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An investigation of bilingualism and achievement in reading in the fourth grade of the parochial school system in the archdiocese of Santa Fe, 1957-1958.

Albert Schneider

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STILLINGUALLISM AND ACHEIVEEMENT IN READING IN FOURTH GRADE

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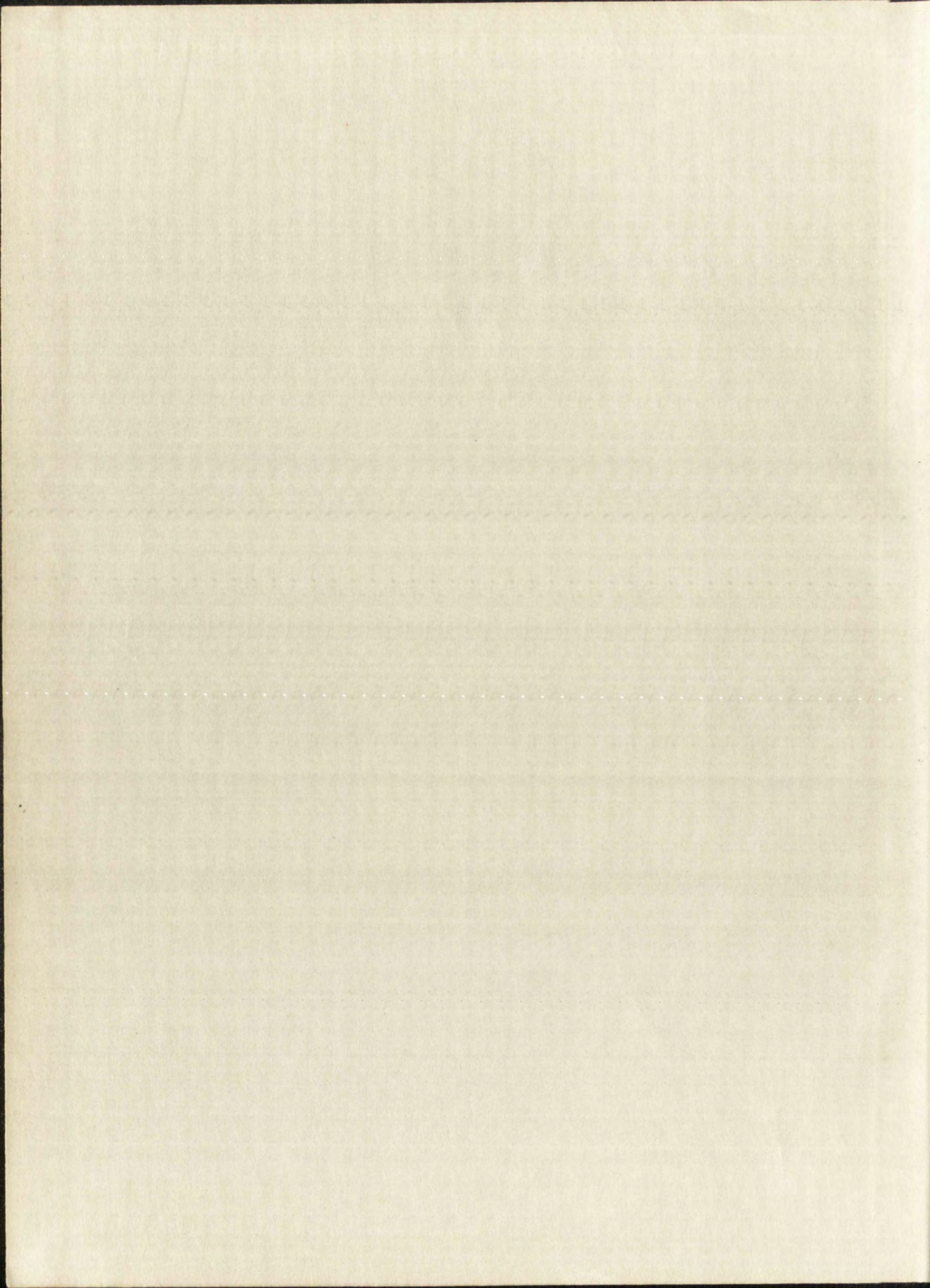
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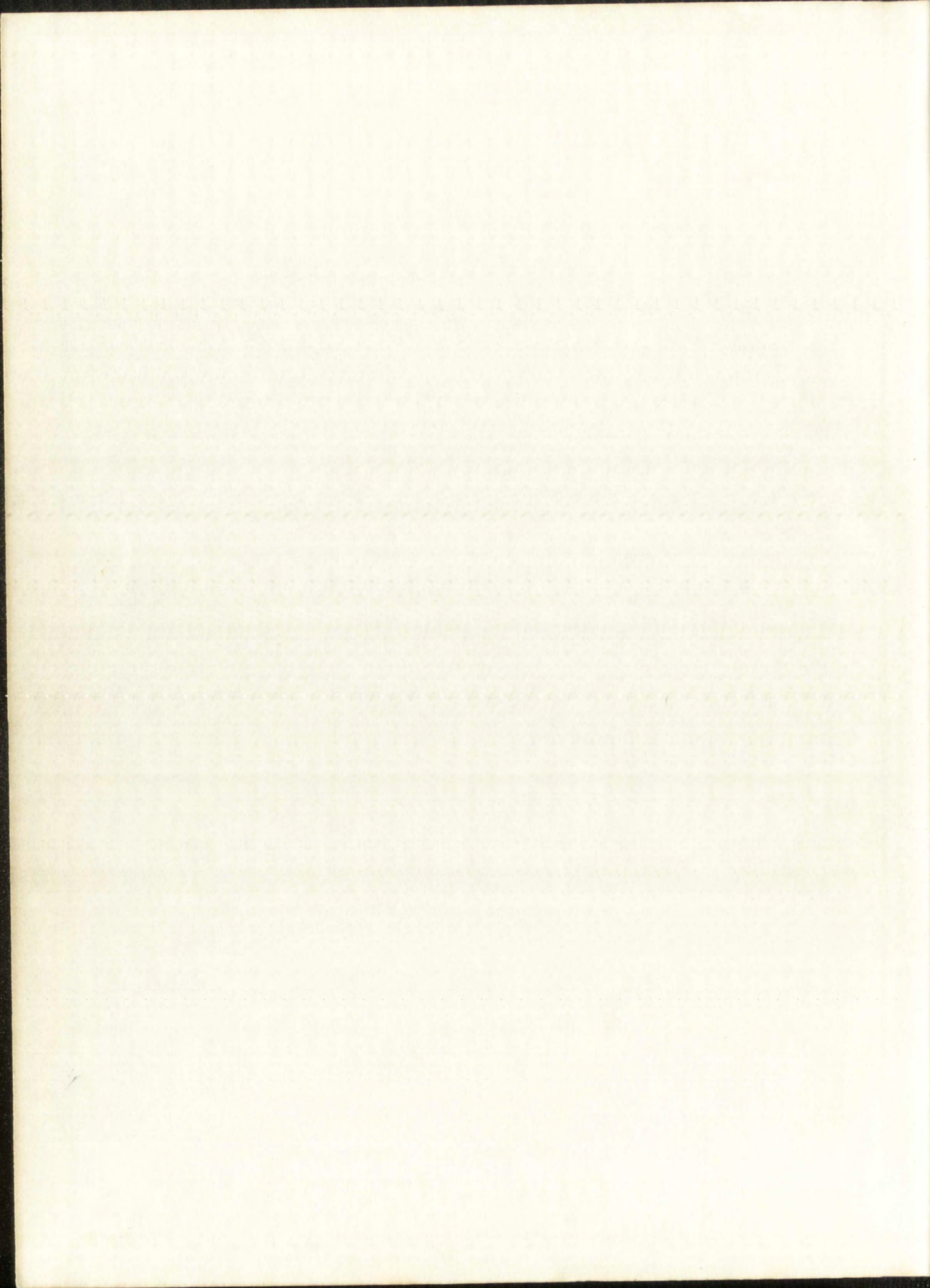
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COTTON CONTENT

AN INVESTIGATION OF BILINGUALISM AND ACHIEVEMENT
IN READING IN THE FOURTH GRADE
OF THE PAROCHIAL SCHOOL SYSTEM
IN THE ARCHDIOCESE OF SANTA FE
1957 - 1958

By

Rev. A. A. Schneider

A Thesis

Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts in Education

The University of New Mexico

1961

AN INVESTIGATION OF THE EFFECTS OF

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WILLIAM

Rev. A. A. Robinson

A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Arts in Education

The University of North Carolina

1925

This thesis, directed and approved by the candidate's committee, has been accepted by the Graduate Committee of the University of New Mexico in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

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CHAPTER I

THE PROBLEM AND IMPORTANCE OF BILINGUALISM

I. THE PROBLEM

Statement of the Problem.

It was the first purpose of this study to investigate a considerable group of elementary school pupils with the intention of determining the measurable growth in reading ability during a seven-month period of instruction.

The second purpose of this study was to determine whether or not a significant difference existed in the amount of reading growth between the unilinguals of the sampling and the bilinguals.

The third purpose of the study was to identify specific areas of weakness in reading and either to make appropriate recommendations for their correction or to point out the area or areas of indicated research.

Importance of the Problem.

This investigation is indicated for two reasons: (1) the considerable growth of the church-sponsored, or parochial schools in recent New Mexican history, and (2) the existence of considerable bilingualism in New Mexico.

First, since the New Mexico Court decision of the

1940's effecting the teaching by religious orders in the state's public schools, the growth of the Catholic parochial school system has been extensive. Today, there are over sixteen thousand children in New Mexico receiving their elementary education under the aegis of this system, and the number is increasing by approximately 500 each year. Furthermore, with the exception of minimal state supervisory functions such as the determination of prerequisites for certification of teachers and the direction of curriculum content, little has been done on the state level to evaluate the teaching success of this system. This limited investigation of reading, then, may provide the model for a more complete self-evaluation by the system.

Second, bilingualism is an extensive phenomenon and has interesting educational implications. These areas are discussed in greater detail in the following two sections.

★ Extensive nature of bilingualism. (It is obvious that bilingualism exists in New Mexico. There is a considerable portion of the population whose home language is still Spanish. In some parts of the state, one encounters a trilingual situation where an Indian-Spanish-English combination occurs.) The situation gives no indication of disappearing in the immediate future. ✓

In the states of Colorado, Utah, Texas, Arizona,

1960's following the founding of the state in 1906.
state's public schools, the growth of the Catholic and
other school systems has been extensive. Today, there
are over sixteen thousand children in the state receiving
their elementary education under the state's public system,
and the number is increasing by approximately 100 each
year. Furthermore, with the exception of a small state
superior court system with an administrative structure of pro-
tecting the constitution of the state and the division
of curriculum content, little has been done on the state
level to evaluate the learning process of this system. This
limited investigation of reading, writing, and arithmetic
model for a more complete evaluation of the system.
Second, difficulties in the state's educational
and has interesting educational implications. These are
are discussed in greater detail in the following two sections.
Alternative nature of bilingualism. It is obvious
that bilingualism exists in the state. There is a consid-
erable portion of the population whose native language is
still Spanish. In some parts of the state, one encounters
a trilingual situation where the Indian population
combination occurs. The situation varies no indication
of disappearing in the immediate future.
In the state of Colorado, Utah, Texas, Arizona,

and California, the problem of bilingualism is growing sufficiently rapidly to justify thorough investigation. This is especially true in the latter three states because they share a common border with Mexico.

One of the regions of our country having the most acute problems with bilingual education is the east coast, especially the New York-New Jersey-Philadelphia area. Besides the normal immigration from Europe, this area is experiencing a continuous and sizeable influx of Spanish-speaking unilinguals from Puerto Rico.

In other English-speaking countries there also exists a bilingual problem, particularly in Wales, the Scottish Highlands (especially the Hebrides), and Western Ireland. The Welsh Universities have conducted some significant studies concerning this problem. These will be examined in a subsequent section of this paper.

Cognizance is taken of the bilingual problems of Europe and Asia, but this study is limited to bilingualism in which English is one of the lingual factors.

Educational implications. (The late Dr. L. S. Tireman, of the University of New Mexico, has pointed out the possibility that bilinguals have some educational disadvantages. In the area of reading, he indicates that the growth of bilinguals keeps pace with that of unilinguals until the

and California, the problem of the situation is growing
exponentially more difficult to handle. This is especially true in the case of the states where
they have a considerable number of people.
One of the results of this is that the states are now
confronted with a situation which is not only more serious
especially in the case of the states where the situation is
besides the normal situation which is now being faced by
experiencing a rapid increase in the number of people
speaking English as a second language.
In other English-speaking countries there also
exists a bilingual problem, particularly in the case of
Scottish Highlands (especially the Highlands), and Wales.
Ireland. The same situation has been experienced in the
bilingual situation concerning the Irish language. This will be
examined in a subsequent section of this paper.
Consequently it is clear that the bilingual problem is
Europe and Asia, but this paper is limited to bilingualism
in which English is one of the languages.
Bilingualism in the United States
The first of the languages of the United States, and indeed one of the
possibilities that bilingualism has been a considerable hindrance
to the growth of the United States. In the case of the United States, the growth
of bilingualism has been a factor with the growth of the United States and the

years of intermediate instruction when their growth curve falls off considerably.¹ This observation is precisely the reason why the first year of intermediate instruction was chosen for this study.

In the light of these two considerations, there is justification for concluding (1) that an investigation into the general effectiveness of the parochial elementary schools of the Archdiocese of Santa Fe is of importance to the children, themselves, and important for the high schools whose task it will be to continue their education, and (2) that an attempt to define the influence of bilingualism on achievement is important for the bilingual students and for the schools which have undertaken their instruction.

II. DEFINITION OF TERMS USED

Fourth year of instruction. Those learnings usually presented in the fourth grade, regardless of the actual grade-level at which a particular student might be operating during that period of instruction.

First year of intermediate instruction. Same as the fourth year of instruction.

¹L. S. Tireman, Teaching Spanish-Speaking Children, (University of New Mexico Press, Albuquerque, New Mexico, 1948), p. 38.

✓ Unilinguals. Those students who habitually use American English as the medium of communication in the home and during leisure-time activities. This does not militate against their having a more or less usable command of a language other than English.

✓ Bilinguals. Those who habitually communicate at home and at play in a language other than English. It is assumed that these children have a knowledge of English not equal to that of the so-called unilinguals because of a lack of practice and because of environmental influences.

Standardized Achievement Test. The complete battery of the Stanford Achievement Test Form H. This includes subtesting in word meaning, paragraph meaning, arithmetic and social studies.

Achievement Median. This gives the grade-level equivalent of the average achievement of each student on the complete battery.

Battery Median. Same as achievement median.

Paragraph comprehension. The ability of the student to fully recognize the meaning of the words in a reading selection.

Bilingualism. Those students who habitually use American English as the medium of communication in the home and during leisure-time activities. This does not militate against their having a more or less usable command of a language other than English.

Bilingualism. Those who habitually communicate at home and at play in a language other than English. It is assumed that these children have a knowledge of English not equal to that of the so-called unilinguals because of a lack of practice and because of environmental influences.

Standardized Achievement Test. The complete battery of the Stanford Achievement Test Form H. This includes subtests in word meaning, paragraph meaning, arithmetic and social studies.

Achievement Median. This gives the grade-level equivalent of the average achievement of each student on the complete battery.

Battery Median. Same as achievement median.

Paragraph comprehension. The ability of the student to fully recognize the meaning of the words in a reading selection.

Mental age. A figure arrived at by comparing raw test scores with mental age equivalent charts included in the test instruction booklet of the Kuhlmann-Anderson Test D.

Chronological age. The actual physical age of the child expressed in years and months.

Intelligence Quotient. This is arrived at from the Kuhlmann-Anderson Test D by dividing the mental age expressed in total months, and derived from the test scores, by the chronological age expressed in months.

Group I. The bilingual group.

Group II. The unilingual group.

The remaining sections of this paper include a brief review of literature touching upon the topic, procedures of the study, analysis of data, summary and conclusions.

.....

Test 1. The subject was given a test consisting of

test scores with respect to the subject's performance in
the test consisting of the following items:

Test 2.

Chronological age. The subject's chronological age was

child expressed in years and months.

Intelligence quotient. This was measured by the use of

Binet-Simon test and was given to the subject by the

in total months, and tested by the test scores, by the

chronological age expressed in months.

Group I. The highest scores.

Group II. The lowest scores.

The remaining sections of this paper include a brief

review of literature covering the topic, a description of

the study, analysis of data, summary and conclusions.

CHAPTER II

REVIEW OF THE LITERATURE

During the 1920's and 1930's, there was a rise of interest in the problem of bilingual education. Many investigations were conducted which were primarily interested in methods of arriving at a valid I. Q. of the bilingual child. This preoccupation with intelligence testing can be explained in part by Saer's study of Welsh bilinguals in which his findings indicated a consistent superiority of unilinguals over bilinguals.¹ In Saer's work an English and a Welsh translation of the Stanford revision of the Binet was used.

In investigations of Spanish-speaking bilinguals between 1924 and 1930, the discovered inferiority of bilinguals in tests was explained by some to be due to "racial limitations,"² and "mental inferiority."³ Others laid poor

¹D. J. Saer, Frank Smith and John Hughes, The Bilingual Problem, (Wrexham: Hughes & Sons, 1924), p. 52.

²B. F. Haught, "The Language Difficulty of Spanish-American Children," Journal of Applied Psychology, XV (1931) pp. 91-95.

³F. C. Paschal and L. R. Sullivan, "Racial Differences in the Mental and Physical Development of Mexican Children," Comparative Psychological Monograph, III, no. 14, (1925).

REVIEW OF THE LITERATURE

During the 1930's and 1940's, there was a rise of interest in the problem of bilingual children. Investigations were conducted which were primarily interested in methods of arriving at a valid estimate of the bilingual child. This preoccupation with intelligence testing was explained in part by the knowledge of the relationship in which his findings indicated a correlation between the child's performance on the intelligence test and the degree of bilingualism and a Welsh translation of the Stanford-Binet test was used.

In investigations of bilingual children, it was found that between 1925 and 1950, the literature indicated that bilingual children were superior to monolingual children in tests of verbal ability. This was explained by the fact that bilingual children had more "verbal" intelligence than monolingual children.

1. W. J. Gair, "Bilingualism and Intelligence," Journal of Educational Psychology, 1931, 22, 1-12.

2. L. L. Thurstone, "The Language Intelligence of Bilingual Children," Journal of Applied Psychology, 1931, 16, 21-25.

3. C. C. Fernald and L. W. Sullivan, "Bilingualism and Intelligence," Journal of Educational Psychology, 1931, 22, 1-12.

test results at the door of language difficulty⁴ and the influences of environment.⁵

Determination of Extent of Bilingualism.

★ (Because of individual differences and subtle variations in the home environment, there are probably as many degrees of bilingualism as there are bilingual individuals. This has real importance when one is trying to arrive at a valid explanation of I. Q. scores of bilinguals.) One may maintain, as George Sanchez does, that the lingual factors in the tests are prejudicial to the bilingual,⁶ but the question arises, "How much bilingualism was there in this particular person, and exactly how did it affect the test score?" Until this problem is solved, not much can be done of a truly scientific nature in arriving at an accurate estimate of the I. Q. of bilinguals.

If the prejudice in I. Q. tests lies in the verbal

⁴O. K. Garretson, "Study of the causes of Retardation Among Mexican Children," Journal of Educational Psychology, XIX, (1928), pp. 31-40; George I. Sanchez, "Scores of Spanish-speaking Children on Repeated Tests," (unpublished Master's thesis, the University of Texas, 1931), cited by L. S. Tireman, op. cit., p. 23.

⁵George I. Sanchez, "Group Differences and Spanish-speaking Children," Journal of Applied Psychology, (October, 1932), XVI, pp. 549-558.

⁶George I. Sanchez, "Implications of a Basal Vocabulary to the Measurement of Abilities of Bilingual Children," Journal of Social Psychology, (1934), V, pp. 394-402.

test results at the cost of accuracy, and the influence of environment.

Determination of Effect of All Factors
Because of the many factors and the variation in the same, it is not possible to have any degree of uniformity in the results. This is the real situation and the only one. It is a fact that the results of all factors are not the same. One may maintain, as some have done, that the factors to the test are negligible in the present state of the question. But when the question arises, "How much difference can there be in this particular action, and how much can it affect the test score?" until this question is solved, not much can be done of a truly scientific nature in testing as an accurate estimate of the I. Q. of a child.
If the difference in I. Q. is not in the whole

10. E. C. Calkins, "Study of the causes of variation among German children," Journal of Educational Psychology, XIX, (1927), pp. 21-32; George L. Calkins, "Factors of German-Speaking Children in English Tests," (unpublished Master's thesis, the University of Texas, 1931), cited by G. L. Calkins, op. cit., p. 25.

