A MEASURING DEVICE IN SPELLING.

A THESIS

Submitted to the Department of EDUCATION and the GRADUATE COUNCIL OF THE UNIVERISTY OF SOUTH AFRICA (Rhodes College) in partial fulfilment of the Requirements for the DEGREE OF MASTER OF EDUCATION.

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P R E F A C E.

The writer was deeply impressed by Mental and Scholastic Tests by Cyril Burt, the London Psychologist. The modest claims he makes for his tests and the ease in applying and scoring his tests convinced the writer that similar tests in South Africa would be used by teachers, if available.

On investigation it was found that very few tests, suitable for classroom work were available in South Africa. Many of those available gave their norms in so complicated a form that no ordinary classroom teacher, would have the courage to use them. (1).

The writer felt that there was a real need for tests, given simply and clearly after the style of those of Burt, and with clear norms like those published with his tests.

The writer was strengthened in this belief by a reply from Dr. R.T. Riemersma to an enquiry concerning the tests in use at present in the Transvaal Education Department. He replied that "On the whole it can be said that, at present, scholastic tests are applied only by enthusiasts on their own initiative. (2).

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(1) Milne: The Use of Scholastic Tests in South African Schools.

(2) Dr. R.T. Riemersma: Vocational Adviser, Transvaal Educational Department.

The Teaching profession is undoubtedly shy of tests and the 14 thesis given in Chapter I of McCall's "How to Measure in Education" will do little to remove their doubts. (3). Only easily applied and scored tests used by the teaching personel themselves will give them confidence. It is hoped that this simple test will be one of those tests used for this purpose.

Imposed from above, standardized tests have proved unpopular in North America, where tests are probably more generally used than anywhere else. But where teachers have introduced the system into a school by common consent, these tests have proved popular and valuable. (4).

Dr. E.G. Malherbe has probably done more actual testing with standardized tests than any other individual in South Africa. In his research into the Poor White Problem he tested thousands of individuals. His opinion is therefore of great value. In hisforeword to the book of Arithmetic Tests by F.T. Milne (5) he says :

> "Though Teachers, Principals, Inspectors and Examiners are constantly measuring the products of learning and teaching, it is strange that in South African Schools such measuring is seldom done scientifically.
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> We are, as regards scholastic measurements, for the most part still in the primitive stage in which man was as regards spatial measurements when he used his own feet or his own hand's span as units - the result being dependent largely on the person measuring. This deplorable absence of objective measurement in South African education is due to the

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(3) McCall: "How to Measure in Education". Macmillan 1923.

(4) Monroe: Introduction to the Theory of Educational Measurements. Houghton Mifflin Co. 1923.

(5) Milne: The Use of Scholastic Tests in South African Schools.

fact that, until recently, very few objective tests with which to measure scholastic achievement have been available. The few that there are, are so little known that teachers hardly ever use them".

That was written in 1937. The position today is approximately unchanged.

The writer proposes to construct and standardize a simple, easily scored spelling test, similar in form and application to the usual final standard six departmental test of the Cape Province. He hopes that the familiar form will encourage teachers to apply the test regularly and that Inspectors and investigators will find it of use in making a rapid survey of the schools they wish to compare.

A beginning was made with this investigation in 1947. Enough preliminary material was collected by the beginning of 1948 to enable the writer to decide on the form and construction of the test. Consequently preliminary tests were constructed and sent out during the third term of 1948. The papers in their final form were sent out in the last month of the school year of 1948.

The writer's thanks are due to those School Principals who kindly agreed to apply the tests in their schools, and especially to those teachers, who, without any obligation on their part whatever, corrected the scripts applied to their own classes, thus adding an additional check to the writer's own corrections.

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CHAPTER I.

THE INTRODUCTION.

1. AIM.

The aim of this ivestigation is to construct a graded Vocabulary Test in English suitable as a test of spelling ability for English medium children in Standards I to VI in the Eastern Cape Province, and to find norms of performance for these tests in this area.

The investigation will include a comparison of the spelling ability of children in this area in Standards VI and VII.

2. SCOPE.

This test is planned to be valid from Standard I to Standard VI if applied at the end of the school year. By a simple calculation the test scores can, however, be adjusted to give readings for any month of the year.

Although standardized only in Class groups, a formula is provided which will give a normative reading for age groups. By means of this formula the test can be used to find the mental age in spelling of a group or of an individual.

The test is intended for the use of the teacher or inspector or investigator. It is not accurate enough for use as a laboratory instrument in the psychological laboratory.

If this test is used to criticise classroom methods or the efficiency of a teacher's instruction it will have to be linked with the results obtained from intelligence tests obtained in the same class. Used alone the tests will indicate only the spelling strength or weakness of a class or an

individual. The test is only a measure, not a form of instruction. It has no diagnostic value, other than that of general weakness or general spelling strength.

3. WORK OF OTHER INVESTIGATORS.

(a) Overseas Investigators:

The need to provide some measuring instrument more objective than the ordinary teacher's classroom test was felt as early as 1864. In this year an English Schoolmaster constructed a measuring instrument called "A Scale Book". This instrument was crude but it included the germ of many of the ideas which are incorporated in our present day educational or scholastic tests. Sample performances, representing various degrees of excellence, were collected and arranged in the form of a scale similar to our present day handwriting and composition scales. Such scale books were constructed for various school subjects and they appear to have been used in the school where the idea originated. (6).

Probably the best known of the early educational scales were those drawn up in America by Dr. Rice in 1894-5. He drew up objective tests in spelling to compare the educational standard in spelling in different cities, and the results of different study methods. Some of his conclusions were quite startling, for he found that longer daily periods spent in spelling instruction were no more efficient than shorter daily periods of instruction.

The construction of really accurate scales of Performance or Scholastic Tests was dependant on rather involved statistical work. The Science of statistics had

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(6) Monroe: Introduction to the Theory of Educational Measurements. Houghton Mifflin Co. N.Y.

not developed enough before the last Quarter of the 19th Century to aid educators in the statistical calculations necessary to make the tests scientifically accurate.

Thorndike was a trained statistician as well as a trained psychologist. He may be considered therefore to be the originator of the modern scientifically accurate scholastic test as well as the greatest single contributor to the development of these standardized objective tests. (7).

In 1903 he published his first contribution. It was a study entitled "Relation between the Different Abilities in the Study of Arithmetic". A year later he published his "Handwriting Scale". Thorndike's interest in standardized objective tests was that of a psychologist. His tests had to be scientifically accurate and involved very intricate and laborious statistical calculations.

These tests were followed by some Arithmetic tests by C.W. Stone. As a student of Thorndike he was undoubtedly influenced by the latter. The Stone tests were not standardized and were designed to test the workings of the mind as well as an instrument for survey purposes. Stone's aim in designing these tests was therefore partly psychological and partly administrative. S.A. Courtis aided Stone in these tests by administering them.

In 1908 S.A. Courtis constructed his own tests as he found those of Stone's unsatisfactory for his purpose. He standardized his tests. Courtis constructed these tests as instruments to aid the teachers in instructing

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(7) Monroe: Introduction to the Theory of Educational Measurements. Houghton Mifflin Co. N.Y.

pupils and in testing the efficiency of their instruction.

We may say that Thorndike, Stone and Courtis illustrate the three main objectives aimed at by test constructors: the objective aimed at by the psychologist who needs an objective measure to study the working of the human mind: the objective aimed at by the Administrator who wishes to study the effectiveness of courses of study, of school organization, of methods of instruction and so on; the objective of the school instructor or Teacher who wishes to evaluate the proficiency of his own class or the efficiency of his own methods so as to effect improvements where possible.

It is the latter two objectives which the writer aims to achieve by means of the tests he has constructed.

The value of different methods or courses of study and related problems were, until the end of the 19th Century, dealt with on a controversial basis. The side which had the best "debaters" won. (8). More recently educators have attempted to answer these questions in a scientific manner, and, in doing this, objective tests have frequently been devised. The list of objective tests from 1914 onwards is a considerable one. The writer has chosen only the more well known ones in spelling as fit to be mentioned here. Spelling tests are so closely linked up with spelling Scales that the writer has seen fit to include the latter in his list.

The uses of the words test and scale in spelling are not always clearly differentiated. Sometimes the words are used as synonymous. The writer suggests that

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(8) Monroe: "Introduction to The Theory of Educational Measurements".

the use of the word scale be confined to a list of words, usually 1000 or more which is drawn up as a suitable vocabulary for elementary children to master.

The words "Scale" and "vocabulary" are synonyms therefore. A scale is, however, a scaled vocabulary, as it is ranked from easy to difficult in approximately equal steps.

The word test may therefore be confined to an actual test, i.e. a short list of words approximately a hundred, or more, which is used to test the child's mastery of a vocabulary or scale.

From the very beginning two distinctly different spelling tests made their appearance. One was designed to test the child's efficiency in mastering some well-known spelling scale, the other was designed to test the child's innate ability to spell accurately, and was not bound by any syllabus. Such tests often included rare and difficult words.

The objective of the former was to test the child's achievement in mastering the words set in the School Syllabus, such as the Standard Spelling List by Professor Boyd. (9). Such a test would not include any word in its test material which did not appear in such a "Standard List". Such a test was designed to test the child's achievement in mastering the spelling of the 3000 or so words appearing in the "Standard List". Such tests expected a normal score of ± 75%. Well known examples of

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(9) W. Boyd: Measuring Devices in Composition, Spelling and Arithmetic. Hamp, London, 1924.

these tests are Burt's Spelling Test (10), F.J. Schonell's Spelling Test (11), Dr. Plekker's "The Transvaal Spelling Test".

These tests are used mainly as group tests in the classroom. As Dr. Wilson says:

> "The first fundamental criterion of a test should be that it properly serves the main curricular aim of the subject being tested.
>
> The second fundamental criterion is that the test should properly reinforce good methods of teaching." (12).

These tests referred to, do that.

The other spelling test had an entirely different objective. Its main value was that of proper classification. It was designed to separate the child with high spelling ability from the child with low spelling ability. It was designed to pick out the children gifted in spelling. In other words, it was designed to contain words with which the child being tested would not have had previous knowledge. This test was there to separate bad spellers from good spellers, and not to test the teaching of spelling. Examples of this type of test are The Stanford Achievement Spelling Test and Starch's Spelling Test. (13).

Here are two opposing objectives. The one objective is classification and measurement. The other objective is the right management and teaching of children.

Before the Spelling Test, to aid class teaching, could

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(10) Burt, Cyril: Mental and Scholastic Tests. P.S. King & Son, London.

(11) F.J. Schonell: Essentials in Teaching and Testing Spelling. MacMillan. London. 1933.

(12) Wildon, Guy: The Purpose of a Standardized Test in Spelling. Journal of Educ. Research XX. Dec. 1929, p.p. 319-326.

(13) Starch: Educational Psychology. MacMillan. N.Y. 1924.

be constructed properly, Spelling Scales or vocabularies had to be constructed. One of the earliest and best was that of L.P. Ayres in 1915. In this Spelling Scale he also emphasized the importance of determining the educational objectives referred to in the previous paragraph as a prerequisite to test construction.

The Ayres Spelling Scale consisted of 1000 words. All the words in each column are approximately of equal difficulty. The steps in spelling difficulty from each column to the next are approximately equal steps. The numbers at the top of each column indicate the percentage of correct spellings which may be expected among the children of the different grades. For example, if 20 words from Column H are given as a spelling test it may be expected that the average score for an entire second grade, spelling them, will be about 79%. For a third grade it should be about 92%, for a fourth grade about 98% and for a fifth grade about 100%. (14).

Ayres constructed his scale from the 1000 most common words used in the ordinary and business letters of adults. In this way he felt sure it would be a spelling scale and not a reading scale.

From 1912 onwards many spelling scales and tests appeared. In 1913 Jones constructed a spelling scale from the words used by 1050 children in Standard I to Standard IV from 75,000 essays. He grouped these words in four groups. Cook and O'Shea collected the words used by 13 persons in their family correspondence for their spelling

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(14) M.J. Nelson: Tests and Measurements in Elementary Education. The Condon Co. N.Y.

scale. Elridge collected 6002 words used in four newspapers. (15).

Soon Spelling Scales began to appear which were constructed from existing Spelling Scales. Thus we have The Tidyman Spelling Scale which consisted of the most common words found in the best six American lists.

In 1937 A.I. Gates published "Spelling Difficulties in 3876 words" which was constructed from the best lists in use in the State of New York. (16).

All the lists became obsolete when E. Horn published his "Basic Writing Vocabulary". To construct this spelling scale he used ten lists already in existence as well as eight more which he himself constructed. He tabulated from a count of 5,000,000 words, the 10,000 which occurred most frequently.

Peter Sandiford says:

> "This list renders obsolete all counts previously made.
>
> Fortunately Horn has done for Spelling what Thorndike did for reading by his "Teacher's Word Book." (17).

Several English and Scottish Educators published Spelling Scales as well. The sources remain fundamentally the same. Professor Boyd, a Scottish Educator, in "Measuring Devices in Composition, Spelling and Arithmetic" published "A Standard Spelling List of 2400 words". He gives his

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(15) Monroe: Introduction to the Theory of Educational Measurements.

