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INTEGRATED DEVELOPMENT OF ENGLISH-SPANISH MACHINE TRANSLATION
AID Grant DPE-5542-G-SS-3048-00
1 August 1983 - 31 July 1985

INTERIM PROGRESS REPORT
1 February - 31 July 1984

ADMINISTRATIVE REPORT

Administrative support continued during the second half of the first year of the grant period for Tasks 1 and 2 under the Technical Work Plan approved for Grant DPE-5542-G-SS-3048-00. Based on the accomplishments of the first six months, work during the period from 1 February through 31 July 1984 focused on coordination of assignments of the staff in place, contracting of part-time personnel to perform specific tasks as provided under the Plan of Work, and coordination of consultants. Management of equipment and space continued.

Staffing and Assignments

The project head,¹ Muriel Vasconcellos, continued to devote 35% of her time to activities under the grant. Her work has related to all phases of the project, with special emphasis on the coordination of broad strategies, the development of assignments for staff and consultants, liaison with other offices both inside and outside the Organization, and general management of the project.

Ms. Vasconcellos completed the final touches on the two papers presented in England during the previous semester, the one to appear in the proceedings of the Aslib Conference, "Translating and the Computer 5" (10-11 November 1983), and the other already published in the May 1984 issue of the Newsletter of the Natural Language Processing Group of the British Computer Society. Together with Ms. Marjorie León, the staff computational linguist, a paper on SPANAM and ENGSPAN was prepared and submitted for publication in a special issue of the Journal of Computational Linguistics which will include contributions from all the major noncommercial machine translation systems.

Ms. Vasconcellos developed a series of enhancements at the level of the Wang word processor for accelerating the process of postediting. Pairs of keystrokes can trigger various word switches and substitutions that are frequently required by the system. In addition, theoretical studies were pursued on techniques for reducing the requirement to rearrange large segments

¹As of 1 June 1984 the ATP activity was officially designated Terminology and Machine Translation Program, with Ms. Vasconcellos as its Chief. This action entailed a promotion.

of output, necessitated by the fact that Spanish, unlike English, has a strong tendency to front its predications.

Ms. Marjorie León, the senior computational linguist from the regular PAHO staff, continued to devote 80% of her time to activities under the AID grant. Her work relates to all phases of the ENGSPAN project, with special emphasis on development of the algorithm. During the report period Ms. León created the structure for bringing the three phases of the algorithm -- analysis (the ATN parser), transfer, and synthesis -- into the overall system architecture, so that there is now synthesis into Spanish utilizing all the capabilities of the system. In producing the synthesis, the algorithm makes an automatic choice of one of three alternatives depending on the results of the parse: full parse, partial parse, or, in the event of no possible parse, translation using local analysis.

Under the transfer phase, Ms. León developed and introduced a new type of lexical routine, the transfer unit. This approach offers the possibility, among other things, of greatly expanding the system's potential for selecting a precise gloss for either a specific context or an entire class of contexts. It consists of a set of rules which act on the structural information returned by the parser and select the appropriate target gloss.

In terms of the Plan of Work, Ms. León has addressed Phases 1 through 4 of Task 1 and has coordinated the work of dictionary assistants under Phases 1 through 3 of Task 2. Details are given in the Technical Report below.

In addition to the paper for the American Journal of Computational Linguistics prepared in collaboration with the project head, Ms. León wrote a paper on ENGSPAN which she delivered at the International Conference on Machine Translation held at Cranfield, U.K. (13 - 15 February 1984).

Ms. Lee Ann Schwartz, the full-time computational linguist, continued her work on the ATN parser. There are now eight subnetworks, for parsing at the level of the sentence, the clause, the noun phrase, the verb phrase, the prepositional phrase, the nonfinite verb phrase, and the hyphenated compound. Details on the parser are given in the Technical Report below and the Appendix.

In terms of the Plan of Work, Ms. Schwartz has completed Phases 1 through 4 of Task 1 to the level indicated in the Plan of Work and is now addressing Phase 5, as well as some of the more complex problems associated with certain aspects of the first four phases.

Four part-time dictionary assistants worked on the project during the period. Mr. José Luiz Meurer completed his assignment, which involved the analysis and in-depth coding of a 4,000-word segment of the corpus, as part of Task 2, Phases 1 and 2. Under Task 2, Phase 3, all the verbs in the dictionary were coded for selectional and subcategorizational features (NOBJ, LOBJ, 2OBJ, COMP, LOC, NOPAS, TOINF, UMINF, DCL, ?CL, IMPCL, ING, PREP, DJUN,

OBJPR) through the joint efforts of Ms. Catherine Ellen Howe, Mr. David Landeck, and Ms. Lucretia Vanderwende, graduate students in linguistics at Georgetown University. With the presence of these codos in the dictionary, it is now possible for the parser to be tried on random text.

In terms of the Program of Work, Phases 1 through 3 under Task 2 are approximately half completed. This effort has been held back by the delay in delivery of the Wang workstation ordered for the project, which did not arrive until December 1984, and by other pressures in the Organization which have resulted in use of this workstation for other purposes. The next six months will be focused on an intensified effort to catch up (see under Equipment and Space below).

Mr. David Landeck was contracted to enhance the print program so that it will retrieve and print groups of the foregoing codes from the dictionary using Boolean combinations and mnemonic descriptors. Previously it had been necessary to specify the precise bit and character fields, which made the coding system essentially opaque to the average user.

During the period there was one consultant, Dr. William Cressey, who conducted in-depth studies of specific problems of synthesis that arise when English is translated into Spanish. His briefings and final report provided a contribution to development of the system's transfer component (see Technical Report below).

Equipment and Space

The equipment and working area continued to be the same as at the end of the previous period. There are two Memorex terminals, one Wang workstation, and a Wang matrix printer. Unfortunately, it was necessary to use the project's Wang station for production under the SPANAM activity, which was intense during the period. Steps are therefore under way to rent a temporary station for a period of six months to compensate for this loss of capability. This will mean that more intensive coding can be done on the dictionaries.

In February 1985 the project will be vacating its current quarters because the Governor Shepherd Building is to be torn down. The plan is to move the project to 515 Twenty-second Street, N.W. (around the corner, on the other side of the Gulf station), and it will remain there until the end of the grant period.

Reporting and Evaluation

Regular monthly reports continued to be prepared by the two computational linguists, and these automatically became part of the system's documentation. A consolidated monthly report by the staff computational linguist was forwarded each month through channels within PAHO.

Program fulfillment continued to be discussed with Ruhl Information Management.

Various avenues are being explored for disseminating the use of ENGSPAN. These include a project with the Consortium for International Crop Protection (see below under Other Initiatives), already under way, and talks with the Arnold & Porter Consulting Group, with a view to utilization of ENGSPAN by the National Captioning Institute. Talks are also being held with Georgetown University in regard to use of ENGSPAN by the Center for the Advanced Study of the Americas. Use of ENGSPAN for development of a parallel system into Portuguese would also be an important way of disseminating the effects of the AID grant.

Other Initiatives Associated with ENGSPAN

A request to translate 233,689 words of machine-readable text on pesticides was received by the project, and steps were taken to start using ENGSPAN to translate this material into Spanish under a grant from the Consortium for International Crop Protection (CICP). Some of the text from this activity was included in the experimental corpus of the AID project, and this section of the corpus has been fully analyzed, coded in depth, and translated and postedited. An expert in pesticides, Dr. A. E. Olszyna-Marcys, was contracted as a consultant under the CICP grant to provide the appropriate technical terminology in Spanish and to key in the coded entries for incorporation in the dictionaries (assignment was from 25 to 29 June 1984).

In collaboration with the University of Sta. Catarina in Brazil, a proposal was written and presented to PSTC which envisioned using ENGSPAN as the basis for developing a parallel system into Portuguese, ENGPOR. Although the proposal did not receive consideration, efforts to find a source of funding are being continued.

Through the Arnold & Porter Consulting Group, it was proposed that consideration be given by the National Captioning Institute to utilize ENGSPAN as a vehicle for the preparation of captions in Spanish for television programs, which would be aimed at helping to integrate the U.S. Spanish-speaking population into the mainstream. Use would be made of ACI's infrastructure already in place for the preparation of captions in English for the deaf.

A proposal is under way suggesting that there be official collaboration between Georgetown University and PAHO under the Center for the Advanced Study of the Americas, which brings together the international organizations and the Consortium of universities in the Washington area. Such collaboration could lead to: (1) the exchange and development of dictionaries for purposes of further research in linguistics, Spanish, and Portuguese, and (2) the exchange of ENGSPAN itself with other international organizations that have a translation need into Spanish, in return for either manpower or a monetary contribution to cover support costs on the part of PAHO.

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Exchanges of Information

Ms. Marjorie León represented the project at the 10th International Conference on Computational Linguistics and the 22nd Annual Meeting of the Association for Computational Linguistics, held concurrently at Stanford University during the week of 2-6 July 1984. The meetings were attended by some 450 people. During the discussions of operational MT systems she gave a verbal report on SPANAM and ENGSPAN. Through individual sessions she was able to brief a number of computational linguists on activities under the project.

The Spanish-English/English-Spanish system being marketed commercially by Challenge Systems was examined on two occasions. The second session, held for representatives of the international organizations at the International Monetary Fund, provided an opportunity to verify that the system is a clone of the one that was in place at PAHO in 1980, before any serious linguistic work was done on it. According to recent information, Challenge has withdrawn the product from the market.

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FINANCIAL REPORT
26 March - 25 June 1984

Attached is a copy of the latest financial report submitted under the grant, corresponding to the second quarter of calendar and fiscal year 1984.

While there appears to be an excessive balance on hand, it should be pointed out that the salary costs for Ms. Vasconcellos and Ms. León have not yet been taken into account. In addition, payment on a number of contracts was made during the third quarter. Nevertheless, it is planned to bring in more contractors during the forthcoming six-month period in order to catch up on the dictionary work that needs to be done.

ACC/GRT-4460-84
EGP/FBI/OIO/TC

22 August 1984

Agency for International Development
AID Controller
FE/PAT
EA-12
Washington, D.C. 20023

Gentlemen:

... **Enclosed please find Standard Form 1034, 1035, 269 and**
272, representing expenditures for the period 26 March - 25 June
1984, on Grant No. DPE-5542-G-88-3048-00.

We would appreciate your adjusting the amount of \$15,007.67
against the Letter of Credit withdrawal.

Sincerely,

John A. Hunter, Chief
Accounts Section

... **Encl.**

cc: ABU
ATP
ACC/GRT

| Standard Form 1034 7 GAO 3000 1034-113 | | PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL | | | | VOUCHER NO 03 | |
|---|--|---|---------------|---|---------|---------------------------------------|--|
| U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT AND LOCATION U.S. International Development Agency Washington, D.C. 20523 | | | | DATE VOUCHER PREPARED 22 August 1984 | | SCHEDULE NO | |
| | | | | CONTRACT NUMBER AND DATE DPE-5542-G-SS-3048-00 | | PAID BY | |
| PAYEE'S NAME AND ADDRESS Pan American Health Organization 525 Twenty-Third Street, N.W., Washington, D.C. 20037 | | | | REQUISITION NUMBER AND DATE | | DATE INVOICE RECEIVED | |
| | | | | | | DISCOUNT TERMS | |
| | | | | | | PAYEE'S ACCOUNT NUMBER ICP-HBI-020 | |
| | | | | | | GOVERNMENT B/L NUMBER | |
| SHIPPED FROM | | TO | | WEIGHT | | | |
| NUMBER AND DATE OF ORDER | DATE OF DELIVERY OR SERVICE | ARTICLES OR SERVICES <small>(Enter description, item number of contract or Federal supply schedule and other information deemed necessary)</small> | QUAN-TITY | UNIT PRICE | | AMOUNT (¹) | |
| | | | | COST | PER | | |
| | | See attached details | | | | 15,007.67 | |
| (Use continuation sheet(s) if necessary) (Payee must NOT use the space below) TOTAL | | | | | | \$ 15,007.67 | |
| PAYMENT: | | APPROVED FOR | EXCHANGE RATE | DIFFERENCES | | | |
| <input type="checkbox"/> COMPLETE | | = \$ | = \$1.00 | | | | |
| <input type="checkbox"/> PARTIAL | | BY | | | | | |
| <input type="checkbox"/> FINAL | | TITLE | | | | | |
| <input type="checkbox"/> PROGRESS | | | | Amount verified, correct for | | | |
| <input type="checkbox"/> ADVANCE | | | | (Signature or initials) | | | |
| Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment. | | | | | | | |
| (Date) | | (Authorized Certifying Officer) | | | (Title) | | |
| ACCOUNTING CLASSIFICATION | | | | | | | |
| | | | | | | | |
| PAID BY | CHECK NUMBER ON TREASURER OF THE UNITED STATES | | | CHECK NUMBER ON (Name of bank) | | | |
| | CASH DATE | | | PAYEE | | | |
| | | | | | | PER | |
| | | | | | | TITLE | |

¹ When stated in foreign currency, insert name of currency.
 If the ability to certify and authorize to approve are combined in one person, one signature only is necessary, other wise the approving officer will sign in the space provided over his official title.
 When a voucher is received in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company per John Smith Secretary" or "Treasurer" as the case may be.

VOUCHER NO. 03
 SCHEDULE NO.
 SHEET NO.

Standard Form No. 1035
 7 GAO 5000
 1035-108-01

**PUBLIC VOUCHER FOR PURCHASES AND
 SERVICES OTHER THAN PERSONAL**

CONTINUATION SHEET

U.S. DEPARTMENT, BUREAU, OR ESTABLISHMENT
 US Agency for International Development

| NUMBER AND DATE OF ORDER | DATE OF DELIVERY OR SERVICE | ARTICLES OR SERVICES <i>(Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)</i> | QUAN- TITY | UNIT PRICE | | AMOUNT |
|--------------------------|-----------------------------|--|------------|------------|-----|--------|
| | | | | COST | PER | |

DETAILS OF EXPENDITURES
 FOR THE PERIOD 26 MARCH - 25 JUNE, 1984
 PROJECT ICP/HBI/020/PG

(expressed in US Dollars)

Grant No. DPE-5542-G-SS-3048-00
 Period: 24 August 1983 -
 31 July 1985
 Amount: \$146,697.00

Salaries and Allowances

Lee A. Schwartz Jan/June 1984 12,111.12

CONTRACTUAL SERVICES

Catherine E. Howe 270.00
 30 Hours of Coding
 Susana Santangelo
 100 Hours of Review 900.00

1,170.00

Total Expenditures 13,281.12

Program Support Cost 13% on \$13,281.12 1,726.55

15,007.67
 =====



PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

525 TWENTY-THIRD STREET, N.W., WASHINGTON, D.C. 20037, U.S.A.

CABLE ADDRESS OFSANPAN

IN REPLY REFER TO

TELEPHONE 861-3200

STATEMENT OF CUMULATIVE EXPENSES
FOR THE PERIOD 26 MARCH - 25 JUNE 1984
PROJECT NO. ICP/HBI/020

| | <u>Budget</u> | <u>Expenditure This Period</u> | <u>Cumulative Expenditure</u> | <u>Balance</u> |
|-------------------------|----------------------------|------------------------------------|-----------------------------------|----------------------------|
| Salaries and Allowances | 74,652.00 | 12,111.12 | 17,137.11 | 57,514.89 |
| Contractual Services | 45,348.00 | 1,170.00 | 4,050.00 | 41,298.00 |
| Furniture and Equipment | 9,820.00 | -o- | -o- | 9,820.00 |
| Program Support Cost | <u>16,877.00</u> | <u>1,726.55</u> | <u>2,754.33</u> | <u>14,122.67</u> |
| | <u>146,697.00</u> ===== | <u>15,007.67</u> ===== | <u>23,941.44</u> ===== | <u>122,755.56</u> ===== |

FEDERAL CASH TRANSACTIONS REPORT

(See instructions on the back. If report is for more than one grant or assistance agreement, attach completed Standard Form 272-A.)

