

영어어문교육 10권 1호 2004년 봄

## The Applicability of Schema Theory to Scientific Texts

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Im, Byung-Bin & Lee, Jong-Hee (2004). The applicability of schema theory to scientific texts. *English Language & Literature Teaching*, 10(1), 1-22.

The primary purpose of this study is to investigate the applicability of content and formal schemata for processing the scientific texts which encompass the human knowledge of the physical world. In general, schema theory is based on the culture-oriented background of a text. From this point of view, the problem as to whether both content and formal schemata are applicable to the comprehension of a scientific text deserves a focal attention in terms of information processing modes. The results of empirical study indicate that whereas the universality of general knowledge content about the natural world attenuates the tenets of schema theory, the rhetorical organization of scientific texts encourages the application of the schema-based approach; the reader's familiarity with the structural patterns of a text facilitates his reading comprehension.

[schema theory/L2 reading instruction/scientific texts 선행  
지식구조이론/제2언어독해지도/과학텍스트]

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## I. INTRODUCTION

This article aims to shed light on the applicability of content and formal schemata for processing the scientific texts which encompass the human knowledge of the physical world. Much research has been conducted on the cross-linguistic and cross-cultural studies on second language (L2) and second culture comprehension under the general heading of schema-theoretical approaches. It is well-documented that when readers try to interpret unfamiliar text contents and its rhetorical structures, the representations of their cultural differences in schemata are obvious. One of the commonly quoted definitions is that reading comprehension is an interactive process between a reader's background knowledge of the general world, on the one hand, and both a text content and its rhetorical organization, on the other (Adams & Collins 1979; Block 1992; Carrell 1983a, 1983b, 1983c, 1984, 1985; Carrell & Eisterhold 1983; Carrell & Wallace 1983; Casanave 1988; Grabe 1991; Lee 1986; Nelson 1987).

The term 'schema', originally rooted in Bartlett's studies on human remembering, refers to the mental organization of an individual's past experience (Carrell & Eisterhold 1983; Casanave 1988; Cook 1992; Nelson 1987). The basic claim of schema-theoretic view is that any new experience is understood by comparison with a stereotypical version of a similar information embedded in long-term memory (Cook 1992; Nunan 1991). As a consequence, efficient reading comprehension is said to require the ability to relate the text material to one's previously acquired knowledge.

Current reading research often distinguishes between two categories of schemata: (a) content or cognitive schema incorporates the reader's prior background knowledge, and (b) formal or organizational schema refers to the rhetorical structure of the text (Barnitz 1986; Carrell 1984, 1985, 1987; Grabe 1991; Matambo & Roller 1992). These two schemata are independently or interactively recalled for the comprehension of the text. In accordance with schema theory, the reading text does not carry actual meaning; it provides only clues that enable readers to reconstruct

specific meaning from their background knowledge. In other words, the readers spontaneously negotiate the contextual meaning of the text. And, on the part of the reader, there are two different modes of reading comprehension: (a) bottom-up processing; and (b) top-down processing. The bottom-up mode is referred to as data-driven or language-based, and the top-down mode is as conceptually-driven or knowledge-based (Carrell 1984, 1985). To become a competent reader, therefore, these two processing modes should be activated simultaneously throughout the reading process.

Given these comprehension modes, the role of any previously acquired knowledge, often referred to as background knowledge, is significant in the processing of input data. Here, background or experiential knowledge is said to be, on the whole, culturally determined in the sense that it covers a knowledge of things, places, relationships, concepts, feelings, attitudes which come with prior experience and learning. So naturally this type of knowledge includes an understanding of one's native language, of the conventional ways of a people's living and thinking, and a broad range of one's general beliefs as passed on in legends, folk-tales and the like. Thus, it is generally recognized that background knowledge consists of *culture-specific* content and formal schemata (Barnitz 1986; Carrell 1984, 1985, 1987; Matambo & Roller 1992). In particular, research results showed that "student recall was significantly higher when reading about their own culture, regardless of expressed preference, and the students usually preferred the articles and stories from their own culture" (Nelson, 1987, p. 425). Basically this verifies the pedagogical foundation that for efficient reading instruction, language teachers are required to provide relevant background information for their students in the processing of L2 reading texts which possess culture-based contents relative to the target-language community.