11. George L. Calkins, "Group Differences and Variations among Children," Journal of Applied Psychology, XXX, (1933), pp. 2-12.

12. George L. Calkins, "Comparisons of a Basic Test with the Assessment of Intelligence in English and German," Journal of Educational Psychology, XXX, (1933), pp. 255-262.

part of the tests as seems indicated,⁷ then the obviously facile answer would be to use a non-verbal test. The research with Welsh bilinguals done at Aberystwith College, however, cautions precisely against "too great dependence even upon the non-verbal tests when linguistic differences abound."⁸

The problem completes the circle, then, and a method must be found to determine the extent of bilingualism before exact research in this field can be carried out.

. . . until this the problem of determining exactly the degree of bilingualism is solved, experimental techniques can contribute little to the theory and controversial question of whether bilingualism is educationally advantageous: whether in fact it does "help to free the mind from the tyranny of words" or whether, on the other hand, the simultaneous learning of two languages in childhood imposes burdens which places children at a disadvantage relative to their unilingual fellows.⁹

It was once fairly popularly accepted as a theory that the bilingual child, especially one in whom the ability in both languages was about equal, had an advantage in the

⁷Grace T. Altus, "Wechsler Intelligence Scale for Children," Journal of Genetic Psychology, LXXXIII, pp. 241-248; George I. Sanchez, "Implications of a Basal Vocabulary to the Measurement of Abilities of Bilingual Children," Journal of Social Psychology, (1934), V, pp. 394-402.

⁸Lewis Goreth, "Effects of Bilingualism," London Times Educational Supplement, 1583, December 13, 1957.

⁹"Compulsory Welsh," London Times Educational Supplement, 2191, May 17, 1947, p. 694.

part of the tests as seems indicated, that the children
 facile answer would be to use a non-verbal test, the
 research with Welsh children done at Aberystwyth College,
 however, cautions precisely against this dependence
 even upon the non-verbal test when the results are
 about 80.

The problem now arises the choice, then, and
 method must be found to determine the extent of bilingual
 and below exact research in this field can be carried out.

... until this the problem of determining exactly
 in the degree of bilingualism is solved, however
 techniques are available to the theory and
 controversial matter of whether bilingualism is an
 essentially advantageous feature in that it does "allow"
 to free the mind from the narrowness of words, or whether
 on the other hand, the bilingual child is limited in his
 language in childhood because he has to learn two
 children as a disadvantage relative to their bilingual
 fellows.

It was once said, "bilingualism is a curse"
 that the bilingual child, especially in the child
 in both languages was almost equal, had an advantage in the

Grace T. Allen, "The Bilingual Child,"
Journal of Genetic Psychology, LXXXII, 1941, pp. 141-144.
 1931; George A. Miller, "Implications of a Bilingual Vocabulary
 for the Measurement of Intelligence of Bilingual Children,"
Journal of Genetic Psychology, LXXXII, 1941, pp. 145-147.
 Lewis Gordon, "Effects of Bilingualism," Journal
Times Educational Supplement, 1947, December 17, 1947.
 "Compulsory Welsh," London Times Educational
Supplement, 219, 27, 1947, p. 22.

educational situation.) Research at Aberystwyth College in Wales casts serious doubt on this concept, since the Aberystwyth-Bowgar tests "seem to show that bilinguals, with equal facility in both languages, score less on intelligence tests than do the unilinguals."¹⁰ These tests were given in both Welsh and English.

Although Lewis states that "the grading of children wishing to enter grammar school is complicated by the fact that there as yet is no reliable test to determine the capacity of the bilingual child"¹¹ (*italics not in original*) recently-developed instruments may be sufficiently reliable.

★ Some interesting speculation has been set afoot by studies which seem to find bilingualism an asset in performance on intelligence tests. For example, Stark, in an investigation of bilingual Dublin students, concluded that "'innate verbal facility' may find early bilingualism an asset to their (sic) mental development"¹²; and Saer, in later experiments with Welsh students, concluded that

"Children who become bilingual at an early age, by learning the second language during their play and in contact with

¹⁰ Ibid.

¹¹ Ibid.

¹² W. A. Stark, "The Effect of Bilingualism on General Intelligence: An Investigation Carried Out in Certain Dublin Schools," British Journal of Educational Psychology, (1940), X, pp. 78-79.

educational situation. Research at St. John's College
 in Wales casts serious doubt on this concept, since in
 laboratory-based tests, scores for Welsh children
 with equal facility in both languages, were lower on tests
 of intelligence than on the English tests. These tests were
 given in both Welsh and English.

Although Lewis claims that the reading of Welsh
 was similar to other Germanic languages, it is not clear
 that there are any real similarities between the
 capacity of the bilingual child and the child who is
 recently-developed. In fact, the child who is
 bilingual is not the same as the child who is
 monolingual. Studies which seek to find similarities in reading in
 terms of intelligence, or memory, or language, are
 investigations of bilingual children's reading, concluded that
 "innate verbal facility" may have been a factor in
 cases to which (late) monolingual development is attributed. In
 later experiments with Welsh children, monolingual and
 bilingual children were compared on a variety of tests, by means
 of which it was found that the bilingual children were
 the second language during their early years and in contact with

1971, "The Effect of Bilingualism on Children's
 Intelligence: An Investigation Carried Out in Welsh Medium
 Schools," British Journal of Educational Psychology, 42(1),
 1-10.

other children, have an advantage over those who learn the second language at school.¹³⁾

However, Saer, in his investigation, used a Welsh translation of the Stanford-Binet which is not the same instrument in any language other than that in which its norms had been standardized.

This early-age bilingualism theory seems to find some support in the unique statement of a Canadian neurologist who claims to have discovered that the speech areas of the brain begin to lose their sensitivity at about age ten and are senescent by age fourteen.¹⁴

Intelligence Testing and the Bilingual.

As was mentioned at the beginning of this chapter, the problem of arriving at a valid I. Q. of bilingual children is one complicated by many factors.¹⁵ More recent investigations, while recognizing these factors, have attempted to by-pass them at least to the extent of

¹³D. J. Saer, "An Inquiry into the Effect of Bilingualism upon the Intelligence of Young Children," Journal of Experimental Psychology, (1922), VI, pp. 232-40, 260-74.

¹⁴London Times Educational Supplement, Sept. 13, 1957, p. 1199.

¹⁵Morton J. Keston and Carmina Jimenez, "A Study of the Performance on English and Spanish Editions of the Stanford-Binet Intelligence Tests by Spanish-American Children", Journal of Genetic Psychology, 85: pp. 263-9, Dec., 1954.

other children, have an advantage over those who learn the

second language as adults.

However, it is not clear that the children who learn

the second language as adults are at a disadvantage

in any language other than the second language.

There has been considerable discussion of the

fact that the children who learn the second language

as adults are at a disadvantage in the second language

and that the children who learn the second language

as adults are at a disadvantage in the second language

and that the children who learn the second language

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as adults are at a disadvantage in the second language

determining a hic et nunc practical intelligence rating instrument. In point of fact, they seem precisely to have overlooked, at least for the present, Darsie's observation in 1926 in his study of "Mental Capacity of American-born Japanese Children."

It must not be overlooked that the existence of a pronounced language handicap may itself be indicative of a lack of capacity to master the language adequately.¹⁶

Levinson, in his investigation of bilingual and unilingual children, indicates that:

The Goodenough Draw-a-Man Test, and the Information Comprehension and Similarities subtests of the WISC Verbal Scale, and the Picture Completion, Block Design, Object Assembly and Coding of the WISC Performance Scale are fair tests for native-born Jewish bilingual children.¹⁷

Altus found that there was high correlation for scores of verbal and performance I. Q. on the WISC, except where severe bilingual handicap is in operation.¹⁸ Her hope was that the gap between the verbal and performance I. Q. would narrow with schooling.

¹⁶M. L. Darsie, "The Mental Capacity of American-born Japanese Children," Comparative Psychology Monograph, (1926) III, pp. 1-18.

¹⁷Boris M. Levinson, "A Comparison of the Performance of Bilingual and Monolingual Native Born Jewish Pre-school Children of Traditional Parentage on Four Intelligence Tests," Journal of Clinical Psychology, XV, No. 1, January, 1959.

¹⁸Altus, op. cit.

determining a high of some particular intelligence rating
instantaneous. In point of fact, they seem to be
overlooked, at least for the present, because of observation
in 1923 in his study of "Mental Capacity of American-born
Japanese Children."

It must not be overlooked that the existence of a
pronounced language barrier may lead to a false
impression of capacity to master the language and
possibly.

Levinson, in his investigation of children and
unilingual children, indicates that

The good thing from a test, and the lack of
comprehension and limited evidence of the child
verbal skills, and the language barrier, which
object assembly and testing of the performance
leads to a false impression of the child's
children.

Levinson found that there was high correlation in
scores of verbal and performance tests on the WISC, except
where severe bilingual handicap is in operation. But here
was that the gap between the verbal and performance tests
would narrow with age.

Ida, L. Daisie, "The Mental Capacity of Japanese-
born Japanese Children," Comparative Psychology, 1923, 11, 1-12.

Ida, L. Daisie, "A Comparison of the Verbal
and of Bilingual and Monolingual Tests in the Japanese-
born Children of Japanese Parents on Test Intelligence
Tests," Journal of Clinical Psychology, 1924, 1, 1-12.

However, it is questionable whether either of these WISC scores is valid. Might it not be possible that the same lingual factor which operates to lower the I. Q. on the verbal section of this test also operates to keep the performance I. Q. lower than its true potential? Even the performance tests depend on a lingual factor in the transmission of instruction.

However, if the phonetic transcription of these

WISC scores is valid, it is not possible that the

same linguistic factor which operates at lower and I. on

the verbal section of this test operates to limit the

performance I. Q. lower than the non-verbal I. Q. test

performance tests depend on a linguistic factor in the same

manner of instruction.

CHAPTER III

THE COLLECTION AND TREATMENT OF THE DATA

I. COLLECTION OF DATA

A questionnaire was structured to gather the information needed for this study and was sent to the principals of the various parochial elementary schools under the sponsorship of the Archdiocese of Santa Fe. The group being investigated was composed of a random sampling of fourth grade pupils attending these parochial schools. The period of instruction whose efficiency was investigated in terms of pupil achievement extended from mid-October, 1957, to mid-May, 1958.

The questionnaire asked for the name of the pupil (solely for ease in pairing in treatment of the data), the pupil's I. Q. score, mental age, chronological age, the Stanford Achievement Battery Median for October, 1957, plus the reading, the word meaning and paragraph meaning score. These data were requested again from the Stanford Battery given in May, 1958.

It was further requested that the teacher indicate into which category the child belonged with reference to language, i.e., unilingual or bilingual. In this case, the teacher's observation and judgment was the most reliable

instrument available.

The majority of schools replied by July 1, 1958. However, much of the information had to be discarded, sometimes because the school had failed to indicate the I. Q. scores for the students or had failed to include the Battery Median scores, and sometimes because the schools had failed to administer the October test. In one or two cases, the schools failed to indicate the lingual status of pupils, rendering the information almost useless. (See Appendix A).

II. TREATMENT OF DATA

After some scores were rejected for the cited reasons, there were found to be over two hundred students with complete records. Of these, almost half were unilinguals and almost half were bilinguals.

These remaining pupils were then paired as to sex, whenever possible, and I. Q. scores. When this was completed, it was found that there were 112 pairs with I. Q. scores ranging from 89 to 125. (See tables, Appendix B).

In this pairing, in only ten per cent of the cases was there a difference in the two I. Q. scores, and of these only two differences were as large as three points. These differences were counterbalanced in each group so that the means would be equal and the variance approximately equal.

instruments available.

The majority of schools tested by July 1, 1955.

However, much of the information had to be discarded, sometimes because the school had failed to indicate the I. Q. scores for the students or had failed to indicate the battery Median scores, and sometimes because the school had failed to administer the Cooper test. In one or two cases, the schools failed to indicate the range of scores of pupils, rendering the information almost useless. (See Appendix A).

ANALYSIS OF DATA

After some scores were rejected for these other reasons, there were found to be over two hundred schools with complete records. Of these, almost half were eliminated as almost half were bilingual. These remaining pupils were then divided as to sex, whenever possible, and I. Q. scores. When this was completed, it was found that there were 112 schools with I. Q. scores ranging from 89 to 115. These schools, according to the data, in this pairing, in only ten per cent of the cases was there a difference in the two I. Q. scores, and of these only two differences were as large as three points. These differences were counterbalanced in each group so that the means would be equal and the variance approximately equal.

As shown in Table I, the mean I. Q. score for unilinguals was 99.607 and that of the bilinguals was 99.607. The standard deviation for each group was as follows: Unilinguals, 10.675; bilinguals, 10.630.

TABLE I

TABLE OF MEANS AND STANDARD DEVIATIONS
OF I. Q. SCORES FOR PAIRED GROUPS

	<u>Unilinguals</u>	<u>Bilinguals</u>
Mean Score	99.607	99.607
Standard Deviation	10.675	10.630

It is obvious from the above that these are very similar groups and any conclusions derived from a comparison should have a high degree of validity.

It was necessary to take great pains in this pairing in order to give validity to any findings and to avoid the criticism that the groups were loaded in favor of one or the other side, either by sex or by I. Q. However, besides these carefully selected subjects about whom information was in every way complete, there were found very many cases whose usefulness in the pairing stage was vitiated by some defect such as lack of Battery Median, I. Q., or October test scores.

It was reasoned that, although these gross scores

As shown in Table 1, the mean score for the
 group was 77.50, and the standard deviation was 10.50.
 The standard deviation for each group was as follows: Unit-
 1, 10.50; Unit-2, 10.50; Unit-3, 10.50.

TABLE 1
 OF E. C. SCORES FOR EACH GROUP

Group	Mean Score	Standard Deviation
Unit-1	77.50	10.50
Unit-2	77.50	10.50
Unit-3	77.50	10.50

It is obvious from the above that there are very
 similar groups and any comparison between them is correct.
 Each group has a high degree of similarity.

It was necessary to find a way to make the data
 better in order to see whether the findings are so
 avoid the criticism that the group was biased in favor
 of one or the other side, for the purpose of the study.
 over, besides these carefully selected subjects, about
 whom information was in every way complete, there were
 found very many cases whose inclusion in the study
 was vitiated by some defect such as lack of interest
 or lack of ability. It was necessary, therefore, to select
 only those cases which were free from such defects.

could not in any way be integrated statistically with the selected paired specimens, they could, nevertheless, present some interesting information which would be true of all of the students on whom some sort of information was received. In other words, this total group would give a fairly accurate picture of the whole fourth grade in this system.

Accordingly, before making an analysis of variance on the smaller, more select group, means and medians for this larger group were determined.

From a comparison of the means and/or medians of this larger group, it was hoped that an accurate picture of what was accomplished by all students during this seven months of instruction could be obtained. In this way, a reasonable judgment of the efficiency of the teaching could be reached.

Further, from a comparison of the starting and finishing points of Groups I and II, a determination of the relative accomplishments of the whole sampling was feasible.

It was hoped that, from the selected paired groups, it would be possible to discover a reason for discrepancy between the groups if any appeared.

could not in any way be such a satisfactory basis for the
selected series of experiments, and, consequently, the
sent some interesting information which would be of value to
all of the students to whom it was sent as information was
received. In other words, this sort of group would give a
fairly adequate picture of the whole group in this
aspect.

Accordingly, before making an attempt at a comparison
on the smaller, more select group, we had to make the
this larger group very definite.
From a comparison of the two groups, we had to make of
this larger group, it was found that an adequate picture
of what was accomplished by all students during this series
of experiments could not be obtained. In this way,
reasonable judgment of the ability of the students
could be reached.

Further, from a comparison of the results, we had to
make points of comparison and a comparison of the
relative accomplishments of the two groups was found.
It was hoped that, from the selected series of experiments,
it would be possible to discover a method for comparison
between the groups if any appeared.

CHAPTER IV

DETAILS OF TREATMENT OF THE DATA

It was found in treating the scores of all the returns which proved useful for purposes of constructing a picture of the gross population of the fourth grade, that there were approximately 150 cases of bilinguals and 190 cases of unilinguals.

Separate distribution tables were set to correspond to the Battery Median scores for October, 1957, and May, 1958. In addition, each of the subtests in reading plus the reading medians for the tests merited its own distribution table. In this way, it was possible to compute the mean and median scores for each of the twelve sets of figures.

A summary of the results of this computation can be seen in Table II.

From Table II it is evident that the whole sampling population of bilinguals advanced on their battery median from 3.27 years to 4.25 years, which is a growth of 9.80 months in seven months of instruction. This represents a growth of 2.80 months above expectation. During this period, they reduced the amount of their retardation from 8.30 months to 5.50 months.

DETAILS OF TREATMENT OF THE DATA

It was found in treating the data of the
 stations which proved useful for purposes of summarizing
 a picture of the urban population of the various groups,
 that there were substantial differences in the
 and 190 census of urban population.
 Separate distributions of the data were
 prepared for the various groups. For example, in 1950
 and May, 1950. In addition, each of the groups in question
 plus the resulting urban population for each group
 distribution of the data. In this case, it was possible to
 compute the mean and median for each of the twelve
 sets of figures.
 A summary of the results of this computation can
 be seen in Table II.
 From Table II it is evident that the urban
 population of the various groups has been
 median from 2.57 years to 6.11 years, which is a growth
 of 9.80 months in seven years of observation. This figure
 means a growth of 1.40 months each year. During
 this period, they reduced the amount of their population
 from 8.50 months to 1.50 months.

TABLE II

MEAN GROWTH ON BATTERY AND SUBTEST SCORES OF STANFORD
ACHIEVEMENT FOR COMPLETE GROUP IN YEARS AND MONTHS

	<u>Group I</u>	<u>Group II</u>
Battery Mean, Oct., 1957	3.27	4.02
Battery Mean, May, 1958	4.25	5.14
Average Growth	.98	1.12
Reading Mean, Oct., 1957	3.05	4.195
Reading Mean, May, 1958	3.855	5.35
Average Growth	.805	1.155
Paragraph Meaning, Oct., 1957	2.90	4.24
Paragraph Meaning, May, 1958	3.83	5.58
Average Growth	.93	1.34
Word Meaning, Oct., 1957	3.20	4.15
Word Meaning, May, 1958	3.88	5.12
Average Growth	.68	.97

TABLE II

MEAN GROWTH ON BATTERY AND POSTURE GROUPS OF STATION
ACQUISITION FOR COMPARISON GROUP IS YEAR AND MONTH

Group I	Group II	
2.27	2.07	Battery Mean, Oct., 1927
2.22	2.14	Battery Mean, May, 1928
2.22	2.12	Average Growth
2.02	1.99	Reading Mean, Oct., 1927
2.22	2.22	Reading Mean, May, 1928
2.02	1.99	Average Growth
2.00	1.94	Paraphrase Reading, Oct., 1927
2.22	2.22	Paraphrase Reading, May, 1928
2.00	1.94	Average Growth
2.22	2.12	Word Meaning, Oct., 1927
2.22	2.12	Word Meaning, May, 1928
2.22	2.12	Average Growth

In the same period of time, the unilinguals advanced their battery median from 4.02 years to 5.14 years. They grew, then, 11.20 months during the seven months of instruction, erasing a retardation of .80 months and showing 3.40 months of precocity.

TABLE III

RETARDATION OF GROUP I RELATIVE TO GROUP II
ON COMPLETE BATTERY OF STANFORD ACHIEVEMENT

	<u>October, 1957</u>	<u>May, 1958</u>	<u>Growth</u>
Group I	3.27 yrs.	4.25 yrs.	9.80 mos.
Group II	<u>4.02 yrs.</u>	<u>5.14 yrs.</u>	<u>11.20 mos.</u>
Difference	7.50 mos.	8.90 mos.	1.40 mos.

It was also discovered that the bilingual group was retarded relative to the unilingual group 7.50 months in October and 8.90 months in May. In other words, even though the bilingual group achieved more than was expected, it was more retarded relative to the unilingual group than when the teaching period began. Group I had dropped 1.40 months further behind Group II.

The reading mean of Group I moved from 3.05 to 3.855, a gain of 8.05 months, reducing the amount of grade-level retardation from 10.50 months to 9.45 months. The

in the same period of time, the billings were advanced
 their history median from 5.05 to 5.15 points. They
 grew, then, 11.25 months during the seven months of interest
 then, creating a retardation of 1.00 months and showing 2.00
 months of precocity.

TABLE III

RETARDATION OF GROUP I RELATIVE TO GROUP II
 ON COMPLETE BATTERY OF TESTS AND ACQUISITION

	October, 1937	May, 1938	Group II
Group I	5.05 yrs.	5.15 yrs.	5.05 yrs.
Group II	5.05 yrs.	5.15 yrs.	5.05 yrs.
Billings	5.05 yrs.	5.05 yrs.	5.05 yrs.