(16) Gates, A.I.: A List of Spelling Difficulties in 3876 words. Bureau of Publications, Teachers College, Columbia University, N.Y. 1937.

(17) P. Sandiford: Educational Psychology. Longmans Green & Co. 1936.

sources as:

(1) A Survey of children's books, newspapers and correspondence;

(ii) Correspondence of ordinary adults;

(iii) A Survey of children's written essays, lessons, etc. (18).

F.J. Schonell selected a body of 3,200 words:

"that would form an adequate spelling vocabulary for an average Elementary School pupil"

in England. He gives Horn's "A Basic Writing Vocabulary" as one of his sources as well as several special investigations of his own similar to those of Boyd. (19).

(b) South African Investigators:

1. Probably the oldest standardized test in South Africa is that of Professor Coetzee, 1924.

He standardized an Arithmetic Test and gave norms for standards and ages.

Later, in connection with his research into the Poor White Problem, Malherbe standardized these tests again and found new norms. Ten years later Dr. Fick again standardized these tests and found norms for them.

2. The S.A.O.U. Spelling List of Barnard, 1928, for English as a second language, is more a spelling scale, or vocabulary, than a test. Barnard grouped the words under standards. The words spelt by 75% of the pupils of a standard were allotted to that standard. Using this

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(18) Boyd, W.: Measuring Devices in Composition, Spelling and Arithmetic.

(19) Schonell, F.J.: Essentials in Teaching and Testing Spelling.

figure as a rough norm, a teacher could make up his own test and in this way test the spelling strength of his class.

3. Malan constructed a test in Printscript for South African Schools 1939. He did not have his test printed.

4. Another Handwriting Test was constructed by Heese for primary and secondary pupils. No norms are provided. (20).

5. A Vocabulary Test in Afrikaans appeared in 1929 with two equivalent lists of 50 words each.

These Tests appeared in"Manual of Physical and Mental Tests"by Malherbe, and also appeared in the Education Gazette of the Cape Province Vol XXVIII. No. 20.

They appear to have been sponsored by the Cape Education Department.

It has two sets of norms published with it, those given by Malherbe and those worked out later on by the Cape Education Department in 1943.

6. In 1932 A Vocabulary Test in English for English speaking children appeared. It was constructed similarly to the previous test in Afrikaans. Again two sets of norms are given for comparison. The earlier set by Malherbe and a later set, 1943, by the Cape Education Department. (20)

These tests were standardized by Malherbe to aid him in his survey of the educational attainments of the Poor Whites in South Africa. These tests were therefore constructed for survey purposes rather than for educational purposes. It is only in 1943 that the Cape

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(20) Die Spelling Bekwaamheid van Skoolkinders. Plekker. D. Ed. Thesis. 1946. Univ. of Pretoria.

Education Department, by finding new norms showed its interest in these tests as an instrument to aid education.

7, Die Afrikaanse Stilleestoets of the National Bureau of Education and Research of South Africa was standardized in 1943.

8. A Silent Reading Test by the same body followed, and later on a Geography Test. (21).

One of the best and latest to be published is Milne's "The Use of Scholastic Tests in South African Schools". This is an Arithmetic Test, standardized on the Witwatersrand with age norms and class norms. It also gives elaborate descriptions of how the norms were calculated. (22).

More recently we have "Afrikaanse Spelonderrig in die Laerskool" to test the spelling ability of Afrikaans-speaking children. There are 20 words for Standard I and 10 words for each of the higher Standards up to Standard 5. If a child spells 70% of the words appropriate to a given Standard correctly, he is qualified for that Standard at least.

Van den Heever - "'n Objektiewe Studie van die Spelling in Afrikaans op die Middelbare Skool" (23) - uses a list of Afrikaans words as a spelling test. One of the peculiar things about Van den Heever's thesis is that he proves conclusively, quoting Harry J. Baker (24) in

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(21) Plekker: Die Spellingbekwaamheid van Skoolkinders.

(22) Milne: The Use of Scholastic Tests in South African Schools. Van Schaik, Pretoria, 1937. 1s.0d.

(23) Van den Heever, L.: 'n Objektiewe Studie van die Spelling in Afrikaans op die Middelbare Skool. M.Ed. verhandeling van die Univ. van S.A. 1930.

(24) Harry J. Baker: Characteristic Differences in Bright and Dull Pupils. pp. 48.

support, that the correlation between spelling ability and intelligence is low. This is in agreement with Sandiford (25); while Plekker (26) Quoting Burt (27) in support is of just the opposite opinion.

This should give the reader food for thought.

Figures and tables of comparison do not apparently always agree in these investigations.

Both writers, Van den Heever and Plekker, agree as to the superiority in spelling ability of girls over boys. This investigation supports their opinion.

Coetzee H.A. also, standardized several tests, one of which was a spelling test, constructed out of words found in Language or Grammar books, and of words frequently misspelt by children. It is an Error-Correction Test of 60 words, 30 correctly spelt and 30 incorrectly spelt. The child had to underline the correct words.

Separate norms for the Spelling Test are not given. (28).

The most important South African contribution to Spelling Tests is undoubtedly that of J.D. Plekker (1946), (29) "Die Spellingbekwaamheid van Skoolkinders", a D. Ed. Thesis of the University of Pretoria. It is not only a mine of information on Spelling and Spelling Tests but contains a Spelling Test in English and one in Afrikaans with duplicate forms.

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(25) Sandiford: Educational Psychology.

(26) Plekker, J.D.: Die Spelbekwaamheid van Skoolkinders. 1946.

(27) Burt: Mental and Scholastic Tests.

(28) Coetzee, H.A.: Agterlikheid en die daarstelling van Skale om die Skoolvordering van die agterlike kind te bepaal. M.A. Thesis. Univ. of S.A.

(29) J.D. Plekker: Die Spellingbekwaamheid van Skoolkinders.

The Spelling Test is a Multiple Choice Test of 150 words. The first 75 words give a choice of two, one correct and one incorrect. From the 76th word onwards th there is a choice of 4, Three incorrect and one correct spelling.

Grade II, which is equivalent to the Cape Sub-Standard B, as well as Standard I, stop at the 75th word. Standards II and III stop at the 113th word and Standards IV to VIII continue to the end. A form B, and C are added as equivalent forms of the test.

Each Test is on the higher Grade. The Afrikaans Spelling Test is for Afrikaans speaking pupils, The English Spelling Test for English Speaking pupils.

To score the pupil must underline the correct word, or write the correct word in the margin if he so chooses. There is no time limit.

Being a Multiple Choice Test it is easy to score.

In a recent note from J.D. Plekker he says:

> "As far as I know and to my great disapointment the tests are not being put to any practical use". (30).

SPELLING SCALES:

There are several Spelling Scales in use in South African Schools. One of the best known is The S.A.O.U. Spelling List of 1600 words. The words are given in lists like the Ayres Spelling Scale. Each list of words is composed of approximately equal words which can be spelt by 75% of the class to which it is assigned. It is meant for

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(30) Plekker: Die Spelbekwaamheid van Skoolkinders.

classes or standards of Afrikaans Speaking pupils. (31).

Other Spelling Books or Scales are Juta's Rational Spelling Lists (32) and Maskew Miller's "Easy Steps in Spelling. (33).

Maskew Miller's "Easy Steps in Spelling" is published in three books. Step I, Step II and Step III. This book was originally printed and published by A. Wheaton & Co. Ltd., Exeter, England.

Although the vocabulary seems sound, there is no way of being certain of this as the Publishers do not give the name of the Author, nor is there any indication as to how it was constructed.

Juta: Rational Spelling Lists. These lists are divided into Standards, one for every Standard from Standard I to Standard VI. Here also the Publishers do not supply the name of the Author nor the means used in constructing the lists.

4. OUTLINE OF THE INVESTIGATION.

1. Source of the Words Chosen.

The writer would have liked to have been able to consult the two well known source books: Horn's "A Basis Writing Vocabulory" and "The Buckingham Extension of The Ayres Spelling Scale". These were, however, unobtainable.

Of the books available the best four appeared to be;

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(31) Barnard, C.: S.A.O.U. Spelling List. Nas. Pers. Beperk. Cape Town 1928.

(32) Juta: Juta's Rational Spelling Lists.

(33) Maskew Miller: Easy Steps in Spelling.

(a) The S.A.O.U. Spelling List. 1600 words;

(b) The Standard Spelling Scale - Boyd - 2400 words;

(c) Spelling Difficulties in 3876 words - Gates - 3876 words;

(d) Essentails in Teaching and Testing Spelling - F.J. Schonell - 3200 words.

Of these four books "Spelling Difficulties in 3876 words" was the only one which had an Average Grade Placement next to each word in the list. As its sources seemed as sound as any of the others, it was chosen as the source book.

This list was constructed in the following manner by Gates. He chose the words most common in several lists or scales in use in New York City and State, and gave the Average Grade Placement of each word as it appeared in these several lists.

To make sure that no unusual American words would be included, each word chosen was checked with the other three lists or books mentioned. Only words common to two or more of the four lists were retained as suitable to be included in the test.

The next problem to be decided was the form the test would take.

2. <u>The Type or Form of Test chosen</u>.

Before deciding on the form of the test it was necessary to examine the objectives of spelling instruction.

M.J. Nelson gives them as follows: (34)

(a) To develop the ability to spell correctly

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(34) Nelson, M.J. : Tests and Measurements in Elementary Education. The Cordon Co. N.Y. 1939.

the words most commonly needed for expression of thought in writing;

(b) To develop the meaning of words to be spelt;

(c) To develop the ability to recognize correct and incorrect spellings of words;

(d) To develop a desire to spell correctly.

There are several types of tests to choose from. Each has merits and demerits.

There are two types of dictated tests. One is the Graded Vocabulary Test. This is a list of words graded from easy to difficult in approximately equal steps. These are dictated to the child who has to attempt to write them down correctly. The other, often called "A Dictation Test", has the graded words arranged so as to form sentences. The Dictation Test suffers from three serious disadvantages:

(a) There are a very large number of words on each script to correct;

(b) The sentences are often of very clumsy construction;

(c) The context divides the child's attention and upsets his concentration.

Then there are the self-administering and self-scoring tests. These tests are divided into two main classes; The Error Correction Tests and The Multiple Choice Tests.

The Error Correction Test consists of a long list of carefully graded words ranging in spproximately equal steps from easy to difficult and with most of the words misspelt. Instructions on the test require the pupil to write these misspelt words correctly. The scripts can be corrected by the Examiner. Sometimes, however, a flap-over sheet provides the correct answers and the pupil can do

the corrections himself. (35).

The more popular of these tests is The Multiple Choice Test, a good example of which is "The Transvaal Spelling Test" by Dr. Plekker. (36).

This test usually consists of words which are commonly used in writing vocabularies or spelling scales. Each word is listed with alternate responses which should be misspellings which children make most frequently e.g. gard, guard, gaurd, gord, God. The words should preferably be given in a context e.g. He said he would teach (1. somwhere. 2. somwer. 3. sumwhere. 4. somewhere. 5. someware).

At least four choices and preferably five should be given.

The pupil indicates the number of the spelling which he believes to be correct e.g. (4) or underlines the correct form of the word.

Such tests have some distinct advantages over the Graded Vocabulary Test. They are more easily scored, more easily administered, and are not influenced by faulty pronunciation on the part of the Examiner or faulty hearing or slips in writing on the part of the pupil. The test has good reliability and may serve very well as a survey test. It can be self-administered and self-scored.

It has the added advantage that it does not require all pupils to proceed at the same rate, which rate, in

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(35) Nelson: Tests and Measurements in Elementary Education.

(36) Plekker: Die Spellingbekwaamheid van Skoolkinders.

the case of all dictated tests, is the teacher's rate of pronunciation, which is often neither uniform nor well-adjusted to the pupils. (37).

It is claimed that these tests fulfil the other three objectives of spelling tests as listed by M.J. Nelson, better than the Dictated Vocabulary Test, i.e.:

(1) To develop the meaning of words to be spelt;

(2) To develop the ability to recognize correct and incorrect spelling of words;

(3) To develop a desire to spell correctly.

It certainly does fulfil objective (2) better than a vocabulary test, but no clear proof in this article is given that it fulfils objectives (1) and (3) better than an ordinary vocabulary test.

The dictated vocabulary test has one very distinct advantage over all other types of tests. It has an acknowledged validity. It does test what it sets out to test; the ability of a pupil to spell the words dictated. In everyday life a pupil has to spell a word he thinks of and does not have the opportunity of choosing a word from a list before him.

It has other advantages also. It is not as expensive to administer as the Multiple Choice Tests which require that each pupil receive a separate copy of the Test.

It conforms very closely to the form of the usual final Standard VI and classroom tests used in the Cape Province, and the writer's test would thus have a

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(37) Nelson, M.J. and Denny, E.C. : The Multiple Choice Test in Spelling. School and Society (Periodical). July 4, 1936.

familiar form when teachers wish to use it.

For these reasons this graded Vocabulary type of test was chosen as the most suitable form to be constructed.

3. The Standard of the Words chosen.

Following the lead of test constructors like Ayres and in order to conform with the suggestions of writers like Wilson (38), Boyd (39) and others, the writer planned to choose words which would be correctly spelt by 60 to 80% of the pupils of the specified Standard or age group.

