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NOUN INCORPORATION IN GREENLANDIC: A CASE OF SYNTACTIC WORD FORMATION

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In Greenlandic Eskimo, a polysynthetic language, the word-building apparatus performs much of the work that is accomplished by the syntax of more familiar languages. In particular, numerous processes in this language create verbs from nouns. Evidence of a quite unusual sort shows that these noun-incorporation processes must follow certain ordinary syntactic rules, such as case assignment and modifier-noun agreement. The language thus falsifies pronouncements concerning the independence of syntax and word formation based on data from languages that are typologically very different from Greenlandic.*

Certain aspects of the grammar of Greenlandic Eskimo shed light on the question of whether, and to what degree, universal grammar must allow for the possibility of syntactic processing before the words of surface structure exist as such. Phrased differently, the question is whether any word-formation rules are interspersed among the ordinary rules of the syntactic component. The extreme relevance of Greenlandic to this issue was recognized by Rischel 1971, 1972, but little notice appears to have been taken of his important work. Thus I wish to present further data and arguments in support of what is essentially the conclusion drawn by Rischel.

1. THEORY. The dispute between the advocates of prelexical syntax, as it is often called, and those who favor presyntactic lexical insertion has been somewhat obscured because of the failure on the part of both sides to make their claims precise. It is not immediately obvious to what degree the formatives of deep

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Most of the data in this paper have been taken from Bugge et al. 1960, Kleinschmidt 1851, Rasmussen 1971, Rischel 1971, 1972, and Schultz-Lorentzen 1927. Some pedestrian and presumably non-crucial examples were made up in order to simplify the Greenlandic vocabulary used.

structure are required to resemble the words of surface structure in a theory without prelexical syntax, nor is it obvious how much divergence is allowed in a theory WITH such syntax.

The most severe restriction that could be placed on universal grammar would be the requirement that all word-sized constituents of surface syntax be represented in deep structure by constituents containing all and only the morphemes of the surface word—in their surface order, and in a form suitable for processing by purely phonological rules. In the weakest possible model, there would be no restrictions whatever as to the point in syntactic derivations where the integrity of surface words would have to be respected, and no limits at all as to the degree of difference between the form of surface words and their deep-structure sources. Neither of these extreme alternatives is particularly attractive.

The problem with the very strict construal of the ban on prelexical syntax is that it would more or less spell doom for syntax itself; e.g., it would make Affix Hopping and *Do*-Support rules impossible, and would remove rules of concord from the syntactic component. Since reflexive pronouns in English are clearly words, they would have to appear as such in deep structure. With no agreement rules or Reflexivization, numerous other rules of classical syntax (such as Passive) would also go by the board. And since Passive is the cornerstone of classical syntax, all the rules that depend on it for their justification would also be eliminated. In other words, there would be virtually no syntax in a theory that totally outlawed prelexical syntax. In fact, virtually syntax-free theories of grammar have become moderately popular lately; but they are motivated in part by the fact that they are consistent with a very strict adherence to the lexicalist doctrine—a doctrine which the data from Greenlandic seem to call into question.

The problem with the most liberal theory of the relation between surface lexical items and their deep sources is, in a nutshell, that it is no theory at all. As has been so often and so loudly proclaimed in the literature of transformational grammar, weaker theories should be resorted to only when stronger (i.e. more constrained) theories have been shown on empirical grounds to be inadequate. The weakest of all possible theories thus carries with it the greatest burden of proof. Since the unconstrained lexical-insertion theory has that status among the family of theories examined here, it is truly a last resort.

Between these two extremes lie more moderate possibilities. One such is a theory that would allow inflectional morphemes to be added, deleted, moved, or altered by syntactic rules, and which would allow for suppletion in inflectional paradigms. To have any real empirical strength, such a theory would require objective and independent criteria for distinguishing between inflection and derivation. To my knowledge, no adequate set of criteria has ever been developed. Overlooking this serious problem for the moment, I will refer to this as a theory that allows PRE-INFLECTIONAL SYNTAX.

A somewhat looser, but still not totally unconstrained theory is the following. First, pre-inflectional syntax is allowed, as in the preceding theory. In addition, meaning-bearing morphemes may be rearranged by syntactic rules into word-sized constituents. To put teeth into this theory, suppletion must be limited to inflection; thus suppletion of both roots and of derivational affixes would be forbidden. Under

such a proposal, *teacher* could be derived from an abstract source in which the verb *teach* and the content of the agentive suffix were not continuous; but *redde*n and *Americanize* would have to be lexically derived, because of the suppletive relation between the causative morphemes *-en* and *-ize*. I will speak of this as a theory that allows PRE-AFFIXAL SYNTAX.

Weaker still would be a theory that allowed pre-inflectional and pre-affixal syntax, but also allowed suppletion of derivational affixes, though not of roots. In such a theory, words like *redde*n, *Americanize*, and *fill* could be derived from abstract syntactic sources containing the adjectives *red*, *American*, and *full*; but *kill* and *remind* would have to be derived from *die* and *remember*, respectively, in the LEXICON (if at all), because the derivation involves suppletion of a root. This I will call a theory of PREDERIVATIONAL SYNTAX.

In the generative-semantic tradition, suppletion is not even restricted to affixes, but the system is still not totally unconstrained. According to generative-semantic lore, morphemes of deep structure must be arranged into a single constituent before they can be replaced by a single word (cf. McCawley 1968). Furthermore, the rules that accomplish the grouping of morphemes into constituents must not exceed the power of otherwise-motivated transformations, or violate any general constraints on the application of transformations. Thus, from the structure which underlies *John kissed a girl who ate bananas*, no sentence such as **John flimpe*d bananas could be derived, for such a derivation would necessarily violate Ross's Complex Noun Phrase Constraint (McCawley 1971, Ross 1967).

My goal in this paper is the rather modest one of showing that universal grammar must be allowed at least the power of pre-affixal syntax. As Rischel has recognized, Greenlandic provides uniquely compelling evidence bearing on the question of separating lexical from syntactic rules.

2. THE WORD IN GREENLANDIC. Like all Eskimo dialects, Greenlandic is almost exclusively suffixing and polysynthetic. In principle, words of any length may be constructed; forms of ten or more morphemes are not uncommon. The typical word consists of a root plus any number of derivational affixes and inflectional suffixes, in that order. Following these, some clitics can occur; but I will not be concerned with them here.