It was also discovered that the billings group
 was retarded relative to the billings group 7.50 months
 in October and 5.90 months in May. In their words, even
 though the billings group achieved more than was expected,
 it was more retarded relative to the billings group than
 when the teaching period began. Group I had dropped 1.00
 months further behind Group II.
 The reading mean of Group I was 5.05 from 5.05 to
 5.45, a gain of 5.05 months, resulting in a mean of 5.45
 level retardation from 11.50 months to 5.45 months. The

reading mean of Group II moved from 4.195 to 5.35, a growth of 11.55 months which gave them a grade-level precocity of 5.50 months. This widened the gap between Group I and Group II by an additional 3.50 months as is shown in Table IV.

TABLE IV

RETARDATION OF GROUP I RELATIVE TO GROUP II ON READING
SUBTESTS OF STANFORD ACHIEVEMENT BATTERIES

	<u>Group I</u>	<u>Group II</u>	<u>Difference</u>
October, 1957	3.05 yrs.	4.195 yrs.	11.45 mos.
May, 1958	<u>3.855 yrs.</u>	<u>5.350 yrs.</u>	<u>14.95 mos.</u>
Growth in months	8.05 mos.	11.55 mos.	3.50 mos.

It seemed to be worthwhile to identify the reading area of least growth, so the mean paragraph and word meaning scores of the two groups were compared. Group I grew in word meaning from 3.20 to 3.88, a gain of 6.80 months, while Group II advanced from 4.15 to 5.12, a growth of 9.70 months. In paragraph meaning, Group I went from 2.90 to 3.83 to gain 9.30 months, while Group II moved from 4.24 to 5.58 marking up a gain of 13.40 months. Table V shows this.

Since the greater growth of both groups is in paragraph meaning, it follows that the instruction in word meaning was not as efficacious as that in paragraph meaning

reading mean of Group II moved from 4.15 to 4.35, a growth of 0.20 months which gave them a relative productivity of 2.50 months. This widened the gap between Group I and Group II by an additional 0.20 months, making the total 0.40 months.

TABLE IV

REPRODUCTION OF GROUP I RELATIVE TO GROUP II ON 10/1/57
SUBSTRATE OF STANFORD UNIVERSITY LABORATORY

Group I	Group II	Relative Productivity
2.00	2.00	1.00
2.50	2.50	1.25
3.00	3.00	1.50
3.50	3.50	1.75
4.00	4.00	2.00
4.50	4.50	2.25
5.00	5.00	2.50
5.50	5.50	2.75
6.00	6.00	3.00
6.50	6.50	3.25
7.00	7.00	3.50
7.50	7.50	3.75
8.00	8.00	4.00
8.50	8.50	4.25
9.00	9.00	4.50
9.50	9.50	4.75
10.00	10.00	5.00

Growth in months

It seemed to be worth while to make the reading area of least growth, so the mean paragraph and word meaning scores of the two groups were compared. Group I was in word meaning from 3.10 to 4.85, a gain of 1.75 months, while Group II advanced from 4.15 to 5.15, a gain of 1.00 months. In paragraph meaning, Group I went from 2.00 to 2.50 to gain 0.50 months, while Group II moved from 2.15 to 2.65 months up a gain of 0.50 months. Table V shows this.

Since the greater growth of both groups in paragraph meaning, it follows that the paragraph meaning was not as efficacious as the word meaning in this

during this particular period of instruction.

TABLE V

GROWTH OF GROUPS I AND II IN WORD-MEANING AND PARAGRAPH
MEANING SUBTESTS OF STANFORD ACHIEVEMENT BATTERIES

<u>Group I</u>			
	<u>October, 1957</u>	<u>May, 1958</u>	<u>Growth</u>
Word Meaning	3.20 yrs.	3.88 yrs.	6.80 mos.
Paragraph Meaning	2.90 yrs.	3.83 yrs.	9.30 mos.
<u>Group II</u>			
Word Meaning	4.15 yrs.	5.12 yrs.	9.70 mos.
Paragraph Meaning	4.24 yrs.	5.58 yrs.	13.40 mos.

Attention was now turned to the second group in which there were 112 pairs of pupils. An analysis of variance was performed on the subtest scores of these groups. The design of this analysis followed the Lindquist Type II mixed design with 112 of the subjects in each cell. This design made it possible to make tests of significance for the effect of lingualism, subtests, grade levels and for all the interactions of the variables. From these calculations it was hoped that a single variable responsible for differences in the test results between the two groups would be identified.

ANALYSIS OF VARIANCE

The analysis of variance is a statistical procedure based on the following assumptions:

- 1) That any set of measurements will manifest some degree of variation.
- 2) That this variation is frequently due to several causes, e.g., the inaccuracy of the instrument of measurement, and human error (personal equation).
- 3) That several of these causes can interact to produce variation in conjunction which is greater than the sum of the several variations produced by these causes acting independently.

The analysis begins with a rational assay of the possible causes of variation, attempting to identify 'pure' factors and factors which imply elements common to other 'impure' factors.

The mathematical procedure itself is not complex. It involves the division of the variance into parts attributable to the several factors and a determination of the importance of each factor's contribution relative to the total variance.

In the analysis of variance on page 22, the various factors are identified as L (lingual), G (grade), S (subtests)

The analysis of the data is based on the following assumptions:

- 1) That the data are representative of the population.
- 2) That the data are free from bias.

It is assumed that the data are free from bias and are representative of the population.

The data are analyzed by the method of least squares.

The results of the analysis are as follows:

The results of the analysis are as follows:

The results of the analysis are as follows:

The results of the analysis are as follows:

The results of the analysis are as follows:

The results of the analysis are as follows:

The results of the analysis are as follows:

and these are considered in various combinations as L X G,
L X G X S. The possibility of each factor's contribution
occurring by chance is indicated wherever appropriate by
the P index.

and these are considered as a first approximation as to the
possibility of a second approximation. The possibility of a
second approximation is indicated by the fact that the
the P index.

The results of this analysis of variance are reproduced in Table VII.

An examination of the reading scores of this select group (Table VI) showed that the total average reading growth was 10.20 months. This broke down as follows: the word meaning scores showed an advance of 8.90 months, from 3.64 to 4.53, and the paragraph meaning growth went from 3.55 to 4.70 for a gain of 11.50 months. Whether this greater growth was due to better instruction in paragraph comprehension or was merely a natural phenomenon of the growth process could not be determined to any degree of satisfaction.

TABLE VI

READING GROWTH OF PAIRED GROUPS ON
STANFORD ACHIEVEMENT BATTERIES

	<u>October, 1957</u>	<u>May, 1958</u>	<u>Growth</u>
Word Meaning	3.64 yrs.	4.53 yrs.	8.90 mos.**
Paragraph Meaning	3.55 yrs.	4.70 yrs.	11.50 mos.**

** P .01

(These growth differences were significant at the .01 level.)

This same information was further analyzed according to the Groups I and II. This analysis showed that the word

TABLE VII

ANALYSIS OF VARIANCE

Source	df	Sum of Squares	Mean Square	F	P
Total	895	1551.90			
Between Ss	223	1004.61			
Linguals	1	79.99	79.99	19.23	.001
Error _B	$\frac{222}{223}$	$\frac{924.62}{1004.61}$	4.16		
Within Ss	672	547.29			
Grades (G)	1	234.83	234.83	521.84	.001
Subtests (S)	1	.41	.41		
G X S	1	4.39	4.39	9.76	.01
L X G	1	1.58	1.58	3.51	
L X S	1	7.08	7.08	15.79	.001
L X G X S	1	.09	.09		
Error _W	$\frac{666}{672}$	$\frac{298.91}{1004.61}$.45		

TABLE VII

ANALYSIS OF VARIANCE

Source	df	Sum of Squares	Mean Square	F	Prob > F
Total	89	171.00			
Between Ss	22	100.41			
Linguistic	1	75.92			
Error B	22	24.49			
Within Ss	67	70.59			
Grades (G)	1	22.43			
Subjects (H)	1	1.11			
G x H	1	1.11			
L x G	1	1.11			
L x H	1	1.11			
L x G x H	1	1.11			
Error	66	69.48			

meaning of Group I in May, 1958, was 3.88, while that of Group II was 4.29, a difference of 4.10 months. In paragraph meaning, Group I achieved at the 3.74 level and Group II at the 4.52 level, revealing a lag of 7.80 on the part of Group I. This lag was significant at the .01 level.

TABLE VIII

READING ACHIEVEMENT OF BOTH PAIRED GROUPS
ON STANFORD BATTERY IN MAY, 1958

	<u>Group I</u>	<u>Group II</u>	<u>Difference</u>
Word Meaning	3.88 yrs.	4.29 yrs.	4.10 mos.**
Paragraph Meaning	<u>3.74 yrs.</u>	<u>4.52 yrs.</u>	<u>7.80 mos.**</u>
Difference	1.40 mos.*	2.30 mos.*	

** P .01

* P .05

Next, these scores were broken down according to the achievements of the separate groups. It was found that Group I had started the instruction in October at a grade level of 3.34. This starting point was some 5.50 months behind that of Group II which had begun at a level of 3.85. By the following May, Group I had advanced to the level of 4.28 and Group II had reached 4.96. In spite of its

meeting of Group I in May, 1955, was 2.55, while that of

Group II was 4.15. Distances of 1.10 and 1.20

graph meaning, Group I consisted of two 2.75 level and

Group II of the 2.55 level, resulting in a total of 1.00 at this

part of Group I. This was a prediction of the 1.00

level.

TABLE 1

MEASURING APPARATUS ON TEST PLATES GROUP I
ON TEST PLATE GROUP II, 1955

Group I	Group II	Distance
2.55	4.15	1.10
2.55	4.15	1.20
2.55	4.15	1.30
2.55	4.15	1.40
2.55	4.15	1.50
2.55	4.15	1.60
2.55	4.15	1.70
2.55	4.15	1.80
2.55	4.15	1.90
2.55	4.15	2.00

2.55
4.15

Next, these results were compared with the

the achievement of the test plates. It was found

that Group I had started the investigation in October and

grade level of 2.55. The investigation was done at 2.55

months before that of Group II which had begun at a level

of 2.55. By the following year, Group I had advanced to the

level of 4.15 and Group II had reached 2.55. An analysis of the

9.40 months growth in the seven months of instruction, Group I had fallen an additional 1.70 months behind Group II.

TABLE IX

TOTAL GROWTH IN READING OF GROUPS I AND II
ON STANFORD ACHIEVEMENT BATTERIES SUBTEST

	<u>Group I</u>	<u>Group II</u>	<u>Lag</u>
October, 1957	3.34 yrs.	3.85 yrs.	5.10 mos.
May, 1958	4.28 yrs.	4.96 yrs.	6.80 mos.
Growth	9.40 mos.	11.10 mos.	1.70 mos.

Although no great difference seemed to exist between these groups, the construction of Table X revealed some real discrepancies.

TABLE X

DIFFERENCES BETWEEN FINAL READING SCORES
FOR LARGE GROUP AND PAIRED GROUP

Final Scores of Unculled Group

	<u>Group I</u> Mean Scores	<u>Group II</u> Mean Scores	<u>Difference</u>
Word Meaning	3.88 yrs.	5.12 yrs.	12.40 mos.
Paragraph Meaning	3.83 yrs.	5.58 yrs.	17.50 mos.

Final Scores of Paired Group

	Group I	Group II	Difference
Word Meaning	3.88 yrs.	4.29 yrs.	4.10 mos.
Paragraph Meaning	3.74 yrs.	4.52 yrs.	7.80 mos.

2.50 months growth in the same amount of time, growth
 I had taken an additional 1.50 months growth in 1.50

WITH THE

TOTAL GROWTH IN HEADING OF GROUPS I AND II
 ON STATION AUGUST 1932

Group I	Group II	Group III
October, 1932	1.50 mos.	1.50 mos.
Nov., 1932	1.50 mos.	1.50 mos.
Growth	1.50 mos.	1.50 mos.

Although no great difference was seen in growth between
 these groups, the correlation of 1.50 months growth to 1
 atmosphere.

STATIONING BETWEEN STATION I AND STATION II
 FOR LARGE GROWTH AND SMALL GROWTH

Final Record of Stationing

Station I	Station II	Station III
Nov. Heading	1.50 mos.	1.50 mos.
Paraph. Heading	1.50 mos.	1.50 mos.
Nov. Heading	1.50 mos.	1.50 mos.
Paraph. Heading	1.50 mos.	1.50 mos.

It is obvious that when the groups were paired according to I. Q.'s, the difference between the bilinguals and unilinguals is not so spectacular; but when the groups were not so paired and unilinguals represented 58 per cent of the total subjects, the difference became much larger. This would lead to the conclusion that there must be some significantly high achievers in the larger group of unilinguals who could not be paired with bilinguals and some extremely low achievers among the bilinguals who could not be paired with unilinguals, so that neither of these appeared in the paired groups.

It is evident that when the groups were paired according to I. S. A., the difference between the groups and unpaired is not so pronounced, but when the groups were not so paired, the difference was greater. Of the total number, the difference between this group and the other was not so pronounced. This would lead to the conclusion that there must be some significantly high activities in the larger group of unpaired who could not be paired with the unpaired or low extremely low activities among the unpaired who could not be paired with unpaired, as the number of unpaired in the paired group.

WILLIAM H. HART
FEBRUARY 1952
WILLIAM H. HART

CHAPTER V

SUMMARY AND CONCLUSIONS

The substance of the material presented in the previous chapters of this investigation can be summed up in the following statements:

(1) During the seven-months period of instruction, the subjects being studied advanced an average of 10.50 months on their battery scores.

(2) In October, 1957, the bilinguals were retarded in reading 11.20 months.

(3) By May, 1958, the bilinguals had grown 9.07 months in reading and had thus reduced their retardation to 9.13 months.

(4) In October, 1957, the unilinguals had a reading retardation of 1.50 months.

(5) By May, 1958, the unilinguals had grown sufficiently to be on an average 5.50 months above grade-level in reading.

(6) The bilinguals used in the paired groups were less retarded than the total bilingual sample as they showed an average retardation in May, 1958, of 4.10 months in word meaning and 7.80 months in paragraph meaning for a mean retardation of 5.95 months.

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(1) During the

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(2) In October, 1957, the

in reading 1.50

(3) By May, 1958, the

months in reading and

to 2.13 months.

(4) In October, 1957, the

retardation of 1.50

(5) By May, 1958, the

clearly to be on an

in reading.

(6) The

less retarded than

showed an average

months in word

meaning for a

(7) The unilinguals of the paired groups were 1.3 months further ahead of the bilinguals at the end of the instruction period.

(8) In the total unculled group, the reading retardation of the bilinguals averaged 14.95 months.

In the light of this summary, the following conclusions seem justified:

In general, the teaching was efficient.

Dr. Tireman's observation that true bilinguals tend to fall consistently behind the unilinguals in reading is substantiated.

It is imperative that the school system make an attempt either to prepare the bilinguals differently for the reading program, or modify the reading program to fit the bilingual's needs.

Finally, some scale must be devised to determine the extent of bilingualism in each child. This scale should be related reliably to the more popular intelligence tests so one can arrive at a more reliable knowledge of the true potential of the bilingual student.

EXHIBIT

EXHIBIT

(7) The findings of the investigation conducted over a
month's period at the site of the alleged incident, and
the investigation report.

(8) In the total absence of any other evidence,
action of the defendant was found to be negligent.
In the light of this finding, the defendant's liability
alone was established.

In General, the defendant was negligent.
Mr. Attorney's objection that the defendant's
liability was established by the evidence is
to this effect: The defendant's liability is
established.

It is important that the defendant's liability
be established to ensure the defendant's liability
for the resulting damage or loss to the plaintiff.
to the defendant's liability.

Finally, the defendant's liability is established
the extent of the defendant's liability is established.
should be established to the plaintiff's liability.
since the defendant's liability is established.
knowledge of the facts of the case.

