(XXIV. MECHANICAL TRANSLATION)

C. CORRESPONDENCE AT THE GRAMMATICAL LEVEL

1. Translation can be approached from two extremes. The first is entirely semantic in orientation and is concerned with what discourse, as a unit, translates the total effect of the communication expressed in the original language. The emotive and stylistic aspects of the communication, as well as the cognitive aspects, would be of concern in this approach. One utterance is to replace another utterance, and the equivalence of the two might be understood in terms of two expressions in different languages which would be elicited under identical conditions. Approaches at the other extreme are grammatical in orientation, many of them mainly lexical. The narrowest of these is word-for-word-translation and is concerned with the correct selection and appropriate combination of individual items from a bilingual dictionary. The first approach lays special emphasis on the excellence of a translation; the second, on methods of arriving at translations.

The following remarks will aim at broadening the basis of the grammatical approach. The treatment will be formal and descriptive rather than evaluative. I shall view the problem in the following way: Assume that we have a certain text in L and a translation of it in L_1. For the present, this translation need satisfy only reasonable minimum demands of adequacy. We ask: What is the linguistic side of the correspondence that the two present? How is the correspondence to be described? And in general, what kinds of interesting statements can be made about such correspondences? Another way of regarding the problems involved in interlingual correspondences could be from the point of view of a polyglot. He hears a statement in L and can render an equivalent of it in L_1, without the necessity of any direct, real-world experience. How shall we describe this transfer linguistically?

In the process of answering questions like these, I would hope to be able to say something about the possible generality of descriptive terms like "object," "complement," "attribute," and so forth, which, as customarily used in structural description, are relevant only to the particular system in terms of which they are defined. Similarly, I should like to re-examine, in the light of a more formal comparative study, assumptions about system-motivated differences between interlingual correspondences in major grammatical categories. What I am referring to here is exemplified, although certainly not originated, by L. Hermodsson.[1] In comparing passive formations in different languages, he remarks that the particular nature of the grammatical elements involved tends to leave its trace on the formation itself. Thus, the German periphrastic passive with WERDEN + past participle originally designated an achieved state, as did WERDEN + adjective, and, according to the theory, this element of meaning would tend still to be observable. Different morphemes employed in the passive formation— e. g., the copula BE in English, with the element of state — would result in different shades

of meaning. Assumptions such as these fall well within the scope of the present study. They not only operate implicitly with the same notion of correspondence involved in translation but they also suggest particular areas in which divergence obtains — although still within over-all correspondence — as a result of particular intralingual characteristics of a given form. From this point of view, the following question arises: What grammatical phenomena are regularly connected with such coincidence of forms that fulfill widely divergent functions?

2. We return now to the notion of interlingual correspondence. Consider first the terms of such correspondence. What are the minimal items that can be said to correspond? One extreme answer to this question would result from viewing any one language as an entirely self-defined system in which each element is defined only by its relation to all of the other elements of the same system. Accordingly, the inner structure (that is, the particular constituents and their arrangement) of any one discourse from a pair of interlingually corresponding discourses (let's say sentences) would be considered utterly different from that of the other. Yet, even a sheerly intuitive appraisal of the comparability of pairs of languages like French and English or German and English suggests that certain languages are, in fact, more or less similar in structure. The utility of the bilingual dictionary offers quite another answer, namely that the minimal unit of correspondence need not be the whole sentence and that correspondences are not most simply stated as the equivalence of a sentence in L_1 considered as a unit to a sentence of L_2. Rather, the minimal unit assumed by such dictionaries is the word, or lexical group. Only rarely, and as a special case of the latter, is the whole sentence entered as a unit. Take the following as an altogether obvious example. The sentence in French "Je vois la maison" has as its English equivalent "I see the house" and not, for example, "I see the car." The minimal correspondence between the words (LA) MAISON and (THE) HOUSE accounts for their appropriateness and the lack of correspondence of "I see the car." In correspondences like "he looks at the house" = "il regarde la maison," the group LOOK AT will be said to correspond to the word REGARDE, and so on with whatever added complexity is necessary (complexity in terms, for example, of the length of the corresponding unit).

In the following discussion, the correspondence between sentences of two languages will be analyzed. The intention is that with this analysis as a basis, the simplest set of rules can be formulated for converting the sentences of L_1 into equivalent sentences of L_2. This set of rules will be the Transfer Grammar for L_1 and L_2, {Grammar} L_1 - L_2. (By convention, rules of the transfer Grammar will be referred to in braces.) It is to be noted that the grammatical structures of the corresponding sentences (the phrase structure and transformational structure of each) is assumed to be already given.[2] The problem of the recognition of grammatical structure will not at all enter

into consideration here. Instances of lexical correspondence like those above will certainly be included among items of correspondence accounted for by rules of the {Grammar}. In a previous paper, the possibility of considering interlingual correspondences below the lexical level was entertained. It was suggested that correspondence between words of L_1 and L_2 could be further analyzed into correspondences between recurring grammatico-semantic properties characterizing words. In the present investigation I should like to look toward grammatical factors lying, so to speak, in the opposite direction; that is, toward correspondence at the level of the construction. What in particular is accounted for by the assumption of inner-structure correspondence between two languages? And what form would be assumed by the rules accounting for such correspondence?