What I will show is that ordinary rules of syntax, including inflectional rules, operate before the constituency of these words is established. Obviously, however, for these facts to bear out my thesis concerning the need for pre-affixal syntax, I must first establish that the strings of morphemes in question are, in fact, words. The problem of defining the word still vexes linguists, of course, but I can show that the forms I will be dealing with deserve the name 'word' at least as much as English forms like *antidisestablishmentarianism*, and more so than German forms like *Vorverkaufsfahrscheinautomat* 'advance-sale ticket-vending machine'. Without going into much detail, I present below seven characteristics of these Greenlandic forms that are often taken to be indicative of wordhood:

(a) In almost all Greenlandic words, only continuous stretches of material including the first morpheme can occur in isolation. With extremely rare exceptions, suffixes are bound forms; no string of morphemes that does not include the first in a word can occur separately.

Thus, *biilersualiorsimavoq* is a word meaning 'He has made a big car.'¹ But only the following simpler forms can be elicited alone: *biili* 'car', *biilersuaq* 'big car', *biilersualiorpoq* 'He makes (or made) a big car.' In other words, the morphemes *-suaq* 'big', *-lior* 'to make', and *-sima* 'to have done in the past' are always suffixes.

(b) Obligatory sandhi processes operate within words, but are optional or inapplicable between words.

Thus the suffix *-suaq* 'big' always uvularizes the final vowel of a vowel-final form to which it is added, but no such process is ever obligatory between words. Again, the word-internal cluster /a + u/ is always simplified to *aa*, but this change never occurs between words. Thus *iga* 'cooking pot' + *-uvoq* 'is a' gives *igaavoq* 'It is a cooking pot'; but *iga* followed by the separate word *ujarpaa* 'He is looking for it' is *iga ujarpaa* 'He is looking for the cooking pot.'

(c) The phonological rules that apply within words are often morphologically or lexically controlled, and can be subject to exceptions and idiosyncrasies.

Thus a noun-forming suffix meaning 'the place (or time) for ...' has two allomorphs, *-vik* and *-ffik*. The former causes gemination of a single consonant in the preceding syllable; the latter does not. The two allomorphs are distributed mainly according to the phonological characteristics of the form to which they are attached; but there are idiosyncratic exceptions, and even variation in some cases. Thus both *iggavik* and *igaffik* mean 'kitchen' and are derived from the verb root *iga* 'to cook'.

(d) The order of the elements within words is entirely fixed by semantics, and cannot be altered without also changing meaning. Within a Greenlandic clause, however, words may be permuted quite freely without affecting (truth-conditional) meaning.

(e) Explicit conjunction never occurs within words or between part of one and part of another.

(f) It is impossible to interrupt words with pauses or parenthetical material; consequently,

(g) Error correction can take place only at the boundaries of words. If a mistake is made, the correction must begin at the beginning of a word.

3. GREENLANDIC SYNTAX. A few introductory remarks on the syntactic organization of the language will be helpful for the subsequent discussion. Greenlandic is a SOV language—or, more neutrally, an agent–patient–verb language; it shows ergative case-marking. A single case form, the absolutive, marks both the subject of an intransitive clause and the object of a transitive clause; but a different case

¹ I employ the new, official orthography in this paper. It is phonemic except for the fact that *e* and *o* are used for the automatic variants of /i/ and /u/ before the uvulars *q* and *r*, and expect for the fact that the subphonemic voicelessness of the geminate version of *v* is recognized in the orthography as *ff*. Both of these deviations from the phonemic principle are carry-overs from the traditional spelling system of Kleinschmidt 1851. The distinction between the blade and point sibilants (*s* and *ss*, respectively, in Kleinschmidt; *s* and *ʃ*, respectively, in Swadesh 1944) is not observed in the new orthography; both are spelled *s*, though the distinction is maintained in one small dialect area in Greenland. The sequence *ng* is a digraph and represents a single velar nasal, the geminate version being spelled *nng*. The sequence *rng* represents a geminate uvular nasal; there is no corresponding non-geminate segment in the language. The symbols *g* and *r* represent (respectively) velar and uvular fricatives which, along with *l*, are voiced when short and voiceless when geminated.

form, traditionally called the relative, is reserved for the subject of a transitive clause. In the singular of unpossessed nouns, absolutive case forms have no suffix, while relatives have the suffix *-p*:²

- (1) *Arnaq tikippoq* 'The woman came.'
woman(ABS.) come-INDIC.-3sg.
- (2) *Arnaq takuvara* 'I saw the woman.'
woman(ABS.) see-INDIC.-1sg./3sg.
- (3) *Arnap takuwaanga* 'The woman saw me.'
woman-REL. see-INDIC.-3sg./1sg.
- (4) *Arnap meeraq takuavaa* 'The woman saw the child.'
woman-REL. child(ABS.) see-INDIC.-3sg./3sg.

Aside from its use as the indicator of transitive subjects, the relative case marks the possessor in possessive constructions. The possessor precedes the possessed, which bears a suffix that indicates the person and number of the possessor and the case of the entire NP:

- (5) *Meegqap qimmia takuvara* 'I saw the child's dog.'
child-REL. dog-3sg.(ABS.) see-INDIC.-1sg./3sg.
- (6) *Meegqap qimmiata takuwaanga* 'The child's dog saw me.'
child-REL dog-3sg.-REL. see-INDIC.-3sg./1sg.

Non-possessor modifiers follow their heads, and agree in case and number with them:

- (7) *Angutip angisuup takuwaanga* 'The big man saw me.'
man-REL. big-NOM.-REL. see-INDIC.-3sg./1sg.
- (8) *Angummik angisuumik tikippoq* 'He came with a big man.'
man-INST. big-NOM.-INST. come-INDIC.-3sg.

As can be seen from the above examples, there are intransitive agreement suffixes on verbs that index the subject, and transitive agreement suffixes that index both subject and object. Many basically transitive verbs, but by no means all, can be used directly as formal intransitives just by affixing intransitive agreement morphemes. In many instances where the English counterpart is an object-deleting verb, the Greenlandic intransitive thus formed has roughly the meaning of the

² The following abbreviations are used in morpheme glosses in the text and examples: INDIC. = indicative mood; INTER. = interrogative mood; INF. = infinitive; ABS. = absolutive case (always parenthesized since, in all cases in this paper, there is no overt marker of the absolutive); REL. = relative case; INST. = instrumental case; ALL. = allative case; ABL. = ablative case; PASS. = passive morpheme; ANTIPASS. = antipassive morpheme; NOM. = nominal participle. 1sg., 2sg. etc. indicate the person and number of possessive suffixes on nouns and agreement suffixes on verbs. Notations such as 1sg./3sg. symbolize the person and number features of transitive verbs; the features of the rel. argument are on the left of the slash, and those of the abs. argument are on the right.

