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CONTRASTIVE STRESS AND EMPHATIC STRESS.
BY- LU, JOHN H.T.

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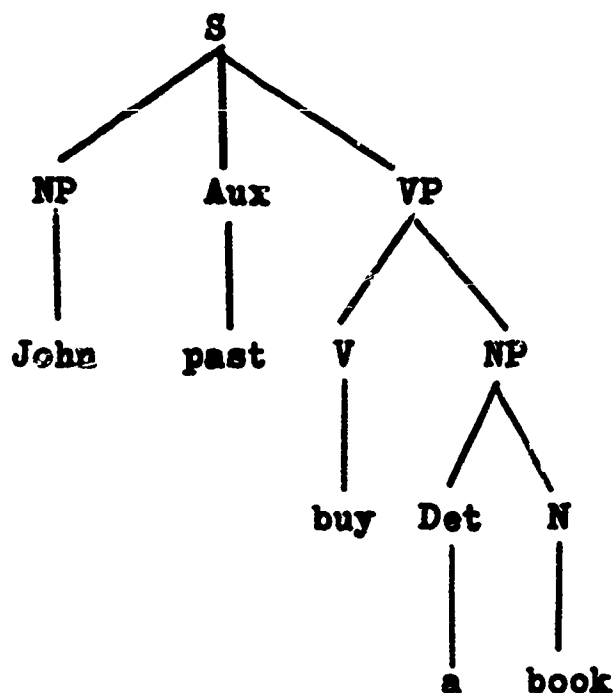
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AN ATTEMPT IS MADE, WITHIN THE GENERAL FRAMEWORK OF A
TRANSFORMATIONAL GRAMMAR, TO ACCOUNT FOR THE PREDICTABILITY
OF STRESS IN TERMS OF ITS UNDERLYING PHRASE STRUCTURES, TO
PROVIDE SOME EXPLANATION FOR THE CONSTRUCTIONAL HOMONYMITY OF
CONTRASTIVE STRESS IN SOME CASES, AND TO ILLUSTRATE WITH
EXAMPLES FROM AMERICAN ENGLISH AND MANDARIN CHINESE SHOWING
THAT THE SOLUTION PRESENTED CAN APPLY TO MORE THAN ONE
NATURAL LANGUAGE. SOME CONSTITUENT STRUCTURE RULES IN ENGLISH
RELATED TO THE PRESENT PROBLEM ARE GIVEN, AS WELL AS
TRANSFORMATION RULES FOR CONTRASTIVE STRESS AND EMPHATIC
STRESS. THIS ARTICLE APPEARS IN THE OHIO STATE UNIVERSITY
RESEARCH FOUNDATION PROJECT ON LINGUISTIC ANALYSIS, REPORT
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are also given after the English examples.

(1)

```
                           S
              _____/ | _____
             NP          Aux            VP
             |            |           /    \
           John         past        V      NP
                                    |      /  \
                                   buy   Det   N
                                         |     |
                                         a    book
```

The deep structure is derived from a set of phrase structure rules which will be given in Section III. With the terminal string "John - past + buy - a - book," we simply apply some morphophonemic rules to change "past + buy" into "bought." Thus, we get the surface structure, "John bought a book." We know it is a simple neutral statement because no word in this sentence receives any conspicuous stress.

(2) See the P-marker on the bottom of page 41 and its description.

CONTRASTIVE STRESS AND EMPHATIC STRESS[1]

John H. T. Lu

I. Introduction

Study on stress, especially on English stress, has been done by
many linguists. Up to 1957, some had argued that there were four
stress phonemes in the English language, i.e. primary, secondary,
tertiary, and weak stresses. However, this claim has not been jus-
tified yet. The fact that native speakers of the language can not
respond to the distinctions between stresses has undoubtedly demon-
strated that stress is still a problem today. William S-Y. Wang in
his paper on "English Stress"[2] pointed out that the chief reason for
this failure to recognize the distinctions on the part of the native
speaker is that they are not phonemic. Wang further strengthened his
argument by using the results of the experiments intended to find out
the physical properties of stress by the English phonetician Dennis
Fry, Bolinger, and others. These experiments had indeed brought to
light some of the acoustical parameters which influence the percep-
tion of stress, as Wang elaborated in his paper, yet they were so
complicated and so elusive that people could hardly be convinced of
the four stress phonemes as claimed by some of the linguists in this
country. So, Wang agreed with A. A. Hill on the first part of the
statement when the latter mentioned the predictability of stress in
the following words: "Thus if one assumes that all the grammatical
entities and relationships in a particular phrase are known, it is
possible to predict the stress pattern... The statement is true
enough, but runs counter to one of the basic tenets of modern lin-
guistics, namely that we recognize grammatical entities and relation-
ships in terms of audible phonemic clues, not that we know the gram-
matical entities and relationships anyhow, and then fill in their pho-
nemic shape according to notions of fitness." However, Wang thought
that this linguistic tenet had little with which to recommend itself
and should not be clung to. As can be seen in his conclusion of the

paper: "It is implausible to suggest that the listener's judgments depend entirely on acoustical cues for their evaluation of English stress in the light of the complexity and elusiveness of these cues. The conclusion must be that he relies heavily on some set of abstract, predictive rules, couched in an over-all grammar, which guides him in his interpretation of stress and which can allow for marked deviations in the acoustical signal." Wang had some doubt then, though, that English stress was indeed predictable by assuming grammatical information.

With this background in mind, the writer of the present paper tries first to account, within the general framework of a transformational grammar, for the predictability of stress in terms of its underlying phrase structures, then to provide some explanation for the constructional homonymity of contrastive stress in some cases, and finally to show by using examples from both American English and Mandarin Chinese that the solution we present here can apply to more than one natural language.

The reader of this paper should, by no means, think that the problems concerning "stress" have been solved after reading this article. There are other aspects of stress which still need further investigation. However, to explain the presence of contrastive stress in terms of deep phrase structure is one possible step through which we might eventually hope to incorporate what used to be called suprasegmental phonemes into syntactic structures.

The rest of the paper is divided into three sections. In section one, the underlying P-markers of the sentence, "John bought a book," as well as its negative counterparts are informally discussed and its solution presented. Some examples from Mandarin Chinese will also be shown with their P-markers in this section. In section two, cases of constructional homonymity on contrastive stress will be discussed and their explanations provided. Examples will also be drawn from the above two languages. In the last section, both the constituent structure and transformational rules will be given.

Section I

Take the sentence "John bought a book," for example. Any native speaker of the English language will point out without any hesitation that the sentence can be said in many different ways. It can be pronounced with a normal rising-falling pitch ending with no particular word in the sentence conspicuously stressed. Or it can be pronounced with one of its constituents stressed. Roughly speaking, there are five different ways of saying this sentence. They can be listed with different meanings as follows:

(1) John bought a book. (With a normal rising-falling pitch ending showing no presupposition at all, it is a simple neutral statement.)

(2) <u>John</u> bought a book. (With the noun "John" stressed, the speaker of this sentence shows the presupposition that it was John who bought a book, not somebody else.)

(3) John bought a <u>book</u>. (With the noun "book" stressed, the presupposition is that the thing John bought was a book, not something else.)

(4) John bought <u>a</u> book. (When "a" used as a number designator is stressed, it has to be turned into "one" or "a single"[3] because "a" is never stressed in this sense. The presupposition here is that the number of the book that John bought was "one" in contrast with two, or three, or many.)

(5) John <u>bought</u> a book. (With the verb "bought" stressed, it means that John bought a book, he did not "steal", or "sell" a book.)

There are some other ways of pronouncing the sentence. But, for the present analysis, these examples are sufficient. We are not going to further elaborate on this. The problem we are facing now is three-fold. First, how do we account for the presence of stress? Is it phonemic? Second, how do we know which one of the words in the sentence should be stressed? In other words, how can we predict where stress will fall? Finally, we would like to ask if there is any simple, systematic, and revealing way to describe it? To answer the first question, we can use the example sentences (1-5). If we take any sentence of (2-5) and compare it with (1), we will see that the two sentences are in contrast. With all the words identical, they differ only in stress. Since these two sentences have different meanings caused by the presence of stress in one and none in the other, stress is apparently phonemic. To the second question our answer is that whenever one of the words in the sentences is stressed, it has a P-marker to show why that word is stressed. Sentence 2, for example, has a P-marker like this:

```
                              S
                 ┌────────────┼────────────┐
                S₁           NEG           S₂
          ┌──────┼──────┐           ┌──────┼──────┐
         NP     Aux     VP         NP     Aux     VP
          │      │    ┌──┴──┐       │      │    ┌──┴──┐
        John   past   V    NP  unspecified past  V    NP
                      │    ┌┴─┐              │   ┌─┴─┐
                     buy  Det  N            buy Det   N
                          │    │                │    │
                          a   book             a    book
```
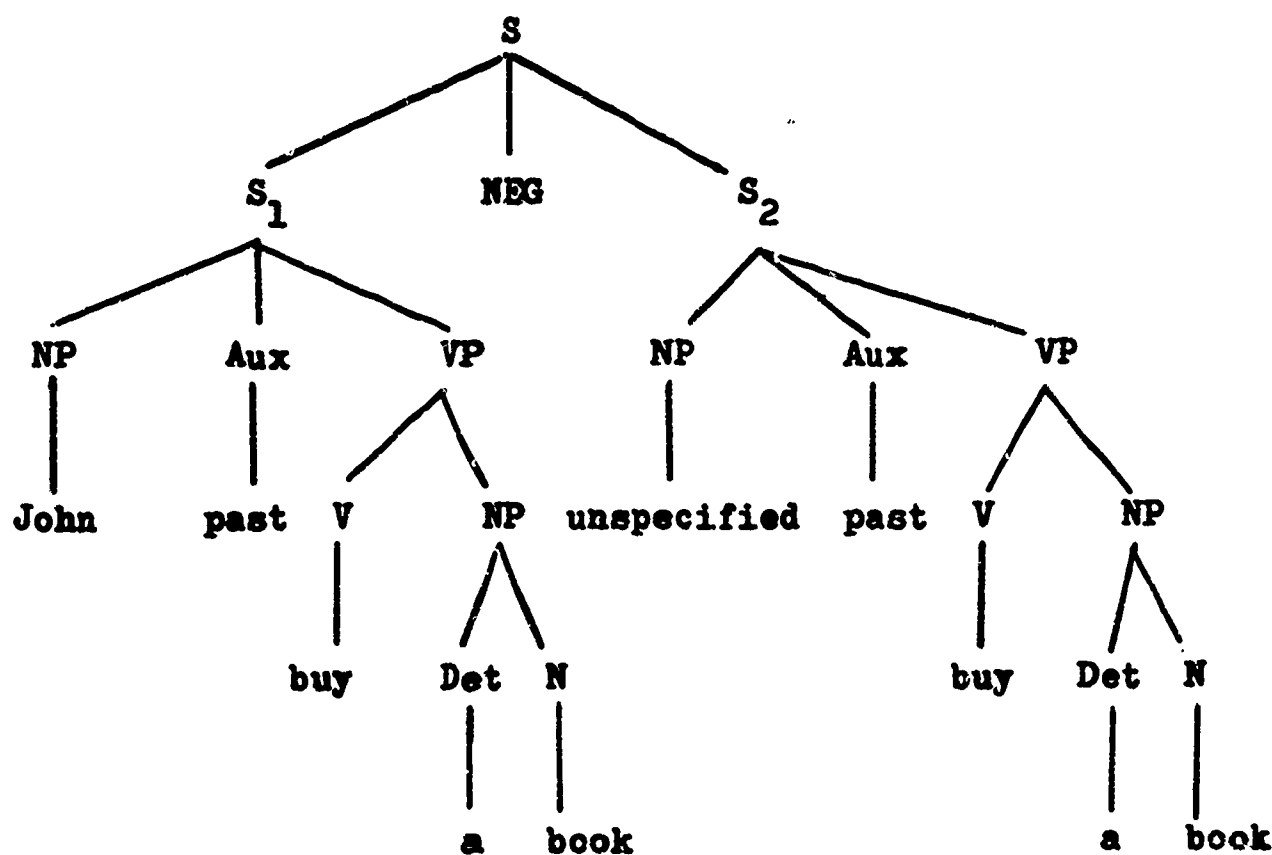
S_1 and S_2 are identical except in one respect:

