UNIVERSITY OF NEW ZEALAND.

SYNOPSIS.

(Paragraphs are numbered and headings underlined.)

TIME ECONOMY IN SILENT READING.

AN INQUIRY

AS TO THE BEST TIME CONDITIONS FOR

CHILDREN TO STUDY BY READING.

by D. Mackay, B.A.

The thesis submitted as part of the Examination

for Honours and M.A. - 1927.

CHAPTER II. THE COLLECTION OF DATA.

1. The experiments undertaken, comprised compar-
isons of reading during the usual period with
that during subdivisions of that period into
two, and three short periods, separated by 4-min.
SYNOPSIS.

(Paragraphs are numbered and headings underlined.)

CHAPTER I.  INTRODUCTION.

| 1. The Theme is an enquiry into the 'optimum' lesson period; the subject of reading provides the field of investigation. |
| 2. The Optimum Period of Work in Industry has been investigated, with result in economy of effort and increased production. |
| 3. The Need in Teaching for Such Study is evident to the teacher who compares the relative values of the long and short lesson. |
| 4. Definitions: (a) 'Optimum' Period is the most economic division of the time allotted to a pursuit. |
| (b) Reading has as its purpose to obtain information. Its most important elements are comprehension and speed. |

CHAPTER II.  THE COLLECTION OF DATA.

| 1. The Experiments undertaken, comprised comparisons of reading during the usual period with that during subdivisions of that period into two, and three short periods, separated by 4-Min. |
rest periods.

2. The Requisites for carrying out the Experi-
ments were reduced to the minimum available.
In the absence of a suitable control, other
regulating means were devised. Silent reading
was preferred.

3. The School chosen was primary and rural,
and situated close to the city.

4. The Children Selected were aged twelve years,
18 in number and a fair sample of the population.

5. The Choice of Time of submitting the work was
determined from the 'freshness' of the children.
The pre-midday session (10:45 A.M. to 12 noon)
on the five consecutive days of the school week,
was adopted.

6. The Elimination of Interfering Factors was
attempted by giving daily a different test to
each of the four groups into which the class was,
for this purpose, divided.

7. The Readings Selected were from "The children
of Europe," a new publication within the scope of the
children but unknown to them, the extracts
being wholes, similar in nature and content,
mimeographed on foolscap

8. The Room was well appointed, quiet, comfort-
able, and that usually occupied by the children.
9. The Week's Programme from June 9-16/1927, comprised a daily reading followed by a written reproduction. On Monday, Wednesday and Friday, 20 minutes of straight-out reading was given; on Tuesday 8 minutes reading, 4 minutes rest and 8 Mins. reading; on Thursday three 4 minute periods separated by 4 minute 'rest' periods.

10. The Standards for Assessing Achievement were
(a) the word as the unit of the Amount read and
(b) the 'idea' as the unit of Amount comprehended.
The reproduction of ideas is called the "narrative."  

11. The Definition of "Idea" was taken as a single extension of information.

12. The Method of Application of the Tests was simple and effective.

13. The Equalization of the Groups for scoring power was considered impracticable.

14. The 'Narrative' Method or reproduction by writing was an exercise familiar with the children.

15. The Marking of the 'Narrative' was done so as to allow a single value for an 'idea', irrespective of mode of expression.

CHAPTER III. THE DATA AND ANALYSIS.

1. Extrinsic Factors liable to complicate the results attributable to the 'time' factor are noted.  

2. The Correlation of Amount Read and Narrative is only. 'Amount Read' is therefore, recorded as
of only incidental interest.

3. **Class Achievements in Amount Read** are recorded in (a) Words per test (b) Words per group (c) Words per Piece. Graph I illustrates these. (a) Indicates that there is a slight advantage in amount read per minute of actual reading in favour of the 'broken periods. (b) There is considerable variation in the reading rate of the groups. (c) The pieces are approximately equal in difficulty for reading rate.

4. **The Response of the Individual** in amount read varies according to type of reading period. For best results some favour the straight-out period; others, one or other of the 'broken' periods.

5. **Class Achievements in 'Narrative'** are, for purposes of analysis, recorded under the heads (a) Per Test (b) Per Group (c) Per Piece.

(a) The ideas gained per minute of reading are more in the 'broken' periods and most in the three 4-minute periods.

(b) The small inequality of the groups is such as not to influence the validity of the conclusion regarding the tests or periods in (a).

(c) The pieces in view of the smallness of their differences may be taken as equal.

6. **Conclusions as to Optimum Period** favour the 4 minute period where not only does the quality
of the reading improve, but the 'rest' period remains as a surplus for other use.

7. **Explanations of Conclusions** as to advantages of 4 minutes period and 'rest' are sought in (a) an "incubation of thought" theory and (b) the elimination of fatigue.

8. **The Individual Reader** as studied from Graph IV, shows that best scores vary with child and type of period.

9. **A Vertical Classification** by these variations, would classify the children according to the individual's optimum period.

10. **A Classification according to "Optimum Period"**, divides the children into a group of seven favouring the 8 minute period, and eleven the 4 minute period. The 20 minute period being generally less economic than one or other of the 'broken' periods, is omitted.

11. **The Correlations between the Various Periods** are 20-minutes and (3&3) Mins. = .84 20-minutes " (4&4&4) " = .85 (3&3) " (4&4&4) " = .81 Several concomitants prejudice the value of these correlations.

12. **The Inconclusive Evidence** from these data necessitated further experimentation along the
same lines. The points noted are (1) the 20-minute's period's superiority is not commensurate with the difference in time. (2) Broken periods show a gain in ideas gathered per minute of reading. (3) A vertical classification might be made.

CHAPTER IV. VERIFICATION OF THEORIES THROUGH FURTHER EXPERIMENTS.

1. The Conditions as to pupils and school were the same as before. The time was a month later—June 27—July 1, 1927. 

2. The Readings Selected were the five parts of "Three Calendars," a new publication and unread by the children, differing in its romantic and emotional nature from the previous selections, but otherwise meeting the requirements similarly.

3. The Evaluation of the Chosen Pieces was attempted by submitting them to a group of children at another school.

4. The Method of Application of the Tests for this purpose was similar to that previously employed except that five groups were instituted and all periods were 20 minutes in duration.

5. The Relative Values of the Pieces were determined from 'Narrative,' rate of reading not being included.

6. A Repetition of the Tests at the first school...
took place July 4-8/1927 under good conditions.

7. The Application of the Tests was made on a system similar to that hitherto used except that five groups, chosen haphazardly, were made, and that the children read from the book instead of the typed sheet.

8. The Line as a Reading Unit was preferred to the word for reasons of economy in marking.

9. The Data in Amount Read was collected as in the previous tests. (a) The amounts read in the various tests bore relationships to one another similar to that in the former tests. (b) The Groups showed great variety in rate-of-reading ability. (c) The amounts read per piece varied little.

10. The Data in Narrative in (a) per period, showed that the reproduction was greater from the 'broken' periods than from the average of 20-minute periods and greatest from the 4-minute periods. Almost double the amount of 'Narrative' in the previous experiment was gleaned in this one. This increase might be due to (i) difference in appeal (ii) development of the short-period habit (iii) improvement due to an extra month. In the light of 'ideas' gathered per minute of actual reading, the 8-minute periods show an increase of 28% and the 4-minute period an increase of 68% over the 20-minute period. The data in (b), per group, show that the best results of the groups are
so evenly distributed as not to affect the deductions from the data in (a). The data in (c) show that the pieces presented approximately the same difficulty to all the groups and that, therefore, the deductions from (a) are valid as approximations.

11. A Resume of the foregoing points from 'narrative' data is given.

12. The Suggested Vertical Classification according to the individual's optimum period is not yet confirmed. The class divided itself equally between the two short periods, but only 3 abide by their former elections. Further experimentation is, therefore, necessary before a definite classification can be decided.

CHAPTER V. TEACHING PRINCIPLES.

1. The Fundamental Conditions of an 'Optimum' Period are (a) Economy of Effort which implies results commensurate with the energy expended. The fatigue-free mind, before inattention and restlessness supervene is capable of assimilating the motor and emotional as well as the intellectual content of the reading situation. The duration of this period of working should not be too short, lest the reader may not have "warmed"up" to his best working stage and maintained that stage for its full time. Nor should it be so short as not to develop his capacity to
hold ideas in suspension in the mind. In view of the amount read in four minutes, that period is thought not to be too short.

(b) **Applicability to Schoolroom Practice** of the short period. It is already casually if not system-atically employed by teachers. Its embodiment into a routine of class teaching involves no difficulty. As a compromise between the 4-minute and 8-minute periods, the 6-minute period is suggested, and a description of its inclusion with 'rest' or 'change' period in a 45-minute lesson is given. The rest periods should be utilized for a complete change of pursuit. The short period affords the teacher greater opportunity for diagnosis of faults in the reading. The question of short piece reading becoming habitual is met.

(c) **The Fostering of good Habits of Work and Thought.**

Demoralization follows over-fatigue, making high concentration impossible and causing the development of habits of mind wandering. A distaste for reading may follow. The short period prevents such over-fatigue and necessitates an immediate 'settling-down' to work. The fresh child experiences competence to deal with the situation. A good work 'complex' is developed and from good reading habits arise good study habits.

2. **The Teacher- Pupil Relation** has increased
opportunity in brighter pupils, less strain for the
teacher in the maintaining of attention and discipline,
less faulty work, less 'contrariant' attitude and
lastly in the fostering of both sociality and
individuality.

CHAPTER VI. RELAXATION.

1. The Need for Conservation of the child's powers
for adequate readjustment to a world becoming
increasingly complex is an important question for
the educator.

2. Unprofitable Expenditure of Energy is evident
in the signs of strain, in the sleepless night and
in the neurotic dispositions of the adult world.

3. An Art of Relaxation means the consciously
controlled diminution of tension and cessation
from work upon the expiry of the time allotted to
it.

4. The Teaching of Relaxation may be begun in the
removal of muscular tension and thence to mental
quiet.

5. The 'Change' Period is suggested as suitable
for exercises in relaxation.

CHAPTER VII. CONCLUSION.

1. A Review of the position of the short period
indicates many advantages in its favour.
2. The Longer Period of reading should not be wholly discarded. It has its place in individual work.

3. 'Literature' as the term for reading for twelve-year old and older children is covered by our term information.

4. Poetry and Reading Aloud are treated as pursuits apart from the ordinary reading process.

5. Conservation of the Powers of the child should be included in his process of education.

6. Increased Production because of the 'optimum' period's gains, should not be stressed unduly in the three R's.

7. Further Research is suggested.

APPENDICES.

I. The Data from the Experiments at Belfast School.

II. Correlation between Rate and Comprehension in Reading in First Tests.

III. The Value of Group and Pieces in First Test.

IV. Correlation in 'Narrative' of the Three Types

(a) Regulating the sequence of his lessons

(b) Allotting to the various subjects the share of his Period with one another.

V. Results of Tests for Standardization of Extracts.

VI. Correlation between amount read and 'narrative'.

VII. The Rank of the Groups in Tests and Pieces.

BIBLIOGRAPHY.
There is much elasticity permitted in the actual time over which the children should occupy themselves with a certain subject at one time, but the teacher's means of arriving at a suitable length of period are wholly empirical. The importance of the choice of 'optimum' period demands that the teacher must use his discretion wisely. In common practice, the teaching periods for the various subjects are arranged in such a way that the teacher has some means of regulating the sequence of his lessons. The distribution of school time among various subjects is as follows:

(a) Regulating the sequence of his lessons.

(b) Allotting to the various subjects the share of his school time commensurate with their importance or, at least, with that accorded them by the Education Department, as their value in the curriculum.

It is, at least, on these two bases, that the time-table is judged by the educational authorities of this country.
There is much elasticity permitted in the actual time over which the children should occupy themselves with a certain subject at one time, but the teacher's means of arriving at a suitable length of period are wholly empirical. The importance of the choice of 'optimum' period demands that the teacher must use his discretion wisely. In common practice, the teaching periods for the main subjects, Reading, Arithmetic, Composition, Grammar, Geography, and History, range from twenty to forty minutes, and even to one hour, according to the school standard. It was with a view to enquiring into the best lesson period for the teaching of these subjects that this work was primarily undertaken, and as the whole range of school subjects presented too wide a field for effective research, my experiments were restricted to the subject of reading.

2. THE OPTIMUM PERIOD

Recent psychological observations in the field of industry, with special reference to the 'optimum' working period among skilled and unskilled workers, has stimulated a desire to enquire into the nature of similar principles of 'optimum' working in the school. In England, but more especially, in U.S.A., the most effective way of spending the allotted time in the doing of work, has been the subject of investigation
by trained psychologists, and their findings have been put into actual practice by the firms employing them. For example, in a Pittsburg steel works, in order to increase the output, a bonus was offered to men wheeling more barrows of ore than constituted the day's quota for each.

Despite this incentive and the response to it on the part of the men, very few earned the bonus. The works' psychologist then organised the work. After seven minutes he blew a whistle, when every man turned and sat on his barrow for three minutes, at the end of which the wheeling process proceeded for seven more minutes, followed by another rest. And so the day went on.

It was found that under this system, not only did every man gain the bonus, but many on the highest scale. This is an example of the prevention of overfatigue, which is the chief limiting element in production over a prolonged period. This thesis is an attempt to refer the same principles to school methods, and to ascertain, within wide limits, some general principles for school practice in the teaching of reading.