3. Consider, again, the notion of correspondence as expressed by rules transferring a word or word group of L, into an equivalent word or word group of L_2. Let us allow certain unilateral features like word order, agreement, and concord. Then, given the structures of corresponding sentences (with some reasonable limit on their length), we would be able to describe their correspondence in terms of just such a transfer of word group for word group, and, ultimately, word for word. To describe correspondences in this way, we need only to order the rules of the {Grammar} so as to begin with the most complicated word groups (e. g. , those that contain the greatest number of items occurring also in other rules). The application of rules of transfer on progressively simpler groups would then proceed until, finally, in certain sentences or parts thereof the unit being transferred is the individual word. The simplest transfer grammar would consist exclusively of rules of this latter type, that is, word-for-word transfer. The transfer grammar describing the correspondences between any two different real languages is, of course, much more complicated. The objective of this study is to present certain properties of correspondence whose representation in the {Grammar} will lead to its simplification.

4. Consider correspondences like the following, in which C and C' are corresponding units (in this case, sentences), and in which " = " is read "corresponds to" or "C and C' correspond." The rules of the transfer grammar will be thought of as carrying a C, given its structure, into C'. Thus, from this point of view, the choice of translated (C) versus translating (C') language is relevant to the discussion.

1) C: 1'instituteur regardait les deux hommes monter vers lui = C': the schoolteacher watched the two men climb toward him[4]

2) C: Certains caracteres sont definis dans ce livre = C': Certain characteristics are defined in this book.

3)	C: The problem was solved	= C':	Das Problem wurde gelöst.
4)	C: Er ging auf das Problem ein und löste es	= C':	He went into the problem and solved it.
5)	C: This is the problem that is attacked and solved	= C':	Dies ist das Problem, das angepackt und gelöst wird.
6)	C: Il insiste sur ses avantages	= C':	He dwells on its advantages.
7}	C: Il l'emporte sur ses adversaires	= C':	He has the better of his opponents.
8)	C: Its advantages were dwelled on by him	= C':	Il a insisté sur ses avantages.
9)	C: Einst machte Han Fook ein kleines Gedicht, das ihm wohlgefiel	= C':	Once Han Fook made a little poem which he liked well.

The rules of transfer for carrying C into C' in correspondences like 1) through 9) could be conceived of in terms of some sort of analogue to word-for-word translation. Take correspondence 1) as an example in which the transfer might be considered somewhat as follows:

I ... [regardait] . . . > . . . watched . . .

II ... regardait . . . $[\text{monter}]_{\text{infinitive}}$ . . . . . > . . . watched . . . climb

III ... regardait . . . monter $[\text{vers}]_{\text{preposition}.....>}$ . . . watched . . . climb toward

IV ... regardait . . . monter vers $[\text{lui}]_{\text{pronoun}...}$ > . . . watched . . . climb toward him

In all of the formulations, the progression in Roman numerals designates relative order in rules. Units of syntactic structure are bracketed. In this study, such units represent an appropriate selection from the elements figuring in the total structure of the sentence. Obviously, many adjustments for concord and the like would be necessary in such a scheme. Such details (and certain serious difficulties that they present) will not be elaborated upon here. In pairs like 6) and 7) the individual constituents of "insiste sur" and "l'emporte sur" have different independent correspondents in other correspondences to be described by the same transfer grammar. Accordingly, the basis of the rules of transfer must be extended to include groups of words as units, and such rules must be ordered so as to precede the simpler type of rule. The rule would have some such form as: "... l'emporte sur ... > . . . has the better of ..."

Both sentences in pairs like 2) and 3) are of the form often referred to, impressionistically, by the single, general, descriptive term: passive. From the point of view considered here, no special difficulty arises with such pairs. The transfer could be thought of as word-for-word. The intralingual relationship that each bears to a corresponding active need not enter into the transfer grammar. Correspondences like 8) can,

of course, also be accounted for within the general scheme of item-for-item transfer, but not without increasing the number of word groups appearing in the transfer rules and elaborating the principle of ordering. Thus the group "are dwelled on," or perhaps even "are dwelled on by," would be said to correspond to "insiste sur," with the necessary switch in the positions of the nouns. The same change in function would be involved in correspondence 9).

