

SPECIAL PLACE EXAMINATIONS

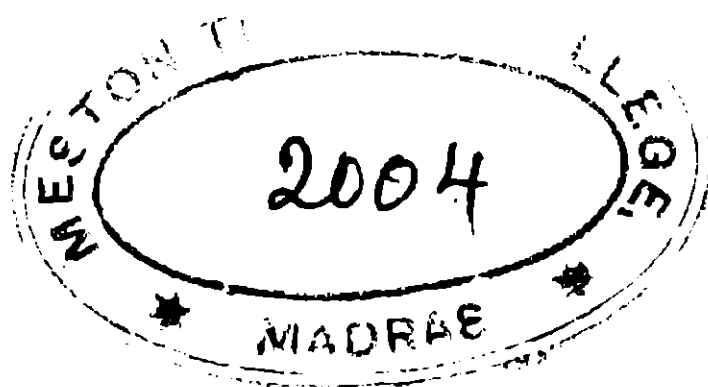
The Report of an Investigation by a
Joint Committee of the West Riding
Teachers' Association and the West
Yorkshire County Association of the
National Union of Teachers, of the
merits and defects of some forms of
SPECIAL PLACE EXAMINATION.

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UNIVERSITY OF LONDON PRESS, LTD.
PUBLISHING OFFICES, WARWICK SQUARE, E.C.4

FIRST PRINTED

February 1941

AGENTS OVERSEAS

*AUSTRALIA, NEW ZEALAND
AND SOUTH SEA ISLANDS*

W. S. SMART, P.O. Box 120 C.C., SYDNEY, N.S.W.

CANADA : CLARKE, IRWIN & Co., Ltd.
480-486 University Avenue, TORONTO.

INDIA : LONGMANS, GREEN & Co., Ltd.,
BOMBAY : Nicol Road.
CALCUTTA : 17 Chittaranjan Avenue.
MADRAS : 36A Mount Road.

SOUTH AFRICA

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FOREWORD

Members of the West Yorkshire County Association of the National Union of Teachers and of the West Riding Teachers' Association have long doubted the reliability of the examinations usually employed to select pupils for Secondary Education of the Grammar School type, and have become increasingly concerned as to the possible effects of special-place examinations of the more usual type on the curriculum, time-table, technique, status and reputation of the Junior School. It is felt, too, among teachers that the decision as to the type of post-primary education for which a child's capacity fits him, is being made by many Local Education Authorities when the child is too young and too immature for the decision always to be a wise one. Considerable uneasiness is caused among teachers by the great variation in the percentage distribution of special places within the area of one Local Education Authority—a variation which in the West Riding of Yorkshire can be illustrated by the award in one year in three contiguous districts of 180, 221, and 444 special places per 1,000 children of scholarship age; and by the comparison of awards in the same year of 47, 53, and 56 special places per thousand children of scholarship age in the areas served by some Secondary Schools, with awards of 239, 203, and 196 special places per thousand children in the areas of other Secondary Schools. This uneasiness remains even after it has been pointed out, first, that chance often determines whether in any one year a small district will produce a few or many able children—that a small district which receives a large proportion of awards in one year may receive fewer than the average number in the following year; and secondly, that districts vary greatly in their distributions of ability. Teachers question also the wisdom of removing a child to a new environment to undergo a test, upon which his future career depends. The strangeness of environment and the importance of the occasion cause emotional distress. This distress is increased by a relatively long and trying journey following an insufficient breakfast. The distress is not alleviated by the instruction to candidates, who live at a distance from the centre, to take food with them. The culmination of physical and emotional disturbance is frequently reached by a child's ignorance of the sanitary arrangements which obtain in the School where the tests are to be held, and the consequent fear, which may increase during the examination, born of such ignorance.

The disquiet of teachers has not been allayed entirely by the

FOREWORD

schemes which many Local Education Authorities have devised to give them a voice in the decision as to the suitability of the test items proposed to be applied to candidates for special places, and some share in the determination of the conditions of the special place examination.

Proposals that the West Riding Committee be asked to make radical changes in the form of its examination have from time to time been debated by the two Associations, and finally, at a joint meeting of the two Committees on 28th March, 1936, a special committee representative of the two Committees was set up, with instructions—

“To investigate the whole question of the methods of selecting children for secondary education, and to prepare a report.”

The members of the two Associations appointed to constitute the Special Committee were :—

Misses Arnold and Sucksmith, and Messrs. Barnes, Clegg, Davies, Edwards, Foster, Hardy, Johnson, Laycock, Manley, Miller, Penlington, Player, Prior, Rooke, Tolson and Tomlinson.

The Special Committee delegated the conduct of an experiment to determine the relative validities of various forms of examination to an Experiment Sub-Committee consisting of the President and Secretary of the West Yorks. C.A. (N.U.T.) and Messrs. Foster, Rooke and Tomlinson.

Interim reports were prepared by a sub-committee consisting of Messrs. Clegg, Foster, Rooke and Tomlinson.

The sub-committee to draft the report for submission to the full Special Place Committee consisted of Messrs. Davies, Rooke and Tomlinson.

The Special Place Committee met for the first time on 2nd May, 1936 and has held altogether 21 meetings. There have been in addition 22 meetings of the Experiment Sub-Committee, and 10 meetings of the Report Sub-Committees.

Memoranda on various aspects of the subject were submitted by Messrs. Clegg, Foster and Manley, and Tomlinson.