The possible difficulty in having such a high percentage of words correct as an average is that too many of the brighter pupils will score 100%. The spelling ability in any class or age varies over several Standards or years. Starch says:

> "Investigations show that the best pupil in the first grade spells as well as the poorest pupil in the 8th grade". (40).

But no pupil can be considered average for his class unless he can spell correctly ± 70% or more of the words set for that class in a Standard spelling scale. It must be held in mind that this test is planned chiefly for class use. The words in the test for a specific standard are words which would normally appear

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(38) Wilson, Guy: The purpose of a Standardized Test in Spelling.

(39) Boyd: Measuring Devices in Composition, Spelling and Arithmetic.

(40) Starch, Daniel: Educational Psychology. Univ. of Wisconsin. The MacMillan Co. N.Y.

in the list of words set for that Standard in a Standard list.

A good example of a dictated vocabulary test of the type planned is that of C. Burt to be found in "Mental and Scholastic Tests (1922). Burt's Test is planned for a 50% average. (41).

4. Description of the Test chosen.

The usual form such tests take is that of a list of words, graded from easy to difficult and divided up into groups. Each group is assigned to an age or a Standard.

Following Burt's lead this test consisted of such groups, seventeen words to each group in the preliminary tests, to be reduced to fifteen words in the final tests.

The tests were planned to test the pupils from Standard I to Standard VI. This called for 7 lists of seventeen words each. A list for Standard VII was included to test out the brighter pupils in VI.

Burt's test words were divided into such groups of ten. The lowest group was assigned to the age of 5 years. His instructions were as follows:

> "When administering the test, the teacher should employ as wide a range of test-words as possible. To set a child or a class only the ten words assigned to the corresponding mental age is not enough. The words for the age below and for the age above should at least be included. In dictating the list each word should be pronounced separately. The enunciation should be quite distinct and moderately slow, without, however, any dislocation of

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(41) Burt: Mental and Scholastic Tests.

syllables. The words may be repeated if necessary, but are not to be enshrined in an illustrative context. No time limit is imposed".

These instructions were adopted as they were, except that in the tests the writer followed the lead of Morrison and McCall, in Morrison-McCall Spelling Scales, and had each word enshrined in an illustrative sentence. (42).

5. The Method of Scoring.

The scoring followed was the method used by Burt. (43) :

> "One mark is awarded for each word correctly spelt. To find the total score, take the number of crucial words, actually dictated and rightly spelt and add to them the number of all the easier words, which in the list precedes those dictated, but were not themselves dictated because presumably known. Thus derived, the score may be regarded as roughly indicating the percentage that the child can spell out of a total number that should form his entire spelling and reading vocabulary at the age of leaving school".

By using words of 50% difficulty, Burt could make use of the following calculation:

> "From this total score a mental age for spelling can be calculated by the following formula:
>
> $$\text{Spelling age} = \left(\frac{\text{Words correct}}{10} + 5 \right) \text{years}$$
>
> From the mental age, in turn, the child's

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(42) M.J. Nelson: Tests and Measurements in Elementary Education.

(43) Burt: Mental and Scholastic Tests.

backwardness can, if required, be directly computed". (44).

6. The Instructions for the Test.

In the Metropolitan Achievement Tests and the Unit Scales Attainment Tests the instructions were approximately the same. (as those of Burt) In the Morrison - McCall Spelling Scales the Examiner pronounces the word, uses it in a sentence, and then pronounces it again, the pupil writing only the word. (45).

The writer copied the instructions in the Metropolitan Achievement Spelling Tests for his preliminary Tests but changed to the type of instructions used by Burt in his final Tests. The change shortened the time of administering the Test considerably and made the Tests more objective; some Examiners being more adept at constructing illustrative sentences than others. The illustrative sentence also divides the child's attention and weakens his concentration. This caused an added difficulty in the construction of the Test. Homonyms had to be discarded.

7. The Scripts or Answer Papers sent out.

Five Hundred Scripts were sent out to four schools and Four Hundred were returned. The average percent words correct were calculated for Standard II and Standard V. This average worked out to 80% and 85% respectively. This was taken as an indication of the percentage to be expected in all Standards. As the percentage

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(44) C. Burt: Mental and Scholastic Tests.

(45) Nelson: Tests and Measurements in Elementary Education.

was too high the writer decided to regrade the Test making the lowest grade Sub B and the highest grade Standard VI. To supply words for Standard VII, twenty new words were selected and sent out to Standards V, VI and V// with the Standards V and VI words already chosen.

When the total words were scaled on approximately 200 spellings of each word, eighty words were chosen from this scale, each word being at approximately a constant interval from the word previous to it and from the word succeeding it. This was then divided into eight lists of ten words each to approximate the eight Standards of Sub B to Standard VII.

The instructions to these tests were changed. The Examiner, when administering the Test, should pronounce each word separately and distinctly, but the words were not to be enshrined in an illustrative context. By changing the instructions so that the Examiner may not enshrine the words in an illustrative context the writer hoped to shorten the time of administering the Test, and also to make the Test more objective. The interference caused by the child paying attention to the context of the illustrative sentences was also avoided.

8. Areas and Schools.

As the great majority of the English Medium Children in the Eastern Cape Province receive their schooling in the five towns of Queenstown, King Williams Town, Grahamstown, East London and Port Elizabeth, most of the scripts were sent to these five towns.

In all, Five Thousand scripts were sent out and approximately Four Thousand returned. Approximately half the scripts were from girls and half from boys.

The scripts were corrected by the writer personally. In many cases an additional check was provided by the Teachers correcting the scripts of their own classes. The number of correct spellings in each class of boys and girls was kept separate and used to calculate the norms.

These norms, if they are proved reliable by use, will be useful in many ways:-

(a) They can be used by the class teachers to compare an individual score or a class score in spelling with that in another subject, if that other subject is also tested by a standardized test. He can thus discover the weaker and stronger subjects of the class.

(b) A teacher, using these Tests, can discover quickly and accurately the spelling strength of his class. From this he will know whether to concentrate more on spelling by seeking better methods, using more time in the teaching of it, and so on,to improve the spelling strength of his class.

If a teacher tests his class at the beginning of the year, then by testing it again in the middle of the year of after the first term, he will be able to discover by how much they have improved, and decide whether their progress is sufficiently rapid or not.

(c) These tests can also be used by the class teacher to compare a class score in spelling in one year with that of the previous year.

(d) They can be used to compare the scores in spelling between different classes, or schools. That is, they can be used in a survey.

(e) They can be used to classify pupils in a class or in the school. If necessary the whole school can

be tested and those of equal spelling strength can be grouped together for spelling instruction. Instruction in the school would be more efficient if this were done. The maximum returns for the teaching done would then be attained.

(f) Promotion from one Standard to another would be more objective and thus more satisfactory if done by standardized tests. The standard of the passes would remain uniform from year to year in spelling as well as in other subjects where standardized tests were being used.

(g) These spelling test norms may be used to discover those children who are backward in spelling and also give the degree of backwardness of the child in the subject.

(h) As schools are not always equal as regards the standard of their pass mark, a new child who has a Transfer Certificate showing a Standard V pass in one school can well be a Standard IV or a Standard VI grade child in a different school. The standardized spelling test used with other standardized tests would show to what grade in the new school the child most closely approximated.

The greatest danger of such standardized tests is that they can give wholly incorrect results in the hands of an unskilled Examiner. This spelling test, administered by someone with a strange accent can give wholly unreliable results, as some of the scripts showed. Yet, used in a class where the children are accustomed to the pronunciation of an instructor, these tests may provide a reasonably accurate objective guage of the child's strength in spelling. Such a mark will be, the writer hopes, of some

small use to the South African teacher.

9. Present Significance of these tests.

In a comparatively simple subject like spelling, the Teacher, the Principal of the school, and the Inspector are equally powerless to guage accurately the strength or weakness of a certain class or school without some standardized spelling test. Having no scientific measuring aid by which to measure spelling, these Educators have to depend on intelligent guessing. Very often the guess is fairly accurate. Yet, very often, a Teacher or a Principal has felt himself unfairly criticised by a superior like an Inspector, because he knows that the Inspector may be mistaken in his judgment.

Inspectors themselves must feel their impotence in giving a true judgment, knowing that children react so violently to certain situations and to "atmospheres". He can never be sure whether their poor answers are due to nervousness or ignorance, or in spelling, to an unfortunate choice of words by himself. In both cases the standardized spelling test may be relied upon to lessen the margin of error in making a decision. Once the Examiner can support his opinion with concrete proof as supplied by the norms of a standardized test, he can give his opinion with greater confidence.

The teacher who is shrewd can easily hide his bad teaching behind easy quarterly tests. Without a standardized test to guage the true strength or weakness of his class, he is safe from discovery and exposure. Even the knowledge that standardized tests were applied in the school at intervals would lessen the temptation to take

life too easy.

Principals are frequently disturbed by the complaints of the Teacher, when taking over a class at the beginning of the year, that his predecessor had handed over an unduly weak class. Without standardized tests no Principal can be sure whether such complaints are just or only due to professional jealousy.

It is every Principal's ambition to use the best method in teaching a subject. Yet, in the teaching of spelling no special method is prescribed by the Cape Education Department. There is, however, no doubt that there are good and bad methods. Anyone revising a large number of scripts from many different schools will discover that some schools are unusually strong in spelling and other schools surprisingly weak. By means of a standardized test a Principal could easily test the spelling strength of his school and so discover whether the method he was using was effective or weak.

A survey of the schools in the Cape Province by means of a standardized spelling test and accompanied by a Questionaire as to the spelling methods employed would supply very interesting and valuable information on effective and ineffective spelling methods.

CHAPTER 2.

ORIGINAL RESEARCH.

1. AIM.

The aim of this investigation is to construct a graded Vocabulary Test in English suitable for English Medium children in Standards I to VI or for primary children of ages 8 upwards, in the Eastern Cape Province, and to find norms of performance for these tests.

As many of these tests were written by Standard VII children as well, a comparison was made of the spelling strength of Standard VII children as compared with Standard VI children in view of the fact that Standard VII children receive no formal instruction in spelling.

The first problem to solve was "What purpose would this educational measurement serve."

Some Educators believe that a proper test should not go beyond the syllabus or curriculum, It should test the teacher's ability in teaching and the child's ability in learning the matter set forth in the curriculum. In other words, it should properly serve the main curricular aim of the subject being tested; and it should properly reinforce good methods of teaching. More and more Teachers, School Supervisors and Administrators are asking that measurements be subordinated to the teaching programme in the interests of the child. (46)

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(46) Purposes of Educational Measurement. Dr. G. Wilson. 1929.

2. SCOPE.

The test is planned to be valid in all Standards from I to VI in English Medium classes in the Eastern Cape Province if applied at the end of the school year.

Although standardized in class groups, a formula is provided by which a normative reading for age groups can be obtained. By means of this formula the test can be used to find the mental age in spelling of a group, or of an individual.

The test is intended primarily for the class Teacher, but may be of use to the visiting Inspector or Investigator. It is not accurate enough to be used as a laboratory instrument by the psychologist.

Used alone the test will indicate only the spelling strength or weakness of a class or an individual. It cannot indicate the strength or weakness of the classroom methods or the efficiency of the instruction of the Teacher unless the results obtained are linked with those obtained from intelligence tests in the same class.

The test is only a measure, not a form of instruction. It has no diagnostic value, other than that of general spelling weakness or strength..

Some spelling tests have classification as their chief function. They are constructed for the purpose of separating bad spellers from good spellers. They are not subordinated to any syllabus and are not constructed to aid or test good teaching methods. The Starch Spelling Test and the Spelling Test in the Stanford Achievement Tests are spelling tests of such a sort. They serve a vocational aim in that they separate good spellers from bad spellers and contain words which no primary child would ordinarily have to spell.

Tests constructed for the use of Teachers in the class-

room differ in both source of words and construction from these.

The writer's aim in constructing these tests was to provide a measuring instrument suitable for classroom use, and which would reinforce good teaching methods.

3. THE CONSTRUCTION OF THE TESTS.

1. Source book of words.

The writer therefore sought a collection of words which would be wide enough to cover all the probable words used by a primary school child and yet difficult enough not to give too many hundred per cent scores.

The first list inspected by the writer was "A Standard Spelling List" by W. Boyd. (47).

Boyd's Standard List of 2400 words was suitable in many ways. The sources were sound. The list had been constructed from some of the best American Scales. To this Boyd added some words obtained by original investigations done by himself. The whole list was submitted to careful testing so as to obtain a correct grading. The disadvantage was that the words appeared in large groups, groups so large that the writer dispaired of getting as close a grading as he would have liked. For instance under I A we have

(a) 420 words;

(b) 108 words;

(c) 36 words.

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(47) W. Boyd: Measuring Devices in Composition, Spelling and Arithmetic.

A similar wide grouping appeared under - I B etc.

The words in his spelling scale, although scaled from easier to more difficult, were not therefore as conveniently graded as the words in either Thorndike's"Teacher's Word Book"(48) or Gates' "Spelling Difficulties in 3876 Words". (49). The "Teacher's Word Book" appeared unsuitable because it contained too many words, 10,000, and Thorndike himself mentions that his book is not a spelling scale but a Reading scale. A reading scale is wider, much wider than a spelling scale and almost two grades ahead of a spelling scale in difficulty. (50).