## II. EFFECTS OF TEXT STRUCTURE ON COMPREHENSION

A number of research studies (Adams & Bruce 1980; Carrell 1985, 1987; Meyer & Freedle 1984; Meyer & Rice 1982; Paran 1996) have shown the positive influence of textual organization on L2 reading comprehension. With respect to the relationship of content and rhetorical structure in target language processing, Carrell (1987:476) concludes that:

( . . . ) when both content and rhetorical form are factors in ESL reading comprehension, content is generally more important than form. When both form and content are familiar, the reading is relatively easy; when both form and content are unfamiliar, the reading is relatively difficult. When *either form or content is unfamiliar, unfamiliar content poses more difficulties for the reader than unfamiliar form. However, perhaps not too surprisingly, rhetorical form is a significant factor, more important than content, in the comprehension of the top-level episode structure of a text and in the comprehension of event sequences and temporal relationships among events. In other words, each component - content and form - plays a significant, but different, role in the comprehension of text (Italics original).*

In parallel with this view, it can be inferred that when the content domain of a text provides such a common knowledge base as a scientific material, its substance, on the whole, can not interact with the reader's content schemata, so that only his background knowledge - formal schemata - of and experience with its textual development patterns may be activated to facilitate reading processes. As long as content domain is concerned, *scientific texts addressing any field of natural sciences and engineering can not be culturally biased.* On the part of the writer, Brookes and Grundy (1990, p. 34) present their general standpoint to recognize this fact as follows:

We find quite a widely held view in the literature that scientists have a common body of knowledge and ways of looking at the world and that the

main task of a writer from another culture writing in English is virtually that they need to do no more than translate directly from one language into another.

In this conjunction, no empirical research has ever been reported as to whether schema theory is applicable to the interpretation of texts covering the shared knowledge contents for the physical world. Hence, this article, based on the argument and observation noted above, attempts to take a close look at the applicability of schema-theoretical approaches to scientific texts.

### **III. METHODS OF EMPIRICAL RESEARCH**

#### **1. Hypotheses Formation**

As briefly described earlier, the schema-theoretical model to reading emphasizes the importance of background knowledge that provides a driving force for the reader in the process of comprehension, and the prior knowledge readers bring to the text is said to be culture-oriented from the ethnographical perspectives (Carrell & Eisterhold 1983; Matambo & Roller 1992). In this regard, as any scientific texts constitute a knowledge of the natural world, their universality may attenuate the tenets of schema theory based on a reader's stereotypical lines of thought. So the research question addressed in this article is "Can schema-theoretical approaches to L2 reading be applied to scientific texts in relation to content and/or formal schemata?" In order to solve this study question, it is necessary to formulate two interrelated hypotheses as follows:

(a) Schema-theoretical approaches to L2 reading cannot be applied to a scientific text in relation to its content domain because any reader cannot possess a culture-specific content schemata with respect to a knowledge of the physical world; and

(b) Schema-theoretical approaches to L2 reading can be applied to a scientific text in relation to its formal rhetorical structure because any scientific text can contain a culture-specific formal organization with respect to a knowledge of the physical world.

## 2. Hypotheses Testing

### 1) Materials

The testing materials were designed to control for the content domain and rhetorical organization of the scientific information for the investigation of subjects' L2 comprehension abilities. In doing this, two distinctive sets of the passages and multiple choice questions were carefully selected or elaborated; one set (Passage Type-1, 20 Questions; see Appendix A) of which contained scientific content domain and English rhetorical features (Connor, 1996) often referred to as *top-heavy and linear-ordering* development styles; the other set (Passage Type-2, 20 Questions; see Appendix B) was composed of scientific texts based on Korean organizational patterns (ibid.) formulated with *bottom-heavy and nonlinear-ordering* structure. However, all these materials with six pieces of scientific texts excerpted from previous official TOEFL (Test of English as a Foreign Language) tests were confirmed as passages at a relatively equal degree of difficulty in processing target language. The two sets of reading comprehension tests are given in Appendices.

### 2) Subjects

This empirical study was conducted with two heterogeneous groups of 37 high intermediate proficiency Korean EFL college students whose TOEIC scores range from 650 to 750 in terms of *prior background knowledge* (opaque / transparent) regarding content domain and rhetorical styles of English expository writing. As the experimental group (Group-1), 19 students in one section, and the control group (Group-2) of 18 students in the other section were composed of the

total participants. The subjects of Group-1 had all humanities majors other than English language and literature; and Group-2 subjects' majors belonged to English language and literature. And, more importantly Group-1 members (opaque group), as freshmen or sophomores, were almost unaware of English rhetorical organization in expository composition; however, all Group-2 members (transparent group), as juniors or seniors, were adequately aware of its unique development styles. A total of 37 subjects were administered a 35 minute-reading comprehension test consisting of 40 multiple choice questions, of which a perfect mark was 100 score based on 5 points assigned to each question.