The first NP in S_2 is unspecified. It can be some noun like Mary,
Peter, Bob, but not book, or pen, or pencil, etc. In other words,
it must be one of those nouns classified in the same group as John.
With this analysis, we can predict that the counterpart of the unspecified
element in S_1 receives stress.

For question 3, we simply apply some transformational rules to the
underlying phrase structure stated above.

T1: Delete the whole S_2.

T2: Delete NEG.

T3: Add stress to the word in S_1 whose counterpart in S_2 is un-
specified.

Finally we will get the surface structure "<u>John</u> bought a book," with the
word "John" stressed. These rules are general. They can apply not only
to English stress, but also to Chinese stress as further examples will
show below.

Before giving more P-markers of the sentence stated above, I would
like to point out that one element in the sentence would have to be ex-
cluded in this treatment. That is "auxiliary." When stress falls on the
auxiliary part of a verb, we simply apply another rule since auxiliaries
in English are to be treated differently.[4]

Many linguists have used the term suprasegmental phoneme for stress.
They claim that it is unique like pitch levels, or junctures. It has to
be attached to something more tangible in nature like segmental phonemes.
Without them, no stress can possible be represented. On the other hand,
they do not believe that stress is like syntax. It can not be represented
by a tree diagram or in a linear sequence. So, generally speaking, stress
has been classified as a part of phonology rather than a part of syntax.
Now, with our analysis, we have found that this is only partly true. On
the surface structure, it is still attached to segmental phonemes, but in
its deep structure, it has shown a much closer relationship with phrase
structure than with any segmental phonemes.

Below, you will find the P-markers of the example sentence (1-5) to-
gether with their negative counterpart P-markers. Some Chinese examples

are also given after the English examples.
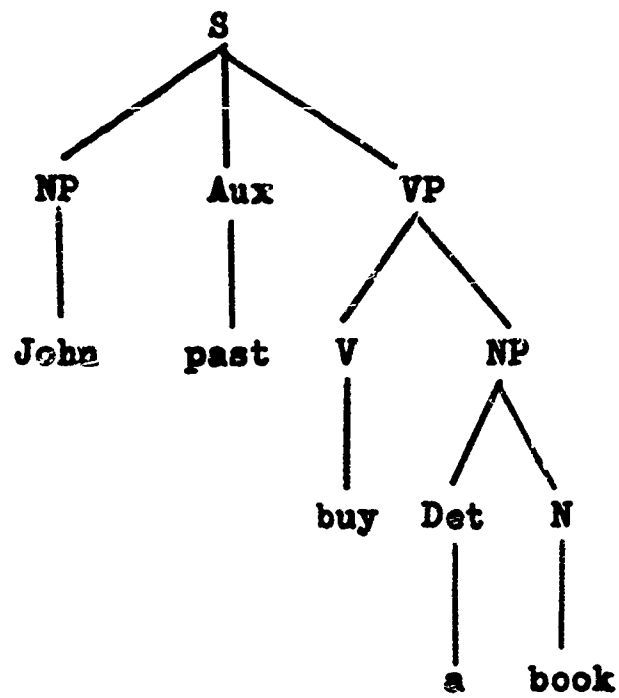
(1)

```
                    S
         ┌──────────┼──────────┐
        NP         Aux         VP
         │          │        ┌──┴──┐
        John       past      V     NP
                             │   ┌──┴──┐
                            buy Det    N
                                 │     │
                                 a    book
```

    The deep structure is derived from a set of phrase structure rules
which will be given in Section III. With the terminal string "John -
past + buy - a - book," we simply apply some morphophonemic rules to
change "past + buy" into "bought." Thus, we get the surface structure,
"John bought a book." We know it is a simple neutral statement because
no word in this sentence receives any conspicuous stress.

(2) See the P-marker on the bottom of page 41 and its description.

(3)

```
                                    S
                    _____|_____
                   /                |                \
                  S₁               NEG               S₂
         _____|_____              _____|_____
        /         |         \            /          |          \
       NP        Aux        VP          NP          Aux         VP
        |         |      ___|___         |           |       ____|____
      John      past    V      NP      John        past     V        NP
                        |     __|__                         |       __|__
                       buy  Det    N                       buy    Det    N
                             |     |                               |     |
                             a   book                              a  unspecified
```
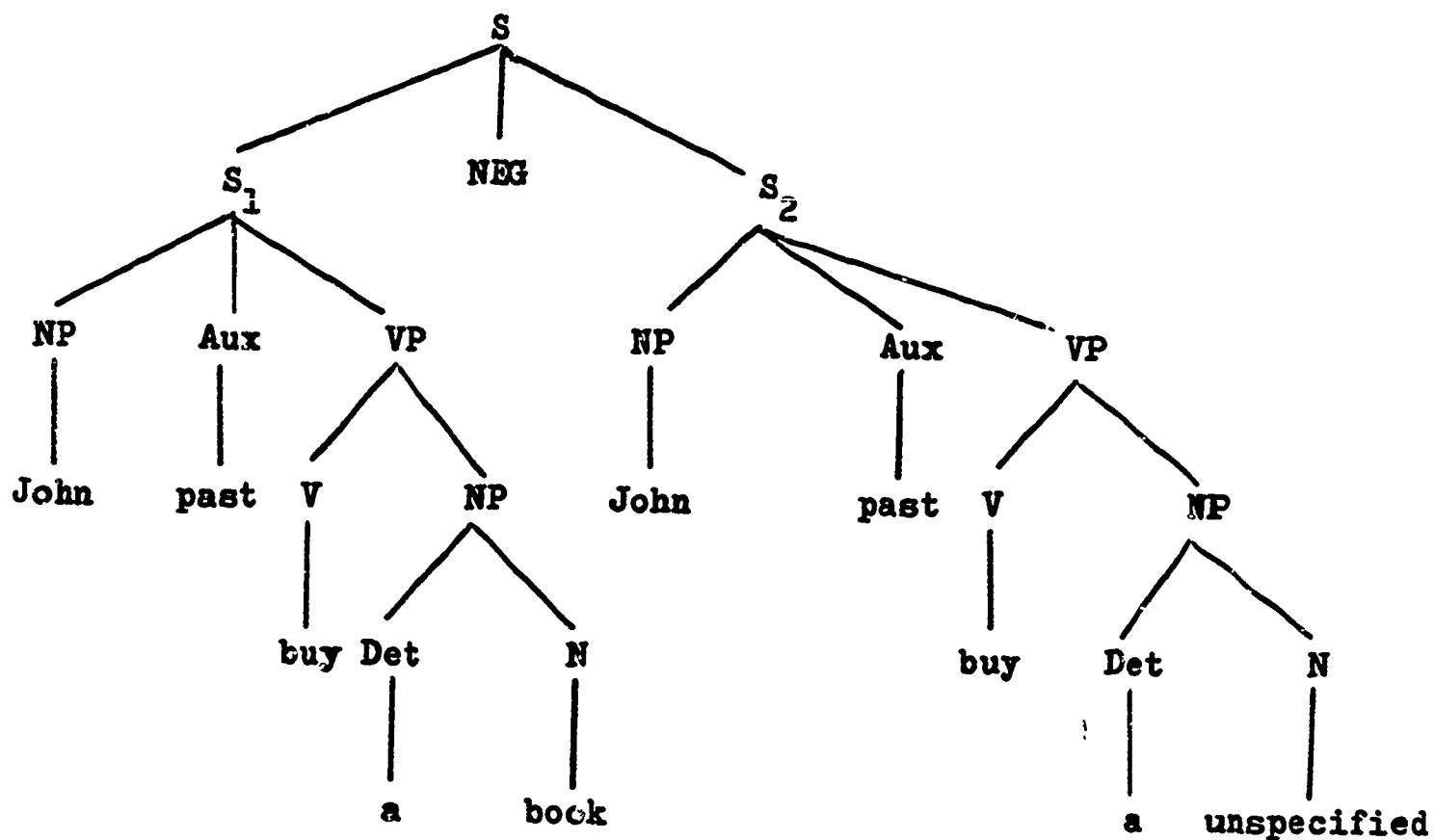
Following the same procedures, we will get the structure "John bought a book," with the word "book" stressed.