We wish to express our thanks :—

To the West Riding Education Committee for permission to apply tests in several of its schools ; to Moray House, University of Edinburgh for the use of five of its tests for the purpose of ascertaining the relative validities of various forms of examination;

F O R E W O R D

to Mrs. J. B. Thomson Davies, M.A. (Edin.) and Mrs. G. A. Jones, O.B.E., B.A. (Lond.), Chief Examiners in Arithmetic and English, respectively, for the County Minor Scholarship Examination of the West Riding Education Committee for the preparation of examination papers for the same purpose; to Professor Godfrey H. Thomson, D.Sc., Ph.D. of the University of Edinburgh, Mr. W. G. Emmett and the staff of Moray House for the supervision of the enquiry, and for carrying out the statistical work necessitated by it; and to all the above-named for valuable suggestions which have made for the improvement of this Report.

The West Riding Education Committee, and the persons mentioned above, are not, of course, committed to the views expressed in the Report on questions in regard to Special Place Examinations in general or the West Riding Examination in particular which might be matters of opinion.

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CHAPTER I.
THE SPECIAL PLACE EXAMINATION
of the
WEST RIDING EDUCATION COMMITTEE.

Though it considered " the whole question of the methods of selecting pupils for Secondary education " the special committee of the two Associations devoted much of its time to the consideration of the specific question of the West Riding Education Committee's County Minor Scholarship Examination.

The sole purpose of that examination, so far as the West Riding Education Committee is concerned, is the selection of candidates for the award of County Minor Scholarships tenable at Secondary Schools, within the administrative area of the West Riding County Council, and, at certain other Secondary Schools in Yorkshire and Lancashire, which are deemed to serve townships within the administrative area of the West Riding County Council.

The conditions of the examination are expressly designed to stimulate and increase the interest of teachers and parents in it. The general control of the examination is delegated to a Central Examinations Council which consists of nine representatives of the West Riding Education Committee, three representatives of West Riding Part III Authorities, five representatives of teachers in Secondary Schools—elected one each by the four Secondary Associations and one by the West Yorkshire County Association of the National Union of Teachers, five representatives of teachers in Elementary Schools, elected by the West Yorkshire County Association of the National Union of Teachers, one representative each of the Universities of Leeds and Sheffield, and the Divisional Inspector of the Board of Education. Teacher representatives are elected in the first place for a period of three years, and at each triennial election a certain proportion of new members must be appointed.

The Central Examinations Council discusses, and approves or amends, the question papers and marking schemes drafted by the Chief Examiners. It approves the qualifying standard for award, and the range of marks qualifying for inclusion in the border zone ; and makes recommendations for the conduct of the examination generally.

The Central Examinations Council serves a useful purpose in maintaining contact between the Local Education Authority and the schools, and in bringing the examination within the range of the opinions and criticisms of those affected by its conditions.

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Local Committees.

Local Committees also assist in the conduct of the examination. Each is composed of the Heads of the Secondary Schools together with representatives of the Assistant Masters and Mistresses of those schools, and representatives of the Heads and Assistants of the Elementary Schools in its area—elected by their respective professional organisations. The Local Committees elect representatives to the Marking-Schemes Sub-Committee of the Central Examinations Council and to the panels of Assistant Examiners. After each examination they may make representations to the Central Examinations Council concerning the papers of questions, the marking schemes and the conditions and conduct of the examination generally. The Local Committees serve a useful purpose in providing contact between the Central Examinations Council and the schools, and for the collection and dissemination of opinions.

Administrative Arrangements.

The examination is now held near the middle of March in each year, and at a number of centres (in 1938 there were 132) at various points in the area.

Age of Candidates.

During the years 1928-1937 candidates were required to be between the ages of 10 and 12 on the first of April of the year in which the examination was held. A candidate could, therefore, if necessary, take the examination in each of two successive years. In 1938 and subsequent years candidates were required to be between the ages of 10 and 11 on the first of March of the year of examination and a candidate was able, therefore, to sit only once for the examination. Children who are prevented by illness from sitting with their own age group are admitted to the examination of the following year on production of a medical certificate.

Preliminary Test.

An internal preliminary test is carried out by the elementary schools about three months before the date of the examination proper. The schools are informed that the Education Committee desires that all children in elementary schools whose work and school records indicate a reasonable probability of success should sit for the County Minor Scholarship examination, and, if successful, should be given the opportunity of attending at a Secondary School.

Head Teachers of Elementary Schools concerned are, therefore, required to hold, on or before a specified date, a preliminary test consisting of papers in English and Arithmetic, and those papers must be worked by all children of the appropriate age who

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occupy a position in the school classification which is at least consistent with their ages.

Suggestions as to the scope and character of the test are made :

1. Each paper should provide an amount of work such as may be expected to occupy a full hour, thus giving the opportunity of judging quickness in work as well as intelligence and accuracy. The papers should be based upon ordinary school work, and the preparation of candidates solely with a view to passing the examination is clearly undesirable.

2. The paper in English should include an exercise in Composition, with a view to showing the children's powers of acquiring knowledge by observation and reading, and also their powers of correct expression. It is suggested that there should be added questions in English, which, while testing powers of accurate and intelligent written expression, may give further indications of suitability for admission to the Scholarship Examination.

3. In Arithmetic the work should include exercises on the application of addition, subtraction, multiplication, and division to money, to ordinary weights and measures, and to fairly simple fractions (vulgar and decimal) and also measurement of surfaces. Questions it is suggested might well be about half in form calling for direct calculations, and half such as involve consideration of a simple problem. Credit should be given for use of suitable method and arrangement, and also for reasonable speed and accuracy.

The papers in English and Arithmetic are to be set and marked by the Head Teacher of the Elementary School with such co-operation by members of the staff and such allowances for the ages of the candidates as may be found desirable and practicable.