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APPENDIX

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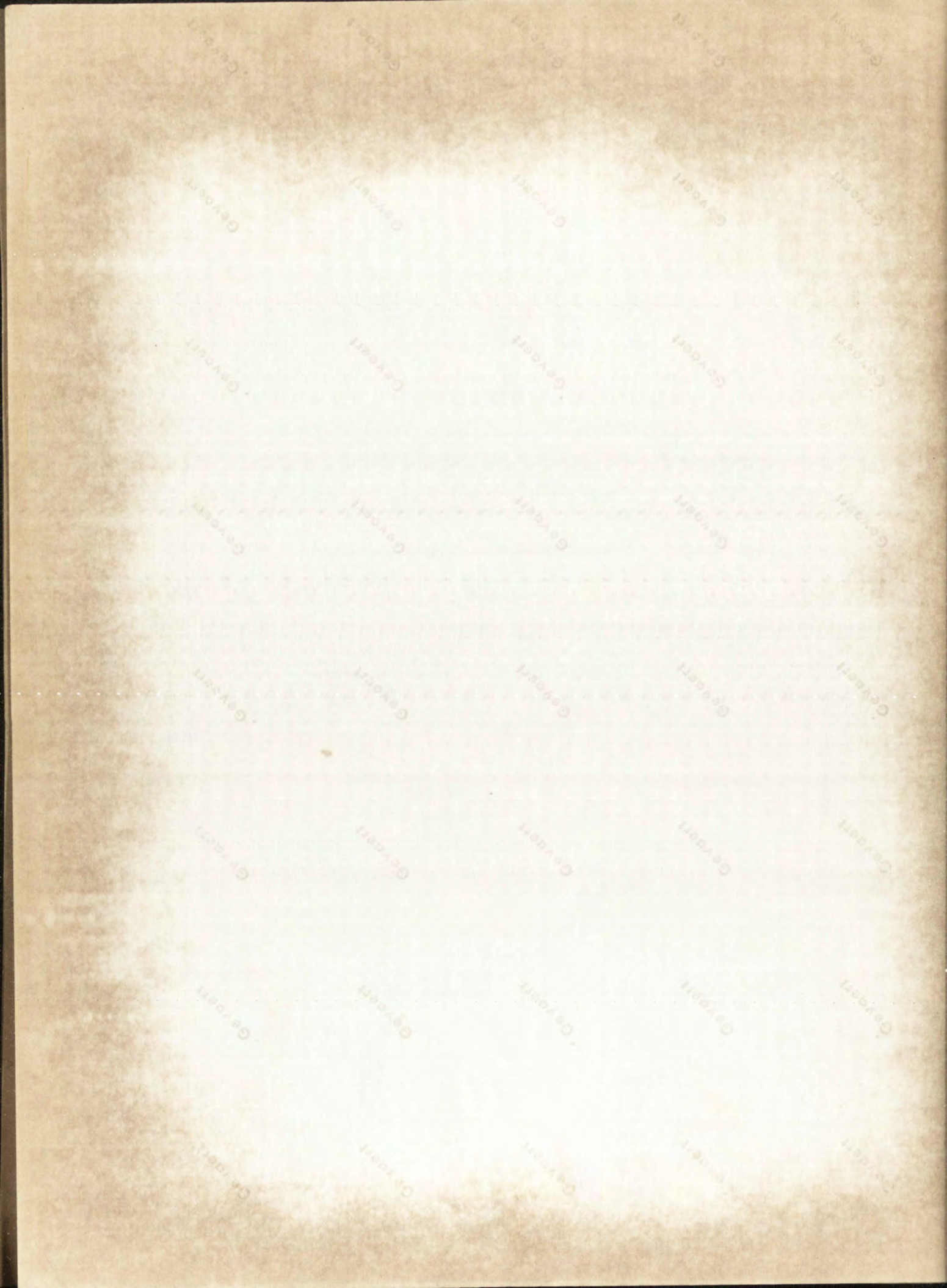
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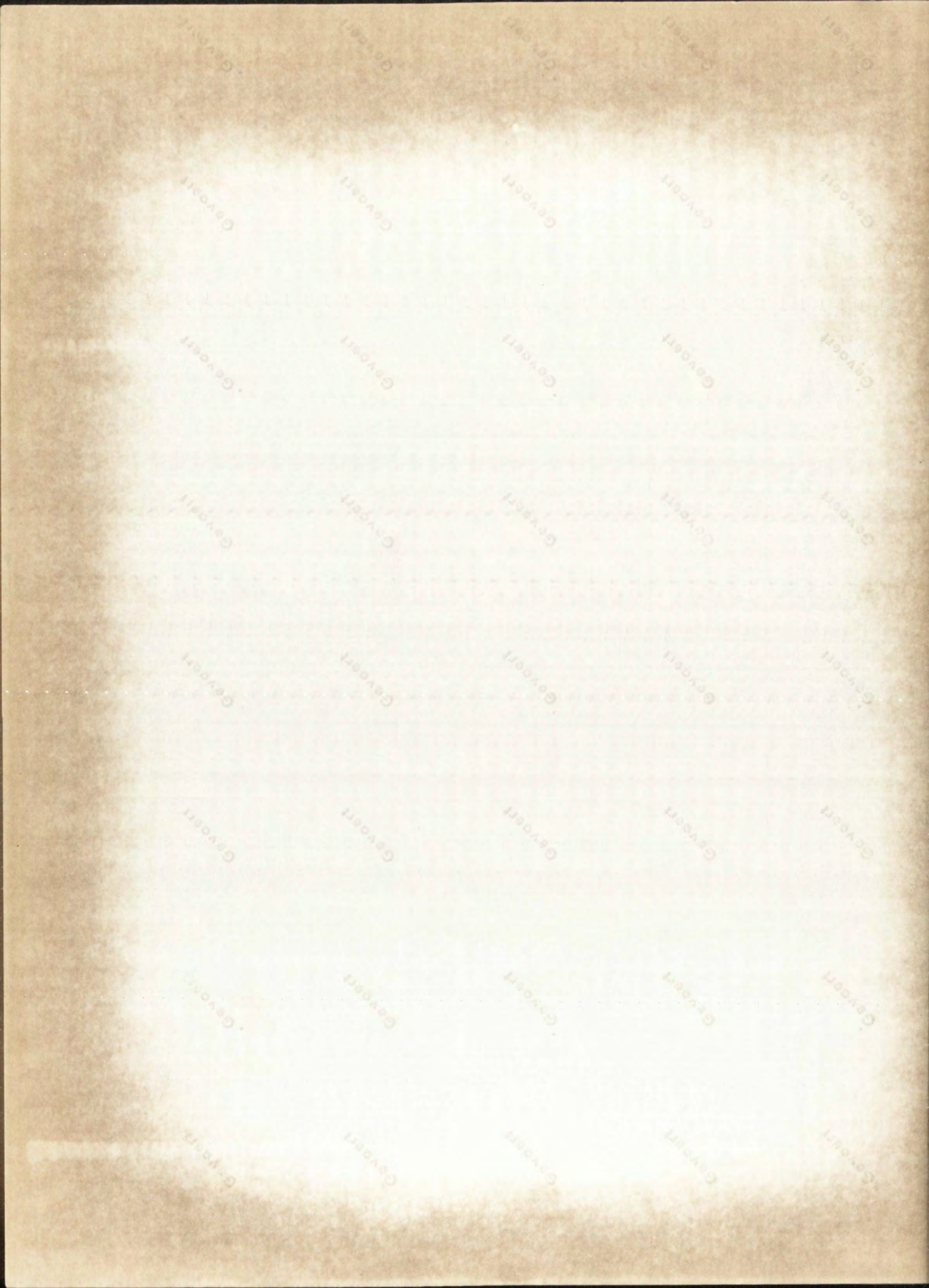
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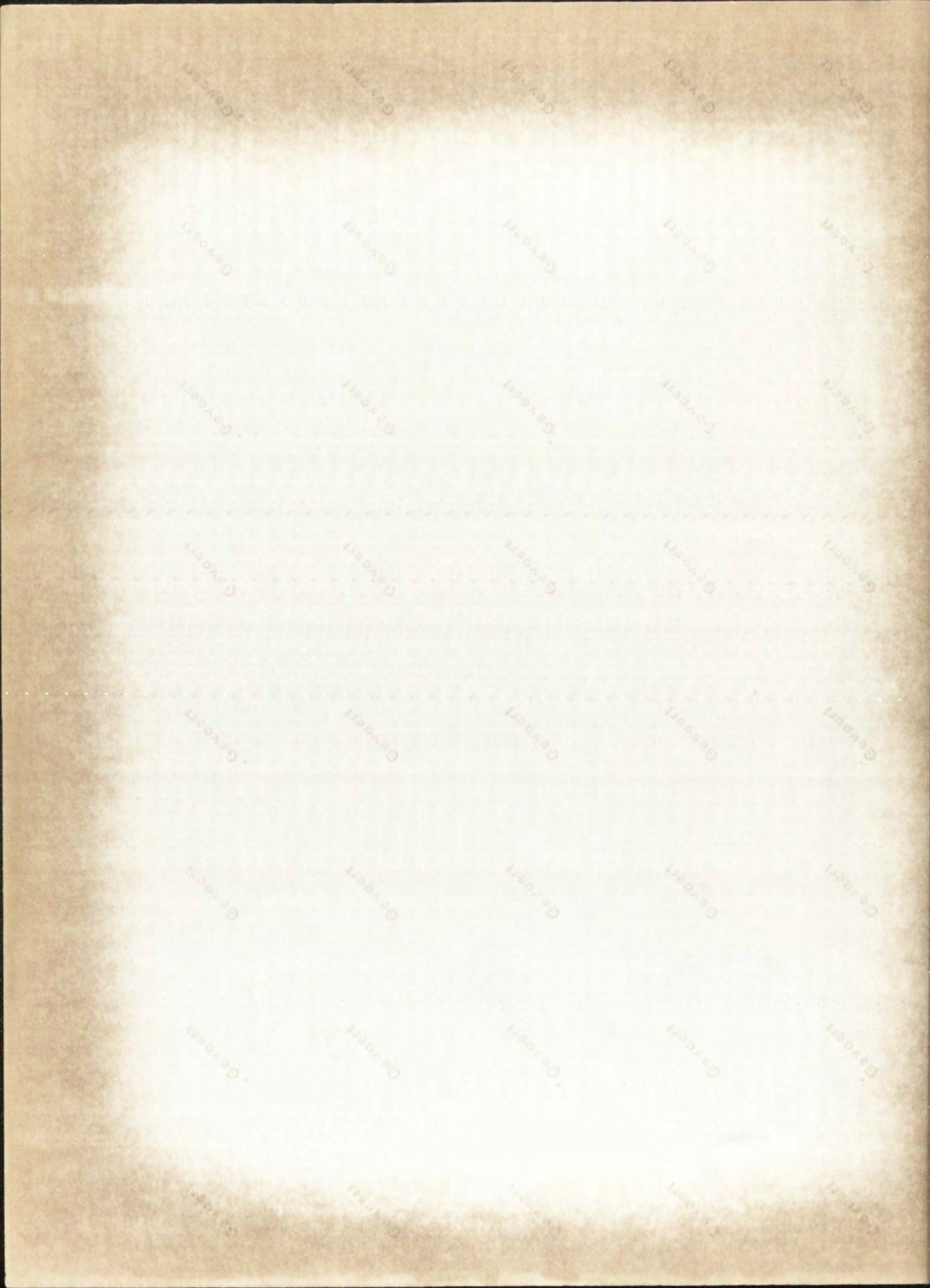


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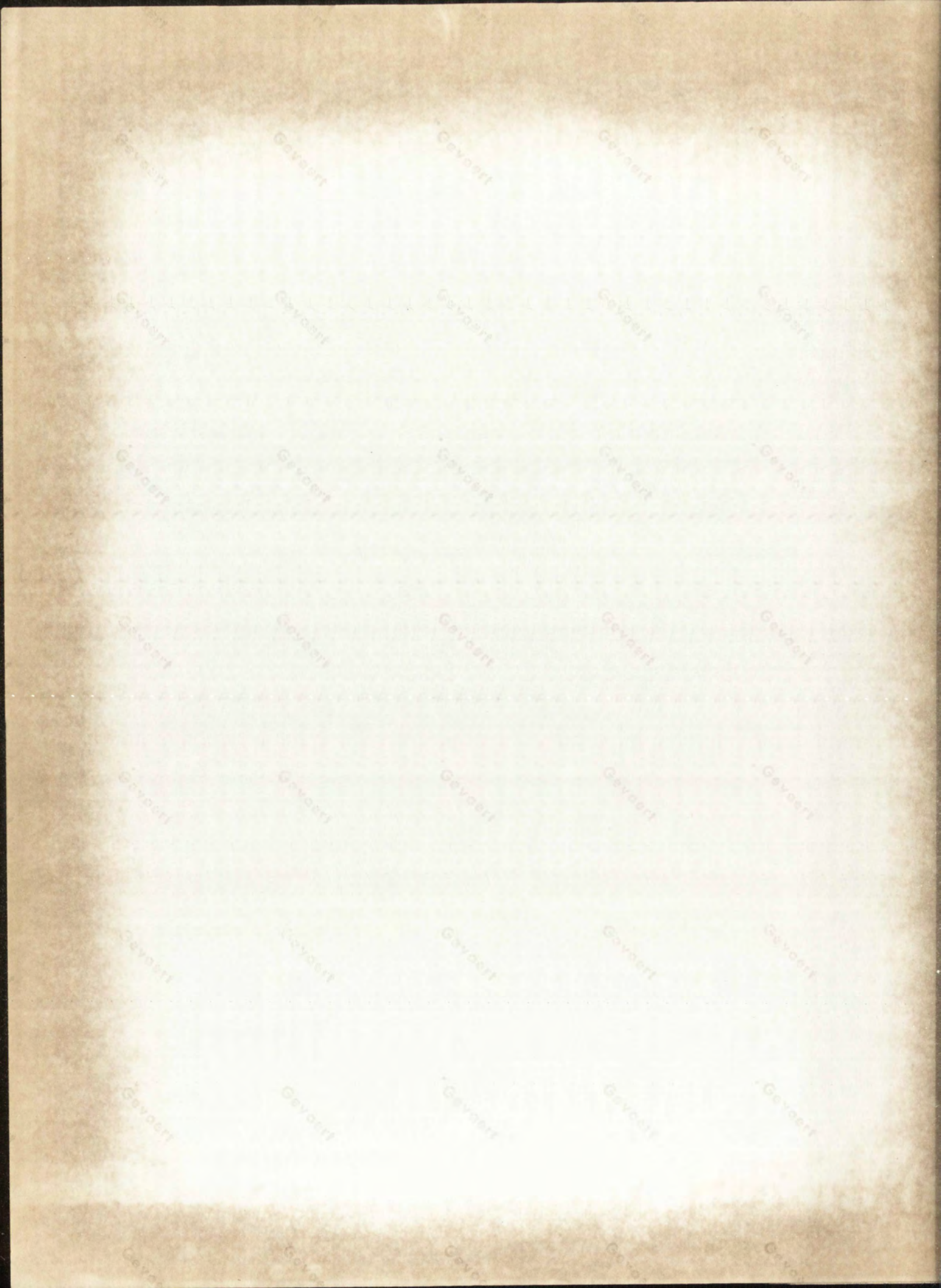
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Paragraph Meaning

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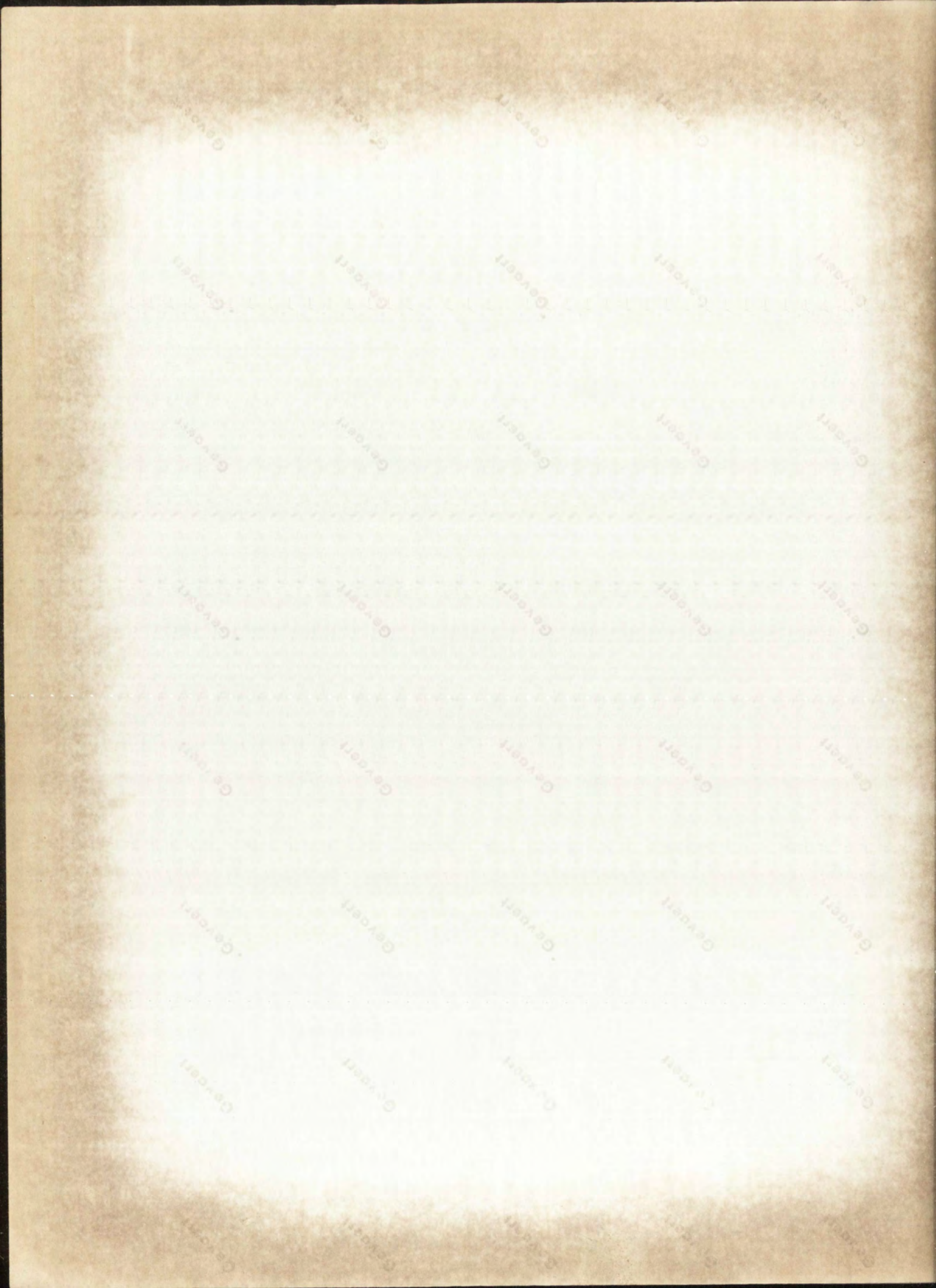
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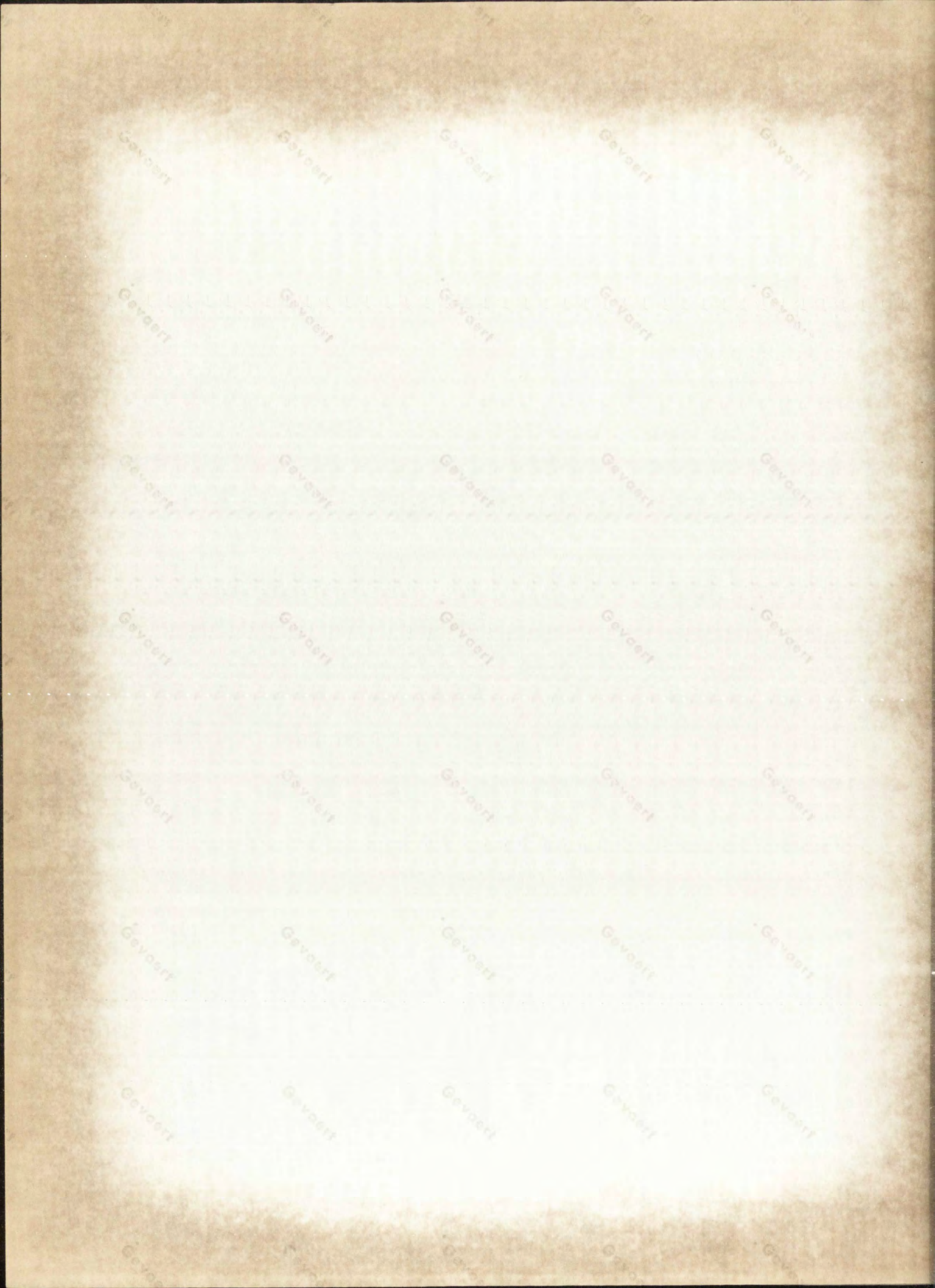
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School J	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1.	II	10-0	12-0	120	6.1	6.7	6.5	6.8	6.5	7.7	6.5	8.9
2.	II	9-9	12-5	127	5.9	5.4	6.0	4.8	7.0	7.3	7.0	7.6
3.	II	9-3	11-8	127	5.8	5.8	5.6	5.9	6.3	7.3	6.1	8.3
4.	II	9-11	12-2	123	5.8	5.9	6.5	5.3	6.6	6.9	7.0	6.7
5.	II	9-9	11-7	119	5.3	5.8	6.0	5.6	6.6	7.1	7.0	7.1
6.	II	9-11	11-5	115	5.3	6.4	6.5	6.3	6.7	7.7	6.5	8.9
7.	II	9-4	10-11	117	5.3	5.6	5.3	5.9	6.1	7.5	6.5	8.4
8.	II	9-6	11-4	119	5.2	6.1	5.3	6.8	6.1	6.2	5.7	6.7
9.	II	9-7	10-1	105	5.2	5.3	5.3	5.3	5.9	7.1	6.1	8.0
10.	II	9-8	11-1	115	5.1	5.2	4.7	5.6	6.1	6.1	6.1	6.1
11.	II	9-4	10-2	111	5.0	5.0	5.0	5.0	7.0	7.7	7.0	8.4
12.	II	9-4	9-9	105	5.0	4.2	5.0	5.3	6.3	6.9	6.1	7.6
13.	II	9-4	10-10	116	4.9	5.1	5.3	4.8	6.4	6.4	6.1	6.7
14.	II	9-2	10-9	117	4.8	5.4	6.0	4.8	5.8	6.3	5.0	7.6
15.	II	9-4	10-8	114	4.6	5.5	5.0	5.9	6.1	6.4	6.5	6.3
16.	II	9-6	11-0	116	4.6	4.4	4.2	4.6	6.2	6.9	6.1	7.6
17.	II	9-11	10-11	110	4.6	6.1	4.7	7.4	5.7	5.9	5.7	6.1
18.	II	9-4	11-6	123	4.4	4.2	3.9	4.4	6.1	6.4	5.7	7.1
19.	II	9-5	11-2	119	4.4	5.0	5.0	5.0	5.2	5.1	5.0	5.2
20.	II				4.4	3.5	3.7	3.3	5.0	4.6	4.9	4.3
21.	II	9-6	10-1	106	4.3	4.2	4.1	4.3	5.6	5.4	5.7	5.0
22.	II	9-3	10-3	111	4.3	5.2	4.7	5.6	5.6	5.9	6.1	5.6
23.	II	9-8	9-10	102	4.3	4.5	3.7	5.3	5.6	7.1	5.7	8.4
24.	II	9-3	10-11	118	4.2	4.4	4.1	4.6	5.6	5.7	5.0	6.3
25.	II	9-1	10-9	118	4.1	4.0	3.8	4.1	5.5	6.0	5.7	6.3
26.	II	9-1	10-4	114	4.1	4.4	3.8	5.0	5.4	5.2	5.0	5.4
27.	II	9-4	10-7	114	4.1	3.9	3.9	3.8	5.6	5.5	5.4	5.6
28.	II	9-4	11-2	120	4.1	3.8	3.5	4.0	5.4	6.7	5.7	7.6
29.	II	9-0	9-3	103	4.1	3.7	3.7	3.7	4.8	4.0	4.1	3.9
30.	II	9-1	9-5	104	3.9	3.2	3.2	3.1	4.7	4.1	4.4	3.8



