

LINGUISTIC ANARCHY NOTES

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These notes were circulated in 1967, in photocopies that Postal mailed out to his drinking companions and in numerous second- and third-order copies that were made subsequently. It is not clear whether Postal then discontinued the series or whether he simply ceased labeling his papers as belonging to the series.

The notes represent a major departure from the then-current tradition of dead-horse flogging, in which works by transformational grammarians were expected to contain re-enactments of battles with structuralist linguists, presumably as an assertion of their title to recently conquered territory. By 1967, Postal's interest in controversies with structuralists had largely waned and had been replaced by an interest in enlarging the factual domain of theoretical linguistics and developing an awareness of the respects in which transformational grammatical theory as it then stood failed to contribute to (let alone provide) the solutions to important problems.

This change in attitude brought with it a second major departure from the existing transformational tradition; whereas previously transformational grammarians had virtually always confined their discussion of specific examples to cases where they had explicit rules that generated the "grammatical" examples and failed to generate the "ungrammatical" ones, Postal's discussion was concerned with examples for which he proposed no

explicit "generative" analysis, where the problems raised by the examples revolved not so much about "generating the right sentences" as about accounting coherently for their semantic interpretation. See Dougherty (1974) for criticism of this particular aspect of work by generative semanticists (including Postal), and McCawley (1975a) for a rebuttal of Dougherty's criticism.

The facts discussed in the third note provide an argument for a further departure from the transformational tradition, though one that Postal at that time did not make, namely, the outright rejection of the notion of "ungrammaticality"; see McCawley (1972b) for an argument that the notion "grammatical" is at best worthless, based in part on Postal's data. The point is that if a distinction between "ungrammatical" and "unacceptable" is to be made, the ungrammatical items are those unacceptable items whose unacceptability is for a reason that the linguist takes to be in his province. That means that in order to tell whether an unacceptable item is ungrammatical, one must identify why it is unacceptable. But if one can identify why it is unacceptable, nothing is gained by in addition classing it as grammatical or ungrammatical. A grammar that specifies what is grammatical and what is ungrammatical but does not enable one to pinpoint what is wrong with all unacceptable sentences (or better, unacceptable uses of sentences) is of questionable value; and if a grammar performs the latter task, there is no obvious reason why one should care whether it performs the former. Particularly important is Postal's observation that the exact same sources of unacceptability may be at work in instances of "faulty agreement" as in instances of arithmetic foulups (John are tired versus Five of my three brothers), and thus that a grammar that "generates the right sentences" as far as agreement is concerned must incorporate a sizeable part of arithmetic.

Many of the issues touched on in the notes were topics of discussion at one or other of the San Diego Syntax Festivals, a series of informal conferences that were held annually at the University of California at San Diego from 1967 to 1970. Some of the issues were raised first in Postal's notes, others are represented here by Postal's reactions to discussions at the preceding Festival.

Kuroda (1970) explores in detail the relationship between relative clauses and certain kinds of adverbs (which Kuroda dubs "Postalian adverbs") that Postal brings up in the first note; the rule of Telescoping proposed by Kuroda to account for some of Postal's facts, which performs reductions like his leaving in the manner in which he left → the manner in which he left, is shown in McCawley (1975b) to play a role in

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a much wider class of structures than Postal and Kuroda discuss. The observations about reference contained in the second note demonstrated that the notion of coreferentiality, which figured in much discussion of anaphoric devices, could not be applied as blindly as it had been and required deeper analysis; see G. Lakoff (1968b), McCawley (1971b), and Morgan (1970) for discussion of problems involved in formulating a linguistically adequate notion of coreferentiality.

The discussion in the third note of the relationship between conjoining, numerals, and grammatical number meets head on a problem that had up to that time not been given any attention, namely, that of distinguishing ambiguity from non-specificity. Postal took a position that virtually all linguists have rejected, namely that many linguists are insane, Tom and Dick own twelve houses between them, etc. are ambiguous rather than unspecified as to the specific numbers involved (e.g., as to how many houses Tom owns, how many Dick owns, and how many they own jointly). At the time Postal made that claim, no one could offer more than visceral feeling as a reason for or against it. This impasse led to the development of tests for ambiguity (basically, ways in which linguistic phenomena might respect or ignore the difference among supposedly different senses), first reported in G. Lakoff (1970d) and reviewed critically in Zwicky and Sadock (1975).

I. INTRODUCTION

This is the first in a random, possibly nonfinite series of communications designed to show beyond any doubt that there exists no linguistic theory whatever. There are apparently endless numbers of fact types not incorporable within any known or imaginable framework. In particular, what has been called the theory of transformational grammar, seems to have only the most partial relation to linguistic reality. (That is not to say, of course, that its competitors are right. In general, these vary from the almost totally empty to the absurd. This fact may have led to more faith in transformational grammar than is warranted by its actual ability in any version to provide grammars capable of representing the actually discoverable linguistic facts.)