(4)

```
                                    S
                    _____|_____
                   /                |                \
                  S₁               NEG               S₂
         _____|_____              _____|_____
        /         |         \            /          |          \
       NP        Aux        VP          NP          Aux         VP
        |         |      ___|___         |           |       ____|____
      John      past    V      NP      John        past     V        NP
                        |     __|__                         |       __|__
                       buy  Det    N                       buy    Det    N
                             |     |                               |      |
                             a   book                        unspecified book
```
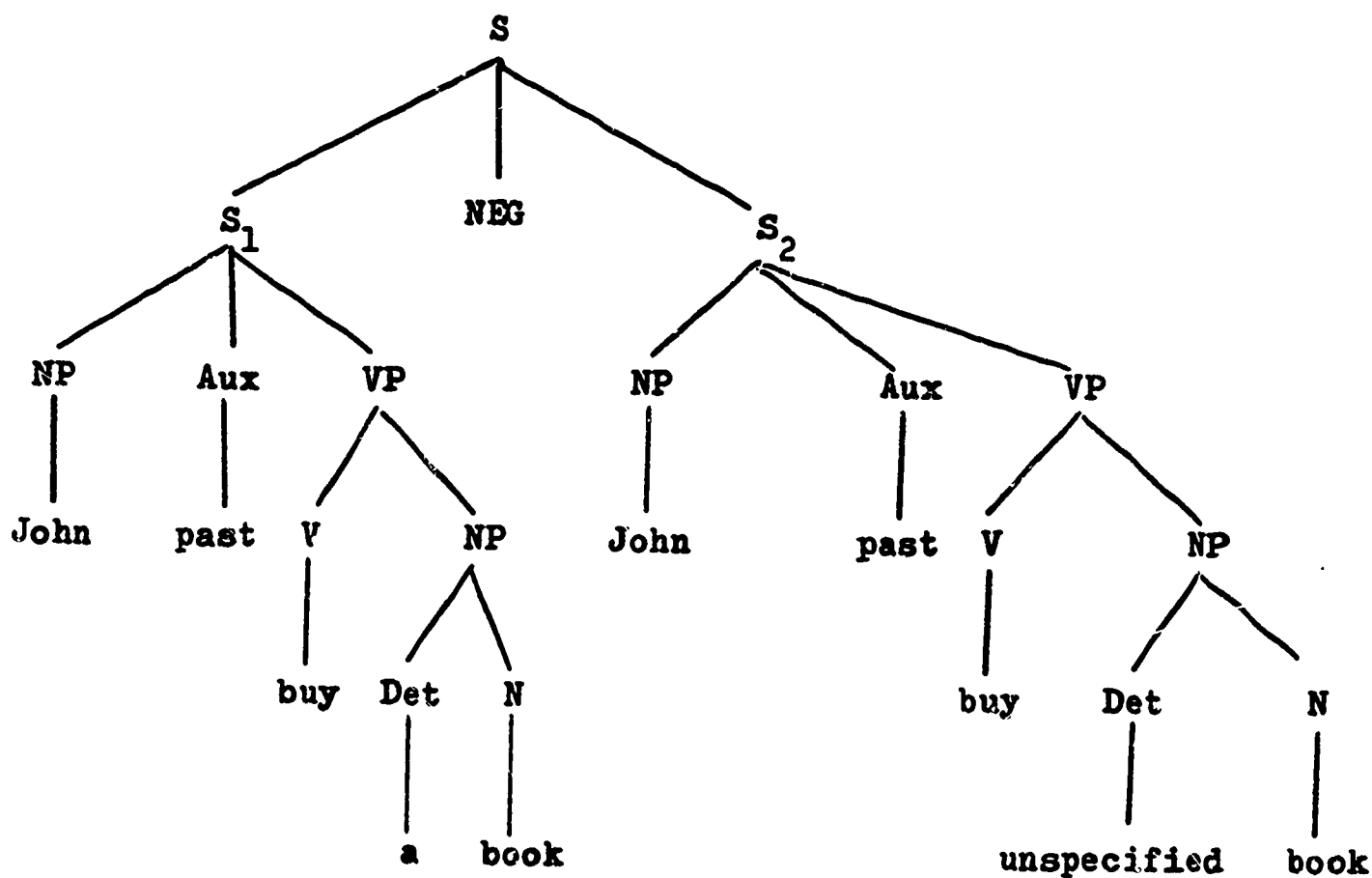
Here, the unspecified element is Det. According to our rules, "a" in S_1 should receive a heavy stress. But, since "a" used as a number designator, can never be stressed, the word "one" or "a single" will have to take its place. Further investigation shows that "a" and "one" when expressing number are in complementary distribution. So in this sense, they can probably be treated as two allogmorphs of the morpheme "one". That is, "one" always occurs with stress while "a" never does. So, finally we will get the surface structure "John bought one (a single) book," with "one" or "a single" stressed.

(5)

```
                          S
          ┌───────────────┼────────────────┐
         S₁              NEG              S₂
    ┌─────┼─────┐                   ┌──────┼──────┐
   NP    Aux    VP                 NP    Aux      VP
    │     │    ┌─┴──┐               │      │     ┌──┴──┐
  John  past   V   NP             John   past    V     NP
               │  ┌─┴─┐                         │    ┌──┴──┐
             buy Det  N                    unspecified Det  N
                  │   │                                │    │
                  a  book                              a   book
```
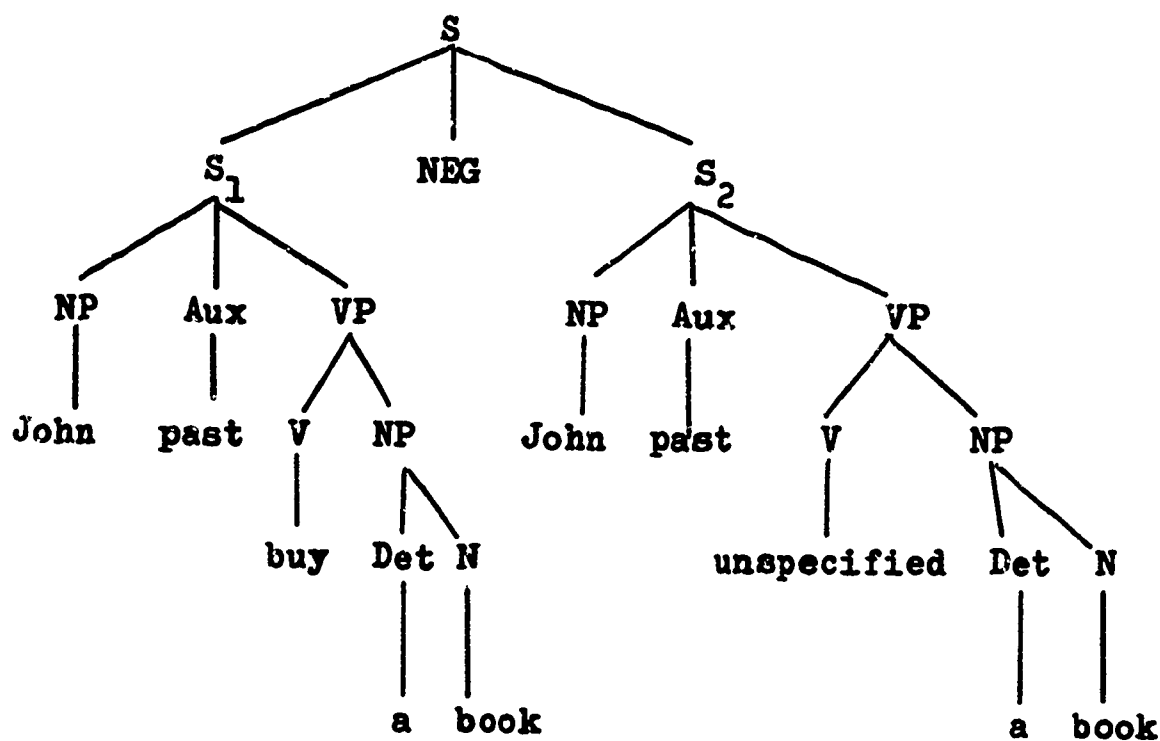
By applying the same procedures and same transformational rules, we will have the surface structure. "John bought a book," with the word "bought" stressed.

A few remarks about NEG under the main S. It serves as a connecting element meaning "it is not that," not the same negative marker as we use to negate the verb. For the latter, we simply use Neg to represent it.

It works with negative sentences too. Take the negative sentence "John didn't buy a book," for example. We can have the following corresponding underlying P-markers:

1a)

By applying T_{Neg}^{5}, we will get the surface structure, "John didn't buy a book." It is a simple negative statement since no word in the sentence receives any heavy stress.