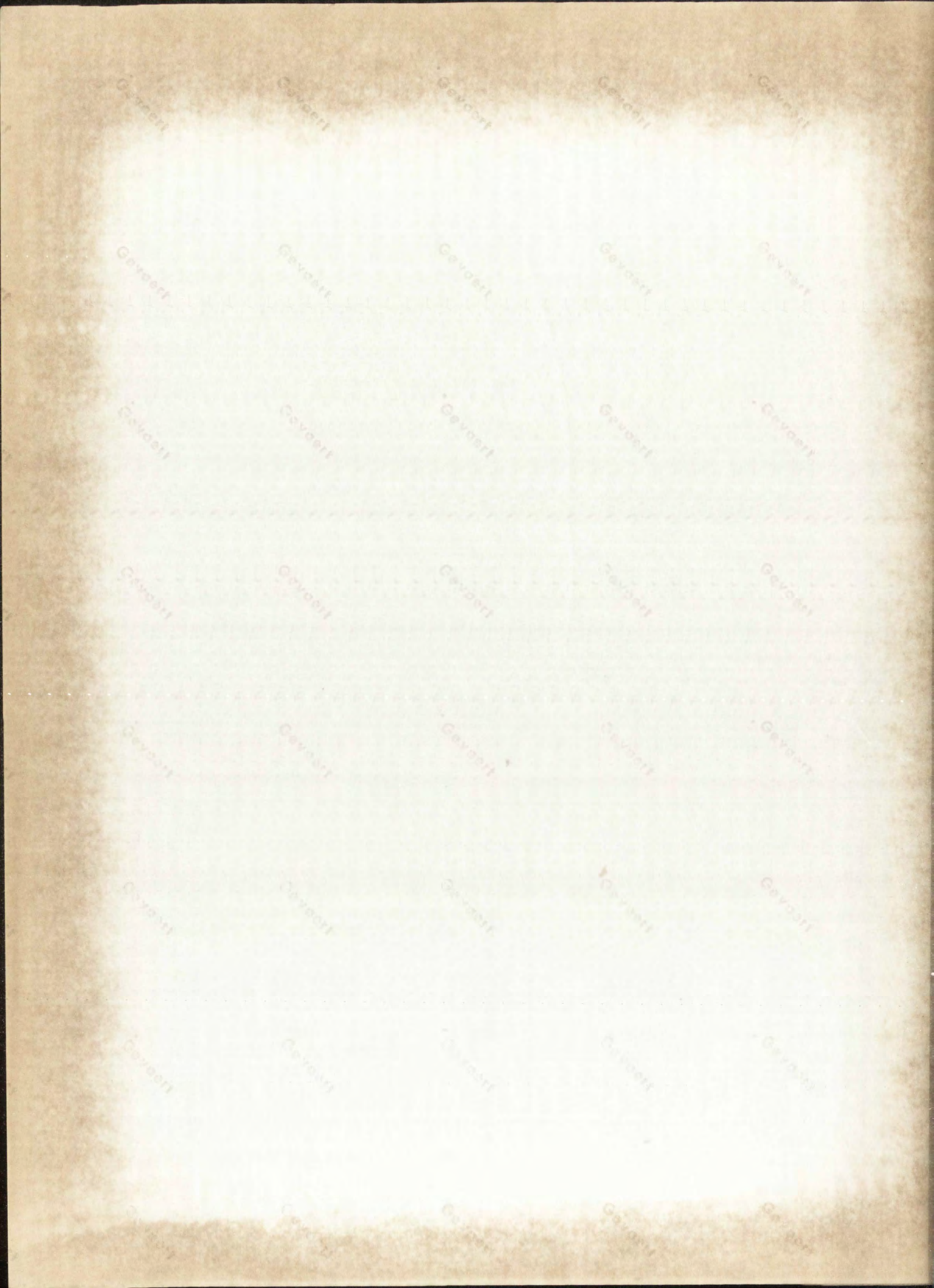
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APPENDIX A

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School M	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1. Eng.	9-1	9-5	104	3.4	3.2	3.2	3.2	5.5	5.0	4.7	5.2	
2. Sp. Eng.	10-4	8-7	83	3.2	3.1	2.9	3.3	4.5	4.5	3.8	5.2	
3. Eng.	9-4	9-7	103	4.7	4.5	4.1	4.8	4.7	4.5	4.1	4.8	
4. Sp. Eng.	9-4	9-2	98	2.9	2.8	3.0	2.5	4.6	5.4	4.7	6.1	
5. Sp. Eng.	9-0	9-1	101	4.0	3.8	3.6	4.0	5.1	4.4	4.3	4.5	
6. Sp. Eng.	8-11	8-5	94	3.5	3.0	2.9	3.1	3.9	3.8	3.4	4.1	
7. Sp. Eng.	9-6	10-3	108	4.1	4.5	4.3	4.8	6.2	6.8	6.5	7.1	
8. Eng.	9-3	11-1	120	4.6	4.3	4.9	3.7	5.7	5.9	6.1	5.6	
9. Sp.	9-5	8-0	85	3.0	2.8	3.0	2.5	4.3	3.9	3.9	3.9	
10. Eng.	9-3	9-7	104	3.8	4.3	5.6	3.1	5.1	5.0	5.0	5.0	
11. Sp. Eng.	9-11	8-7	87	3.2	2.6	2.9	2.3	4.0	4.6	4.9	4.2	
12. Sp.	9-7	9-2	96	4.2	4.0	4.4	3.6	6.1	6.4	6.1	6.7	
13. Sp. Eng.	8-6	9-5	99	3.7	4.0	4.1	3.8	5.3	5.4	4.9	5.9	
14. Eng.	8-9	8-8	99	3.3	3.3	3.1	3.5	5.2	5.6	5.0	6.1	
15. Eng.	9-2	9-3	101	3.5	2.9	2.1	3.7	4.4	4.0	3.7	4.3	
16. Eng.	8-9	9-0	103	4.1	3.7	3.5	3.8	4.6	5.1	4.9	5.2	
17. Sp. Eng.	9-0	9-2	102	4.4	4.3	4.2	4.4	4.9	5.6	5.0	6.1	
18. Eng.	9-6	10-5	110	4.3	4.6	5.1	4.2	6.7	7.3	6.5	8.0	
19. Sp. Eng.	10-5	9-5	90	4.3	3.8	3.8	3.8	5.0	4.8	5.0	4.5	
20. Sp. Eng.	9-8	9-4	97	3.8	4.0	4.3	3.8	5.3	5.2	4.7	5.6	
21. Sp. Eng.	10-4	9-0	87	3.5	3.6	3.5	3.6	4.7	4.8	4.4	5.2	
22. Eng.	8-11	9-5	106	3.3	3.3	3.1	3.5	4.6	4.6	4.5	4.7	
23. Sp.	10-4	9-0	87	2.9	3.0	2.9	3.0	4.8	4.4	4.7	4.1	
24. Sp. Eng.	8-10	9-0	102	4.2	3.7	4.3	3.1	6.0	5.4	6.1	4.7	
25. Eng.	10-2	9-0	89	3.8	3.0	2.7	3.2	4.5	3.9	3.4	4.3	
26. Sp. Eng.	8-9	10-1	115	3.7	3.4	3.2	3.6	5.0	4.8	5.4	4.1	
27. Sp. Eng.	9-2	10-2	111	4.3	4.4	4.4	4.3	5.6	5.4	4.5	6.3	
28. Sp. Eng.	8-11	8-10	99	4.6	3.8	4.3	3.3	5.1	4.7	4.7	4.7	
29. Sp. Eng.	8-11	8-9	98	3.4	3.1	3.3	3.0	5.1	4.6	4.4	4.8	
30. Sp. Eng.	9-3	10-1	109	4.5	4.5	4.2	4.8	6.6	6.7	5.7	7.6	

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APPENDIX A

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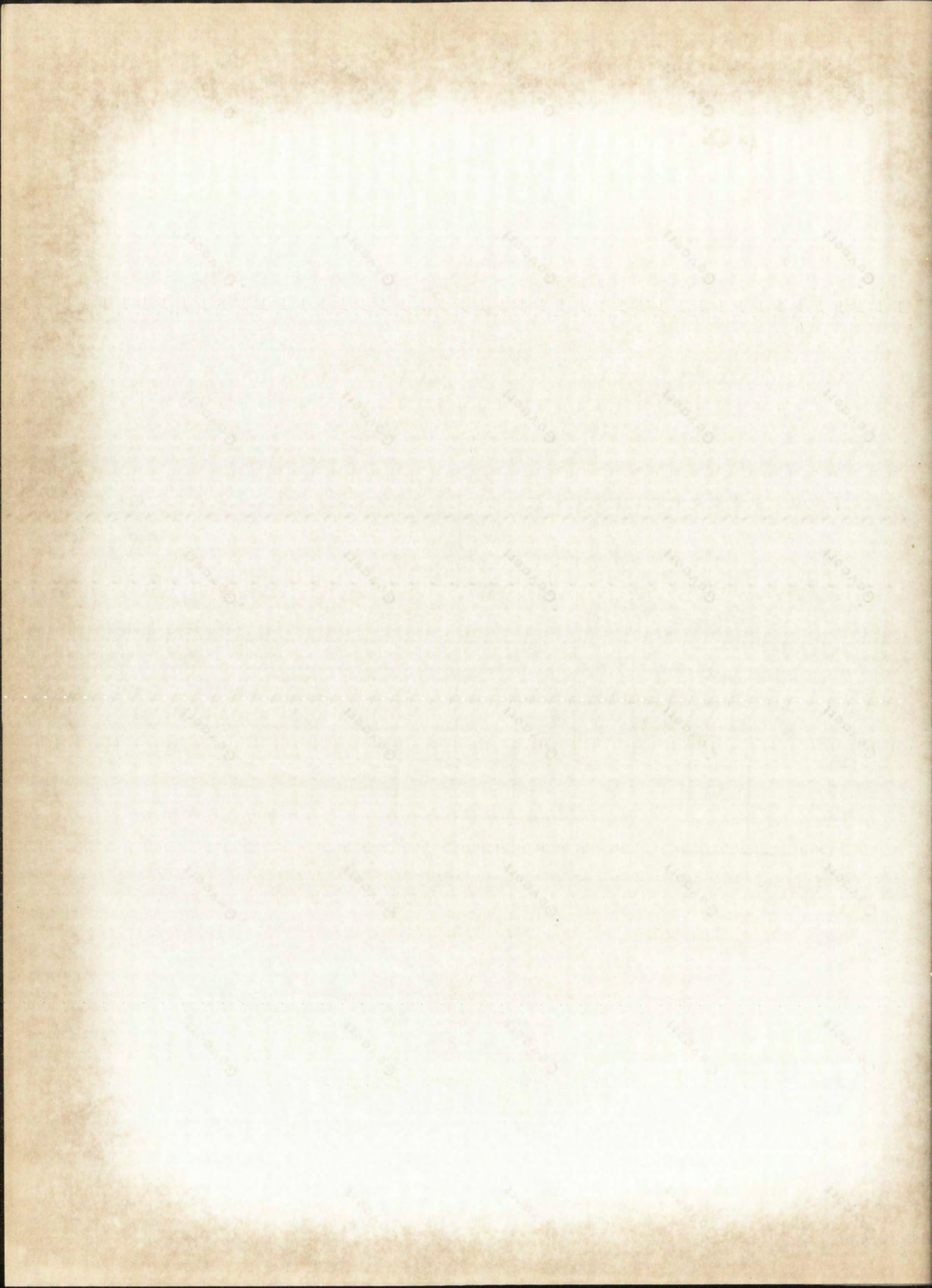
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School O	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1.	I	10.6	11.4	92	4.8				6.4	6.6	6.1	7.1
2.	II	10.10	10.4	98	4.1				5.3	5.4	4.5	6.3
3.	I-II	10.0	9.9	93	3.6				4.7	4.6	4.1	5.0
4.	I-II	11.0	9.4	86	3.1				4.3	4.2	4.1	4.2
5.	I	10.3	9.11	95	3.3				4.9	5.1	4.7	5.4
6.	I	9.11	9.3	101	3.0				4.2	4.3	4.1	4.5
7.	I-II	11.2	9.0	78	3.0				4.0	4.0	3.3	4.7
8.	I	9.9	10.0	98	3.7				5.0	4.8	4.5	5.0
9.	I	11.0	7.11	83	2.4				2.8	2.4	2.0	2.7
10.	II	9.10	9.0	91	2.8				4.0	3.4	3.5	3.3
11.	I-II	11.12	8.0	81	2.2				3.0	3.0	3.0	3.0
12.	I-II	10.9	10.4	103	4.2				5.3	4.8	4.5	5.0
13.	I-II	11.1	9.6	80	3.4				4.5	4.0	3.8	4.2
14.	I-II	11.1	10.4	89	3.8				5.3	5.1	5.4	4.8
15.	I	10.5	7.11	82	2.3				2.9	2.6	2.9	2.3
16.	II	10.2	10.8	105	3.6				5.7	5.4	4.5	6.3
17.	II	9.3	10.11	108	4.4				5.9	6.6	6.1	7.1
18.	I-II	9.11	9.6	96	3.5				4.5	4.1	3.9	4.3
19.	I-II	9.12	10.5	120	4.4				5.4	5.2	4.9	5.4
20.	II	10.1	9.9	105	3.5				4.7	4.8	4.3	5.2
21.	I-II	10.1	10.0	105					5.0	5.3	4.7	5.9
22.	II	9.11	9.9	100	3.6				4.7	4.7	3.9	5.4
23.	I-II	10.5	8.11	84	2.8				3.9	3.2	3.4	3.0
24.	I-II	11.7	8.5	74	2.6				3.4	2.7	2.5	2.9
25.	I-II	10.5	9.10	92	3.4				4.8	4.6	4.4	4.8
26.	II	9.7	11.1	114					6.8	6.9	6.1	7.6
27.	II	9.6	9.7	100	3.2				4.6	4.7	4.5	4.8
28.	I	11.3	7.7	83	2.2				2.5	2.5	2.5	2.4
29.	I	10.5	9.9	89	4.3				4.7	4.7	4.5	4.8
30.	II	11.4	8.6	83	2.8				3.5	3.3	2.8	3.7

APPENDIX A

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Stanford Achievement
Median May or Oct. 57

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Stanford Achievement
Median May or Oct. 57

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APPENDIX A

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School 8				Standard Achievement Median May or Oct. 57			Standard Achievement May, 1958		
Language Sp. I Sp. II				Reading Median			Reading Median		
C. A.				Word Meaning			Word Meaning		
H. A.				Paragraph Meaning			Paragraph Meaning		
I. Q.				Standard Achievement Median May or Oct. 57			Standard Achievement May, 1958		
C. A.				Reading Median			Reading Median		
H. A.				Word Meaning			Word Meaning		
I. Q.				Paragraph Meaning			Paragraph Meaning		
11-1	9-10	89		5.1	5.3	4.8	6.7	5.7	7.6
9-9	10-00	103		3.2	3.5	2.9	5.2	5.4	4.7
9-4	9-2	98		4.2	3.8	4.6	5.4	4.7	6.1
9-9	9-2	94		-	-	2.6	3.8	3.3	4.2
9-1	8-11	98		2.7	2.8	2.6	5.7	5.9	5.4
9-7	10-5	109		-	-	-	5.0	5.0	5.0
9-6	8-1	85		2.3	2.4	2.2	3.5	3.3	3.6
9-4	9-6	102		3.2	3.5	2.9	4.2	4.3	4.1
9-1	8-11	104		-	-	-	4.6	4.3	4.8
9-8	9-8	100		3.6	3.8	3.4	4.6	4.9	4.3
9-0	10-8	118		4.4	4.7	4.0	at.	-	6.7
9-4	10-1	107		4.7	5.0	4.3	at.	4.5	-
10-8	7-11	69		2.4	2.7	1.6	2.3	2.7	1.9
10-1	7-11	79		2.0	2.2	1.7	2.4	2.5	2.3
9-2	9-5	102		3.2	3.3	3.0	5.4	4.9	5.9
9-8	9-6	98		2.7	2.6	2.8	-	3.4	-
9-8	9-8	100		2.9	2.3	2.7	3.3	3.5	3.1
-	-	-		3.4	3.7	3.1	4.6	4.5	4.7
9-11	8-11	89		3.2	3.2	3.2	3.5	3.8	3.1
10-1	9-1	90		2.9	3.0	2.8	4.5	4.5	4.5
8-11	8-11	100		2.4	2.5	2.2	3.1	3.2	2.9
9-1	9-8	107		3.8	3.8	3.8	5.5	5.4	5.6
9-7	10-4	108		4.6	4.3	5.0	6.0	6.1	5.9
10-3	9-0	88		2.7	2.6	2.7	4.0	4.3	3.6
9-7	9-3	96		-	-	-	4.9	5.6	4.1
9-5	10-4	110		5.3	5.3	5.3	5.5	5.0	5.9
9-4	10-3	110		-	-	-	6.9	5.7	8.0
9-1	8-5	93		-	-	1.5	2.7	3.2	2.2
9-8	9-4	94		4.0	4.1	3.8	4.6	4.4	4.8
9-6	10-7	112		-	-	-	5.9	5.4	6.5
9-2	9-1	99		-	-	1.7	3.8	3.4	4.1

54

[illegible]

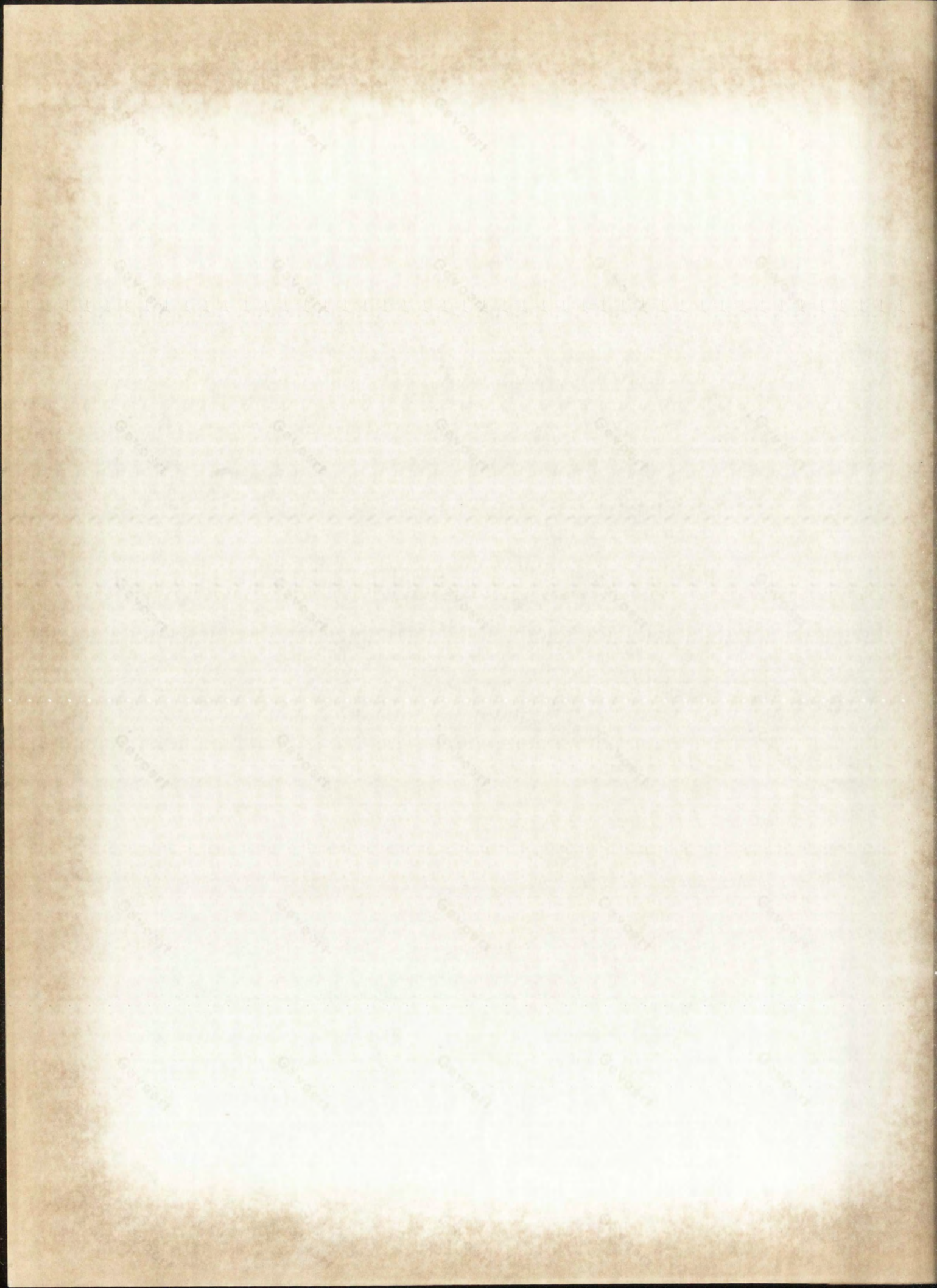
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[illegible]