5. Even with correspondences like the following, the possibility exists of accounting for them by unit-for-unit replacement.

10) C: this is the problem that is gone into and solved = C': dies ist das Problem, auf das eingegangen und das gelöst wird.

11) C: these are the advantages that were described and dwelled on = C': ce sont les avantages qui ont été décrits et sur lesquels on a insisté.

When conceived of in this way, however, the transfer grammar is characterized by the extreme complexity in its word groups and the great amount of material that they contain and that is unanalyzed from the point of view of correspondence. Moreover, cases like 10) and 11) and also, although less obviously, 8), contrast with those like 6) and 7), for, in the last two pairs, the treatment of several items as single transfer units is matched intralingually by special grammatical features that establish the existence of just such a group, independently of comparison with a second language. (Sometimes it is said of such constructions that the words in them are not used in their usual sense; sometimes they are referred to as idioms.)

On the other hand, the arbitrariness and the general lack of discreteness of 10) and 11), from the point of view of unit-for-unit correspondence in a transfer-grammar description, contrast markedly with the intrasystem are regularity and structural compactness of the same constructions considered solely from the point of view of the system of the given language.

6. From the point of view of German grammar, the four following sets of sentences are regular. They present: an active sentence, and its passive; UND-conjunction of members of the first two with members of the third, to the extent that the sentences are similar in structure; and the formation of relative clauses.

a) er packt das Problem an	a') er geht auf das Problem ein	a") er löst das Problem
b) das Problem wird angepackt	b') auf das Problem wird eingegangen	b") das Problem wird gelöst

c) er packt das Problem an und löst es

c ') er geht auf das Problem ein und löst es

d) das Problem wird angepackt und es wird gelöst

d') auf das Problem wird eingegangen und es wird gelöst

d_1) das Problem wird angepackt und gelöst

e) dies ist das Problem, das er anpackt und das er löst

e ') dies ist das Problem, auf das er eingeht und das er löst

e_1) dies ist das Problem, das er anpackt und löst

f) dies ist das Problem, das angepackt und das gelöst wird

f') dies ist das Problem, auf das eingegangen und das gelöst wird

f_1) dies ist das Problem, das angepackt und gelöst wird

The fact that UND-conjunction produces only one structure in certain constructions with "auf etwas eingehen" (d'), e'), f')) as compared with two for "etwas anpacken" is the regular result of more general features of the syntax of conjunction in German, whereby dissimilar syntactic elements may not be united. According to German syntax, the prepositional phrase and the noun phrase present such a dissimilarity. In a similar way, when the prefix AN is separated from the verb, as in c), sentences with anpacken do not enjoy the extent of reduction that is possible with two unprefixed verbs; for example, "er beschreibt und löst das Problem" compared to "er beschreibt das Problem und löst es" (the latter sentence is comparable to c) above). Cases like 5) are simple from the point of view of the transfer grammar, since C duplicates this much of the regularity of C', but intralingual structural features appearing in C' need not be reflected in the same manner. Then the element of simplicity, which results from the structural quality of C' in terms of L_1 , will have been lost from the transfer grammar.

7. In the present study we propose to describe equivalence between languages in terms of correspondences between rules of their respective grammars rather than between elements. Correspondence between sentences of two languages will be analyzed into corresponding chains of these rules, with varying degrees of individual rule correspondence between the chains. The types of rules assumed here will be those describing at least two of the levels of linguistic structure: the phrase-structural and the transformational levels. The discussion will center around the transformational level, since my objective is the investigation of the role of that level in correspondence. By beginning all of the arguments that follow with initial correspondences like:

Sentence $\rightarrow$ I know it = Satz $\rightarrow$ Ich weiss es

we understand that the rules in each such case are abbreviations of the individual rule correspondences at the respective phrase-structural levels.[b]

8. Consider, first, the trivial example of well-known structural features motivating intralingual characteristics in the shape of sentences and thus complicating direct correspondence. Take, for example, the word order in German, and, under the assumption that there are homoglottal reasons for assuming that the word order of dependent clauses is derived from that of independent clauses, consider the following corresponding sentences:

12) C: Ich weiss, dass sie ihn sehen = C' : I know that they see him.