2a)

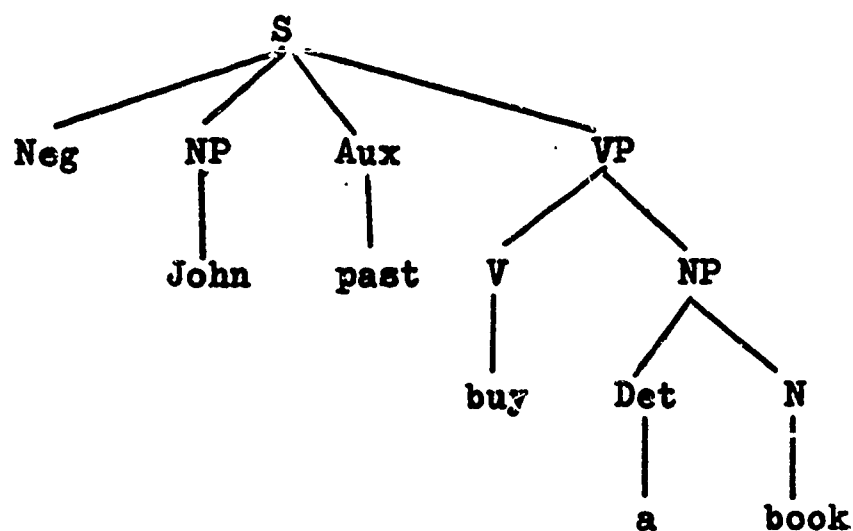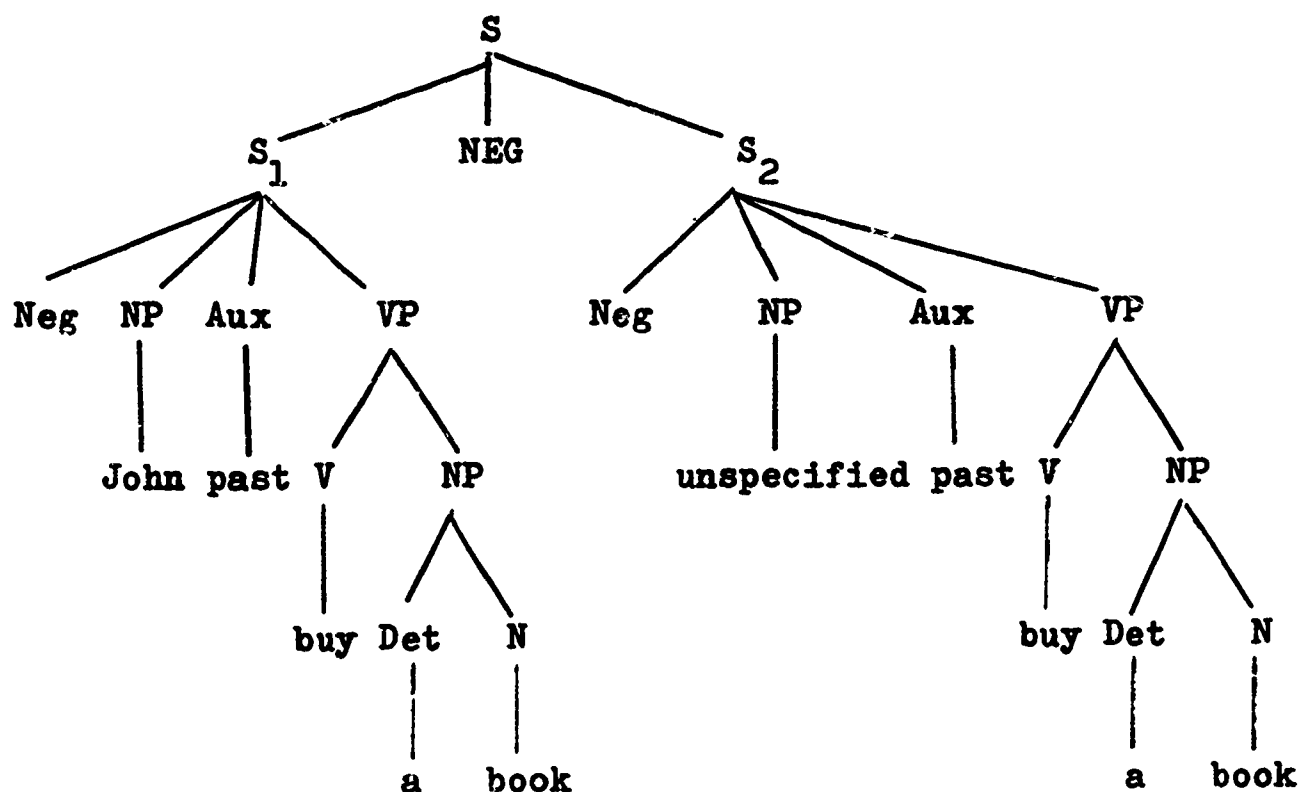To turn this into the surface structure, "<u>John</u> didn't buy a book,"
with the noun "John" stressed, we simply take four steps:

1. Apply T_{Neg} to S_1.
2. Delete the whole S_2.
3. Delete NEG.
4. Stress the constituent in S_1 whose counterpart in S_2 is
   unspecified.

3a)

Applying the same procedures, the same rules, we finally will get
"John didn't buy a <u>book</u>," with the word "book" stressed.

4a)

```
                              S
              _____|_____
             S1              NEG              S2
      _____|_____              _____|_____
     Neg  NP  Aux    VP           Neg  NP  Aux    VP
          |   |      |                 |   |      |
        John past   _|_             John past    _|_
                   V   NP                        V   NP
                   |   _|_                       |   __|__
                  buy Det  N                    buy Det    N
                      |    |
                      a   book                 unspecified book
```
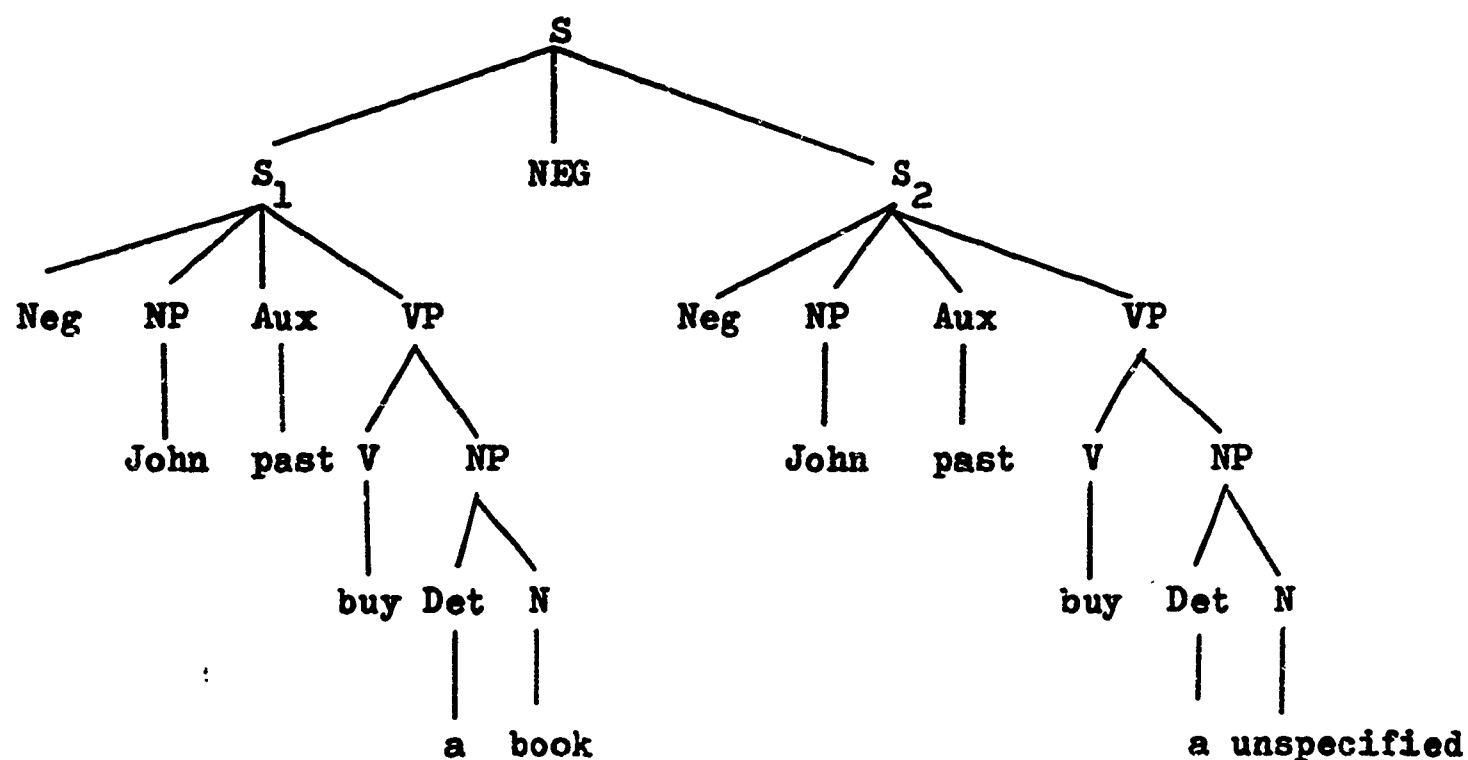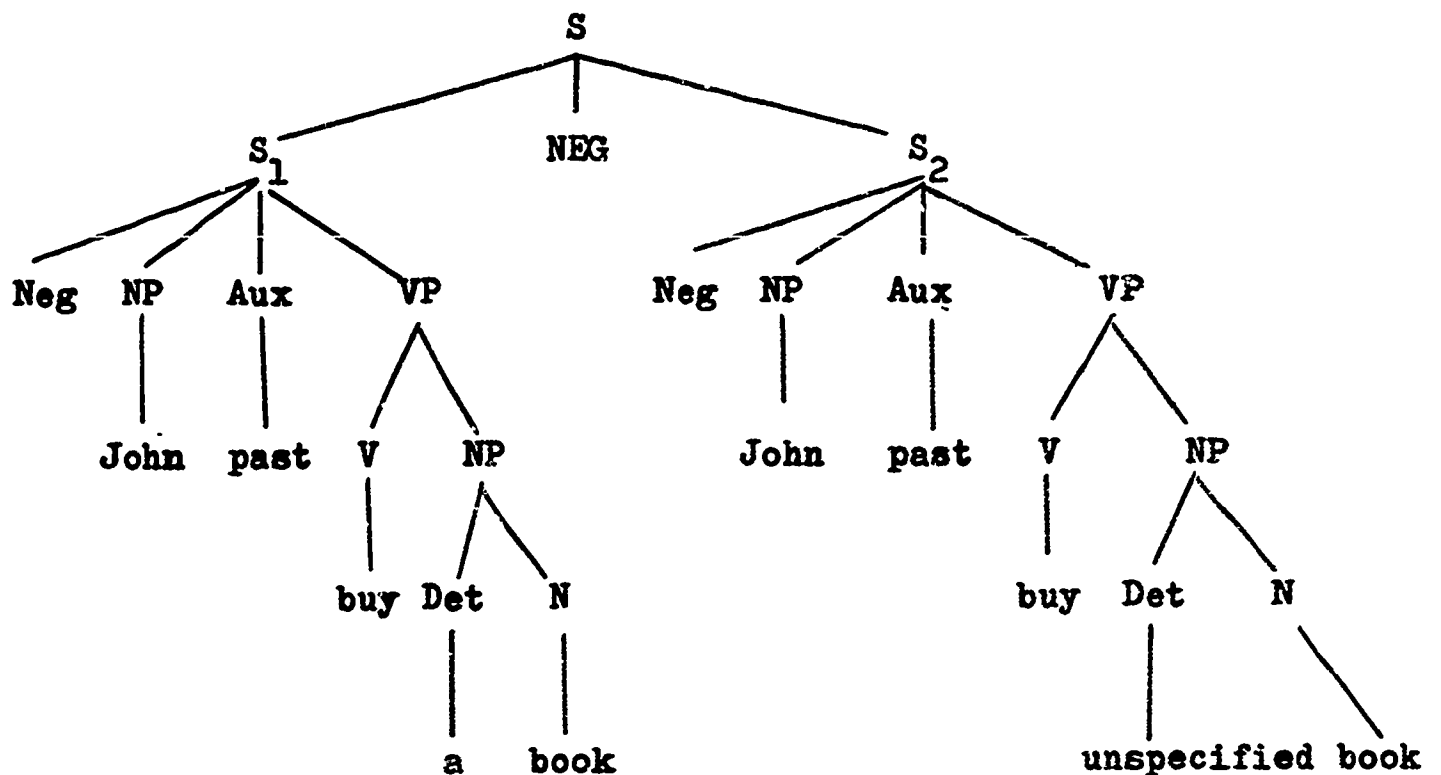
Except the rules shown above, "a" will have to be turned into "one" or
"a single" like before. The surface structure for this will be "John
didn't buy <u>one</u> (<u>a single</u>) book," with "one (a single)" stressed.

