The fact is that he left. For The fact of his

leaving is crucial, The fact that he left is crucial we begin with ((That is crucial) wh (That is his leaving/that he left)) wh (That is a fact), yielding (That which is (of) his leaving/that he left is crucial)wh (That is a fact)→
The fact which is (of) his leaving/that he left is crucial. There are some N_s (problem, joy) under which the likelihood of separate time-order for their argument is apparently not great enough for the which is of the last form to be zeroed (III 1.3.2), hence we have: The problem is his leaving/that he left, The problem which is (of) his leaving is crucial, The problem of his leaving is crucial, but only The problem which is that he left is crucial, and ~~The problem that he left is crucial~~.

6.5 Quantifiers. Certain quantifiers and negatives (including not) are operators on sentences and take adverb form, or else the III 2.6 permutation. However, the bulk of quantifiers appear as modifiers on nouns. These can be derived in two ways. Some including none, several, some, and (if we wish) the numbers, can be taken as second arguments of certain verbs appropriate to them (amounts to, numbers, etc., reducible then to is); they thus become modifiers permuted to before the noun (none then becoming no). Others can be taken as operators on and. This can be done for the plural: N_1 and N_1 to some number or the like can have as reduced form N_1 plus plural suffix. It can also be done for the numbers: N_1 and N_1 →two N_1 plural, two N_1 plural and N_1 →three N_1 plural, and so on; the interest here is in obtaining the number words not from a large initial vocabulary but from reduced forms on the unbounded repeatability of and.

When under an operator there appear more than one number, these appear as second operators (under which or on and) on different nouns under that operator; therefore, differently from quantifiers in logic, there is no direct grammatical (or semantic) relation between them. Thus Five men bought two papers says little about who in particular bought what: it comes from (Men bought papers)

wh- (Men numbered five) wh- (Papers numbered two), or some equivalent source, and thus cannot in itself specify what each man bought. A stronger source, which explicitly precludes this detailed information, would be to use the indefinite-zeroing of 6.6 and posit A set of 5 men bought a set of 2 papers; but this is hardly necessary.

There are certain quantifiers which, in language, are specifically relative to a set. The occurrences of all N₁, every N₁ can be derived by indefinite or repetitional zeroing from all N₁ in the relevant (or: mentioned) set: all men in the world, all men in the room, all men mentioned. These can in turn be derived from operators: men exhausting those in the room, etc. The relation of these quantifiers to each other under a single operator is as above: Everybody (in the room) was greeted by several people is derivable from some such form as People who exhausted those in the room were greeted by people who numbered several. While English does not furnish vocabulary to make these operator forms sound natural, it is clear that these are paraphrastic transforms of the ordinary forms, as far as concerns understanding the grammatical relations of the quantifiers to the nouns.

Related to the quantifiers are the scale sentences: It is 3 ft. long, etc. We begin with It scales (or: mounts) a foot in length, It scales (in) length by a foot, where the O_{nnn} operator scale or mount or amounts can permute its last two arguments (III 2.7), with numbers operating on this to yield by 3.7 feet, etc. The verb scale is appropriate to its objects and can be reduced to is: It is a foot in length, It is a foot long. Product-nominalization yields Its length is a foot. That the source has scale, mount, explains why the dimension is always named by the top of the scale: It is 0.1 mm long, It is 0.1 mm short, for the source states that it has mounted up to 0.1 mm.

The first steps above, without the appropriate-reduction, are seen also in the case of words for fragment: He ate bread up to 3 slices, He ate 3 slices (out) of the bread.

6.6 Collectives; respectively. There are certain verbs (collect, gather, is extinct, is numerous, etc.) whose first or second argument has to be - by a strong selection - certain mass or collective nouns, or else plurals: The water collected in the basin, The dust gathered in the corner, The group gathered, The people gathered. Oddly, the plural has to be above two, something which can hardly be accepted as an original grammatical requirement: John and Mary and Frank gathered there, but ~~John and Mary gathered there~~. We can avoid this, and avoid having and as operator on nouns (which would mean a non-sentence-forming operator), if we take as source: (A group gathered there) wh- ((A group contained John) and (A group contained Mary) and (A group contained Frank)). Zeroing under and yields A group which contained John and Mary and Frank gathered there. If we zero a group which contained as an appropriate form (under these verbs) of that which is, we obtain the sentence above.

The zeroable set which contains can also occur under certain other verbs if it is followed by N and N: Gilbert and Sullivan wrote operettas can be (and, we know extra-grammatically, is) from A set (or: team) which contained Gilbert and contained Sullivan wrote operettas, but we know it is not so for Mozart and Beethoven wrote operas; and the second source never arises for John and Frank died. Positing a source with set gives us a grammatical form for why Mozart and Beethoven and Gilbert and Sullivan wrote operas is factually disturbing: for either the source contains set or it does not, and the two cases have correspondingly different meanings.

This analysis serves also for respectively. John and Mary play violin and piano respectively can be derived from A set which contains John and Mary play a set (of instruments) which contains violin and piano respectively. That set is present here is seen from the oddness of the sentence if we take words which are not likely to occur as conjoined objects of a set contains: John and Mary play violin and tennis respectively.

6.7 Reciprocals. There remains the case of and between nouns before reciprocal verbs (meet, equal, etc.): John and Mary met, John met Mary. If we begin with John met Mary and Mary met John we can form John and Mary met Mary and John respectively and can pronoun this to John and Mary met each other. So far, we can do this to every verb. The only peculiarity in these "reciprocal" verbs is that they permit the zeroing of each other. If we consider which are these verbs, we find that they are the ones for which A's doing it to B constitute B's doing it to A. However, we do not need to use all of this information: it suffices to say that these are the verbs for which the ordered pair of arguments A, B has the same likelihood as B, A. The zeroing of each other (which pronouns the inverse argument pair) is appropriate to these verbs. That this is indeed the relevant consideration can be seen in the fact that if these verbs have for any reason certain pairs of argument whose inverse is not equally likely, they do not function as reciprocals for those pairs: for Keep walking until you will meet the river, where ~~∇~~ The river will meet you, we do not have ~~∇~~ You and the river will meet.

7. Metaphor. There are various problems such as metaphor, idiom, extension of selection, which seem marginal to sentence-structure, but which can be characterized in terms of the operators and reductions of the present analysis.

Thus metaphors can in general be obtained as follows: For $N_1V_1N_2$ with metaphoric V, the source would be N_1 does to N_2 as one V_1 things → N_1 did-like- V_1 ing to N_2 (by zeroing the indefinites, one, things, and permuting the residue as in III 2.4.2, then appropriately zeroing the did like). This fits the fact that metaphors have definite, non-zeroable, arguments, since otherwise the indefinite verb do to would have no function: In Mary stuffed the goose with truffles the second object can be indefinite and zeroed, but not in Mary stuffed her speech with poor jokes. It also explains why in Le juge a

Ravacholisé X, the X cannot be Ravachol: the source is The judge did to X
as one did to Ravachol (the verb form by 4.1.5).

The metaphor examples here, and various observations throughout these
Notes, are due to Maurice Gross.