Approved by Office of Management and Budget, No. 80-RO182

1. Federal sponsoring agency and organizational element to which this report is submitted

U.S. International Development Cooperation Agency

2. RECIPIENT ORGANIZATION

Name : Pan American Health Organization

Number and Street : 525 Twenty-Third Street, N.W.

City, State and ZIP Code: Washington, D.C. 20037

4. Federal grant or other identification number

DPE-5542-G-SS-3048-00/ICP/HBI/020/PG

6. Letter of credit number

1139-72-00

5. Recipient's account number or identifying number

00/ICP/HBI/020/PG

7. Last payment voucher number

Give total number for this period

8. Payment Vouchers credited to your account

9. Treasury checks received (whether or not deposited)

3. FEDERAL EMPLOYER IDENTIFICATION NO.

10. PERIOD COVERED BY THIS REPORT

FROM (month, day, year)

03-26-84

TO (month, day year)

06-25-84

11. STATUS OF

FEDERAL

CASH

(See specific instructions on the back)

a. Cash on hand beginning of reporting period

\$ 11,066.23

b. Letter of credit withdrawals

-0-

c. Treasury check payments

-0-

d. Total receipts (Sum of lines b and c)

-0-

e. Total cash available (Sum of lines a and d)

11,066.23

f. Gross disbursements

15,007.67

g. Federal share of program income

-0-

h. Net disbursements (Line f minus line g)

15,007.67

i. Adjustments of prior periods

-0-

j. Cash on hand end of period

\$ (3,941.44)

12. THE AMOUNT SHOWN ON LINE 11, ABOVE, REPRESENTS CASH REQUIREMENTS FOR THE ENSUING

Days

13. OTHER INFORMATION

a. Interest income

\$

b. Advances to subgrantees or subcontractors

\$

14. REMARKS (Attach additional sheets of plain paper, if more space is required)

15. CERTIFICATION

I certify to the best of my knowledge and belief that this report is true in all respects and that all disbursements have been made for the purpose and conditions of the grant or agreement

AUTHORIZED
CERTIFYING
OFFICIAL

SIGNATURE

DATE REPORT SUBMITTED

22 August 1984

TYPED OR PRINTED NAME AND TITLE

John A. Hunter, Chief, Accounts Section 202-861-3336

TELEPHONE

(Area Code)

(Number)

(Extension)

THIS SPACE FOR AGENCY USE

FINANCIAL STATUS REPORT

(Follow instructions on the back)

| | | | | | | | |
|--|--|--|--|--|-----------|---|-------|
| 1. FEDERAL AGENCY AND ORGANIZATIONAL ELEMENT TO WHICH REPORT IS SUBMITTED U.S. International Development Cooperation Agency | | 2. FEDERAL GRANT OR OTHER IDENTIFYING NUMBER DPE-5542-G-SS-3048-00 | | OMB Approved No. 30-RO180 | PAGE 1 | OF 1 | PAGES |
| 3. RECIPIENT ORGANIZATION (Name and complete address, including ZIP code) Pan American Health Organization 525 Twenty-Third Street, N.W. Washington, D.C.20037 | | 4. EMPLOYER IDENTIFICATION NUMBER | | 5. RECIPIENT ACCOUNT NUMBER OR IDENTIFYING NUMBER ICP/HBI/020/PG | | 6. FINAL REPORT <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO | |
| 7. BASIS <input checked="" type="checkbox"/> CASH <input type="checkbox"/> ACCRUAL | | 8. PROJECT/GRANT PERIOD (See instructions) FROM (Month, day, year) 08/24/83 | | 9. PERIOD COVERED BY THIS REPORT TO (Month, day, year) 07/31/85 | | FROM (Month, day, year) 03/26/84 | |
| | | | | TO (Month, day, year) 06/25/84 | | | |

| PROGRAMS/FUNCTIONS/ACTIVITIES ▶ | STATUS OF FUNDS | | | | | | TOTAL (g) |
|---|-----------------|-----|-----|-----|-----|-----|--------------|
| | (a) | (b) | (c) | (d) | (e) | (f) | |
| a. Net outlays previously reported | \$ 8,933.77 | \$ | \$ | \$ | \$ | \$ | \$ 8,933.77 |
| b. Total outlays this report period | 15,007.67 | | | | | | 15,007.67 |
| c. Less: Program income credits | -0- | | | | | | -0- |
| d. Net outlays this report period (Line b minus line c) | 15,007.67 | | | | | | 15,007.67 |
| e. Net outlays to date (Line a plus line d) | 23,941.44 | | | | | | 23,941.44 |
| f. Less: Non-Federal share of outlays | -0- | | | | | | -0- |
| g. Total Federal share of outlays (Line e minus line f) | 23,941.44 | | | | | | 23,941.44 |
| h. Total unliquidated obligations | 13,908.00 | | | | | | 13,908.00 |
| i. Less: Non-Federal share of unliquidated obligations shown on line h | -0- | | | | | | -0- |
| j. Federal share of unliquidated obligations | 13,908.00 | | | | | | 13,908.00 |
| k. Total Federal share of outlays and unliquidated obligations | 37,849.44 | | | | | | 37,849.44 |
| l. Total cumulative amount of Federal funds authorized | 146,697.00 | | | | | | 146,697.00 |
| m. Unobligated balance of Federal funds | 108,847.56 | | | | | | 108,847.56 |

| | | | | | | | |
|---|---|----------------------|-----------------------------|------------------------------|--|--|---|
| 11. INDIRECT EXPENSE | B. TYPE OF RATE (Place "X" in appropriate box) <input type="checkbox"/> PROVISIONAL <input type="checkbox"/> PREDETERMINED <input checked="" type="checkbox"/> FINAL <input type="checkbox"/> FIXED | | | | 13. CERTIFICATION I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents. | SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL John A. Hunter Chief, Accounts Section | DATE REPORT SUBMITTED 22 August 1984 |
| | b. RATE 13% | c. BASE 13,281.12 | d. TOTAL AMOUNT 1,726.55 | e. FEDERAL SHARE 1,726.55 | | | |
| 12. REMARKS: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation. | | | | | | | |
| | | | | | | TYPED OR PRINTED NAME AND TITLE | TELEPHONE (Area code, number and extension) 202-861-3336 |

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TECHNICAL REPORT
1 February - 31 July 1984

The three phases of the English-Spanish machine translation program (ENGSPAN) are now in place. The analysis phase includes the source word and phrase lookup procedures, an augmented transition network (ATN) parser, and local analysis routines which are used as a "safety net" when a complete parse cannot be obtained. The transfer phase consists of lexical and syntactic transfer procedures. The synthesis phase includes the target lookup procedure, verb phrase synthesis, and noun phrase synthesis.

The ATN parser, which was being developed as an independent program, has been linked with the synthesis procedures contained in ENGSPAN. The combined program can produce a target translation based on the results of a complete parse, a partial parse, or the local analysis routines. The grammar, which previously handled only independent declarative clauses, has been expanded to include interrogative sentences, sentences with existential there, and several types of dependent clauses. The parsing algorithm itself has been refined by the addition of a hold list, which is used in parsing questions and relative clauses, and a well-formed phrase list, which is used to improve the efficiency of backtracking.

A successful parse eliminates the need for other methods of homograph resolution. In the case of a partial or unsuccessful parse, homographs are resolved by using the information returned by the parser for the longest path found; the remaining words in the sentence are disambiguated by the local analysis routines.

The procedures for noun and verb phrase synthesis have been modified to utilize some of the information returned by the parser. Subject-verb agreement and modifier-head concord are now determined by the parse, while the word order in noun phrases is still based on the pattern-matching procedure used in earlier versions of the program. Work is now proceeding on the development of transfer and synthesis routines that will take full advantage of the results of the parse.

As part of its transfer procedures, the program now includes a module which accesses a new type of dictionary entry called a transfer unit. These units are actually rules that use the structural information returned by the parser in order to select the desired gloss from among the possible alternative target translations of a word.

Work on the dictionaries accomplished during the reporting period included the coding of all verbs for their syntactic coda, recoding or addition of all irregular verb forms, the implementation of a scheme for the coding of adjectives, and the coding of premodifiers and adverbs. The program that prints the dictionaries was enhanced so that groups of records can be retrieved by specifying Boolean combinations of bit fields as well as character fields.

The Parser

The parser utilizes an augmented transition network. The network consists of eight subnetworks, for the parsing of sentences, clauses, noun phrases, verb phrases, prepositional phrases, nonfinite verb phrases, hyphenated compounds, and comparative phrases. Each subnetwork consists of a set of states connected by arcs that define the sequences of words which are accepted by the grammar.

Each arc has a label that indicates either the part of speech that must be matched by the current word in the input string in order for the parser to consume the word and move onto the next one, or the state and subnetwork to be moved to before the current word can be consumed. Four types of arcs -- category arcs, jump arcs, seek arcs, and send arcs -- correspond to the different types of labels. The category arc is the only arc that consumes an element of the input string, and does so when the part of speech of the current word corresponds to the category; the jump arc moves the processing to another state within the same subnetwork; the seek arc indicates on which subnetwork the processing is to continue; and the send arc indicates that processing is to return to the subnetwork where processing had been taking place when a seek arc was taken. Associated with each arc is a condition to be satisfied before the arc can be traversed, an action to be performed after the arc is traversed, and the state to which the transition is to be made. Conditions, actions, or both, may be null.

The algorithm performs a top-down, left-to-right sequential parse with chronological backtracking. The parser stops after completing the first successful parse. The path taken through the network depends on the ordering of the arcs at each state, the structural information already determined by the parser, and the codes contained in the dictionary record for each lexical item and multiple-word entry. The algorithm processes the words of the input string one at a time, moving from left to right. At each state, all arcs are tested to determine whether they may be taken for the current word. The possible arcs are placed on a pushdown stack, and the top arc on the stack is taken. The parser continues through the input string as long as it can find an arc that it is allowed to take. If no arc is found for the current word, the parser backtracks. If the end of the string is reached and the algorithm is at a final state in the network, the parse is successful. If no path can be found through the network, the parse fails. If there are more words in the sentence than the parser allows (at present the parser allows a sentence to be 40 words long), the parser stops working, saves the information it has generated, and informs the backup and synthesis routines that it is returning only a partial parse.

The network itself is not part of the algorithm; it is specified at run time. This makes it possible to expand the grammar without recompiling the program and to experiment with different network configurations and with combinations of conditions and actions. At the end of the reporting period, the network contained a total of 63 states and 184 arcs and used 62 conditions and 38 actions.

Although the ATN grammar is being designed primarily in order to parse complete sentences, it must also be able to handle titles and other types of incomplete sentences such as those found in lists and in segments of the input bounded by parentheses, dashes, and colons and semicolons. The parser is being equipped to recognize these situations and relax the appropriate conditions. In addition, a new parameter, which can be specified at run time, allows the parser to accept sentence fragments even if they are punctuated as complete sentences. This option is needed in order to deal with texts such as the WHO Data Sheets on Pesticides, which contain many incomplete sentences.

Two other parameters were added to the combined version of the program in order to facilitate the process of testing and debugging. One of these options causes the parser to be bypassed completely so that the backup analysis modules can be tested. The other causes a step-by-step record of the parse to be printed out.

Preparations are currently being made to enable the algorithm to perform explicit backtracking. The parser now makes use of a list of well-formed phrases which it creates when it backtracks. This list contains all the information generated by the parser after the point at which it is about to restart the parse. This information can be reused, if possible, at a later point. In this way the parser avoids doing the same work more than once.

When the parser backtracks chronologically, the point from which the parse is restarted is the last point at which it was presented with a choice of paths to take. In explicit backtracking this is not necessarily the case. If the parser has a hypothesis about the type of error it has made, it can restart the parse at the point where the error was most likely to have occurred. As in chronological backtracking, a list of well-formed phrases will help to avoid reparsing; however, with explicit backtracking it is crucial that such a list exist. If the parser's hypothesis about its error should prove to be incorrect, it must be able to restore the information it had developed at the point when it made the incorrect hypothesis and either form new hypotheses or start backtracking chronologically.

The use of a list of well-formed phrases requires additional storage space. In order to avoid taking up too much storage, a limit is set on the number of phrase information structures that can be allocated. This limit is currently set at 25. If this limit is exceeded, parsing stops and a partial parse is returned, as in the case of the sentence that exceeds the limit on sentence length.

Noun Phrase (Task 1, Phase 1)

The parse identifies the components of the noun phrase: its head, its person and number, and the modification relationships within the phrase. The following types of simple noun phrases are being analyzed: phrases consisting of a head which is a noun, pronoun, adjective, or numerative; phrases containing determiners, phrasal quantifiers, possessive nouns, numeratives, adjectives,

tives, and/or nouns in premodifying position; and phrases containing some types of hyphenated and conjoined premodifiers. In addition, the parser handles complex noun phrases consisting of any or all these elements plus an appositive clause, postmodifying prepositional phrases, adverbial clauses, and/or full or reduced relative clauses. Conjoined noun phrases are also being parsed.

Figure 1 shows the translations of examples 1-9. The results of the parse for all the examples given in this report are included in the Appendix.

- (1) Famines have social and economic implications.
(simple NP) (NP with conjoined modifiers)
- (2) A large number of animals died from poisoning.
(phrasal quantifier)
- (3) Another factor bearing on routes and rates of exposure is
(reduced relative (conjoined noun phrases)
clause with gerund)
the amount used.
(reduced relative clause with past participle)
- (4) The fact that it happens often is well known.
(appositive clause)
- (5) The problems that are caused by starvation are apparent.
(full relative clause)
- (6) Pesticides protect the farmers' crops.
(possessive modifier)
- (7) Many persons with heavy and prolonged occupational exposure to DDT in
(numerative) (conjoining in object (postmodification
of preposition) of object)
manufacturing plants have been subjected to exhaustive medical
(gerund premodifier) (adjectival modification)
examinations.
- (8) The representative of the Mexican-American group spoke in Spanish.
(hyphenated premodifier)
- (9) Spraymen from areas where the normal diet is of a low nutritional
(adverbial clause)
standard have shown no predisposition to poisoning.