There is some controversy as to whether *-q* is an absolutive morpheme in Greenlandic. As this issue is entirely irrelevant to the point of this paper, I have simply chosen to adopt the conservative stance that it is not, but is always part of the stem of the noun. The relationship between absolutive and relative forms of possessed nouns is considerably more complicated (cf. 5-6). Since this also has no bearing on the issues discussed here, I will ignore the problem.

corresponding English intransitive. The agent in such an intransitive construction is in the absolutive case, and the verb is marked for agreement with it. The patient, if it is expressed, is in the instrumental case, and is not cross-referenced on the verb:

- (9) *Neqi nerivara* 'I ate the meat.'
 meat(ABS.) eat-INDIC.-1sg./3sg.
 (10) *Neqimik nerivunga* 'I ate meat.'
 meat-INST. eat-INDIC.-1sg.

Note that the absolutive patient in 9, with which the verb agrees, is understood as definite; but the instrumental patient in 10, which does not trigger verb agreement, is understood as indefinite.

At least in the older language, other inherently transitive verbs acquired a passive sense when used with intransitive verb endings (Kleinschmidt 1851:55). The verb in such usages agrees only with the patient:

- (11) *Piniartog toqupaa* 'He killed the hunter.'
 hunter(ABS.) kill-INDIC.-3sg./3sg.
 (12) *Piniartog toqupooq* 'The hunter was killed.'
 hunter(ABS.) kill-INDIC.-3sg.

Furthermore, any transitive verb can be used directly as an intransitive with a reflexive sense. Thus 12 is ambiguous; besides the meaning given above, it could mean 'The hunter killed himself.' An independent pronominal object in the dative—or ALLATIVE, as it is often called in Greenlandic studies—can stand for the reflexive object:

- (13) *Imminut takuvunga* 'I saw myself.'
 self-ALL. see-INDIC.-1sg.
 (14) *Imminut takuvoq* 'He saw himself.'
 self-ALL. see-INDIC.-3sg.

Reflexivization in Greenlandic can be considered a process that puts objects which are coreferent with subjects of the same clause into the allative case—upon which they cannot trigger verb agreement, so that the verb is marked intransitively.

Any transitive verb is subject to two other important detransitivizing processes: the passive and the antipassive. In a passive sentence, the underlying subject (i.e. the NP that would appear in the relative case in a simple transitive sentence) is in the ablative—or, in some dialects, the instrumental—and need not appear at all. The patient is in the absolutive, and only its person and number features are recorded on the verb. Thus the agent is understood as indefinite, and the patient as definite:

- (15) *Angutimit arnaq takuneqarpoq.*
 man-ABL. woman(ABS.) see-PASS.-INDIC.-3sg.
 'The woman was seen by a man.'

In the antipassive, the verb is marked with one of several special suffixes distributed partially along phonological lines, with some lexical idiosyncrasies. The underlying subject appears in the absolutive case, and triggers verb agreement. The

underlying object is optional; if present, it is in the instrumental case. As expected, it is indefinite:

- (16) *Angutip arnaq unatarpaa* 'The man beat the woman.'
 man-REL. woman(ABS.) beat-INDIC.-3sg./3sg.
 (17) *Angut arnamik unataavoq* 'The man beat a woman.'
 man(ABS.) woman-INST. beat-ANTIPASS.-INDIC.-3sg.

I am not aware of any particular differences in sense between antipassives and direct intransitives like 10. It might therefore be possible to regard direct intransitives as antipassives with phonologically-null antipassive suffixes.

There is no distinct morphological class of adjectives. One sort of restrictive noun modification is accomplished by means of affixes that are added to nouns to form more specific nouns: thus from *qimmeq* 'dog' can be derived *qimmersuaq* 'big dog', *qimminnguaq* 'little dog', *qimmiaaraq* 'young dog, puppy', and numerous other words that include adjectival meanings.

The class of noun-to-noun suffixes, however, is closed. General modification proceeds by following the head with a modifying word or phrase. Nominal modifiers are formally nouns, and agree in case and number with their heads. Often—in fact, usually—they are deverbal nouns formed with the aid of one of a few related suffixes; the choice depends on whether the nominalized verb is transitive or intransitive and, if it is transitive, upon the grammatical relation that the head noun bears to the nominalized verb. Several examples of this sort of modification are given in §4.11 below.

4. INCORPORATION. Greenlandic has a rather large number of highly productive suffixes that are used to form nouns from verbs, verbs from nouns, and more specific nouns and verbs from less specific ones. The exact number is difficult to determine, but a rough estimate would be two hundred. In this paper, I restrict my attention to those processes that verbalize nouns; but I believe that pre-affixal syntax can also be motivated on the basis of the other classes of derivational suffixes.

4.1. OBJECT INCORPORATION. One especially important variety of denominal, verb-forming suffix produces predicates in which the incorporated noun is understood as the object of the verb encoded by the suffix. All the following examples are clauses, since verb stems cannot be pronounced in isolation. (Note that what I am here calling 'noun incorporation' is not at all the process described by Sapir 1911. The Eskimo phenomenon under consideration is a derivational process, as Sapir pointed out; but the phenomenon which he was interested in—and which is discussed under the rubric of 'noun incorporation' by, e.g., H. Woodbury 1975—is more akin to compounding.)

- (18) a. *qimmeq* 'dog'
 b. *Qimmeqarpoq* 'He has a dog.'
 (19) a. *sapangaq* 'bead'
 b. *Sapangarsivoq* 'He bought beads.'
 (20) a. *nerrivik* 'dining table'
 b. *Nerrivilorpoq* 'He set the table.'