This complex correspondence can be analyzed as the result of a chain of simple correspondences:

I a) Satz → ich weiss es = a') Sentence → I know it

b) Satz → sie sehen mich = b') Sentence → they see me

II the transformational rule GT^1 that embeds b) in a):

c) ... ⇒ ich weiss - dass + [sie sehen mich]

=

the transformation rule ET^1 that embeds b') in a')

c') ... ⇒ I know - that + [they see me]

III plus the transformational rule of German grammar which situates the verb at the end of the clause: ich weiss, dass [sie sehen mich] ⇒ ich weiss, dass sie mich sehen

Actually, in both derivations the constituents that are directly derived from "Satz" and "Sentence" by the rule of phrase structure and to which transformational rules like those stated above apply appear in a more abstract form than "the men saw him": example, "the man+Plural Present+see he." Later unilateral rules (e. g. , the conversion of HE in certain positions to HIM and the affixation to a following verb of morphemes like "Present") carry the sentences into their ultimate forms. Similarly, a certain element in L may motivate one type of structure, while the corresponding element in L_1 motivates a related, but elsewhere nonequivalent, structure. (By "corresponding element" is meant the very sort of discrete phrase-structural correspondence that is left only implicit in this study). For example, take the following sentences:

13) C: Er tut es, ohne dass sie ihn sehen = C': he does it without them seeing him.

I a) Satz → er tut es ohne + [Ergänzung] = a') Sentence → he does it without + [Complement]

b) Satz → sie sehen ihn = b') Sentence → they see him

II embedding rule GT^1

c) . . . ⇒ er tut es ohne dass + [sie sehen ihn]

III plus the transformational rule for verb position in clauses

d) . . . ⇒er tut es, ohne dass sie ihn sehen

=

embedding rule ET^2

c') . . . ⇒ he does it without Gerund + [they see him]

III plus the transformational rule of English which replaces the Tense of the verb by the gerund marker — ING.

d') . . . ⇒ he does it without [they] see + ING him

IV the transformational rule of English which converts pronouns into their object form (possessive form if that is preferred)

e') . . . ⇒ he does it without them seeing him.

A very straightforward case of the same type, but one that characterizes many correspondences, is that in which L has certain optional variations in constructional possibilities lacked by L_1. Thus the English sentence "the boy he sees lives here," and a form related to it, "the boy that he sees lives here," have one French equivalent with the relative pronoun, "Le garçon qu'il voit habite ici." The chain of correspondences is obvious.

9. All of the irregularities that we have considered occurred at the end of matched chains of corresponding rules. Similar irregularities, however, may also occur within the chain and produce repercussions at various points of correspondence. A very clear example is the following correspondence:

14) C: this is the problem that was gone into and solved = C': dies ist das Problem, auf das eingegangen and das gelöst wird.

The latter was included in the discussion in Para. 6. The chains of rule correspondences would be something like this:

I a) Sentence → this is the problem = a') Satz →dies ist das Problem.

b) Sentence → someone goes into the problem = b') Satz → jemand geht auf das Problem ein

c) Sentence → someone solves the problem = c') Satz → jemand löst das Problem

II the rule ET^3 which converts b) above into its passive

d) . . . ⇒ the problem is gone into

=

the rule GT^2 which converts b') above into its passive

d') . . . ⇒ auf das Problem wird eingegangen

. II the same ET^3 applied to a)

e) . . . ⇒ the problem is solved

=

the same GT^2 applied to c')

e') . . . das Problem wird gelöst.

III	the rule ET^3 embedding d) in a) as a relative clause of "problem"	=	the rule GT^3 embedding d') in a') as a relative clause of "Problem"
	f). . . this is the problem that is gone into		f). . . dies ist das Problem, auf das eingegangen wird
III	the same rule ET^4 on e)	=	
	g). . . this is the problem that is solved		g'). . . dies ist das Problem, das gelöst wird.
IV	the rule of AND-conjunction applied to the two relatives to the greatest degree of reduction (where the least reduction under conjunction would be "this is the problem that is gone into and that is solved")	=	the rule of UND-conjunction to the same degree in German (with least reduction in the relatives represented, by "dies ist das Problem, auf das eingegangen wird und das gelöst wird")
	h)⇒ . . . this is the problem that is gone into and solved		h')⇒. . . dies ist das Problem, auf das eingegangen und das gelöst wird

From the point of view, judged to be inadequate here, whereby all correspondences between sentences are considered as single relations, the divergence in the shape of the corresponding sentences presented above would be crucial, and thus necessitate analysis in terms of complex units of correspondence, that is, underdifferentiated group of items. However, in terms of sets of relations, that is, corresponding chains of rules the correspondence can be further broken down, and more can be specified about the nature of the divergence in the final shape. This divergence is shown to be a result of certain unilateral features within rule correspondences which occur early in the chain; namely, while the positive rules of both languages correspond, in German a preposition phrase is not thereby broken, as it is done in English. Furthermore, while the relative clause transformations correspond, the unilateral difference between the prepositional phrase "auf das Problem" and noun phrase "das Problem" is reflected, on the one hand in the form assumed by the relative, and on the other hand, in a restriction on the extent of UND-conjunction, though their rules of conjunction correspond. Finally, again because of a unilateral feature of German — the final position of the finite verb in relative clauses — the particular conjoining that appears is without any direct correspondent in English.