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| | | |
|---|----|--|
| FAMINES HAVE SOCIAL AND ECONOMIC IMPLICATIONS . | OK | LAS HAMBRUNAS TIENEN CONSECUENCIAS SOCIALES Y ECONOMICAS . |
| A LARGE NUMBER OF ANIMALS DIED FROM POISONING . | OK | UN GRAN NUMERO DE ANIMALES MURIERON DE INTOXICACION . |
| ANOTHER FACTOR BEARING ON ROUTES AND RATES OF EXPOSURE IS THE AMOUNT USED . | OK | OTRO FACTOR QUE ATAN#E RUTAS Y TASAS DE EXPOSICION ES LA CANTIDAD EMPLEADA . |
| THE FACT THAT IT HAPPENS OFTEN IS WELL KNOWN . | OK | EL HECHO QUE SUCEDE A MENUDO BIEN SE SABE . |
| THE PROBLEMS THAT ARE CAUSED BY STARVATION ARE APPARENT . | OK | LOS PROBLEMAS QUE SON CAUSADOS POR INANICION SON EVIDENTES . |
| PESTICIDES PROTECT THE FARMERS' CROPS . | OK | LOS PLAGUICIDAS PROTEGEN LOS CULTIVOS DE AGRICULTORES . |
| MANY PERSONS WITH HEAVY AND PROLONGED OCCUPATIONAL EXPOSURE TO DDT IN MANUFACTURING PLANTS HAVE BEEN SUBJECTED TO EXHAUSTIVE MEDICAL EXAMINATIONS . | OK | MUCHAS PERSONAS CON EXPOSICION OCUPACIONAL INTENSA Y PROLONGADA A DDT EN PLANTAS MANUFACTURERAS SE HAN SOMETIDO A EXAMENES MEDICOS EXHAUSTIVOS . |
| THE REPRESENTATIVE OF THE MEXICAN-AMERICAN GROUP SPOKE IN SPANISH . | OK | EL REPRESENTANTE DEL GRUPO MEXICANO-NORTEAMERICANO HABLO/ EN ESPANOL . |
| SPRAYMEN FROM AREAS WHERE THE NORMAL DIET IS OF A LOW NUTRITIONAL STANDARD HAVE SHOWN NO PREDISPOSITION TO POISONING . | OK | LOS PULVERIZADORES DE AREAS DONDE LA DIETA NORMAL ES DE UNA NORMA NUTRICIONAL BAJA NO HAN DEMOSTRADO PREDISPOSICION A INTOXICACION . |

Figure 1. Examples of noun phrases.

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Verb Phrase (Task 1, Phase 2)

Declarative Sentences

The parser identifies the head of the verb phrase: its person, number, tense, aspect, and voice, and the type and location of the verb's arguments. The verb phrase network includes arcs for adjuncts, direct and indirect objects, complements, nonfinite verb phrases, prepositional phrases, and clauses. Simple verb phrases consisting of main verbs preceded by modals and auxiliary verbs and modified by adverbs are being analyzed in both the affirmative and negative. There is also provision for certain types of conjoining. Figure 2 shows the translations of examples 10-16.

- (10) Most are relatively strong acids that readily form salts and amides.
(main verb + complement) (main verb + direct obj)
- (11) Necessary adjustments will be made as the study progresses.
(future + passive) (intransitive)
- (12) The group should not have been exposed to the pesticide before the commencement of the operation.
(modal + negative + perfect + passive)
- (13) These properties do not influence the extent of water contamination.
(negative with "do")
- (14) An information system can also be used for quality control.
(intervening adverb)
- (15) The program costs the government more money every year.
(verb + indirect object + direct object + time phrase)
- (16) The technicians carried the project out efficiently.
(verb + adjunct)

Additional examples of the translation of verbs with adjuncts, both contiguous and noncontiguous, are given in Figure 3. Figure 4 illustrates sentences containing existential there.

Interrogative Sentences

The parser now handles interrogative sentences in which the questioned element is the subject or object of the verb, the proposition itself, or some adverbial element. The parser analyzes the surface structure and leaves it as is. As in declarative sentences, the parser identifies the subject and object of the sentence.

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MOST ARE RELATIVELY STRONG ACIDS THAT READILY FORM
SALTS AND AMIDES . OK
NECESSARY ADJUSTMENTS WILL BE MADE AS THE STUDY
PROGRESSES . CK
THE GROUP SHOULD NOT HAVE BEEN EXPOSED TO THE PESTICIDE
BEFORE THE COMMENCEMENT OF THE OPERATION . CK
THESE PROPERTIES DO NOT INFLUENCE THE EXTENT OF WATER
CONTAMINATION . OK
AN INFORMATION SYSTEM CAN ALSO BE USED FOR QUALITY
CONTROL . CK
THE PROGRAM COSTS THE GOVERNMENT MORE MONEY EVERY YEAR . OK
THE TECHNICIANS CARRIED THE PROJECT OUT EFFICIENTLY . OK

LA MAYORIA SON ACIDOS RELATIVAMENTE FUERTES QUE
FACILMENTE FORMAN SALES Y AMIDAS .
LOS AJUSTES NECESARIOS SE EFECTUARAN A MEDIDA QUE EL
ESTUDIO PROGRESA .
EL GRUPO NO DEBE HABERSE EXPUESTO AL PLAGUICIDA ANTES
DEL COMIENZO DE LA OPERACION .
ESTAS PROPIEDADES NO INFLUYEN EL GRADO DE
CONTAMINACION DE AGUA .
UN SISTEMA DE INFORMACION TAMBIEN PUEDE EMPLEARSE
PARA CONTROL DE CALIDAD .
EL PROGRAMA CUESTA EL GOBIERNO MAS DINERO CADA ANO .
LOS TECNICOS LLEVARON A CABO EL PROYECTO
EFICIENTEMENTE .

Figure 2. Examples of verb phrases in declarative sentences.

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II TURNED ON THE LIGHT .
II TURNED THE LIGHT ON .
II TURNED OFF THE LIGHT .
II TURNED THE LIGHT OFF .
II TURNED THE PAGE .
|WILL HE TURN DOWN THE OFFER ?
|DID HE TURN THE OFFER DOWN ?

OK
OK
OK
OK
OK
OK
OK
OK

PRENDI/ LA LUZ .
PRENDI/ LA LUZ .
APAGUE/ LA LUZ .
APAGUE/ LA LUZ .
VOLTEE/ LA PA/GINA .
X RECHAZARA/ LA OFERTA ?
X RECHAZO/ LA OFERTA ?

Figure 3. Examples of verbs with adjuncts.

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!THERE IS A GOOD RESTAURANT ON THE CORNER . CK
!THERE WERE MANY FACTORS THAT HAD NOT BEEN CONSIDERED . CK
WILL THERE BE ENOUGH BEDS FOR ALL THE PATIENTS ? OK
!WAS THERE ENOUGH COFFEE ? OK
IF THERE IS NO EXPOSURE , THERE CAN BE NO RISK . CK

HAY UN RESTAURANTE BUENO EN LA ESQUINA .
HUBO MUCHOS FACTORES QUE NO SE HABIAN CONSIDERADO .
X HABRA/ SUFICIENTES CAMAS PARA TODOS LOS PACIENTES ?
X HUBO SUFICIENTE CAFE/ ?
SI NO HAY EXPOSICION , NO PUEDE HABER RIESGO .

Figure 4. Examples of sentences with existential there.

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Figure 5 shows the translation of examples 17-24.

- (17) Which doctor operated?
(questioning the subject of the verb)
- (18) Which manual did he consult?
(questioning the object)
- (19) On what scale will the program operate?
(questioning an adverbial element)
- (20) Where do they obtain their medicine?
(questioning an adverbial element)
- (21) Has he written the report?
(questioning the proposition - auxiliary separated from verb phrase)
- (22) Are the data reliable?
(questioning the proposition - entire verb phrase preceding subject)
- (23) Will there be changes in the report?
(questioning the proposition - auxiliary separated from verb phrase, subject following verb phrase)
- (24) Were there problems with the data?
(questioning the proposition - entire verb phrase precedes empty subject which is followed by the full subject)

Prepositional Phrases (Task 1, Phase 3)

Prepositional phrases can be parsed on the clause level, the noun phrase level, and the verb phrase level. Figure 6 contains the translations of examples 25-28.

- (25) In developing countries, the concept of preventive medicine is gaining acceptance.
(clause level)
- (26) Mankind became the host to a variety of diseases.
(noun phrase level)
- (27) These chemicals are used in smaller quantities.
(verb phrase level)

Work has begun on determination of the relationship between the prepositional phrase and the other elements of the sentence. In the default situa-

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| | | |
|--|----|---|
| WHICH DOCTOR OPERATED ? | OK | X¿QUE/ DOCTOR OPERO/ ? |
| WHICH MANUAL DID HE CONSULT ? | OK | X¿QUE/ MANUAL CONSULTO/ ? |
| ON WHAT SCALE WILL THE PROGRAM OPERATE ? | OK | X¿EN QUE/ ESCALA EL PROGRAMA OPERARA/ ? |
| WHERE DO THEY OBTAIN THEIR MEDICINE ? | OK | X¿DO/ND E OBTIENEN SU MEDICINA ? |
| HAS HE WRITTEN THE REPORT ? | OK | X HA ESCRITO EL INFORME ? |
| ARE THE DATA RELIABLE ? | OK | X¿SON LOS DATOS CONFIABLES ? |
| WILL THERE BE CHANGES IN THE REPORT ? | OK | X HABRA/ CAMBIOS EN EL INFORME ? |
| WERE THERE PROBLEMS WITH THE DATA ? | OK | X HUBO PROBLEMAS CON LOS DATOS ? |

Figure 5. Examples of interrogative sentences.

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IN DEVELOPING COUNTRIES , THE CONCEPT OF PREVENTIVE
MEDICINE IS GAINING ACCEPTANCE .

OK

EN PAISES EN VIAS DE DESARROLLO , EL CONCEPTO DE
MEDICINA PREVENTIVA ESTA GANANDO LA ACEPTACION .

HUMANITY BECAME THE HOST TO A VARIETY OF DISEASES .

OK

LA HUMANIDAD LLEGO A SER EL HUESPED DE UNA VARIEDAD DE
ENFERMEDADES .

THESE CHEMICALS ARE USED IN SMALLER QUANTITIES .

OK

ESTOS PRODUCTOS QUIMICOS SE EMPLEAN EN CANTIDADES MAS
PEQUEÑAS .

THE PEOPLE ATTEMPTED TO PROTECT THEIR LIVESTOCK FROM
DISEASE .

OK

LAS PERSONAS INTENTARON PROTEGER SU GANADO DE
ENFERMEDAD .

Figure 6. Examples of prepositional phrases.

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tion, a prepositional phrase immediately following a noun phrase is taken to modify that noun phrase. If, however, a verb or noun in the same clause is coded for the particular preposition that initiates the phrase in question, the default does not obtain. For example, in the sentence that follows, the prepositional phrase is parsed with the verb phrase rather than as a postmodifier of the noun phrase that precedes it because the verb is coded for the preposition from.

(28) The people attempted to protect their livestock from disease.

Nonfinite Verb Phrases (Task 1, Phase 4)

Nonfinite verb phrases, in the form of the gerund and the marked infinitive, are being handled at various levels of the sentence. At the level of the verb phrase, marked infinitives and gerunds can be parsed if the head of the verb phrase is coded to take either of these. The verbs begin and continue, for example, are coded to take these constructions. Marked infinitives functioning as purpose clauses can also be parsed. The translations of examples 29-33 are shown in Figure 7.

(29) The project began to produce results.
(verb coda)

(30) You should continue adding salt to the mixture.
(verb coda)

(31) The government promoted modern agricultural practices to overcome these threats to the welfare of man.
(purpose clause)

At the level of the noun phrase, gerunds and participial phrases are parsed as reduced relative clauses. Examples:

(32) The manual containing the instructions is in the library.

(33) The manual written in English must be translated into Spanish first.

At the sentence level, the parser can also handle nonfinite verb phrases containing marked infinitives and participial phrases. Verb phrases containing gerunds can also be parsed when they function as the object of a preposition.

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| | | |
|--|-------|---|
| THE PROJECT BEGAN TO PRODUCE RESULTS . | OK | EL PROYECTO EMPEZO/ A PRODUCIR RESULTADOS . |
| YOU SHOULD CONTINUE ADDING SALT TO THE MIXTURE . | OK | USTED DEBE CONTINUAR ANADIENDO LA SAL A LA MEZCLA . |
| THE GOVERNMENT PROMOTED MODERN AGRICULTURAL PRACTICES TO OVERCOME THESE THREATS TO THE WELFARE OF MAN . | OK | EL GOBIERNO PROMOVIO/ PRACTICAS AGRICOLAS MODERNAS PARA SUPERAR ESTAS AMENAZAS AL BIENESTAR DEL HOMBRE . |
| THE MANUAL CONTAINING THE INSTRUCTIONS IS IN THE LIBRARY . | OK | EL MANUAL QUE CONTIENE LAS INSTRUCCIONES ESTA/ EN LA BIBLIOTECA . |
| THE MANUAL WRITTEN IN ENGLISH MUST BE TRANSLATED INTO SPANISH FIRST . | OK TO | EL MANUAL ESCRITO EN INGLES DEBE TRADUCIRSE AL ESPANOL PRIMERO . |

Figure 7. Examples of nonfinite verb phrases.

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Parsing at the Clause Level (Task 1, Phase 5)

As evidenced by the examples of relative clauses, adverbial clauses, and participial clauses, much has already been accomplished in parsing at the clause level. At the level of the sentence, both independent and dependent (participial and full) clauses are parsed. At the level of the noun phrase, both full and reduced relative clauses are analyzed. At the level of the verb phrase, clauses are accepted as objects of verbs and as adverbials. Figure 8 shows the translations of examples 34-36. The sections on noun phrases and nonfinite verb phrases contain other examples of clauses currently being parsed.

- (34) If there is no exposure, there can be no risk to the organism.
(subordinate conj & full dependent clause - independent clause)
- (35) There can be no risk to the organism if there is no exposure.
(independent clause - subordinate conj & full dependent clause)
- (36) We know that environmental pollution is a serious problem.
(clause as object of the verb)

The parser is also able to analyze input strings that do not contain complete sentences. For example, titles are accepted without a main verb phrase; strings ending with a colon are accepted with an incomplete verb phrase; and strings ending with a semicolon do not require a main verb phrase when the previous string ended with either a colon or a semicolon. Figure 9 shows the translations of examples 37 and 38.

- (37) These considerations include:
(no direct object)
- (38) (a) the acute dermal toxicity of the formulated product when dermal exposure is considered the most significant route of absorption;
(no main verb phrase)

Transfer Procedures

The parser is now equipped to analyze many types of sentences which cannot be translated into Spanish using the same syntactic structures. Work has begun on the development of syntactic transfer procedures to handle these constructions. A consultant has already provided some guidance on problems such as the synthesis of passive verb phrases, reduced relative clauses containing present and past participles, and infinitive phrases. Other areas to be dealt with include the ordering of subject and predicate, synthesis and ordering of clitic pronouns, insertion of personal a, synthesis of the definite article, the use of the subjunctive mood, and the selection of prepositions.