After the results of the test have been considered in conjunction with the school records of the children, recommendations for admission to the examination are submitted to the Education Authority, based upon the results of the tests in English and Arithmetic or upon the general school record of the pupil, or upon both combined.

In each of the years 1926 and 1927 a written Group Intelligence Test was included as part of the preliminary test.

The preliminary test is intended to advertise the existence of the examination, to furnish a sufficiency of candidates, and to prevent the omission from the examination of children fitted for secondary education of the Grammar School type.

The Examination.

The County Minor Scholarship examination consists of two papers in Arithmetic, two in English, and a written Group Test of Intelligence. The papers in Arithmetic and English are drafted by the Authority's Chief Examiners, in Arithmetic, Mrs. J. B. Thomson Davies, M.A., and in English, Mrs. G. A. Jones, O.B.E., B.A. The Intelligence Test is set and standardised by Professor G. H. Thomson, D.Sc., Ph.D. of Edinburgh University, and his staff.

The Arithmetic and English papers follow substantially, both in character and scope, the recommendations of the Authority for the preliminary test in those subjects. The English paper contains a test of comprehension of reading. The composition exercise forms the first paper in English and 25 minutes are allowed for its completion.

Marking of the Scripts.

The scripts in English and Arithmetic are marked by the Chief Examiners each with the aid of a panel of Assistant Examiners nominated by the Local Committees. Marking schemes are drafted by the Chief Examiners after the provisional marking of a considerable number of scripts, and, when approved by the Marking-Schemes Sub-Committee of the Central Examinations Council, are supplied to the Assistant Examiners for guidance in their marking. The work of the Assistant Examiners is supervised by the Chief Examiners, and very great care is taken to ensure uniformity of marking. An allowance for differences in age of the candidates, assessed on the results of previous examinations and corrected by the results of the current examination, is made, and a special allowance is also made to candidates from small schools or from schools where it is considered that frequent staffing changes or other exceptional conditions during the year may have tended to impede the school work. In 1938, the assessed age allowance was 1.2 per cent. of the maximum marks per month. The allowance was adjusted at certain parts of the range in accordance with the results of the current Examination.

The specials allowances were :—

- (i) 5 per cent. of the maximum marks to candidates from small all-standard schools, and
- (ii) 3.5 per cent. in the case of small Junior Schools with one, and 2.5 per cent. to schools with two, teachers.

The marks of the intelligence test are converted into Intelligence Quotients according to norms based on the performances of several thousand children both in the West Riding District and in other parts of England.

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The marks in the various portions of the examination are so adjusted as to give equal weight in the determination of awards to the Arithmetic, English and Intelligence Tests. Usually the standard deviation of the Intelligence Quotient is roughly half that of the Arithmetic or English paper, so that the examination score of a candidate is obtained by adding the sum of his adjusted marks in English and Arithmetic to twice his Intelligence Quotient.

No information as to the performances of their candidates in the Examination is supplied to teachers.

Awards.

Scholarships are offered to candidates reaching an aggregate total of marks approved by the Central Examinations Council. Those obtaining an aggregate total of marks within an agreed range above and below this qualifying standard are regarded as border-line candidates, and the marking of their scripts is subjected to special scrutiny by the Chief Examiners.

In 1938 there were in the area 20,521 children of scholarship age. 18,805 of these took the preliminary test and 7,783 were recommended for admission to the examination. 7,682 actually sat, and 1,992 of them received awards. The number of awards was therefore 9.7 per cent. of the whole scholarship field. From 1907 to 1920 all candidates, and from 1921 to 1931 border-line candidates only, were submitted to an oral test designed to assess their (i) powers of observation, (ii) powers of inference, (iii) powers of grasping an argument, (iv) powers of rapid mental calculation, (v) general miscellaneous knowledge. The test was conducted by a panel consisting of the Head of the Secondary School which the candidate would, if successful, be required to attend, the Head of an Elementary School in another district and a member of the Authority's Central staff of Examiners. The latter did not necessarily visit every centre.

The oral test was discontinued in 1932, and a Group Intelligence Test, taken by all the candidates on the same day as the written papers in English and Arithmetic, was used to sift the border-line candidates. This procedure was continued in 1933 and 1934. In 1935 the Intelligence Test became an integral part of the examination and in the determination of awards was given weight equal to that of each of the other two papers.

The whole machinery of the Examination is declared by an authority to be excellent. Examining, marking, office-work, and administrative arrangements are said to be a model of their kind, and to reflect much credit on all concerned. Another authority says that the Examination of the West Riding Education Committee is among the finest of its type.

CHAPTER II.

SPECIAL PLACE EXAMINATIONS.

Some General Considerations.

The purpose of such examinations, the Board of Education's Pamphlet 63 states, is the selection at the age of 11 plus of children fit to profit by secondary education. The importance of accurate selection is vital and the main business is to get the right children. We agree with this statement of the Board. The selection of the right children is important to the community, to the Secondary School, and to the child. It is almost impossible to over-estimate the importance of right selection to the last named, and it is the recognition by parents of this importance that is the cause of much of the pressure brought by them to bear on the Junior School. The Secondary School considers that "rightness" depends on the standard of attainment achieved in the "tool" subjects of English and Arithmetic, on the quality of the innate mental ability of the child, and on his will-temperament and character-traits.