5a)

```
                              S
              _____|_____
             S1              NEG              S2
      _____|_____              _____|_____
     Neg  NP  Aux  VP            Neg  NP  Aux    VP
          |   |    |                  |   |      |
        John past _|_              John past    _|_
                 V   NP                        V    NP
                 |   _|_                       |   __|__
                buy Det  N                    buy  __|__
                    |    |               unspecified Det  N
                    a   book                         |    |
                                                     a   book
```
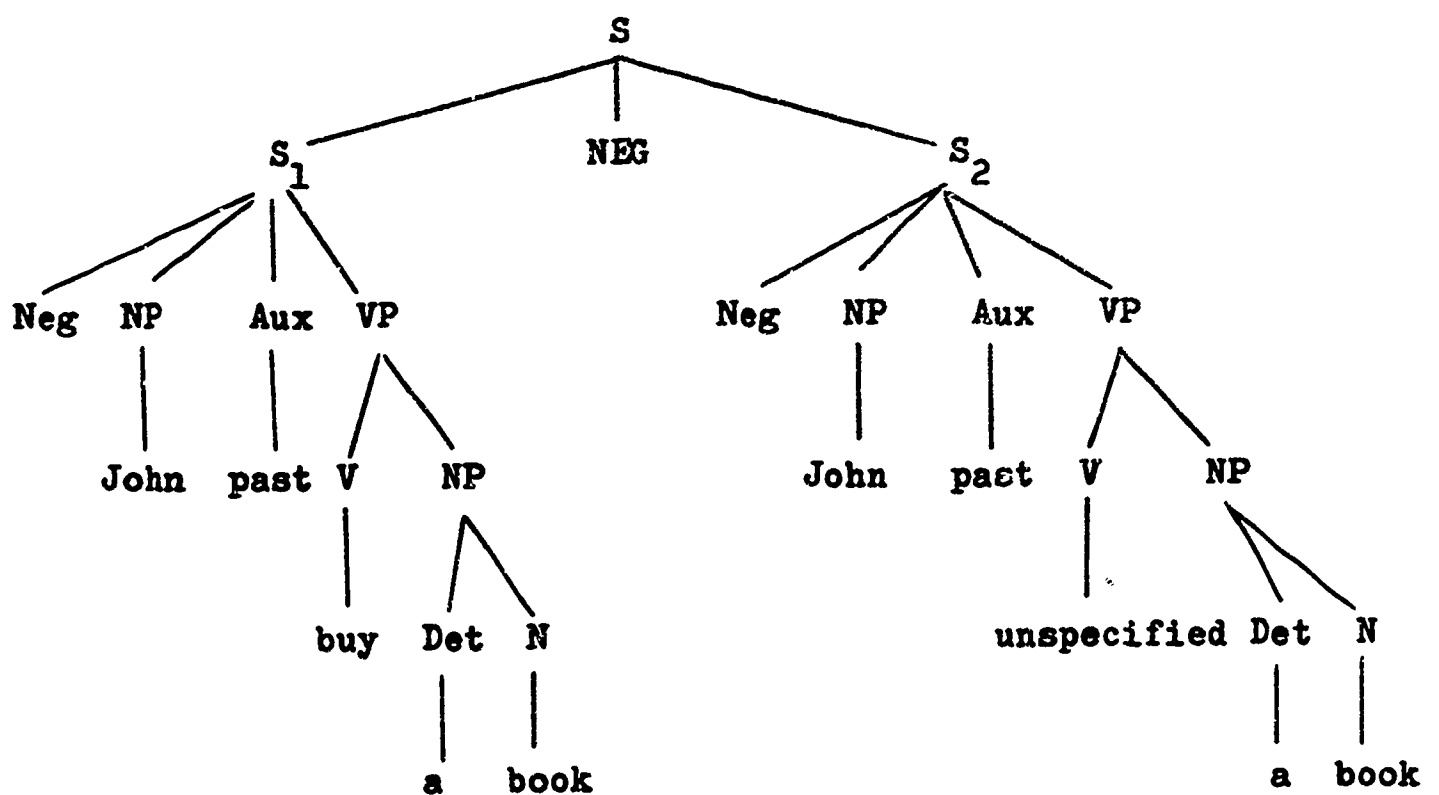
With the same set of rules, we turn this P-marker into the surface structure, "John didn't buy a book," with the verb "buy" stressed.

The encouraging fact is that this analysis seems workable with Chinese, too. Use the equivalent sentence of "John bought a book," in Chinese for example:

1b)
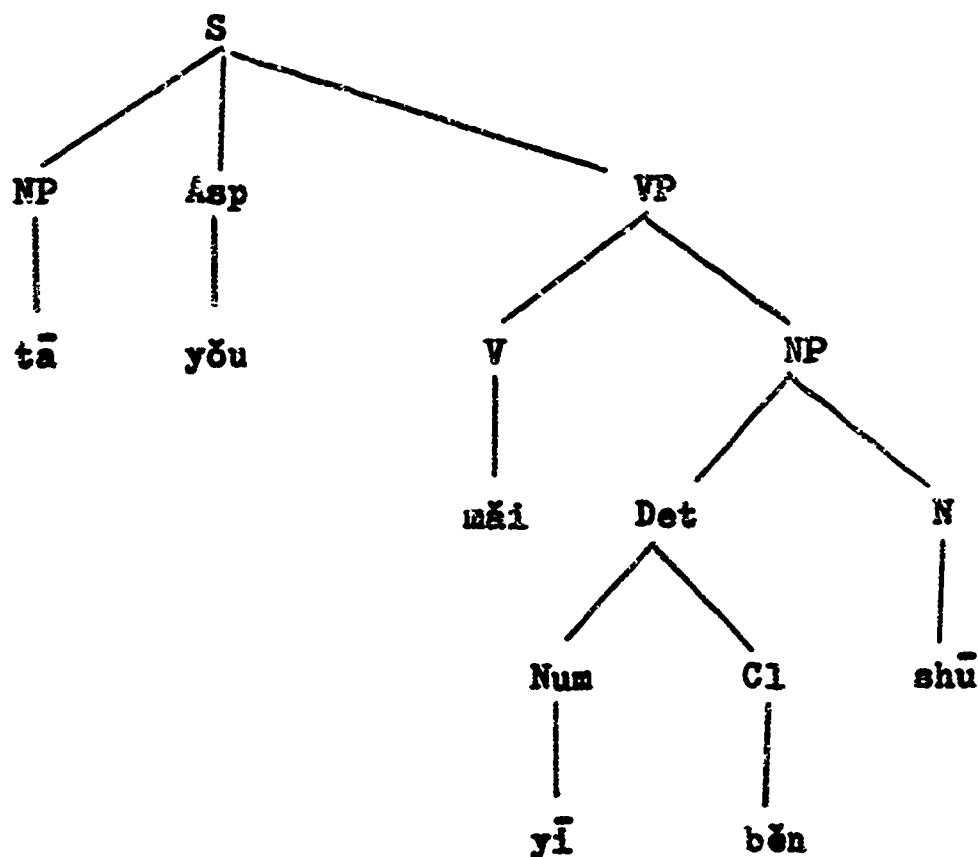
With a P-marker like this, we simply apply T_{Asp}[6] to turn the sentence into the surface structure "Tā mǎi le yī běn shū." We know that no word in the sentence will receive stress, and as a result, the sentence is a neutral statement. Num can be optionally deleted in this case.