#### IV. RESULTS AND ANALYSIS

##### 1. Results

As a result of the reading comprehension tests described above, tables below present mean scores and standard deviations for both groups on the six passages and 40 questions:

**TABLE 1**  
**Results on Reading Comprehension Test**

Group-1 (n=19)	Type-1	Type-2
(Student No.)		
01.	60	65
02.	55	70
03.	65	65
04.	55	60
05.	60	70
06.	50	60
07.	65	80

08.	70	65
09.	55	60
10.	55	70
11.	60	65
12.	65	70
13.	55	65
14.	60	60
15.	75	80
16.	55	60
17.	50	60
18.	60	65
19.	65	65
Mean Scores	59.74	66.05
SD	6.381	5.977

**TABLE 2**  
**Results on Reading Comprehension Test**

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Group-2 (n=18)	Type-1	Type-2
(Student No.)		
01.	75	70
02.	65	65
03.	70	60
04.	60	60
05.	65	70
06.	55	55
07.	70	75
08.	65	60
09.	65	60
10.	50	55
11.	65	65
12.	70	75
13.	60	55



14.	65	65
15.	80	75
16.	65	65
17.	60	60
18.	70	65

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Mean Scores	65.28	64.17
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SD	6.764	6.508
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## 2. Analysis

Even though this study was a limited kind of investigation as to whether schema theory is applicable to scientific texts, the results may be said to be impressionistic on the ground that the experimental group participants obtained slightly better scores (66.05 vs. 59.74) in the processing of text materials containing culturally familiar rhetorical format together with a lower standard deviation (5.977 vs. 6.381). On the contrary, the control group participants did not make any tangible differences in their reading comprehension performance on the basis of mean scores (64.17 vs. 65.28) and standard deviations (6.508 vs. 6.764).

Given these numerical outcomes, this research seems to support the probability that rhetorical structures rather than content domain in processing the scientific texts of which the substance is, as a universal knowledge of the natural world, presented to test-takers may exert a positive influence on their performance in L2 reading comprehension tests; both of the hypotheses set forth earlier have been validated.

## V. CONCLUSION

This empirical study has thus far examined the following two hypotheses:

(a) Schema-theoretical approaches to L2 reading cannot be applied to a scientific text in relation to its content domain because any reader cannot possess a culture-specific content schemata with respect to a knowledge of the physical world; and

(b) Schema-theoretical approaches to L2 reading can be applied to a scientific text in relation to its formal rhetorical structure because any scientific text can contain a culture-specific formal organization with respect to a knowledge of the physical world.

The first hypothesis above constitutes the fundamental elements which are verifiable through introspection prior to the implementation of an empirical research. Those factors, in their entirety, derive from the boundary that science circumscribes in a pursuit of knowledge of the natural world. So, it is taken for granted that the study results, though inadequately documented, support the integral part of the first hypothesis; scientific texts address the universal scope and limit of human knowledge with regard to the world.

The second hypothesis is based on the fact that all text materials may be constructed in a wide variety of formal rhetorical structures which are normally culture-specific. This consideration is also attributable to one's factual judgement. However, it is insightful to have provided a valid foundation for the confirmation of an argument or logical reasoning without substantial evidence. Therefore, for this purpose, further research should be focused on the combinatory influences of content and formal schemata in L2 reading comprehension and the broad-ranged effects on the data interpretation of differences in the rhetorical patterns of expository writings.

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## APPENDIX A

## Passage Type-1 for Reading Comprehension Tests

Questions 1~6

There are two kinds of numbers, prime and composite, and mathematicians have been trying to tell them apart since the time of Euclid 2,200 years ago. It is easy enough with small numbers: 21 is clearly composite, because it can be divided by 7 and 3; 23 is prime because it is not divisible by any smaller number except 1. But how can an investigator know if a 15-digit number is prime? A new procedure has been developed using a computer that can determine in ten hours or less whether a 100-digit number is prime. One expert has estimated that such a feat previously would have required a century of computer time.

The new technique initially picks key numbers that have the potential to divide evenly into the large number. With these key numbers, tests are made to detect crucial characteristics of the large number, and soon the computer produces a short list of the only key numbers that might divide evenly into the large number. The computer then tries to divide the large number by each key number on the list. If none of the key numbers works, then the large number must be a prime.