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| IF THERE IS NO EXPOSURE , THERE CAN BE NO RISK TO THE ORGANISM . OK

| THERE CAN BE NO RISK TO THE ORGANISM IF THERE IS NO EXPOSURE . OK

| WE KNOW THAT ENVIRONMENTAL POLLUTION IS A SERIOUS PROBLEM . OK

| SI NO HAY EXPOSICION , NO PUEDE HABER RIESGO AL ORGANISMO .

NO PUEDE HABER RIESGO AL ORGANISMO SI NO HAY EXPOSICION

•
SAREMOS QUE LA CONTAMINACION AMBIENTAL ES UN PROBLEMA SERIO .

Figure 8. Examples of sentences with dependent clauses.

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THESE CONSIDERATIONS INCLUDE :
(A) THE ACUTE DERMAL TOXICITY OF THE FORMULATED
PRODUCT WHEN DERMAL EXPOSURE IS CONSIDERED THE MOST
SIGNIFICANT ROUTE OF ABSORPTION ;

OK
OK

ESTAS CONSIDERACIONES INCLUYEN :
(A) LA TOXICIDAD DERMICA AGUDA DEL PRODUCTO FORMULADO
CUANDO LA EXPOSICION DERMICA SE CONSIDERA LA RUTA MAS
SIGNIFICATIVA DE ABSORCION ;

Figure 9. Examples of incomplete sentences.

The program now includes a lexical transfer procedure which is invoked when the sentence has been parsed successfully. This procedure utilizes a new type of dictionary entry called a transfer unit in order to select the desired gloss from among alternative translations within the same part of speech. The criteria specified in the transfer unit are based on the syntactic relationships which have been identified by the parser, the occurrence of a specific lexical item as one of the arguments of the word in question, or the occurrence of a lexical item with specific semantic features.

If an English word has been coded as the trigger for a transfer unit, the source dictionary is consulted and the first unit is retrieved. The conditions specified in the unit are tested; if they are met, its actions are performed. If the conditions are not met, the next unit is retrieved and tested. This process continues until a unit is found for which the conditions are met or until all units for the word have been checked.

Currently, two types of transfer units have been implemented: a unit that checks the semantic features or identity of the object of a verb or preposition, and a unit that checks the type of coda which occurs with a verb. The verb-object relationship is identified in both active and passive sentences and in reduced participial phrases. At least three other types of units are planned: one will check the relationship between subject and verb, another will identify the head and its modifier(s), and the third will look within a given clause for any two specific lexical items that have been coded to occur in association.

Figure 10 contains the translations of examples 39-51.

- (39) The methods of crop protection that have been used by small farms for centuries must be improved by the introduction of modern agricultural concepts.
(object is time word) (object is deverbal noun)
- (40) He asked a question.
(object is specific word)
- (41) I asked many difficult questions.
(object is specific word, which is premodified and inflected)
- (42) He asked to continue working.
(coda is a marked infinitive)
- (43) The professor asked that the students return the books.
(coda is an imperative (verb is transitive) clause)
- (44) The professor asked when the students would return with the books.
(coda is an interrogative clause) (verb is intransitive)

- (45) He asked for a raise.
(verb + bound preposition)
- (46) They raise chickens.
(object is animate)
- (47) They raised the price of beef.
(object is specific word)
- (48) The children were raised in Mexico.
(subject of passive verb phrase is animate)
- (49) They raised the American flag.
(object is specific word)
- (50) The participants raised many interesting questions.
(object is specific word)
- (51) The funds raised by the volunteers were an important contribution.
(specific word is modified by reduced relative clause)

Noun and Adjective Coding

Twelve new feature codes were implemented for adjectives and nouns. The six bit fields previously reserved for adjective features are used for the first set of codes. The other six features are coded in the fields that were previously designated for selectional restrictions for the indirect object. Those selectional restrictions have been eliminated. The new codes are as follows:

| <u>Descriptor</u> | <u>Code</u> | <u>Explanation</u> | <u>Example</u> |
|-------------------|-------------|---|---------------------------------|
| ADJ= | GEN | General modifier (usually comparable) | new |
| | TEMP | Temporary condition (requires <u>estar</u> in Spanish) | available |
| | INFL | Inflects only with <u>-er</u> and <u>-est</u> | tall |
| | OPINF | Takes either <u>-er</u> and <u>-est</u> or <u>more</u> and <u>most</u> | common |
| | PLUS | Positive connotation | desirable |
| | NEG | Negative connotation | unfortunate |
| | NAT | Nationality | American |
| | MAT | Material | plastic |
| | COLOR | Color | red |
| | SCALE | Follows a unit of measure | long |
| | DEV | Device | generator |
| | DCL | Followed by a appositive clause | it is <u>evident</u> that... |

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|THE METHODS OF CROP PROTECTION THAT HAVE BEEN USED BY
SMALL FARMS FOR CENTURIES MUST BE IMPROVED BY THE
INTRODUCTION OF MODERN AGRICULTURAL CONCEPTS .

OK TU TU

|LOS METODOS DE PROTECCION DE CULTIVOS QUE HAN SIDO
EMPLEADOS POR EXPLOTACIONES PEQUEÑAS POR SIGLOS DEBEN SER
MEJORADOS MEDIANTE LA INTRODUCCION DE CONCEPTOS AGRICOLAS
MODERNOS .

|HE ASKED A QUESTION .

OK TU

HIZO UNA PREGUNTA .

|I ASKED MANY DIFFICULT QUESTIONS .

OK TU

HICE MUCHAS PREGUNTAS DIFICILES .

|HE ASKED TO CONTINUE WORKING .

OK TU

PIDIO/ CONTINUAR TRABAJANDO .

|THE PROFESSOR ASKED THAT THE STUDENTS RETURN THE BOOKS

OK TU YU

|EL PROFESOR PIDIO/ QUE LOS ESTUDIANTES DEVOLVIERAN LOS
LIBROS .

|THE PROFESSOR ASKED WHEN THE STUDENTS WOULD RETURN WITH
THE BOOKS .

OK TU

|EL PROFESOR PREGUNTO/ CUANDO LOS ESTUDIANTES
REGRESARIAN CON LOS LIBROS .

|HE ASKED FOR A RAISE .

OK

PIDIO/ UN AUMENTO .

|THEY RAISE CHICKENS .

OK TU

CRIZAN POLLOS .

|THEY RAISED THE PRICE OF BEEF .

OK TU

AUMENTARON EL PRECIO DE LA CARNE DE RES .

|THE CHILDREN WERE RAISED IN MEXICO .

OK TU

|LOS NIÑOS SE CRIARON EN MEXICO .

|THEY RAISED THE AMERICAN FLAG .

OK TU

IZARON LA BANDERA NORTEAMERICANA .

|THE PARTICIPANTS RAISED MANY INTERESTING QUESTIONS .

OK TU

|LOS PARTICIPANTES PLANTEARON MUCHAS PREGUNTAS
INTERESANTES .

|THE FUNDS RAISED BY THE VOLUNTEERS WERE AN IMPORTANT
CONTRIBUTION .

OK TU

|LOS FONDOS RECAUDADOS POR LOS VOLUNTARIOS FUERON UNA
CONTRIBUCION IMPORTANTE .

Figure 10. Examples of lexical transfer units.

In addition to these codes, adjectives can be coded using other applicable noun and verb features. These include:

| <u>Descriptor</u> | <u>Code</u> | <u>Explanation</u> | <u>Example</u> |
|-------------------|-------------------------|--|-------------------------|
| NOUN= | HUM | Human | childish |
| | ANIM | Animate | mammalian |
| | FEM | Feminine | maternal |
| | LOC | Location | rural |
| | TIME | Time | monthly |
| | QUAN | Quantity | excessive |
| | BODY | Body part | renal |
| | COND | Condition | diabetic |
| | TREAT | Treatment | surgical |
| CODA= | PREP TO=PREP OF=PREP | Followed by the specified preposition | attributable capable |
| IMPCL | | Followed by verb in subjunctive mood in Spanish | advisable impossible |
| TOINF | | Followed by infinitive in English | likely |

Revised Codes for Verbs

The coding system for the tense of English verbs was modified in order to improve the handling of irregular verbs. All irregular forms were added to the dictionary or recoded, as necessary, in accordance with the following scheme:

| <u>Tense</u> | <u>Code</u> | <u>Descriptor</u> | <u>Example</u> |
|---------------------------------|-------------|-------------------|----------------|
| Third person singular present | 0 | PRES | has |
| Past only | 2 | PAST | took |
| Past and past participle | 3 | 2-3 | made |
| Stem, past, and past participle | 4 | 123 | cost |
| Present participle | 5 | PART | living |
| Past participle only | 6 | PPRT | taken |
| Infinitive only | 7 | INF | be |
| Stem or uninflected form | 8 | STEM | live |
| Stem and past participle | 9 | 1-3 | come |

APPENDIX

The following pages contain a list of the codes, a copy of the network, and the results of the parse of each of the examples given in the text of the report.

List of codes

The codes for parts of speech are given below. These codes appear on the network, as labels of category arcs, and in the phrase information structures produced by the parse.

| <u>Code</u> | <u>Part of speech</u> |
|-------------|-------------------------------------|
| 01 | Preposition |
| 02 | Coordinate conjunction |
| 03 | Subordinate conjunction |
| 05 | Auxiliary |
| 07 | <u>not</u> |
| 09 | <u>than</u> and <u>as</u> |
| 11 | Noun |
| 12 | Verb |
| 13 | Adjective |
| 14 | Adverb |
| 21 | Predeterminer |
| 22 | Determiner |
| 23 | Non-predicative adjective |
| 32 | Ordinal number |
| 33 | Quantifier |
| 34 | Cardinal number |
| 38 | Proper name |
| 39 | Personal title |
| 41 | Subject pronoun only |
| 42 | Subject and object pronoun |
| 43 | Object pronoun only |
| 44 | Possessive pronoun |
| 45 | Reflexive pronoun |
| 51 | Modifier of adjective and/or adverb |
| 52 | Modifier of numerative |
| 53 | General purpose modifier |
| 75 | Prefix |
| 93 | Question mark |
| 96 | Comma |
| 97 | Colon |
| 98 | Semicolon |

The following codes appear in the network as labels on seek arcs and in the phrase information structures as phrase labels. With the exception of CM and V2, which are varieties of CL and VP respectively, each of the following codes also represents a subnetwork in the network system.

| <u>Code</u> | <u>Phrase type</u> |
|-------------|--|
| ST | Sentence |
| CL | Clause |
| CM | Comparative clause |
| NP | Noun Phrase |
| VP | Verb Phrase |
| V2 | Participial verb phrase |
| PP | Prepositional Phrase |
| SN | Sentence Nominalization (for/to complementation and infinitive phrases) |
| HY | Hyphenated compound |
| MT | Comparative phrase |

The codes XX and YY appear in the network as labels for jump and send arcs, respectively. The codes NH and PH appear in the parse. They represent noun phrases and prepositional phrases, respectively, which have been copied from the hold list.

The following codes are found in the phrase information structures. They indicate the role of the elements within a phrase. Some codes may represent different roles in different types of phrases.

| <u>Code</u> | <u>Role</u> |
|-------------|-----------------------------|
| B | Auxiliary <u>be</u> |
| C | Verbal complement |
| D | Descriptor in NP |
| H | Dependent clause in ST |
| H | Head noun in NP |
| I | Auxiliary <u>have</u> in VP |
| I | Indirect object |
| J | Adjunct |
| K | Numerative |
| M | Modal in VP |
| M | Main clause in ST |
| O | Object |
| S | Subject |
| T | Determiner in NP |
| V | Time noun phrase in VP |
| V | Main verb |
| Y | Existential <u>there</u> |

| Sentence | | | |
|----------|---|---|---------|
| NETWORK | 3 | 1 | STATE 1 |
| 03 | 3 | 1 | 78 0 |
| CL | 2 | 1 | 0 86 |
| NETWORK | 2 | 1 | STATE 2 |
| 96 | 2 | 1 | 0 0 0 |
| 03 | 3 | 1 | 78 0 0 |
| YY | 0 | 0 | 81 0 0 |
| NETWORK | 4 | 1 | STATE 3 |
| CL | 4 | 1 | 0 87 |
| V2 | 4 | 1 | 0 87 |
| NETWORK | 5 | 1 | STATE 4 |
| 96 | 5 | 1 | 85 0 0 |
| YY | 0 | 0 | 81 0 0 |
| NETWORK | 6 | 1 | STATE 5 |
| CL | 6 | 1 | 0 86 |
| NETWORK | 0 | 1 | STATE 6 |
| YY | 0 | 0 | 81 0 0 |

| Clause | | | | |
|---------|----|---|----------|----|
| NETWORK | 6 | 2 | STATE 1 | 14 |
| 14 | 6 | 2 | 84 14 | |
| 05 | 3 | 2 | 18 93 | |
| VP | 10 | 2 | 90 90 | |
| 14 | 2 | 2 | 89 90 | |
| 14 | 1 | 2 | 73 0 0 | |
| NP | 4 | 2 | 21 89 | |
| NP | 2 | 2 | 21 16 | |
| NP | 2 | 2 | 21 16 | |
| NP | 4 | 2 | 0 8 | |
| PP | 4 | 2 | 0 8 | |
| PP | 1 | 2 | 0 0 0 | |
| SN | 1 | 2 | 0 0 0 | |
| SN | 4 | 2 | 0 0 0 | |
| 96 | 1 | 2 | 0 0 0 | |
| NETWORK | 3 | 2 | STATE 2 | 20 |
| 05 | 3 | 2 | 88 20 | |
| VP | 11 | 2 | 70 0 | |
| NETWORK | 5 | 2 | STATE 3 | 8 |
| XX | 5 | 2 | 34 8 | |
| NP | 9 | 2 | 0 8 | |
| NETWORK | 5 | 2 | STATE 4 | 20 |
| 05 | 5 | 2 | 88 20 | |
| VP | 13 | 2 | 0 0 0 | |
| YY | 0 | 2 | 9 0 0 | |
| NETWORK | 7 | 2 | STATE 5 | 14 |
| 14 | 7 | 2 | 94 14 | |
| NETWORK | 8 | 2 | STATE 6 | 0 |
| VP | 8 | 2 | 0 0 | |
| NETWORK | 8 | 2 | STATE 7 | 94 |
| V2 | 8 | 2 | 0 94 | |
| YY | 13 | 2 | 91 91 | |
| NETWORK | 12 | 2 | STATE 8 | 19 |
| NP | 12 | 2 | 92 19 | |
| YY | 13 | 2 | 91 0 | |
| NETWORK | 13 | 2 | STATE 9 | 0 |
| V2 | 13 | 2 | 20 0 | |
| NETWORK | 11 | 2 | STATE 10 | 14 |
| 14 | 11 | 2 | 94 14 | |
| NP | 11 | 2 | 0 9 | |
| NETWORK | 12 | 2 | STATE 11 | 8 |
| NP | 12 | 2 | 0 8 | |
| NETWORK | 13 | 2 | STATE 12 | 0 |
| SN | 13 | 2 | 0 0 0 | |
| YY | 0 | 0 | 9 0 0 | |
| NETWORK | 0 | 2 | STATE 13 | 0 |
| YY | 0 | 0 | 9 0 0 | |