What is responsible for the initial divergence and the many aftereffects is the inter relation between the structure in German of Verb + Prepositional Phrase and the way the rules treat the structures.

10. The following case is similar to that just discussed, but the aftereffects of unilateral features within chains of transformational correspondences are les pronounced.

15) C: that reveals the characteristics that were defined and dwelled on = C': cela révèle les caractères qui ont été définis et sur lesquels on a insisté.

The divergence in this case has its source in certain unilateral features in the passive transformations of the two languages. Specifically, in French the construction Verb + Preposition - Noun does not permit passivization, although in certain other respects such instances of Verb + Preposition are similar to simple Verb followed by Noun. Given this restriction, and assuming regular correspondence subsequently in the chains between the respective rules of relativization and coordinate-conjoining, we can account for the sentence correspondence 15) in the same way that we account for the correspondence between: C: that reveals the characteristics that were described and defined = C': cela révèle les caractères qui ont été décrits et définis. In fact, it is precisely to account for the divergence in sentence correspondence 15) that general equivalence is assumed between the active-passive relationship in English and the same in French. In other words, this divergence is motivation for postulating the correspondence of the passivization rules of the two languages. The description of sentence correspondence 15) would contain the following chains of rules. (Some will be greatly abbreviated.)

I a) Sentence → that reveals these characteristics = a') Phrase → cela révèle ces caractères

b) Sentence → someone defined these characteristics = b') Phrase → on a défini ces caractères

c) Sentence → someone insisted on these characteristics = c') Phrase → on a insisté sur ces caractères

II the rule of passivization ET[3] to b) and c) where it applies, here to both: = the rule of passivization FT to the corresponding phrase structural products of b') and c') where it applies, here only to b')

d) . . . ⇒ the characteristics were defined = d') . . ⇒ les caractères ont été définis

e) . . . ⇒ the characteristics were dwelled on

III corresponding rules of relativization whose French correspondent has c') to operate on, since c') was left unconverted by FT.

f) . . . ⇒ the characteristics that were defined = f') . . . ⇒ les caractères qui ont été définis

g) … ⇒ the characteristics that were dwelled on = g') … ⇒ les caractères sur lesquels on a insisté.

IV corresponding rules of coordinate conjunction to the highest degree of reduction; the French correspondents allow a very restricted degree of reduction.

11. Corresponding sentences such as 16) are relatively simple when viewed as chains of correspondences that are unevenly matched here and there. On the other hand, the divergence of the final forms in terms of the final arrangement of items may reach really extreme proportions. Consider this example:

16) C: there are expected to be many people working here = C': Es wird erwartet, dass viele Leute hier arbeiten werden.

Each major word has a mutual correspondent, but the interrelation of the words from the point of view of the grammatical form of the sentences would seem, in general, not to be related in any regular way. The following analysis of their correspondence reveals that there is a regular relation:

I a) Sentence → You expect it = a') Satz → Man erwartet es

b) Sentence → Many people will be working here = b') Satz → Viele Leute werden hier arbeiten

II Subject deferring rule ET[5]: = Subject deferring rule GT[4]:

c). . . ⇒There will be many people working here = c'). . . ⇒ Es werden hier viele Leute arbeiten.[e]

III The rule ET that embeds c) in a) = The similar rule in German

d). . . ⇒They expect INF [there will be many people working here] = d'). . . ⇒ Sie erwarten, dass + [viele Leute werden hier arbeiten]

Unilateral rules of English characteristics of INF

e). . . ⇒ You expect there to be many people working here

Unilateral rules of Verb position in dependent clauses

e'). . . ⇒ Sie erwarten, dass viele Leute hier arbeiten werden

IV The passive rule ET[3] THERE is object, and the infinitive phrase as complement = The passive rule GT[2], for which the DASS-clause is object

f). . . ⇒ There are expected to be many people working here = f'). . . ⇒ Dass viele Leute hier arbeiten werden, wird erwartet.

the transformational rule which optionally defers the clause as subject by rendering that subject discontinuous with ES.

g'). . . ⇒ es wird erwartet, dass viele Leute hier arbeiten werden.

12. The subtle effect of unilateral peculiarities within the domain of a rule of grammar can be further illustrated by the examples 17)-19)- Again, the rules of the different grammars correspond in general, but, in particular cases, grammatical features that are regular from the point of view of the individual language disrupt correspondence in

the applicability of certain rules in the chain and lead to divergence, or at least to restrictions, in the shape of corresponding sentences. The example is that of noun modifiers in German, French, and English. We shall be concerned, first, with noun phrases of the following types, in suitable sentences.