2t)

```
                                    S
                  ┌─────────────────┼─────────────────┐
                 S₁                NEG               S₂
         ┌────────┼────────┐              ┌───────────┼──────────┐
        NP       Asp       VP            NP          Asp         VP
         │        │      ┌──┴──┐          │           │       ┌───┴───┐
        tā      yǒu     V    NP      unspecified    yǒu      V      NP
                         │   ┌┴──┐                            │    ┌──┴──┐
                        mǎi Det  N                           mǎi  Det    N
                          ┌──┴──┐ │                           ┌───┴──┐   │
                         Num   Cl shū                        Num    Cl  shū
                          │     │                             │      │
                          yī   běn                            yī    běn
```
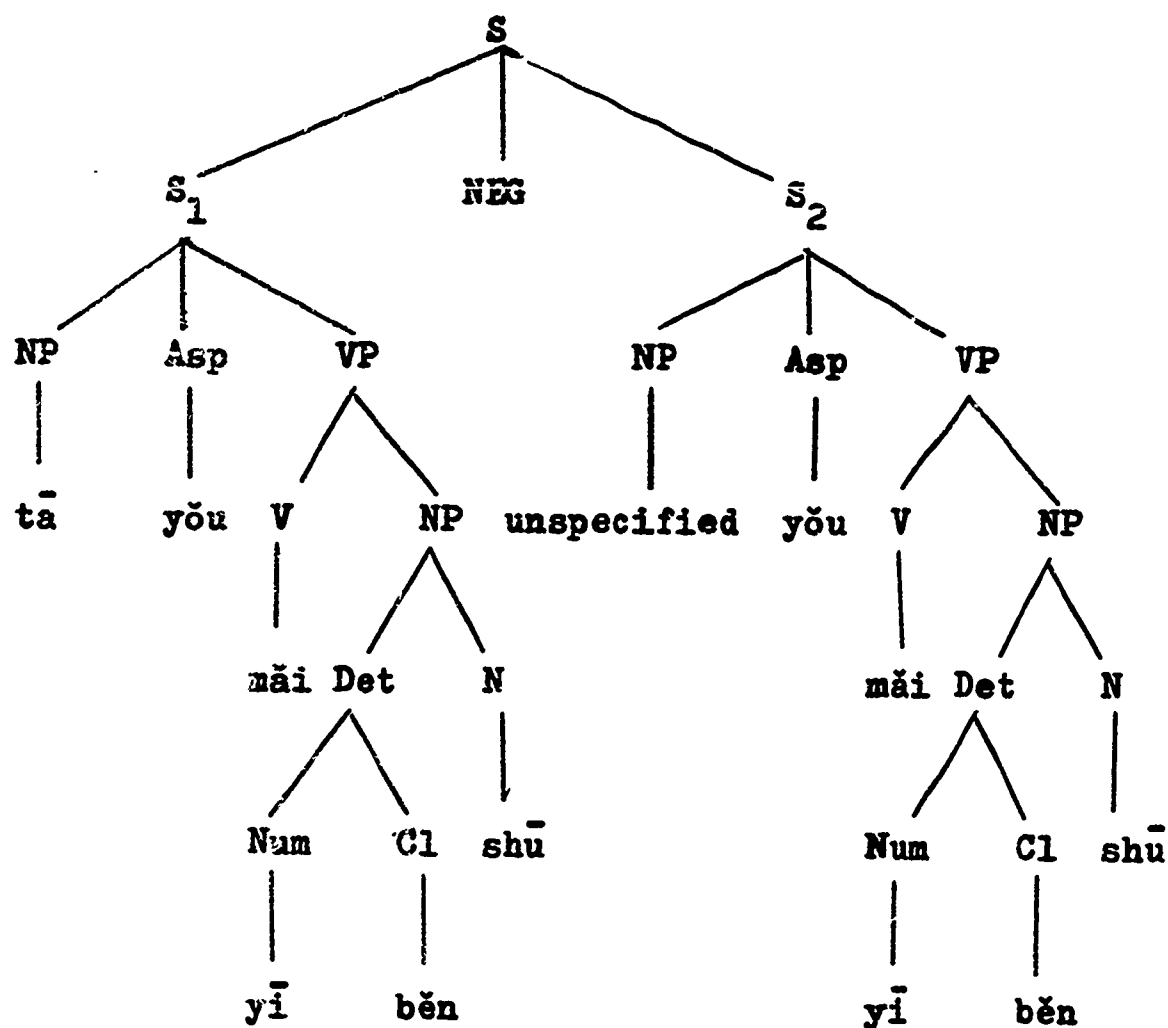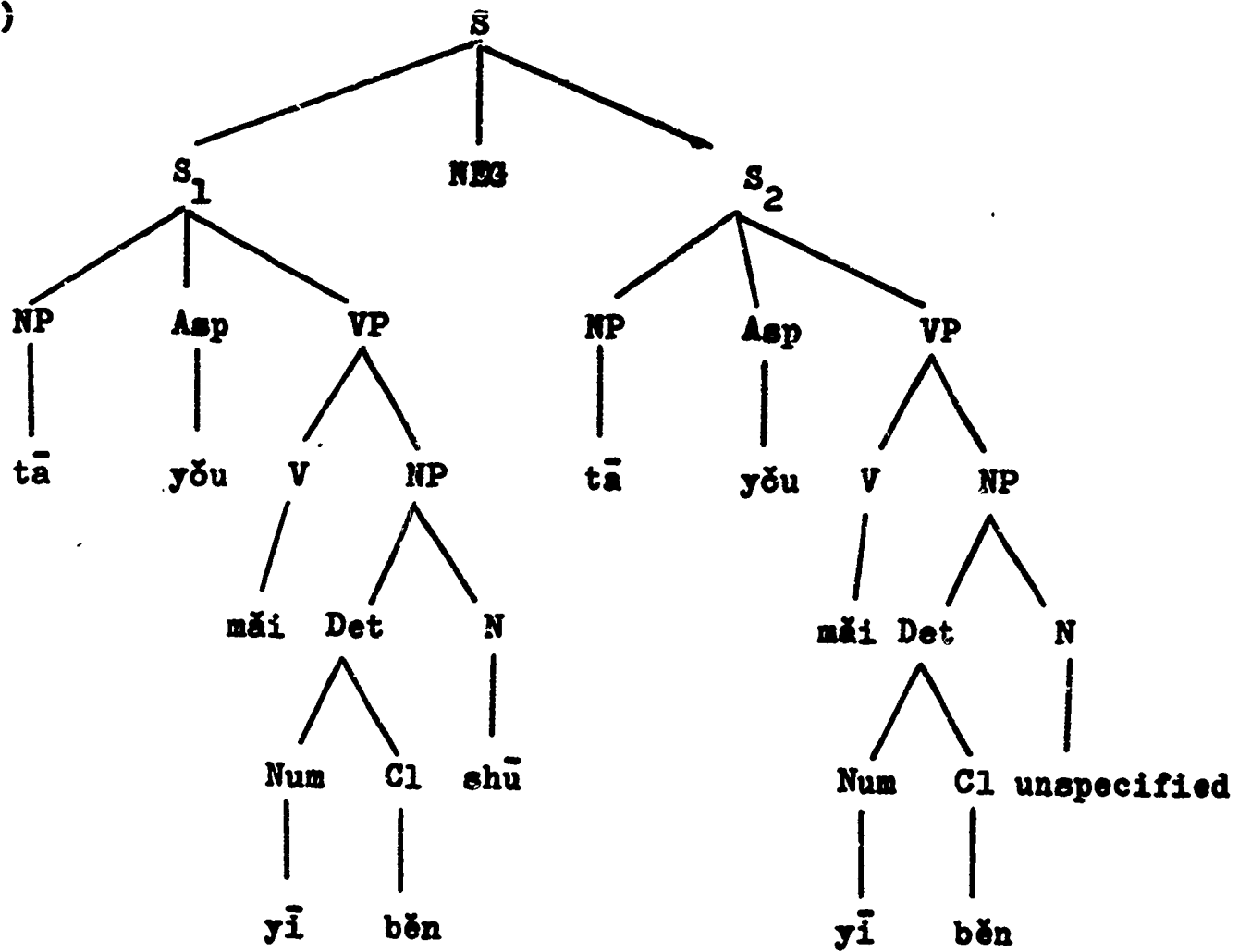
To turn this into the surface structure, "Tā mǎi lè yī běn shū," with the word "tā" stressed, we simply take four steps as we did with the English sentence.
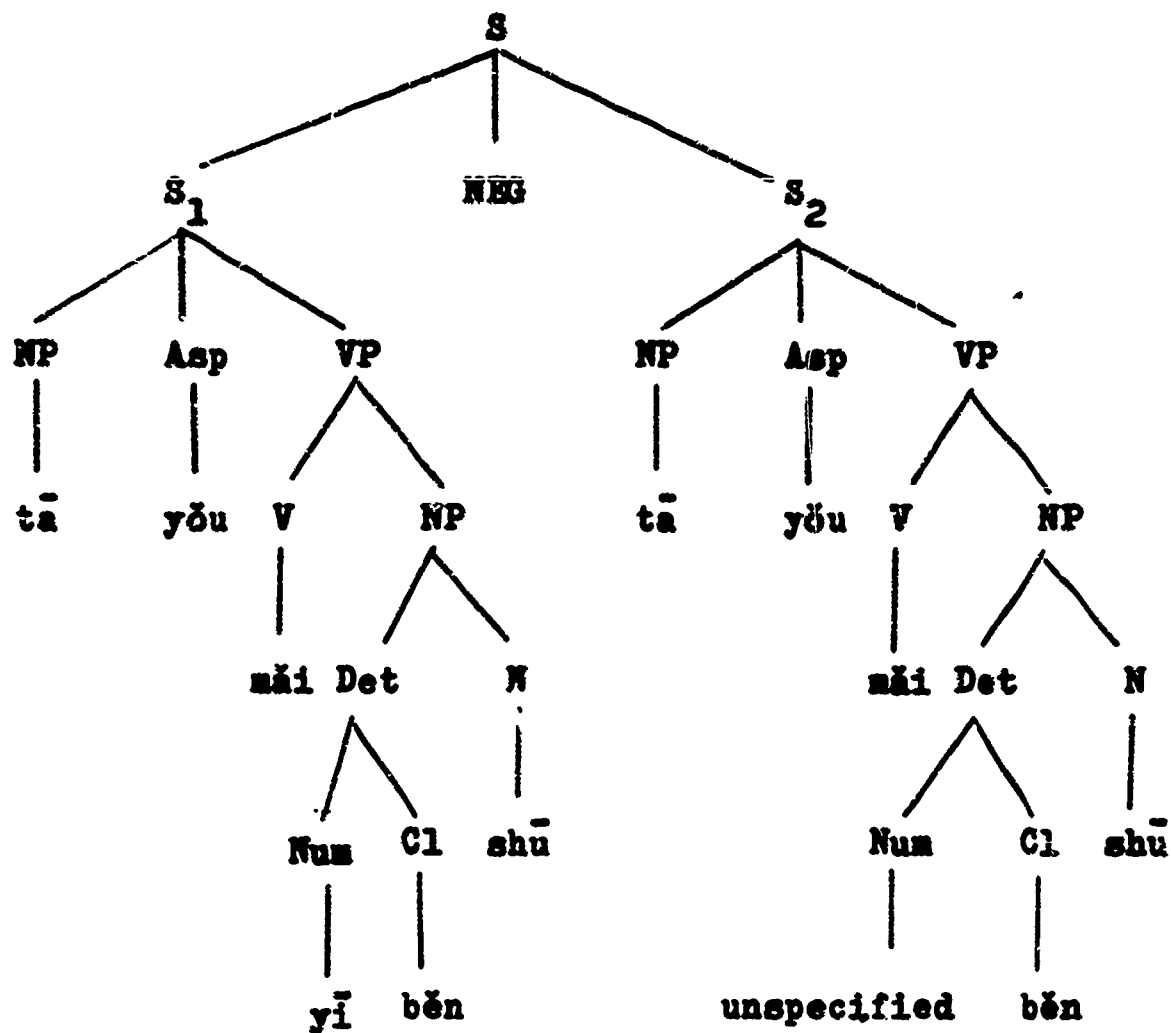
1. Apply T_{Asp} to change yǒu into lè and move it to the place after the verb.
2. Delete the whole S.
3. Delete NEG.
4. Stress the constituent in S_1 whose counterpart in S_2 is unspecified.
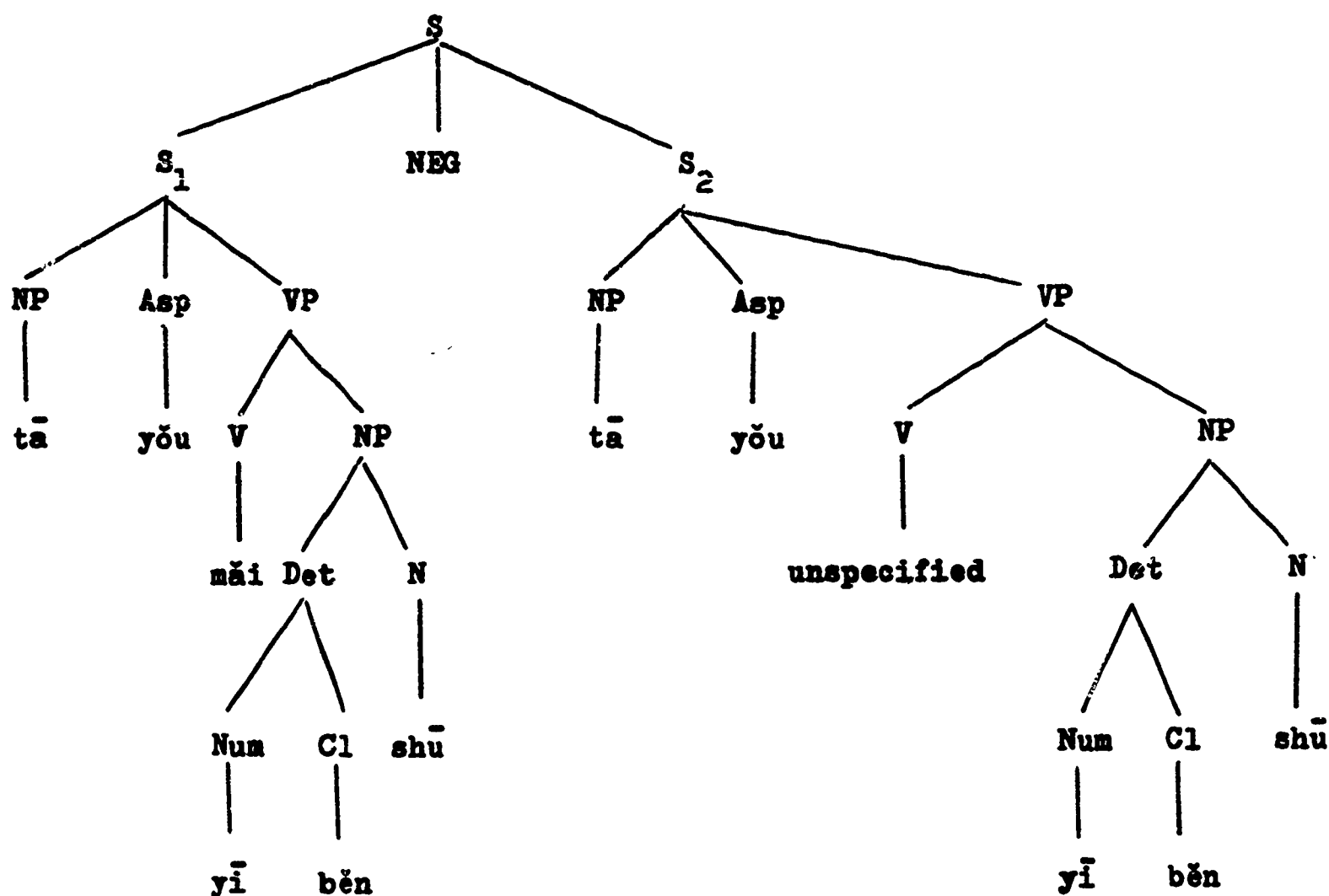
3b)