Noun Phrase

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 1 | |
| YY | 0 | 00000000 | 79 | 26 |
| 21 | 1 | 00000000 | 0 | 1 |
| 22 | 3 | 00000000 | 0 | 1 |
| 41 | 2 | 00000000 | 0 | 6 |
| 42 | 6 | 00000000 | 0 | 6 |
| 43 | 9 | 00000000 | 0 | 2 |
| 38 | 7 | 00000000 | 0 | 0 |
| 44 | 7 | 00000000 | 0 | 0 |
| 4T | 1 | 87 | 0 | 0 |
| XX | 2 | 0 | 0 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 2 | |
| 11 | 2 | 00000000 | 12 | 1 |
| 32 | 3 | 00000000 | 0 | 4 |
| 34 | 3 | 00000000 | 0 | 4 |
| 23 | 2 | 00000000 | 0 | 1 |
| 34 | 9 | 00000000 | 0 | 2 |
| 51 | 3 | 00000000 | 0 | 3 |
| 53 | 3 | 00000000 | 0 | 3 |
| 53 | 3 | 00000000 | 0 | 3 |
| 22 | 2 | 00000000 | 0 | 4 |
| 33 | 3 | 00000000 | 0 | 2 |
| 33 | 3 | 00000000 | 0 | 4 |
| HY | 3 | 0 | 0 | 17 |
| XX | 3 | 0 | 0 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 3 | |
| 14 | 3 | 00000000 | 75 | 3 |
| 13 | 3 | 00000000 | 0 | 3 |
| HY | 3 | 00000000 | 0 | 17 |
| 13 | 9 | 00000000 | 10 | 2 |
| XX | 4 | 0 | 0 | 0 |

| | | | | |
|---------|----|----------|----|----|
| NETWORK | 3 | STATE | 4 | |
| 11 | 4 | 00000000 | 15 | 3 |
| 11 | 5 | 00000000 | 96 | 19 |
| 11 | 10 | 00000000 | 12 | 19 |
| XX | 6 | 00000000 | 11 | 7 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 5 | |
| XX | 6 | 00000000 | 9 | 0 |
| 11 | 6 | 00000000 | 98 | 19 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 6 | |
| V2 | 9 | 00000000 | 16 | 17 |
| XX | 9 | 00000000 | 0 | 0 |
| V2 | 9 | 00000000 | 99 | 17 |

| | | | | |
|---------|----|----------|---|----|
| NETWORK | 3 | STATE | 7 | |
| O3 | 8 | 00000000 | 5 | 15 |
| XX | 10 | 00000000 | 0 | 0 |

| | | | | |
|---------|----|----------|----|---|
| NETWORK | 3 | STATE | 8 | |
| CL | 10 | 00000000 | 71 | 0 |
| ST | 13 | 00000000 | 0 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 3 | STATE | 9 | |
| PP | 9 | 00000000 | 90 | 84 |
| XX | 7 | 00000000 | 0 | 0 |

| | | | | |
|---------|----|----------|----|---|
| NETWORK | 3 | STATE | 10 | |
| G6 | 11 | 00000000 | 86 | 0 |
| O2 | 11 | 00000000 | 86 | 0 |
| C9 | 12 | 00000000 | 0 | 0 |
| YY | 0 | 00000000 | 86 | 5 |

| | | | | |
|---------|----|----------|----|----|
| NETWORK | 3 | STATE | 11 | |
| O2 | 11 | 00000000 | 0 | 0 |
| NP | 13 | 00000000 | 0 | 12 |

| | | | | |
|---------|----|----------|----|---|
| NETWORK | 3 | STATE | 12 | |
| CH | 13 | 00000000 | 0 | 0 |

| | | | | |
|---------|---|----------|----|---|
| NETWORK | 3 | STATE | 13 | |
| YY | 0 | 00000000 | 0 | 0 |

Verb Phrase

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 4 | STATE | 1 | |
| O5 | 2 | 00000000 | 20 | 20 |
| 12 | 3 | 00000000 | 20 | 21 |
| 51 | 1 | 00000000 | 0 | 0 |
| 14 | 1 | 00000000 | 0 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 4 | STATE | 2 | |
| O5 | 2 | 00000000 | 22 | 22 |
| O7 | 2 | 00000000 | 23 | 23 |
| 12 | 3 | 00000000 | 24 | 24 |
| 51 | 2 | 00000000 | 0 | 0 |
| 14 | 2 | 00000000 | 0 | 0 |
| PP | 2 | 00000000 | 6 | 0 |

| | | | | |
|---------|----|----------|----|----|
| NETWORK | 4 | STATE | 3 | |
| C7 | 3 | 00000000 | 25 | 23 |
| 14 | 3 | 00000000 | 74 | 0 |
| SN | 9 | 00000000 | 28 | 0 |
| O1 | 5 | 00000000 | 26 | 0 |
| SN | 9 | 00000000 | 29 | 0 |
| PP | 9 | 00000000 | 0 | 0 |
| C3 | 7 | 00000000 | 27 | 0 |
| NP | 4 | 00000000 | 8 | 9 |
| NP | 6 | 00000000 | 30 | 9 |
| NT | 3 | 00000000 | 87 | 0 |
| 51 | 3 | 00000000 | 0 | 0 |
| 96 | 10 | 00000000 | 84 | 0 |
| O2 | 10 | 00000000 | 0 | 0 |
| YY | 0 | 00000000 | 7 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 4 | STATE | 4 | |
| O3 | 7 | 00000000 | 33 | 0 |
| NP | 9 | 00000000 | 77 | 10 |
| PP | 9 | 00000000 | 76 | 83 |
| NT | 8 | 00000000 | 87 | 10 |
| XX | 9 | 00000000 | 2 | 0 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 4 | STATE | 5 | |
| NP | 9 | 00000000 | 35 | 29 |
| XX | 9 | 00000000 | 37 | 28 |

| | | | | |
|---------|---|----------|----|----|
| NETWORK | 4 | STATE | 6 | |
| O1 | 9 | 00000000 | 32 | 30 |
| C3 | 7 | 00000000 | 33 | 0 |
| SN | 9 | 00000000 | 34 | 0 |
| XX | 9 | 00000000 | 0 | 0 |

| | | | | |
|---------|---|----------|---|----|
| NETWORK | 4 | STATE | 7 | |
| CL | 9 | 00000000 | 0 | 10 |

| | | | | |
|---------|---|----------|---|---|
| NETWORK | 4 | STATE | 8 | |
| CM | 9 | 00000000 | 0 | 0 |

| | | | | |
|---------|----|----------|----|----|
| NETWORK | 4 | STATE | 9 | |
| 51 | 9 | 00000000 | 0 | 0 |
| 14 | 9 | 00000000 | 0 | 0 |
| SN | 9 | 00000000 | 29 | 0 |
| NT | 9 | 00000000 | 0 | 0 |
| PP | 9 | 00000000 | 0 | 83 |
| 96 | 10 | 00000000 | 84 | 0 |
| O2 | 10 | 00000000 | 0 | 0 |
| YY | 0 | 00000000 | 7 | 0 |

| | | | | |
|---------|----|----------|----|---|
| NETWORK | 4 | STATE | 10 | |
| O2 | 11 | 00000000 | 0 | 0 |
| XX | 11 | 00000000 | 0 | 0 |

| | | | | |
|---------|----|----------|----|---|
| NETWORK | 4 | STATE | 11 | |
| VP | 12 | 00000000 | 0 | 0 |

| | | | | |
|---------|---|----------|----|---|
| NETWORK | 4 | STATE | 12 | |
| YY | 0 | 00000000 | 0 | 0 |

Prepositional Phrase

| | | | | |
|---------|---|-------|----|----|
| NETWCRK | 5 | STATE | 1 | |
| YY | 0 | 0 | 79 | 26 |
| 01 | 2 | 5 | 0 | 0 |
| NETWORK | 5 | STATE | 2 | |
| SN | 3 | 5 | 3 | 0 |
| NP | 3 | 5 | 0 | 85 |
| XX | 3 | 5 | 11 | 0 |
| NETWORK | 5 | STATE | 3 | |
| 96 | 4 | 5 | 84 | 0 |
| C9 | 4 | 5 | 0 | 0 |
| V2 | 4 | 5 | 0 | 0 |
| YY | 0 | 0 | 0 | 0 |
| NETWCRK | 5 | STATE | 4 | |
| 02 | 4 | 5 | 0 | 0 |
| PP | 5 | 5 | 0 | 0 |
| NETWORK | 5 | STATE | 5 | |
| YY | 0 | 0 | 0 | 0 |

Sentence Nominalization

| | | | | |
|---------|---|-------|----|---|
| NETWCRK | 6 | STATE | 1 | |
| 01 | 4 | 6 | 0 | 0 |
| CI | 2 | 6 | 40 | 0 |
| XX | 4 | 6 | 3 | 0 |
| NETWCRK | 6 | STATE | 2 | |
| NP | 3 | 6 | 0 | 8 |
| NETWORK | 6 | STATE | 3 | |
| 01 | 4 | 6 | 29 | 0 |
| NETWCRK | 6 | STATE | 4 | |
| V2 | 5 | 6 | 0 | 0 |
| NETWCRK | 6 | STATE | 5 | |
| YY | 0 | 0 | 0 | 0 |

Hyphenated Compound

| | | | | |
|---------|---|-------|----|----|
| NETWORK | 7 | STATE | 1 | |
| 34 | 1 | 7 | 0 | 0 |
| 34 | 4 | 7 | 0 | 0 |
| 32 | 4 | 7 | 0 | 0 |
| XX | 2 | 7 | 0 | 0 |
| NETWCRK | 7 | STATE | 2 | |
| 75 | 3 | 7 | 0 | 0 |
| 14 | 4 | 7 | 0 | 0 |
| 14 | 5 | 7 | 0 | 0 |
| 13 | 4 | 7 | 0 | 0 |
| 13 | 5 | 7 | 0 | 0 |
| 11 | 4 | 7 | 0 | 0 |
| 11 | 5 | 7 | 0 | 0 |
| NETWCRK | 7 | STATE | 3 | |
| 14 | 4 | 7 | 0 | 0 |
| XX | 4 | 7 | 0 | 0 |
| NETWORK | 7 | STATE | 4 | |
| 13 | 4 | 7 | 0 | 0 |
| 11 | 4 | 7 | 0 | 0 |
| YY | 0 | 0 | 1 | 0 |
| NETWCRK | 7 | STATE | 5 | |
| 12 | 6 | 7 | 3 | 13 |
| 12 | 6 | 7 | 17 | 0 |
| PP | 6 | 7 | 0 | 0 |
| NETWCRK | 7 | STATE | 6 | |
| YY | 0 | 0 | 0 | 0 |

Comparative Phrase

| | | | | |
|---------|---|-------|---|---|
| NETWCRK | 8 | STATE | 1 | |
| 51 | 2 | 8 | 0 | 0 |
| NETWORK | 8 | STATE | 2 | |
| 09 | 3 | 8 | 0 | 0 |
| NETWORK | 8 | STATE | 3 | |
| YY | 0 | 0 | 0 | 0 |

BEGIN SENTENCE 1
IFAMINES HAVE SOCIAL AND ECONOMIC IMPLICATIONS .

LONGEST PATH:
11 12 13 02 13 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
11 H 1
HEAD= 1
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
HEAD= 2
NUMBER= 6
VERBFEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
13 D 3 6
02 4
NP 6
HEAD= 6
NUMBER= 6

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
13 D 5 6
11 H 6
HEAD= 6
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 2
A LARGE NUMBER OF ANIMALS DIED FROM POISONING .

LONGEST PATH:
22 13 11 01 11 12 01 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3 6
VP

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 3
13 D 2 3
11 H 3 3
PP 4
HEAD= 5
NUMBER= 6

PP PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
01 4 5
NP

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
11 H 5
HEAD= 5
NUMBER= 6

VP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
12 V 6 7
PP

PP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
01 7 10
NP

VP PHRASE 10 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
11 H 8
HEAD= 8
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 3
ANOTHER FACTOR BEARING ON ROUTES AND RATES OF EXPOSURE IS
THE AMOUNT USED .

LONGEST PATH:
22 11 12 11 02 11 01 11 12 22
11 12

ST PHRASE 1 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
CL M 2

VP PHRASE 9 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 9
NP C 10

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 9

HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1
11 H 2
V2 D 4

HEAD= 2
NUMBER= 3

NP PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
22 T 10
11 H 11
V2 D 11

HEAD= 11
NUMBER= 3

V2 PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
12 V 3
NP U 5

HEAD= 3
VERBFEATURES: PARTICIPLE

V2 PHRASE 11 COMPLETE
CALLED BY PHRASE 10
CATEGORY ROLE LOCATION MODIFIES
12 V 12

HEAD= 12
VERBFEATURES: PARTICIPLE PAST
END OF SENTENCE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
11 H 4
02 NP 5
NP 6

HEAD= 99
NUMBER= 6

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
11 H 6
PP 7

HEAD= 6
NUMBER= 6

PP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
01 NP 7
NP 8

HEAD= 8
NUMBER= 3

NP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
11 H 8

HEAD= 8
NUMBER= 3

BEGIN SENTENCE 4
THE FACT THAT IT HAPPENS OFTEN IS WELL KNOWN .

LONGEST PATH:
22 11 03 42 12 14 05 14 12

ST PHRASE 1 COMPLETE
CATEGORY CL ROLE M LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY NP ROLE S LOCATION 3 MODIFIES
VP 11

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY NP ROLE T LOCATION 1 MODIFIES
11 H 2
03 3
ST 8
HEAD= 2
NUMBER= 3

NP PHRASE 5 COMPLETE REUSED
CALLED BY PHRASE 9
CATEGORY NP ROLE H LOCATION 4 MODIFIES
42
HEAD= 4
NUMBER= 3

ST PHRASE 8 COMPLETE
CALLED BY PHRASE 3
CATEGORY CL ROLE M LOCATION 9 MODIFIES

CL PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY NP ROLE S LOCATION 5 MODIFIES
VP 10

VP PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY VP ROLE V LOCATION 5 MODIFIES
12 6
14
HEAD= 5
NUMBER= 3
VERBFEATURES: FINITE

VP PHRASE 11 COMPLETE
CALLED BY PHRASE 2
CATEGORY NP ROLE B LOCATION 7 MODIFIES
05 8
14 V 8
12 9
HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE PASSIVE
END OF SENTENCE

BEGIN SENTENCE 5
[THE PROBLEMS THAT ARE CAUSED BY STARVATION ARE APPARENT .

LONGEST PATH:
22 11 03 05 12 01 11 12 13

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP 5 3
VP 11

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2 3
03 3 4
CL
HEAD= 2
NUMBER= 6

CL PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
NH 5 7
VP 8

NH PHRASE 7 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2 3
03 3
HEAD= 2
NUMBER= 6

VP PHRASE 8 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
05 B 4
12 V 5
PP 9
HEAD= 5
NUMBER= 6
VERBFEATURES: FINITE PASSIVE

PP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
01 6
NP 10
HEAD= 7
NUMBER= 3

NP PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
11 H 7
HEAD= 7
NUMBER= 3

VP PHRASE 11 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 8
NP C 12
HEAD= 8
NUMBER= 6
VERBFEATURES: FINITE

NP PHRASE 12 COMPLETE
CALLED BY PHRASE 11
CATEGORY ROLE LOCATION MODIFIES
13 H 9
HEAD= 9
NUMBER= 3
END OF SENTENCE

BEGIN SENTENCE 6
PESTICIDES PROTECT THE FARMERS' CROPS .