3. THE NEED FOR SUCH STUDY IN TEACHING PRACTICE. In my own experience as a primary school teacher, the need for some means of estimating the
best teaching time has often presented itself.
Compared with the longer period, a ten or fifteen
minute essay has given much improvement in quality,
and greater freedom from error in spelling and
grammar; the short sharp lesson, at more frequent
intervals, in acquiring the mechanics of arithmetic
has appeared to be so much more fruitful of result,
that it was deemed worth while to ascertain more
definitely, the relative values of the longer and
shorter divisions of the week's time allotted to any
one subject.

Further, in class work, the varied working
rates of the pupils militated against the best results
from the fastest and slowest workers; subdivision of
the class into smaller working groups, should be made
on some other basis than that of achievement. The fast
worker, not working at best capacity, rests on his
oars, thus developing habitual laziness. The slow
worker, not grasping the work, develops a feeling of
inferiority; for a time he may be able to follow with
great effort, but he is soon demoralised by fatigue.

On this want in our school practice, Gray says
"Few variations of methods have been made for either
backward or bright children. If such pupils are given
the benefit of individual instruction, they are
allowed in most cases, to read more extensively; but
the methods are varied little, if any, to meet the
special needs of individual pupils. The difficulty lies in the fact that no thorough-going individual instruction in reading can be given, until a careful and systematic study of the individual pupil's reading ability has been made."

4. DEFINITIONS OF ------

(a) 'OPTIMUM PERIOD' 'optimum' period for
(b) READING: the teaching of reading,

was therefore, the end in view. It was necessary to appreciate the significance of the term 'optimum' period, and it was taken to be the division of the school time allotted to a subject, which is the most economic, judged from the advantages gained in accordance with the purpose of the work.

(b) The purpose of reading, according to Starch, is to obtain information, and its most important elements are comprehension of the material, and speed of reading. Rusk defines reading as "the instrument by which the content of recorded language is communicated to us."
CHAPTER II.

THE COLLECTION OF DATA.

1. EXPERIMENTS.

The scope of the experiments undertaken was to be of the nature of a comparison of the usual reading lesson period, with other periods of various lengths, and as it was felt that the present period erred rather on the side of length, it was decided to commence the investigation with periods shorter than the customary length. Further, the nature of the experiments had to be modified, in accord with the conditions prevailing.

2. THE REQUISITES FOR THE EXPERIMENTS.

I was not attached to a school or training college, and could enter a school only through the courtesy of the authorities concerned. The senior inspector of the Education District readily granted permission to go to the schools, but it was not in his power to order a head-master to accede to my requirements. A head-master friend was, however, willing to admit me to his school and give me good conditions of working.
Thus the goodwill of the class-teacher was also obtained.

The type of the school offering, and for my purposes it seemed the best available, made it quite unsuitable for the employment of a 'control' group and other means of regulation had to be devised. The elimination of other factors, liable to cloud the issue, presented further problems, and the choice of class, of material, of time of applying the test pieces, and methods had to be made with that end in view, so that differences in comparison might be readily interpreted, that is, as far as the difficulty of getting an exact reproduction of the same conditions in matters involving all the complications of the personal equation, would allow. Silent reading was chosen as being less complicated and more practicable than oral and chiefly, because the children to be tested should have already mastered the mechanics of reading.

3. SCHOOL. The school chosen, is situated in a rural locality, six miles from Christchurch. It is a primary school, which is attended by all the children of the district up to about fourteen years of age, except those who, through greater ability, pass on to the secondary school at an earlier age. The children attending, number 269 and come from various types of
homes, some parents being small farmers, orchardists, market gardeners, employees of a big meat-freezing works, or general workers in the small township.

The head-master described the children as "a fair average lot", not up to the standard of his previous school, a suburban one, but fairly alert from the wide experience offered by rural life in close proximity to the city.

4. CHILDREN SELECTED. The children selected for the investigation, were of the chronological age of twelve years, chosen thus as being from the highest age at which no child had left school, and so presenting a true sample of the population. At this age they should have mastered the mechanics of reading.

These children were classified in Std.5 and Std.6—the senior division of the primary school which has roughly its limits between the chronological ages of twelve and fourteen years. All the children of this age in the school numbered 18, 10 girls and 8 boys. For the purpose of the tests they were placed under my control.

5. CHOICE OF TIME The time chosen for applying the tests, 10.45 A.M. to noon came immediately after the fifteen-minute, morning recess. This period was taken for various reasons. Many of the children walk considerable distances
to school, in some cases four miles. Many of them again are required to perform certain home duties, such as milking cows, and doing the many incidental tasks that fall to the lot of the child on the small farm, and they arrive at school more or less fatigued.

The first morning period requires some adjustment on the part of the pupil to his school day and is not suitable for our purpose. The first period in the afternoon session does not offer as good conditions as the period chosen, which is generally taken, by teachers, to be the best in the school day.

The last time period of the day, 2.10 to 3 P.M., is too short, and, moreover, the children are fatigued. The same standard of fatigue not being so surely regular in each individual and from day to day, on account of the uncertain and irregular demands made on the child, by the varying work of the different days of the week, there is less chance of uniform conditions for the purposes of comparison in the afternoon period than in the pre-midday period when the child is comparatively free from fatigue.

Sleight says "The time best fitted for close mental application is roughly from one and a half to two hours after the opening of school."

The tests were administered on the five successive school days of one week.
6. **ELIMINATION OF OTHER FACTORS.** In an attempt to control the effects of fatigue growing as the school week advanced, and to control in some measure the effects of conditions, otherwise beyond control, e.g., the inequality of tests, and the subjective element in the reading, the class was divided into four groups, to each of which a different test was given each day, with the exception of Monday, so that at the end of the week, the children had done all the tests but in different order.

7. **READINGS SELECTED.** The choice of tests offered much difficulty. The published intelligence and achievement tests offered nothing suitable and special material had to be sought. The requirements were an approximation to uniformity in content, length, style, difficulty and interest in the pieces.

After looking into the content of many books, I decided on selections from a publication called, "Children of Europe" by Finch, in the Kingsway series, as the most suitable for my purpose. They treated the geography of various countries of Europe from the viewpoint of the child, the descriptions being in terms of the experience of a boy or girl, of about twelve years, and native of the country dealt with.

These pieces contained similar treatments each
of one of these countries - France, Spain, Holland, Switzerland and Poland. In length they were almost uniform and being by the same author, aiming at treating them similarly, the style, treatment and difficulty were nearly the same in each. The theme of all being similar in nature and treatment, as far as the adult could tell, they were of equal interest for the pupil.

This uniformity was necessary only within certain limits. Exactness of value in each, could only be ascertained by testing over a wide range of children of the same type as those in the group tested. For purposes of investigation, this was not considered necessary. Each piece I abstracted from the book I had mimeographed separately. None of the children had seen the work before.

8. THE ROOM. For the application of the test, the class-room, ordinarily occupied by the children for all their work not done in the open air, was given me, the remainder of the class-room occupants working outside. Each child was sole occupant of a dual desk and the test class was seated in haphazard order.

The class was divided into four groups, three containing five pupils and one three, each group constituting a unit for the purpose of changing tests. After the first day, each group worked a different piece from the others on each day. The room was well
warmed, well-lighted, well-ventilated and free from disturbing elements.

9. PROGRAMME. The week's programme was planned thus—

Monday, a twenty minutes reading test.

Tuesday, the twenty minute period was divided,

8 minutes reading and 4 minutes rest and

8 minutes reading.

Wednesday, a twenty minute straight out reading test

as for Monday.

Thursday, 4 minutes reading and 4 minutes rest and

4 minutes reading 4 minutes rest and

4 minutes reading.

Friday, a twenty minutes reading period as for

Monday and Wednesday.

The tests for the day were passed out to each group and turned face downwards. The child was required to write his or her name, age, class, on the back.

The instructions given were "You are to read the story on your papers for a certain time. When I say 'Stop', you will mark very distinctly, the last word you have read. After that you will write out for me everything you remember in the story. Turn up your papers. Start."

For Monday, the piece "Stanislaw of Poland", was distributed to the whole class, as a preliminary, in order to allow the children to adjust themselves to the new conditions. For the following days the tests
For this last reason, the system of counting words were varied according to group.

On Tuesday and Thursday, explanations of this nature were made. "Today you are going to read for a certain time and then, when I say 'Stop', you will mark your last word with a ! (one) and rest for a time, doing anything you like, with the exception of reading or talking about your reading. Then I shall say 'Start', and you will begin to read from where you left off, until I again say 'Stop', when you will mark the last word you have read with a distinct figure 2."

10. STANDARDS FOR ASSESSING ACHIEVEMENT. Achievement was regarded from two standpoints - (a) The amount read, (b) the amount comprehended.

(a) The Unit of Amount Read. There was no difficulty in ascertaining the reading amount achievement. Two standards were available, (i) the number of words, (2) the number of lines read. The latter method again allows of two standards, one in which a whole line, or any part of a line is reckoned as one line; the other, where two or more part lines are included to make one complete line and the total count is that of complete lines, in which case, the total of lines in each test, would be proportionate to the total of words. In printed matter, the lines are almost uniform in content, but in typed matter the lines vary in length.
For this last reason, the system of counting words was adopted. Both Gray (6) and Price (7) have used the word as the unit. At first, this seems satisfactory; but words differ much in length and hence certain ones require a longer time for pronunciation than others. The syllable is open to the same objection, as is also the phrase with also the uncertainty of what constitutes the reading-phrase super-added. In view of all these facts, it seems that the word as a unit of reading is most practicable.

(b) The Unit of Amount Comprehended. The comprehension was judged, as already stated, by having the pupils write out what they remembered from their reading, that is by the narrative method of reproduction, with which the children were familiar, and which reduced suggestibility on the part of the teacher to a minimum.

The children were also quite familiar with the question as a means of testing comprehension. For this method, it may be claimed that it has the distinct advantage of liberating, otherwise tightly bound complexes, through which arise trains of associations, not available were the child left to reach them in a perfectly spontaneous manner. But the question rarely involves all the passage read, and questions, enough to cover the whole passage, would cause overlapping in the recorded matter, which would cause great difficulty
in discounting repetitions. Real understanding permits the ideas to come freely, and therefore, what will henceforth be called "the narrative method" was adopted, not because it was fool-proof, for it had all the mensural defects of the essay, but because it answered our purposes best. Unlimited time was allowed them to write this.

To appreciate the value of the thought gathered from the reading, the definition of a unit measure required special consideration. The unit should cover quality of ideas returned, as well as quantity, and further, it must be a definite standard, as between child and child, and test and test.

The method of marking should be as objective as possible, so as to avoid whatever anticipation of result might, unconsciously, on my part, tend to influence the unit in mind. In order that this subjective tendency might not have effect, all the papers were left unmarked until the conclusion of the last test, when they were shuffled up and marked, the noting of the marks being left until all were marked.

Daniel Starch, in his silent reading test, tries to overcome the difficulty of valuing the matter reproduced, by counting the number of words, which correctly express the thought. "This", says Ballard, "is equivalent to marking a piece of composition by...
its length." For our purposes it was impracticable.

14. DEFINITION OF "IDEA". The adoption of the "idea" as a unit, required an exact definition. Dewey (10), defines an idea as "the meaning that is tentatively entertained, formed and used with reference to its fitness to decide a perplexing situation— a meaning used as a tool of judgment."

This gave some indication of what was required. Our 'idea' measured both understanding and memory, and with them, the actual intellectual gain got from the reading.

Proper names presented an additional difficulty, but the child had to fit them correctly into his scheme for them to have value as ideas. Consider the sentence, 'The young boy walks slowly.' The word 'boy' implies an idea, 'walks' another, and 'slowly' another idea. 'Young' is also included as an idea as it complicates the idea 'boy'. The articles 'the' and 'a', although they add to the complete thought, definitely or indefinitely, I have decided to ignore. The language commonly employed in sending telegraphic messages, which give merely the skeleton of the thought, was considered to approximate in its words to the 'bare' ideas. This, however, is an arbitrary scheme, and some definition is necessary.

Ideas must have a standard value irrespective of the mode by which the child expresses them. If one
child can use a single word to express the same idea as is expressed by another in several, the latter gets the same recognition as did the former. The system thus discounted pleonastic or round-about styles, and the marker was careful to watch for whatever was repetition. Errors in spelling as well as errors in grammar, which did not obscure the thought, were ignored. The main issue in deciding the standard, was that it should be uniformly applicable to all the tests, and the standard known, the same marker should do all the marking.

An 'idea', for the purpose of testing comprehension, was taken to be a single extension of information. Marking of ideas was carried out by indicating with a stroke of blue pencil, each word or group of words denoting an idea.

The data collected in the process of marking were :- (Appendix I)

(a) Number of words read.
(b) From (a) the number of words read per minute.
(c) Number of words read in each of the shorter periods into which the 20 minute periods were subdivided.
(d) Number of ideas reproduced.
(e) From (d) the average number of ideas gathered per minute.

12. METHOD OF APPLICATION The first test was set on OF THE TESTS. Monday, June 6th, when the
piece "Stanislaw of Poland", was read. For the remaining four days, the selections were varied according to
groups. The external conditions were quite satisfactory,
the weather being bright and sunny for the whole week.

From the first experiment, the children seemed to
grasp intelligently what was required of them, and they
set to work from the word 'Start'. After the middle of
the first 20 minute period, some of the children, after-
wards proved to be some of the weaker ones, were ob-
served to rest, but if they noticed that they were
watched, they immediately resumed. 7 of the 18 moved
their lips in reading silently, but apart from this
defect, no other defect, physical or mental, was visible.