1. Which of the following is a main topic in the passage?  
(A) A new computer procedure  
(B) Uses for prime numbers  
(C) Euclid, the ancient mathematician  
(D) Advantages of composite numbers
2. How many centuries ago did mathematicians first try to distinguish between prime and composite numbers?  
(A) One  
(B) Ten  
(C) Twelve  
(D) Twenty-two
3. In the first paragraph, the phrase "trying to tell them apart" means  
(A) attempting to explain the system to non-mathematicians  
(B) seeking a more convenient way to classify numbers  
(C) endeavoring to differentiate between the two kinds of numbers  
(D) looking for ways to end the separation between mathematicians and computer scientists

4. According to the passage, a prime number is one that  
(A) can be divided only by 7, 3, or multiples of these numbers  
(B) is not divisible by any number smaller than itself except 1  
(C) has 15 digits  
(D) has 100 digits
5. Before the technique described in the passage was developed, how much time might it have taken to determine whether a 100-digit number was prime?  
(A) 10 hours  
(B) 100 hours  
(C) 10 years  
(D) 100 years
6. With the new technique described in the passage, about how long does it take to determine whether a 100-digit number is prime?  
(A) 10 hours  
(B) 100 hours  
(C) 10 years  
(D) 100 years

#### Questions 7~13

The body of nearly all flowering plants can be divided into two systems, the root system which grows below ground and the shoot system which grows above it. The typical root system anchors the plant firmly in the soil, and absorbs water and various dissolved raw materials from it. The typical shoot system consists of a main stem upon which are borne leaves, branch shoots, and sometimes flowers. It should be emphasized that the words stem and shoot are not synonymous, the word "shoot" being a collective term for both stem and leaves. The leaves are the chief food-producing organs of the plant, making complex foods in the presence of light by a process called photosynthesis. The stem supports the leaves, displaying them in the light needed for photosynthesis, and also acts as the main channel of communication between the various organs of the plant. Water and dissolved minerals absorbed by the roots are carried in the stem to the leaves and flowers, and foods synthesized in the leaves are conducted away through the stem to other regions of the plant, both above and below ground, where they are either used for growth or else stored for future use. Flowers are organs that are concerned with the reproduction of the species by seeds.

7. With what topic is the passage primarily concerned?
- (A) How plants produce seeds
  - (B) Different types of flowers
  - (C) The structure of plants
  - (D) How leaves grow
8. According to this passage, what is one main function of the root system?
- (A) To absorb light for growth
  - (B) To create minerals for nutrition
  - (C) To speed the reproduction process
  - (D) To secure the plant in the ground
9. With which of the following would the author be most likely to agree?
- (A) The shoot is part of the stem.
  - (B) The stem is part of the shoot.
  - (C) The stem and the shoot are identical.
  - (D) The stem is not part of a flowering plant.
10. The major food-producing part of a plant is the
- (A) leaf
  - (B) root
  - (C) flower
  - (D) shoot
11. In the next-to-last sentence of the passage, the word "they" refers to
- (A) regions
  - (B) foods
  - (C) leaves
  - (D) flowers
12. The author implies that plants with flowers are
- (A) likely to have long roots
  - (B) not reproducing organisms
  - (C) grown from seeds
  - (D) the most beautiful of all plants
13. What did the paragraph preceding the passage most probably discuss?
- (A) The anatomy of fruit-bearing trees
  - (B) Methods of increasing plant production
  - (C) The definition of a plant body
  - (D) The differences between flowers and leaves

Questions 14~20

Within closely related groups you may observe slightly different feeding techniques. In the spruce-fir forests of northern New England and Canada, five warbler species peacefully coexist in the same trees, each feeding in a slightly different manner: the Cape May warbler looks for insects mainly in the tops of trees at the outer tips of the branches. The yellow-rumped warbler feeds nearer the trunk, on the lower branches of the tree, and on the ground. These two species also catch many insects in the air by flying from tree to tree. The black-throated green warbler feeds primarily at middle elevations in the trees, on the tips of branches, and midway from the tips to the trunk. It hovers to reach insects more than any of the others. The Blackburnian warbler searches the outer tips of the tree from mid-height to the top. The bay-breasted warbler feeds in the lower half of the same trees, mainly away from the outer tips of the branches. By dividing the tree into different sections, five species are able to exploit what would seem like only a single food source.