The communications will be divided into many subdivisions, which will appear at opportune moments over the next four decades. These include:

Series A Horrors of Identity

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Series B	Temporal Monstrosities
Series C	Coordinate Mind Snappers
Series D	Selectional Impossibilities
Series E	Other Linguistic Wonders

Further series may be added as required.

Although personally I find it hard to appreciate, there may be those living who doubt the conclusions of the first paragraph. We have not neglected such individuals. Quite the contrary. For them and them alone we have prepared proposals for Nobel Prize awards and are ready to fill in at once the appropriate lines with the names of anyone who can deal adequately with any reasonable portion of the facts revealed in these notes. All applications for these awards must, however, be postmarked on or before midnight January 1, 2150 A.D. and must include fifty cents handling charges.

It is perhaps necessary to take note of a possible objection at this point in view of what will be our unflinching methodology in these reports. Namely, we absolutely refuse to discuss any theories whatever. We hug closely the ground of true fact. The defenders of various particular so-called linguistic theories may then wish to object that there is a big difference between facts not explained and cases where a theory actually claims something false. They may wish to distinguish, that is, between situations of the form:

- (1) *Theory T says nothing about facts X and X exists.*
- (2) *Theory T says A about facts X when in fact all observed X reveal not A.*

And they may wish to claim that the facts being brought forward in these notes are of exclusively the former type and hence not really indicative of the falsehood of any theory but only of their incompleteness. Technically, this distinction and its associated ideas are quite valid. But there is much ignored here by anyone who takes such a stand with respect to linguistic theory today. For what is implicitly suggested is that the particular theory defended can be extended naturally to handle the set of facts X in (1) situations. What I am suggesting is that there is not the slightest reason to believe this, since the class of facts not handled thus far are in nature quite different from those for which any linguistic framework has been constructed to deal. Moreover, if one looks at the set of all known

linguistic facts, even restricting this set to English, and English syntax-semantics at that, as we shall in these notes, it will be found that most fall under (1) and not under (3).

- (3) *Theory T says B about facts X and in fact observed X reveal B.*

Furthermore, a value judgement. The facts not covered are in general the most interesting ones.

A final word. Our goals seem quite negative. In fact, however, in a deeper way, they are entirely positive. Many people today are engaged in the attempt to construct linguistic theories. My view is that an important difficulty with all such attempts is that there is not a good a priori statement of the full range of known facts which a theory must handle. To the extent that theories are formulated in the absence of explicit awareness of this range of facts, they are dreamlike.

SERIES A. Horrors of Identity

Number 1. Some Requisite Equivalences in Instrumental Phrases

Workers in the transformational grammar framework are already long since well versed in the fact that in complement constructions there are often identity requirements of some sort between an NP in the complement and some NP in the "main" clause. These are usually requirements that in some sense the NPs be identical referentially. But requirements of nonidentity are also findable:

- (1) *I demand that Schwartz leave.*
(2) **I demand that I leave.*

Maybe this restriction is representable in terms of an obligatory shift to infinitive yielding (3) from the structure underlying (2).

- (3) *I demand to leave.*

But this seems dubious in view of the fact that the meaning of (3) seems to involve the notion of 'X let me leave' while no such 'let' component is part of the interpretation of (1). Such an explanation would be doubly desirable, though, since these examples are special not only in involving nonidentity conditions but in involving any kind of identity conditions into *that* clauses, normally free of such restrictions. All of this is irrelevant to the deeper point toward which we move inexorably. I note only that if obligatory shift to infinitive were right, no linguistic theory known provides a way to state it.

Often ignored is that identity requirements in grammar are of at least two fundamentally different sorts quite independently of the division into equal and unequal types. One must distinguish between requirements of this sort that are natural or deep constraints as against those that are arbitrary or superficial. The distinction is revealed by the contrast between:

- (4) a. *I tried to win.*
 b. **I tried (for) Nasser to win*
- (5) a. *I hope to win.*
 b. **I hope (for) Nasser to win.*

In each case one might, and at one time some did, speak of an identity requirement. But the conditions are different in the (4) and (5) cases. The requirement of identity with infinitives of *hope* is arbitrary. This reveals itself in at least two different ways. First, (5b) is unacceptable only for some speakers of English, including the writer, but not including P.S. Rosenbaum. Second, even for those who, like me, reject (5b), it is perfectly well formed semantically. It is not anomalous and is interpretable literally in a way exactly analogous to types like (5a).

In (4), the restriction is natural. That is, it is a function of the meaning of the verb *try*. There are thus no speakers of English who will regard the two forms of (4) as equally well put together. More generally, I would claim that any language has a verb with exactly this meaning must embody this restriction. Once you learn that the Gzorian form for *try* is *noaf*, you don't also have to find out if *noaf* requires this identity of its complement. In passing, one can observe that no known linguistic theory provides any way of incorporating such semantically dependent referential identities in its descriptions. These are cases that seem to be maximally embarrassing for any who wish to claim that there is a completely semantics-free syntax. It seems reasonable if relatively empty to assume that natural and arbitrary identity restrictions will be represented in very different parts of a grammar. The natural suggestion is that the former are constraints of semantic representation or of deep structure if this is different from that. The arbitrary restrictions should likely be represented as properties of lexical items in regard to those "transformational" rules that relate semantic representations to the superficial forms of sentences. They should be represented in a way similar to an account of such facts as that *want* has no passive or that the plural of *man* is *men*. It is, of course,

exactly facts like these latter where foreigners will make mistakes.