13. EQUALIZATION OF

THE GROUPS.

The achievement in words read

was noted at the conclusion of
each test, and in the case of the broken tests, the
scores of words read in the part periods were kept.

It was noted early, that there might have been some
attempt to make the scoring capacities of the various
groups equal, but the varying nature and the great
range in the scores (some of the fastest read nearly
three times as many words as the slowest) made this
extremely difficult and even impracticable. Later on,
the correlation of rate of reading and comprehension
was found to be only .2, therefore no correlation, so
that, whatever grouping might have been made for rate

x Appendix II
of reading, would not apply to a 'narrative' gradation.

14. THE 'NARRATIVE'. The writing out of their 'narratives' from what was read, was part of the usual work of the children concerned, and they set to work quickly and worked steadily, until they had exhausted their store. There was a difference of about twenty minutes between the first to finish and the last—the first took an average of 23 minutes, and the last of 41 minutes. The length of the time taken in the 'narrative', corresponded roughly to the number of words written, those having most to record taking longest. The two girls N.R. and F.G. were exceptions in this case, being slow writers and always finished in the last four.

None of the class were permitted to leave the room, until all had completed writing, as early dismissal might encourage some children to leave before they had exhausted their stock of ideas. In order that those finished might not disturb the others by any restlessness, they were permitted to hand in their papers, and undertake whatever school work they chose.

15. MARKING OF THE 'NARRATIVE'. After the last test was finished, the marking of the papers was commenced. The definite standards of the 'idea', as defined above, were accepted from the beginning. The
force of the phrase "made up my mind" might be expressed by another child in the word "decided" or "determined" and was therefore value for only one idea. So with "quite sure" given by another as "certain", and "went down" for "descended".

Adjective and adverb phrases and clauses were treated as their equivalent adjective or adverb, but extra adverbs or adjectives in them were considered separately.

Replications of the same subject in successive sentences were ignored, as such simple sentences could be joined by a better essayist by eliminating these subjects, which higher ability would place him at a disadvantage with his weaker fellow, if the repeated subject were accepted as an idea.

These instances are quoted to show that the marking of the papers was carried out with a view to allowing each child, as far as possible, equal value for the same idea, irrespective of the mode of expression.

2. CORRELATION OF AMOUNT READ

Comprehension has a correlation of only 0.3 with the number of words read. For this reason, the data in words read, is recorded as of only incidental interest. The facts derivable from such sources, may or may not apply to the problem in the same way as do
the facts derivable from the 'narrative' data. As the
definition of reading is taken for the purpose of this
work, to be a means of 'obtaining information', chief
attention will be given to 'narrative'.

3. CLASS ACHIEVEMENTS IN AMOUNT READ.

CHAPTER III.

(a) AMOUNT READ, (Graph I) PER Pupil.

Test A. 20

DATA AND ANALYSIS.

1. EXTRINSIC FACTORS.

To be thoroughly sound, the comparison of results,
obtained under the conditions, demands that we account
for and measure objectively, if possible, all factors
contributing to the results. The factor under study is
the "time element", and the factors to be eliminated
are (a) Variation in the content and intrinsic interest
of the extracts, (b) Variation in results due to factors
such as (i) increasing fatigue as the school week
advances, and (ii) increasing familiarity with the type
of work and working conditions. A knowledge of the
ability of each group is necessary to ascertain the
evaluation of the extracts.

2. CORRELATION OF AMOUNT READ AND 'NARRATIVE' PRODUCTION.

Comprehension has a correlation of only .2 with the number of words read. For this reason, the
data in words read, is recorded as of only incidental
interest. The facts derivable from such sources, may
or may not apply to the problem in the same way as do
the facts derivable from the 'narrative' data. As the definition of reading is taken for the purpose of this work, to be a means of 'obtaining information', chief attention will be given to 'narrative'.

3. CLASS ACHIEVEMENTS IN AMOUNT READ.

(a) AMOUNT READ, (Graph I) PER TEST.

<table>
<thead>
<tr>
<th>Test</th>
<th>Duration</th>
<th>Words Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20 min.</td>
<td>48820</td>
</tr>
<tr>
<td>B (8x8)</td>
<td>20 min.</td>
<td>39193</td>
</tr>
<tr>
<td>C</td>
<td>20 min.</td>
<td>46700</td>
</tr>
<tr>
<td>D (4x4x4)</td>
<td>20 min.</td>
<td>30533</td>
</tr>
<tr>
<td>E</td>
<td>20 min.</td>
<td>47297</td>
</tr>
</tbody>
</table>

The numbers of words read in the twenty minute tests were almost equal, with a slight increase in the first test A, due perhaps to freshness in the pupils and enthusiasm in a new exercise. The Test A was taken with Piece I, which may have been easier than any of the other pieces. More words were read, but the higher number may be due to the fact that all the groups read for twenty minutes, whereas in the other pieces, the words read included those read in broken periods, as well as those read in the three 20 minute periods.

The differences are almost negligible—the range of their difference being no more than 2% above or below their mean. These 20 minute periods reduced to the proportion of 16 minutes or 12 minutes reading, show a slight advantage in favour of the broken periods. (See Graph I.) The difference is slight and
Class Scores in Amount Read.

Graph I.
may be attributed to the lack of fatigue owing to
the rest period. The twenty minute period may have had
the advantage in the child having only one settling-
down process, whereas the broken periods had either two
or three starts to make, and 'settling-down' seems to
be a characteristic of the reading of at least some of
the children. The longer reading period is the one with
which the children are familiar.

I had considered having the children 'tick off'
the last words read, when I gave a tap at the end of
every four minutes, in order to see how the rate of
reading proceeded in the reading period. This plan was
abandoned, because it was of little value from the
informational view of reading, but more because the
disturbance of 'ticking off' the word would in many
cases affect the children, so as to obscure the results
sought.

Any conclusion arrived at from this data, must be
qualified by the varying scores of the groups, for
example, the total of group 1 is very nearly double that
of Group 3.

(b) AMOUNT READ BY EACH GROUP.

Group 1. 73144 words.
Group 2. 50606 words.
Group 3. 38074 words.
Group 4. 50749 words.

The scores of the groups in amount read do not show
much uniformity. Group 3 consists of only three pupils, while the others have five. Groups 2 and 4 are about equal, but 1 nearly doubles the number of words read by 3. There is a greater approximation to equality in grouping when the scores in 'narrative' are considered.

The tests show that from breaking up the period, no great advantage in the amount read by the class as a whole, is derived.

(c) **AMOUNT READ IN EACH PIECE.**

| Piece I. Stanislaw of Poland. | 46820 words. |
| " II. Pierre of Switzerland. | 42441 " |
| " III. Jean and Marie of France. | 39809 " |
| " IV. Batiste of Spain. | 40670 " |
| " V. Jan of Holland. | 40803 " |

The amount read by the whole class in each piece, affords some indication of the difficulty of that piece. The pieces are nearly equal in this respect. An explanation of the greater amount read in Piece I, has been given above.

4. **THE RESPONSE OF THE INDIVIDUAL.** The question of effects on the individual is now to be considered. From Graph II, showing number of words read by each child, it is seen that only in two cases does the amount read in a 'broken' period, exceed the average of the 20 minutes periods, and then only in
Names are arranged in order of achievement in "Narrative," the average of the 20-minutes periods.

Graph II.
the case of those weakest in 'narrative'. The achievement in the two 'broken' periods is not always in proportion to their difference in length of time. In three cases, J.Y., M.R., and M.G., the amount read in the 12 minutes period was greater than in the 16 mins. period, and with D.M., it was almost as much. Generally, the children read at the same rate in all three periods. The exceptions will be considered when the quality of the reading is considered in 'narrative' results.

5. CLASS ACHIEVEMENTS IN 'NARRATIVE' (Graph III).

(a) 'Narrative' per Test.

<table>
<thead>
<tr>
<th>Day</th>
<th>Test</th>
<th>Time</th>
<th>&quot;Ideas&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>A.</td>
<td>20 min</td>
<td>2239</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B.</td>
<td>(8 &amp; 8)</td>
<td>2381</td>
</tr>
<tr>
<td>Wednesday</td>
<td>C.</td>
<td>20 min</td>
<td>2749</td>
</tr>
<tr>
<td>Thursday</td>
<td>D.</td>
<td>(4 &amp; 4 &amp; 4)</td>
<td>2497</td>
</tr>
<tr>
<td>Friday</td>
<td>E.</td>
<td>20 min</td>
<td>2922</td>
</tr>
</tbody>
</table>

The low score in Test A may be due to the newness of the situation to the children. It is seen from the graph that, as the week's work proceeds, there is a regular improvement, due to greater familiarity with the type of work. Test A should be lower still if the contribution from two groups working over the 16 mins., or the 12 minutes test were used instead of 20 minute periods for all. The higher score in amount read in A may be due to the children sacrificing comprehension to rate of reading, and then, finding with experience
Class Scores in 'Narrative'

Graph III.

IDEAS

<table>
<thead>
<tr>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TESTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>IV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIECES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>
that, for purposes of reproduction, it was necessary to gather for their 'narrative' from the reading. The sacrifice of comprehension to rate may, then, be the cause of, at once, increasing the amount read and lowering the 'narrative'. The increasing ability to concentrate on the comprehension would be quite a natural outcome of repeated exercise on materials having so many common characteristics, as well as in the method used.

An average of the class scores in the three 20-minutes periods gives a criterion suitable for estimating the comparative values of the 'broken' periods. Assuming a regular improvement, as the week advanced, Test B of (35) minutes on Tuesday would be slightly more, and Test D of (444) minutes on Thursday slightly less than they were, to accord with the average-of-20-minutes-periods standard.

It is not, however, necessary for us to consider this difference any further. Graph III shows that the average of 'ideas' in the 20-minutes tests (2637 ideas) is higher than the scores in either of the 'broken'-period tests; but the difference which is the gain is not commensurate with the difference in the actual times spent in reading. Indeed, when the proportions of the 20-minutes periods are reduced to those of the 16-minutes and 12-minutes periods, there is seen to be of 'ideas'. Excepting this numerical inequality,
a considerable gain for the shorter periods. But in comparison of period with period, the 16-minute period has gained in ideas to the extent that it is less than 10\% (instead of 20\%) short of the score in the average 20-minute period, that is to say, in the 16-minute period more than 18 minutes worth of work was done, basing the work of the minute on that of the average minute in the 20-minute period. The 12-minute period has not only excelled the 16-minute period in the narrative score, but has almost equalled the score of the 20-minute periods. The difference in time is 40\% less than the 20-minute period, but the narrative result is only 5\% less than that in the longer time, or in the terms of the last comparison, 12 minutes worth of work was done in \((4\&4\&4) = 12\) minutes period.

(b) 'Narrative' per Group.

The 'narrative' reproduced by the four groups showed them to be almost equal in scoring capacity:

Group 1. 3158 (ideas) = 98.7\% of average (3197)

2. 3272 " 102.3\% "

3. 3285 " 102.6\% "

4. 3373 " 96.1\% "

The mean score was 3197. Such equality was merely accidental, as no attempt was made to ensure it.

One group, number 3., containing only three pupils, while the others had five, scored the largest number of 'ideas'. Excepting this numerical inequality,
similar conditions prevailed between group and group. The groups reproduced approximately equal amounts in each of the pieces. (See Appendix) so that, everything considered, the above figures give a fair estimate of the work of each group.

(c) *Narrative per Piece.*

I. Stanislaw of Poland. 2239 ideas 87.5% of mean.

II. Pierre of Switzerland. 2564 " 109.2%

III. Jean and Marie of France. 2792 " 105.9

IV. Batiste of Spain. 2492 " 97.4

V. Jan of Holland. 2784 " 108.8

For the sake of simplicity and in view of their small differences, in the deductions following, the pieces will not be assigned their exact evaluation but will be taken as all equal.

The low score in *Stanislaw of Poland* may be explained by the fact that it was the initial piece and applied as a preliminary to the whole class on the first day. Thus, its score did not benefit from the improvement developing as the week advanced, although it had the advantage of being the product of all 20a minute periods, that is, it had no 'broken' period records to lower its total.

The highest score, in *Jan of Holland* is interesting because the landscape described in the story, has points of similarity with that of the children's own
district—flat and threatened by the overflow of the
embanked Waimakariri River. There are also sand-dunes
here and small market-garden farms, and black and
white Friesian cows. No member of the class failed to
note the youthful Jan who smoked a cigar, who wore the
baggy, well-patched breeches, and who skated to school.

Although these children live within sight of the
snow-clad Southern Alps, Switzerland was a less
familiar type of country. Our mountain valleys are not
peopled as are the 'Alps' of Switzerland, and lack
their verdure.

So, too, was it with Spain. Two or three incidents
in this story, the method of leading the cow through
the streets, to be milked according to customers' require-
ments, and the squabble about the opening of the
sluice gates in the irrigation system were fully
reproduced by all. Again, these were subjects of local
interest. Dairying is carried on in their own locality,
and irrigation is instituted in many parts of their
province. The remainder of the descriptions of Spain
were reproduced less easily.

France offered many topics of interest, especially
in school and religious spheres, the descriptions of
the children working in the fields and of the crops
grown.