LONGEST PATH:
11 12 22 11 11

ST PHRASE 1 COMPLETE
CATEGORY 22 ROLE M LCCATION 2 MODIFIES
CL

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY 11 ROLE S LOCATION 3 MODIFIES
NP 4
VP

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 11 ROLE H LCCATION 1 MODIFIES
HEAD= 1
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 12 ROLE V LCCATION 2 MODIFIES
NP 5
HEAD= 2
NUMBER= 6
VERBFEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 22 ROLE T LCCATION 3 MODIFIES
11 T 4 5
11 T 5 5
HEAD= 5
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 7
 MANY PERSONS WITH HEAVY AND PROLONGED OCCUPATIONAL EXPOSURE TO IIDD
 IN MANUFACTURING PLANTS HAVE BEEN SUBJECTED TO EXHAUSTIVE MEDICAL EXAMINATIONS

LONGEST PATH:
 33 11 01 13 02 13 13 11 01 11
 01 13 11 05 05 12 01 13 13 11

ST PHRASE 1 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 CL M 2

PP PHRASE 9 COMPLETE
 CALLED BY PHRASE 8
 CATEGORY ROLE LOCATION MODIFIES
 01 11
 NP 10
 HEAD= 13
 NUMBER= 3

CL PHRASE 2 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 NP 5
 VP 11

PP PHRASE 9 COMPLETE
 CALLED BY PHRASE 8
 CATEGORY ROLE LOCATION MODIFIES
 01 11
 NP 10
 HEAD= 13
 NUMBER= 6

NP PHRASE 3 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 33 K 1
 11 H 2
 PP 4
 HEAD= 2
 NUMBER= 6

NP PHRASE 10 COMPLETE
 CALLED BY PHRASE 9
 CATEGORY ROLE LOCATION MODIFIES
 13 D 12
 11 H 13
 HEAD= 13
 NUMBER= 6

PP PHRASE 4 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY ROLE LOCATION MODIFIES
 01 3
 NP 5
 HEAD= 8
 NUMBER= 3

VP PHRASE 11 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 05 H 14
 05 B 15
 12 V 16
 PP 13
 HEAD= 16
 NUMBER= 6
 VERBFEATURES: FINITE PASSIVE PERFECT

NP PHRASE 5 COMPLETE
 CALLED BY PHRASE 4
 CATEGORY ROLE LOCATION MODIFIES
 13 D 4
 02 5
 NP 6
 HEAD= 8
 NUMBER= 3

PP PHRASE 13 COMPLETE
 CALLED BY PHRASE 11
 CATEGORY ROLE LOCATION MODIFIES
 01 17
 NP 14
 HEAD= 20
 NUMBER= 6

NP PHRASE 6 COMPLETE
 CALLED BY PHRASE 5
 CATEGORY ROLE LOCATION MODIFIES
 13 O 6
 13 D 7
 11 H 8
 PP 7
 HEAD= 8
 NUMBER= 3

NP PHRASE 14 COMPLETE
 CALLED BY PHRASE 13
 CATEGORY ROLE LOCATION MODIFIES
 13 O 18
 13 D 19
 11 H 20
 HEAD= 20
 NUMBER= 6

PP PHRASE 7 COMPLETE
 CALLED BY PHRASE 6
 CATEGORY ROLE LOCATION MODIFIES
 01 9
 NP 8
 HEAD= 10
 NUMBER= 3

END OF SENTENCE

NP PHRASE 8 COMPLETE
 CALLED BY PHRASE 7
 CATEGORY ROLE LOCATION MODIFIES
 11 H 10

BEGIN SENTENCE 8
| THE REPRESENTATIVE OF THE | MEXICAN -/ | AMERICAN GROUP SPOKE IN
| SPANISH .

LONGEST PATH:
22 11 01 22 13 - 13 11 12 01
11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
11 H 11
HEAD= 11
NUMBER= 3
END OF SENTENCE

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 7

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2 4
PP
HEAD= 2
NUMBER= 3

PP PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
01 T 3 5
NP
HEAD= 8
NUMBER= 3

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 4 8
HY D 6
11 H 8
HEAD= 8
NUMBER= 3

HY PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
13 T 5 7
- 6
13 7

VP PHRASE 7 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 9 8
PP
HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE PAST

PP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
01 T 10 9
NP
HEAD= 11
NUMBER= 3

BEGIN SENTENCE 9
 ISPRAYMEN FROM AREAS WHERE THE NORMAL DIET IS OF A
 LOW NUTRITIONAL STANDARD HAVE SHOWN NO PREDISPOSITION TO POISONING .

LONGEST PATH:
 11 01 11 03 22 13 11 12 01 22
 13 13 11 05 12 22 11 01 11

ST PHRASE 1 COMPLETE
 CATEGORY ROLE LOCATION MODIFIES
 CL M 2

CL PHRASE 2 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 NP S 3
 VP 12

NP PHRASE 3 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 NP H 1
 PP 4
 HEAD= 1
 NUMBER= 6

FP PHRASE 4 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY ROLE LOCATION MODIFIES
 NP 01 2
 NP 5
 HEAD= 3
 NUMBER= 6

NP PHRASE 5 COMPLETE
 CALLED BY PHRASE 4
 CATEGORY ROLE LOCATION MODIFIES
 NP 11 H 3
 NP 03 4
 ST 6
 HEAD= 3
 NUMBER= 6

ST PHRASE 6 COMPLETE
 CALLED BY PHRASE 5
 CATEGORY ROLE LOCATION MODIFIES
 CL M 7

CL PHRASE 7 COMPLETE
 CALLED BY PHRASE 6
 CATEGORY ROLE LOCATION MODIFIES
 NP S 8
 VP 9

NP PHRASE 8 COMPLETE
 CALLED BY PHRASE 7
 CATEGORY ROLE LOCATION MODIFIES
 NP 22 T 5 7
 NP 13 D 6 7
 NP 11 H 7
 HEAD= 7
 NUMBER= 3

VP PHRASE 9 COMPLETE
 CALLED BY PHRASE 8
 CATEGORY ROLE LOCATION MODIFIES

12 V 8
 PP 10
 HEAD= 8
 NUMBER= 3
 VERBFEATURES: FINITE

PP PHRASE 10 COMPLETE REUSED
 CALLED BY PHRASE 9
 CATEGORY ROLE LOCATION MODIFIES
 NP 01 9
 NP 11
 HEAD= 13
 NUMBER= 3

NP PHRASE 11 COMPLETE REUSED
 CALLED BY PHRASE 10
 CATEGORY ROLE LOCATION MODIFIES
 NP 22 T 10 13
 NP 13 D 11 13
 NP 13 D 12 13
 NP 11 H 13
 HEAD= 13
 NUMBER= 3

VP PHRASE 12 COMPLETE
 CALLED BY PHRASE 11
 CATEGORY ROLE LOCATION MODIFIES
 NP 05 H 14
 NP 12 V 15
 NP 11 O 13
 HEAD= 15
 NUMBER= 6
 VERBFEATURES: FINITE PERFECT

NP PHRASE 13 COMPLETE
 CALLED BY PHRASE 12
 CATEGORY ROLE LOCATION MODIFIES
 NP 22 T 16 17
 NP 11 H 17
 PP 14
 HEAD= 17
 NUMBER= 3

PP PHRASE 14 COMPLETE
 CALLED BY PHRASE 13
 CATEGORY ROLE LOCATION MODIFIES
 NP 01 18
 NP 17
 HEAD= 19
 NUMBER= 3

NP PHRASE 17 COMPLETE
 CALLED BY PHRASE 14
 CATEGORY ROLE LOCATION MODIFIES
 NP 11 H 19
 HEAD= 19
 NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 10
MOST ARE RELATIVELY STRONG ACIDS THAT READILY FORM SALTS AND
AMIDES .

LONGEST PATH:
42 12 51 13 11 03 14 12 11 02
11

ST PHRASE 1 COMPLETE
CATEGORY CL ROLE M LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY NP ROLE S LOCATION 3 MODIFIES
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 42 ROLE H LOCATION 1 MODIFIES
HEAD= 1

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 12 ROLE V LOCATION 2 MODIFIES
NP C 5
HEAD= 2
VERBFEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 51 ROLE D LOCATION 3 MODIFIES
13 D 4 5
11 D 5
03 H 6
CL 6
HEAD= 5
NUMBER= 6

CL PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY NP ROLE S LOCATION 10 MODIFIES
NH 11
VP 11

NP PHRASE 8 COMPLETE REUSED
CALLED BY PHRASE 12
CATEGORY 11 ROLE H LOCATION 11 MODIFIES
HEAD= 11
NUMBER= 6

NH PHRASE 10 COMPLETE
CALLED BY PHRASE 6
CATEGORY 51 ROLE D LOCATION 3 MODIFIES
13 D 4
11 D 5
03 H 6
HEAD= 5
NUMBER= 6

VP PHRASE 11 COMPLETE
CALLED BY PHRASE 6
CATEGORY 14 ROLE V LOCATION 7 MODIFIES
12 V 8
NP O 12
HEAD= 8
NUMBER= 6
VERBFEATURES: FINITE

NP PHRASE 12 COMPLETE
CALLED BY PHRASE 11
CATEGORY 11 ROLE H LOCATION 9 MODIFIES
02 H 10
NP 8
HEAD= 99
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 11
NECESSARY ADJUSTMENTS WILL BE MADE AS THE STUDY PROGRESSES .

LONGEST PATH:
13 11 05 05 12 03 22 11 12

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2
03 6
CL D 10

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
13 D 1 2
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 3
05 B 4
12 V 5
HEAD= 5
NUMBER= 6
VERBFEATURES: FINITE FUTURE PASSIVE

NP PHRASE 6 COMPLETE REUSED
CALLED BY PHRASE 10
CATEGORY ROLE LOCATION MODIFIES
22 T 7 8
11 H 8
HEAD= 8
NUMBER= 3

CL PHRASE 10 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 6
VP 11

VP PHRASE 11 COMPLETE
CALLED BY PHRASE 10
CATEGORY ROLE LOCATION MODIFIES
12 V 9
HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE
END OF SENTENCE

BEGIN SENTENCE 12
THE GROUP SHOULD NOT HAVE BEEN EXPOSED TO THE PESTICIDE
BEFORE THE COMMENCEMENT OF THE OPERATION .

LONGEST PATH:
22 11 05 07 05 05 12 01 22 11
01 22 11 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1
11 H 2
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 3
07 4
05 H 5
05 B 6
12 V 7
PP 8
HEAD= 7
NUMBER= 3

VERBFEATURES: FINITE PASSIVE PERFECT NEGATIVE

PP PHRASE 6 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 8
NP 7
HEAD= 10
NUMBER= 3

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
22 T 9
11 H 10
PP 8
HEAD= 10
NUMBER= 3

PP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
01 11
NP 9
HEAD= 13
NUMBER= 3

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES

PP H 13
HEAD= 13
NUMBER= 3

PP PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
01 14
NP 11
HEAD= 16
NUMBER= 3

NP PHRASE 11 COMPLETE
CALLED BY PHRASE 10
CATEGORY ROLE LOCATION MODIFIES
22 T 15
11 H 16
HEAD= 16
NUMBER= 3
END OF SENTENCE

BEGIN SENTENCE 13
THESE PROPERTIES DO NOT INFLUENCE THE EXTENT OF WATER CONTAMINATION

LONGEST PATH:
22 11 05 07 12 22 11 01 11 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 3
07 4
12 V 5
NP O 5
HEAD= 5
NUMBER= 6
VERBFEATURES: FINITE NEGATIVE DO_INSERT

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 6 7
11 H 7
PP 6
HEAD= 7
NUMBER= 3

PP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
01 8
NP 7
HEAD= 10
NUMBER= 3

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
11 D 9 10
11 H 10
HEAD= 10
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 14
AN INFORMATION SYSTEM CAN ALSO BE USED FOR QUALITY CONTROL

LONGEST PATH:
22 11 11 05 14 05 12 01 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 3
11 D 2
11 H 3
HEAD= 3
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 4
14 5
05 B 6
12 V 7
PP 5
HEAD= 7
NUMBER= 3
VERBFEATURES: FINITE PASSIVE

PP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 8
NP 6
HEAD= 9
NUMBER= 3

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
11 H 9
HEAD= 9
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 15
|THE PROGRAM COSTS THE GOVERNMENT MORE MCNEY EVERY YEAR .

LONGEST PATH:
22 11 12 22 11 33 11 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 1
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
NP I 5
NP O 6
NT 7
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 4 5
11 H 5
HEAD= 5
NUMBER= 3

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
33 K 6 7
11 H 7
HEAD= 7
NUMBER= 3

NT PHRASE 7 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 8 9
11 H 9
HEAD= 9
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 16
THE TECHNICIANS CARRIED THE PROJECT OUT EFFICIENTLY .

LONGEST PATH:
22 11 12 22 11 01 14

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
NP O 5
01 J 6
14 7
HEAD= 3
NUMBER= 6
VERBFEATURES: FINITE PAST ADJUNCT

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 4
11 H 5
HEAD= 5
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 17
WHICH DOCTOR OPERATED ?

LONGEST PATH:
22 11 12

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4
NUMBER= 9

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE PAST

END OF SENTENCE

BEGIN SENTENCE 18
WHICH MANUAL DID HE CONSULT ?

LONGEST PATH:
22 11 05 41 12

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP 0 8
05 1 3
NP 5 5
V2 9
VERBFEATURES: FINITE PAST DO_INSERT

NP PHRASE 5 COMPLETE REUSED
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 4
HEAD= 4
NUMBER= 3

NP PHRASE 8 COMPLETE REUSED
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 1 1 2
11 H 2
HEAD= 2
NUMBER= 3

V2 PHRASE 9 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 5
NH 0 11
HEAD= 5
VERBFEATURES: FINITE PAST DO_INSERT

NH PHRASE 11 COMPLETE REUSED
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
22 1 1 2
11 H 2
HEAD= 2
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 19
ON WHAT SCALE WILL THE PROGRAM OPERATE ?

LONGEST PATH:
01 22 11 05 22 11 12

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
PP O 3
05 M 4
NP S 5
V2 6
VERBFEATURES: FINITE FUTURE

PP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
01 1
NP 4
HEAD= 3
NUMBER= 3

NP PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
22 T 2 3
11 H 3
HEAD= 3
NUMBER= 3

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 5 6
11 H 6
HEAD= 6
NUMBER= 3

V2 PHRASE 6 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 7 8
PH 8
HEAD= 7
VERBFEATURES: FINITE FUTURE

PH PHRASE 9 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
01 1
NP 4
HEAD= 3
NUMBER= 3

END OF SENTENCE

57

BEGIN SENTENCE 20
WHERE DO THEY OBTAIN THEIR MEDICINE ?