Gates's book was a spelling scale, apparently well constructed and very conveniently scaled. Next to each word was the approximate grade placement. The words appeared in alphabetical order. This book appeared the most suitable one to choose. The grade placements were from 2.0 to 8. This appeared to cover the needs of the test planned. Words appeared in this list from 2, 2.1, 2.2 etc. up to 8,in numbers given up to two decimal places. If these grade placements applied to South African children it would save the writer the difficult and laborious work of scaling the words himself. In the hopes that this would be the case, the writer chose this book as his chief source book. Other books consulted were: "Essentials in Teaching and Testing Spelling" by Fred J. Schonell; "The S.A.O.U. Spelling List"; "Juta's Spelling Lists"; Maskew Miller: "Easy Steps in Spelling"; "The Canadian Spelling Scale" by Stottart and Stotgart.These scales were all considered un-

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(48) Thorndike: The Teacher's Word Book. Teachers College. Columbia Univ. N.Y. 1937.

(49) Gates: Spelling Difficulties in 3876 words.

(50) Burt: Mental and Scholastic Tests. P.287. 1927 Edition. P.S. King & Son, London.

suitable for the same reason that the writer rejected "The Standard Spelling Scale" by W. Boyd.

2. Method of choosing the words.

Gates' "Difficulties in 3876 Words" is a spelling scale of 3876 words constructed from the most common words in several State and City lists used in New York. Presumably these lists were based on well constructed standard lists, but as Gates does not give a list of the sources, there is no way to be sure. The writer therefore decided first to choose the words he needed, and then to check them with wellknown spelling scales, keeping only those common to two or more scales. They were checked with Thorndike's "Word Book." Only the first 1000 words. The first thousand are those most commonly used. They were also checked with Boyd's "Standard Spelling List" and Schonell's "Spelling Scale", and with "The S.A.O.U. Spelling List". There was now a reasonable guarantee that the spelling test constructed by the writer would include only words that would appear in a normal primary spelling syllabus.

Boyd's "Standard Spelling List" is a Scottish Spelling Scale of 2400 words, constructed from some of the best American Spelling Scales and from some original investigations of his own. (51)

Schonell's Spelling Scale (52) has 3200 words and is especially constructed for London children. The words were drawn chiefly from two sources. Original investigations done by Schonell himself, and from Horn's "A Basic Writing Vocabulary."

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(51) W. Boyd: Measuring Devices in Composition, Spelling and Arithmetic.

(52) Schonell: Teaching and Testing Spelling.

The "S.A.O.U. Spelling List" is a South African Spelling Scale of 1600 words, containing the words common in the following scales:-

"The Standard Spelling List" - Boyd - 2400 words;

Buckingham's Extension of the Ayres's Spelling Scale - 1505 words;

"The Improvement of Spelling in Schools" by Murray Brown - 5300 words;

Juta's Rational Spelling Lists.

At the same time the grading given in Gates' Scale was checked with that given by these other scales mentioned, as shown in Table I.

TABLE I.

Comparison of Grade Placements in Various Lists.

Words	Gates Av.G.P. Grade	Equiv. S.A. Stds.	Schonell Scale English Stds.	S.A.O.U. S.A. Stds.	Boyd S.A. Stds.	G.P. by writer
lily	6.5	4.5	3	3d	3b	5
bruise	6.6	4.6	-	-	5b	6
flesh	6.6	4.6	3	-	-	4
protect	6.67	4.67	4	-	4a	4
author	6.7	4.7	5	-	5b	5
necessary	6.8	4.8	6	6c	5b	5
handsome	6.9	4.9	5	-	5c	5
coarse	7.0	5	-	-	5b	6
absence	7.0	5	6	5d	5b	5
rural	7.13	5.13	5	-	5c	5
decent	7.3	5.3	-	-	5b	5
insult	7.3	5.3	6	-	-	4
Av.						

Av. G.P.: A verage Grade Placement.

American Grades and South African standards are

not equivalent. Therefore an American Grade Placement has to be corrected to apply to a South African standard.

American children enter Grade I at six. South African children enter Sub A at six. It appears to be correct to subtract two from the American Grade to get the South African Standard. This I have done in the second column of the above table to show the grading in South African Standards.

As Boyd divided his lists into three, I, II and III, to correspond to the ages of 10, 11, and 12, I have used the average age for the South African standards on June 4th, 1946, given in the Report of the Superintendant General of the Cape of Good Hope to attach the corresponding standard to his lists so as to fill in column 5 for purposes of comparison.

TABLE 2.

The Median Age of European Pupils in each Primary Standard on 4th June, 1946. (53)

Std.	Age	Age in Whole numbers in November.
Sub A	6.78	7
Sub B	7.72	8
I	8.66	9
II	9.66	10
III	10.7	11
IV	11.74	12
V	12.8	13
VI	13.79	14

This would make list I suitable for Std. II at

(53) Cape Education Department : Report of the Superintendent General of the Cape of Good Hope. 1946.

the end of the year or Std. III at the beginning of the year. The impression Boyd (54) gives is that the ages are intended to apply at the beginning of the year.

Age 10 would be equivalent to Std. III;
Age 11 would be equivalent to Std. IV; and
Age 12 would be equivalent to Std. V.

Using that interpretation the writer filled in the fifth column of figures headed: Boyd: in South African Standards.

The final column shows the standard in which the words were placed after the writer had scaled the words himself on the results of his first preliminary tests.

In the main the words are, therefore, correctly graded in Gates' Spelling Scale. If the writer prepared further spelling tests, he would avoid the work of re-scaling the words given in Gates' Scale and use them as given. Apparently the words as scaled in Gates' list apply equally well to South African children. There were a few words which did not. Rescaling could be avoided by discarding such words after the results of a preliminary test were examined.

Procedure for choosing words out of Gates' "Difficulties in 3876 Words" :

As the writer planned in the first place to have 15 words for each class from I to VII, he decided to choose 17 for each class and discard 2 of the least suitable words for one reason or another after the scripts of the preliminary tests were examined. The total number of words needed would be 7 x 17 = 119. There were 154 pages of words in the book. Each page contained words of all grades arranged in alphabe-

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(54) Boyd: Measuring Devices in Composition, Spelling and Arithmetic. Harrap. London. 1924

tical order. 154 ÷ 17 gave a quotient of 9. The writer decided to choose one word on every ninth page for list I by starting on the first page of words, for list II by starting on the second page of words, for list III by starting on the third page of words, and so on, taking every ninth page in each case. In this way the test words would be a fair sample of the words in the book.

On page one, the first grade 2 word, encountered, was taken. On page 10 (9+1) the first grade 2 word, not equal in grade placement to the one already taken, was accepted and so on. List I was as follows:

All (2.2); an (2.1); bring (2.5); cold (2.3) and so on. As there are only ten decimals and 17 words to be chosen, intermediate decimals were accepted such as, winter (2.46), school (2.42) or if these did not occur doubles were accepted such as:

all (2.2) and do (2.2); from (2.3) and it (2.3) and so on.

Once list I was completed, list II was begun. The first word was chosen on the second page of words, the second word on the 11th page and so on every nine pages later. List III was started on the third page of words and so on.

When words of an obvious American flavour like "federal" were encountered, they were passed over for the following suitable word more generally in use. Words like "auto", which does not appear in Chambers 20th Century Dictionary, Large Edition, ~~was~~ were also passed over.

3. The Preliminary Tests.

These lists were then typed out as shown with the following instructions:

S P E L L I N G T E S T.

Instructions for administering The Spelling test.

(a) In administering the test the examiner or teacher of the class should begin by dictating the words set for the standard below the one to be tested so as to give the weak spellers a chance to score. The examiner will then follow on by dictating the words set for the standard actually writing the test and then follow on by dictating the words set for a standard higher so as to give the good spellers a chance to score less than full marks.

In administering the test to the class before him the examiner will, therefore, dictate three lists of words for the test, the list for the standard lower, the list set for the standard, and the list for the standard higher.

Example:

When testing Standard IV for instance the examiner would have to dictate the 17 words set for Standard III as well as those 17 set for Standard IV and he would complete the test by dictating the 17 words set for standard V as well. A test therefore consists of 51 words in all.

N.B. These are PRELIMINARY TESTS and it is the intention of the designer of these tests to discard seven of the less suitable words in each list of seventeen when he receives the completed tests from the schools. The test in its final form will, therefore, contain only ten words in each list, making a total of thirty words for each full test.

(b) The examiner should pronounce each word without syllabification, use the word in a suitable sentence to bring out its meaning, and finally say the word again.

(c) All 51 words of the test should be given in ONE lesson if possible.

(d) There is no time limit. Pupils should be given adequate time to complete each dictated word.

(e) Schools which have classes for backward pupils should have the tests administered to these classes.

(f) Care should be taken to administer the test under examination conditions. Copying or previous knowledge of the contents of the test would render the results valueless and would cause the final norms to be inaccurate.

The writer wishes to express his grateful appreciation of the help rendered by teachers who kindly administer these tests and he hopes that the final tests will provide them with valuable help in guaging the strength of their classes each year in spelling.

V.H. Knipe,
Seymour Secondary School,
Seymour.

(For the actual words of the test, see Apendix I).

An attempt was made to get the co-operation of the various teachers who were acting as examiners, by informing them on such matters as the length of the final test. Any teacher dictating 51 words in one lesson would need a reason for doing so.

An alternate test was originally planned, but the work involved in getting suitable norms for this test made it impossible at present to complete norms for a duplicate form of the test.

Actually no school sent in returns or scripts written by backward pupils or pupils in special classes.

A form was provided on which certain particulars were asked. Except for the statement of the standard, none of the particulars asked for on this form were used in later computations.

The tests were sent to four schools, two in towns and two in the country:

Vincent Primary School, East London	114 pupils.
Grey Junior School, Port Elizabeth	450 pupils.
Cathcart High School, Cathcart	83 pupils.
Victoria East Secondary, Alice	72 pupils.
	719

When the 700 completed scripts were returned, they were corrected personally by the writer.

Each word correct scored one mark. Each wrong word scored 0. So the marking was of the "all right" or "all wrong" type.

4. Results and possible changes.

It was noted that in many schools about 10% of the pupils scored a hundred percent. On an average, for all pupils in II and V, the respective scores were 80% and

85% in round numbers.

A second factor appeared clearly from these scripts. Too many words in the same list were equally difficult. In the Std. V list for instance, every child in Std. V scored full marks for three of the words in the list in the scripts returned from the Vincent Primary School, and another five words, in that list of 10, were spelt incorrectly only once. In other words, the words were too closely grouped or scaled. If possible a wider spacing should be obtained.

New words would have to be chosen and new preliminary lists prepared or a suitable alteration would have to be planned and made to the existing lists.

Two factors contributed to make a suitable alteration possible.

(1) Following the lead of Burt and other testmakers the writer had decided to change the number of words in the final test from 15 to 10. This gave 7 discards instead of 2 for each list. This factor could be used to widen the spacing of the existing words.

(2) A second factor was that all classes had written the list assigned to the class above it.

As Standard II had written the Standard III list as well as the Standard II list, and Standard V had written the Standard VI list as well as the Standard V list, average scores were worked out for these results. These worked out to 68.5% correctly spelt by Standard II and 65.3% correctly spelt by Standard V. This gives an improvement of ± 16% per year. As this was nearly the scores planned by the writer, it was considered satisfactory. These scripts were written in September and so the writer could expect 4% improvement (i.e. $\frac{1}{4}$ of 16%) in all scores

after another term's work. This would bring the present scores of 68.5% and 65.3% to approximately 70%. As this seemed satisfactory, it was resolved to make the lowest group of words equivalent to Sub B instead of Standard I and the highest equivalent to Standard VI instead of Standard VII.

Twenty new words were chosen from the most difficult section of the words in Boyd's Standard Scale i.e. from the III C list of 120 words, in the same manner as before.

Being far from a library the writer had kept three approximately duplicate lists of Boyd's words from Section III C in case the VII words proved too easy in the preliminary tests. These three lists of 17 words were prepared by taking every 8th word in the list in each case. This gave 17 words in each case. A total of 51 words. 20 Words were now chosen from this list by accepting every second word, and discarding homonyms and words already on the preliminary lists. 20 Words were chosen so that 10 could be discarded if too easy, too similar in difficulty to one of the other words in the 20, or too difficult, when the test scripts were returned.

To prevent the close groupings of certain words from upsetting the norms unduly, the writer decided to place the words on a scale or chart and choose the 70 words, needed for the final tests,from words approximately equally spaced on this chart or scale, and then to add the ten most suitable for Standard VII after the 20 set for 7 had been added to this chart, as previously explained.

5. Scaling or grading of the Words.

A typical example of how the writer regraded the words may be given by considering the grading of the lists set in

the preliminary tests for Standards II and III.