Local interest influenced largely the reproduction
of 'ideas', and topics of dress and home, common to all
the pieces, were uniformly dealt with. Although I kept
no data, other than two notes, to bear out this opinion,
considering such to be of only passing interest, I think
that there was increasing attention paid to 'dress' and
'home' as the week advanced, and fewer pupils seemed to
omit reference to these common aspects of the story of
the time allowed the mind for consolidation in what
each piece.

6. CONCLUSIONS AS TO In making deductions, I have
'OPTIMUM PERIOD'. accepted the above results as
mere reference points, and they are not held to be con-
cclusive evidence of constant phenomena. For such results
to be authoritative, they would have to be standardised
by application over a very large number of children.
They are, therefore, accepted only tentatively.

Considered from the group scores and the interpret-
ation given above, the 4-minute period is the 'optimum'
period. Although the amount read be smaller, the
quality of the reading had improved. There was again,
on average, of one minute's reading in every 4-minute
period, and there is further gain in the use to be made
of the two 4-minute 'rest' periods. Work such as drawing,
hand work, or singing could be undertaken in the rest
period, and such work could be considered as profit for
the shorter period compared with the longer 20-minute
period. The 8-minute period also yields better results in comprehension than does the longest period tried, there being an average gain of 1 minute's work per 8-minute period, and the 4-minute rest period could again be utilised for more recreative pursuits.

7. EXPLANATION OF CONCLUSIONS

(a) One of the advantages of the shorter period would seem to be in the time allowed the mind for consolidation in what Graham Wallas calls the 'incubation' process. While the mind is assimilating what has already been read, there is not during the 'rest' or 'change' period, the accumulation from further reading that would, from the demands of its greater complexity and amount, hinder the mind in its apperceptive processes. The lack of this 'rest' or 'change' accounts, in part, at least, for the deterioration in the informational quality of the reading.

(b) Another advantage of the shorter period followed by a 'rest' or 'change' is to be sought in the opportunity it affords the organism to eliminate the fatigue elements in the brain centres concerned with the various mental operations. In the 'rest' or 'change' period, new brain centres are being employed, so that the blood flow has time to repair the cells exhausted in the reading process, and remove the waste.
As fatigue develops in a geometrical progression, this is a most important consideration. The day wears on, general fatigue makes its presence felt, and the organism will become less and less able to 'freshen' for succeeding efforts. Scientific utilization of the short period will, however, give advantages in economy of energy, in quality of work, and, of most importance, in the mental, physical and moral well-being of the child, and reduce fatigue to an unavoidable minimum.

3. THE INDIVIDUAL READER. An examination of the curves of achievement in the three types of time division on Graph IV (P. 37) shows that there is rarely any tendency to parallel achievement in any two of the periods. One child excels in the 20-minutes period, another in the (3&8)-minutes period, and another in the (4&4&4)-minutes period.

2. A VERTICAL CLASSIFICATION. The differences in the curves is decided enough to suggest that a very real benefit might come from each child working according to his own 'optimum' period, that is to say, that period should be largely determined according to the temperament of the child and that teaching practice, having regard to this temperamental difference, should classify vertically, in accordance with it. The significance of such individual variation in achievement may be judged
ACHIEVEMENTS IN "NARRATIVE" PRODUCTION.

Block -- Average of 20-min. periods.
Red - - (8 + 8) min - 16-min. "
Green - - (4+4+4) " = 12 min. "

GRAPH IV.
from the subdivision of the class.

From Graph IV (p 37) it is seen that those excelling in the different periods are:

20-minutes period- 1, 4, 5, 9, 10, 13, 17, 18,
8- minutes period- 7, 12, 14, 15,
4- minutes period- 2, 3, 6, 8, 11, 16.

Thus 8 excel in the commonly used period - the 20-minutes period, and more are found to excel in the 4-minutes period than in the 8-minutes period. The majority of the children (10) do better in either or both of the 'broken' periods than in the 20-minutes period.

Comparisons of the individual achievements in the 8&8-minutes period with those in the 20-minutes period and its 16-minute proportion are made from Graph V (p.39). The (8&8) minute 'narrative' exceeds that of the 16-minute proportion in every case but two— the weak readers R.J. and S.M.—numbered 17 and 18. H.I., number 5, just equals the 16-minute proportion.

In Graph VI (p.40) the (4&4&4) minute performance far exceeds the 12-minute proportion of the 20-minute result. It exceeds the actual 20-minute score in six instances.

10. CLASSIFICATION ACCORDING TO 'OPTIMUM PERIOD'.

The distribution of the 8 children doing best actually in the 20-minutes period, extends from
"Narrative" Production

Black: Average of 20-min. periods.
Red: Ideas from \((8 + 8)\).
Dot-dash: 16 min. proportion of 20-min. period.

Graph V.
'Narrative' Production

Black: Average of ideas from 20-min. periods.
Green: Ideas from (4+4+4) min = 12-min. periods.
Dot-dash: Ideas from 12 min. prop of 20-min. periods.

Graph VI
the best reader to the poorest, but only in the case of the two poorest readers does the achievement of the (343) 'broken' period fall below that of the proportion of the 20-minutes period. Then, only in the case of these two poor readers, who fail because of their inability to adapt themselves to the new situation, presented in a very short reading period, is there failure on the part of an individual to respond better to the 'broken' or short period. They, however, excel in the (343)-minutes period.

From this it is seen that the 20-minutes period could be dispensed with in the vertical classification suggested, and attention devoted to the two periods, 3-minutes and 4-minutes. Classified on this basis, the pupils find their optimum period as follows:

8 minutes - 17, 4, 7, 10, 12, 14, 15,
4 " - 2, 3, 5, 6, 8, 9, 11, 13, 16, 17, 18.

14. CORRELATIONS BETWEEN THE VARIOUS PERIODS. The factor which differentiates these into two groups, is the greater ability to react in one or other of these time periods. Other factors are relatively constant, so that the differences between the correlations of the class positions in the various types of reading period and that of complete correlation in the above work. So far, it has been noted that those periods are due to the time-effects on the child. The correlations, by rank difference, between the
results in the various tests are:-(Appendix IV)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Correlation</th>
<th>P.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-minutes</td>
<td>.84</td>
<td>.03</td>
</tr>
<tr>
<td>(8&amp;8) minutes</td>
<td>.84</td>
<td>.05</td>
</tr>
<tr>
<td>(4&amp;4&amp;4)</td>
<td>.81</td>
<td>.05</td>
</tr>
</tbody>
</table>

In these experiments, the novel situations of reading for 8 minutes or 4 minutes in short and regular spasms, were likely to cause children of varying temperament to react varyingly. Some children respond readily to new conditions, others, more conservative in nature, find it more difficult to adjust themselves, and form new habits. Such variation in habit-forming will modify the rank of the child, so that the correlations and their differences are not absolutely due to the various time effects.

Such consideration is merely an aspect of the difficulty of personal equation, which is the elusive element likely ever to belie the results whose proof is sought. The difference in correlation is for our purpose due largely to variation in reaction to length of period, and the lesser concomitant factors are put aside until a future repetition of this experiment throws more light on the situation.

12. INCONCLUSIVE EVIDENCE. Further experimentation was necessary to test the validity of the findings in the above work. So far, it has been noted that
(1) The advantage gained in the 20-minutes period over the broken period was not commensurate with the difference in time expended. (2) That 'broken' periods showed a distinct profit in information gained per minute of actual reading. (3) A vertical classification might be advantageous according to the child's 'optimum' period. Besides verifying these conclusions, further testing afforded the children more experience in what was to them a new reading method.

Verification of theories through further experiments. The five days of the school week were used, and the same time, 10.45 A.M. accepted. The pupils in the previous experiment and the same school conditions of working were again available, and the mode of application of the tests was also the same.

2. THE SELECTED READINGS. In the previous experiments, some of the very fast readers read the piece more than once. In choosing the new extracts for this experiment, a greater length was sought, so that no pupil might need to repeat any of his reading in order to read the full time.

Great difficulty was again experienced in getting selections meeting the requirements. After examining some hundreds of books, I decided on "The Three Calendars", "Stories of the Three Calendars", "Sons of Kings" and "Five Ladies of England", adapted from "The Arabian Nights Entertainments" for children aged 10 to
IV.

VERIFICATION OF THEORIES THROUGH FURTHER EXPERIMENTS.

1. CONDITIONS.

The new work was carried out along the lines of the former experiments. The five days of the school week were used, and the same time, 10.45 A.M. accepted. The pupils in the previous experiment and the same school conditions of working were again available, and the mode of application of the tests was also the same.

2. THE SELECTED READINGS.

In the previous experiments, some of the very fast readers read the piece more than once. In choosing the new extracts for this experiment, a greater length was sought, so that no pupil might need to repeat any of his reading in order to read the full time.

Great difficulty was again experienced in getting selections meeting the requirements. After examining some hundreds of books, I decided on "The Three Calenders", Stories of the Three Calenders, Sons of Kings and of Five Ladies of Bagdad, adapted from "The Arabian Nights Entertainments" for children aged 10 to
12 years. It was a recently published book and none
of the children had read it. This book was not ideal
but it was the best available. In order to choose
pieces of the same length, each being a more or less
complete narrative, arbitrary limits to two pieces
had to be made.

Piece 1. pp5-22 (572 lines) Introduction to Characters.

1 page illustration.

Piece 2. pp22-41 (587 lines) The Histories of the First
and Second Calendars. 2 page illustrations.

Piece 3. pp41-58 (569 lines) The Story of the Envious
man and Third Calendar. 1 page illustration.

Piece 4. pp58-78 (631 lines) The Story of Third
Calendar is completed. 12 page illustration.

Piece 5. pp78-95 (589 lines) The Histories of Zobeida
and Amina. 1 page illustration.

The nature of the book was such that the child
could begin at almost any part, and having read a few
lines, get an interest and understanding of the course
of events sufficient to carry him on. This type of
literature differed very materially from that used
previously, which was essentially 'factual'. It was
narrative in nature, recording adventures which were
novel and highly fanciful to the child, facts being
generally incidental and subordinate to the emotional
interest.
The illustrations were equally distributed over the pieces—one to each piece and in the cases of Piece 2 and Piece 4, two pictures. If illustrations could have been avoided, it were better, as some types of children might gain more from them than others. In the two pieces with an extra picture, there might be increased advantages. The fact that there was one picture at least in each piece, minimised the chance of variation on account of the illustrations, and, moreover, it is probable that the child read no more into the picture than his reading permitted him to, any advantages gained being in clearness of what was already learned, that is, the enrichment of the ideas without their increase in number.

Observation of the class in their reading of the picture, when they came to it, revealed that with three exceptions, they dealt with the pictures in a cursory manner, spending but little time on them. Those three viewed the picture more critically, but not long enough to interfere unduly with their usual reading rate.

3. EVALUATION OF

On Monday, June 28, at West

CHosen Pieces. Christchurch District High School, the pieces were applied to a group of twenty-one pupils lent me for the purpose, through the courtesy of the Head-master and Class-teacher. These children
these children were from Std. 5, and of a type similar to that of Belfast School, except in that they were chosen from one standard and were thus a selected group. The age of 12 years having representatives in Std. 4 and Std. 6 as well as in Std. 5, it was likely that they would not be as good as those in Std. 6 nor as poor as those in Std. 4, but should be of medium quality.

For the purpose of estimating the relative values of the test-pieces, this sample factor is not of importance. The best of the aged 12 might in some of the test-pieces, meet situations which were beyond weaker children, and so search out all the possibilities of each piece, but generally, everything else being equal, the child should have done equally well in all five pieces, and thus a fair estimate of the relative worth of the chosen pieces was obtained.

3. METHOD OF THE TESTS. A room was set apart for the work, and as these children were quite accustomed to being shifted round in small groups for work with Training College Students, the change was nothing new. The twenty-one pupils were divided into five groups of four fours and a five for the purpose of interchanging the pieces. They were chosen haphazardly and named Group 1, 2, 3, 4, 5.

The question as to whether the same piece should
be read by all the children on the same day, or whether the group system with each group reading a different piece each day, should be adopted, was decided on from the end in view.

To evaluate correctly the chosen pieces, so that such valuation might apply equally to the repeated experiments, the tests had to be submitted under exactly similar conditions. Such exactness, in view of the personal equation, was well nigh impossible, and only reasonable exactness and care were within reach.

The introduction into this test, of the broken periods, would have incurred as many disabilities as advantages, owing to the varying nature of the response of different children to the length of reading period, and 20-minute periods for all five days were preferred.

The use of different pieces on different days was decided on. In this method the improvement or loss made as the week advanced, was distributed uniformly over the pieces, and the disadvantage of incoherence of the work, through beginning the day's reading at points up to which the story had not been read, was common to all pieces and to all pupils. It has been already shown that the pieces were as far as possible wholes in themselves, that is to say, pupils beginning at the first piece had no great advantage over those beginning elsewhere. These reasons justified the use
of this method of application.

The time of applying the tests was as at Belfast School—10.45 A.M., immediately after the morning interval, and on the five successive days of the week.

The children read for twenty minutes, and were then required to write out the 'narrative'.

External conditions were quite satisfactory, but during the week four children absented themselves on account of illness, and the scores of the 17 alone words seen that were attempt at equalizing the groups, were kept. Fortunately, the distribution of the absentees was equal over the groups—one from each of the four.

5. EVALUATION OF THE PIECES.

The correlation of amount read with 'narrative' was only .2. Amount read is therefore, deleted as a consideration in the evaluation of the pieces. (Appendix V)

Piece I. 2545 ideas.