Verbs that are formed by incorporating an object in this way are always intransitive with respect to that object, i.e., the verb will never agree with the incorporated object, and thus the object is always understood as indefinite. The object-incorporating suffixes themselves may never stand alone; but if an independent verb separate from the object is required, they may be added to the 'empty stem' *pi-*, which I will gloss as 'thing':³

- (21) *Peqarpoq* 'He has something.'
thing-have-INDIC.-3sg.
(22) *Pisivoq* 'He bought something.'
thing-get-INDIC.-3sg.
(23) *Piliorpoq* 'He made something.'
thing-make-INDIC.-3sg.

An overt object can be expressed along with verbs formed by incorporating the empty stem; it appears in the instrumental case, just as we should expect of the object of a notionally transitive, formally intransitive verb (see §3, above):

- (24) *Qimmimik peqarpoq* 'He has a dog.'
dog-INST. thing-have-INDIC.-3sg.
(25) *Sapanngamik pisivoq* 'He bought a bead.'
bead-INST. thing-get-INDIC.-3sg.

If object-incorporated forms like 18b and 19b are compared to the corresponding forms with a separate object and a verb formed from the empty stem (e.g. 24–25), virtually the only difference is that the number of the object is neutralized when it is incorporated (at least in the examples cited). There may be stylistic differences of which I am unaware.

4.11. MODIFICATION. A striking fact about incorporated objects, and one that argues powerfully for deriving them syntactically rather than morphologically, is that they may be modified. The modifier appears as a separate word in the instrumental case—the same case that it would have if it were the modifier of a non-incorporated object of a free-standing, formally intransitive verb. Compare 27, in which the object is incorporated, with the synonymous 26, in which it is not:

- (26) *Sapanngamik kusanartumik pisivoq* 'He bought a beautiful bead.'
bead-INST. beautiful-NOM.-INST. thing-get-INDIC.-3sg.
(27) *Kusanartumik sapangarsivoq.*
beautiful-NOM.-INST. bead-get-INDIC.-3sg.

If 27 were derived either from a structure very much like 26, or from a somewhat more abstract structure into which the empty stem had not yet been inserted, then the case of the modifier would automatically be assigned by independently-needed rules.

However, the generalization that is so obvious between 26 and 27 would be obscured if object-incorporating verbs had to appear fully formed in deep structure.⁴ I assume that direct objects of formally intransitive, notionally transitive verbs

³ The fact that the stem *pi-* is not just a noun with a very general meaning, but has come to have a purely grammatical significance, is shown by its being able to stand for verbal bases that are not derived from nouns, as well as for those that are.

⁴ Kleinschmidt, who is otherwise a model of lucidity and insight, makes no attempt to capture the generalization here. Among the various functions of the instrumental case, he

have instrumental case assigned to them by syntactic rule. I further assume that a syntactic rule copies the case of a head noun onto all its non-possessive modifiers. Now suppose that verbs like *sapangarsivoq* in 27 are lexically rather than syntactically derived. Then, if modifiers of incorporated objects were treated as syntactically distinct from direct objects, an ad-hoc syntactic rule would be needed to assign instrumental case to them. And if such modifiers were treated as syntactically identical to direct objects, an ad-hoc SEMANTIC rule would be needed to interpret them as modifiers. Either way, a generalization would be lost.

Still another syntactic generalization would be lost if object-incorporated verbs had to appear in underlying structure. Although the plurality of the understood object in examples like 18b, 19b, and 20b is not clear, it is unambiguously singular in 27. This is a function of the fact that the MODIFIER has singular form. Plural modifiers in such sentences indicate that the incorporated object is plural (the importance of these facts was clearly recognized by Rischel 1972:68):

- (28) *Kusanartunik* *sapangarsivoq* 'He bought beautiful beads.'
 beautiful-NOM.-PL.-INST. bead-get-INDIC.-3sg.

Since modifiers agree in both case and number with their heads, the modifier of the incorporated noun here has precisely the form that it would have if it modified an independent, instrumental plural noun. Thus, if the verb meaning 'to have beads' were present throughout the syntactic processing of the sentence, a special statement in the grammar would be needed so that instrumental adjuncts to the verb could be either singular or plural. A special semantic mechanism would also be required, to transfer the plurality of the modifier to the understood object. Neither complication arises if a syntactic rule, operating after the independently-needed agreement rule, creates the complex verb out of a verb and the head noun of the object nominal.

In fact, even the degree of complication described would not make the non-syntactic treatment work, since it is the GRAMMATICAL number of the incorporated noun that is reflected in the form of the modifier, not notional plurality. Although in most cases, syntax and semantics agree on this score, many formally plural nouns in Greenlandic either have a singular sense, and do not correspond to any formally singular noun in the language, or else have an unusual sense with respect to the singular from which they apparently come. Thus *qamutit* 'sled, carriage' can designate one or several. But it is formally plural; it always takes plural modifiers, and forces plural verb agreement. The singular form, which apparently meant 'sled runner', has dropped out of the language. The familiar word *umiaq* 'women's boat' actually designates only the boat itself; the plural *umiat* can designate a single boat and its crew. Even when these anomalous plurals are incorporated (thereby losing their plural morphology), they demand plural agreement of any external modifiers:

- (29) *Angisuunik* *qamuteqarpoq* 'He has a big sled.'
 big.-NOM.-PL.-INST. sled-have-INDIC.-3sg.

includes, as separately numbered items, its uses as the marker of objects of formally intransitive verbs and as the modifier of incorporated objects.

Swadesh (1944:47) sees the generalization quite clearly, but has to use a disjunction to capture it: 'The instrumental case expresses ... (2) apposition to the contained or implied object of an internally-transitive intransitive verb ...'

- (30) **Angisuumik qamuteqarpoq.*
big.-NOM.-INST. sled-have-INDIC.-3sg.

The semantic singularity of the incorporated object in examples like 29 remains intact, of course, and can be indicated explicitly by means of a quantifier. Numerical quantification is accomplished by following a head with a numeral (formally a noun) that agrees in case and number. Naturally, the numeral *ataaseq* 'one' is usually singular, and all others plural; but this need not be the case if the semantic and syntactic plurality of the head are not the same. Thus the notional singularity of an incorporated head noun can be made explicit by quantification, while its syntactic plurality is still reflected in the case and number suffixes on the quantifier:

- (31) *Ataatsinik qamuteqarpoq* 'He has one car.'
one-PL.-INST. carriage-have-INDIC.-3sg.

