This is quite similar to the set of transformations summarized in §99.8, **166–168**. These analyses can be reformulated so as to bring out further similarities. There are various ways of simplifying **320–323**. For one thing, there is no need to set up T^{0}_{cmp}–T^{iv}_{cmp} as five separate transformations. Since the restricting class for a transformation can be defined as a set of sequences $(W_1^{(i)},\ldots, W_n^{(i)})$, we can regard **323** as the characterization of the restricting class of a single transformation $\overline{T}_{cmp}$, and we can rewrite **320** as

324 **320** with the second set of brackets (and the contained terms) replaced by "$\overline{T}_{cmp}$"

The similarities with previous constructions (e.g., **166–168**) can also be more fully exploited.

In §§100–103 we discovered that the complex verb phrases that had appeared in the grammar of phrase structure all reduced to the simple verb–object construction, when we set up a subconstruction *Verb–Complement* under transitive verbs. This analysis was forced upon us by the necessity of accounting for the behavior of these verb phrases under transformations which had been set up for the simple verb phrases. Now we see that the construction *Verb–Complement* can itself largely be eliminated by generalized transformations in favor of kernel sentences with simple verb phrases. The motive for this transformational analysis lies in the heavy selectional restrictions (including, as a special case, agreement in number) that hold between the object and the complement, duplicating the selection of subject and predicate in the simple cases. In other words, if we were to define grammatical relations in terms of selectional relations, as suggested briefly in §71.2, we would find, e.g., that the grammatical relation subject–verb in simple sentences is closely related to (cf. Note 26) the grammatical relation object–complement in sentences of the form NP_1-V_T-NP_2, where $V_T \rightarrow Verb^\frown Complement$ (the sentence becoming NP_1-$Verb$-NP_2-$Complement$ by Φ_1^{P}). The only instance of the *Verb–Complement* construction that resists this analysis is the case of V_{sep}-P, discussed in §100, e.g., "call up," etc. These might more properly be called cases of V_{sep}–*Particle*, since many nonprepositions occur as the complement in such constructions. In §109 we have seen that one of the particles in this construction is $\emptyset$, which occurs as the complement when the *Verb* is any of V_h, V_g, V_e, V_β, V_b, V_δ.

110 In the course of this analysis we have found that much of the recursive part of the grammar of phrase structure in §72.2 has been cut away. It seems reasonable to place the formal requirement that no recursions

appear in the kernel grammar. Specifically, we rule out such statements as 10,[33] §72.2, and we drop the constructions of §§55.3–55.4 that permit running through the grammar indefinitely many times. As far as I can determine, this formal requirement on **P** does not exclude anything that we would like to retain in **P**; nor does it impose any artificial or clumsy limitation on the actual statement of the grammar corresponding to **P**, now that transformational analysis presents an alternative way of generating sentences. On the other hand, this requirement almost trivializes the problem of validating those transformations which we would like to set up as elements in **T** for the extrasystematic reasons which we have noted throughout this analysis of English structure. Given this requirement on **P**, there is no alternative to transformational analysis in many of these cases. The case of the passive transformation can serve to show how effective this criterion can be in avoiding the necessity for detailed and laborious validation based on total simplicity. Given this nonrecursion requirement, there is no alternative to transformational analysis in the case of *ing*-phrases. By the argument of §101.1 it then follows that "consider–a fool," etc., must be verbal elements, and from this it follows, as we saw in §101.2, that the passive transformation must be constructed with inversion of noun phrases. In §101.2, we had to appeal to overall simplicity of the grammar in putting this argument forward, since the transformational analysis of *ing*-phrases was partially supported by the fact that passives had been deleted from the kernel.

Naturally, much more study is needed to verify this, but it seems at this point that this requirement on **P** meets the conditions discussed in §93.2. That is, it is a simple and natural requirement that, by and large, makes transformational analysis necessary in just those cases where it leads to intuitively satisfactory results.

There are also purely systematic motivations for this formal requirement on the level **P**. It follows from the nonrecursion requirement that the kernel must be finite. In §§55.3–55.4, in developing the general relation between the algebra **P** and actual grammars, we were forced to consider the problem of recursive production of sentences by the grammar, since we know that the set μ^{W} of grammatical strings of words must be infinite. This led to the artificiality of running through the grammar indefinitely many times (a procedure which, as we saw in Chapter VIII, may lead to considerable complication in the formulation of the grammar). It also produced a serious theoretical gap in our program of devising a mechanical evaluation procedure for grammars.