To the real point. Consider the identity restriction between the grammatical subject of certain active verbs and the grammatical subject, usually deleted,¹ of a complement sentence inside a *by* phrase of the instrumental type.

- (6) a. *I found Jones by looking in the pyramid.*
 b. **I found Jones by Bill's looking in the pyramid.*

These constructions offer major problems besides those I wish to stress primarily. In particular, how one can represent their incompatibility with passivization:

- (7) a. **Jones was found by me by looking in the pyramid.*
 b. **Jones was found by me by my looking in the pyramid.*

or their relations to sentences of the form:

- (8) *My looking in the pyramid annoyed Jones.*

when the main verb of the (6) type sentences is one of a class of psychological predicates:

- (9) *I annoyed Jones by looking in the pyramid.*

Then there are the restrictions as to which class of verbs allows these constructions in the first place, i.e., what verbs can be main verb, what main verb of complement, etc.

All of this is difficult enough. But consider further examples of a type first brought to my attention by Jane Robinson:

- (10) *Jones annoyed me by the abrupt manner in which he left.*

The fact is that the grammatical subject of the main clause here must be identical to the grammatical subject of the apparent restrictive relative clause on *manner*. Hence,

- (11) **Jones annoyed me by the abrupt manner in which*

$$\left\{ \begin{array}{c} \text{Shirley} \\ \text{you} \\ \text{Tony's cousin} \end{array} \right\} \text{ left.}$$

Like the identity in previously mentioned examples such as (6) and (9), and related ones not previously mentioned such as (12) and (13),

- (12) *Jones annoyed me by leaving* $\left\{ \begin{array}{c} \text{in an abrupt manner} \\ \text{abruptly} \end{array} \right\}.$

- (13) *Jones annoyed my by the abrupt manner of his leaving.*

the identity in (10) is natural. That is, the examples in (11) are uninterpretable literally. They are screwed up semantically.

The identity revealed in examples like (10) is, as far as I know, a unique type. Outside this class of cases, roughly characterized presently, we have not encountered identity restrictions between one NP and another inside a relative phrase, where the latter is not the pivot on which the relative is based. The identity in cases like (6) seems, on the other hand, to fall under the more general class of to be sure poorly understood identity restrictions between NP in main clauses and NP, usually grammatical subjects, inside of complement sentences within these main clauses. The unique class in which (10) falls seems to be characterized very roughly by the fact that the head noun of the apparent restrictive phrases is one of those nouns, like *manner*, that typically form prepositional phrases that function as adverbials, whatever that means. Hence:

- (14) a. *I surprised John by the degree to which I understood astrology.*
b. *I surprised John by the frequency with which I sneezed.*
c. *I surprised John by the time I wasted in searching for gold.*
d. *I surprised John by the speed with which I poked him in the nostril.*
e. **I surprised John by the dogfood with which I fed him.*
f. **I surprised John by the baseball bat with which I broke it.*

For some reason, the locative adverbial forming nouns seem to be exceptional:

- (15) a. **I surprised John by the place where I lived.*
b. **I surprised John by the location to which I took him.*

Perhaps this has something to do with the relatively concrete meaning of these. But even forgetting about these exceptions what has been said does not really begin to characterize the restrictions here as to the noun or the construction in which the noun can occur. For instance,

- (16) a. *I astonished John by the amount of time I spent sleeping.*
b. **I astonished John by the amount of time I investigated.²*
c. *I astonished John by the amount of time I wasted.*

Earlier examples together with (16b) suggest that that noun inside the apparent restrictive that forms the pivot must be inside an adverbial and not a subject or object. But what of (16a,c)? Is this a subtle test for adverbials that look like objects?

The heart of the inexplicable has not yet been reached however. To reach this, consider some of the restrictions on the apparent relative phrase in examples like (10). First, there is the unique identity, which would be bad enough even were it not the case that these restrictions are largely identical to those in the ordinary instrumental complement cases, i.e., those in (10) mirror those in (12). Observe that in (10) the second relative *in which he left* is not omissible:

- (17) **Jones annoyed me by the abrupt manner.*

But this is by no means generally true of restrictives, one good reason to doubt that these things are restrictives. It is not even generally true of restrictives in adverbial prepositional phrases:

- (18) *I left in an abrupt manner.*

However, the restriction revealed by (10) and (17) is no doubt related to that revealed in definite cases parallel to (18):

- (19) a. *I left in the manner I planned to.*
b. *I left in the calm manner I planned to.*
c. **I left in the manner.*
d. **I left in the calm manner.*

The natural path to search for an explanation of these restrictions is, of course, to suggest that in sentences like (10) and (19) the apparent preposed adjective actually originates as part of a manner adverbial in the sentence that shows up as the second relative. Hence, the nonomissibility of the latter. This suggests, as do the many weird restriction on identity alone, that the structure in sentences like (10) is not a real restrictive relative but somehow

derived from a complement form. That is, the structure of (10) type forms should be derived from that like (12) type. How this might happen eludes me. Observe, for instance, that there is a shift from indefinite to definite.