14. What is the author's main purpose in this passage?
- (A) To urge groups to coexist peacefully
  - (B) To list the types of insects eaten by warblers
  - (C) To illustrate how different feeding practices allow species to coexist
  - (D) To advise naturalists on where to find different species of warblers
15. In line 6, the phrase "These two species" refers to the
- (A) Cape May warbler and the yellow-rumped warbler
  - (B) black-throated green warbler and the Blackburnian warbler
  - (C) yellow-rumped warbler and the black-throated green warbler
  - (D) Blackburnian warbler and the Cape May warbler
16. According to the passage, which of the following must hover more than the others?
- (A) The Cape May warbler
  - (B) The yellow-rumped warbler
  - (C) The bay-breasted warbler
  - (D) The black-throated green warbler
17. Where should someone hoping to see a Blackburnian warbler look?
- (A) On the ground
  - (B) At the bottom of the tree
  - (C) At the tips of the lower branches
  - (D) At the tips of the higher branches



18. The five types of warbler are able to share a single food source by  
 (A) specializing in different insects  
 (B) living in different parts of the forest  
 (C) eating different sections of the trees  
 (D) searching for food in different areas of the trees
19. As used throughout the passage, the word "trunk" refers to the  
 (A) central part of a tree  
 (B) main part of an animal body  
 (C) flexible snout of an animal  
 (D) luggage compartment of a car
20. The passage would most likely be found in a textbook on  
 (A) botany  
 (B) zoology  
 (C) geography  
 (D) agriculture

#### APPENDIX B

#### Passage Type-2 for Reading Comprehension Tests

##### Questions 1~5

The diameter of the sun is more than 100 times as big as that of the earth. It gives off powerful rays of light in the form of radiant energy. This energy travels to the earth at a speed of approximately 300,000 kilometers per second. This means that sunlight takes 8.33 minutes to get to the earth. The temperature on the surface of the sun is about 5,520 Celsius degrees, and it is much hotter inside. Scientists now believe that the heat of the sun comes from natural atomic energy. In this process, hydrogen is believed to be changed to helium with an enormous amount of energy given off. The mass is changed to energy. This energy is in the form of heat, light, and other forms of radiation. The term, nuclear fusion reaction refers to the mysterious phenomena happening in the sun, a huge ball of very hot gases, at the center of our solar system.

1. The author makes all of the following statements about the sun EXCEPT that it  
 (A) is a star.  
 (B) emits light rays.

- (C) lies at the edge of the solar system.  
(D) is 100 times bigger than earth.
2. It can be inferred from the passage that the temperature of the outer rim of the sun is  
(A) hotter than the earth's interior.  
(B) cooler than the sun's interior.  
(C) as hot as the earth's interior.  
(D) as hot as the sun's interior.
3. The author implies that scientists at one time did not believe that atomic energy was  
(A) the source of the sun's heat.  
(B) contained in the earth's core.  
(C) able to travel at the speed of light.  
(D) less powerful than solar energy.
4. According to the passage, which of the following best describes the manner in which the sun is thought to produce energy?  
(A) Helium heats hydrogen, which gives off light.  
(B) Heat and light melt hydrogen, which releases helium.  
(C) Light produces hydrogen and helium, which release heat.  
(D) Hydrogen changes to helium, which gives off light and heat.
5. Which of the following would most likely follow the passage?  
(A) An analysis of the solar system  
(B) A description of nuclear fusion reaction  
(C) A debate on scientists' understanding of radiant energy  
(D) A discussion on other planets except for the earth

#### Questions 6~13

Short and stubby wings enable a tanager and other forest-living birds to swerve and dodge at speed through the undergrowth, just as they helped the fighter planes of the Second World War to make tight turns and acrobatic maneuvers in a dog-fight. More modern fighters achieve greater speeds by sweeping back their wings while in flight, just as peregrines do when they go into a 130 kph dive, swooping to a kill. Championship gliders have long, thin wings so that, having gained height in a thermal up-current they can soar gently down for hours and an albatross, the largest of flying birds, with a similar wing shape and a span of 3 meters, can patrol the ocean for hours in the same way without a single wing beat. Vultures and hawks circle at very slow speeds supported by a thermal and they have the broad rectangular wings that very slow-flying aircraft have. People have not been able to

adapt wings to provide hovering flight. That has only been achieved with the whirling, horizontal blades of a helicopter or the downward-pointing engines of a vertical landing jet. Hummingbirds have paralleled even this. They tilt their bodies so that they are almost upright and then beat their wings as fast as 80 times a second producing a *similar down-draft of air*. So the hummingbird can hover and even fly backwards. As a consequence, bird wings have a much more complex job to do than the wings of an airplane, for in addition to supporting the bird they must act as its engine, rowing it through the air. Even so, the wing outline of a bird conforms to the same aerodynamic principles as those eventually discovered by people when designing airplanes, and if you know how different kinds of aircraft perform, you can predict the flight capabilities of similarly shaped birds.