The same rules will turn this into the surface structure "Tā mǎi lè
yī běn shū," with the word "shū" stressed.

4b)

```
                                    S
                    ┌───────────────┼───────────────┐
                   S₁             NEG              S₂
           ┌────────┼────────┐            ┌────────┼────────┐
          NP       Asp       VP          NP       Asp       VP
          │         │      ┌──┴──┐       │         │      ┌──┴──┐
          tā       yǒu     V     NP      tā       yǒu     V     NP
                           │    ┌─┴─┐            │    ┌─┴─┐
                          mǎi  Det  N          mǎi  Det  N
                              ┌─┴─┐  │              ┌─┴─┐  │
                             Num  Cl shū          Num  Cl shū
                              │    │                │    │
                             yī   běn          unspecified  běn
```

We apply the same rules here. And since Num is the constituent receiving stress, it can not be optionally deleted in this case. Finally, we will get "Tā mǎi lè yī běn shū," with the word yī stressed.

5b)

```
                                S
                 _____|_____
                S₁              NEG              S₂
          _____|_____                   _____|_____
         NP   Asp    VP                   NP   Asp          VP
         |     |    __|__                 |     |        ____|____
         tā   yǒu  V    NP                tā   yǒu      V         NP
              măi |    _|_                          unspecified  _|_
                 Det   N                                        Det  N
                 _|_   |                                        _|_  |
               Num  Cl shū                                   Num  Cl shū
                |    |                                         |    |
               yī   běn                                       yī   běn
```

By using the same rules, this P-marker will be turned into the surface
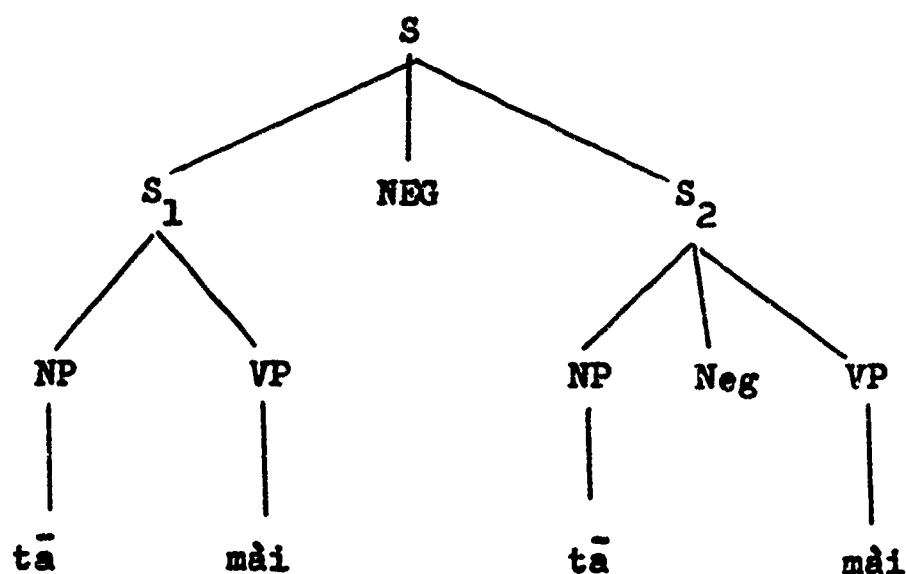structure, "Tā măi lè yī běn shū," with the verb măi stressed.

    I do not know if this analysis will work with other stress languages
or not. Much has to be done before we can say anything definite. However,
it seems to me that, with this kind of explanation, we now can tell, in a
very simple and consistent way, why this word receives stress while others
don't. And vice versa, given a surface structure with one of its constit-
uent stressed, we can reconstruct its deep structure in a very convincing
way.