APPENDIX A

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School U	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1.	II	9.3	9.7	104	3.6	Not Recorded			4.9	4.5	4.7	4.3
2.	II	8.5	10.3	122	4.2				4.6	4.3	4.4	4.1
3.	II	8.11	8.8	9.8	2.9				4.4	4.6	3.6	3.6
4.	II	9.1	10.1	111	4.5				5.4	4.6	4.5	4.7
5.	II	9.7	11.2	115	5.0				6.3	6.6	6.5	6.7
6.	II	9.3	10.6	113	6.1				6.2	6.9	6.1	7.6
7.	II				2.8				4.3	3.1	2.5	3.7
8.	II	9.6	10.4	109	3.8				5.4	6.3	5.4	7.1
9.	II	9.0	9.6	106	4.2				4.8	4.7	4.3	5.0
10.	II	9.3	8.11	97	3.7				5.3	4.8	4.3	5.2
11.	II	9.6	11.3	119	5.4				6.2	6.4	6.5	6.3
12.	II	9.7	9.0	94	2.5				4.6	4.5	4.4	4.5
13.	II	9.3	9.2	99	3.1				4.3	4.1	4.3	3.8
14.	9.110	9.0	9.1	101	4.5				5.4	5.7	5.4	5.9
15.	II	9.0	8.9	97	4.3				5.3	6.4	5.7	8.0
16.	II	9.2	8.10	96	2.7				3.9	4.0	3.6	4.3
17.	II	9.0	8.4	104	4.1				5.3	5.4	5.4	5.4
18.	II	10.9	10.3	95	4.0				5.3	5.2	4.9	5.4
19.	II	9.4	9.4	100	3.4				5.3	5.1	4.7	5.4
20.	II	9.4	9.11	106	3.0				4.3	3.9	4.1	3.7
21.	II	9.7	10.2	106	3.9				5.5	5.5	5.4	5.6
22.	II	9.6	10.3	108	3.8				5.3	5.1	5.4	4.8
23.	II	10.0	11.6	115	5.2				5.8	5.8	5.7	5.9
24.	II	9.7	10.7	110	4.2				5.3	6.1	5.0	7.1
25.	II	9.10	9.2	97	3.9				5.3	5.0	4.7	5.2
26.	II	9.4	9.5	101	4.6				6.1	6.4	6.1	6.7
27.	II	9.2	9.0	98	3.7				4.7	3.7	3.9	3.4
28.	II	9.7	11.7	121	5.4				6.4	7.5	6.1	8.9
29.	II	9.6	9.11	104	4.9				6.0	6.4	6.1	6.7
30.	II	8.11	9.5	106	3.7				4.6	4.6	4.9	4.2



APPENDIX A

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APPENDIX A

[illegible]

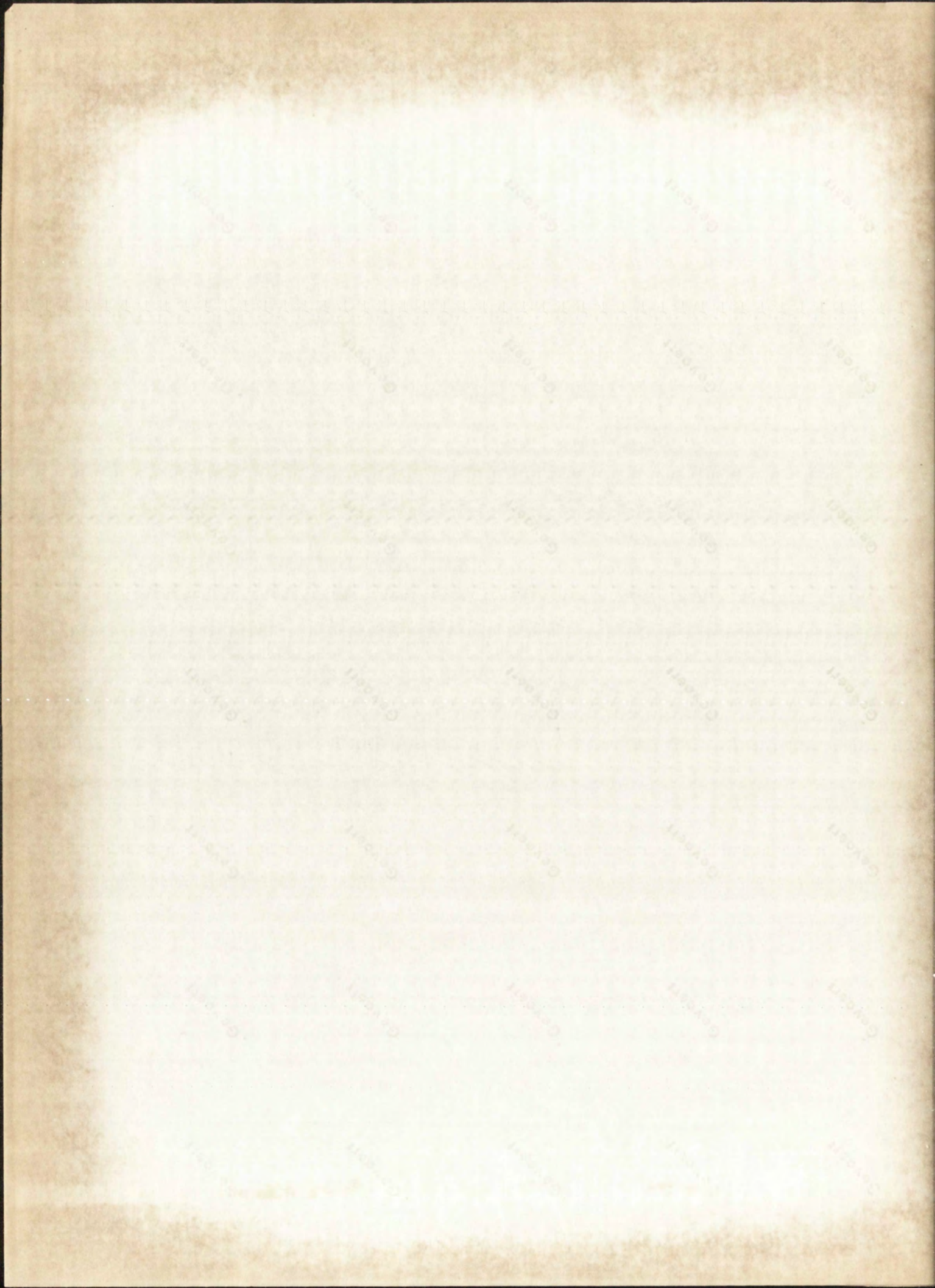
APPENDIX A

[illegible]

APPENDIX A

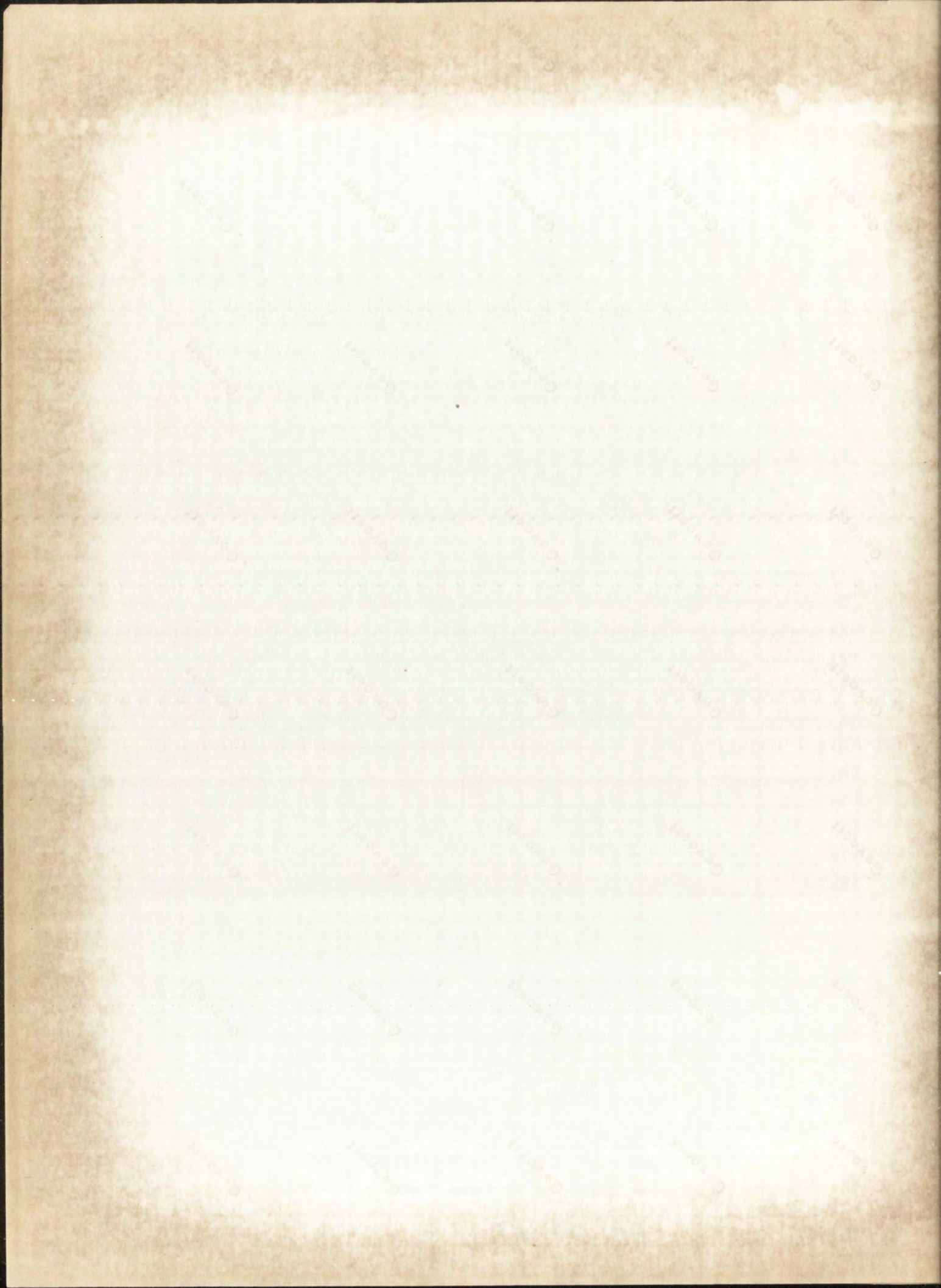
60

School X	Home Language Sp. I Eng. II	G. A.	M. A.	I. Q.	Standard Achievement Median May or Oct. 57	Reading Median	Word Median	Paragraph Median	Standard Achievement Median May, 1958	Reading Median	Word Median	Paragraph Median
1.	11	10.1	9.0	87 ⁶	4.8	4.7	5.6	3.9	4.3	4.3	4.4	4.2
2.	1	10.2	9.0	88	3.7	3.1	3.0	3.1	4.7	4.9	4.1	4.5
3.	1	10.0	9.10	98	4.2	4.4	4.1	4.6	4.2	3.7	4.1	3.2
4.	41	9.10	9.0	92	3.2	2.9	3.3	2.5	4.0	2.3	2.3	2.2
5.	11	9.1	9.1	100 ⁶	3.1	3.1	2.5	3.7	5.0	4.4	4.5	4.8
6.	1	9.4	12.0	123	3.5	3.8	4.8	3.1	5.3	4.3	5.0	3.6
7.	1	9.6	9.5	99	3.9	4.3	3.8	4.8	4.0	4.8	4.5	4.7
8.	1	9.0	10.1	111	4.1	3.7	4.6	2.8	4.5	4.8	4.7	4.8
9.	11	9.0	9.5	114 ⁶	3.4	4.6	5.3	4.0	5.0	5.1	5.7	4.5
10.	1	9.9	9.5	97	3.1	3.0	2.9	3.1	4.3	4.6	5.4	3.8
11.	1	10.0	9.0	90	2.1	1.9	2.2	1.6	4.4	3.9	3.9	3.9
12.	1	9.9	9.4	95	4.6	4.0	4.9	3.1	4.8	5.0	5.0	5.0
13.	1	9.2	8.9	96	4.1	3.6	5.2	2.0	4.5	4.9	4.9	4.8
14.	1	10.5	7.10	73	2.2	2.0	2.3	1.8	2.1	2.8	2.9	2.5
15.	1	9.0	7.0	78	3.7	3.3	3.9	2.8	3.9	4.1	4.1	4.1
16.	1	9.9	8.8	90	3.4	3.4	3.8	3.1	3.6	3.4	3.9	3.0
17.	1	9.2	9.0	98	3.5	3.3	3.5	3.1	4.8	3.6	4.1	3.2
18.	1	9.5	8.4	89	4.1	3.6	4.8	3.1	4.9	5.9	5.4	2.8
19.	1	9.10	8.11	91	4.3	3.7	3.4	3.1	4.6	5.0	5.6	4.5
20.	1	9.6	10.4	108	3.5	3.4	4.0	2.8	4.7	4.5	5.0	4.5
21.	1	9.5	8.6	91	3.9	3.6	4.5	3.1	4.8	4.9	5.7	4.2
22.	1	10.9	8.0	72	3.6	3.4	3.8	3.1	4.5	4.5	3.6	3.7
23.	1	9.3	9.0	97	3.9	4.0	4.9	3.2	4.6	4.1	3.7	4.5
24.	1	9.10	10.9	109	3.6	3.0	3.7	2.4	5.7	4.1	4.5	3.8
25.	1	10.11	8.7	80	3.0	2.1	4.2	2.0	4.3	4.3	4.4	4.2
26.	1	9.8	9.11	103	3.6	3.5	4.3	2.8	4.5	4.8	4.7	4.5
27.	1	9.10	8.0	81	4.1	4.1	4.2	4.1	3.8	3.8	3.9	3.7
28.	1	8.10	10.1	112	3.7	3.6	3.9	2.4	4.2	4.5	4.8	4.2
29.	11	9.2	8.5	92 ⁶	4.4	3.4	5.8	3.0	4.1	4.2	5.0	3.5
30.	11	9.6	10.1	106 ⁶	3.6	3.5	4.6	2.4	5.9	5.5	5.1	5.8



APPENDIX A

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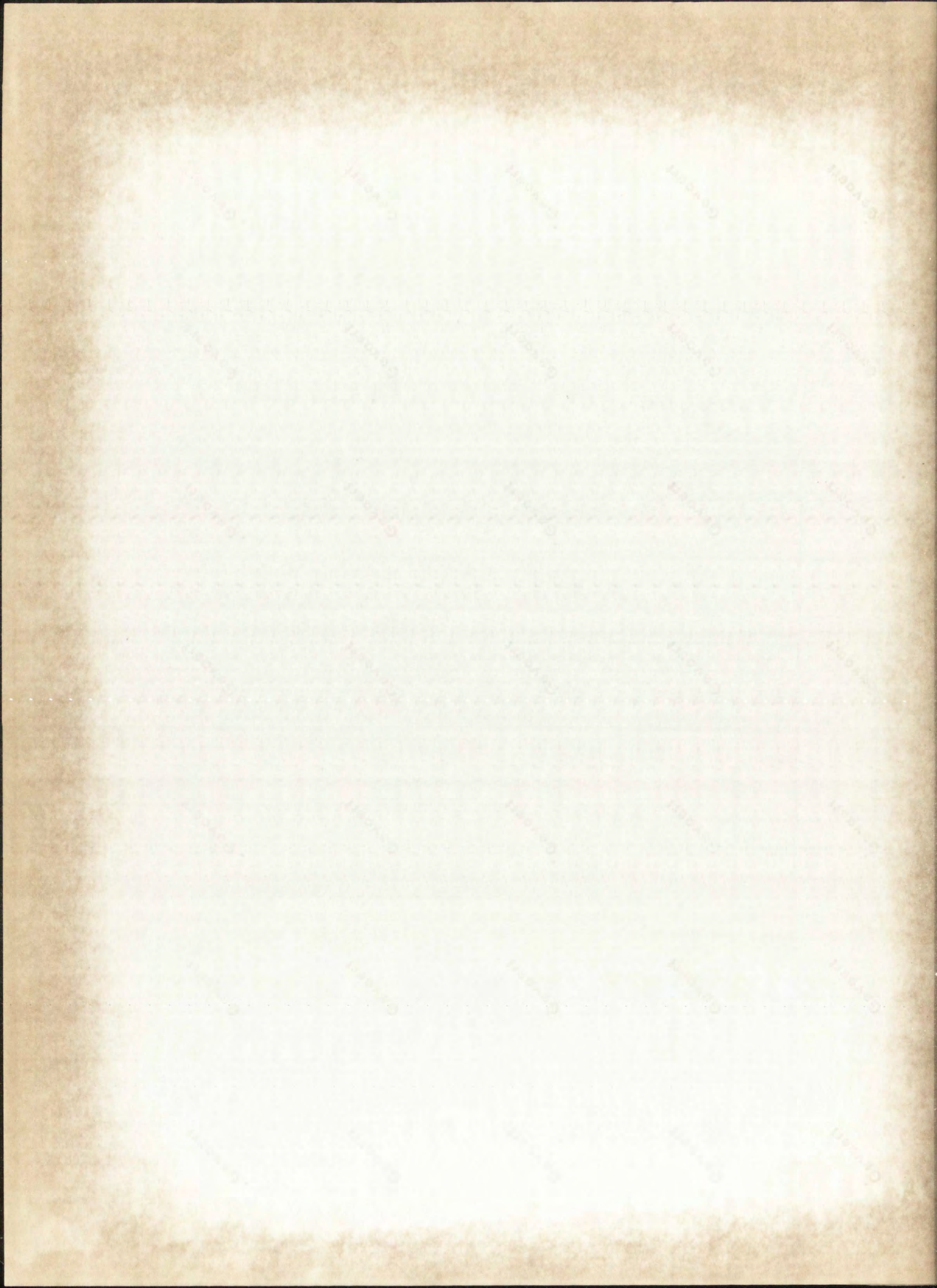
APPENDIX A

School Y	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1.		9.6	10.11	115	5.8	5.1	5.6	4.6	5.9	5.7	6.0	5.3
2.		9.4	10.7	113	4.3	4.3	4.2	4.4	4.9	5.2	4.4	5.9
3.		9.2	9.9	106	3.5	3.4	3.2	3.6	4.4	4.1	4.4	3.8
4.		9.8	10.4	107	4.5	4.6	4.7	4.3	5.6	6.4	5.6	8.1
5.		9.3	10.4	112	5.2	5.3	5.3	5.3	5.8	5.8	6.0	5.6
6.		9.2	9.7	105	4.1	3.7	3.6	3.7	5.1	5.0	5.0	5.0
7.		10.7	8.9	83	3.6	3.0	2.9	3.0	4.4	4.7	3.9	5.4
8.		9.7	10.4	108	4.5	4.1	4.7	3.4	4.9	5.1	5.3	4.8
9.		9.10	11.2	112	4.8	4.8	5.0	4.6	5.11	6.1	6.1	6.1
10.		9.0	10.11	121	4.3	3.8	3.8	3.8	5.8	5.8	5.6	5.9
11.		9.2	9.11	108	4.5	4.1	3.9	4.3	5.2	5.3	4.7	5.9
12.		8.10	10.7	120	4.5	4.2	4.7	3.7	5.6	5.2	5.4	5.0
13.		8.11	11.2	125	4.2	4.3	3.9	4.6	5.4	5.5	4.7	6.3
14.					3.6	3.3	3.2	3.5	4.6	4.2	4.3	4.1
15.		9.1	11.0	122	5.1	5.6	4.4	6.8	6.0	7.1	5.7	8.4
16.		8.11	10.8	120	5.4	5.3	6.0	4.6	6.5	7.1	6.0	8.8
17.		9.4	10.3	110	4.3	4.2	3.8	4.6	5.0	5.3	5.0	5.6
18.		9.3	10.4	113	4.6	5.0	5.6	4.4	5.5	5.9	6.5	5.3
19.		8.12	9.3	103	3.7	3.3	2.8	3.5	3.9	3.3	3.8	2.7
20.					3.8	4.1	3.3	4.8	4.7	5.4	5.0	6.8
21.		9.7	11.3	117	5.4	7.4	5.3	9.5	6.7	8.1	7.0	10.0
22.		9.7	9.7	100	3.5	3.5	3.5	3.5	4.3	4.2	5.3	3.0
23.		9.1	10.2	112	4.7	4.7	4.7	4.6	6.4	6.9	7.0	6.8
24.		9.2	11.5	125	5.3	5.3	5.0	5.6	6.0	6.9	5.7	8.0
25.		9.2	10.7	115	4.6	4.2	4.4	4.0	5.7	5.6	6.5	4.7
26.		9.10	9.7	98	3.8	3.1	2.9	3.3	4.2	3.4	3.3	3.4
27.		9.9	10.10	111	5.0	5.3	5.6	5.0	5.7	6.1	5.4	6.7
28.		9.3	9.7	104	4.4	4.0	3.2	4.8	5.7	5.8	6.0	5.6
29.		9.3	10.4	102	4.4	4.3	4.1	4.4	5.2	5.2	5.7	5.6
30.		8.11	10.3	115	3.4	3.2	3.1	3.3	4.5	3.6	2.7	4.5