" II. 2382 "

" III. 2682 "

" IV. 2865 "

" V. 2692 "

6. REPETITION OF THE EXPERIMENTS.

On the following week the experiments were tried at Belfast School. Classroom conditions were satisfactory and mild weather prevailed. On Tuesday, a warm 'Nor Wester' blew, but the children did not seem to be
affected by the laziness generally caused by such conditions. On Friday it was slightly sultry, but no variation was to be expected from atmospheric or class-room conditions.

7. APPLICATION OF THE SECOND TESTS. The children were placed in five different groups, each group being known by a numeral, 1, 2, 3, 4, 5. These groups were chosen haphazardly, but it was afterwards seen that some attempt at equalising the groups, according to their 'narrative' scores in previous experiments, would have been of value in giving some uniformity for purposes of easy comparison. There still remained means of comparing results in the several groups, although their inequality complicated the issue. In the previous work there were only four groups, and although it happened that they were very nearly equal, an attempt to divide them into five groups, especially, since each group was so small, might not have been so successful. This time, five were necessary, as the groups were used over the five days.

A similar system of instructions as hitherto, was used, except in that the children were required to open their books according to their group at the place indicated on the black-board, and then, to turn down their books. Each child took a slip of paper on which he wrote his name and the piece numbers in the
order of his reading them. Against these numbers he noted the page on which he had finished reading. On the book page he marked the last line he had read. With the help of this system, and a list showing total of lines per group up to any page, quick and correct marking could be done, there being room for only a minimum of error.

3. THE LINE AS A READING UNIT. In these experiments the line was taken as the reading unit, because (a) it entailed considerably less work than the word, and (b) it was quite efficient as a means of accurately assessing the amount read. Part lines were added together to make whole lines, so that in the event of need to convert 'lines' into 'words read' this could be done effectively by multiplying by 10.3 - the average number of words per whole line taken over 10 pages. The 'idea' was retained as the standard for marking 'narrative'. As in the first series of experiments, on the completion of the last test, all the 'narratives' were shuffled and marked without attention to order.

9. THE DATA IN AMOUNT READ. The same data as in the previous series of experiments was taken. The amount read is given under three heads (a) In each test, (b) By each group, (c) From each piece. Graph No. VII.
The correlation, by **53** difference, of amount
read with narrative is only .26, and since 'narrative'
is our basis for estimating the quality of reading, it
is not necessary to attempt to read deeply into those
data. The correlation of the reading with the previous
reading is .87. This difference may be due to the
change in kind of material, and also to variation in
the individuals in the adaptation to new methods and
materials. (Appendix A)

The 20-minute scores vary considerably. Monday and
Wednesday have nearly equal scores, but on Friday
there is a very considerable drop. What the cause is
it is difficult to say. The sultry weather conditions
on Friday, (in the winter season) could not account
for such deterioration, and in view of the high score
made on Thursday, week-end fatigue is hardly answerable.

Only in one case did the Friday score exceed that of
Monday and of Tuesday, and in only three cases did it
exceed one or other. Thus the deterioration was general
over the class.

The amount read on Tuesday, (8&8)-minutes, approx-
imated to the 16-minute proportion of Monday and of
Wednesday, but there was a big increase on Friday's
return. Thursday's, (4&4&4)-minutes, result gave a
substantial increase over the amounts read in the
12-minute proportion of all the other periods, and
almost equalled the actual (8&8)-minutes score on
Tuesday and the actual 20-minutes score on Friday.
The correlation, by rank difference, of amount read with 'narrative' is only .26, and since 'narrative' is our basis for estimating the quality of reading, it is not necessary to attempt to read deeply into those data. The correlation of this reading with the previous reading is .67. This difference may be due to the change in kind of material, and also to variation in the individual in the adaptation to new methods and material. (Appendix VI)

(b) Amount read by each group.

Group 1. 4 pupils 3458 lines
    2. 4 7906
    3. 4 6229
    4. 3 4278
    5. 3 4483

The amounts read by the groups show great diversity. Group 1, consisting of 4 pupils, does not total as much as either Gr. 3 or Gr. 4, which each comprise only three pupils. In Gr. 2, one girl, J.Y., read almost as much as the three pupils in Gr. 1, and twice as much as any one of the pupils in her own group. She was consistent in her high rate of reading, but her low rank in 'narrative' 9th, shows that she culled relatively little from the large amount read. Gr. 3 and Gr. 4 did not do as well proportionately as did Gr. 2 and Gr. 3. Owing to their very different worth the groups cannot be taken as
(c) Amount read from each piece.

I. 5252 lines
II. 5412 "
III. 4953 "
IV. 5468 "
V. 5269 "

The amounts read per piece vary little. From this it may be assumed that, with regard to the difficulties of reading, the pieces approximate to a common worth. This assumption of equality is qualified from piece to piece according to whether the high or low scoring groups are working at the piece in 20-minute or 'broken' periods, but such variation is of small importance, and it may be taken that the pieces are approximately equal.

10. THE DATA IN 'NARRATIVE'. The scores in 'ideas' made by the class, will be tabulated according to (a) Tests or Periods (b) Groups (c) Pieces (Graph VII)

(a) 'Narrative from Periods.

Monday 20 minutes reading 4054 ideas.

Tuesday (8A5) " 4387 "

Wednesday 20 " 4221 "

Thursday (4A4A4) " 4341 "

Friday 20 " 4570 "

Taking the 20-minutes periods as the basis of
of comparison, it is seen that there is a steady improvement as the week advances, and that better work has been done in the 'broken' periods, with the exception of Friday which exceeded the Tuesday production. Thursday and Friday present the highest scores in Narrative, but on those days there is a distinct drop in the amount read, especially so in the case of Friday, compared with the other '20-Mins' days. The quality of the reading, rather than the amount read, is the factor determining the amount of 'narrative' to be reproduced. The average of the 20-minutes periods, 4282 ideas, shows that a better performance has been made in the shorter times.

In the first experiment, the reproduction in the 'broken' periods, exceeded the production in the proportions of the 20-minute period, but the great improvement in these over the actual 20-minutes scores is impressive.

Compared with the previous experiment, the increase in the number of 'ideas' is very marked— in every test almost double. This increase may be accounted for in various ways, but principally by the change in the nature of the material.

The former matter was written with the 'geography' aim in view, of having the pupil project his own conditions of life into those of a child of another country,
NARRATIVE PRODUCTION.

PERIODS

GROUPS

PIECES

GRAPH VIII.
and in that way by means of the "vivid" word pictures full of the colour and atmosphere of the foreign lands, to captivate the children and enable them to feel as well as to know, the facts of the life in these lands described in "The Children of Europe".

Such sugar-coated methods may appear to the adult mind to be the best way of imparting information to the child, but they may not appeal so naturally to the child, as do the stories from "The Arabian Nights", written mainly for the interest of the story itself. The children could enter more into the life of the characters in the latter, and from their better understanding reproduce so much more 'narrative'.

Another factor likely to have increased the 'reproduction', was the improvement that may have taken place in the child's reading ability in the month elapsed between the two experiments. It is hardly to be expected that so great improvement could be wholly explained from the normal class-work, but there was, in all likelihood some improvement due to that.

The remaining factor contributing to the change is an important one. There is little doubt that the children benefitted from their former experience in meeting the new situation in these tests. This would especially hold good in the case of the 'broken' period, where so much improvement is shown. On account of the
'strangeness' of the conditions in the first 'broken' periods and from the fact that they had not experienced such methods hitherto, the pupils did not give as much as they would have given were they as familiar with the 'broken' period as with the usual 20-minute period.

The increase may be accounted for in part by their greater familiarity with and adaptation to the new conditions. In addition to this, the children knew generally what was expected of them and threw themselves enthusiastically into the work. They knew that to make the most of the 'broken' periods they had to start from the word 'Go'. This keenness on their part did not adversely affect the nature of the experiment, as they seemed to enter equally willingly into all the tests, irrespective of period.

On the last day, Friday, I became aware of some competition among the children themselves. If it existed before, I had not noticed it. The boy, T.M., was eager to outdo the effort of the girl, P.L., who regularly wrote six pages of 'narrative'. He, alone, did not finish at lunch hour and was permitted to continue after lunch when he completed eleven pages. Much of his matter was, however, irrelevant and repetitive, and although he nearly doubled his usual score, he was much lower than P.L. His extra effort gave him approximately 200
more 'ideas' than he achieved on the previous 20-Min.
days and would alone have accounted for the greater
class score on Friday, leaving a margin over the other
days accounted for already as being due probably to
regular improvement as the week advanced.

This experiment gives a truer estimate of the
relative values of the 'broken' periods, compared with
those of the 20-minutes periods, because the two types
of periods are now more equally familiar.

Considered from the common basis of the number of
ideas reproduced per minute of reading, the scores are:-

(a) 20-minute test 244 ideas per Min. the whole
(b) (8&8) " 274 " 4% increase on (a
(c) (4&4&4) " 51403 " 4% "

There is thus a gain of 2½ minutes of 20-minute-
quality reading in each 8 minute period, and in the
4-minute period there is a gain of 3½ minutes of
20 minute-quality reading. If the day's 20-minute
quota of time for reading were distributed over the
day on the above reckoning, two and a half 8 minute
periods would give a profit of 5 minutes of 20-minute-
quality reading and five 4-minute periods a profit of
16 minutes of 20-minute-quality reading.

It is not expected that such calculations would
hold good in actual practice under such conditions, as,
factors such as time lost in 'warming-up' and the
progressive development of fatigue as the day advances, would tend to lessen the gain, but if the broken periods scored less profit at the end of the day than in the morning, it is likely, although yet to be proved, that there would still be a considerable gain over the 20-minute period at the same time of day.

The calculations merely show that there is an increase worthy of consideration, and that the 4-Min. period shows the best result, and is apparently the 'optimum' period.

(b) The Groups.

Gr. 1. (4 pupils) 3728 ideas 16.9% of the whole
" 2. (4 " ) 4252 " 19.3% " " "
" 3. (4 " ) 5177 " 23.4% " " "
" 4. (3 " ) 5032 " 22.8% " " "
" 5. (3 " ) 3884 " 17.6% " " "

It has already been noted that some attempt should have been made to have the scoring capacities of the groups made equal, and from the high correlation, .90, of this narrative with the previous one, it is seen that such equalization would have been possible by accepting as a basis the previous scores of the pupils. Based on the relative values of the pieces as established at West Christchurch School, and taking them as equal, the above estimate is now taken as the worth of each group.

To ascertain how the various groups scored in the
narrative of the various tests, the average rank obtained by the groups was found to be A- 3.8, B- 3.0, C- 3.4, D- 2.0, and E- 2.3. To explain this in the highest test, D, (44444)-minutes reading, the weakest groups, 1 and 5, did their best, the best group, 3, its fourth best, and groups 2 and 4 their second best. The average of these performances 1, 2, 4, 2, 3 = 10. 10 = 2.

The even distribution of best results of the individual groups, shows that no test has benefited unduly through getting the best results of a large number of the groups, and that this factor operates in only a small way, to interfere with the results per period. (See Appendix)

(c) The Pieces.

I. 3950 ideas
II. 4488 "
III. 4217 "
IV. 5059 "
V. 4359 "

With the exception of Piece QV, there is little difference in the relative values of the pieces.

In an analysis of the group's standard of performance in each piece, it was found that all groups did very well in Piece IV- their average rank being 1.4 and with no group did this piece yield lower than the second best score. Piece I was, on average, the most
barr. With no group did it reach a higher rank than fourth among the five pieces, its average rank being 4.4. The spread of the average ranks from 1.4 - 4.4 shows that the difficulty of each piece was to a large degree, common to all the groups, and that their several scores were limited accordingly. The pieces, therefore, as an influence to affect understanding of the significance of period-effects are now known, the regularity of the scoring of the groups per piece in the various periods being more or less constant.

Piece I yielded the lowest score because of lack of narrative, the matter being mostly introductory and therefore, somewhat of loose ends yet to be knit into the fabric of the story.

Piece IV gained preeminence because of the force of its narrative and richness in incident. (i) The accidental murder of the young prince (ii) the visit to the ten one eyed men, (iii) being carried off by the roc, (iv) reaching the castle of the 40 ladies, (v) the Door of Gold, (vi) the loss of his eye, and (vii) his calender disguise provided an interesting and cohesive story, the sequence of whose events it was easy to maintain.

II. RESUME.

Summarised, the data from the above analysis are:-

(a) A steady increase as the week advances.
(b) A great increase in the number of 'ideas' over that in the former experiment, due to (1) Different material, (ii) Normal improvement in children for one month, (iii) Further practice in meeting the new 'broken' period situation.

(c) A great increase in 'ideas' from (3&6) minute reading over 20 minute reading, but the greatest increase from (4&44) minutes reading, which is the 'optimum' period.

(d) The groups as scoring units were near enough to equal, and their best scores were well distributed over the tests.

(e) The pieces presented similar difficulty to each of the groups.

12. SUGGESTED VERTICAL CLASSIFICATION. A study of Graph IX shows that the individual excelled in one or other of the 'broken' periods, in every case. There is again evident a number of cases showing a marked difference between the individual's scores in the 'broken periods, and it seems that there is one period of working, at which the child does much better work than at the other.