These facts demonstrate that the pluralizing effect of plural-form modifiers of incorporated nouns cannot be relegated to a rule of semantic interpretation. It is the grammatical plurality of the noun that the modifiers reflect, not its semantic plurality. The grammatical rule that spreads the features of plurality from a head noun to its modifiers will have to be duplicated UNLESS sentences with incorporated object nouns are derived from structures in which these nouns are not part of the verb, but rather are in constituency with their modifiers.

4.12. POSSESSION. As mentioned in §3, possessor nouns are in the relative case and stand before possessed nouns. Though the handbooks do not mention it, Rischel has found that it is sometimes possible for fully incorporated nouns to be possessed. Thus 32 and 33 are synonymous:

- (32) *Tuttup neqaanik nerivunga* 'I ate reindeer meat.'
reindeer-REL. meat-3sg.-INST. eat-INDIC.-1sg.
(33) *Tuttup neqitorpunga.*
reindeer-REL. meat-eat-INDIC.-1sg.

Ex. 32 shows an independent verb and an object NP. The object consists of a possessor in the relative case, followed by the possessed—whose inflection indicates the person and number of the possessor, as well as the case of the entire NP. In 33, however, we find a denominal verb; but there is still a possessor, and the incorporated noun is understood as possessed. Note in particular that the case of the possessor is relative, just as it would be in an overt possessor–possessed construction. Obviously, if 33 is derived from a structure very much like 32, the case of the possessor, as well as the semantics of the sentence, is accounted for directly.

The fact that incorporated nouns can be possessed is exceedingly important evidence for a syntactic incorporation rule, since sentences like 33 could not otherwise exist. But modified object incorporation yields structures that superficially resemble others in the language that do not involve incorporation. Thus 34 is similar to 35–36 in terms of gross syntactic form:

- (34) *Angisuumik qimmeqarpoq* 'He has a big dog.'
big-NOM.-INST. dog-have-INDIC.-3sg.
(35) *Angisuumik unataavoq* 'He beat a big one.'
big-NOM.-INST. beat-ANTIPASS.-INDIC.-3sg.

- (36) *Ajunngitsumik pisuppoq* 'He walks well.'
 good-NOM.-INST. walk-INDIC.-3sg.

But any grammatical sentence of Greenlandic containing a relative-case NP that is not followed either by a formally transitive verb, or by a noun with possessive suffixes, MUST contain an incorporated-object verb.

In other words, if it were not for the incorporability of possessed nouns, object incorporation would be a structure-preserving rule. Then, an a-priori case could be made for the base-generation of sentences containing object-incorporating verbs, with semantic and morphological regularities handled by lexical redundancy rules. Wasow 1977 has gone so far as to link structure-preservation with lexical rules, and structure-creation with syntactic rules. If he is right, then incorporation in Greenlandic must belong to the syntax just because its application to possessed nouns creates an otherwise unattested kind of syntactic structure.

If the incorporation of possessed nouns were completely free, we would have the strongest possible evidence for a syntactic rule forming verbs from independent nouns. Rischel (p.c.) notes that Greenlandic has serious restrictions on the incorporation of possessed nouns, with regard both to the identity of the incorporating suffix and to the nature of the possessor; but even if the incorporation of possessed objects is not completely productive (as opposed to the incorporation of objects with other sorts of modifiers), I agree with Rischel that it is hard to imagine how forms like 33 could have developed in the absence of a syntactic incorporation rule.

As I see it, the chain of events that led to the present condition of the language must have been as follows. There has always been a productive rule which changes the head of an NP (other than the subject) into the stem of a verb. In Kleinschmidt's day, there was also an exception-free surface-structure constraint requiring relative-case nouns to co-occur with an agreeing item, either a transitive verb with personal suffixes or a noun with a possessive suffix. At some time in the not-too-distant past, this surface filter was weakened, allowing previously forbidden outputs of the incorporation process to surface.

The reasonableness of this picture is borne out by two considerations, both indicating that no restriction ever applied to the incorporation of possessed nouns per se. On the one hand, external possessors of incorporated nouns have always been allowed when the possessive suffix of the noun survives after incorporation (see ex. 60 below). On the other hand, the incorporation of possessed nouns has apparently always been allowed if there is no external possessor. Quite a few Greenlandic nouns either never occur without possessive suffixes, or occur with certain meanings only when they bear possessive suffixes. An example of the latter class is *angut*, which means 'man' without possessive endings, but 'father' when it has a possessive ending (e.g. *angunni* 'his own father'). The existence of object-incorporating verbs like *angusisarpoq* 'he resembles his own father', and of parallel sentences with possessed objects, e.g. *Angunni assigaa* 'He resembles his own father', demonstrates that there is not an outright ban on the incorporation of possessed objects. In fact, the only possessed nouns that cannot be incorporated are those whose incorporation would result in a violation of the surface-structure constraint suggested above; and even some of these can be incorporated, as we have seen.

4.13. ANAPHORA. The personal suffixes of Greenlandic carry much the same pragmatic load as English personal pronouns; in particular, they indicate reference to persons or things already mentioned in the discourse. But a Greenlandic word, unlike its English counterpart, is not an anaphoric island with respect to its semantic or morphological components. What is of special interest here is that an incorporated object establishes a discourse referent just as well as an independent indefinite NP, and this reference may subsequently be picked up by personal suffixes. Consider the following sequence of sentences from a children's book (Schwaerter 1961):

- (37) *Suulut timmisartuliorpoq* 'Søren made an airplane.'
 Søren(ABS.) airplane-make-INDIC.-3sg.
 (38) *Suluusaqarpoq aquteqarllunilu* 'It has wings and a rudder.'
 wing-have-INDIC.-3sg. rudder-have-INF.-4sg.-and⁵

The 3rd and 4th person suffixes in 38 refer to the previously mentioned airplane, even though that mention occurs inside an object-incorporating verb.

The incorporated object can also set up the reference for the object of a succeeding transitive verb. Here is an example from the same children's story:

- (39) *Suulut biiliorsimavoq.*
 Søren(ABS.) car-make-PERF.-INDIC.-3sg.
 'Søren has made a car.'
 (40) *Sikaat karsikuannik sanasimavaa.*
 cigar-PL.(REL.) box-old-3pl.-INST. make-PERF.-INDIC.-3sg./3sg.
 'He made it with old cigar boxes.'