APPENDIX A

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School Y	Home Language Sp. I Eng. II	C. A.	M. A.	I. Q.	Stanford Achievement Median May or Oct. 57	Reading Median	Word Meaning	Paragraph Meaning	Stanford Achievement Median May, 1958	Reading Median	Word Meaning	Paragraph Meaning
1.		8.11	10.4	116	3.8	3.3	3.7	2.9	4.8	4.1	4.7	4.8
2.		9.4	10.0	107	4.6	4.6	4.1	5.0	5.2	5.3	5.7	5.0
3.		9.1	10.3	113	4.2	3.7	3.3	4.3	5.0	5.4	5.9	5.0
4.		9.1	11.7	128	5.6	5.8	5.6	5.9	6.3	6.6	6.5	6.7
5.		10.8	8.9	82	3.7	3.1	3.3	2.9	4.7	4.2	4.7	3.7
6.		9.1	11.9	129	5.1	6.7	5.3	8.1	6.1	6.8	6.1	7.6
7.		9.9	11.1	114	4.1	3.9	4.4	3.4	5.1	4.9	5.0	4.8
8.		9.5	9.10	106	4.1	4.3	5.0	3.6	5.3	5.8	5.4	6.1
9.		9.5	10.10	115	5.1	5.2	5.3	5.0	5.8	5.8	6.0	5.6
10.		8.11	9.3	103	4.1	4.4	3.9	4.8	4.8	5.7	6.5	4.8
11.		8.11	9.3	104	3.4	3.6	3.1	4.0	3.9	3.6	3.9	3.2
12.		9.2	10.4	113	5.2	5.2	5.3	5.1	6.7	6.10	6.5	7.4
13.		9.1	10.4	114	3.9	3.7	3.8	3.6	5.5	5.5	5.7	5.2
14.					3.9	3.7	3.3	4.0	4.6	4.7	4.7	4.7
15.		9.4	11.8	125	5.4	5.1	5.6	4.6	6.5	6.9	6.1	7.6
16.		9.2	10.3	112	4.4	3.8	3.5	4.0	4.9	4.4	4.7	5.0
17.		8.11	9.12	112	4.7	5.1	4.2	5.9	5.5	5.5	5.3	5.6
18.		9.8	11.2	115	5.0	5.3	5.6	5.0	7.1	7.8	7.9	7.6
19.		9.8	10.3	106	3.4	3.0	3.1	2.8	5.3	6.2	7.0	5.4
20.		9.3	9.8	105	4.7	4.7	4.4	5.0	5.6	5.9	5.0	6.8
21.		9.1	9.9	107	3.6	3.4	3.2	3.5	4.3	3.7	4.3	3.1
22.		9.2	8.12	98	3.6	3.6	3.5	3.7	4.1	4.4	4.4	4.4
23.		8.9	10.7	121	4.6	4.1	3.9	4.3	5.2	5.3	4.7	5.9
24.		9.1	9.8	106	4.8	4.5	5.0	4.0	4.9	5.1	5.6	4.6
25.		9.3	10.12	119	5.1	5.7	6.0	5.3	6.3	7.2	7.0	7.4
26.		9.7	9.7	100	4.3	5.3	6.0	4.6	6.6	7.4	6.0	8.7
27.		8.9	10	114	5.3	6.1	5.3	6.8	5.8	5.8	6.0	5.6
28.		9.0	10.4	115	4.1	4.3	4.7	4.8	5.8	5.7	5.7	5.6
29.		8.11	10.10	122	5.0	4.7	5.0	4.4	6.1	6.9	6.1	7.6
30.		9.6	8.8	106	3.8	3.6	3.8	3.4	4.7	3.3	4.1	2.5



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APPENDIX B

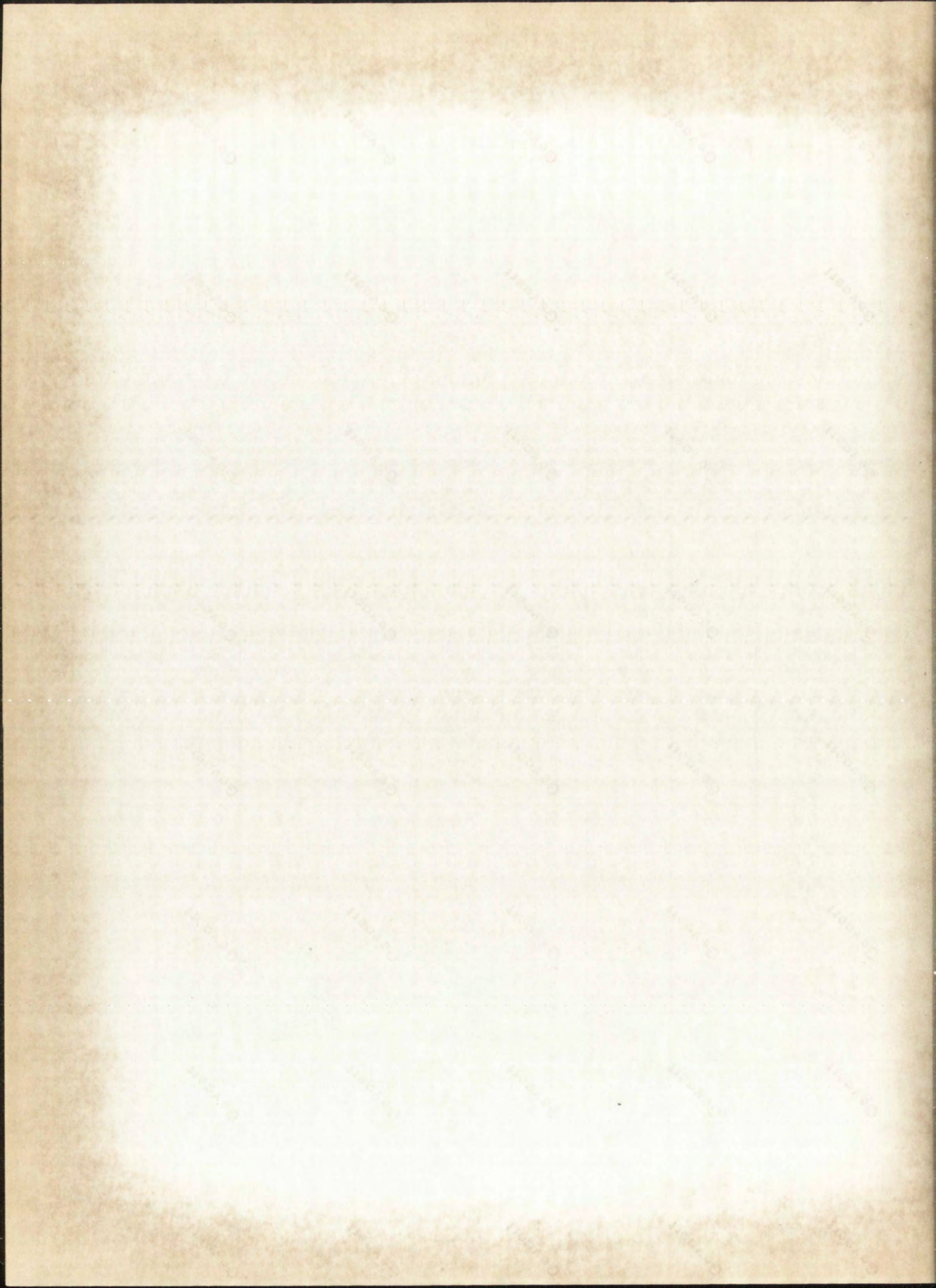
TABLE XI

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GROUP I

PAIRED SCORES

W.M.	P.M.	T ₁	W.M.	P.M.	T ₂	T _{W.M.}	T _{P.M.}	T	I.Q.
3.4	4.7	8.1	4.6	4.5	9.1	8.0	9.2	17.2	✓101
3.7	3.6	7.3	4.3	6.1	10.4	8.0	9.7	17.7	✓101
2.8	3.3	6.1	3.3	3.5	6.8	6.1	6.8	12.9	✓101
4.6	4.0	8.6	5.4	5.4	10.8	10.0	9.4	19.4	✓102
4.1	3.1	7.2	6.1	3.3	9.4	10.2	6.4	16.6	✓100
4.0	3.1	7.1	5.0	4.2	9.2	9.0	7.3	16.3	✓100
4.2	4.1	8.3	5.7	5.4	11.1	9.9	9.5	19.4	✓100
2.8	3.0	5.8	4.9	7.6	12.5	7.7	10.6	18.3	✓101
4.2	4.4	8.6	5.0	6.1	11.1	9.2	10.5	19.7	✓102
3.8	3.6	7.4	4.9	4.3	9.2	8.7	7.9	16.6	✓101
3.3	3.4	6.7	3.9	4.1	8.0	7.2	7.5	14.7	✓101
2.7	2.3	5.0	2.6	2.4	5.0	5.3	4.7	10.0	✓97
2.4	3.0	5.4	4.3	4.2	8.5	6.7	7.2	13.9	✓96
4.1	4.6	8.7	4.1	3.2	7.3	8.2	7.8	16.0	✓98
2.7	1.7	4.4	3.2	2.5	5.7	5.9	4.2	10.1	✓96
3.6	3.8	7.4	4.7	4.5	9.2	8.3	8.3	16.6	✓99
2.9	3.1	6.0	5.4	3.8	9.2	8.3	6.9	15.2	✓97
2.6	2.3	4.9	2.9	1.7	4.6	5.5	4.0	9.5	✓99
2.9	3.0	5.9	4.0	4.0	8.0	6.9	7.0	13.9	✓98
3.5	3.1	6.6	4.1	3.2	7.3	7.6	6.3	13.9	✓98
2.3	1.7	4.0	3.4	2.6	6.0	5.7	4.3	10.0	✓97
4.4	3.6	8.0	6.1	6.7	12.8	10.5	10.3	20.8	✓96
2.1	2.2	4.3	2.8	3.6	6.4	4.9	5.8	10.7	✓97
2.6	2.2	4.8	3.2	3.1	6.3	5.8	5.3	11.1	✓97
3.8	4.8	8.6	4.5	4.7	9.2	8.3	9.5	17.8	✓99
3.6	3.5	7.1	3.5	3.7	7.2	7.1	7.2	14.3	✓98
5.3	2.3	4.6	2.5	3.0	5.5	4.8	5.3	10.1	✓97
4.1	3.8	7.9	4.9	5.9	10.8	9.0	9.7	18.7	✓99
4.4	3.2	8.1	3.7	4.5	8.2	8.6	7.7	16.3	✓97
5.8	3.4	9.2	7.0	3.4	10.4	12.8	6.8	19.4	✓97
3.5	3.1	6.6	4.7	4.8	9.5	8.2	7.9	16.1	✓96
3.1	2.9	6.0	3.6	3.6	7.2	6.7	6.5	13.2	✓99
2.8	1.9	4.7	3.7	3.8	7.5	6.5	5.7	12.2	✓92
2.9	2.5	5.4	3.9	3.7	7.6	6.8	6.2	13.0	✓91
4.7	3.1	7.8	4.9	5.4	10.3	9.6	8.5	18.1	✓94
3.8	3.1	6.9	3.9	3.0	6.9	7.7	6.1	13.8	✓90
4.7	2.8	7.5	4.4	4.3	8.7	9.1	7.1	16.2	✓93
2.8	2.3	5.1	3.0	2.5	5.5	5.8	4.8	10.6	✓94
4.9	3.1	8.0	5.0	5.0	10.0	9.9	8.1	18.0	✓95
2.7	3.2	5.9	3.8	3.2	7.0	6.5	6.4	12.9	✓93
2.2	1.9	4.1	2.4	2.3	4.7	4.6	4.2	8.8	✓92
4.2	4.0	8.2	3.5	4.4	7.9	7.7	8.4	16.1	✓95
2.6	2.8	5.4	2.0	2.3	4.3	4.6	5.1	9.7	✓90
2.4	2.2	4.6	2.6	2.5	5.1	5.0	4.7	9.7	✓93
2.2	2.2	4.4	2.0	2.0	4.0	4.2	4.2	8.4	✓92
153.7	139.0	292.7	183.4	178.0	361.4	337.1	317.0	654.1	4361
560.13	456.70	2004.69	703.44	778.62	3117.92	2682.71	2387.82	10041.79	42311



APPENDIX B

TABLE XI

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GROUP I

PAIRED SCORES

W.M.	P.M.	T ₁	W.M.	P.M.	T ₂	T _{W.M.}	T _{P.M.}	T	IQ
3.2	3.6	6.8	5.7	5.2	10.9	8.9	8.8	17.7	✓ 125
4.8	3.1	7.9	5.0	3.6	8.6	9.8	6.7	16.5	✓ 123
4.4	4.0	8.4	6.1	5.6	11.7	10.5	9.6	20.1	✓ 121
3.7	3.1	6.8	3.6	4.8	8.4	7.3	7.9	15.2	✓ 117
4.3	2.8	7.1	5.0	4.1	9.1	9.3	6.9	16.2	✓ 115
3.8	4.1	7.9	5.7	6.3	12.0	9.5	10.4	19.9	✓ 119
5.6	5.3	10.9	6.5	8.0	14.5	12.1	13.3	25.4	✓ 116
4.0	3.7	7.7	5.7	5.9	11.6	9.7	9.6	19.3	✓ 118
4.1	3.7	7.8	5.7	5.9	11.6	9.8	9.6	19.4	✓ 115
3.2	3.6	6.8	5.4	4.1	9.5	8.6	7.7	16.3	✓ 115
6.0	5.6	11.6	3.6	6.5	10.1	9.6	12.1	21.7	✓ 113
5.5	4.3	9.8	5.0	5.6	10.6	10.5	9.9	20.4	✓ 113
1.7	3.0	4.7	6.1	4.3	10.4	7.8	7.3	15.1	✓ 112
4.6	2.8	7.4	4.7	4.8	9.5	9.3	7.6	16.9	✓ 111
3.9	2.4	6.3	4.8	4.2	9.0	8.7	6.6	15.3	✓ 112
5.3	5.6	10.9	7.0	6.1	13.1	12.3	11.7	24.0	✓ 114
4.7	4.0	8.7	5.0	6.7	11.7	9.7	10.7	20.4	✓ 112
6.0	5.3	11.3	6.5	7.1	13.6	12.5	12.4	24.9	✓ 110
4.1	4.4	8.5	4.9	6.3	11.2	9.0	10.7	19.7	✓ 111
3.1	4.1	7.2	4.9	5.7	10.6	8.0	9.8	17.8	✓ 110
3.9	4.3	8.2	4.5	4.3	8.8	8.4	8.6	17.0	✓ 105
4.1	3.4	7.5	4.9	4.7	9.6	9.0	8.1	17.1	✓ 108
2.8	2.6	5.4	3.2	3.2	6.4	6.0	5.8	11.8	✓ 106
2.5	2.2	4.7	3.4	3.2	6.6	5.9	5.4	11.3	✓ 109
3.7	3.7	7.4	4.5	6.3	10.8	8.2	10.0	18.2	✓ 105
5.6	6.7	12.3	5.5	4.9	10.4	11.1	11.6	22.7	✓ 107
3.7	1.8	5.5	5.7	6.3	12.0	9.4	8.1	17.5	✓ 105
5.4	3.1	8.5	5.0	5.0	10.0	10.4	8.1	18.5	✓ 109
2.5	1.6	4.1	2.6	2.5	5.1	5.1	4.1	9.2	✓ 105
4.0	2.8	6.8	5.0	4.5	9.5	9.0	7.3	16.3	✓ 108
3.7	2.4	6.1	4.5	3.8	8.3	8.2	6.2	14.4	✓ 109
3.0	2.5	5.5	4.1	4.2	8.3	7.1	6.7	13.8	✓ 108
2.7	3.1	5.8	4.7	5.6	10.3	7.4	8.7	16.1	✓ 109
3.5	3.6	7.1	5.4	6.3	11.7	8.9	9.9	18.8	✓ 109
2.7	3.1	5.8	4.3	5.0	9.3	7.0	8.1	15.1	✓ 105
3.2	4.0	7.2	4.1	3.6	7.7	7.3	7.6	14.9	✓ 104
2.6	2.3	4.9	3.3	2.8	6.1	5.9	5.1	11.0	✓ 104
5.0	4.0	9.0	4.9	5.1	10.0	9.9	9.1	19.0	✓ 104
2.8	4.4	7.2	5.4	4.2	9.6	8.2	8.6	16.8	✓ 104
2.6	2.5	5.1	3.1	3.7	6.8	5.7	6.2	11.9	✓ 103
3.2	3.6	6.8	4.4	3.8	8.2	7.6	7.4	15.0	✓ 103
2.9	2.9	5.8	3.5	3.8	7.3	6.4	6.7	13.1	✓ 103
4.3	2.8	7.1	4.7	4.5	9.2	9.0	7.3	16.3	✓ 103
3.2	3.2	6.4	5.0	5.0	10.0	8.2	8.2	16.4	✓ 103
4.2	3.6	7.8	4.5	5.9	10.4	8.7	9.5	18.2	✓ 100
173.8	158.7	332.5	217.1	223.0	440.1	390.9	381.7	772.6	4940
719.18	608.31	2615.15	1088.15	1169.96	4476.35	3523.55	3418.17	1381.312	543824

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PAIRED SCORES

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APPENDIX B

TABLE XI

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GROUP II

PAIRED SCORES

W.M.	P.M.	T	W.M.	P.M.	T	T _{w.m.}	T _{p.m.}	T	IQ
2.5	3.3	5.8	4.5	5.0	9.5	7.0	2.3	15.3	101
2.8	2.9	5.7	3.7	4.7	8.4	6.5	7.6	14.1	101
3.6	4.0	7.6	4.3	4.5	8.8	7.9	8.5	16.4	101
2.8	3.0	5.8	4.7	4.8	9.5	7.5	7.8	15.3	102
4.2	2.7	6.9	3.2	3.9	7.1	7.4	6.6	14.0	100
3.5	3.5	7.0	5.3	3.0	8.3	8.8	6.5	15.3	100
2.5	3.7	6.2	4.5	4.3	8.8	7.0	8.0	15.0	100
2.7	2.2	4.9	2.2	2.8	5.0	4.9	5.0	9.9	101
4.3	3.1	7.4	6.1	4.7	10.8	10.4	7.8	18.2	102
2.5	4.6	7.1	3.5	3.3	6.8	6.0	7.9	13.9	101
5.5	7.8	13.3	7.0	7.2	14.2	12.5	15.0	27.5	101
3.7	3.2	6.9	4.9	4.6	9.5	8.6	7.8	16.4	97
3.6	3.4	7.0	4.5	4.6	9.1	8.1	8.0	16.1	96
3.9	3.6	7.5	5.0	6.3	11.3	8.9	9.9	18.8	98
3.0	2.5	5.5	4.7	6.1	10.8	7.7	8.4	16.3	98
3.1	3.5	6.4	5.0	6.1	11.1	8.1	9.6	17.7	99
4.3	3.8	8.1	4.7	5.6	10.3	9.0	9.4	18.4	97
4.3	3.3	7.6	4.7	4.7	9.4	9.0	8.0	17.0	99
3.3	3.0	6.3	4.4	4.8	9.2	7.7	7.8	15.5	98
4.2	4.4	8.6	5.0	6.3	11.3	9.2	10.7	19.9	98
4.1	3.7	7.8	4.7	3.8	8.5	8.8	7.5	16.3	97
3.5	3.9	7.4	3.6	4.7	8.3	7.1	8.6	15.7	96
2.6	2.3	4.9	1.9	2.5	4.4	4.5	4.8	9.3	97
2.8	3.1	5.9	5.4	4.2	9.6	8.2	7.3	15.5	97
2.6	2.9	5.5	3.3	3.5	6.8	5.9	6.4	12.3	99
3.5	3.8	2.3	4.7	4.2	8.9	8.2	8.0	16.2	98
2.6	2.2	4.8	3.9	3.2	7.1	6.5	5.4	11.9	97
3.8	3.7	7.5	5.0	4.8	9.8	8.8	8.5	17.3	99
2.9	3.3	6.2	4.1	4.3	8.4	7.0	7.6	14.6	98
3.5	3.7	7.2	4.4	4.4	8.8	7.9	8.1	16.0	98
2.9	3.3	6.2	3.3	3.4	6.7	6.2	6.7	12.9	98
3.5	3.7	7.2	4.4	4.5	8.9	7.9	8.2	16.1	99
5.8	3.0	8.8	5.0	3.5	8.5	10.8	6.5	17.3	92
2.8	2.5	5.3	4.9	5.9	10.8	7.7	8.4	16.1	91
2.9	3.1	6.0	3.4	4.1	7.5	6.3	7.2	13.5	94
3.8	3.8	7.6	5.0	4.5	9.5	8.8	8.3	17.1	90
3.1	3.2	6.3	2.7	3.2	5.9	5.8	6.4	12.2	93
2.8	3.0	5.8	4.7	4.7	9.4	7.5	7.7	15.2	94
3.1	3.3	6.4	3.7	4.1	7.8	6.8	7.4	14.2	94
3.6	3.2	6.8	3.6	3.9	7.5	7.2	7.1	14.3	93
2.8	3.7	6.5	4.4	4.8	9.2	7.2	8.5	15.7	92
2.7	4.4	7.1	4.7	4.5	9.2	7.4	8.9	16.2	94
0.7	2.8	5.5	3.4	3.5	6.9	6.1	6.3	12.4	90
2.2	2.9	5.1	3.5	3.8	7.3	5.7	6.7	12.4	93
3.0	3.5	6.5	3.8	3.5	7.3	6.8	7.0	13.8	92
149.9	153.5	303.4	193.4	198.8	392.2	343.3	352.3	695.6	4365
25.09	556.49	213.14	870.02	922.30	3557.92	2718.05	2871.87	1111.80	423901