LONGEST PATH:
14 05 41 12 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
14 1
05 M 2
NP S 3
V2 4
NUMBER= 9
VERBFEATURES: FINITE DO_INSERT

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 3
HEAD= 3
NUMBER= 6

V2 PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 4
NP O 5
HEAD= 4
VERBFEATURES: FINITE DO_INSERT

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 5 6
11 H 6
HEAD= 6
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 21
HAS HE WRITTEN THE REPORT ?

LONGEST PATH:
05 41 12 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES

05 H 1
NP S 3
V2 4
NUMBER= 9
VERBFEATURES: FINITE

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES

41 H 2
HEAD= 2
NUMBER= 3

V2 PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES

12 V 3
NP O 5
HEAD= 3
VERBFEATURES: FINITE PERFECT

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES

22 T 4
11 H 5
HEAD= 5
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 22
ARE THE DATA RELIABLE ?

LONGEST PATH:
12 22 11 13

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
VP 4
NP S 3
NP C 5
NUMBER= 9

NP PHRASE 3 COMPLETE REUSED
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 Y 2 3
11 H 3
HEAD= 3
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 1
HEAD= 1
VERBFEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
13 H 4
HEAD= 4
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 23
WILL THERE BE CHANGES IN THE REPORT ?

LONGEST PATH:
05 14 12 11 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
05 M 1
14 Y 2
V2 V 3
NP S 4
NUMBER= 9
VERBFEATURES: FINITE FUTURE

V2 PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
HEAD= 3
NUMBER= 6
VERBFEATURES: FINITE FUTURE

NP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
11 H 4
PP 5
HEAD= 4
NUMBER= 6

PP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 5
NP 6
HEAD= 7
NUMBER= 3

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
22 T 6
11 H 7
HEAD= 7
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 24
WERE THERE PROBLEMS WITH THE DATA ?

LONGEST PATH:
12 14 11 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
VP 7
14 Y 2
NP S 8
NUMBER= 9

PP PHRASE 4 COMPLETE REUSED
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
01 4
NP 5
HEAD= 6
NUMBER= 6

NP PHRASE 5 COMPLETE REUSED
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 5 6
11 T 6
H
HEAD= 6
NUMBER= 6

VP PHRASE 7 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 1
HEAD= 1
VERBFEATURES: FINITE PAST

NP PHRASE 8 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
11 3 4
PP H
HEAD= 3
NUMBER= 6

END OF SENTENCE

11

BEGIN SENTENCE 25
IN DEVELOPING COUNTRIES , THE CONCEPT OF PREVENTIVE MEDICINE IS
GAINING ACCEPTANCE .

LONGEST PATH:
01 11 96 22 11 01 11 05 12 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL H 2

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
11 H 10

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
PP 3
96 3
NP S 5
VP 8

HEAD= 10
NUMBER= 3
END OF SENTENCE

PP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
01 1
NP 4
HEAD= 2
NUMBER= 6

NP PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
11 H 2
HEAD= 2
NUMBER= 6

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 4 5
11 H 5
PP 6
HEAD= 5
NUMBER= 3

PP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
01 6
NP 7
HEAD= 7
NUMBER= 3

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
11 H 7
HEAD= 7
NUMBER= 3

VP PHRASE 8 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 B 8
12 V 9
NP O 9
HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE PROGRESSIVE

61

BEGIN SENTENCE 26
HUMAN KIND BECAME THE MOST TO A VARIETY OF DISEASES .

LONGEST PATH:
11 12 22 11 01 22 11 01 11

ST PHRASE 1 COMPLETE
CATEGORY 22 11 01 22 11 01 11
CL M LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY NP VP
ROLE S
LOCATION 3 4
MODIFIES

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 11 11
ROLE H
LOCATION 1
MODIFIES
HEAD= 1
NUMBER= 3

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY 11 11
ROLE H
LOCATION 9
MODIFIES
HEAD= 9
NUMBER= 6
END OF SENTENCE

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 12 NP
ROLE V C
LOCATION 2 5
MODIFIES
HEAD= 2
NUMBER= 3
VERBFEATURES: FINITE PAST

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 22 11 01
ROLE T H
LOCATION 3 4 6
MODIFIES
HEAD= 4
NUMBER= 3

PP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY 01 NP
ROLE
LOCATION 5 7
MODIFIES
HEAD= 9
NUMBER= 6

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY 22 11 01
ROLE T H
LOCATION 6 7 8
MODIFIES
HEAD= 9
NUMBER= 6

PP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY 01 NP
ROLE
LOCATION 8 9
MODIFIES
HEAD= 9
NUMBER= 6

BEGIN SENTENCE 27
THESE CHEMICALS ARE USED IN SMALLER QUANTITIES .

LONGEST PATH:
22 11 C5 12 01 13 11

ST PHRASE 1 COMPLETE
CALLED BY PHRASE 1
CATEGORY CL ROLE M LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY NP ROLE S LOCATION 3 MODIFIES
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 22 ROLE T LOCATION 1 MODIFIES
11 H 2 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 05 ROLE B LOCATION 3 MODIFIES
12 V 4
PP 5
HEAD= 4
NUMBER= 6
VERBFEATURES: FINITE PASSIVE

FP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 01 ROLE NP LOCATION 5 MODIFIES
NP 6
HEAD= 7
NUMBER= 6

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY 13 ROLE O LOCATION 6 MODIFIES
11 H 7 7
HEAD= 7
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 20
[THE PEOPLE ATTEMPTED TO PROTECT THEIR LIVESTOCK FROM DISEASE .

LONGEST PATH:
22 11 12 01 12 22 11 01 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1
11 H 2
HEAD= 2
NUMBER= 6

HEAD= 9 H
NUMBER= 3
END OF SENTENCE

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
SN 5
HEAD= 3
NUMBER= 6
VERBFEATURES: FINITE PAST

SN PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 4
V2 6

V2 PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
12 V 5
NP O 7
PP 8
HEAD= 5

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
22 T 6
11 H 7
HEAD= 7
NUMBER= 3

P PHRASE 8 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
01 8
NP 9
HEAD= 9
NUMBER= 3

P PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES

BEGIN SENTENCE 29
THE PROJECT BEGAN TO PRODUCE RESULTS .

LONGEST PATH:
22 11 12 01 12 11

ST PHRASE 1 COMPLETE
CATEGORY 12 ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY 12 ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 22 ROLE LOCATION MODIFIES
11 T 1 2
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 12 ROLE LOCATION MODIFIES
SN V 3 5
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE PAST

SN PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 01 ROLE LOCATION MODIFIES
V2 4 6

V2 PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY 12 ROLE LOCATION MODIFIES
NP V 5 7
HEAD= 5

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY 11 ROLE LOCATION MODIFIES
H 6
HEAD= 6
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 30
YOU SHOULD CONTINUE ADDING SALT TO THE MIXTURE .

LONGEST PATH: 42 05 12 12 11 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
42 H 1
HEAD= 1
NUMBER= 2

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 2
12 V 3
SN 5
HEAD= 3
NUMBER= 2
VERBFEATURES: FINITE

SN PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
V2 6

V2 PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
12 V 4
NP O 7
PP 9
HEAD= 4
VERBFEATURES: PARTICIPLE

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
11 H 5
HEAD= 5
NUMBER= 3

PP PHRASE 9 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
01 6
10
HEAD= 8
NUMBER= 3

NP PHRASE 10 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
22 T 7 8

HEAD= 8 H 8
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 31
 THE GOVERNMENT PROMOTED MODERN AGRICULTURAL PRACTICES TO OVERCOME THESE THREATS
 TO THE WELFARE OF MAN .

LONGEST PATH:
 22 11 12 13 13 11 01 12 22 11
 01 22 11 01 11

ST PHRASE 1 COMPLETE
 CALLED BY PHRASE 0
 CATEGORY ROLE LOCATION MODIFIES
 CL M 2

CL PHRASE 2 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 NP S 3
 VP 4

NP PHRASE 3 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 22 T 1 2
 11 H 2
 HEAD= 2
 NUMBER= 3

VP PHRASE 4 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY ROLE LOCATION MODIFIES
 12 V 3
 NP O 5
 SN 7
 HEAD= 3
 NUMBER= 3
 VERBFEATURES: FINITE PAST

NP PHRASE 5 COMPLETE
 CALLED BY PHRASE 4
 CATEGORY ROLE LOCATION MODIFIES
 13 D 4 6
 13 D 5 6
 11 H 6
 HEAD= 6
 NUMBER= 6

SN PHRASE 7 COMPLETE
 CALLED BY PHRASE 5
 CATEGORY ROLE LOCATION MODIFIES
 01 7
 V2 8

V2 PHRASE 8 COMPLETE
 CALLED BY PHRASE 7
 CATEGORY ROLE LOCATION MODIFIES
 12 V 8
 NP O 9
 HEAD= 8

NP PHRASE 9 COMPLETE
 CALLED BY PHRASE 8
 CATEGORY ROLE LOCATION MODIFIES
 22 T 9 10
 11 H 10
 PP 10
 HEAD= 10
 NUMBER= 6

PP PHRASE 10 COMPLETE
 CALLED BY PHRASE 9
 CATEGORY ROLE LOCATION MODIFIES
 01 11
 NP 11
 HEAD= 13
 NUMBER= 3

NP PHRASE 11 COMPLETE
 CALLED BY PHRASE 10
 CATEGORY ROLE LOCATION MODIFIES
 22 T 12 13
 11 H 13
 PP 12
 HEAD= 13
 NUMBER= 3

PP PHRASE 12 COMPLETE
 CALLED BY PHRASE 11
 CATEGORY ROLE LOCATION MODIFIES
 01 14
 NP 13
 HEAD= 15
 NUMBER= 3

NP PHRASE 13 COMPLETE
 CALLED BY PHRASE 12
 CATEGORY ROLE LOCATION MODIFIES
 11 H 15
 HEAD= 15
 NUMBER= 3
 END OF SENTENCE

BEGIN SENTENCE 32
THE MANUAL CONTAINING THE INSTRUCTIONS IS IN THE LIBRARY .

LONGEST PATH:
22 11 12 22 11 12 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY CL ROLE H LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY NP ROLE S LOCATION 3 MODIFIES
VP 6

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 22 ROLE T LOCATION 1 MODIFIES
11 H 2
V2 D 4
HEAD= 2
NUMBER= 3

V2 PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY NP ROLE V LOCATION 3 MODIFIES
12 O 5
HEAD= 3
VERBFEATURES: PARTICIPLE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 22 ROLE T LOCATION 4 MODIFIES
11 H 5
HEAD= 5
NUMBER= 6

VP PHRASE 6 COMPLETE
CALLED BY PHRASE 2
CATEGORY PP ROLE V LOCATION 6 MODIFIES
12 7
PP 7
HEAD= 6
NUMBER= 3
VERBFEATURES: FINITE

PP PHRASE 7 COMPLETE REUSED
CALLED BY PHRASE 6
CATEGORY C1 ROLE 7 LOCATION 8 MODIFIES
NP 9
HEAD= 9
NUMBER= 3

NP PHRASE 8 COMPLETE REUSED
CALLED BY PHRASE 7
CATEGORY 22 ROLE T LOCATION 8 MODIFIES
11 H 9
HEAD= 9
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 33
THE MANUAL WRITTEN IN ENGLISH MUST BE TRANSLATED INTO SPANISH
FIRST .

LONGEST PATH:
22 11 12 01 11 05 05 12 C1 11
14

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL H 2

NUMBER= 3

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 7

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
11 H 10
HEAD= 10
NUMBER= 3

END OF SENTENCE

VP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
V2 D 4
HEAD= 2
NUMBER= 3

/2 PHRASE 4 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
12 V 3
PP 5
HEAD= 3
ERB/FEATURES: PARTICIPLE PAST

VP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 4
NP 6
HEAD= 5
NUMBER= 3

VP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
11 H 5
HEAD= 5
NUMBER= 3

P PHRASE 7 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 6
05 B 7
12 V 8
PP 8
14 11
HEAD= 8
NUMBER= 3
ERB/FEATURES: FINITE PASSIVE

P PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
9
9
HEAD= 10

BEGIN SENTENCE 34
IF THERE IS NO EXPOSURE , THERE CAN BE NO
RISK TO THE ORGANISM .

LONGEST PATH:
03 14 12 22 11 96 14 05 12 22
11 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
03
CL D 1
96 2
CL M 6
5

HEAD= 14
NUMBER= 3

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
14
VP Y 2
NP S 3
4

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
22 T 13
11 H 14
14

HEAD= 14
NUMBER= 3

END OF SENTENCE

VP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE

NP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 4
11 H 5
HEAD= 5
NUMBER= 3

CL PHRASE 5 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
14 Y 7
VP 6
NP S 7

VP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
05 M 8
12 V 9
HEAD= 9
NUMBER= 3
VERBFEATURES: FINITE

IP PHRASE 7 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
22 T 10
11 H 11
PP 8
HEAD= 11
NUMBER= 3

P PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
01 12
NP 9

BEGIN SENTENCE 35
THERE CAN BE NO RISK TO THE ORGANISM IF THERE
IS NO EXPOSURE .

LONGEST PATH:
14 05 12 22 11 01 22 11 03 14
12 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2
03 9
CL D 7

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
14 Y 1
VP 3
NP S 4

VP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 M 2
12 V 3
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE

NP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 4
11 H 5
PP 5
HEAD= 5
NUMBER= 3

PP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 6
NP 6
HEAD= 8
NUMBER= 3

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
22 T 7
11 H 8
HEAD= 8
NUMBER= 3

CL PHRASE 7 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
14 Y 10
VP 8
NP S 9

VP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
12 V 11
HEAD= 11
NUMBER= 3

VERBFEATURES: FINITE

NP PHRASE 9 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
22 T 12
11 H 13
HEAD= 13
NUMBER= 3

END OF SENTENCE

11

BEGIN SENTENCE 36
WE KNOW THAT ENVIRONMENTAL POLLUTION IS A SERIOUS PROBLEM .