Pamphlet 63 states that the examination should be so framed that every child who has been through the ordinary curriculum of the Junior School shall have a fair and equal chance, as far as this is humanly possible. But the standard of attainment achieved by a child is a function of the time that the Junior School devotes to the subject measured, and of the quality of the teaching that the child has received. It becomes, therefore, questionable whether it is humanly possible to ensure for every child, or even for those children whose progress in the Junior School is normal, a fair and equal chance, if tests of attainment are included as part of the examination.

The Board's Pamphlet states, too, that a child's success should not depend upon special preparation. This suggests either the removal of tests of attainment from the examination syllabus, or the narrowing of the field of the syllabus of academic subjects to such an extent that special preparation will not improve performance.

Pamphlet 63 also states that the free development of the Junior School must not be jeopardised by the existence of the examination, and that the taking of the examination must not be looked on as the aim and end of the education given there.

The free development of the Junior School can be affected adversely by an attempt to achieve a higher standard in the

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subjects of the curriculum that are to be examined, by devoting an undue proportion of the school's time to those subjects, to the detriment of other subjects of equal or greater importance to the true education of the child, and to the crowding out of the experimentation necessary to the formulation of a Junior School technique.

The danger both of the selection of the wrong children and of the jeopardising of the free development of the Junior School is the greater because of the congestion that occurs about the line which separates the passes from the failures in the examination list, because the achievement, by special preparation, of only a slight improvement in the performance of a border-line candidate raises him many places in the examination list and transforms failure into success.

Unreliability of the "Single Opportunity"

A feature of the external examination is its relatively low coefficient of reliability, that is, of the power of the examination to place a group of candidates in the same order when applied on two or more separate occasions.

The Board of Education's Pamphlet No. 63 states that it has become clear that an examination given at one time possesses a lower degree of reliability than a series of tests separated from each other by a suitable interval ; that children's performances in an examination are more seriously affected by temporary disabilities than had been realised ; and that any single examination involves a certain element of chance.

CHAPTER III.

EXTERNAL EXAMINATIONS.

Some Forms Discussed.

The external examination for selecting candidates for special places in Secondary Schools usually assumes one of three forms.

These are :—

1. Tests of English and Arithmetic of the “ old ” type, the English paper containing an essay, and the Arithmetic paper a small number of questions including some problems. The tendency of this Arithmetic paper is to approach more nearly the Arithmetic paper described in the next section, by increasing the number and shortening the length of its questions, and by increasing the ratio of problems to mechanical questions. The 1939 Arithmetic paper of the West Riding examination, for example, contained 21 separate questions, of which 10 at least rank as problems. This form of examination may or may not include an intelligence test.
2. Tests in English and Arithmetic of the objective type, consisting of a large number of questions requiring short answers, with or without an intelligence test.
3. A test, or tests, of intelligence only.

For each of the three types of examination merits are claimed—against each defects are urged.

I. The “ Old ” Type Examination in Attainment.

The West Riding Education Committee's County Minor Scholarship examination is one of the best examples of this form. A written group test of intelligence is included as an integral part of the examination with the papers in English and Arithmetic. The efficiency of the examination is largely determined by the quality of the marking schemes for assessing the values of different answers.

Merits.

- (i) As tests of attainment in English and Arithmetic form part of the examination, it can be ensured that every successful candidate has reached an adequate minimum standard of attainment in the “tool” subjects of the Secondary School.

- (ii) It is claimed for this type of examination that questions of the essay and discussion-type test constructive ability as neither of the other types of examination does.
- (iii) It is claimed that the successful solution of the problems in the Arithmetic paper depends upon, amongst other factors, analysis of a whole, persistence in effort, the power to look ahead—to take successive steps in reasoning; and that this latter is a power distinct from that required to take the single step in reasoning which questions set in the objective type of examination usually demand.

Defects.

- (i) The difficulty of standardising the marking of a team of examiners, and of achieving consistency in the marking of a single examiner.

The difficulty of standardising the marking is especially great in the English paper, and is not entirely removed by the appointment of a Chief Examiner. Dr. Starch has found experimentally that the variation in marking of a single examiner is only 1 per cent. less than the variation among the members of a team of examiners working together on a preconceived marking scheme. With the large numbers of candidates that sit for the examinations of some of the larger Education Authorities (7,682 candidates sat for the West Riding Education Committee's Scholarship examination in 1938) it is impossible for the Chief Examiners to do much more than scrutinise the marking of sample scripts taken at random, re-mark the scripts of Assistant Examiners whose mark distributions do not conform to the distributions obtained by the Chief Examiner, and re-mark the scripts of candidates who fall into the border zone.¹

Among the rest there is sufficient room for the examiner's blunders to be hidden as successfully from the public gaze—Dr. Ballard says they are—as are the doctor's blunders under the tombstone.

- (ii) Low reliability of the examination due to inconsistency from day to day in the quality of a candidate's product in the essay and in the essay-type of answer.

Dr. Ballard says² that a pupil's essays show a greater variation in merit than any other intellectual product. The same pupil will, with equally good intentions, produce an excellent essay to-day and an atrocious one to-morrow. He says that one well-

¹ The procedure followed in the West Riding Education Committee's Examination is described fully in "*Selection of Children for Secondary Education.*" Davies & Jones.

² "*The New Examiner.*" Chapter V.

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known investigator found that the essays of one and the same student written within one and the same year may cover a range of merit equivalent to six mental years. He suggests that the apparent grossness (to a teacher) of this statement is due to the curious fact that in the teacher's marking of a series of essays by the same pupil he unconsciously tends to ignore variations and to mark them all on the same dead level. In other words he does not mark so much on the merit of the piece of writing that lies before him as on his preconception of what the writer's ability actually is.