The statistical technique evolved for selecting such test problems (where interval of difficulty which separates problem one from problem two should, it is said, be identical in magnitude with interval of difficulty which separates problem number two from problem number three, and so throughtout the series) differs with different investigators and for different subjects; in every instance it is cumbrous and obstruse. Certainly for the uncompromising precision of the scientist's research, a technical unit, intelligible only to the initiated - the "probable error", the "percentage difference", or the "standard deviation" - must in the end be unavoidable. (55) But, for ordinary use in ordinary hands, something simpler would have to suffice. The writer therefore decided to rank or scale the words on approximately 200 spellings of each word after correcting and tabulating the number of correct spellings of each word.

According to the instructions sent out with the preliminary tests, each list was written by three classes, the class below, the class above, as well as by the class to which it was particularly assigned. This meant that in each case two succeeding lists were written by identically the same pupils. This fact provided a basis upon which to evolve a method of scaling or ranking the words which would be reasonably accurate. The data used to rank the words is given in the Table on Page 42.

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(55) Burt: Mental and Scholastic Tests.

TABLE 3.

	SCORES MADE BY STANDARDS I & II ON 221 SPELLINGS					SCORES MADE ON THESE WORDS BY STDS. II & III ON 236 SPELLINGS ALLOTED SCORES FOR RANKING ON SCALE CHART TABLE 5				SCORES MADE BY STANDARDS III & IV ON 236 SPELLINGS				
	ALOTTED SCORE FOR RANKING ON SCALE CHART TABLE 5					RANKING ON COMBINED SCORES OF STANDARDS I & II				RANKING ON COMBINED SCORES OF STANDARDS II & III				
	RANKING ON SCORE OF STD. I ALONE					RANKING ON COMBINED SCORES OF STANDARDS I, II & III				RANKING ON COMBINED SCORES OF STANDARDS II, III & IV.				
	RANKING ON COMBINED SCORES OF STANDARDS I & II					SCORES MADE BY STANDARDS I & II				SCORES MADE BY STANDARDS II & III				
	WORDS FOR STANDARD I					WORDS FOR STANDARD II				WORDS FOR STANDARDS III.				
N° of Column →	1	2	3	4		5	6	7	8	9		10	11	12	13	14
hop	184	12	10	186	rolled	84	17	17	Same scores here as in column 5 due to close agreement in columns 6 & 7	122	above	186	11	11	149	and so on.
bail	190	10	12	189	never	191	5	6		220	forget	201	8	7	168	
him	211	4	4	211	two	203	3	3		223	awake	202	6	8	169	
all	205	5	3	207	aunt	127	16	14		180	iron	94	15	15	58	
hat	214	1	1	214	lip	169	10	10		202	near	189	10	9	152	
cold	183	13	13	183	hair	134	14	15		190	guess	77	17	17	43	
did	212	2	5	210	egg	193	7	7		220	peas	183	12	13	138	
little	200	7	9	198	pat	208	2	2		221	eating	208	4	4	178	
of	183	11	8	186	pull	131	15	16		188	limp	211	2	3	181	
pig	212	2	2	212	broke	140	13	12		176	bright	201	7	6	170	
tree	204	6	7	204	coat	184	8	9		212	roof	210	3	2	182	
sun	193	9	11	191	spring	191	6	5		222	silver	191	9	10	154	
fall	173	16	15	173	fire	158	11	11		195	clover	181	13	12	144	
run	199	8	6	201	about	183	9	8		211	December	114	14	14	77	
tell	176	15	16	176	dead	150	12	13		190	trip	212	1	1	184	
ma(m)ma	97	17	17	97	into	218	1	1		233	spin	203	5	5	172	
bring	180	14	14	180	wing	199	4	4		222	quite	85	16	16	50	

Next to the list of words for standard one is the first column of figures numbered column I. In this column was recorded the number of correct spellings made of the word by 221 pupils in standards I and II. In column 2 are the positions or order of the scores. The highest score corresponding to the easiest word was taken as number 1 and the lowest score or most difficult word as number 17. Next to that in column 3 will be found the positions of the scores when standard I alone was taken into account. If the positions or order of the words in these two rankings differed by much, the number corresponding to the correct spellings was advanced or lowered to allow for this difference. Column 4 gives these allotted scores.

The first four columns, numbers 5, 6, 7 and 8, were completed in the same way for the second list of words. As these figures were scores made on different words by identically the same pupils, these 34 words, comprising list one and two, can now be scaled or ranked from easy to difficult and the scores can indicate the spacing between the words. As there were 221 children in this group, it was easiest to number a page or chart from 221 to nil and fill in each word opposite the line carrying the figure shown in column 1 or column 5. Thus "hop" stood opposite number 184 and "rolled" stood opposite number 84. (For Scale Chart see Table 5), P48.

The next step was to fill in the words of the third list on to this page or chart. In column 9 are given the numbers of correct spellings of the words in list two i.e. rolled, never, two etc, made by a group of children in II and III numbering 236. The spaces between these numbers are actually $\frac{221}{236}$ of the size of the spaces between

the numbers on the chart or scale page because 236 spaces must fit into a space made for 221 spaces. This fraction

$$\frac{221}{236} = \frac{220}{240} = \frac{11}{12}$$

approximately. This fraction is convenient for converting the spaces between the words as given in column 10 if and when necessary.

In columns 10, 11, 12 are given the raw scores and the rankings respectively made by this new group of children similarly to those made by the previous group in columns 1, 2, 3 and 5, 6 and 7 as explained then.

Note that the value of the numbers in column 9 and column 10 are approximately equal. These scores having been made by an identical group of children on different words. Hence a score of 212 in column 9 for the word "Coat" in list 2 and a score of 212 in column 10 for the word "trip" in list 3 mean that the word "coat" and the word "trip" are identically equal in difficulty to that group. As equal as scores obtained from pupils usually are. Hence the word "coat" and the word "trip" must appear opposite the same number on the page of scaled words. As "coat" appears opposite the number 184 in column 5, so "trip" is allotted the number 184 also and will appear on the same line next to "coat" on the page of scaled words. By choosing words with a ranking fairly constant as shown by the ranking in columns 11 and 12, and at the same time evenly spaced from each other in ranking as trip (1st), eating (4th), forget (7th of 8th), clover (12th) and so on; a framework of words was placed on the ranking chart by means of the equivalent scores given in columns 10, 9 and 5, as illustrated above with the words "trip" and "coat".

By using this framework as a guide and the fraction $\frac{11}{12}$, the other words on the third list were placed on the ranking chart in approximately correct positions. Thus the word "trip", being placed at No. 184 on the chart next to "Coat", the next word is "eating".

"Eating" shows a score of 208 in column 10;

"Lip" shows a score of 202 in column 9;

"Coat" shows a score of 212 in column 9.

Hence the score 208 lies 6 positions above "lip" and 4 positions below "coat". On the scale chart, as also in column 5, the chart number for "lip" is 169 and for "coat" is 184, a difference of 15. The scale chart number should be $\frac{6}{10}$ of 15 or 9 positions above "lip" or $\frac{4}{10}$ of 15 or 6 positions below "coat". This gives "eating" a scale chart number of 178. "Forget" is placed in the same way at 168 because it was only one position less than "lip" in the scores shown in columns 10 and 9 respectively. "Clover" was not placed on the scale chart on an allotted score in column 13 of 128, as it would have been had its relative score only been considered. The score against "clover" in column 10 is 181 and so, compares closely with the score 180 for "aunt" in column 9. One would therefore give it a score slightly above the allotted score for "aunt" in column 5, which is 127. But such an allotted score of 128 would change its ranking in column 13. To keep it in the framework and in its correct ranking position, it receives the allotted score of 144. As its ranking position is 12 in column 12, it must be about four of five places below the word ranked 11th i.e. the word "above", because the raw score in column 11 for "above" is 186, and for "clover" is 181, a difference of 5. Using the conversion fraction of $\frac{11}{12}$ we get $5 \times \frac{11}{12} \quad 4\frac{7}{12}$ which is equal to 5. Hence, if the allotted score for "above"

is 149, that for "clover" is 144 and not 128. So also for the word "near" and so on.

In every case the order of the words given in the ranking columns 11 and 12 was maintained, as it seemed that the ranking or order of the words was all important in constructing a scale of words. The scheme is certainly not foolproof, but seemed adequate for the purpose. Succeeding lists were fitted into the scale chart in a similar manner. When all the 221 spaces on the chart were used up in finding the correct positions of words, further spaces were provided by marking from 0 onwards to -10, -20, -30 etc. to -75. The whole chart consisted of 221 + 75 spaces, a total of 296 spaces and 119 words.

6. Procedure for choosing the test words.

Words were chosen from this chart in the following manner:

Because the earlier tests were too easy, the writer decided to choose only 70 words from this scale chart and allot them in lists of ten words to Sub B, I, II, III, IV, V and VI. To do this an estimate of the spacing between the individual words on the scale chart had first to be made so that 70 words, fairly equally spaced from each other and spread over the whole of the chart, could be chosen. It appeared that this could best be done by choosing ten words in each case, as evenly spaced as possible, which fell between the following numbers on the scale chart, known as Table 5.

These numbers, with the total number of spaces between each, are given on the next page in Table 4.

SPACING TABLE.

TABLE 4.

221 and 193	28 spaces
193 and 163	30 spaces
163 and 133	30 spaces
133 and 97	36 spaces
97 and 62	35 spaces
62 and 10	52 spaces
10 and -44	54 spaces

Towards the latter part of the scale, words scattered or spaced themselves out very widely. There seems no good reason for this except that an interval of difficulty in the lower standards would mean very much less in the upper standards. Hence, a chart started with spaces suitable for an interval of difficulty suitable for lower standards, would find these spaces greatly extended when used in the upper standards.

As this did not change the essential ranking of the words, the writer does not consider it as a serious fault, as he was using words already ranked as regards the limit values i.e. the values of the easiest words and the most difficult words.

If a word was a homonym or could be easily mispronounced like "peas" which could be understood as "piece" or "peace", it was discarded and the nearest word taken in its place. If it had two forms, like "mama" or "mamma", it was also left out.

TABLE 5.

Scale Chart or Ranking Chart.

221		172	spin (8)	121		68	
220		171		120		67	guide (9)
219		170	bright	119		66	
218	into (1)		finger	118	negro(3)	65	
217		169	lip	117		64	guard(10)
216			awake (9)	116		63	
215		168	forget	115		62	
214	hat (2)	167		114		61	
213		166		113		60	stationary
212	pig (3)	165	save (10)	112		59	
211	him	164		110		58	iron (1)
210	did (4)	163		109	dearest	57	
209		162		108	nature(4)	56	author(2)
208	pat	161		10	instead	55	handsome(3)
207	all (5)	160		107	stage(5)	54	instruct(4)
206		159		106	rush (6)	53	
205		158	fire (1)	105	deal (7)	52	
204	tree (6)	157	peach (2)	104		51	personal(5)
203	two	156	split	103	provide(8)	50	quite (6)
202		155		102		49	
201	run (7)	154	silver (3)	101		48	
200		153		100	simple(9)	47	
199	wing (8)	152	near (4)	99		46	
198	little (9)	151		98	eighteen	45	sound (7)
197		150	dead	97	treatment(10)	44	
196		149	above	96		43	guess
195		148	cloud (5)	95	flesh (1)	42	
194		147	proud	94	clothing	41	social
193	egg (10)	146	able	93		40	rural
192		145		92	protect (2)	39	satisfactory (8)
191	never	144	silly (6)	91	insult (3)		
	sun	1	clover	90		38	maintain
	spring	143		89		37	debate (9)
190		142		88		36	attention
189	ball (1)	141		87	education(4)	35	
188		140	broke (7)	86	buildings	34	absence
187		139	August (8)	85		33	
186	hop,of (2)	138	peas	84	rolled (5)	32	
185		137		83	firm	31	
184	trip,coat	136	edge (9)	82	likely (6)	30	
183	cold	135	instead	81	abuse	29	trimmed
	about (3)	134	treated(10)	80		28	
182	roof	132		79		27	patient
181	limp	131	pull (1)	78		26	
180	bring (4)	130		77	December(7)	25	
179		129		76		24	
178	eating (5)	128		75			etc
177		127	aunt (2)	74			---oOo---
176	tell (6)	126		73			
175		125		72	loose (8)		
174		124		71			
173	fall (7)	123		70			
		122		69			

To the test words so chosen ~~was~~ were added under standard VII the 20 words chosen from Boyd's book. When the final scripts or answers were received, the 10 most suitable words were chosen, as explained later. Only the 10 words chosen were used to provide scores for the final calculations.

7. Changes in the Final Instructions.

After practical experience with the test, the writer felt that the greatest disadvantage of such a test was the time needed to administer it. The teacher who uses it would want to make a rapid survey of his class. If each list comprised 15 words, as at first planned, it would mean dictating 45 words. Not only would this take more time than most teachers would like to use for spelling in one day, but the child would become tired and bored before the end of the test. Added to this would be the laborious task of correcting scripts with such a long list of words.

The first improvement should be the reduction of the number of words to be dictated. Following C. Burt's (56) lead, I made each list ten words only.

The instructions were also changed to read:-

> When administering the test, the teacher should employ as wide a range of test words as possible. To set the class, only the ten words assigned to it is not enough. It is necessary to set the class not merely the ten words assigned to it, but also the ten words assigned to the class below and to the class above it. To test any class or individual, at least thirty words have to be dictated in the test. Therefore, the minimum number of words which may be dictated to any standard above Sub B, is thirty, if the conditions of this test are to be fulfilled.