17)	ces problèmes très difficiles	= these very difficult problems	= diese sehr schwierigen Probleme
18)	quelques militaires capturés	= a few captured soldiers	= einige gefangene Soldaten
19)	les lignes omises	= the lines left out	= die ausgelassenen Zeilen

The number of corresponding sentences like these is, of course, enormous — sentences in which the modifier is an adjective (or adjectival phrase), or a phrase headed by the passive participle. Clearly, there is some sense in which nominal modifiers correspond in these three languages. And if only modifiers of the types exemplified by 17)-19) occurred, then their correspondence could be described at this level of grammatical structure, that is, solely in terms of the constituent of the noun phrase which the so-called modifier represented in each language, with the addition of unilateral rules of agreement and word order. The fact is, however, that certain other modifiers do not . occur in a corresponding way in these languages. Thus,

20) "die 1930 erschienenen Bücher"

"les livres parus en 1930 (sont épuisés)"

not " * the books appeared in 1930 (are out of print)"

but rather "the books that appeared in 1930 (are out of print)"

21) "Il guetta ensuite sa respiration, devenue plus forte et plus régulière"

"Then he listened for the man's breathing which had become heavier and more regular"

22) "diese häufiger gewordenen Erscheinungen"

"ces phénomènes devenus plus fréquents (sont de mieux en mieux étudiés)"

not " *these phenomena become more frequent"

but rather "these phenomena that have become more frequent"

23) "der ideale niemals wirklich gewesene Zustand"

not " * la condition jamais vraiment etée"

but rather "la condition qui n'a vraiment jamais existé"

not " * the condition never really been"

but rather "the condition that has never really been"

24) "the problems gone into"
no corresponding simple modification by the past participle
but rather "die Probleme auf die eingegangen worden ist"

25) "the advantages dwelled on by him"
but "les avantages sur lesquels il a insisté"

This discrepancy will be found, however, not to represent a basic incorrectness in the assumption of correspondence among modifiers. Moreover, it can be resolved in a more revealing way than by listing possible modifier heads that correspond. By looking into the grammatical mechanism involving modifiers we will discover certain grammatical facts that themselves, account for the differences that appear in 20)-25) as exceptions to the notion of modifier correspondence which is being considered. Consider intralingually the structural phenomena involved in the modifiers in the individual languages. In each case, sets of sentences like the following will be involved:

26) he solved these problems that are very difficult
he solved these very difficult problems

The types of modifiers exemplified above are related to relative clauses. That relationship can be thought of in terms of a particular reduction of the relative clause, formulated later under the name: Attributivization Rule. The suitable reduction would be possible when the relative clause contains BE in the appropriate structural position in its predicate. The situation in German and in French would be analogous.

27) Il a résolu ces problèmes qui sont très difficiles
Il a résolu ces problèmes très difficiles

28) Er hat diese Probleme, die sehr schwierig sind, gelöst
Er hat diese sehr schwierigen Probleme gelöst

13. Thus the intralingual correspondences among modifiers of this sort (Para. 12) can be analyzed as chains of correspondences involving the respective Relativization and Attributivization rules of the three languages; the latter rule involves in addition, the correspondence of the items BE, SEIN, and ÊTRE, a correspondence that can be thought of as lexical; the type of element involved is complex, from the point of view of phrase structure, in that certain constituents that it represents appear otherwise to have no further relation (for example, SEIN as auxiliary verb of the perfect and as verb of predication with adjectives). The discrepancies appearing in Para. 12 find a ready explanation in terms of the chains of correspondences mentioned, in that the cases in which the attributive form appears are matched in the particular languages by the

occurrence of BE, SEIN, or ÊTRE appropriately located in the predicate; and, when he predicate of a correspondent lacks one of these in a particular combination, then he corresponding attributive form is, in general, also missing.

14. I want to emphasize that the relationship between the relative with BE and the attributive modifier in English is being postulated as an intralingual grammatical fact, and similarly in French and in German, each independently. Granted the correctness of these hypotheses, I further propose that the three relationships correspond. In each language within the proposed intralingual relationship there may be restrictions and irregularities; for example, in French, although prepositional phrases of place occur freely after ÊTRE, they are greatly restricted in the same form as attributive modifiers: "le garçon est dans la maison" but not ordinarily "le garçon dans la maison m'appelle." In English, although BE does not occur as the auxiliary of the perfect, certain isolated past participles of intransitive verbs occur as modifiers: "the snow has fallen" (not "is fallen") but "the fallen snow." In German, certain verb phrases with SEIN as the auxiliary of the perfect do not occur as modifiers with the verb in the past participle form, although, when combined with other phrases, the past participle does occur as a modifier: "der Junge ist gelaufen" but not * "der gelaufene Junge"; only, "der auf die Strasse gelaufene Junge." Furthermore, the relationship in the passive between "... geworden ist" and "... ist," leave certain problems, as does the nature of the reduction of "... gelöst worden ist" to the attributive "gelöst."