. This defect is appreciated by the Board of Education whose Pamphlet 63 states that in view of the evidence as to the unreliability of essay questions as part of the examination, hesitation is felt in recommending the inclusion of such questions.

The reliability of the examination as a whole is further reduced because the relatively small number of questions makes the incidence of these questions an important factor in the score of a candidate.

- (iii) Speed of writing is an important factor in the score obtained in a paper of this type.

In marking scripts it is not unusual to find some that contain evidence of an exceptionally high level of ability but which have obviously been worked with such excessive attention to neatness and excellence of handwriting that the paper has not been nearly completed and so the candidate has not obtained for the paper the marks necessary to qualify for the award of a special place. The West Riding Education Committee's examination recognises this defect and the marking scheme now allows a bonus up to 5 marks to be awarded to candidates whose ability does not appear to be represented by their marks. This bonus is to be used chiefly on behalf of slow but able candidates.

- (iv) The length of time required for the marking of the scripts necessitates the holding of the examination early in the school year, and places difficulties in the way of setting a supplementary test to combat the lack of reliability of the single examination.
- (v) Like any other examination in academic subjects it may affect harmfully the time allotted to certain subjects, the curriculum, and teaching methods, of the Junior School. The teacher in the Junior School is tempted to concentrate the efforts of himself and his pupils on just those aspects of English and Arithmetic which are measured by the examination.

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Such an examination may, therefore, condemn the majority of the children in a class to a type of education which is not fitted to their capacity and attainments, in order that a few may achieve that success which guarantees entry to the Grammar School which provides a type of education from which they can profit. Sometimes the evil may be due to a praiseworthy desire on the part of the teacher to ensure for his brighter pupils that type of education for which he thinks they are fitted.

- (vi) There is an injustice arising from a disposition on the part of inspectors, administrators and the public to measure the effectiveness of the education given in the Junior School by the results of an examination designed to select from the mass of its pupils, the few for whom an academic type of education is suitable. This attitude on the part of inspectors and others may have a very adverse effect on the work of the Junior School.

That this evil is real is widely recognised.

Pamphlet 63 states that it is important that the results of the examination should not be used for the purpose of comparing school with school and that an unhappy competitive spirit between schools arising from the anxiety to obtain as great as possible a number of successes should be eliminated. No examination, in fact, can do its work properly unless all those concerned—teachers, parents, and Local Authorities—realise the evils of intensive special preparation, and co-operate in eliminating it as far as possible. And again: "It is generally agreed that undue emphasis on the results of the special place examination (for instance the publication of the examination results) not only leads indirectly to unfair selection, but has deleterious effects on the work of the Junior School."

The report of the Joint Committee of the Association of Education Committees and the National Union of Teachers states: "We hold very strongly that the uncritical and inexpert use of examination results for invidious comparison between school and school, or for hasty inferences respecting individual teachers, whether favourable or unfavourable to their professional repute or prospects, by members of the Local Education Authority or the public is highly objectionable. In our opinion it is most necessary that no disclosure of results in a form which lends itself to such misuse of them or to public comment should be permitted by the Local Education Authority." The West Riding Education Committee strongly and specifically deprecates any disposition on the part of inspectors, administrators or the public to make use of its County Minor Scholarship Examination for such purposes.

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- (vii) This type of examination places an undue emphasis on speed of memorisation, and may lead to "cramming" in the Junior School.
- (viii) It is more than desirable that the Junior School should create and develop its own particular and suitable technique as the Infants' School has done. This creation and development cannot take place while the Junior School is pre-occupied with examination results.

The examination is not intended by Local Education Authorities to have an adverse effect on the time-table, curriculum or technique of the Junior School. They usually deprecate any differentiation between likely and unlikely candidates, and in some instances have expressly forbidden special classification and special coaching whether in school hours or by means of homework, the declared intention being that the child shall take the examination in his stride through the Junior School. Nevertheless, there can be no doubt that the examination is sometimes responsible for the premature promotion of Infants to the Junior School, and for the rapid promotion of pupils through the Junior School. The Joint Advisory Committee of the Association of Education Committees and the National Union of Teachers during its "Enquiry into Examinations for pupils in Public Elementary Schools" was assured that in some areas overpressure upon the children, excessive homework, the organisation of a special scholarship class in which attention is concentrated upon the more mechanical aspects of English and Arithmetic, the special coaching of scholarship candidates both in and out of school hours, and the allocation of the best teacher to the part of the school that contains the scholarship candidates, are results of the free place examination. At the same time, the enquiry produced ample evidence, both from teachers and administrators, to show that the evils so frequently feared do not necessarily accrue, and that over large areas of the country they do not exist. The Joint Advisory Committee, indeed, expressed its belief that they are happily very rare, and that they become evident in areas where the free place examination is ill-devised, where, for example, the papers contain too high a proportion of mechanical questions, or where, in opposition to the wishes of the Board of Education, questions on Geography, History and general knowledge are included.

The report of an investigation (in 1931) of the County Minor Scholarship Examination of the West Riding Education Committee by His Majesty's Inspectors of Schools states that the examination has no detrimental effect on the curriculum of the schools, as it is practically impossible to cram for the type of question that is set. This, we are assured, is an optimistic opinion. The report however does find that in several schools bright children have been

promoted somewhat prematurely in order that they might spend longer time in the upper classes where more advanced Arithmetic is taken, but that this undesirable tendency is being checked and will probably disappear when Junior Schools are generally established.