In dictating such a list, each word should be pronounced separately. The enunciation should be quite

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(56) C. Burt: Mental and Scholastic Tests.

distinct and moderately slow, without, however, any dislocation of the syllables. The words may be repeated if necessary, but are not to be enshrined in an illustrative context. No time limit is imposed.

Answer papers are supplied on which the answers are to be written after the particulars asked for on the answer papers have been filled in. (See Appendix 2).

The reason for the change to "The words may be repeated, but are not to be enshrined in an illustrative context" is as follows:-

(i) The change shortened the time of administering the test;

(ii) It made the test more objective, some examiners causing too much disturbance by their witty or pointed sentences;

(iii) Any sentence, by its context, distracts the pupil's attention and lessens his concentration.

8. Procedure for choosing Schools and Scholars to be tested.

The Schools in the Eastern Province which carry 100 or more English Speaking Primary pupils may be roughly classed under four headings:-

(1) The large boarding schools, with many primary school boarders and the better class day school pupils from the town in which they are situated. They are usually situated in our larger towns;

(2) The large primary English Medium Suburban or priviliged or fee paying schools in the larger towns, like Grey Junior in Port Elizabeth;

(3) The small country school or the larger country high school carrying small English Medium classes and large Afrikaans Medium classes;

(4) The large English Medium primary school or parallel medium primary school situated in the working class areas of the larger towns.

In grouping these schools it seemed correct to group (1) and (2) together, and (3) and (4) together.

After this grouping had been made, examination papers were sent out to schools in these groups so as to have approximately equal numbers of papers from the first group comprising categories (1) and (2), and from the second group comprising categories (3) and (4). At the same time an attempt was made to have about 2000 of the answers from boys and about 2000 from girls.

To ensure this, over 5000 papers or scripts were sent out.

Only English speaking pupils were asked to write the test.

9. Distribution of pupils according to the number of scripts returned.

Both the English boarding schools and the English primary schools with day scholars were to be found chiefly in the Eastern Province towns of some size like Port Elizabeth, East London, Grahamstown, Uitenhage, King Williams Town and Queenstown. The tests were sent to the schools under the School Boards of these towns, and to several country schools.

The tests were sent to five large boarding schools, three large suburban primary schools, eight primary schools in the poorer suburban areas, and six country schools.

TABLE 6.

	Boys	Girls	Total
The Boarding Schools	750	337	1067
The better class primary schools	236	491	727
Totals	986	828	1814
The poorer class primary schools	731	645	1376
The country day schools	255	216	471
Totals	986	861	1847
Grand Totals	1972	1689	3661

The numbers of scripts received, as recorded above, shows that if this grouping is correct, that an approximately equal number of poorer class children and better class children wrote the test.

From the names of the towns mentioned, and due to the inclusion of English Speaking country children as well, it will be seen that a fair sampling of the school-going English Speaking population in the primary schools was tested.

Wherever a school had primary and secondary classes, a request was made to the Principal to set the test to the standard VII class. A very poor response was received to this request, hundreds of scripts being returned unwritten, although in every case the primary classes in the same school wrote the test. The total of Standard VII scripts received were: 86 boys and 109 girls = 195 pupils.

TABLE 7.

The distribution of scripts according to classes were:

Boys:

	Sub B	I	II	III	IV	VI	VI	VII	Total
	133	247	285	346	326	265	284	86	1972

Girls:

	Sub B	I	II	III	IV	V	VI	VII	Total
	188	254	223	266	253	199	197	109	1689
Totals	321	501	508	612	579	464	481	195	3661

These scripts were sent out at the beginning of November 1948. About half were returned about the middle of November, i.e. were written before the final examinations; the rest were returned during the first few days of December. These were completed after the final examinations.

10. Method of Correcting the final Scripts and computing the scores.

When the completed scripts were returned, they were corrected by the writer personally. Many of these scripts had already been corrected by class teachers. These were again corrected by the writer and the teacher's corrections provided a valuable double check.

200 Standard VI scripts were examined, and the scores made in each of 20 words assigned to standard VII in these scripts were compared with the scores made in each of the 10 words assigned to standard VI. In this way the 20 words were entered on the Scale chart as described on page 44 of this thesis. The ten most suitable words out of these 20 were chosen and the rest crossed out of the scripts as redundant.

This left only 30 words on each standard VI script.

In scoring the test, one mark was awarded for each word correctly spelt.

The instructions to the examiner were that he should employ as wide a range of test words as possible. The words for the standard below and for the standard above should at least be included.

This instruction lead to the pupil in Sub B standard writing a total of 20 words, and all the pupils in the other higher primary standards writing a total of 30 words each.

As one mark was awarded for each word correctly spelt, the total score for a pupil could be found in the following manner:

Take the number of crucial words, actually dictated and rightly spelt, and add to them the number of all the easier words, which in the list precedes those dictated, but which were not themselves dictated because presumably

known. Thus derived, the score may be regarded as roughly indicating the percentage that the child can now spell out of the total number that should form his entire vocabulary in that standard.

Thus a child in Sub B scoring 15 words correct, would have a score of 15, having written the first and second list of words. A child in standard I scoring 15 words correct would have a score of 15 also, having written lists 1, 2 and 3. But a child in standard II scoring 15 words correct, would have a score of 15+10 because of the 10 words in list 1 which he had not written, but presumably he had known, having written lists 2, 3 and 4. So also the child in standard III would have 20 added to the number of words he had written correctly and so on.

11. Method of converting a standard score to an age score.

Once an average score for the standard had been obtained, it would be convenient to have a formula for converting such a score to one which would give the Spelling Age, or mental age in spelling.

The Median Age Table for European primary pupils in the Cape Province of South Africa is given in the "Report of the Superintendent-General of Education for the year 1946. This information is set out as follows:

TABLE 8.

Median Age of European Pupils in each Primary Standard on 4th June 1946.

Standard	Age on 4th June	Age in November (This column was supplied by the Author)
Sub A	6.78	+ .42 = 7.(2)
Sub B	7.72	+ .42 = 8.(14)
Standard I	8.66	+ .42 = 9.(08)
" II	9.66	+ .42 = 10.(08)
" III	10.7	+ .42 = 11.(12)
" IV	11.74	+ .42 = 12.(16)
" V	12.8	+ .42 = 13.(22)
" VI	13.79	+ .42 = 14.(21)

In Columns 1 and 2 are given(57) the figures from the Superintendent-General's Report. Column 3 has been added by the writer adding $\frac{5}{12}$ or .42 to the age of the pupils on June 4, because November 4 is five months later. Using only the whole numbers, we have the following easy calculation to get the mental age for spelling:

$$\text{Spelling Age} = \left\{ \frac{\text{Words correct}}{10} \right) + 7 \right\} \text{ years}$$

This formula was arrived at in the following way:

To each standard between Sub B and standard VII, 10 words are assigned. This is equivalent to saying that to each age between 8 and 15, ten words are assigned. These are words which are spelt correctly by approximately 60 to 80% of the age group specified. By virtue of this arrangement a child so tested can at once be awarded an approximate mental age for spelling.

Of the children aged between ten and eleven, for example, about 70% can spell the ten words from "pull" to "treatment". That is, the average child can spell correctly seven out of the ten words set for his standard. At 11 years old, therefore, that is, half a year later, the average child can spell another 3½ of these words correctly, and by implication the 30 easier words preceding them, i.e. 40½ words in all. Consequently, a score of approximately 40 words indicates a mental age for spelling at 11.

If 40 words correct indicate a spelling age of 11, then 50 words correct indicate a spelling age of 12, and 60 words correct indicates a spelling age of 13, and so on.

Hence we have again:

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(57) Cape Education Department: Report of the Superintendent-General of Education for the year 1946. Mercantile Atlas Printing Co. Cape Town.

$$\text{Spelling age} = \left\{ \frac{\text{Words correct}}{10} + 7 \right\} \text{ years}$$

From this mental age, in turn, the child's backwardness can, if required, be directly computed.

Spelling ages for boys, calculated from this formula by using the writer's norms as the average number of words correct, and compared with Table 8, i.e. the 1946 Median Age Table, are shown below.

TABLE 9.

Standards	November Median Age Table in years (to nearest whole no.)	Spelling Age = $\frac{\text{Words correct}}{10} + 7$	Spelling age to nearest whole no.
Sub B	8	8.06	8
Standard I	9	8.91	9
" II	10	10.2	10
" III	11	11.26	11
" IV	12	12.1	12
" V	13	13.1	13
" VI	14	13.76	14

Spelling ages for girls, calculated from this formula by using the writer's norms as the average number of words correct and compared with the ages given in the 1946 Median Age Table for the Cape Province, are given below:

TABLE 10.

Stds.	November Median age table in years (to nearest whole no.)	Spelling age = $\frac{\text{Words correct}}{10} + 7$ for Boys	nearest whole no.	Spelling age = $\frac{\text{Words correct}}{10} + 7$ for Girls	Spelling age to nearest whole no.
Sub B	8	8.06	8	8.27 (8¼)	8
Std. I	9	8.91	9	9.06 (9)	9
" II	10	10.2	10	10.22 (10¼)	10
" III	11	11.26	11	11.39 (11)	11
" IV	12	12.1	12	12.45 (12½)	12
" V	13	13.1	13	13.24 (13¼)	13
" VI	14	13.76	14	13.86 (14)	14

From this table it can also be seen that girls are superior to boys in spelling. On the average this advancement appears to be about three months. This is one of the most striking examples of sex differences.

12. Method of Calculating the Norms.

From the scores made by counting correct words for each standard with boys' and girls' scores kept separately, separate averages were calculated for boys and for girls for each standard. These averages represent norms.

A norm in this case may be defined as representing the average achievement of groups of pupils under present school conditions.

Another definition is:

> "a norm is a pattern, standard or representative value for a group or type. Or a norm is the mean, median or modal score (or group of scores) of the subjects employed in standardizing a given test or measure." (58).

To derive these norms the writer grouped the pupils according to their school grade or standard. Such norms are called "grade norms" or "standard norms".

STATISTICAL METHODS.

The raw scores, i.e. number of words correct in each standard, boys and girls scores separate, were listed and then grouped in intervals of 2 or of 3 to form a frequency distribution table.

This frequency distribution table was then used to

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(58) Warren, Howard C., ed. "Dictionary of Psychology", London, George Allen & Unwin Ltd. 1935.

calculate "the average" by the "Shortt Method" as explained later.

TABLE 11.

Scores in Spelling made by 86 Boys in Standard VII in November 1948, out of a total of 30 words.

3,	11	11	10	23	18	16	21	16	13
17	13	26	17	11	10	20	10	13	7
24	22	23	8	12	21	8	20	21	19
5	22	14	13	27	23	20	28	19	21
16	16	14	7	11	14	12	28	24	16
23	21	24	18	6	20	5	20	26	21
17	10	19	26	21	30	6	30	16	17
17	28	21	22	26	27	18	19	12	12
26	9	30	24	15	21				

These scores were now divided into intervals by taking the lowest score 3 from the highest score 30, giving a number value of 27. A convenient frequency distribution table has the number of steps in the distribution not more than 20 nor less than 10. (59). It will be most convenient therefore, to make the step interval 2, which will give $\frac{27}{2} = 14$ steps.

Using the data from Table 11, we can construct A Frequency distribution table. But as so many of the other frequency tables had 0 as one of the scores and 30 as another score, it was very convenient to take 3 as a step interval. This gave 10 step intervals. For this reason 3 is taken as the step interval in this illustration.

(59) McCall: How to Measure in Education,

TABLE 12.

A Frequency Distribution Table of the scores in Table 11.

Scale Intervals	Distribution i.e Scores which fall into these scale intervals.	Frequency of such distribution.
28-30	28, 28, 30, 28, 30, 30	6
25-27	26, 27, 26, 26, 26, 27, 26	7
22-24	23, 24, 22, 23, 22, 23, 24, 23, 24, 22, 24	11
19-21	21, 20, 21, 20, 21, 19, 20, 19, 21, 21, 20, 20, 21, 19, 21, 21, 19, 21	18
16-18	18, 16, 16, 18, 17, 17,16, 16, 16, 18, 17, 16, 17, 17,18	15
13-15	13, 13, 14, 13, 14, 14, 15	7
10-12	11, 11, 10, 11, 10, 10, 12, 11, 12, 10, 12, 12	12
7-9	7, 8, 8, 7, 9	5
4-6	5, 6, 5, 6	4
1-3	3	1
0	0	
10 scale intervals		86 pupils

Graph of Table 12. (Frequency Table).

This frequency surface shows a minus skewness on the graph. This is in the first place due to the words being 60% to 80% difficult as planned, instead of 40% to 60% difficult. In other words, an average child should be able to spell 70% of the words of the writer's spelling test correctly. If this had planned out exactly as the writer intended, the piling up of the scores should have taken place at 21 on the horizontal axis, which is roughly what happened. The graph shows that the average child can spell about 65% of the words correctly.

The test is, therefore, slightly more difficult than the writer had planned.

Most of the tests show a similar graph to that of Table 12.