Ponder, moreover, the amusing fact that while (10) has a fairly exact paraphrase into (12), sentences like (20) are only paraphraseable in complement terms as (21).

(20) *Jones annoyed my by the manner in which he left.*

(21) *Jones annoyed me by leaving in the manner he did (leave in).*

Here there are two forms of horror. First, what kind of grammar can formally relate at once both (10)-(12) and (20)-(21) type pairs? Second and more interesting, there is a kind of identity in (21) never seen before. The sentence underlying *Jones leaving* that occurs before *in the manner* must be identical in some very strong sense to that underlying the following repetition. Not only same morphemes, constituent structure, meanings, etc., but also the indexing of the NP must be the same to indicate reference to same objects and that of the verbs must be the same to indicate the reference, or whatever purists want to call it, of these. That is, not only do the two occurrences of *leave* refer to the same type of occurrence of an event of leaving, but to the very same token, i.e., they are "cotemporal" and "colocal". This type of identity is again characteristic of instrumental expressions involving the same class of adverbial nouns.

(22) a. *By leaving at the time I did (leave at), I avoided being eaten by the grizzly.*

b. *By running at the speed I did (run at), I overtook Batman.*

c. *By living at the location I do live at, I avoid having to rub elbows with swine.*

Here, the locational ones are, for some reason, all right.

We have by no means exhausted all of the special facts that are manifested by this one small class of English expressions. But even the limited set considered is enough to suggest, at least to me, that the very terms we now use to conceptualize syntacticosemantic phenomena are inadequate.

Number 2. Coreferentiality and Physical Objects

Suppose Karnofsky is an English-speaking alligator describing his life to a "Time" reporter. He might say:

- (1) *My tail fell off, but it grew back.*

He might also reveal that:

- (2) *My wife likes my tail, but the kids think it is too short.*

In each of these cases there seems to be pronominalization linking the underlined forms. It has been proposed (Chomsky, 1965, pp. 145-146) that the coreferentiality involved in this be analyzed in terms of the identity of underlying reference indices.³ The idea is that these indices keep track of identical entities. The trouble is that the notion of entity and hence of reference being reconstructed is quite unclear. Nothing shows this more than (1) and (2). For although pronominalization seems the same in both, the referential notions linking entities are evidently very different. In (2), the tail beloved by the wife and disparaged by the kids is the same tail; i.e., it is a chunk of tailhood filling a continuous portion of space-time. This object is thus a decent relatively well-behaved type of entity of the sort typically taken to be a physical object. It meets the conditions for physical objects as specified, for example, by Katz (1967, pp. 129, 168):

Consider the idea each of us thinks of as part of the meaning of the words "chair", "stone", "man", "building", "planet", etc., but not part of the meaning of such words as "truth", "togetherness", "feeling", "shadow", "integer", "departure", etc. --the idea that we take to express what is common to the meaning of the words in the former group and that we use to conceptually distinguish them from those in the latter. Roughly, we might characterize what is common to our individual ideas as the notion of a spatially and temporally contiguous material thing. The semantic maker (Physical Object) is introduced to designate that notion.

For example, (Physical Object), although not presently definable, should eventually be replaced by some formal configuration of symbols whose internal structure represents the notion of some

physical entity constituted of spatio-temporally contiguous parts which endures in form unless its permanence is terminated by outside influence.

But these conditions are not met by the "entity" referred to in (1). Clearly, in one obvious sense, the tail that fell off and the one that grew back are different. For instance, assuming judicious use of preservatives, at a later date someone might pick up the first tail and give the new one a sharp rap. This would hardly be describable as

- (3) **He rapped the tail with itself.*

which can at best be interpreted to involve bending a tail and striking one part with another.

One's first reaction is that the mysteries here have something to do with body parts, or perhaps more generally with whatever things are involved in part-whole relations. But this is wrong. The same contrast can be found in

- (4) *Bugati's house burned down, but he rebuilt it.*

- (5) *Bugati's house is expensive, but it is still ugly.*

Again, the underlined forms in (5) both refer to something filling the same continuous portion of space-time. Not so in (4). It is also not so that genitives are necessarily involved in this phenomenon:

- (6) *The boat was completely destroyed by the explosion, but they rebuilt it.*

- (7) *The boat is heavy, but it can still float.*

Actually, what seems to be crucial in permitting coreferentiality between nominals that refer to what are in physical reality distinct objects⁴ is the presence of what might be called Negative Verbs of Result, i.e., verbs that describe events that, when occurring to an entity, more or less cause it to cease to exist, *destroy*, *tear down*, *fall off*, *burn up*, *demolish*, *smash*, etc.