- (ix) The results of the examination are closely related to the quality of the teaching which the candidates have received and to the effectiveness of the organisation of their schools. This is unfair to the candidates, and to the Secondary Schools which because of this fact may receive the wrong pupils. This fact, too, provides a spurious justification for the pressure of parents on the Junior School, and for the basing of the reputation of the school on its examination results. The West Riding Education Committee attempts to reduce the effect of these factors by the award of bonus marks to children from certain types of school. The awarding of these bonus marks, however, appears to be largely arbitrary.

Suggestions for the removal of defects which frequently exist without being inherent in this form of examination have been made.

Pamphlet 63 states that the range of the syllabus covered, especially in Arithmetic, should not be greater than the average child who takes the examination may fairly be expected to cover.

Members of our Committee suggest, too, that a Special Place examination should be less dependent on a definite school syllabus than it often is, that questions could often be designed to measure more successfully the ability that they set out to measure and that marks could be so allocated in the marking scheme as to assist materially in securing greater validity for the examination.

II. Objective Tests in English and Arithmetic.

Merits.

- (i) A large number of short-answer questions allows a wide field to be covered in a relatively short time. The incidence of the examination questions, therefore, becomes less important.
- (ii) Marking, being objective, is completely reliable.
- (iii) Questions can be graded more effectively.
- (iv) Answers can be marked very quickly, and so this type of examination can be held later in the school year than can the type previously discussed. Candidates would then be older, and would have progressed further through their

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Junior School course. With regard to the examination of the West Riding Education Committee, it could be held at a time of the year when the health of the candidates, generally, is better, and when improved weather makes the journey to the examination centre (if the practice of examining candidates in centres is continued) less of a strain.

- (v) For children of this age, Pamphlet 63 states, it is better to use a large number of short questions than a few relatively long questions. They reduce the strain of the examination on the children.

Defects.

An examination of this form is an attainment test. It therefore has the defects of the type of test previously discussed, viz. adverse effect on the time-table, curriculum and technique of the Junior School; dependence of its results on the quality of teaching and the effectiveness of the organisation of the Junior School, and on the candidate's speed of memorisation; interference with the Junior School's task of creating and developing its own special technique; and all the evils, already discussed, which derive from those defects.

In addition, it is urged against this form of examination that :—

- i. It tends to select the superficially bright child. It is not clear what children are included in this category. The objection is probably the same as that sometimes urged against Intelligence Tests, that they select the rapid thinker and reject the profound thinker. There can be no doubt, however, that the rapid thinker who arrives at a correct solution is superior to the slow thinker.
- ii. It does not measure "constructive ability" as the essay and the essay-type of question do. If it is claimed that "constructive" ability is a quality differing from "general" ability, it does not seem that it would be impossible to construct an objective test that would measure this ability.
- iii. The questions in the Arithmetic portion of this type of examination do not assess the power of the candidate to look ahead, to take successive steps in reasoning. It is by no means certain that this ability is distinct from that needed for the taking of a single step in reasoning.

III. A Test, or Tests, of Intelligence.

Merits.

- i. Marking is objective and, therefore, completely reliable.
- ii. The Tests are more reliable than are other forms of examination, that is, there is greater consistency in the rankings

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given by an intelligence test to a group of candidates who are tested with the same test on different occasions.

- iii. They can be marked quickly.
- iv. They measure acquired knowledge to a limited extent only, and so give results that are less dependent on the quality of the teaching that the candidate has received than are those given by other forms of examination.

They, therefore, tend to remove from the teacher responsibility for the examination results and to free him from parental pressure; and to free the child from the examination incubus. When these tests are used there is no longer a tendency to assess the quality of the work of the Junior School by its examination results, nor to allow the examination to affect the time-table, curriculum and technique of the Junior School, so that the school is left perfect freedom for self-development.

Defects.

- (i) The standard of a child's scholastic attainment should be one of the criteria that determine his place in a system of secondary education. The weight given to the various criteria depends on the value attached to their relative importance. Thomson suggests that innate ability and scholastic attainment should be weighted equally. The West Riding Education Committee's County Minor Scholarship examination weights Attainment x 2 (English x 1 and Arithmetic x 1) and Intelligence x 1.

Against the charge that the use of Intelligence Tests alone for the selection of children for special places in Secondary Schools ignores the important factor of scholastic attainment, it may be stated that a written Group Intelligence Test as it is usually applied requires a child to be able to read and to understand the questions before he can answer them. The results of such a written Group Intelligence Test, therefore, correlate highly with ability to read with comprehension, an attainment of great importance in secondary education of the Grammar School type.

- (ii) It is said that coaching improves performance in tests of this type, and that the tests, therefore, are not measuring innate ability only.

It is certain that practice in tests of this type improves performance. It is probable, however, that the maximum effect of practice is quickly reached, and that a short preliminary test imposed as a "shock absorber" is almost sufficient to put all candidates, those who were familiar with this type of test and those

who were not, on the same level in respect of improvement with practice. The evidence that there is a coaching effect over and above this practice effect is not at all conclusive. Certainly intelligence tests are much less susceptible to the effects of coaching than any attainment tests.

It is a defect of all types of examination yet discussed that they cannot assess, except by inference, qualities of character that are at least as important as intellectual qualities in determining to what type of secondary education a child should proceed. Such examinations say nothing, at any rate directly, of the candidate's will-temperament, character traits or interests.

Validity.

Nothing has been said, as yet, of the validity of the various forms of examination that have been discussed, that is, of the extent to which they measure the qualities that they set out to measure—in our case, fitness to profit by secondary education of the Grammar School type. Yet it is of primary importance to know of each form of examination how far success in the examination can be regarded as predicting success in the Grammar School. If different types of examination differ greatly in validity, then validity will have to be the predominant consideration in determining the type of examination to be preferred. If, on the other hand, the examinations differ little in prognostic value, then the other factors that have already been discussed should be allowed to influence the choice of examination.