TABLE XI

GROUP II

PAIRED SCORES

W.M.	P.M.	T ₁	W.M.	P.M.	T ₂	T _{W.M.}	T _{P.M.}	T	TQ
5.0	5.6	10.6	5.7	8.0	13.7	10.7	13.6	24.3	125
6.5	5.3	11.8	7.0	6.7	13.7	13.5	12.0	25.5	123
5.5	6.1	11.6	6.5	7.6	14.1	12.0	13.7	25.7	121
5.1	5.0	10.1	6.1	6.3	12.4	11.2	11.3	22.5	117
6.5	4.3	12.8	6.5	8.9	15.4	13.0	15.2	28.2	115
6.0	5.6	11.6	7.0	7.1	14.1	13.0	12.7	25.7	119
4.2	4.6	8.8	6.9	6.1	13.0	11.1	10.7	21.8	116
5.3	4.4	9.7	5.7	7.1	12.8	11.0	11.5	22.5	118
6.5	4.4	10.9	7.0	8.0	15.0	13.5	12.4	25.9	115
5.0	6.6	11.6	6.5	6.3	12.8	11.5	12.9	24.4	115
4.1	3.5	7.6	6.5	8.0	14.5	10.6	11.5	22.1	113
5.3	5.1	10.4	6.5	7.4	13.9	11.8	12.5	24.3	113
4.2	5.9	10.1	5.3	5.6	10.9	9.5	11.5	21.0	112
5.3	8.1	13.4	7.0	8.4	15.4	12.3	16.5	28.8	111
4.2	4.4	8.6	6.1	6.1	12.2	10.3	10.5	20.8	112
3.8	5.0	8.8	5.0	5.4	10.4	8.8	10.4	19.2	114
4.7	4.6	9.3	7.0	6.8	13.8	11.7	11.4	23.1	112
5.1	4.2	9.3	6.5	8.0	14.5	11.6	12.2	23.8	110
5.0	5.0	10.0	7.0	8.4	15.4	12.0	13.4	25.4	111
4.7	7.4	12.1	5.7	6.1	11.8	10.4	13.5	23.9	110
5.3	5.9	11.2	6.5	5.9	12.4	11.8	11.8	23.6	105
5.3	4.3	9.6	6.5	7.1	13.6	11.8	11.4	23.2	108
4.6	2.4	7.0	5.1	5.8	10.9	9.7	8.2	17.9	106
2.8	2.6	5.4	3.5	3.4	6.9	6.3	6.0	12.3	109
3.6	4.4	8.0	4.5	5.4	9.9	8.1	9.8	17.9	105
3.3	3.8	7.1	4.4	4.1	8.5	7.7	7.9	15.6	107
4.4	5.0	9.4	5.0	6.8	11.8	9.4	11.8	21.2	105
4.1	4.8	8.9	5.7	5.6	11.3	9.8	10.4	20.2	109
5.3	5.3	10.6	6.1	8.0	14.1	11.4	13.3	24.7	105
4.1	3.7	7.8	5.7	4.5	10.2	9.8	8.2	18.0	108
5.3	5.6	10.9	5.4	6.7	12.1	10.7	12.3	23.0	109
4.3	4.8	9.1	6.5	7.1	13.6	10.8	11.9	22.7	108
4.2	4.8	9.0	5.7	7.6	13.3	9.9	12.4	22.3	109
3.5	3.3	6.8	3.6	3.8	7.4	7.1	7.1	14.2	109
5.0	5.3	10.3	6.1	7.6	13.7	11.1	12.9	24.0	105
2.8	2.5	5.3	5.4	5.6	11.0	8.2	8.1	16.3	104
4.6	4.1	8.7	5.7	6.3	12.0	10.3	10.4	20.7	104
3.8	3.9	7.7	4.6	5.5	10.1	8.4	9.4	17.8	104
5.3	4.0	9.3	5.7	4.5	10.2	11.0	8.5	19.5	104
4.1	4.2	8.3	5.0	4.8	9.8	9.1	9.0	18.1	103
4.1	4.8	8.9	4.1	4.8	8.9	8.2	9.6	17.8	103
3.8	3.5	7.3	4.7	4.8	9.5	8.5	8.3	16.8	103
3.5	3.8	7.3	4.9	5.2	10.1	8.4	9.0	17.4	102
3.7	3.7	7.4	4.1	3.9	8.0	7.8	7.6	15.4	103
3.8	3.2	7.0	4.3	4.6	8.9	8.1	7.8	15.9	100
206.6	210.8	417.4	256.3	281.7	538.0	462.9	492.5	955.4	4940
994.18	1049.18	4023.64	1502.23	18499.1	6656.78	4897.69	5617.53	20930.06	543824

APPENDIX B

TABLE XI

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GROUP II

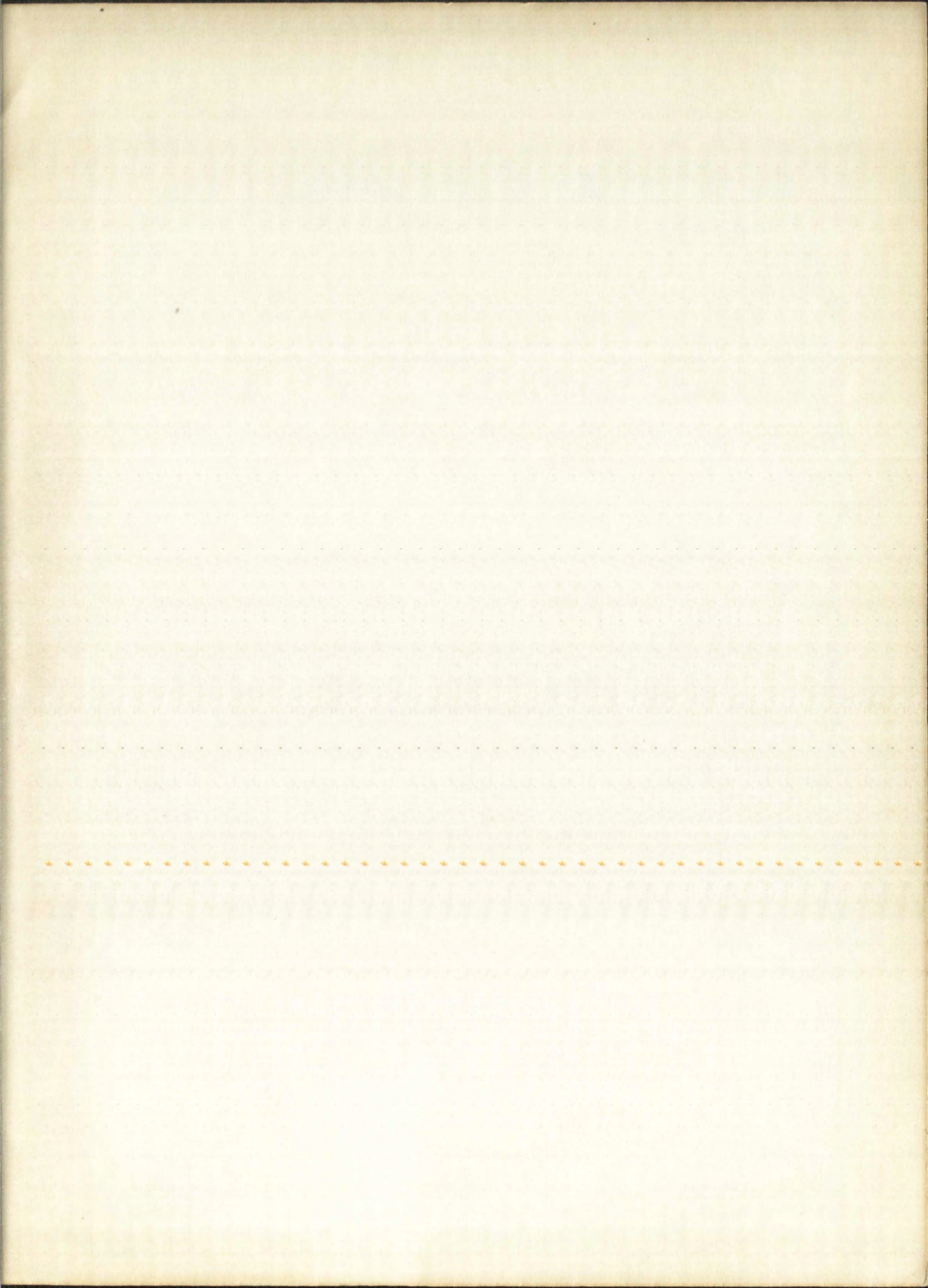
PAIRED SCORES

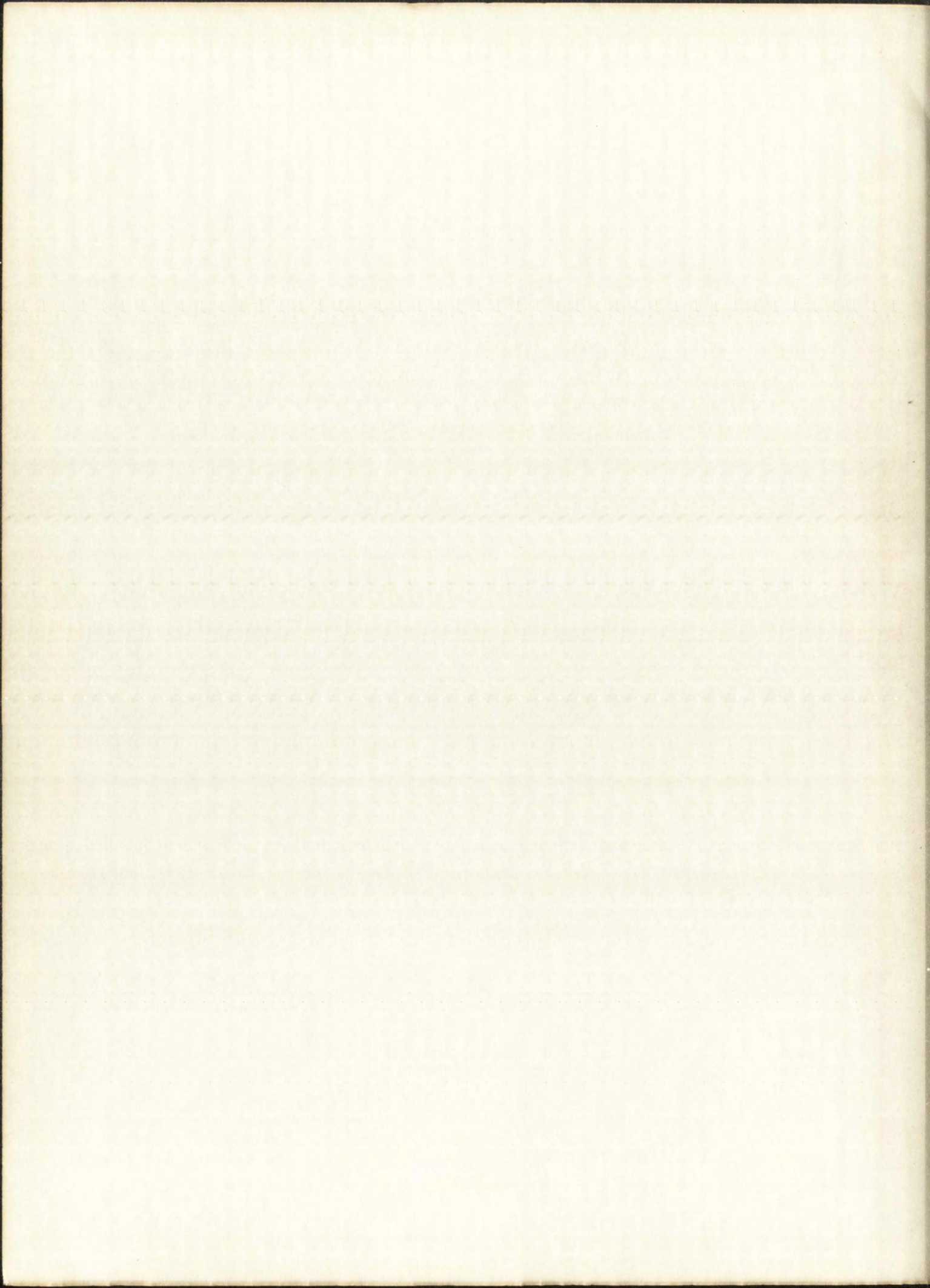
W.M.	P.M.	T ₁	W.M.	P.M.	T ₂	T _{W.M.}	T _{P.M.}	T	I.Q.
3.4	3.6	7.0	3.4	4.1	7.5	6.8	7.7	14.5	69
3.5	3.5	7.0	4.1	4.1	8.2	7.6	7.6	15.2	77
2.3	2.9	5.2	2.6	1.6	4.2	4.9	4.5	9.4	76
3.3	2.9	6.2	4.7	3.7	8.4	8.0	6.6	14.6	82
2.9	3.0	5.9	3.9	5.4	9.3	6.8	8.4	15.2	83
2.9	2.8	5.7	3.1	3.7	6.8	6.0	6.5	12.5	84
2.7	3.0	5.7	4.1	3.3	7.4	6.8	6.3	13.1	85
2.8	2.6	5.4	3.8	4.2	8.0	6.6	6.8	13.4	83
3.8	4.2	8.0	4.3	6.1	10.4	8.1	10.3	18.4	83
2.3	3.5	5.8	3.8	3.2	7.0	6.1	6.7	12.8	83
2.8	2.1	4.9	3.7	3.7	7.4	6.5	5.8	12.3	84
2.9	3.5	6.4	3.3	3.4	6.7	6.2	6.9	13.1	84
2.4	3.7	6.1	2.7	3.0	5.7	5.1	6.7	11.8	90
2.8	3.0	5.8	3.5	4.7	8.2	6.3	7.7	14.0	91
5.6	3.9	9.5	4.4	4.2	8.6	10.0	8.1	18.1	87
4.1	4.5	8.6	5.7	5.5	11.2	9.8	10.0	19.8	88
4.0	3.4	7.4	5.7	5.0	10.7	9.7	8.4	18.1	86
2.8	4.5	7.3	4.6	5.8	10.4	7.4	10.3	17.7	87
2.6	2.7	5.3	3.6	3.8	7.4	6.2	6.5	12.7	88
2.4	3.0	5.4	3.8	4.1	7.9	6.2	7.1	13.3	86
4.2	3.1	7.3	4.4	7.1	11.5	8.6	10.2	18.8	86
2.7	3.2	5.9	3.4	4.3	7.7	6.1	7.5	13.4	89
69.2	72.6	141.8	86.6	94.0	180.6	155.8	166.6	322.4	1851
290.98	247.28	943.50	354.16	431.72	1550.48	1146.20	1311.22	4878.94	156255
425.7	436.9	862.6	536.3	574.5	1110.8	962.0	1011.4	1973.4	11156
1740.25	1852.95	7098.28	2726.41	3203.93	11765.18	8761.94	9800.62	36920.80	1123980
1618.04	1704.30		2568.02	2946.88					

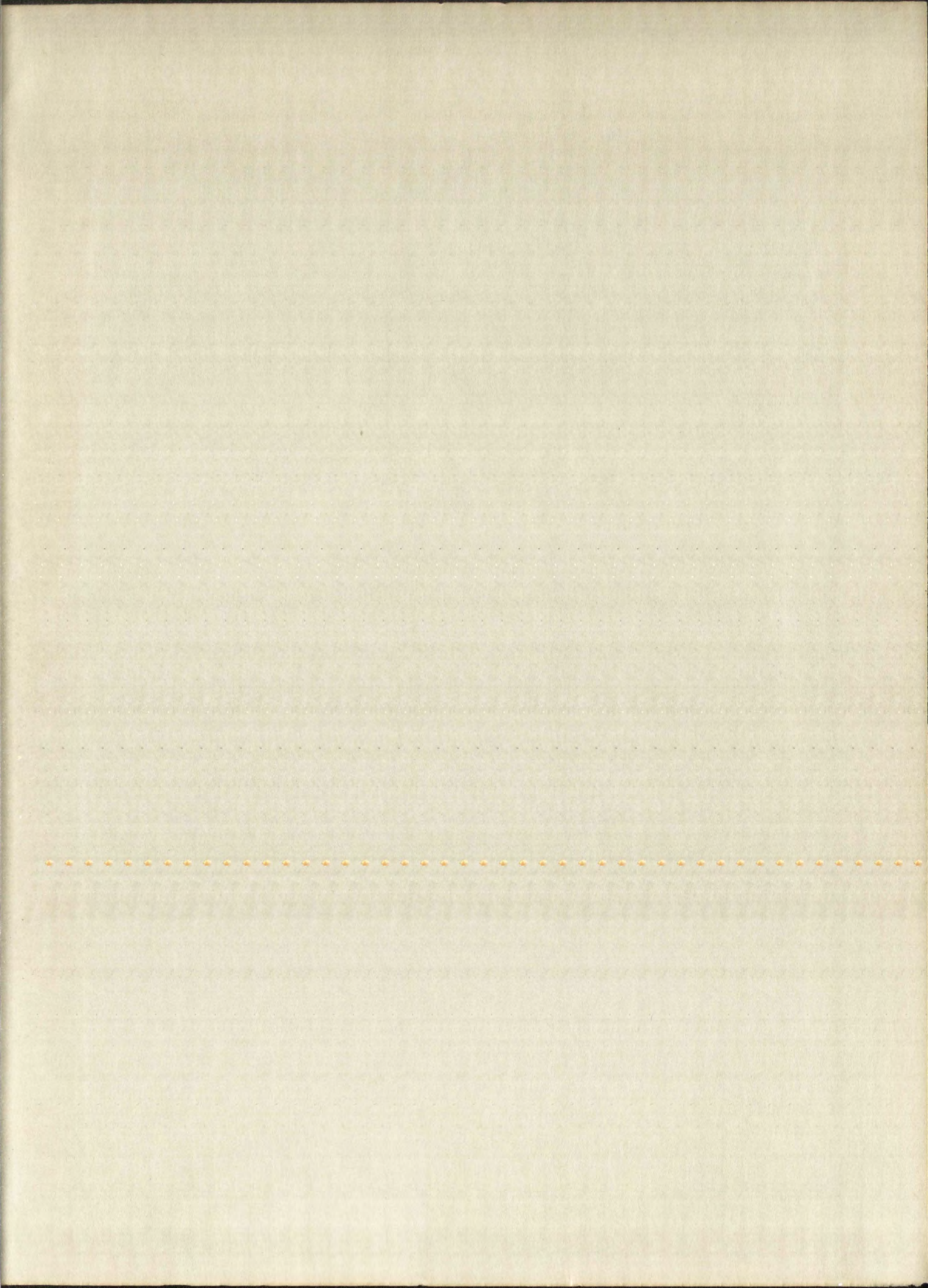
M =
99.607

σ =
10.675










IMPORTANT!

Special care should be taken to prevent loss or damage of this volume. If lost or damaged, it must be paid for at the current rate of typing.



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SEP 12

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