Of course these facts constitute an ironclad argument for syntactic incorporation only if pronominalization (and its Greenlandic analog) is itself a syntactic phenomenon. But the fact that English lexical items are generally anaphoric islands has been used as evidence AGAINST deriving them via rules of syntax, e.g. by Fodor 1970. At least, then, this argument cannot be applied to Greenlandic incorporation. I feel, though, that whether or not anaphoric relations are accounted for syntactically, the fact that incorporated objects in Greenlandic are possible antecedents for anaphoric elements is indicative of the transparency of derivational processes in the language—a transparency more usually encountered in syntax than in morphology.

4.14. INTERROGATIVE INCORPORATION. An interesting set of facts concerns the formation of questions in Greenlandic. The interrogative mood is signaled by special personal suffixes on the verb in certain person and number combinations:

- (41) a. *Tkippoq* 'He arrived.'
 b. *Tkippa?* 'Did he arrive?'
 (42) a. *Takuvat* 'You saw it.'
 b. *Takuviuk?* 'Did you see it?'

This morphology is found both with yes–no questions, like those above, and with information questions. There is also a small class of basically-interrogative nominal stems, with highly restricted syntactic distribution. When one of these

⁵ The fourth person in Greenlandic indicates coreference with the subject of the main clause; for a detailed discussion, see A. Woodbury 1977.

occurs in a clause with interrogative verb morphology, it is understood as representing the unknown entity that the speaker wishes the addressee to identify, much like English WH-words:

- (43) *Nerivit?* 'Did you eat?'
eat-INTER.-2sg.
(44) *Sumik nerivit?* 'What did you eat?'
what-INST. eat-INTER.-2sg.

Not surprisingly (in view of the genius of this language), this interrogative stem can be incorporated as an object. Thus a close paraphrase of 44 is

- (45) *Sutorpit?*
what-eat-INTER.-2sg.

Incorporation of the 'empty stem' contrasts with incorporation of the interrogative stem in questions:

- (46) *Soqarpa?* 'What does he have?'
what-have-INTER.-3sg.
(47) *Peqarpa?* 'Does he have anything?'
thing-have-INTER.-3sg.

This contrast is identical to that between the use of a real object with an interrogative verb and the use of an interrogative object. With 44, compare:

- (48) *Negimik neriva?* 'Did he eat meat?'
meat-INST. eat-INTER.-3sg.

The facts concerning the meaning of incorporated interrogative objects would, of course, be directly accounted for if incorporation were a syntactic rule. However, I cannot imagine a uniform treatment of the meaning of the interrogative stem in which 45 was entirely the product of a lexical rule, while 44 remained syntactically complex.

Furthermore, a description of the DISTRIBUTION of the interrogative stem would involve needless duplication if there were no syntactic rule of incorporation. Verbs constructed by incorporating the interrogative stem have a variety of uses, including a complementizing function with the nominal participle:

- (49) *Sutortoq naluvara.*⁶ 'I don't know what he ate.'
what-eat-NOM.(ABS.) be ignorant-INDIC.-1sg./3sg.

What is important for the issue at hand, though, is that *su-* cannot be the object of an indicative clause, WHETHER OR NOT IT IS INCORPORATED:

- (50) **Sumik nerivoq.*
what-INST. eat-INDIC.-3sg.
(51) **Sutorpoq.*⁷
what-eat-INDIC.-3sg.

⁶ This example was provided by J. Rischel (p.c.)

⁷ Schultz-Lorentzen regularly lists verbs derived from *su-* in the affirmative indicative. Since this is the form he has chosen as the citation form for verbs, and since the examples in these entries are almost always either interrogative or negative, there is a good chance that the affirmative indicative is just a lexicographic convenience. According to Rischel (p.c.), 50-51 are indeed grammatical.

However such restrictions are stated for syntactic constructs, they would apparently have to be repeated for word-sized units if the latter were not derived syntactically. But once again, the similar behavior of incorporated and non-incorporated nominals follows automatically if the former are derived from the latter.

4.2. NON-OBJECT INCORPORATION. Nouns in non-object roles are incorporated in the following constructions.

4.21. PREDICATE NOMINALS. A few suffixes form predicates from nouns that are understood as predicate nominals, notably *-u* 'to be' and *-nngor* 'to become':

- (52) a. *nukappiaraq* 'boy'
 b. *Nukappiaraavoq* (< *nukappiaraq* + *uvoq*) 'He is a boy.'
 boy-be-INDIC.-3sg.
- (53) a. *palasi* 'priest'
 b. *Palasinngorpoq* 'He became a priest.'
 priest-become-INDIC.-3sg.

As with object-incorporating verbs, these denominal forms allow their internal nouns to be modified. But there are a few surprises here. First, the modifier is in the absolutive case, rather than the instrumental; second, it must follow the verb, though it regularly precedes the verb when it modifies an incorporated object:

- (54) *Piitaq nukappiaraavoq mikisoq*. 'Peter is a little boy.'
 Peter(ABS.) boy-be-INDIC.-3sg. little-NOM.(ABS.)

Kleinschmidt (86) suggested that this unexpected word order serves to prevent a pernicious ambiguity. If the absolutive modifier stood before the verb, it could be interpreted as a part of the subject phrase rather than the predicate—since, in this sort of example, both the subject and the modifier of an incorporated nominal are in the absolutive case. Thus 54 contrasts in meaning with

- (55) *Piitaq mikisoq nukappiaraavoq* 'Little Peter is a boy.'
 Peter(ABS.) little-NOM(ABS.) boy-be-INDIC.-3sg.

The absolutive case of the modifier of an incorporated predicate nominal offers another argument in favour of treating incorporation as a rule that operates after case assignment. While there is no independent copular verb that could substitute for the affixal verb in examples like 52b, the demonstratives *tassa* and *tamassa* (roughly 'that one' and 'this one') are used somewhat like equational verbs. This is shown in the following example from Kleinschmidt (102):

- (56) *Naatsiiffik tassa silarsuaq* 'The field is the world.'
 field(ABS.) that one world(ABS.)

It can be seen here that both the subject and the predicate nominal are in the absolutive case. The modifier of a predicate noun also would be absolutive—since it would agree in case with its head, like all non-possessor modifiers. Once again, then, we see inflectional identity between modifiers of independent nominals and modifiers of incorporated nouns. A transformational rule applying after case-assignment and agreement rules, and changing the head noun of a predicate nominal into the stem of a verb, would handle this relationship.