[33] Actually, we have not provided the technical means for the introduction of such statements as 10 into the grammar.

In the last paragraph of §56.2, we noted that it is necessary to prove that a given grammar is a reduced form of some system **P**. This might not be an easy task in particular cases. In fact, it may even be the case that there is no general mechanical procedure for determining by inspection of the grammar that it is a reduced form of some system **P**, if the set of generated strings is infinite. But we can determine in a mechanical way whether or not a given finite set of derivations leads (in the manner discussed in §55) to an underlying algebra satisfying the axiom system for **P**. Hence if the kernel is finite, we do have a mechanical way of determining whether a given grammar is a reduced form of some system **P**.

Now that the higher level of transformational analysis has been established, it is no longer necessary to require that generation by the grammar of phrase structure be infinite. As the level **T** has been formulated, the process of transformational derivation is recursive, since the product of a **T**-marker can itself appear in the **P**-basis of a **T**-marker (cf. condition 4, §91.4). For example, from a sentence we can form a *that*-clause which replaces a noun in a second sentence, giving a more complex sentence from which we can form a *that*-clause, etc. Similarly, the family of generalized transformations that plays the role of the conjunction rule will indefinitely construct longer and more complex sentences.

In §41.1 (cf. also §§49, 58), we sketched the general lines of a definition of grammaticalness, noting that each linguistic level provides a certain descriptive apparatus in terms of which a given set of sentences can be characterized. New sentences are automatically added to this set when we utilize this descriptive machinery to give the simplest characterization of the given sentences. Applying the methods of Chapter V to a linguistic corpus, we construct a finite set $Gr_1(W)$ containing the highest-degree grammatical sentences of a length less than or equal to some fixed length. We construct a system of phrase structure for some subset of $Gr_1(W)$, producing, perhaps, a finite extension of this subset to a kernel K. K is the set of strings of words corresponding (under Φ^{P}) to the set $Gr(P)$ of products of restricted ρ-derivations. We then construct a set of **T**-markers that generate the rest of $Gr_1(W)$ from the kernel. Allowing these constructed transformations to run on freely, applying to transforms, we generate the infinite set μ^{W} of grammatical strings of words. We have noted that not all of the corpus of data need be included in $Gr_1(W)$. Similarly, we may be able to construct the systems **P** and **T** in a much more simple way if a limited part of $Gr_1(W)$ is not regenerated. This is a schematic picture, which must be filled in with detailed construction. It may be that along these lines we will be able to develop an adequate explication of the notion of "grammatical sentence" in the infinite sense, and an explanation for the general process of projection by which speakers extend their limited linguistic experience to new and immediately acceptable forms.

Statement 10, §72.2 (now reformulated as **169**, §99.9), is the only instance in §72.2 of a recursive statement. To meet the nonrecursion requirement of §110, this statement must be eliminated in favor of a transformational analysis. However, there are independent reasons, quite apart from this nonrecursion requirement, for making this move. **111.1**

In §109.6 we found that such sentences as "John wanted him to come" (= **311**) are introduced by transformation. If we investigate these sentences in more detail, we discover that there are certain restrictions on the occurrence of pronouns. Alongside of **311** we have **325** but not **326**:

325 (a) *I wanted him to try*
(b) *I wanted you to try*
(c) *I wanted to try*

326 *I wanted me to try*

The only way to avoid a special restricting statement on the level **P** is to add a mapping $\Phi_x{}^{\mathrm{P}}$ that carries **326** into **325**c:

327 $\Phi_x{}^{\mathrm{P}}$ carries *I–want–I–to⁀try* into *I–want–to⁀try*

We must determine how extensive is the range of application of $\Phi_x{}^{\mathrm{P}}$. First of all, it is clear that the analogous restriction holds for "you." The case of "he" is more difficult. We have both **328**a and **328**b:

328 (a) *he wanted him to try*
(b) *he wanted to try*

The simplest way to handle this situation appears to be to set up two distinct elements *he* and *he** corresponding to the element he^{W} of **W**, *he* being an element just like *I* and *you* (which accounts for **328**b), and *he** being an ordinary proper noun (which accounts for **328**a, just as we have "he wanted John to try"). The establishment of this pair of homonyms on the level **P** is further supported by its usefulness for other