6. What is the main idea presented in the passage?

- (A) Bird wings are less complicated than the wings of airplanes.
- (B) Similar wing shapes in aircraft and birds produce similar flight capabilities.
- (C) Aerodynamic principles show that short, studdy wings are more efficient than long, thin ones.
- (D) People design airplanes by looking at the wing shapes of birds.

7. According to the passage, bird wings differ most from airplane wings in that bird wings

- (A) can be used in water as well as in air.
- (B) are less varied in shape than airplane wings.
- (C) have a sturdier framework than airplane wings.
- (D) provide power as well as support.

8. Modern fighter planes may be compared to peregrines in the same way that Second World War fighter planes may be compared to

- (A) tanagers.
- (B) hawks.
- (C) albatrosses.
- (D) hummingbirds.

9. The advantage of short, stubby wings is that they

- (A) blend invisibly with undergrowth.
- (B) increase close-range maneuverability.
- (C) permit long, soaring flight.
- (D) provide hovering flight.

10. The bird that has the same wing shape as a glider is the  
(A) tanager.  
(B) peregrine.  
(C) albatross.  
(D) hummingbird.
11. Which of the following permits the greatest speed?  
(A) A broad, rectangular wing  
(B) A long, thin wing  
(C) A swept-back wing  
(D) A whirling, horizontal blade
12. Which of the following birds most resembles a helicopter in the way it moves?  
(A) A hummingbird  
(B) A hawk  
(C) A tanager  
(D) A peregrine
13. What kind of aircraft has the same type of wing as a vulture?  
(A) A helicopter  
(B) A plane built for dog-fighting  
(C) A glider  
(D) A plane built for slow flight

#### Questions 14~20

Water is scarce for the air plants, so they are adapted, like desert plants, to last through dry periods. When they do get water, they absorb it very quickly and conserve it carefully. Some send dangling roots down through the canopy until they can take nourishment from the earth itself. Then they may grow into large and burdensome trees on top of the trees on which they started life. A few strangle their supporting tree by building their own trunks around it. Others develop rosettes of overlapping leaves which catch and hold water; incidentally, these also serve as breeding places for mosquitoes, frogs, and swarms of tiny invertebrates. Likewise, the air plants attach themselves to crannies in the branches of trees and lianas. Usually they put forth a fine meshwork of roots. These collect dust and plant debris, and in time create a soil of their own. Often the roots also harbor ants, which help build up the soil by their wastes and dead bodies. So it is widely known that even stranger than the lianas are the epiphytes, or the air plants described above, which flower high in the trees without benefit of soil. This large group includes orchids, cacti, aroids, bromeliads. There are also non-flowering lichens and mosses.

14. The paragraph preceding the passage most probably discussed
- (A) lichens.
  - (B) lianas.
  - (C) desert plants
  - (D) tiny invertebrates.
15. Which of the following is a type of epiphyte?
- (A) Aroid
  - (B) Ant
  - (C) Mosquito
  - (D) Liana
16. Where does a young air plant often develop?
- (A) Under the ground
  - (B) In an ant hill
  - (C) In the upper part of a tree
  - (D) In the upper layers of the atmosphere
17. According to the passage, how are air plants and desert plants similar?
- (A) Both serve as breeding places for insects.
  - (B) Both grow in the same environment.
  - (C) Both have a fine meshwork of roots.
  - (D) Both have ways of saving water.
18. According to the passage, an air plant can be damaging to which of the following forms of life?
- (A) An ant
  - (B) A mosquito
  - (C) An orchid
  - (D) A tree
19. Rosettes of leaves help some air plants by
- (A) conserving water.
  - (B) taking nourishment from the earth.
  - (C) creating soil.
  - (D) repelling harmful insects.
20. Which of the following statements is true of all the epiphytes mentioned in the passage?
- (A) They are small.
  - (B) They can grow without soil.
  - (C) They have few roots.
  - (D) They have rosettes.

예시언어(Examples in): English

적용가능 언어(Applicable Languages): English

적용가능 수준(Applicable Levels): College/Higher

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Revised in Feb., 2004

Reviewed in March, 2004

Revised version received in April, 2004