One final stimulating fact concerning the suffix *-u* 'to be' is that it may incorporate pronominals:

(57) *Uvangawunga* 'It is I.'

I-be-INDIC.-1sg.

(58) *Illiuvit?* 'Is that you?'

you-be-INTER.-2sg.

Note particularly the agreement between the person and number of the incorporated pronoun and the suffix on the derived verb. It would, of course, be desirable to use the ordinary rule of subject-verb agreement to handle these facts. To achieve generality, such a treatment would require the incorporated pronoun to be a separate constituent from the verb at some stage of syntactic derivation; however, unfortunately for the thesis I am advancing here, it would require that the pronoun be SUBJECT at that stage.⁸

4.22. ALLATIVE INCORPORATION. At least one fairly frequent suffix, *-liar* 'to go to ...', incorporates objects that correspond to allative-case NP's in paraphrases with independent verbs. Thus 59a-b are synonymous:

(59) a. *Nuummut aallarpoq* 'He went to Godthaab.'

Godthaab-ALL. leave-INDIC.-3sg.

b. *Nuuliarpog.*

Godthaab-go-INDIC.-3sg.

An interesting fact about this suffix is that it can incorporate heads of definite NP's, including proper nouns as above, or the following example (note also that the possessive suffix survives the incorporation here, whereas it is lost in examples like 33):

(60) *Kalaallit nunaaliarpog.*

Greenlander-PL.(REL.) country-3pl.-go-INDIC.-3sg.

'He went to Greenland (i.e. to the Greenlanders' country).'

However, object incorporation like that discussed in 4.1 is limited to indefinite objects. A handy explanation for this difference is available under a theory that allows pre-affixal syntax. Recall that instrumental-case objects of inherently transitive, formally intransitive verbs are always indefinite. They contrast with absolutive arguments that stand in the same semantic relation to the verb, which are referenced by agreement particles on the verb, and are understood as definite (see §2). The instrumental case, in other words, is assigned by a syntactic rule. But in sentences like 59b, the allative case is underlying. There is no opposition with an absolute NP that has the same semantic relation to the verb; consequently, there is no contrast in definiteness. Both definite and indefinite NP's occur freely in the allative case.

I propose, then, that the incorporation rule applies only to oblique NP's, but

⁸ It is not clear to me exactly what are the logical subject and logical predicate in equational sentences such as these. In English one says *It is I* (or *me*), in German *Ich bin es*, and the Greenlanders would appear to be saying 'I am I'. For 'Is it you?' Schultz-Lorentzen has the example parallel to this, namely 58, but Jørgen Rischel informs me that, instead, *Illiuva?*, literally 'Is it you?', is preferred. Since this is quite parallel to the Danish (which is like English), I assume it is a calque.

that it is not sensitive to the specific oblique case which the incorporated nominal bears. Furthermore, if the incorporation rule applies after grammatical case assignment—and, in particular, after rules that assign instrumental case to indefinite objects—the contrast in definiteness between allative and instrumental incorporation is automatically explained. The only oblique objects are those to which instrumental case has been assigned on the basis of their indefiniteness; but the allative case is found on both definite and indefinite NP's. Such a treatment requires a syntactic rule of head-noun incorporation.

4.23. INCORPORATION OF INFLECTED FORMS. Though I have treated the incorporation rule as applying to nouns that bear case endings, no trace of those suffixes is to be found in the incorporated forms discussed so far. However, a fair number of suffixes differ from those that we have seen in that they verbalize inflected nominals without loss of inflectional affixes. Lists of suffixes with this property can be found in Kleinschmidt and in Bergsland 1955. They are attached directly to oblique-case forms which also preserve possessive suffixes. Since the possessive suffixes survive this sort of incorporation, external possessor nouns in the relative case seem always to have been allowed here (see §4.12). Examples like the following are quite frequent:

- (61) *Palasip illuanukarpoq* 'He went to the priest's house.'
 priest-REL. house-3sg.-ALL.-GO-INDIC.-3sg.

The incorporation of inflected head nouns is, I suppose, closer to familiar sorts of cliticization than is the sort of incorporation that results in the omission of inflectional affixes. Yet it is strikingly different from typical cases of cliticization, as discussed by Zwicky 1977, in two major respects. First, there is almost never a free form of the affix that is phonologically (or historically) related.⁹ Second, the process results in a change in the grammatical class of the base form. In crucial ways, then, even the incorporation of inflected nouns in Greenlandic seems more like a derivational process than a clitic-forming process.

5. CONCLUSIONS. A widely-held view of the organization of grammar corresponds closely with what I called, in §1, pre-inflectional syntax. This position has been associated with Chomsky, although it is difficult to pinpoint it in his published writings. Jackendoff 1972 attributes to Chomsky 1970 a position which he characterizes thus: 'roughly, that transformations do not perform derivational morphology.' He speaks in approving terms of a stronger hypothesis according to which 'the only changes that transformations can make to lexical items is to add inflectional affixes such as number, gender, case, person, and tense.' In a similar vein, according to Aronoff 1976, the position of Chomsky 1973 seems to be that 'derivational morphology is never dealt with in the syntax, although inflection is ...'

The arguments in favor of this very influential 'lexicalist position' (and, indeed, the arguments against it) have been based largely on data from English—with a smattering of examples from other languages, many of which are typologically

⁹ An exception to this claim is the form *ippoq* 'he is (in a certain place or condition)'. This occurs both as an independent verb and as a suffix. Interestingly, it is restricted to occurrence with words meaning 'how' and 'thus', and with nouns in the aequalis and locative cases, regardless of whether it occurs bound or free.

similar to English. What I have done here is investigate one sort of derivational process from a typologically remote language, Greenlandic Eskimo. Since this is a language with an incredibly well-developed system of word-formation, it would seem to be an ideal test case for the lexicalist hypothesis: if it behaved just like languages such as English with respect to the separation of lexical and syntactic processes, it would be a language with very much less syntax than we have come to expect. But the facts are different, both in degree and kind, from corresponding facts in better-known languages.

There is no reason, in principle, why Greenlandic could not have turned out to parallel English—or, for that matter, why English does not work like Greenlandic. But, in fact, English does not present the same sort of data with the regularity that Greenlandic does. For example, word-internal morphemes of English, no matter how great their phonological resemblance to independent words, are simply incapable of the same sort of modification as their free-standing relatives. One cannot say in English **totally destruction*, **small intestinally*, or **to shiny new bicycle around the block*. It is arguable that such modification exists in examples like *female infanticide*;¹⁰ but even if it does, it is a highly restricted, sporadic phenomenon, since we do not find **premature infanticide* ('killing of premature infants') or **female homicide* ('killing of female human beings'). We have seen, however, that the modification of incorporated nouns is perfectly regular in Greenlandic.