Similar evidences were present in the first experiment, when it was noted that the class could be divided into 8-minute pupils and 4-minute pupils. The classification was, in 'Children of Europe' (First experiment)
NARRATIVE PRODUCTION

Black . . . Average of ideas from 20-min periods
Red . . . Ideas from \( (3+3) \) \( n = 16 \)
Green . . . Ideas from \( (4+4+4) \) \( n = 12 \)

GRAPH IX.
The classification is:


(Those underlined are those in the same classification as before. ? indicates the doubtful ones.)

In the last experiment, the class was equally divided into the two groupings. Eight (underlined) have definitely remained in the grouping of the first experiment, and with these the period was evidently the one they preferred. Of the others, six were doubtful as to 'optimum' period, in one or other of the experiments.

The best pupil, the girl P.L. (1), did not definitely favour either period, nor did the boy, R.J. (17). Those of the first experiment (marked ?) who showed no marked preference for either of the periods, have in the second experiment gone over to the grouping less favoured in the first experiment, except the girl D.P., who has consolidated her position in the 4-minutes
grouping.

In the second experiment there were also some doubtful ones, who were not yet definitely assignable to one of the groupings. Their indecision may have been due to some of several causes, and it is seen that to classify the children according to their preference for one particular reading period, either a system of carefully graded, standardized tests for this purpose should be constructed for universal application, or the children should be tested sufficiently often to determine which really is their 'optimum' period.

Comparisons from Graph X (p.68) of the individuals' achievements in the (66) - minutes period, with those in 20-minutes period and its 16-minutes proportion show that 8 children did better in the 'broken' period than in the longer period, and that all except two, did better in the 'broken' period than in the 16-minute proportion of the 20-minutes period.

According to Graph XI, 13 of the children produced more ideas from (4444) - minutes reading than they did from the 20-minutes period, and in no case did the (4444) - minutes score fall below that of the 12-minutes proportion of the 20-minutes score.

As was already noted (Graph IX) only with two pupils did the 20-minutes score exceed both broken
**Narrative Production.**

- **Black:** Average of ideas from 20-min periods
- **Red:** Ideas from (8+8) min = 16-min period
- **Dot-dash:** " = 16-min prop of 20-min period

**Graph X.**
NARRATIVE PRODUCTION.

Black: Average of ideas from 20-min periods.
Green: Ideas from (4+4+4) min = 12 " "
Dot-dash: = 12 min prep of 20-min.

GRAPH XI.
periods. The 4-minute or 8-minute period suited the children in general better than the longer 20-minutes period.

These two experiments, do not however, warrant the assumption that a further vertical classification on the basis of the individual's 'optimum' reading period, should be made. There is, nevertheless, a strong suggestion, that a number of such experiments would disclose a length of period decidedly advantageous to the reader, and from that knowledge it would follow that the child should be taught to use the period that, in his individual work, would serve him most efficiently and economically.

Lested to a subject or pursuit, which is the most economical judged from the advantages gained in accordance with the purpose of the work.

The reading pursuit, for the purpose of this thesis, is to obtain information, and the best teaching would be that in which the child is taught to garner most effectively the information contained in the literature he reads, such information to include the emotional and motor, as well as the more narrowly intellectual content.

The characteristics essential in the 'optimum' period are (a) Economy of effort, (b) Applicability to school-room practice, and (c) The fostering of good habit of work and thought.
CHAPTER V.

TEACHING PRINCIPLES.

FUNDAMENTAL CONDITIONS

OF AN 'OPTIMUM' PERIOD.

In finally reviewing the thesis, it is well to re-examine the definition of the subject of experimentation given at the beginning of the work. The "optimum" period is the division of school time allotted to a subject or pursuit, which is the most economical judged from the advantages gained in accordance with the purpose of the work.

The reading pursuit, for the purpose of this thesis, is to obtain information, and the best teaching would be that in which the child is taught to garner most effectively the information contained in the literature he reads, such information to include the emotional and motor, as well as the more narrowly intellectual content.

The characteristics essential in the 'optimum' period are (a) Economy of effort, (b) Applicability to school-room practice, and (c) The fostering of good habit of work and thought.
(a) Economy of Effort. "Any person who has endeavoured to apply himself to arduous tasks, when his resources have been too heavily taxed, knows that it is with great difficulty he can hold his mind to the thing in hand. One grasps everything in order to find relief from the object before him." If, then, in a comparatively-fatigued state, attentive attitudes can be maintained but for relatively brief periods, it is not difficult to foresee the result on mental efficiency; a chaotic mind cannot exhibit keenness, readiness or accuracy in any of its operations, and this condition has a similar effect in principle upon the emotional as upon the motor and intellectual activities. In a state of fatigue, the nerve cells are unstable, giving off energy and exploding, as it were, without sufficient cause, and attention becomes less concentrated and enduring than when one is in good neural form.

The great amount of inattention common in the modern class-room is in part due to lengthy lessons and is in some degree symptomatic of the development of over-fatigue. "Cases are on record, where the school day has been shortened by half and as good results have accrued, and it seems to be the opinion of those most competent to judge, that children in the elementary school should not spend more than three hours a day in mental labour." The freer from fatigue the mind is, the
more and with richer effects can concentration take place. The 'optimum' period, then, is that keeping the mind working at its best efficiency, without fatigue unduly affecting its operations.

"The mind, instead of being, as was formerly supposed, like the old-fashioned sensitized plate of the photographer, which required a long exposure is, after all, more like the highly sensitized plate of the snapshot camera. Not long exposure but right conditions, such as proper foundations, close attention, profound interest—these determine the vividness of the mental picture, its permanency and the degree of strength gained."

For best results, again, the period should prevent the development of over-fatigue. On the other hand, it should not be too short but sufficiently long for the pupil to have attained his best working point and maintained it long enough to have gained the highest value from his effort. If there is variation in the times at which the individual pupils reach that point and in its duration, the time best suited to all should be adopted, to meet the exigencies of class teaching.

The amounts read in the 4-minutes periods were separately noted and ranged from 172 lines of the fastest down to the 33 lines of the slowest reader. The objection has been raised that "one line sentences and short
'snippity' stories are especially bad since they give no opportunity for holding thought, as it were in solution. The child must learn to hold bigger and bigger elements in the mind, even from the beginning.\(^{(15)}\)

This criticism refers to the type of reading but might be levelled at the short period. The child is reading for but a few minutes and the question arises as to whether he has time to find the many ideas in their best settings. The analogy of the highly sensitized photographic plate applies here. The fatigue-free mind can exploit the idea to its full in the very shortest time taken for its reading. Moreover, the holding of the idea in "solution" (suspension is a better word) is exercised quite fully in the 4-minute period. In this time the fastest reader could average 172 lines, about four pages, and the slowest reader 33 lines, about a page. For a child of twelve years, from one to four pages of good material afforded considerable thought content, were the mind to operate on that alone.

It has been already suggested that the holding of thought in suspension depends not on long exposure but on right conditions, and if the mind is in good working order, the thought content from the reading is kept in its most fluid state. The short period is the one that can longest keep the mind functioning in this
state.

(b) Applicability to School-room Practice.

The previous subsection has dealt with the 'optimum' period of reading. The phrase, "for teaching" is the text for the following discussion. Class-room methods- and pupil's methods are included as well as teacher's methods- have in the past been concerned with the teaching of children en masse, and both teacher and pupil had to be adapted to the condition of the class.

In the swing of the pendulum to the other extreme, wholly individual methods such as in the Dalton Plan and Wimnetka System, have become widely employed. There is a minimum of work for the group, just as formerly there was a minimum of work for the individual. In the face of the innovations it can be maintained that there are advantages in the corporate life of the class which warrant its continuance. Individuality is but one aspect of the school sphere; sociality is also important and the 'optimum' period must apply to all work activities, individual and collective.

The 4-minutes period chosen is quite adaptable to the routine methods of class teaching. That it may be embodied into a routine does not mean that it may become a mechanical or soul-destroying institution, for it is in such routine that best working conditions are found. There is little disturbance through loss of time
and energy in making adjustments to new circumstances, 
and it is in the class routine that the 'optimum' 
period should apply most effectively.

A vertical classification according to the 
'optimum' period has been suggested and abandoned 
because of the indecisive nature of the election of 
period by the class. As a compromise between the 
4-minutes period and the 3-minutes period a 6-minutes 
period is now chosen, and the method of a lesson taken 
with the class is adapted accordingly.

A reading lesson usually extends over a period of 
forty-five minutes. If the reading is from a continu-
ous reader, the narrative previously read may be 
gathered up in the first minute or two, before the 
day’s reading has begun. The actual reading period may 
be divided into six minutes intensive reading followed 
by six minutes 'change' which is in turn followed by 
six minutes reading, six minutes 'change' and six 
minutes reading.

Questioning or the discussion period in which the 
children reproduce what they have gathered from the 
reading is not taken during these 'change' periods nor 
immediately after the reading is completed, for time 
should be allowed the minds of the children to assimil-
ate the thought gathered. Otherwise, their reproduct-
ton is "a medley wherein the child's natural English
and the phraseology of the lesson or text book are mixed but not blended.

The utilization of the rest period may be made in various ways. There should be a real change. Although the work may be incidental to the subject of reading, it should exercise different brain centres. It may be that the child has some hand-work such as cardboard work, book-binding or drawing, to be taken up at odd moments and his attention diverted to that. Perhaps the teacher thinks that period too short for handwork activity, and some other recreative activity such as singing songs appropriate to the lesson, the playing of a gramaphone record or two, an exercise in speech-training or even a select reading by one of the children may be taken up to extend and deepen the hold of the topic.

There are many useful means to this end open to the resourceful teacher. What remains of the reading period may be devoted to whatever aspect of the teaching lesson the teacher thinks fit, be it a class discussion of a certain passage difficult to follow or individual reference by the children to the dictionary-aries and other reference books in the class library on what problems or interests have cropped up during their reading.

These methods are practised frequently, if not
regularly, by many teachers and there seems to be no great difficulty in the way of their universal adoption. It may be that 45 minutes for a lesson is not the best length and that two or four 6-minute periods would be more practicable than three 6-minute periods. To settle this, further experimentation would be necessary, but it is seen that whatever the time saved in subject work by the methods of class-management, it may be used for broader and deeper education.

In its application to the individual teaching now gaining increasing popularity, in modifications of Dalton and Winnetka systems, this 'optimum' period has distinct advantages. There is no reason why the teacher should not advise the individual pupil how best to utilise his time. The discussion of conservation of energy and of economic methods of working would help the individual, especially in understanding of his best working period.

The children on whom these experiments were carried out asked me on several occasions to let them know how they fared in the tests. After the last experiment the children were shown the completed graphs which were explained to them, and they evinced a real interest in their respective best periods, although previously a show of hands from them signalled their
favour for the straight-out 29-minutes reading - their customary length. It is probable, that those children, well exercised in individual methods as they were, could have gained materially from knowing the period at which they worked best and, moreover, they would have experienced that glow of satisfaction from activities in which they could in some way measure themselves at their best. Especially is this possible in learning the 'tool' subjects.

The short period offers a good means of diagnosing the common faults in reading. There are fewer extraneous factors to involve the issue sought. The record of these experiments shows that much could be done for the improvement of reading by means of individual guidance and tuition.

We aim to refine the child's habits by increasing the attention paid to a piece for a short time, so that the habit of attending to meaning may grow. The skimming type of reader can be taught to take more from the reading. The girl, J.Y. (highest in amount read), read 809 lines, about twice as much as the girl, P.L., yet she reproduced little more than half the value in "narrative" of P.L. (highest in 'narrative'). Children of the J.Y. type should first be taught not to undertake too much and then, be required to give more and more content from what they read. Further, any exercises given to improve rate of reading, must
be shaped to ensure that attention is devoted to content also, and in every reading scheme there should be allowance made for guidance in the studying of the matter assigned.

The short period allows of the child-mind adapting the lessons he has learned to his reading, and ability for finer appreciation is thus developed. It is only correct practice that makes perfect, and such work as outlined, following careful diagnosis must bring sound progress.

There is another fault in class-room practice. Unless there is constant checking of the thought obtained, some rapid readers may get into the habit of skipping unknown words or of giving them almost any meaning in order to proceed with the reading. An unknown word presents a challenge, and children should be trained to respond effectively to that challenge when the word is important.

If it is argued that the short 'broken' period tends to make short-piece reading habitual it may be said that very essential parts of every person's reading are the short newspaper column, the encyclopedia reference, directions for the cutting out of new dresses or for the building of radios, and descriptions of new games to be learnt. But all the child's school training in reading need not necessarily be in the short period.
A longer reading period may be applied to leisure reading, and the short period to the more informational type of work, where precise knowledge of content is desirable. It is not likely that even in the reading of long continuous stories there will be perseverance of the break habit. The pieces for reading in the above experiments were not chosen for information essential to class problems, but were lengthy extracts, primarily intended to broaden and enrich the experiences, by means of intensive study. It would be interesting to compare in that way the total information derived by the above periods, with the information derived by longer times of continuous reading.

The value of the gleanings from the reading depends on (i) the facility with which ideas come in response to the stimuli, (ii) the fertility of the apperceptive groups, (iii) their depth or intrinsic worth.

These topics have been already dealt with in their relation to the mind fresh through the absence of over-fatigue. In brief, it is that reading "that maketh a full man". If the reading be light, then the incidence of fatigue is slight, but the constant 'baulk-ing' of the fatigued mind in heavier and continued reading, brings superficiality and even distaste for the reading activity.

