SUMMARY AND CONCLUSION

As a large number of scientific texts are written in English and no large scale translation of the texts into Thai has so far been undertaken, Thai university students majoring in science always face a lot of difficulties in reading. One of the major difficulties is the structural difficulty that usually constitutes problems even for advanced students.

It is obvious that in academic writing, particularly in scientific texts, relative clause reduction is one of the significant procedures that science writers commonly use to supply information in the shortest or most concise way. In fact, though the writers try to be concise, the effect of their writing style can sometimes cause the students some structural problems and does not lead them to fully comprehend the texts read.

Accordingly, the thesis is particularly a study of reduced relative clauses at phrase level. The procedure was done by analysing the 1,000 reduced relative clauses, randomly drawn from every fourth page from page 1 to page 364 of the two scientific texts; Biology, by Claude A. Villee and College Chemistry, by Bruce H. Mahan, in order to clarify how the clauses were reduced or which element had been shortened. Then the reduced clauses were classified into categories by means of structural differences, position in the noun phrase, and function. A reduction formula was also set for each reduced relative clause category. Finally, the frequency of occurrence of each relative clause reduction was counted in order to establish the relative frequency of occurrence of the total.
The result of the study reveals that the reduced relative clauses studied can be classified into two main categories:

**Defining Reduced Relative Clauses**

This type of the reduced clauses can be sub-divided into three types:

I. Reduced relative clauses consisting of a participial phrase and occurring in the pattern:

Nominal + Participial Phrase

**Examples:**

**Active:** Nom. + WH-word + V. + ...

an animal which suffers from anthrax

→ Nom. + Pres. Participial Phr.

an animal suffering from anthrax

The active relative clause is reduced by omitting the "WH-word" and changing the verb into the present participial form (V-ing).

**Passive:** Nom. + WH-word + be + V-ed + ...

a person who is subjected to intense gamma rays

→ Nom. + Past Participial Phr.

a person subjected to intense gamma rays

The passive relative clause is reduced by omitting the "WH-word" and the auxiliary "be".

II. Reduced relative clauses consisting of a participial phrase and occurring in the pattern:

(Det.) + (Adj.) + Participial Phrase + Nominal

**Examples:**

**Active:** Nom. + WH-word + V. (Adv.) + ...

particles which move quickly
quickly moving particles

The active relative clause is reduced by omitting the "WH-word" and changing the verb into the present participial form (V-ing). As the clause consists only of the "WH-word" and the verb, when it is reduced the "V-ing" or present participle is usually placed before the nominal and it is adverbially modified.

Passive: Nom. + WH-word + be + (Adv.) V-ed + ...
experiments which are well controlled

Past Participial Phr. + Nom.
well-controlled experiments

The passive relative clause is reduced by omitting the "WH-word" and the auxiliary "be". The past participle (V-ed) is then placed in front of the nominal and it is adverbially modified. In order to show that the two elements are closely related to each other, a hyphen is often used.

III. Reduced relative clauses consisting of \{Adj./Num./N.-N\-ed\} and occurring in the pattern:
(Det.) + \{Adj./Num./N.-N\-ed\} + Nom.

Examples:
Active: Nom. + WH-word + V. +\{Adj./Num./N.\} + N.
cells which have thick walls
the organisms which have one cell
most bacteria which have rod shapes

(Det.) + \{Adj./Num./N.-N\-ed\} + Nom.

thick-walled cells
the one-celled organisms
most rod-shaped bacteria
The active relative clauses are reduced by omitting the "WH-word" and the verb "have". The suffix "-ed" is usually added to the noun (N.) to form an adjective meaning "having ..." Meanwhile, the complements of the clauses become the compound premodifiers which take the forms of "Adj.-N+ed", or "Num.-N+ed", or "N.-N+ed" and they are shifted to the front of the nominals. When the complements premodify, they are often hyphenated to function as single adjectives, however, they are not hyphenated when they occur after the verbs of the clauses as complements.

Non-defining Reduced Relative Clauses

Examples:

Active: Nom. , WH-word + V. + ... ,
        Geiger and Marsden, who work in Rutherford's laboratory ,
        Nom. , Pres. Participial Phr. ,
        Geiger and Marsden, working in Rutherford's laboratory ,

Passive: Nom. (WH-word +be+ V-ed + ... )
        a disease of tobacco plants ( which is called mosaic disease )
        Nom. ( Past Participial Phr. )
        a disease of tobacco plants ( called mosaic disease )

The reduction of the non-defining relative clauses - both in the active and passive form - is like that of the defining relative clause type I except that they are non-defining or non-restrictive.

The frequency of occurrence of each defining reduced relative clause category are 40% (40.5%), 41½ (41.4%), 43 (4.3%), and that of the non-defining reduced relative clause category is 138 (13.8%). This reveals that the reduction type I and II have about the same occurrence frequency and they occur the most frequently. The highest frequencies of the two reduced relative clause categories reflect the usefulness of these reduction patterns which the students are most likely to meet in the texts read
and they are also the ones which should be selected for teaching in the English class. Further, the relative clause reduction type III which occurs the least frequently should not be neglected since it may seem complicated thus constituting a problem for the students. Therefore, it should be considered and selected for teaching too so that a more fruitful interpretation may result.

Moreover, the frequency of occurrence of the reduced relative clauses in the active form is 315 (31.5%), whereas the occurrence frequency of those in the passive form is 685 (68.5%). This suggests the idea that the reductions of the active relative clauses are less frequent than those of the passive relative clauses.

In conclusion, it is hoped, at any rate, that the study will serve as a guide for instructors to select or prepare scientific English materials that are strictly necessary and relevant to the students to overcome the reading difficulty previously discussed. In addition, it is hoped, at the very least, that the implication of the study will help the students increase their reading efficiency which is so important in studying at university level and long afterwards.

Finally, it is suggested that although the frequency of occurrence is an important, perhaps the most important, means of selection, the range of occurrence is also of considerable importance. That is to say, the wider the range of the reduction pattern, the more important its frequency. As the study covers only two fields of science; Biology and Chemistry, and the frequency of occurrence is the only factor focussed on, it is hoped that there will be further studies in other fields of science in both frequency and range of occurrence of the reduction patterns. Besides, it is believed that if a large number of reduced relative clauses are counted, a clear indication of their relative frequencies will emerge.