CALCULATION OF THE AVERAGE OR NORM.

The method used in calculating the average or norm from Table 12, is that given by W.S. Monroe in "An Introduction to the Theory of Educational Measurements", Chapter XII, 1933 edition. Table 13 gives the figures needed for the calculations used in this method.

TABLE 13.

Illustrating the calculation of The Average by the Short Method.

Scale Intervals	Frequency (f)	Deviation in intervals (d)	Frequency x Deviation (fd).
28 - 30	6	4	24
25 - 27	7	3	21
22 - 24	11	2	22
19 - 21	18	1	18
16 - 18	15	0	Total + 85.
13 - 15	7	-1	-7
10 - 12	12	-2	-24
7 - 9	5	-3	-15
4 - 6	4	-4	-16
1 - 3	1	-5	-5
0	0	-6	-0
Totals	86		-67

Assumed Average.

In table 13, the average has been assumed to fall at the midpoint of the interval 16 to 18, or at 17. Any other point would do as well.

The 18 scores in the interval 19-21 are three units or one scale division above the assumed average. In order to reduce the calculations to a minimum, the deviation is called "one scale interval". In the same way, the deviations of the other scores from the assumed average are expressed in terms of intervals. A negative deviation means that the scores fall in an interval below the assumed average.

The products (fd) of the deviations and frequencies are then recorded in column 4.

The difference between the sum of these positive and negative products is then found:

$$85 - 67 = +18.$$

This is divided by the total of the frequencies which may be expressed as N.

$$C = \frac{\text{Difference}}{N} = \frac{+18}{86} = +.254$$

This means that the assumed average is too small by .254 of an interval. Since an interval comprises 3 units, this quotient C is multiplied by 3, to find the correction in terms of units:

$$\text{Correction} = 3 \times +.254 = +.762 \text{ units.}$$

$$\text{True Average} = \text{Assumed Average} + \text{Correction}$$

$$= 17 + .76 = 17.76.$$

13. Calculation of The Standard Deviation.

In recording the frequency of the scale intervals, it is assumed that the average of such a scale interval will predominate. That is, the central tendency will predominate. In the scale interval 28-30, it is assumed

that there will be approximately as many 28's as 30's, i.e. the average or central tendency of 29 will be maintained. If most of the scores were higher than 29 or lower than 29, and a higher or lower tendency persisted in other scale intervals, then the"true average" would be effected. This variability of the average caused by the variability of the spread of measures in this way can be measured.

The variability of a frequency distribution, therefore, refers to the deviation, or spread of measures, about the central tendency. This may be measured in terms of the standard deviation. This statistical term is generally referred to as signa (σ), and is given by the formula

$$\sigma = \sqrt{\frac{\Sigma fd^2}{N} - C^2}$$

To calculate the standard deviation, the following table is useful.

TABLE 14.

Illustrating the calculation of The Standard Deviation of a frequency distribution. The measures are spelling scores of 86 standard VII Boys as measured in November 1948. (Same as Table 13).

Scale Intervals	(f)	d	fd	fd^2
28-30	6	4	24	96
25-27	7	3	21	63
22-24	11	2	22	44
19-21	18	1	18	18
16-18	15	0	Total + 85	0
13-15	7	-1	-7	7
10-12	12	-2	-24	48
7-9	5	-3	-15	45
4-6	4	-4	-16	64
1-3	1	-5	-5	25
0	0	-6	0	0
Totals	86 (N)		-67	410

In the formula $\sigma = \sqrt{\frac{\Sigma fd^2}{N} - C^2}$

d is the deviation from the assumed average. In Table 14 the assumed average is 17. Sometimes the deviation is taken from the true average. The true average for the figures in Table 14 is 17.76. If "d" represents this latter deviation, then the formula used is

$$\sigma = \sqrt{\frac{\Sigma fd^2}{N}}$$

Because "d" in Table 14 is not the deviation from the True Average, but is the deviation from the Assumed Average, a correction C is made to the formula for σ .

The formula to be used is, therefore

$$\sigma = \sqrt{\frac{\Sigma fd^2}{N} - C^2}$$

so that:-

d represents the deviation of any interval with respect to the assumed average and is given in column 3 of Table 14;

f stands for the frequency of measures within the interval and is given in column 2 of Table 14;

fd^2 is the product of f and d^2. (Σfd^2) is the sum of all these products, and is given in the fifth column of Table 14 as 410;

N is the total of the frequencies of the distribution and is given at the bottom of the second column of Table 14 as 86;

C is the difference between the true average and the assumed average in terms of intervals.

$$C = \frac{\text{Difference of the (fd) and (-fd) products}}{N}$$

$$= \frac{18}{86} = .254 \quad \text{as calculated}$$

before when finding the true average from the assumed average.

But since d and C are expressed in terms of intervals, it is necessary to multiply the value of sigma obtained by this formula by the width of this interval if it is desired to have the standard deviation expressed in terms of the unit.

As the scale interval is 3, we have

(in terms of units) $3 \times 2.17 = 6.51$

Thus the Standard Deviation = 6.51.

By working out the True Average or True Mean, and then the Standard Deviation for each class in this way, figures were obtained for the Table of norms, as given in Table 15.

TABLE 15.

Table of Norms for the Spelling Test:

Number of words correct.

Standard	Boys		Girls		
	Mean or Average	Standard Deviation	Mean or Average	Standard Deviation	
Sub B	10.6	5.7	12.7	5.3	
Standard I	19.1	7.8	20.6	6.6	
" II	32.5	6.4	32.2	6.6	
" III	42.6	6.6	43.9	5.7	
" IV	53.2	5.3	54.5	4.5	
" V	60.8	5.4	62.4	4.9	
" VI	67.6	6.2	68.6	5.8	

In all ordinary testing the Mean or Average should be taken. Thus, in making comparisons of schools, or in measuring the spelling strength or the spelling weakness of a school, the average score made by the school, would be compared with the averages given above. So also in individual testing, the average column in Table 15 must be compared with the score made when the child was tested

alone.

But when it is desired to allow extreme scores to markedly influence the variability measure, or when low unreliability is desired, or when subsequent correlation or reliability formulae require the Standard Deviation, then use the Standard Deviation.

4. Comparison of Standard VI and Standard VII.

Besides the calculation of norms for the spelling test, the investigation also included an attempt to discover whether Standard VII was more advanced in spelling than standard VI, more especially because standard VII does not receive any formal spelling instruction in the Cape Province Provincial Schools, while Standard VI does.

There were two ways in which this could be done. Norms for standard VI and for standard VII could be found for the same range of words, using approximately equal numbers of boys or girls in each case.

Or, norms for standard VI and standard VII could be found, using only boys or girls from the same school.

The writer chose the latter method. Using the 10 words set for standard VI and all the 20 words set for standard VII in the test, the writer compared the norms for 64 boys in standard VI in three schools, with the norms for 86 boys in standard VII in the same three schools. The Mean or average or norms worked out to be:-

Standard VI Boys - 64 Norm: 16.5;
Standard VII Boys - 86 Norm: 17.7.

Using the same words and procedure, the writer compared the scores of 70 standard VI girls from three schools with 109 standard VII girls from the same three schools. The Mean or average or norms worked out to be:-

Standard VI Girls - 70 Norm: 16.7;
Standard VII Girls - 109 Norm: 19.6.

In each case the scores of all the sixes in the three schools were counted, and all the scores of the standard VII pupils in those schools were counted.

As the class of school was the same in each case, and the environment was the same, presumably the children in standard VII had been standard VI a year earlier. But as two of the schools in each case had boarding establishments, it is very probable that many of the standard VII children came from other schools. In fact, the larger numbers in the standard VII classes prove that many of the standard VII children did come from other schools.

The numbers used in this investigation should have been bigger; a suitable number would have been 200 for each class.

Nevertheless, it is significant that in both cases, that of boys as well as of girls, the seven class was far superior to the standard six class in spelling.

This is probably due to three causes. Firstly, the greater maturity of mind of the standard VII pupil. Secondly, the felt need to spell correctly while doing the enormously increased amount of individual writing work, such as experimental descriptions in the sciences, setwork and history essays, and so on.

Thirdly, there is the fact that standard VII is a selected group out of standard VI.

It is generally acknowledged that intelligence increases with age below the age of 16, and some investigators believe the limiting age is even higher. The standard VII child is a year older,and therefore, more intelligent than the standard VI child, and should spell better.

This maturity of mind could account for much of the spelling superiority of the standard VII classes over the

standard VI classes tested.

Plekker(60) says that great readers are better spellers than poor readers. It is a well known fact that the amount of wide reading necessary to cover only the syllabus in standard VII is far in excess of the total of the average child's compulsory and private reading in VI. The four setwork books, the large science, history, Arithmetic, Bookkeeping, Typewriting and other subject matter books, form a considerable body of reading matter which must effect his spelling ability considerably.

Lastly comes the selective factor. According to the 1946 "Report of the Superintendent-General of Education of the Cape of Good Hope", only 74% of the standard VI pupils continue their schooling in standard VII. Presumably a large proportion of the 26% who did not move up into standard VII from standard VI, could not. In other words, the poorer spellers stayed behind and the better spellers moved up. This would also account to a large extent for the higher average spelling ability in standard VII. (61).

Van den Heever(62) , quoting Nifnenecker's results in New York on an investigation into spelling ability in different standards, gives the following table:-

Class	5a	5b	6a	6b	7a	7b	8
Average % correct	43.1	54.3	65.2	74.6	79.0	83.2	88.1.

He draws the conclusion that the percentage improvement is far greater in the fives and sixes than in the upper classes. Wallin(62) obtains approximately the same results.

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(60) Plekker: Die Spellingbekwaamheid van Skoolkinders. Thesis for D.Ed. Pretoria University, 1946.

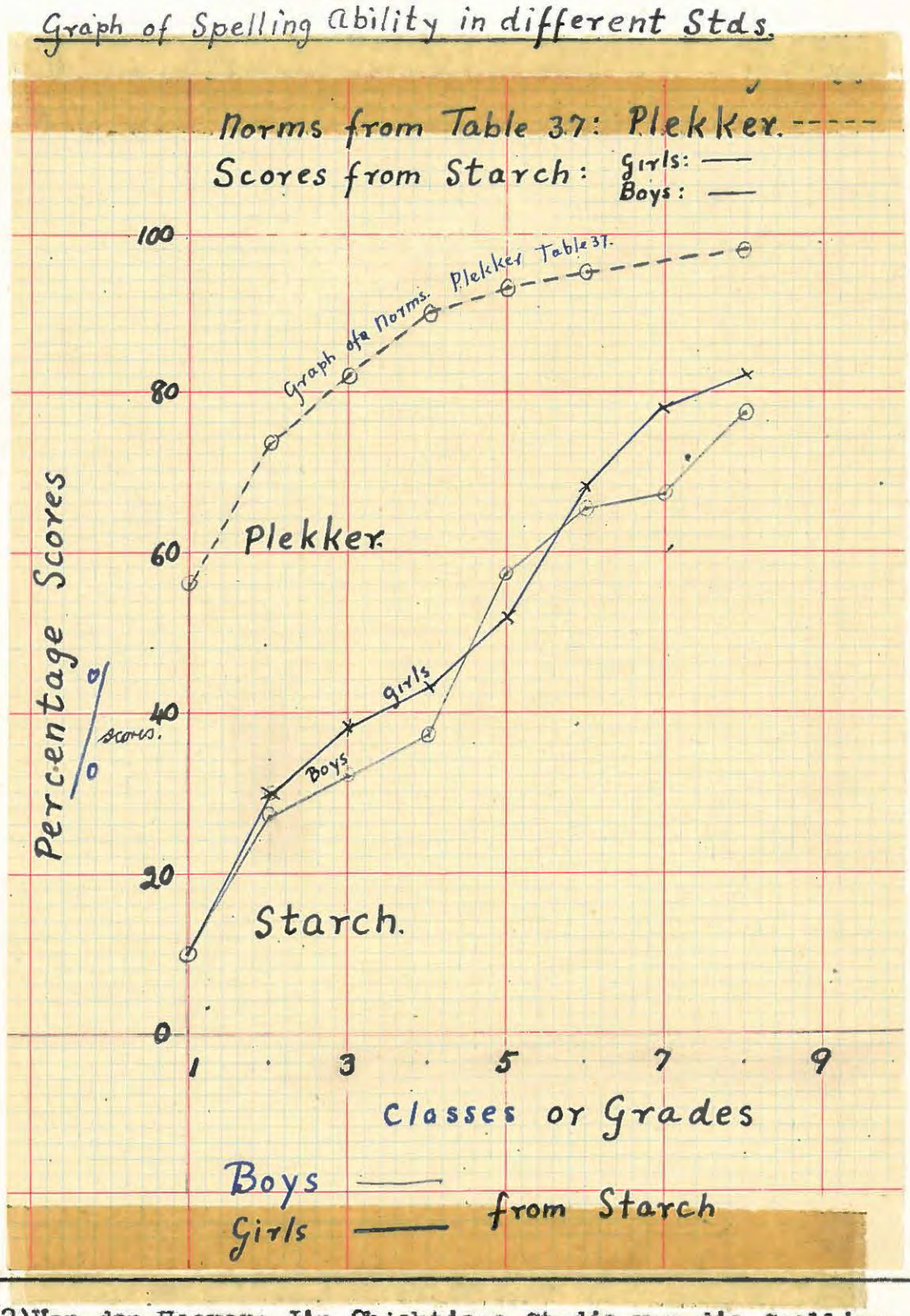
(61) Cape Education Department: Report of the Superintendent-General of Education of the Cape of Good Hope. 1946.