Suppose we refer to pronominalization and identity affairs generally of the sort previously known as "ordinary coreferentiality" and to the type in sentences like (1), (4), and (6) as "destruction coreferentiality". There are then two possibilities. (a) Both types are representable in terms of underlying nominals with identical reference indices. The result is that the notions of reference and entity, already unclear though strangely often considered straightforward, are thereby clouded severely. (b) The two types are represented differently. In this case, it is not

at all clear how to begin to do the formal linguistic job of representing the relations. If ordinary coreferentiality is accounted for by identical indices, what represents destruction coreferentiality?

To show the latter problem in its true seriousness, one must emphasize that the laws of ordinary pronominalization hold for destruction coreferentiality in a straightforward way. For instance,

- (8) a. After his house burned down, Harry rebuilt it.
- b. After it burned down, Harry rebuilt it.
- c. Harry rebuilt his house after it burned down.
- d. *Harry rebuilt it after his house burned down.

Especially observe that there can be one nominal which enters into two different sorts of coreferentiality, ordinary and destruction:

- (9) I saw the house Harry built before it burned down
but you / only saw it after he rebuilt it.
-

Here solid lines indicate ordinary coreferentiality, broken ones destruction coreferentiality.

It seems clear, then, that the same rules of pronominalization apply in both cases, suggesting that the underlying identity required should be the same in both cases. The implication is, then, that the notion of reference, that supposed clear link between linguistic form and entity in the world, is even muddier than might have been thought. And what is most ironic is that this mud should appear in exactly that domain where reference is taken to be most clear, that typically taken as a paradigm case for reference, namely, physical objects.

But on the contrary, one must note in closing only that the differences between ordinary and destruction coreferentiality cannot be attributed to the nebulous land of real world-language relations. They must be built into the linguistic structure of sentences. This follows most clearly from the fact that one can derive absurdities by assuming that what follows from one kind of identity follows from another. Thus, take (a) and (b) to be premises of two arguments (10) and (11).

- (10) a. My tail fell off but it grew back.
- b. What fell off me was a certain (physical) object X.

- c. *What grew back on me was a certain (physical) object Y.*
 - d. *X is the same entity as Y.*
 - e. *Therefore the (physical) object that fell off me is the same entity as the (physical) object that grew back on me.*
- (11)
- a. *My wife likes my tail but the kids think it is too short.*
 - b. *What my wife likes is a certain (physical) object X.*
 - c. *What the kids think is too short, is a certain (physical) object Y.*
 - d. *X is the same entity as Y.*
 - e. *Therefore, the (physical) object that my wife likes is the same entity as the (physical) object that the kids think is too short.*

Although both arguments have apparently identical forms, evidently only (11) is valid. The crucial step in both arguments is (d), which establishes the identity between entities. What emerges then is that the identity is different in the two cases, since making it the same justifies invalid arguments like (10). It follows that somehow the semantic representation of sentences involving destruction coreferentiality must specify a different relation of identity between nominals that undergo pronominalization than the relation of identity normally required. The apparently inconsistent conditions for explaining these facts are met by the linguistic theory proposed by _____? on _____?

Explanatory Addendum

I have already detected certain, to be sure, inevitable misunderstandings of previous numbers, which, perhaps, it is best to purge at an early moment. Some, particularly Mediterranean, individuals have taken the comments to indicate some despair about the possibilities of linguistic formulation. This does not exist. Others, usually with beards, have taken them to involve giving up the search for generalizations and explanations. This is both false and curious. It would seem that this accusation should be laid at the feet of those maintaining the rightness of some particular theory in the face of endless numbers of ever impinging data to the contrary.

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I have simply wished in these notes to suggest with supporting data that, for instance, the theory of grammar presented in Katz and Postal (1964) is, from the point of view of present knowledge not just slightly in error and rather incomplete, but in deep ways hopelessly far from linguistic reality. This fact has not, however, I am pleased to be able to report, affected sales, which continue at an enriching level. Furthermore, subsequent worthy dickerings of this theory have improved it, to be sure, but not to the extent required to blister reality by any extensive contacts. Would anyone in his right mind try to construct a grammar of English today in the sense Lees tried in the late fifties and early sixties? If you understand why they would not, you understand the theoretical basis of these notes. If not, not.

✓SERIES F. That Much-Beloved Semantics-Free Syntax

Number 1. *"Plus 1" or "How about Arithmetic?"*

A. The cardinal-ordinal hangup

A *seventh* in (1a) is ambiguous as to whether it refers to a seventh crook like (1b) or to a seventh member of some other set of stabblables not mentioned in (1a) itself:

- (1) a. *Six crooks were stabbing a seventh.*
- b. *Six crooks were stabbing a seventh crook.*

Consider then

- (2) a. *Six crooks were stabbing an eleventh (one).*
- b. **Six crooks were stabbing an eleventh crook.*

(2a) is perhaps all right, but is unambiguous; an *eleventh* cannot refer to one of the set of crooks to which the six previously mentioned thugs belong. Only the "list" interpretation is possible. Correspondingly, (2b) is out.