It is necessary, then, to ascertain the relative validities of the various forms of examination available. This can only be done directly by subjecting a group of children to the various forms of examination, tracing their careers through their Secondary Schools, and relating their achievement in the Secondary School to their scores in the different examinations taken before entry.

Pamphlet 63 states that one of the two criteria—the other is its effect upon the free development of the Junior School—by which the success of a special place examination should be judged is the subsequent school careers of the candidates, and that the careers, not only of those who have gained special places but also of those who have not, should be examined. Investigations designed to discover how far this criterion is satisfied, should be regarded as an integral part of examination procedure; for example, the order of merit of pupils in Secondary Schools might be compared with their order of merit in the examinations by which they were selected, and with the results of the component tests.

The employment of this criterion to assess validity requires, of course, a considerable time. The West Yorkshire Special Place

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Committee sought an alternative criterion that would give a more immediate judgment, and it was decided that, for a preliminary assessment, the opinions of the teachers in the Primary Schools would provide a very satisfactory criterion.

It was therefore decided to carry out an investigation of the relative validities of the various forms of examination discussed, and of various combinations of those forms, using as a criterion, in the first place, the ranking of the teachers of the schools from which the children chosen for the investigation were drawn. After the scripts had been marked it was thought that it might be possible to compound the scores made in the various tests, so as to give a better basis than the teachers' judgments, for the evaluation of the merits of the different forms of examination.

It was intended that there should be an investigation, over a number of years, into the careers of children who had been examined before leaving the Primary School. A Record Card was to be prepared, from which information deduced from definite answers to definite questions could be obtained. This Card was to be sent, on the first day of February of each year following the application of the various forms of examination, to the Heads of the Schools and Firms to which the children had proceeded. It was hoped that such an investigation would enable an opinion to be formed about the ability of teachers to assess those qualities which are essential for success in education of the Grammar School type.

CHAPTER IV.

THE EXPERIMENT.

Introductory.

The following are the forms of examination the relative validities of which it was decided to investigate :—

1. An “ old-type ” examination similar to that now employed by the West Riding Education Committee, described previously in this report, and comprising papers in English and Arithmetic, and a written Group Intelligence Test.
2. A “ new-type ” examination comprising standardised objective tests in English and Arithmetic, and a written Group Intelligence Test.
3. Written Group Tests (or Test) of Intelligence only.

For the first type of examination, the facsimile County Minor Scholarship Examination, the papers in English and Arithmetic were prepared by the Chief Examiners of the West Riding Education Committee—Mrs. J. B. Thomson Davies (Arithmetic) and Mrs. G. A. Jones (English). The Intelligence Test, M.H.T. 21, was supplied by Moray House, University of Edinburgh.

For the second type of examination, all the papers used were standardised Moray House Tests constructed in the Education Department of the University of Edinburgh. The English Test was M.H.E. 8, the Arithmetic Test, M.H.A. 8a, and the Intelligence Test, M.H.T. 23.

For the third type of examination, the results of the two Moray House Intelligence Tests, M.H.T. 21 and M.H.T. 23, already worked, were used, along with those of an additional Moray House Intelligence Test, M.H.T. 26.

Professor Thomson of Edinburgh undertook to supervise the experiment, and to make himself responsible for the statistical work necessitated by it. He appointed a member of his staff, Mr. W. G. Emmett, to keep in close touch with the Experiment Sub-Committee and with the Investigation.

It was decided to apply the tests to 2,000 children of the age-group qualified to take the forthcoming West Riding County Minor Scholarship examination, children who would be between the ages

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of 10 and 11 on 1st March, 1937, and for this purpose 40 schools were, with the permission of the West Riding Education Committee, selected by their Chief Examiners and Inspectors of Schools. Circumstances reduced the number of schools taking part in the experiment to 39. One school did not complete the experiment, and its results are excluded from the survey.

The total number of children actually taking part in the experiment was about 1,800. Of these several were absent on one or other of the days on which tests were applied. 1,586 children took all the five Moray House Tests, and it was on the results obtained from those children that the Moray House Tests were standardised.

The schools were chosen so as :—

1. To include representatives of the different types of area in the West Riding, urban, mining, textile and agricultural.
2. To represent as far as possible an average of the whole district. That this object was satisfactorily achieved will be seen from the section of the Moray House report that deals with the standardisation of the Moray House Tests.
3. To give an approximately representative distribution of abilities for the complete experiment field.
4. To provide a minimum entry of 40 candidates from each school, except that in a few cases a minimum of 25 was accepted, so that some rural schools could be included.

The Head Teachers of the selected schools agreed to cooperate in the investigation, and they were invited to attend a meeting in Leeds so that Mr. Emmett and the members of the Experiment Sub-Committee could supplement the written instructions, given to each school, for the application of the tests. Each school was asked to apply the tests to every child of the selected age-group on its roll. The object of testing every child within the selected age range was to obtain first a representative sample from which accurate norms could be obtained, and secondly a series of correlations free from the influence of selection.

Before the tests were supplied to the schools, the staff of each school arranged its candidates in the order of their fitness to profit by secondary education. The teachers were asked to place their candidates in the order in which it was thought a perfect examination would place them, in such an order that there would be no ground for complaint, if the County Minor Scholarship Examination placed them in that order. They were advised that in forming this order, every effort should be made to make allowances for the varying ages of the children.

The Administration of the Examination.