LONGEST PATH:
41 12 03 13 11 12 22 13 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

PL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

IP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
HEAD= 1
NUMBER= 4

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
03 3
CL O 5
HEAD= 2
NUMBER= 4
NUMBER OF FEATURES: FINITE

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
NP S 6
VP 7

VP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
13 D 4
11 H 5
HEAD= 5
NUMBER= 3

NP PHRASE 7 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
12 V 6
NP C 8
HEAD= 6
NUMBER= 3
NUMBER OF FEATURES: FINITE

VP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
22 T 7
13 D 8
11 H 9
HEAD= 9
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 37
THESE CONSIDERATIONS INCLUDE :

LONGEST PATH:
22 11 12

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
HEAD= 3
NUMBER= 6
ERBFEATURES: FINITE

END OF SENTENCE

1
2

BEGIN SENTENCE 30
 (A) THE ACUTE DERMAL TOXICITY OF THE FORMULATED
 PRODUCT WHEN DERMAL EXPOSURE IS CONSIDERED THE MOST SIGNIFICANT ROUTE
 OF ABSORPTION ;

LONGEST PATH:
 85 35 95 22 13 13 11 01 22 13
 11 03 13 11 05 12 22 51 13 11
 01 11

ST PHRASE 1 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY CL ROLE M LOCATION 2 MODIFIES

CL PHRASE 2 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY NP ROLE S LOCATION 3 MODIFIES

NP PHRASE 3 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY 22 T LOCATION 4 MODIFIES 7
 13 D 5 7
 13 D 6 7
 11 H 7 7
 PP 4
 HEAD= 7
 NUMBER= 3

PP PHRASE 4 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY 01 NP ROLE 8 LOCATION 5 MODIFIES
 HEAD= 11
 NUMBER= 3

NP PHRASE 5 COMPLETE
 CALLED BY PHRASE 4
 CATEGORY 22 T ROLE 9 LOCATION 10 MODIFIES
 13 D 10 10
 11 H 11 11
 03 ST 12 6
 HEAD= 11
 NUMBER= 3

ST PHRASE 6 COMPLETE
 CALLED BY PHRASE 5
 CATEGORY CL ROLE M LOCATION 7 MODIFIES

CL PHRASE 7 COMPLETE
 CALLED BY PHRASE 6
 CATEGORY NP ROLE S LOCATION 8 MODIFIES 9

NP PHRASE 9 COMPLETE
 CALLED BY PHRASE 7
 CATEGORY 13 D ROLE 13 LOCATION 13 MODIFIES 14
 11 H 14
 HEAD= 14
 NUMBER= 3

VP PHRASE 9 COMPLETE
 CALLED BY PHRASE 7
 CATEGORY 05 B ROLE 15 LOCATION 15 MODIFIES
 12 V 16
 NP C 10
 HEAD= 16
 NUMBER= 3
 VERBFEATURES: FINITE PASSIVE

NP PHRASE 10 COMPLETE
 CALLED BY PHRASE 9
 CATEGORY 22 T ROLE 17 LOCATION 17 MODIFIES 20
 51 D 18 19
 13 D 19 20
 11 H 20 20
 PP 11
 HEAD= 20
 NUMBER= 3

PP PHRASE 11 COMPLETE
 CALLED BY PHRASE 10
 CATEGORY 01 NP ROLE 21 LOCATION 21 MODIFIES 22
 HEAD= 22
 NUMBER= 3

NP PHRASE 12 COMPLETE
 CALLED BY PHRASE 11
 CATEGORY 11 H ROLE 22 LOCATION 22 MODIFIES
 HEAD= 22
 NUMBER= 3

END OF SENTENCE

REGIA SENTENCE 39
 THE METHODS OF CROP PROTECTION THAT HAVE BEEN USED BY
 SMALL FARMS FOR CENTURIES MUST BE IMPROVED BY THE INTRODUCTION
 OF MODERN AGRICULTURAL CONCEPTS .

LONGEST PATH:
 22 11 01 11 11 03 05 05 12 01
 13 11 01 11 05 05 17 01 22 11
 01 13 11 11

HEAD= 9
 NUMBER= 6
 VERBFEATURES: FINITE PASSIVE PERFECT

ST PHRASE 1 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 CL 4 2

PP PHRASE 20 COMPLETE
 CALLED BY PHRASE 19
 CATEGORY ROLE LOCATION MODIFIES
 01 10 21
 NP
 HEAD= 12
 NUMBER= 6

PP PHRASE 27 COMPLETE
 CALLED BY PHRASE 26
 CATEGORY ROLE LOCATION MODIFIES
 01 21

CL PHRASE 2 COMPLETE
 CALLED BY PHRASE 1
 CATEGORY ROLE LOCATION MODIFIES
 NP 5 3 24
 VP

NP PHRASE 21 COMPLETE
 CALLED BY PHRASE 20
 CATEGORY ROLE LOCATION MODIFIES
 13 11 12
 11 0 11 12
 PP H 22
 HEAD= 12
 NUMBER= 6

NP
 HEAD= 24
 NUMBER= 6 28

NP PHRASE 3 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 22 11 1 2
 11 H 4 6
 PP 15
 03
 CL
 HEAD= 2
 NUMBER= 6

PP PHRASE 22 COMPLETE
 CALLED BY PHRASE 21
 CATEGORY ROLE LOCATION MODIFIES
 01 13 23
 NP
 HEAD= 14
 NUMBER= 6

NP PHRASE 28 COMPLETE
 CALLED BY PHRASE 27
 CATEGORY ROLE LOCATION MODIFIES
 13 11 22 24
 13 D 23 24
 11 D H 24
 HEAD= 24
 NUMBER= 6

PP PHRASE 4 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY ROLE LOCATION MODIFIES
 01 3 5
 NP

NP PHRASE 23 COMPLETE
 CALLED BY PHRASE 22
 CATEGORY ROLE LOCATION MODIFIES
 11 14
 H
 HEAD= 14
 NUMBER= 6

END OF SENTENCE

NP PHRASE 5 COMPLETE
 CALLED BY PHRASE 4
 CATEGORY ROLE LOCATION MODIFIES
 11 11 4 5
 11 D H
 HEAD= 5

VP PHRASE 24 COMPLETE
 CALLED BY PHRASE 2
 CATEGORY ROLE LOCATION MODIFIES
 05 15 16 17 25
 05 H B
 12 V
 PP
 HEAD= 17
 NUMBER= 6
 VERBFEATURES: FINITE PASSIVE

CL PHRASE 15 COMPLETE
 CALLED BY PHRASE 3
 CATEGORY ROLE LOCATION MODIFIES
 NP 5 18 19
 VP

PP PHRASE 25 COMPLETE
 CALLED BY PHRASE 24
 CATEGORY ROLE LOCATION MODIFIES
 01 18 26
 NP
 HEAD= 20
 NUMBER= 3

NM PHRASE 14 COMPLETE
 CALLED BY PHRASE 15
 CATEGORY ROLE LOCATION MODIFIES
 22 11 1 2 4 6
 11 H
 PP
 03
 HEAD= 2
 NUMBER= 6

NP PHRASE 26 COMPLETE
 CALLED BY PHRASE 25
 CATEGORY ROLE LOCATION MODIFIES
 22 19 20 27
 11 T H
 PP
 HEAD= 20
 NUMBER= 3

VP PHRASE 19 COMPLETE
 CALLED BY PHRASE 15
 CATEGORY ROLE LOCATION MODIFIES
 05 7 8 9
 05 H B
 12 V
 PP

BEGIN SENTENCE 40
HE ASKED A QUESTION .

LONGEST PATH:
41 12 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL H 2

PL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

IP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
EAD= 1
NUMBER= 3

P PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
EAD= 2
NUMBER= 3
ERBFEATURES: FINITE PAST

P PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 3 4
11 H 4
EAD= 4
NUMBER= 3

END OF SENTENCE

11

BEGIN SENTENCE 41
I ASKED MANY DIFFICULT QUESTIONS .

LONGEST PATH:
1 12 33 13 11

IT PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

IT PHRASE 2 COMPLETE
MODIFIED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

IT PHRASE 3 COMPLETE
MODIFIED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
HEAD= 1
NUMBER= 1

IT PHRASE 4 COMPLETE
MODIFIED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
HEAD= 2
NUMBER= 1
VERBFEATURES: FINITE PAST

IT PHRASE 5 COMPLETE
MODIFIED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
33 K 3 5
13 D 4 5
11 H 5
HEAD= 5
NUMBER= 6

END OF SENTENCE

11

BEGIN SENTENCE 42
THE ASKED TO CONTINUE WORKING .

LONGEST PATH:
41 12 01 12 12

ST PHRASE 1 COMPLETE
CATEGORY 01 ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY 01 ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY 41 ROLE LOCATION MODIFIES
H 1
HEAD= 1
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY 12 ROLE LOCATION MODIFIES
SN V 2
5
HEAD= 2
NUMBER= 3
VERBFEATURES: FINITE PAST

SN PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY 01 ROLE LOCATION MODIFIES
V2 3
6

V2 PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY 12 ROLE LOCATION MODIFIES
SN V 4
7
HEAD= 4

SN PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY V2 ROLE LOCATION MODIFIES
8

12 PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY 12 ROLE LOCATION MODIFIES
SN V 5
HEAD= 5
VERBFEATURES: PARTICIPLE

END OF SENTENCE

BEGIN SENTENCE 43
THE PROFESSOR ASKED THAT THE STUDENTS RETURN THE BOOKS .

LONGEST PATH:
22 11 12 03 22 11 12 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
03 4
CL O 5
HEAD= 3
NUMBER= 3
VERBFEATURES: FINITE PAST

CL PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
NP S 6
VP 7

NP PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
22 T 5 6
11 H 6
HEAD= 6
NUMBER= 6

VP PHRASE 7 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
12 V 7
NP O 8
HEAD= 7
NUMBER= 6
VERBFEATURES: FINITE

NP PHRASE 8 COMPLETE
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
22 T 8 9
11 H 9
HEAD= 9
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE #4
THE PROFESSOR ASKED WHEN THE STUDENTS WOULD RETURN WITH THE
BOOKS .

LONGEST PATH:
22 11 12 03 22 11 05 12 01 22
11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL * 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP 5 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
03 4
CL 0 9
HEAD= 3
VERBFEATURES: FINITE PAST

CL PHRASE 9 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
NP 5 10
VP 11

NP PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
22 T 5 6
11 H 6
HEAD= 6
NUMBER= 6

VP PHRASE 11 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
05 H 7
12 V 8
PP 12
HEAD= 9
NUMBER= 6
VERBFEATURES: FINITE PAST FUTURE

PP PHRASE 12 COMPLETE
CALLED BY PHRASE 11
CATEGORY ROLE LOCATION MODIFIES
CI 7
NP 13
HEAD= 11
NUMBER= 6

NP PHRASE 13 COMPLETE
CALLED BY PHRASE 12
CATEGORY ROLE LOCATION MODIFIES
22 T 10 11
11 H 11
HEAD= 11
NUMBER= 6
END OF SENTENCE

BEGIN SENTENCE 45
THE ASKED FOR A RAISE .

LONGEST PATH:
41 12 01 22 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
HEAD= 1
NUMBER= 3

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
PP 7
HEAD= 2
NUMBER= 3
VERBFEATURES: FINITE PAST

NP PHRASE 6 COMPLETE REUSED
CALLED BY PHRASE 7
CATEGORY ROLE LOCATION MODIFIES
22 T 4 5
11 H 5
HEAD= 5
NUMBER= 3

PP PHRASE 7 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
01 3
NP 6
HEAD= 5
NUMBER= 3

END OF SENTENCE

BEGIN SENTENCE 46
THEY RAISE CHICKENS .

LONGEST PATH:
1 1 2 1 1

T PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL H 2

L PHRASE 2 COMPLETE
ALLOD BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

P PHRASE 3 COMPLETE
ALLOD BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
EAD= 1
NUMBER= 6

P PHRASE 4 COMPLETE
ALLOD BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
EAD= 2
NUMBER= 6
ERBFEATURES: FINITE

P PHRASE 5 COMPLETE
ALLOD BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
11 H 3
EAD= 3
NUMBER= 6

END OF SENTENCE

GIN SENTENCE 47
HEY RAISED THE PRICE OF BEEF .

LONGEST PATH:
12 22 11 01 11

PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
HEAD= 1
NUMBER= 6

PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
HEAD= 2
NUMBER= 6
VERBFEATURES: FINITE PAST

PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 3
11 H 4
PP 6
HEAD= 4
NUMBER= 3

PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
01 5
NP 7
HEAD= 6
NUMBER= 3

PHRASE 7 COMPLETE
CALLED BY PHRASE 6
CATEGORY ROLE LOCATION MODIFIES
11 6
HEAD= 6
NUMBER= 3
END OF SENTENCE

85

BEGIN SENTENCE 40
THE CHILDREN WERE RAISED IN MEXICO .

LONGEST PATH:
22 11 C5 12 01 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
05 B 3
12 V 4
PP 5
HEAD= 4
NUMBER= 6
VERBFEATURES: FINITE PAST PASSIVE

P PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
C1 5
NP 6
HEAD= 6
NUMBER= 3

P PHRASE 6 COMPLETE
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
11 H 6
HEAD= 6
NUMBER= 3

ID OF SENTENCE

84

BEGIN SENTENCE 49
THEY RAISED THE AMERICAN FLAG .

LONGEST PATH:
41 12 22 13 11

S1 PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

S2 PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

S3 PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
41 H 1
HEAD= 1
NUMBER= 6

S4 PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 2
NP O 5
HEAD= 2
NUMBER= 6
VERBFEATURES: FINITE PAST

S5 PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
22 T 3 5
13 O 4
11 H 5
HEAD= 5
NUMBER= 3

END OF SENTENCE

41

BEGIN SENTENCE 50
THE PARTICIPANTS RAISED MANY INTERESTING QUESTIONS .

LONGEST PATH:
22 11 12 33 13 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 4

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1 2
11 H 2
HEAD= 2
NUMBER= 6

VP PHRASE 4 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 3
NP O 5
HEAD= 3
NUMBER= 6
VERBFEATURES: FINITE PAST

NP PHRASE 5 COMPLETE
CALLED BY PHRASE 4
CATEGORY ROLE LOCATION MODIFIES
33 K 4 6
13 D 5 6
11 H 6
HEAD= 6
NUMBER= 6

END OF SENTENCE

BEGIN SENTENCE 51
THE FUNDS RAISED BY THE VOLUNTEERS WERE AN IMPORTANT CONTRIBUTION

LONGEST PATH: 22 11 12 01 22 11 12 22 13 11

ST PHRASE 1 COMPLETE
CATEGORY ROLE LOCATION MODIFIES
CL M 2

CL PHRASE 2 COMPLETE
CALLED BY PHRASE 1
CATEGORY ROLE LOCATION MODIFIES
NP S 3
VP 9

NP PHRASE 3 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
22 T 1
11 H 2
V2 D 8
EAD= 2
NUMBER= 6

NP PHRASE 5 COMPLETE REUSED
CALLED BY PHRASE 8
CATEGORY ROLE LOCATION MODIFIES
01 T 4
NP 6
EAD= 6
NUMBER= 6

P PHRASE 6 COMPLETE REUSED
CALLED BY PHRASE 5
CATEGORY ROLE LOCATION MODIFIES
22 T 5
11 H 6
EAD= 6
NUMBER= 6

P PHRASE 8 COMPLETE
CALLED BY PHRASE 3
CATEGORY ROLE LOCATION MODIFIES
12 V 3
PP 5
EAD= 3
VERBFEATURES: PARTICIPLE PAST

P PHRASE 9 COMPLETE
CALLED BY PHRASE 2
CATEGORY ROLE LOCATION MODIFIES
12 V 7
NP C 10
EAD= 7
NUMBER= 6
VERBFEATURES: FINITE PAST

P PHRASE 10 COMPLETE
CALLED BY PHRASE 9
CATEGORY ROLE LOCATION MODIFIES
22 T 8
13 D 9
11 H 10
EAD= 10
NUMBER= 3