Possession of derivationally included nominals is strictly forbidden in English; but there can hardly be a language-universal explanation for it, since it is allowed in Greenlandic. An English phrase like *a horse's meat eater* cannot mean 'one who eats a horse's meat' (if it is grammatical at all); but, as we have seen, morphemically parallel constructions occur sporadically in Greenlandic.

In some varieties of English, no derivationally included parts of words can serve as antecedents for anaphoric processes (see Postal 1969). In other varieties, subword constituents can serve such a function to a limited extent (Corum 1973); but as Browne 1974 has shown, it is not derivational inclusion that is involved, but rather morphemic similarity. However, incorporated nominals regularly set up discourse referents in Greenlandic—and here derivational inclusion is responsible.

Some pieces of English words are restricted in their occurrence in ways that are reminiscent of syntactic restrictions. For example, English has what might be called negative polarity items below the word level, e.g. the *-ept* of *inept*, or the *-ert* of *inert* (suggested by William Bright, p.c.) But the general fact for English items of this sort is that they may only occur in combination with specific negative morphemes in the same word. A negative morpheme outside the word does not sanction their use, even if meaning is preserved:

- (62) Argon is inert.
 *Argon is not ert.
 *Argon is ert.

Thus there is no reason to treat the occurrence of such items as English *-ert* anywhere in the grammar, but in the lexicon. But we have seen that the distribution of

¹⁰ I owe this example to Alexis Manaster-Ramer.

Greenlandic *su-* is influenced either by the interrogativity of the verb of which it is a part, or by the interrogativity of a separate verb whose direct object it is. Syntax and morphology in Greenlandic are parallel in a way that they are not in English.

English thus behaves quite consistently as if there were no syntactic phase of the derivation of words in which the parts of the words are in different constituents. This, of course, is powerful evidence in favor of a theory that forbids pre-affixal syntax, e.g. the lexicalist theory. But such evidence is from English. The strikingly different behavior of derived verbs in Greenlandic argues just as persuasively FOR pre-affixal syntax, i.e. for a limited version of the transformationalist position. Thus neither the lexicalist hypothesis nor any contradictory hypothesis should be taken (as I believe they always have been) as a hypothesis about universal grammar. At most, the grammar of a GIVEN language might be constrained so as to preclude prelexical syntax of all sorts. The status of such a language-particular constraint on the form of the grammar is very unclear to me.

The facts of Greenlandic noun incorporation also call into question the speculations about universal grammar in Newmeyer 1976. We find there the following hypothesis, put forth somewhat hesitantly (152): 'All incorporation rules that are not clitic-placement rules are universally precyclic.' Newmeyer presents a good case for this position (and provides further corroborating data in Newmeyer 1975); but the evidence is almost entirely drawn from English. Some of the evidence from Greenlandic, however, is analogous to the OPPOSITE of that which Newmeyer employs. Furthermore, as I have shown, Greenlandic noun incorporation follows case-assignment, which in turn can be shown to follow such rules as passive and antipassive—and these have been shown by A. Woodbury to be cyclic rules. Thus the incorporation rule is either cyclic or postcyclic—not, as Newmeyer's hypothesis would require, precyclic.¹¹

Likewise, the interesting attempt by Wasow 1977 to develop a universal set of criteria for distinguishing between lexical and transformational processes falls afoul of the data from Greenlandic. Two of the five properties that Wasow cites (331) as distinguishing the two sorts of rules are: First, lexical rules 'may relate items of different grammatical categories', whereas transformations 'do not change node labels'. Second, lexical rules 'apply before any transformations', but transformations 'may be fed by transformations'. We have seen that the process that makes verbs out of nouns in Greenlandic follows at least two ordinary transformations, case-assignment and noun-modifier agreement. It thus has one of the properties that Wasow claims uniquely characterize lexical processes, and one of those that uniquely characterize transformations.

I am not sure about the implications for the analysis of English of the data discussed here, but it seems to me that some rethinking is in order. One clear lesson of this study is that proposed universals of grammar should be based on a reasonable sample of languages, including typologically extreme examples such as Greenlandic.¹²

¹¹ Pullum 1979 gives an argument, based solely on English data, against the identification of prelexical rules with precyclic ones.

¹² Since writing this, a relevant paper by Fortescue 1979 has come to my attention. Fortescue demonstrates the possibility (though, to my mind, not the desirability) of keeping the sentence- and word-forming components of a grammar of Greenlandic strictly separate. He touches on

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two of the more important kinds of data used by Rischel and me in motivating pre-affixal syntax for this language, namely the instrumental-case modifiers and relative-case possessors discussed in sections §4.11–4.12 above. To accommodate the basic facts, Fortescue suggests adding two phrase-structure rules to the base, rather than adding a rule of noun incorporation to the transformational component. He writes these rules as follows:

- (a) $VP \rightarrow N_{rel} + V_{inc}$
 (b) $VP \rightarrow ADJ_{instr} + V_{inc}$

But note that these rules merely recapitulate the basic syntactic facts. They do not account for the agreement between the external modifier and the incorporated nominal, or for the distributional properties of the interrogative stem, or for the other sorts of incorporation discussed above.

Most importantly, these rules give no clue as to the meaning of the constructions which they generate. A phrase-structure treatment of incorporation, such as Fortescue's, would thus require the addition of a rule of semantic interpretation whose function would be to 'read' the incorporated nominal as an object, and to specify (a) that an external instrumental adjective is the modifier of this object, and (b) that an external relative nominal is its possessor. But note that this rule of semantic interpretation is exactly the rule of noun incorporation turned upside down. Just by regarding this rule as a transformation, rather than a semantic rule, the same semantic results can be obtained, and rules like (a)–(b) become superfluous.

I have not argued in this paper that a non-transformational account of the facts of Greenlandic is impossible, nor do I think that any such argument could be given. Rather, I have tried to show that the cost of a non-transformational account, in terms of loss of generalization, is excessive. Fortescue's re-analysis, it seems to me, reinforces this point nicely.

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