The generalization is elementary; such sentences with the nonlist interpretation must meet the condition

$X \text{ Numeral } N_i \ Y \text{ Numeral}' + \text{th } N_i \ Z,$ where

$\text{Numeral}' = \text{Numeral} + 1.$

This is a perfectly decent condition, which could be formalized in a number of ways. All have in common their erosion of the syntax-semantics border, at least with respect to arithmetic.

One should also note that sentences like (1b), with the interpretation that all seven crooks belong to one set, do not have passives and are thus another of the many cases showing that the usually assumed generality of the Passive rule is unfounded:

- (3) **A seventh (crook) was being stabbed by six crooks.*

A sensible use of (3) would involve reference to at least thirteen crooks. More generally, such NPs do not undergo a variety of other rules that whip NPs from one place to another:

- (4) a. *It was tough for the six crooks to stab the seventh (crook).*
 b. **The seventh (crook) was tough for the six crooks to stab.*
- (5) a. *I talked to the six crooks about the seventh (crook).*
 b. **I talked about the seventh (crook) to the six crooks.*
- (6) a. *It seemed to the six crooks that the seventh (crook) was a fink.*
 b. **The seventh (crook) seemed to be a fink to the six crooks.*

B. Ordinal anaphora

Sentences like the following are good nuts for theory advocates to crack:

- (7) a. *Three men entered the room, but John insulted only the first.*
 b. *John, Bill, and Harry entered the room, but Schwartz only knew the second.*
 c. **John, Bill, and Harry entered the room, but Schwartz only knew the eleventh.*
- (8) a. *I talked to the seventh of the eight men who were successively rescued.*
 b. **I talked to the ninth of the eight men who were successively rescued.*
 c. *???I talked to the seventh of the eight men who were rescued simultaneously.*

C. Subsets of sets containing fewer members than they do

It is well known that in pure-syntax syntaxes, such beauties as (10) are unstoppable.

(10) *Nine of my three friends are linguists.*

Again, the restriction is elementary, roughly that Numeral of Det Numeral' N Y must meet the condition that Numeral \leq Numeral'. I allow equality here so as not to exclude

(11) *All (twelve) of my twelve friends are Bedouins.*

It is ineffable, is it not, that there should exist a non-null class of linguists who wish to maintain that (10) is grammatical, while (12) is not?

(12) *Sincerity is annoyed with Harry.*

D. Two or three

As I was reminded by M. Gross (personal communication during dinner at the most excellent Sheila Chang's Chinese Restaurant), we also have:

(13) *I am losing two or three friends every month
by writing things that bug them.*

with an interpretation distinct from that of the propositional calculus. There is also (14) but not (15).

(14) a. *three or four*
b. *fifty or fifty one*

(15) a. **three or five hundred and twelve*
b. **six or two*
c. **nine or two-thirds*

i.e., in general, just J or $(J + 1)$. Actually, this is not precisely true, because of examples like:

(16) *fifty or sixty*

But the general point holds in view of:⁵

(17) a. *five \times 'ten' = fifty*
five \times 'hundred' = five hundred.

E. Lists

Another good instance of the pervasive role of arithmetic in sentence formation is provided by such examples as:

- (19) a. **Mary, I would like to introduce you to my two friends, John, Billy, Sally, Jack, Tom, Peter, Schwarz, and Thmug.*
- b. *Mary, I would like to introduce you to my two friends, John and Billy.*
- c. *Mary, I would like to introduce you to my three friends, John, Billy, and Thmug.*
- (20) a. **Eleven men were sitting in the room, Harry and Jack.*
- b. *Two men were sitting in the room, Harry and Jack.*
- (21) a. *Those three men own one, two, and three cars respectively.*
- b. **Those sixty six dogs ate one, two, and three cats, respectively.*

F. Reciprocals

Consider some positions of the English plural morpheme; only interpretations in which *others* refers to the initial NP are considered in these data:

- (22) a. *John is tough for Bill to visit.*
- b. *It is tough for John and Bill to visit each other.*
- c. **John and Bill are tough for each other to visit.*
- d. *John and Bill are each tough for the other to visit.*
- e. **John and Bill are each tough for the others to visit.*
- f. *John, Bill, and Mary are each tough for the others to visit.*
- g. **John, Bill, and Mary are each tough for the other to visit.*

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- h. *The two men are each tough for the other to visit.*
- i. **The two men are each tough for the others to visit.*
- j. *The three men are each tough for the others to visit.*
- k. **The three men are each tough for the other to visit.*

As W. Plath perceptively points out, the *other* constructions in (22) are no doubt to be regarded as reductions of expressions of the form:

- (23) a. *John and Bill are each tough for the other one to visit.*
- b. *The two men are each tough for the other one to visit.*
- c. *John, Bill, and Harry are each tough for the other two to visit.*
- d. *The three men are each tough for the other two to visit.*

For some speakers, these are sentences, for others, perhaps only intermediate forms. Probably everyone has things like:

- (24) *Each of the three men is tough for the other two to visit.*

Again, ignoring the conjunction-plural difference for the moment, the condition on these constructions is roughly

$X \text{ Numeral } N_i \text{ } Y \text{ other Numeral}' \text{ } Z,$

where $\text{Numeral}' = \text{Numeral} - 1.$

G. Predicate numbers

We find:

- (25) a. *Johnson and Balsworthy are two of the nicest guys you would ever want to meet.*
- b. **Johnson, Rusk, and Ho Chi Minh are six of the cruelest devils on Earth.*

H. Languages with dual number

Much of the syntactic nature of number is obscured in English by the fact that it has only singular-plural inflections. This permits much numerical work to be done by a pure-syntax-appearing division into singular-plural. In languages like Mohawk, where there is singular, dual, and plural, this fails, and syntax must demonstrably count to three for such gross syntactic facts as agreement. This is true marginally in English as well:

- (26) a. **All two of my neighbors are necrophiles* \Rightarrow
Both of my neighbors...
b. *All three/four/... of my neighbors are*
necrophiles.
- (27) a. *Any of those three/four/... razors might be*
good for other uses...
b. **Any of those two* \Rightarrow *either of those two*

I remember dimly that there are languages with trial numbers as well. This places the defender of nonarithmetical syntax in the curious position of defending a maximum 4 syntax. Why four should have the magic property of terminating syntactic description eludes me.

I. Conjunction⁶

A nice challenge for the defender of maximum 4 syntax is provided by sentences like

- (28) *Harry and Thmug married seven women (between them).*

If such are to come from sentence conjunction, where the conjuncts have nonconjoined Harry and nonconjoined Thmug as individual agents, then arithmetic (>4) must be included in the grammar. If it is claimed that the deep structure of (28) is more or less its surface structure, i.e., that it is a case of NP conjunction, it must be faced that the interpretation that (28) is not the usual joint interpretation of other, more standard cases of what is often claimed to be NP conjunction (I don't believe in this anywhere, if anyone cares) such as,

- (29) *Harry and Bill wrestled (with each other).*

In items like (29), there is one predicate token jointly associated with the compound subject. But observe the contrast between this kind of thing as in

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(30) *Harry and Bill wrestled* $\left\{ \begin{array}{c} \text{a Korean} \\ \text{seven Koreans} \end{array} \right\}$ *(together)*.

(31) *Harry and Bill wrestled seven Koreans (between them)*.

If the deep structure of (31) is essentially the surface structure, what is that of (30)? I would suggest that (31) comes from sentence conjunction and is six ways ambiguous. What the maximum 4 syntax defender would say eludes me.

J. Number coordination

In general, conjunction and disjunction are parallel.⁷
But observe under coordination reduction:

(32) a. *Jack bought six books or Jack bought seven books.*

b. *Jack bought six books and Jack bought seven books.*

(33) a. *Jack bought six books or seven books.*

b. *Jack bought six books and seven books.*

(34) a. *Jack bought six or seven books.*

b. **Jack bought six and seven books* \Rightarrow b'. *Jack bought thirteen books.*

It seems to me important to observe that (34b') is in fact ambiguous in the way such a derivation predicts, namely, over the number of different sales events involved, which varies in this case from one to thirteen.

K. Why?

Obviously, we have merely scratched the surface of the phenomenon of arithmetical restrictions in syntax. This raises the question as to why there shouldn't be a syntax that includes arithmetical principles rather than principles of sentence formation, which yield mostly driven in arithmetical cases, plus an appeal to syntactic principles up to 4 but a fix-up semantics thereafter putting in just what was left out of the syntax?

A good ground for believing that arithmetical properties are not to be excluded from the syntax is that the information required seems to be provided by the natural correspondence between the unquestioned syntactic property of number of conjuncts and numbers. This is shown by the "twohood" of

John and Bill, "threehood" of *John, Bill, and Thmug*, etc., as illustrated, for example, in (20). See also (7). Other well known examples are obvious.

My suggestion is, then, that all plurals are derived from the conjunction of distinct singulars, usually referentially distinct, and that numbers are a way of indexing the number of underlying conjuncts.⁸ Schematically: *two men* = *man*₁ and *man*₂. To make this more natural, one requires the further insight that all nouns are deformed relative phrase predicates, but that is another story. This is not a theory or anything like it, of course, simply a suggestion of the direction in which to look for one. Its advantage consists first of forcing one to come to grips with facts like those noted above, facts that maximum 4 syntax has in historical fact led to the ignoring of.