Section II

In the previous section, I have pointed out that the predictability of stress can be revealed by examining sentences' deep structure. Now, to prove what I have presented here is on the right track, I want to make some further investigation and see if there is any other possible underlying phrase structure from which we may get the same surface structure.
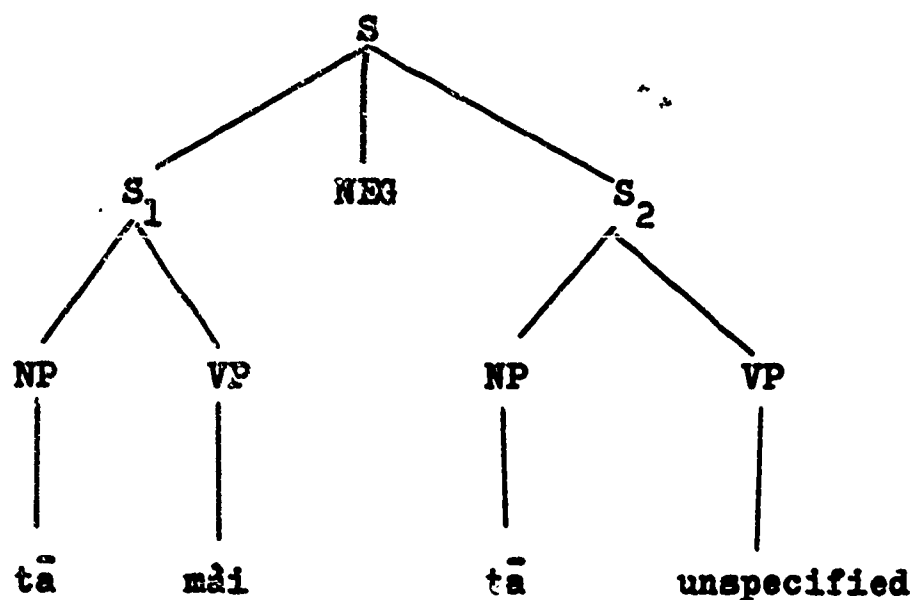
The result of this investigation shows that a sentence with stress on VP might present a case of constructional homonymity. In other words, it will have two possible deep structures. Take the Chinese sentence, "Tā mǎi," for example. The sentence literally means "He sells." We may have an underlying P-marker like this:
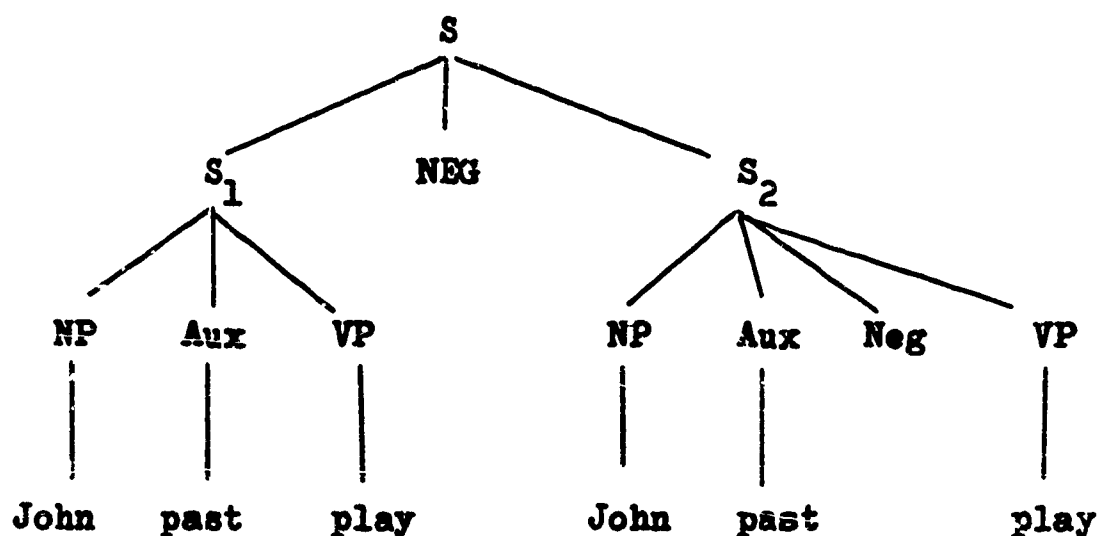
6a)

```
                          S
           ┌──────────────┼──────────────┐
          S_1            NEG            S_2
        ┌──┴──┐                    ┌─────┼─────┐
       NP    VP                   NP    Neg    VP
        │     │                    │           │
       tā    mǎi                  tā          mǎi
```

NEG is connecting S_1 and S_2 while Neg is to negate the verb phrase. With a structure like this, if the rest of the constituents in S_2 are identical with those in S_1, we can simply delete the whole S_2 and NEG, and then add stress on the constituent in S_1 whose counterpart in S_2 is preceded by a negative marker. Thus, we get a surface structure identical with the one we derive from a P-marker in the way as shown in Section I. That is like the following:
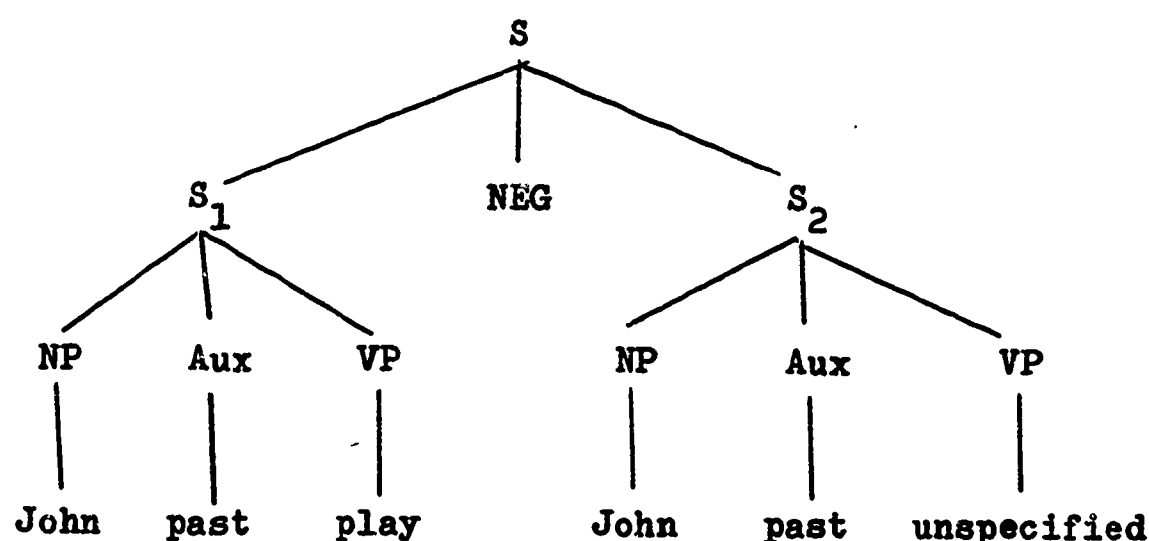
6b)

```
                           S
              ┌────────────┼────────────┐
             S₁           NEG           S₂
          ┌───┴───┐              ┌───────┴───────┐
         NP      VP             NP              VP
          │       │              │               │
          tā      mài            tā          unspecified
```

So, consequently, the sentence "Tā mài" has two different meanings: one means "He sells but he does not buy, or steal, etc." another means "He does sell." Such ambiguity can also be seen in English sentences too. If we examine the sentence, "John played," we will find it can be derived from two different P-markers. One is like this:

7a)

```
                           S
              ┌────────────┼────────────┐
             S₁           NEG           S₂
        ┌─────┼─────┐          ┌──────┬────┬──────┐
        NP   Aux    VP        NP    Aux   Neg    VP
        │     │      │         │      │            │
       John  past  play      John   past         play
```

Another is like this:

7b)

```
                              S
                  _____/|_____
                 /            |            \
               S₁           NEG           S₂
         _____/|_____           _____/|_____
        /       |       \         /       |       \
      NP       Aux       VP     NP       Aux       VP
       |        |        |       |        |        |
     John     past     play    John     past   unspecified
```

The P-marker 7a) carries the meaning, "John did play," while P-marker
7b) means, "John played but he did not do other things." We might call
the first one "emphatic stress" and the second one "contrastive stress."
However, they do not show any difference on their surface structures.

Looking from another angle, we further strengthen our belief that
the sentence "Tā mǎi" is ambiguous by the fact that we may use this sen-
tence to answer either of the following questions:

1. Tā mǎi hái shi mǎi? (Does he sell or buy?)
2. Tā mǎi bu mǎi? (Does he sell or not?

In the case of the English sentence, "John played," we can also use
it to answer either of the following two question types:

1. Did John play or work? - Did John play or watch? - ...
2. Did John play or not?

All these indicate that our argument presented here is correct.
Our conclusion now is that a sentence with its VP (excluding auxiliary)
stressed is a case of constructional homonymity. It could be a con-
trastive stress or an emphatic stress. However, they are differnet since
they are derived from different P-markers.

Section III

The constituent structure of English presented here includes only those parts related to the present problem.

CS Rules:

$$S \rightarrow NP + Aux + VP$$

$$VP \rightarrow \begin{cases} V + NP \\ V_i \end{cases}$$

$$NP \rightarrow Det + N$$

$$Aux \rightarrow \begin{array}{l} present \\ past \end{array}$$

$$V \rightarrow buy, sell, etc.$$

$$V_i \rightarrow play, work, etc.$$

$$Det \rightarrow a, an, the$$

$$N \rightarrow John, book, etc.$$

T Rules: (for contrastive stress)

$$\underset{S_1}{\underline{NP\ Aux\ VP}} \quad NEG \quad \underset{S_2}{\underline{NP\ Aux\ VP}}$$

NP Aux VP with one of the components (excluding Aux) stressed or one of the subunits in VP stressed. The stressed part is chosen on the basis of the second string where one of the constituents is unspecified.

Condition:

1. S_1 and S_2 must be identical except that one of the constituents in S_2 is unspecified.
2. S_1 and S_2 are connected by NEG.

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T Rules: (for emphatic stress)

$$\frac{\text{NP Aux VP}}{S_1} \quad \text{NEG} \quad \frac{\text{NP Aux Neg VP}}{S_2} \quad \rightarrow$$

NP Aux VP with one of the components stressed or one of the subunits in VP stressed. The stressed part is chosen on the basis of the second string where VP is preceded by Neg.

Condition:

1. S_1 and S_2 are identical except that VP in S_2 is preceded by Neg.

2. S_1 and S_2 are connected by NEG.

NOTES

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2. 'English Stress' was published in Language Learning Vol. XII No. 1, pp. 69-77. See the bibliography therein for studies relevant to the present problem.

3. I first used "one" to replace "a" when the latter is stressed. Dr. Langendoen suggested "a single" would sound better than "one" especially in a negative sentence, so both are included here.

4. See Noam Chomsky's Syntactic Structures pp. 65-7.

5. See Noam Chomsky's Syntactic Structures pp. 61-2.

6. See William S-Y. Wang's "Two aspect markers in Mandarin," to appear in Language, September 1965.