(c) Fostering of Good Habits of Work and Thought.
Demoralization of the child from fatigue has been suggested as an agent engendering dislike of reading. While the child can concentrate effectively on his work, without having to fight the persistent defection of attention, the work 'complex' is being built from pleasant experiences in which the child has some mastery over his environment. But when fatigue has developed to such an extent that attention is difficult and only momentarily possible the pretence at attention is demoralizing and formative of bad habits. There is, more-over, the extreme possibility of the child generating a distaste for reading which will be a life-long handicap.

The high concentration possible in the short period is valuable as a means for developing clear-cut modes of hard thinking. The shorter time over which concentration is necessary, and, on that account, the better sequence of ideas in their logical and concise order of development, contrasts with the longer period and with the hazy medley following the prolonged reading process.

A short period necessitates that the child should utilize every moment, so that the acquired habit of taking long to settle down and of, again, taking rests by looking away from his book, may be prevented and with it the accompanying evil of day-dreaming. "Doubtless, pupils, as a whole, spend too much time in the
school-room, not only wasting energy, but what is worse idling away a good many precious moments, and thereby contracting habits which will be of great disadvantage to them in after-years." The question of how the time allotment in reading can be best reduced without lessening the effectiveness of the instruction is most easily answered in the short period which this thesis advances.

"Good silent reading methods encourage good study habits, in fact, good silent reading ability is essential to effective study." If the child is required to read and not required to read effectively, if he becomes satisfied with mere slipshod application and with letting his energy ooze away, by the time he leaves school he has partially adopted "an attitude towards the stimuli of his environment which can briefly be labelled idleness or loafing." The moral significance of the 'optimum period' of work looms big in the list of the contributions required from the school for the child.

2. THE TEACHER-PUPIL RELATION. The school society should be as a whole benefit from the better utilization of the time, in brighter pupils, freer answering, fewer corrections of faulty, illogical English and spellings, less of the contrariant attitude and less perversion generally. There will be less strain on the teacher in demanding and maintaining attention from his pupils, and
the two aspects of school life, individuality and sociality may be well served. The teacher will be more a guiding agent than ever, while the children individually different are given greater consideration and scope for development.

CHAPTER VI.

RELAXATION.

1. THE NEED FOR CONSERVATION. "It will probably be agreed to by everyone, that life is growing constantly more complex, and an individual must be more effective than ever, if he would become adapted to this environment. This means that he will need to generate more energy than his ancestors did and not expend it without profitable issue. Education must be as economical as possible of a pupil's energies.

So far, our attention has been directed to the child's passivity in the process of economising his energies. He has been saved the development of over-fatigue. An attempt will now be made to show how he may himself become an effective agent in working out his own salvation by conserving energies and by husbanding his resources.

2. UNPROFITABLE EXPENDITURE OF ENERGY. To see the waste from the inability of people "to leave their worries behind" and "to get away from their work," is
to realise that there is much expenditure of energy, not only without profitable issue but with great harm to the individual and with loss of his efficiency as a social unit. Thoughts of the day occupy the mind long past their time, even to stealing into the hours necessary for sleep. This is unnecessary, for the same progress, in solving problems, could be made in very few minutes of hard thinking at the proper time of day.

CHAPTER VI.

RElAXATION.

1. THE NEED FOR CONSERVATION. "It will probably be agreed to by everyone, that life is growing constantly more complex, and an individual must be more effective than ever, if he would become adapted to this environments. This means that he will need to generate more energy than his ancestors did and not expend it without profitable issue. Education must be as economical as possible of a pupil's energies."

So far, our attention has been directed to the child's passivity in the process of economising his energies. He has been saved the development of over-fatigue. An attempt will now be made to show how he may himself become an effective agent in working out his own salvation by conserving energies and by husbanding his resources.

2. UNPROFITABLE EXPENDITURE OF ENERGY. To see the waste from the inability of people "to leave their worries behind" and "to get away from their work," is
Periods. Such relaxation could then mean a consciously
to realize that there is much expenditure of energy,
not only without profitable issue but with great harm
to the individual and with loss of his efficiency as
a social unit. Thoughts of the day occupy the mind long
past their time, even to stealing into the hours neces-
sary for sleep. This is unnecessary, for the same pro-
gress, in solving problems, could be made in very few
minutes of hard thinking at the proper time of day.
The individual cannot, however, dismiss the thoughts
from his mind. Many people refuse to 'talk shop' after
hours, as if appreciating that in relaxation time the
mind should be given its rest. There seems to be a feel-
ing of insecurity in the face of the difficulty of
throwing off obtrusive trains of thought from the other
'life' led by the individual. The 'home' man refuses to
bring the cares that infest the day of the 'business'
into his family life. The divorce between the two sides
of man's activities is very real. Relaxation is a
zealously sought and jealously guarded institution.

3. AN ART OF RELAXATION. It is evident that few
people can relax without the aids of some new environ-
ment into which to project their thinking. The question
arises whether an art of relaxation may not be develop-
uced. If such an art be, the time for this development
is in youth when the plastic nature adapts itself to
habits more easily and more permanently than at later
periods. Such relaxation would then mean a consciously controlled diminution of tension and cessation from work upon the expiry of the time allotted to it.

4. THE TEACHING OF RELAXATION. Hitherto, educational practice has been concerned with the process of 'tightening up' the child's concentrative powers. The necessity for relaxing has been generally ignored. The advantages of relaxation to the physical worker have been noted in the case of the men barrowing ore. Other instances, of a similar nature could be cited. In addition to this somewhat passive "easing-off" some conscious mode of relaxing could be practised.

To lie down on the back and consciously remove all muscular tension from the toes through all the sets of muscles up to the jaws and facial muscles, with the eyes closed, has a refreshing effect. With this muscular relaxation the mind gradually leaves the thoughts coursing through it and rests, so that sleep may come.

That children could be taught something of this is quite probable, and further, that the mind could be trained to dismiss the perplexing thoughts, either by (a) substituting for it something very light and soothing, much as the child's bedtime prayers are expected to be, or (b) relaxing voluntarily from all mental strain as was done with the muscles of the body.

For young children there is little difficulty to
abandon themselves to the next fun as soon as their school class is over, but even among these, there are the 'over-conscientious' little folk, about whom the walls of the school close for a much longer period of their waking hours. Attention should be given to those hypersensitive children to release them from the cares of their little world. It is hardly within the scope of this work to evolve any system for inculcating habits of relaxation, but its very importance merits at least a passing thought.

5. THE 'CHANGE' PERIOD. The habit of relaxing after each short period of reading to enjoy singing, or gramophone music, or prints from the 'masters' or whatever educative, recreative process is chosen, is a sound basis on which to build. If it is gramophone music the teacher suggests to the class, "We shall all close our eyes, when listening to this piece and try to let ourselves go." 'Letting ourselves go' is the first and most difficult process in learning relaxation. Only time will accomplish it with the more highly-strung children, but its wide practice would help to eliminate the 'nervy' and 'tired' from the people we meet on every hand.

A sound practice, sometimes carried out in nursery schools, and which might be introduced with advantage to the junior classes of the elementary school is the
rest period, when for a few minutes the children rest, prostrate on the floor, with the blinds drawn and the room quiet. But such study is outside the realms of our thesis. An error patent in our schools is that the child is a miniature adult, and that over-fatigue in him is regarded much as it is in the grown-up. To the young child it is more, for as well as restoring the energy dissipated in play and work activities, he must provide for his mental and physical growth, and in the event of over-fatigue it is the latter which is liable to suffer.

...
situation more satisfactorily by himself, and his taste for the work is developed.

The investigation has been confined to reading, but it is safe to say that the principle of the short period, although it may vary in length with the individual from pursuit to pursuit, may be applied to the other 'tool' subjects.

CHAPTER VII.

CONCLUSION.

2. THE LONG PERIOD. The period for long application has... REVIEW. In the course of this thesis it has been suggested that the lesson period devoted to reading may be more advantageously distributed by subdivision into short, regulated periods, than by maintaining a long period of twenty or more minutes continuous reading, with or without spasmodic interruptions by the teacher for the purposes of explanation. The former method has all the advantages of a routine, along with the full utilization of the child's best powers. The same amount of work may be done in less time, so that more time is freed for the more widely educative pursuits. Further, the same amount of work is done with the minimum of expended energy. The child's powers are conserved, so that his full being may operate on the situations presented, to accept, to his full capacity all that is there to receive of intellectual, motor and emotional worth. He has finer discrimination for perception and apperception. He can cope with the
situation more satisfactorily to himself, and his taste for the work is developed.

The investigation has been confined to reading, but it is safe to say that the principle of the short period although it may vary in length with the individual from pursuit to pursuit, may be applied to the other 'tool' subjects.

2. THE LONG PERIOD. The period for long application has not been discarded as wholly useless, but its scope has been limited. The chief merits of the long period were said to lie in developing the habits of persistent application to reading and the capacity for holding long trains of thought in suspension in the mind. The short period, it has been shown, is to some extent capable of this, but with the maturing powers in children, older than those experimented with, some purposeive training of that habit and capacity may be necessary. It may be submitted here, that the school reading lesson is but a small proportion of the child's reading time, and that elsewhere, reading is lengthened or shortened according to the purpose in hand.

3. LITERATURE. At the age of the above children, twelve years, the educationist prefers to term the reading lesson 'literature'. Reading, having as its purpose to obtain information, may appear too narrow for
the connotation of "literature", but the wide speci-
ification of 'information', as including the intellect-
ual, motor, and emotional content, and as so assimil-
able by the fatigue-free mind, meets the requirements
of the term 'literature'.

4. POETRY AND READING ALOUD. The reading of poetry
has been omitted, as a special department in itself
requiring reading aloud and a specific treatment of
its matter.

Reading aloud, too, has not come under consider-
ation. Perhaps at the stage of the child tested, it
could well be transferred to the pursuit we call
speech-training.

5. CONSERVATION OF POWERS. The aim of this thesis
has been to investigate the economy of the teaching of
reading. Reading is the most important subject in the
elementary school curriculum. The pupil must be taught
to read. The teacher must devise the best means of
teaching him to read, but the teaching of this 'subject'
is not the only consideration. He must consider the
whole body-mind organism and the best teaching must
include this care. The child should work at his highest
efficiency at his greatest concentration, but while it
is the teacher's function to have him work at high
tension, it should also be his function to teach him
relaxation—the prevention of useless leakage of power and dissipation of energy.

6. INCREASED PRODUCTION. The insistent demand of our age is for increased production. From industry, it has spread to our schools, and attempts to measure efficiency in production are everywhere insinuating themselves. May it be again affirmed that the end of the 'optimum period' in school (as in industry) is not necessarily to increase production beyond legitimate needs in the three R's, but to give the individual a greater freedom for matters of more vital concern.

7. FURTHER RESEARCH. I have not been able to find any other investigations conducted along these lines, and in their absence there was no opportunity for corroboration of my conclusions.

Many avenues for further investigations opened during the writing of this work and its worth depends largely on the acknowledgment of the need for these further researches.

Further Research:

1. A series of experiments similar to the above to determine the definite short period classification (if any) into which these children fall.

2. To devise some standard method of ascertaining a child's 'optimum' period in reading applicable to
schools in general.

3. To correlate this work with finding 'optimum' period in the teaching of other school subjects.

4. To compare the 'narrative' method of reproduction as a test of reading ability over against other methods.

5. To test the perseverance of ideas from the reading in the various periods after the lapse of say, two weeks.

6. Oral reading versus silent reading.

7. The utilization of the 'rest' period; whether best results accrue from
   (a) Doing nothing
   (b) Doing a prescribed change of work
   (c) Doing whatever they like.

8. To determine suitable length for reading material.

9. Correlation of I.Q. with silent reading under 'optimum' period conditions.

10. The number of reading periods; whether one, two, or three 6-minute periods.

11. To ascertain from which part, the beginning, middle, or end of the reading, most ideas are culled.

12. If a child's reading rate is improved, is comprehension improved in like proportion?

### APPENDIX II.

**Correlation between Speed of Reading and Comprehension**

**from Average rank in 5 Tests in "The Children of Europe."**

<table>
<thead>
<tr>
<th>Name</th>
<th>Rate</th>
<th>Compl.</th>
<th>Diff.</th>
<th>$D^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.Y.</td>
<td>4</td>
<td>7</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>E.R.</td>
<td>9</td>
<td>11</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>H.L.</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>A.S.</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>S.M.</td>
<td>4½</td>
<td>18½</td>
<td>6 ½</td>
<td>132.25</td>
</tr>
<tr>
<td>P.G.</td>
<td>13½</td>
<td>13</td>
<td>½</td>
<td>2.25</td>
</tr>
<tr>
<td>D.P.</td>
<td>13½</td>
<td>6</td>
<td>4½</td>
<td>20.25</td>
</tr>
<tr>
<td>L.T.</td>
<td>17</td>
<td>15</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>N.R.</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>P.L.</td>
<td>4½</td>
<td>1</td>
<td>3½</td>
<td>12.25</td>
</tr>
<tr>
<td>S.S.</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>R.N.</td>
<td>11</td>
<td>2</td>
<td>9</td>
<td>81</td>
</tr>
<tr>
<td>R.J.</td>
<td>11</td>
<td>17</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>T.E.</td>
<td>13</td>
<td>5</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>J.H.</td>
<td>41</td>
<td>12</td>
<td>29</td>
<td>1</td>
</tr>
<tr>
<td>D.M.</td>
<td>16</td>
<td>13½</td>
<td>2½</td>
<td>6.25</td>
</tr>
<tr>
<td>M.G.</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Correlation = -0.21  
P.E. = 0.16
### APPENDIX IV.