(62) Van den Heever: 'n Objektiewe Studie van die Spelling in Afrikaans op die Middelbare Skool

Suzzallo (62) concludes that "spelling reflects general progress".

While drawing up a spelling scale, Starch (63) obtained similar results, which he illustrated in a graph.

Graph of Spelling Ability in different Stds.



(62) Van den Heever: I'n Objektiewe Studie van die Spelling in Afrikaans op die Middelbare Skool.

(63) Daniel Starch: Educational Psychology. P.326.

From this graph it appears that the progress in spelling ability rises fairly constantly. There is a falling off in progress after standard VI, but then there is a falling off after standard II as well. It is significant that,after standard II, the child's educational environment enlarges very rapidly, as rapidly in comparison with his former environment as that of the standard VII pupil in comparison with his standard VI environment.

A graph from Table 37 of the Norms for English Spelling given by Plekker, tells the story differently. According to this graph, the falling off in spelling improvement begins in standard IV.

It seems likely that the improvement in spelling in the secondary classes would be very little effected by formal spelling drill. Much more would probably be effected by careful correction of spelling faults in the written work done of these secondary classes. In any case, it seems improbable that any method of testing could prove conclusively whether this is the case or not. What all investigations do prove, is that the spelling improves as the child moves up to a higher class. We come back to Suzzalo's conclusion therefore:

"Spelling reflects general educational progress".(64).

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(64) Henry Suzzallo: The Teaching of Spelling, a critical study of recent tendencies in method.

APPENDIX I

S P E L L I N G T E S T S.

In administering these tests the examiner of the class should begin by dictating the list of words set for the standard lower than the class he or she is examining, then follow on by dictating the list set for the class he or she has present before him (her) and complete the test by dictating the list of words set for the class just higher. The complete test A or B thus comprises three lists of words
N.B. (The end lists i.e.Std I and VII can only use two lists of test words)

The examiner should pronounce the word without syllabification, use it in a suitable sentence to bring out the correct meaning, and finally repeat the word once more.

There is no time limit. The pupils should be given adequate time to complete each dictated word before the next one is called out.

T E S T A.

STANDARD I	II	III	IV
1. hop	1.rolled	1. above	1. instead
2. ball	2.never	2. finger	2. save
3. him	3.two	3. awake	3. peach
4. all	4.aunt	4. iron	4. able
5. hat	5.lip	5. near	5. dearest
6. cold	6.hair	6. guess	6. edge
7. did	7.egg	7. peas	7. negro
8. little	8.pat	8. eating	8. cloud
9. of	9.pull	9. limp	9. silly
10. pig	10.broke	10. bright	10. flat
11. tree	11.coat	11. roof	11. proud
12. sun	12.spring	12. silver	12. loose
13. fall	13.fire	13. clover	13. August
14. run	14.about	14. December	14. split
15. tell	15.dead	15. trip	15. treated
16. mam(m)a	16.into	16. spin	16. guard
17. bring	17.wing	17. quite	17. brook

STANDARD V	VI	VII
1. nature	1. lily	1. nonsence
2. eighteen	2. bruise	2. foreigner
3. rush	3. flesh	3. satisfactory
4. clothing	4. protect	4. similar
5. buildings	5. author	5. cabinet
6. guide	6. necessary	6. debate
7. provide	7. handsome	7. institute
8. deal	8. coarse	8. attendance
9. stage	9. absence	9. gymnasium
10. trimmed	10. rural	10. physical
11. instruct	11. decent	11. specimen
12. simple	12. insult	12. ability
13. likely	13. social	13. combination
14. firm	14. education	14. judgement
15. attention	15. personal	15. proposition
16. patient	16. stationary	16. maintain
17. abuse	17. treatment	17. thoroughly

N.B. All 51 words of a test should be given in ONE lesson if possible. Test A and Test B should be given in the same week if possible.

APPENDIX 2 (a)

INSTRUCTIONS FOR ADMINISTERING THE TEST.

When administering the test, the teacher should set the class the words for the class below and for the class above as well as the ten words assigned for the corresponding class. In all each class should therefore be set 30 (thirty) words, which should all be written at one sitting.

In dictating the list, each word should be pronounced seperately. The enunciation should be quite distinct and moderately slow, without, however, any dislocation of the syllables. The words may be repeated if necessary; but are not to be enshrined in an illustrative context. No time limit is imposed.

Answer papers are supplied on which the answers are to be written after the particulars asked for on the answer papers have been filled in.

Sub B. into hat pig did all
tree run wing little egg.

Std 1. ball of about bring eating
tell fall spin awake save.

Std II. fire peach silver near cloud
silly broke August edge treated.

Std III pull aunt negro nature stage
rush deal provide simple treatment.

Std IV. flesh protect insult education rolled
likely December loose guide guard.

Std. V. iron author handsome instruct personal
quite sound satisfactory debate combination.

Std VI. cabinet attendance bruise institute nonsense
physical similar thoroughly judgement gymnasium.

Std VII. Collision economical ingenious peaceable receipt.
ceremony existence privelege conscience leisure.
courteous system arctic bicycle disease
excursion operation precede yacht suburbs.

Kindly note that Std VII has 30 words listed instead of the usual 10, so that Std VI has to do 40 words instead of the usual 30 in the test.

The writer wishes to express his grateful thanks for the help rendered by the teachers who kindly administer these tests and he hopes that the printed tests may provide them with valuable help in guaging the spelling strength of their classes at a later date.

APPENDIX 2 (b)

Pupil's Scoring Paper.

Test Paper A.

1. Write your full name .....

2. Are you a boy or a girl?.....

3. What is your age? ..... Years .....months.

4. What is the name of your School? .....

5. In what class are you? Standard ..... or form.

6. Score in test (i) Score for 10 words of Std. .....
(ii) Score for 10 words of Std. .....
(iii) Score for 10 words of Std. .....

Total Score ..... _____

Write the dictated words in PENCIL.

1.....1.....1.....

2.....2.....2.....

3.....3.....3.....

4.....4.....4.....

5.....5.....5.....

6.....6.....6.....

7.....7.....7.....

8.....8.....8.....

9.....9.....9.....

10.....10.....10.....

Below are extra numbers for the standards VI and VII.....

11.....12.....13.....

14.....15.....16.....

17.....18.....19.....

20.....

.....

APPENDIX 3.

The Test in its final form as it will be issued when printed.

A GRADED VOCABULARY SPELLING TEST.

Practical Cautions and Suggestions.

Tests are time-savers. They cannot pretend to greater accuracy than the considered judgment of the experienced teacher, judging his own pupils. But observation is slow, and experience an affair of years.

Tests provide a formula for measuring the estimate of one teacher against the estimate of a different. Tests should provide a universal measure, especially when attempting to judge the products from different schools. What is "fair" in one school may be "excellent" in another. But if both schools use the same tests and quote the same terms - "with such a scale the child is so many years above or below the normal average" - then a valid comparison has already been instituted.

These tests will, I believe, furnish a statement of school attainment in spelling probably more trustworthy and certainly more precise than could be got with the same expenditure of labour from unaided impressions and improvised examinations.

From norms obtained upon so limited a scale as the present, a wide margin should be allowed for error of measurement. Unless a child, or a group of children, differs from the stated averages by one year at the very least, little significance can be affixed to the divergence. If possible, when testing individuals, a teacher should always examine the remainder of the age-group or standard-group in the same school, or, at any rate, a sufficient normal sample. This holds with special force for those accepting a scale worked out in the Eastern Cape

Province, and applying it either to schools in the Western Cape or the Free State or Transvaal. So great, indeed, are local differences in school attainments, whether due, as in some cases, to differences in social and economic status, or as in others, to differences in teaching method, that a child's performances should never be judged except by comparison with others of his age or standard who have had equal opportunities and an equal chance, alike at school and at home.

Anyone using standardized tests must bear in mind that, if a standardized test has once been applied in a classroom, then the next time it is used as an examination in the same class, its whole significance may be destroyed or changed.

The standards of attainment are norms only in the statistical sense. They represent actual averages and actual medians, not ideals. They represent what the average child actually can do, not what teachers would like the average child to do. Hence, most teachers and educationists will, I suspect, view with a shock of surprise, the low level of the norms now given. They should remember always that the norm, as here defined, is a mediocre performance which cuts the entire group into two halves, numerically equal, those below average and those above. If a child or a school reaches merely the average here given, that in itself is little cause for gratification. In a good school or a good neighbourhood, it would be a reason for dismay.

Standard deviations are given throughout; and their unexpected size shows how artificial a thing is the list of averages against which they are set. If the reader desires some indication of a genuinely good performance, he

may add the standard deviation to the average; and take their sum as marking a figure which only the best 16% of a typical age-group reach or surpass.

The examiner should always discriminate between children who are backward in most subjects and children who are backward in only one subject, or a limited group of subjects. A child who suffers merely from a specialised disability in spelling, is to be carefully distinguished from one who is in every respect mentally defective.

Instructions for Administering the Test.

1. While the test is being given, the children should be seated well apart and in such a manner that the tester can keep the members of the class under observation.
2. The examiner should use some form of answer sheet which will give him the data he will need in comparing the class performance with the norms:

1. Full name.....
2. Are you a boy or a girl?.....
3. What is your home language?.....
4. In what standard are you?.....
5. State your age in years and months today.....
6. Name of school.....

If this test is being used by a class teacher, some of these particulars will not be necessary.

3. When administering the test, the teacher should employ as wide a range of test words as possible. To set the class only the ten words assigned to it is not enough. It is necessary to set the class not merely the ten words assigned to it but also the ten words assigned to the class below and to the class above it. Therefore, the minimum number of words which may be dictated to any standard above Sub B, is thirty, if the conditions of this test are to be fulfilled.

In a class that is likely to be above grade, it would be wise to continue to dictate still another ten words so as to be sure to extend the more gifted spellers.

In individual testing, where the ability of the child is unknown and undetermined, it is still superfluous to ply the child with each of the 80 words. It will be sufficient to give him the first word in each line or standard-group until he fails or falters, and then test him with all the words in the preceding group, and with those that follow until he fails outright with about ten consecutive words. Certain individuals fail erratically and succeed sporadically. With them, wide range testing is essential.

In dictating such a list, each word should be pronounced separately. The enunciation should be quite distinct and moderately slow, without, however, any dislocation of the syllables. The words are not to be enshrined in an illustrative context. No time limit is imposed.

Instructions for Scoring the test.

One mark is awarded for each word correctly spelt. To find the total score, take the number of crucial words, actually dictated and rightly spelt, and add to them the number of all the easier words, which in the list precede those dictated, but were not themselves dictated because presumably known. Thus derived, the score may be regarded as roughly indicating the percentage that the child can now spell out of the total number that should form his entire spelling vocabulary at that age or in that standard.

This score, if compared to the average or norms given below, will show whether the individual or class tested is above or below average.

Note that the scores for girls and boys must be kept separate, as separate norms are provided for each of the

sexes. Normal boys appear backward as compared with normal girls, especially in the higher standards.

S P E L L I N G.

(GRADED VOCABULARY TEST).

Standard	Sub B	I	II	III
1	into	ball	fire	pull
2	hat	of	peach	aunt
3	pig	about	silver	negro
4	did	bring	near	nature
5	all	eating	cloud	stage
6	tree	tell	silly	rush
7	run	fall	broke	deal
8	wing	spin	August	provide
9	little	awake	edge	simple
10	egg	save	treated	treatment

Standard:	IV	V	VI	VII
1	flesh	iron	cabinet	yacht
2	protect	author	attendance	ceremony
3	insult	handsome	bruise	disease
4	education	instruct	institute	excursion
5	rolled	personal	nonsense	conscience
6	likely	quite	physical	ingenious
7	December	sound	similar	precede
8	loose	satisfactory	thoroughly	courteous
9	guide	debate	judg(e)ment	privilege
10	(guard)	combination	gymnasium	existence

N.B. (a) guard may be enshrined in a sentence as it may be confused with "God";

(b) judg(e)ment may or may not include the (e). It is optional.

STANDARD-NORMS FOR SPELLING.

NUMBER OF CORRECT WORDS

Standard	BOYS.		GIRLS.	
	Mean or Average	Standard Deviation	Mean or Average	Standard Deviation
Sub B	10.6	5.7	12.7	5.3
Standard I	19.1	7.8	20.6	6.6
" II	32.5	6.4	32.2	6.6
" III	42.6	6.6	43.9	5.7
" IV	53.2	5.3	54.5	4.5
" V	60.8	5.4	62.4	4.9
" VI	67.6	6.2	68.6	5.8

N.B. These Standard-Norms for Spelling can be converted to Age-Norms by the formula:-

$$\text{SPELLING AGE} = \left\{ \frac{\text{Number of words correct}}{10} + 7 \right\} \text{ years}$$

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