There are many more such irregularities, that cannot be discussed here, but thus far none that have turned up in my investigation of these languages invalidates the postulated relationship.

The divergence in occurrence of certain past participles to intransitive verbs as attributive modifiers (cf. example 20)-23)) turns out to be the result of unilateral features of selection with respect to the auxiliary of the perfect. In French and German, but not English, that auxiliary in the case of certain intransitives is ÊTRE rather than AVOIR, and SEIN rather than HABEN. When the former in each case is the choice, the past participle generally functions also in an attributive modifier construction that is missing in English. But the selection of ÊTRE and SEIN with respect to corresponding main verbs is not identical in French and German, whence the difference in attributive modifiers between them. Divergence in occurrence of modifiers headed by passive participles is explained by factors discussed in Para. 9. In 25), because in French a construction of Verb + Preposition - Noun does not passivize, and in the German example 24), while the passive occurs, the relative pronoun is not the subject of the clause. Finally, in French there is a very extensive restriction on post-nominal occurrence of the prepositional phrases regularly occurring after ÊTRE. For the time being, this restriction can be viewed as a unilateral feature of French, but such an explanation does

not clarify the relationship between prepositional phrases in general after ETRE and such phrases introduced postnominally by DE.

15. In the chains of rules proposed below as the analysis of structures involving attributive modifiers, we note: First, Perfect-Expansion Rules (carrying the perfect into ÊTRE or AVOIR in French, SEIN or HABEN in German) are considered transformational the corresponding English construction, on the other hand, is included in the phrase-structural level. These are simply intralingual facts. However, the description of interlingual correspondence involving different levels (and certainly in the total description of the correspondences between two languages such will often be the case) presents problems of its own, which for convenience will be overlooked here. Second, Perfect-Expansion Rules will be relevant only to those sentences that do not already contain the copula. Third, the German Passives will be considered directly in their form with SEIN, for example, "das Problem ist gelöst worden," the perfect of the simple passive "das Problem wird gelöst." Fourth, the occurrence of particular corresponding rules in each language will be abbreviated by naming the correspondence after the English rule name, and letting the accompanying Roman numerals always represent the same rule correspondences. For convenience, underlining marks the occurrence of the corresponding elements BE, ÊTRE, and SEIN, that are named "Copula" (this naming does not resolve any of the difficulties mentioned in Para. 13). Finally, various unilateral rules of order and agreement are assumed without direct mention.

I Phrase-structure Rules, yielding regular Copula correspondence
II Passivization Rule, yielding Copula correspondence when applicable
III Perfect-Expansion Rule, with diverging Copula correspondence
IV Relativization Rule
V Attributivization Rule, dependent on subject relative and copula

29)	C: ... the lines left out. . .	=	C': . . . les lignes omises . . .
I a)	Sentence → ... the lines ...	=	a') Phrase → ... les lignes . . .
b)	Sentence → someone leaves out the lines	=	b') Phrase → on omet les lignes
II c)	. . . ⇒ the lines <u>are</u> left out	=	c'). .. ⇒ les lignes <u>sont</u> omises
IV d)	. . ⇒the lines that <u>are</u> left out ...	=	d'). .. ⇒ les lignes qui <u>sont</u> omises . . .
V e)	. . . ⇒ . . . the lines left out ...	=	e') ...⇒ ... les lignes omises . . .
30)	C: ... die 1930 erschienenen Bücher . . .	=	C': . . . the books that appeared in 1930 ..

I a) Satz → . . . die Bücher . . . = a') Sentence → . . . the books . . .

b) Satz →- . . . die Bücher - "ZEIT" + ERSCHEINEN = b') Sentence → . . . the books appeared in 1930

III c) .. .⇒ die Bücher sind 1930 erschienen

IV d) . . . ⇒ ... die Bücher, die 1930 erschienen sind = d') ... ⇒the books that appeared in 1930

V e) . . . ⇒. . . die 1930 erschienenen Bücher . . .

31) C: der (ideale) niemals wirklich gewesene Zustand . . . = C': . . . la condition (ideale) qui n'a vraiment jamais existé . . .

I a) Satz →. . . der (ideale) Zustand a') Phrase → . . . la condition (idéale). . .

b) Satz → der (ideale) Zustand— ZEIT + SEIN niemals wirklich b') Phrase → la condition (idéale) ne TEMPS + EXISTER vraiment jamais

III c) . . . ⇒ der (ideale) Zustand ist niemals wirklich gewesen c') . . . ⇒. la condition (idéale) n'a vraiment jamais existé

IV d) . . . ⇒ . . . der (ideale) Zustand, der niemals wirklich gewesen ist, . . . = d') . . . ⇒la condition (idéale) qui n'a vraiment jamais existé . . .