NOTES

¹Except in a limited number of cases that seem to involve intransitive constructions if not intransitive verbs:
I annoyed Jones by my complaining; **I annoyed Jones by my complaining about Communism*; *I annoyed Jones by my running*;
**I annoyed Jones by my running of the race*.

²(16b) must be interpreted with *time* as object of *investigate*, not as an adverb modifying it, i.e., not as a paraphrase of 'amount of time is spent investigating X'.

³Chomsky actually proposed more, namely, that the indices be associated with lexical nouns that are the heads of nominals. Hence, pronominalization and other operations involving referential identity would involve not only index identity but lexical noun identity as well. This can be shown to be impossible, a point argued in my forthcoming paper "Noun and Pronoun in Universal Grammar" to appear in S. Lamb (ed.), "The Linguistic Wisdom of S. Lamb: Papers Published on the Occasion of the Publication of 'The Linguistic Wisdom of S. Lamb'; etc.". Chomsky also seems (although I am really not sure about this) to regard the indices as, in the logical sense, constants or constantlike, whereas there are many grounds for taking them as logical variables over which, for instance, quantification can be defined. Part of the difference here is whether one takes deep structures, semantically interpreted, to make (in the declarative case) an infinite number of assertions or whether one takes them to

be the equivalent of propositional functions without truth values, receiving the latter only when values for variables are provided.

⁴The appeal to physical reality here is not empty. It can be pointed out that Schwarz in 1911 and "the same man" in 1967 are physically different; in fact, no two molecules probably occur in both objects. But there is a physical continuity in this typical situation lacking in the cases of (1), (4), and (6).

⁵The fact that coordination reduction works in cases like *five hundred or six hundred* \Rightarrow *five or six hundred*, but not in cases like *fifty or sixty* \Rightarrow **fif or sixty* is, I believe, a special instance of the universal principle that conjunction reduction does not operate below the level of words, a fact closely linked to the deeper principle that word boundaries correspond to constituent boundaries in surface structures. Although I have been told of some German and Japanese counter-examples to the special principle, I believe that, in the terminology of the eminent Bar Hillel, this constraint is worth enforcing. There are, after all, minor English examples too, such as *pro and anti Castro speeches*. But I would seek another explanation for these, such as deletion rather than conjunction reduction. This would yield a bracketing of the form (i) rather than the structure (ii), which would result from real coordination reduction:

(i) ((*pro* (*and* (*anti Castro*))) *speeches*)

(ii) (((*pro*)(*and* (*anti*)) *Castro*) *speeches*)

And (i) seems quite correct to me. Further study of the proposed German and Japanese examples is in order, for the principle does too much work to be discarded lightly.

⁶This and the following section barely skim the top of arithmetic facts in the domain of coordination reduction. For one further example,

(iii) a. *nice boys and nice girls* \Rightarrow *nice boys and girls*.

b. *three boys and three girls* \Rightarrow **three (boys and girls)*.

(iv) a. *nice boys and mean girls* \Rightarrow *nice and mean boys and girls, respectively*.

b. *three boys and four girls* \Rightarrow **three and four boys and girls, respectively*.

b'. seven boys and girls.

⁷I suspect disjunction is derived in a logical way from combinations of negation and conjunction, the latter being the only deep type of coordination. Some support for this seems to me derivable from the obvious greater perceptual difficulties of otherwise parallel to conjunctive disjunctive structures. I have also observed some contexts in which the two appear not to contrast semantically:

(v) a. *I didn't know that John or Bill lived in Chicago.*

b. *I didn't know that John and Bill lived in Chicago.*

⁸McCawley (1968b) accepts the derivation of some plurals from conjunction but not all. His grounds include the existence of statements about an indefinite number of individuals, i.e., those with *roughly*, *approximately*, etc. This argument seems to me anything but compelling. Sentences like (vi,a) might have a deep structure of the form (vi,b):

(vi) a. *Approximately 300 men volunteered.*

b. *[it S] is approximate*

where the S contains precisely 300 conjuncts. I also see nothing wrong with letting indefinite quantifiers like *many*, *few*, receive infinitely many readings with respect to number, i.e., nothing wrong with allowing sentences containing them to be infinitely ambiguous over individuals. McCawley also takes it as a counterargument to this view that sentences containing enormous numbers must involve deep structures with enormous numbers of conjuncts. But why this is a counterargument he does not say. Possibly he has some perceptual argument in mind. Perhaps the most interesting apparent counterargument is given by sentences with terms like *infinite*, *boundless*, in them that would require infinitely long deep structures. But I see no reason to take this as a difficulty of any greater scope than that faced by the mathematician who wishes to represent an infinite set. He simply devises a finite notation for it. There is no reason why the theory of grammar cannot contain deep structure schemas for these cases that provide a finite representation for those infinitely long structures. I thus raise the possibility that not only is there an infinite number of sentences each of finite length, but there are also sentences of infinite length

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(unwise to try to pronounce fully). The beginning of one such is:

(vii) English is an infinite set of sentences which consist respectively of the morpheme strings

a. ...

b. ...

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