1. Correlation in 'narrative' of the three types of period with one another.

<table>
<thead>
<tr>
<th></th>
<th>Comp.</th>
<th>Comp.</th>
<th></th>
<th>Comp.</th>
<th>Comp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d</td>
<td>d^2</td>
<td></td>
<td>d</td>
<td>d^2</td>
</tr>
<tr>
<td><strong>(a) 20 min. and (8@8) min.</strong></td>
<td></td>
<td></td>
<td><strong>(b) 20 mins. and (4@4@4) min.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J.Y.</td>
<td>6</td>
<td>10^2</td>
<td>4^2</td>
<td>49^2</td>
<td>176</td>
</tr>
<tr>
<td>E.F.</td>
<td>10^2</td>
<td>14</td>
<td>4^2</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>H.J.</td>
<td>15</td>
<td>2^2</td>
<td>4</td>
<td>15</td>
<td>21^2</td>
</tr>
<tr>
<td>A.S.</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>21^2</td>
</tr>
<tr>
<td>S.M.</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>21^2</td>
</tr>
<tr>
<td>F.G.</td>
<td>14</td>
<td>9</td>
<td>3^2</td>
<td>30^2</td>
<td>245</td>
</tr>
<tr>
<td>D.P.</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>10^3</td>
</tr>
<tr>
<td>L.T.</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>N.R.</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>P.L.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>S.S.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>R.N.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>R.J.</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>J.M.</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>J.H.</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>D.M.</td>
<td>14^2</td>
<td>9</td>
<td>3^2</td>
<td>30^2</td>
<td>245</td>
</tr>
<tr>
<td>E.M.</td>
<td>11</td>
<td>7</td>
<td>7</td>
<td>49</td>
<td>150^2</td>
</tr>
</tbody>
</table>

**Correlation = .89. P.E.=.03 Correlation =.84. P.E. =.05**

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(c) (8@8)min. and (4@4@4)min.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J.Y.</td>
<td>10^2</td>
<td>4</td>
<td>6^2</td>
<td>42^2</td>
<td>10^2</td>
<td>4</td>
<td>6^2</td>
<td>42^2</td>
<td>10^2</td>
</tr>
<tr>
<td>E.F.</td>
<td>14</td>
<td>1^2</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>1^2</td>
<td>1</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>H.J.</td>
<td>6</td>
<td>5^2</td>
<td>1</td>
<td>25</td>
<td>6</td>
<td>5^2</td>
<td>1</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>A.S.</td>
<td>15^2</td>
<td>1^2</td>
<td>1</td>
<td>2</td>
<td>15^2</td>
<td>1^2</td>
<td>1</td>
<td>2</td>
<td>15^2</td>
</tr>
<tr>
<td>S.M.</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>F.G.</td>
<td>9</td>
<td>14</td>
<td>5</td>
<td>25</td>
<td>9</td>
<td>14</td>
<td>5</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>D.P.</td>
<td>12</td>
<td>11</td>
<td>1^2</td>
<td>1</td>
<td>12</td>
<td>11</td>
<td>1^2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>L.T.</td>
<td>16</td>
<td>7</td>
<td>7</td>
<td>49</td>
<td>150^2</td>
<td>150^2</td>
<td>150^2</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Correlation= .81 P.E.=.05**
## APPENDIX V.

Results of West Christchurch Tests for Standardization of Extracts.

<table>
<thead>
<tr>
<th>Name</th>
<th>Piece</th>
<th>Rdg.</th>
<th>A Comp.</th>
<th>B Comp.</th>
<th>C Comp.</th>
<th>D Comp.</th>
<th>E Comp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.G.</td>
<td>I</td>
<td>312</td>
<td>167</td>
<td>182</td>
<td>156</td>
<td>184</td>
<td>170</td>
</tr>
<tr>
<td>C.S.</td>
<td>I</td>
<td>452</td>
<td>120</td>
<td>176</td>
<td>202</td>
<td>202</td>
<td>205</td>
</tr>
<tr>
<td>K.M.</td>
<td>I</td>
<td>350</td>
<td>121</td>
<td>148</td>
<td>128</td>
<td>112</td>
<td>117</td>
</tr>
<tr>
<td>B.G.</td>
<td>I</td>
<td>411</td>
<td>146</td>
<td>211</td>
<td>199</td>
<td>201</td>
<td>148</td>
</tr>
<tr>
<td>C.M.</td>
<td>II</td>
<td>248</td>
<td>222</td>
<td>245</td>
<td>228</td>
<td>197</td>
<td>243</td>
</tr>
<tr>
<td>T.M.</td>
<td>II</td>
<td>229</td>
<td>169</td>
<td>140</td>
<td>148</td>
<td>163</td>
<td>210</td>
</tr>
<tr>
<td>B.A.</td>
<td>II</td>
<td>254</td>
<td>99</td>
<td>103</td>
<td>107</td>
<td>108</td>
<td>109</td>
</tr>
<tr>
<td>S.S.</td>
<td>III</td>
<td>436</td>
<td>135</td>
<td>203</td>
<td>204</td>
<td>205</td>
<td>223</td>
</tr>
<tr>
<td>R.B.</td>
<td>III</td>
<td>236</td>
<td>84</td>
<td>106</td>
<td>128</td>
<td>118</td>
<td>148</td>
</tr>
<tr>
<td>B.K.</td>
<td>III</td>
<td>374</td>
<td>160</td>
<td>192</td>
<td>189</td>
<td>153</td>
<td>166</td>
</tr>
<tr>
<td>M.M.</td>
<td>IV</td>
<td>749</td>
<td>171</td>
<td>140</td>
<td>132</td>
<td>147</td>
<td>215</td>
</tr>
<tr>
<td>T.E.</td>
<td>IV</td>
<td>369</td>
<td>112</td>
<td>49</td>
<td>113</td>
<td>117</td>
<td>153</td>
</tr>
<tr>
<td>A.K.</td>
<td>IV</td>
<td>623</td>
<td>131</td>
<td>93</td>
<td>122</td>
<td>100</td>
<td>149</td>
</tr>
<tr>
<td>R.W.</td>
<td>V</td>
<td>368</td>
<td>208</td>
<td>193</td>
<td>247</td>
<td>196</td>
<td>202</td>
</tr>
<tr>
<td>G.K.</td>
<td>V</td>
<td>369</td>
<td>211</td>
<td>164</td>
<td>240</td>
<td>227</td>
<td>260</td>
</tr>
<tr>
<td>H.J.</td>
<td>V</td>
<td>295</td>
<td>145</td>
<td>95</td>
<td>147</td>
<td>107</td>
<td>156</td>
</tr>
<tr>
<td>M.G.</td>
<td>V</td>
<td>416</td>
<td>126</td>
<td>129</td>
<td>138</td>
<td>104</td>
<td>148</td>
</tr>
</tbody>
</table>

### VALUE OF PIECES.

<table>
<thead>
<tr>
<th>Piece</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>555</td>
<td>717</td>
<td>685</td>
<td>699</td>
<td>635</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>567</td>
<td>498</td>
<td>482</td>
<td>483</td>
<td>468</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>476</td>
<td>537</td>
<td>359</td>
<td>503</td>
<td>521</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>367</td>
<td>364</td>
<td>522</td>
<td>414</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>581</td>
<td>772</td>
<td>634</td>
<td>766</td>
<td>690</td>
</tr>
<tr>
<td>Total</td>
<td>2545</td>
<td>2888</td>
<td>2652</td>
<td>2565</td>
<td>2599</td>
<td>13579</td>
</tr>
</tbody>
</table>
APPENDIX VI.

Correlation between amount read and 'narrative'
production in reading from 'The Three Calendars'.

<table>
<thead>
<tr>
<th>Rate. Narr. D</th>
<th>D²</th>
<th>Rate. Narr. D</th>
<th>D²</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.G. 17</td>
<td>13</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>D.F. 15</td>
<td>10</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>R.J. 16</td>
<td>17</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>L.T. 14</td>
<td>42</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>S.K. 6</td>
<td>45</td>
<td>2½</td>
<td>99</td>
</tr>
<tr>
<td>L.F. 10</td>
<td>7</td>
<td>1½</td>
<td>11</td>
</tr>
<tr>
<td>E.R. 7</td>
<td>45</td>
<td>6½</td>
<td>72½</td>
</tr>
<tr>
<td>J.Y. 1</td>
<td>9</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>N.N. 12½</td>
<td>14</td>
<td>2½</td>
<td>61</td>
</tr>
</tbody>
</table>

Correlation = .26  P.E. = .15

Correlation between rate of reading in the
first experiment and that in the second Expt.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Rate</th>
<th>d</th>
<th>d²</th>
<th>Rate</th>
<th>Rate</th>
<th>d</th>
<th>d²</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.G.</td>
<td>13</td>
<td>17</td>
<td>1½</td>
<td>12½</td>
<td>M.G.</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>D.F.</td>
<td>13½</td>
<td>15</td>
<td>1²</td>
<td>2½</td>
<td>H.I.</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>R.J.</td>
<td>16</td>
<td>7</td>
<td>1½</td>
<td>4½</td>
<td>D.M.</td>
<td>16</td>
<td>3½</td>
</tr>
<tr>
<td>L.T.</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>9</td>
<td>R.N.</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>S.K.</td>
<td>4½</td>
<td>6</td>
<td>1½</td>
<td>2½</td>
<td>P.L.</td>
<td>4½</td>
<td>2</td>
</tr>
<tr>
<td>L.F.</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>25</td>
<td>J.R.</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>E.R.</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>A.S.</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>J.Y.</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>S.S.</td>
<td>7</td>
<td>4½</td>
</tr>
<tr>
<td>N.R.</td>
<td>2</td>
<td>14½</td>
<td>9½</td>
<td>90½</td>
<td>T.M.</td>
<td>16</td>
<td>2</td>
</tr>
</tbody>
</table>

Average rank (4.4) (2.2) (3.4) (4.4)  11770

Correlation= .67  P.E. = .09
APPENDIX VII.

The Rank of the Groups in Tests and Pieces.

(The bracketed figure indicates the rank of each performance in the groups' scores).

<table>
<thead>
<tr>
<th>Test</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>681 (4)</td>
<td>746 (5)</td>
<td>550 (5)</td>
<td>981 (1)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>777 (5)</td>
<td>841 (3)</td>
<td>954 (1)</td>
<td>871 (2)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>913 (5)</td>
<td>1172 (1)</td>
<td>1067 (3)</td>
<td>948 (4)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1033 (1)</td>
<td>1011 (3)</td>
<td>883 (5)</td>
<td>1121 (2)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>650 (4)</td>
<td>626 (5)</td>
<td>767 (3)</td>
<td>920 (1)</td>
</tr>
<tr>
<td>Total</td>
<td>(19)</td>
<td>(15)</td>
<td>(17)</td>
<td>(10)</td>
<td>(14)</td>
</tr>
<tr>
<td>Average rank</td>
<td>(3.8)</td>
<td>(3.0)</td>
<td>(3.4)</td>
<td>(2.9)</td>
<td>(2.8)</td>
</tr>
</tbody>
</table>

The Piece Effects on the Groups.

<table>
<thead>
<tr>
<th>Piece</th>
<th>I.</th>
<th>II.</th>
<th>III.</th>
<th>IV.</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>681 (4)</td>
<td>746 (3)</td>
<td>550 (5)</td>
<td>981 (1)</td>
<td>779 (2)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>819 (4)</td>
<td>777 (5)</td>
<td>841 (3)</td>
<td>954 (1)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>946 (4)</td>
<td>1077 (2)</td>
<td>913 (5)</td>
<td>1172 (1)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>883 (5)</td>
<td>1121 (1)</td>
<td>994 (4)</td>
<td>1033 (2)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>626 (5)</td>
<td>767 (3)</td>
<td>920 (1)</td>
<td>919 (2)</td>
</tr>
<tr>
<td>Total</td>
<td>(22)</td>
<td>(14)</td>
<td>(18)</td>
<td>(7)</td>
<td>(14)</td>
</tr>
<tr>
<td>Average rank</td>
<td>(4.4)</td>
<td>(2.8)</td>
<td>(3.4)</td>
<td>(1.4)</td>
<td>(2.8)</td>
</tr>
</tbody>
</table>

(Hodder & Stoughton) 1925, p116.
BIBLIOGRAPHY.

   (Heath) 1922. p 8.

2. Starch D. Educational Measurement Ch.IV
   quoted by Rusk. (as in 3) p269.

3. Rusk R.R. Experimental Education
   (Longman) 1921. p252.

4. Sleight W.G. The Organization and Curricula
   of Schools. (Arnold) 1920. p141.

5. Finch R.J. The Children of Europe
   (Evans) 1925. p126.

6. Gray W.S. Studies of Elementary School Reading
   through Standardized Tests.
   (Univ. of Chicago) 1917. p157.

   (Cited by Gray C.T. See 1 above) p32

8. Starch D. Quoted by Ballard in 'Mental Tests'
   (Hodder & Stoughton) 1925. p146

9. Ballard P.B. Mental Tests
   (Hodder & Stoughton) 1925. p146.


11. Finch R.J. as in 5 above. p176.

12. O'Shea Dynamic Factors in Education
    (Macmillan) 1917. p200

14. Kratz President quoted by O'Shea (See 12) 1917 p258.


18. O'Shea as for 12 p279.