V e) . . . ⇒. . . der ideale, niemals wirklich gewesene Zustand . . .

32) C: . . . the problems gone into earlier . . . = C': . . . die Probleme, auf die früher eingegangen ist, . . .

I a) Sentence → . . . the problems . . . = a') Satz → . . . die Probleme . . .

b) Sentence → someone went into the problems earlier = b') Satz → man ist früher auf die Probleme eingegangen

II c) . . . ⇒ the problems were gone into earlier = c') . . . ⇒ auf die Probleme ist früher eingegangen worden

IV d) . . . ⇒. . . . the problems that were gone into earlier . . . = d') . . . ⇒. . . . die Probleme, auf die früher eingegangen worden ist. . .

V e) ... ⇒ ... the problems gone into earlier (Attributivization not applicable because the relative pronoun AUF DIE is not subject of the clause)

16. In the light of the correspondences discussed above, I should like to consider briefly certain notions similar to those entertained by Hermodsson, namely that certain semantic values that are proper to a word in its capacity as a full lexical item can be carried over into its purely grammatical functions. In the preceding section, the discussion centered around an example of just such a grammaticalized use of a word; that is,

ÊTRE and SEIN in their functions as verbal auxiliaries of the perfect tense, complementing AVOIR and HABEN, with some overlap. Not infrequently, instances of the perfect tense employing the former pair are characterized semantically as more descriptive than those using the latter. Or else, they are said to emphasize the resultant state. That is, the "adjectival" character of such a participle, secondary though it may be to the primary temporal-aspectual function, is maintained. Accordingly, between corresponding sentences of languages of which one lacks this periphrasis (e. g., between French and English) or which differ in the distribution of this periphrasis (e. g. , between German and French), this semantic value might hold for only one of the sentences. All such arguments are, of course, extremely vague. Intuited differences of this nature are open to various interpretations. Often, however, some clarification can be achieved through the discovery of grammatical phenomena related to such differences. Although the derivations in Para. 12 do not in any way confirm the particularly "adjectival" quality-claimed, and certainly do not explain the notion "adjective," they do show clearly in what way the perfect periphrasis with SEIN and ÊTRE differs from that with HABEN and AVOIR and that in certain ways (viz. its possibility as an attribute) the periphrasis with SEIN and ÊTRE behaves like a predicate complement, a category which includes adjectives.

17. The description of interlingual correspondences at the transformational level presented here is only the preliminary step in the formulation of the precise rules of transfer comprising the transfer grammar. It seems likely, however, that the rules themselves will assume a form similar to certain of the abbreviating devices used in Para. 15. Thus the correspondence between the German Passive and the English Passive will itself be given a single symbolic designation as {Passive}, chains of correspondence will assume the form of chains of such symbols of {Grammar} and the derivation of a C', that is, the sentence to be produced as a result of transfer, will proceed as operations dictated by the {Grammar} are applied to the evolving structure of C'.

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Footnotes

[a] On the other hand, with many postulated interlingual correspondences of a very free nature, it may ultimately be discovered that they are rather to be considered as simpler correspondences of sentences of which the original is an intralingual paraphrase.

[b] Presumably correspondences like 9) or like "C: cela me plaît = C': I like that" would still be irregular at the phrase-structure level. The simplification that ensues through the analysis of correspondence at the transformational level, unfortunately, does not extend to serious problems like these, problems that one would expect to find multiplied in pairs of languages characterized impressionistically as widely divergent.

[c] In this analysis, GT is the abbreviation for "transformational rule of German"; ET, for "transformational rule of English"; and FT, for "transformational rule of French."

[d] The choice of someone and the French on as correspondents, and of someone and the absent agent in passives as intralingually related elements is not presented as a solution to the problems involved but only as an expedient.

[e] Es in II c') actually appears much later in the derivation of sentences; its absence in d')-g') below thus does not require special comment.

References

1. L. Hermodsson, Reflexive und Intransitive Verba im älteren Westgermanischen (Almquist and Wiksell, Uppsala, 1952).

2. For a discussion of structure and levels of structure, see N. Chomsky, Syntactic Structure (Mouton and Company, The Hague, 1957).

3. E. S. Klima, Structure at the Lexical Level and Its Implications for Transfer Grammar, Proceedings of the First International Conference on Machine Translation of Language and Applied Language Analysis (H. M. Stationery Office, London, 1961).

4. The correspondences are taken preferably from unsolicited translations. Two dual-language bo oks were particularly useful: French Stories, edited by W. Fowlie (Bantam Books, Inc., New York, 1960); German Stories, edited by H. Steinhauer (Bantam Books, Inc., New York, 1961).