The schools were divided on a rough geographical basis into two groups, Group A mainly from the South of the Riding and predominantly mining, and Group B situated largely in the West of the Riding, and representative of the textile industry.

In order to equalise the effect of practice on the results from the various tests the order of application of the tests was varied, Group A taking the facsimile County Minor Scholarship examination first, and Group B taking the Standardised Tests first.

The several tests were administered by, or under the direction of, the Head Teachers. The time-table of the examination was as follows:—

GROUP A Schools.

March 2nd, 1937.

Morning—County Minor English and Arithmetic papers.

Afternoon—Intelligence Test, M.H.T. 21.

March 9th, 1937.

Morning—Standardised English and Arithmetic Tests, M.H.E. 8 and M.H.A. 8a.

Afternoon—Intelligence Test, M.H.T. 23.

March 16th, 1937.

Afternoon—Intelligence Test, M.H.T. 26.

GROUP B Schools.

March 2nd, 1937.

Morning—Standardised English and Arithmetic Tests, M.H.E. 8 and M.H.A. 8a.

Afternoon—Intelligence Test, M.H.T. 23.

March 9th, 1937.

Morning—County Minor English and Arithmetic papers.

Afternoon—Intelligence Test, M.H.T. 21.

March 16th, 1937.

Afternoon—Intelligence Test, M.H.T. 26.

A preliminary practice intelligence test, occupying 10 minutes, preceded the administration of the Intelligence Test on March 2nd.

The duration of the several sections of the examinations was as follows:—

Each Intelligence Test—45 minutes.

English Test, M.H.E. 8—40 minutes.

Arithmetic Test, M.H.A. 8a—30 minutes.

County Minor English Paper—65 minutes.

County Minor Arithmetic Papers—50 minutes.

Marking.

Teams of Assistant Examiners selected and supervised by the Chief Examiners marked the County Minor English and Arithmetic papers in accordance with marking schemes prepared by the Chief Examiners.

The Standardised Tests were marked and checked by the staffs of the schools taking part in the experiment. The marking was further checked by members of the Experiment Sub-Committee.

Statistical Returns.

Returns were sent, at the end of the examination, to Moray House showing for each child, his age and score made in each of the papers. The raw scores in the County Minor English and Arithmetic papers had been adjusted for differences in age, while no correction had been applied to any of the scores in the Moray House Tests. In addition the children were classified according to school and the order of merit in that school.

CHAPTER V.
THE EXAMINATION PAPERS.

COUNTY MINOR ENGLISH.

65 minutes allowed.

I. Read the following passage very carefully :

It was in December, 1898, that I made my last voyage in the **Seagull**. We were all eagerly anticipating landing on Christmas Eve, for we were already approaching Cornwall and three more days would see us in port. At this point, however, we ran into a terrible storm. With an awful roar the wind carried away two of our masts, leaving only the mainmast standing. The mountainous waves swept everything off the deck, and we had to lash the helmsman to the wheel. Try as he would, he couldn't keep the ship's nose off the land ; and soon, although the sun was obscured by the dark clouds, we could see some people on the beach. We signalled for help, but they didn't seem able to do anything. Presently another man arrived on the shore with a fine Newfoundland dog, and almost immediately we saw the dog plunge into the boiling sea and swim strongly towards us. In his mouth was a stick with a cord tied to it, the other end of the cord being held by the man : but it was not long enough—the dog could not reach us with it. Quick as lightning our captain tied a stick to a rope and threw it into the sea. The clever dog at once dropped his stick, swam to ours, seized it, and swam back to the shore. After a great struggle he was able to carry our rope back to his master, thus saving us all; for, now that we had established communication with the shore, we were able to use our life-saving apparatus.

Now answer the following questions :

- (1) Give a short title suitable for this story.
- (2) Did these events happen at night or in the day-time ?
How do you know ?
- (3) Explain (a) why the sea is said to be boiling, and (b) what is meant by the ship's nose ?
- (4) In 1898 Christmas Day was on a Sunday. On what day of the week did the ship run into the storm ?
- (5) What words are used in the passage to mean (a) looking forward to, (b) getting near to, (c) enormous, (d) to tie, (e) the man who steered the ship, (f) hidden ?

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(6) Which of the following statements are untrue according to what you are told in the passage? Do not write the statements out. Give only the letter which is printed at the beginning of each statement you think is untrue.

- (a) The ship's rope was shorter than the rope brought by the dog's master.
- (b) The dog found it very difficult to swim to the shore.
- (c) The ship had a life-saving apparatus.
- (d) The wind was blowing off the land.
- (e) The sailors were not expecting a bad storm.

(7) The story is told here by someone on the ship. Write it in about 12 lines as it might be told by the owner of the dog.

II. Write about 12 lines on **one** of the following :

- (a) Today's weather.
- (b) A description of something you have made with your own hands.
- (c) Wash-day.
- (d) Picnics.

County Minor Papers in English.

Marking Scheme.

General Instructions for Marking.

N.B.—These instructions apply in all cases unless an exception is indicated in the detailed marking scheme. They should be read by the examiner before and in close connection with the detailed marking scheme.

-
1. All marking should be done in **Blue Pencil**.
 2. The total marks obtained for a question should be written in the left-hand margin opposite the answer. Marks obtained for parts of a question should be written in the right-hand margin opposite the answer.
 3. No fractional marks are to be entered in the left-hand margins or on the mark schedules. If the sum of the detailed marks given to an answer involves a fraction, the nearest unit, or in the case of $\frac{1}{2}$ mark, the upper unit, should be entered. If a candidate has not attempted a question, put a dash—but **NOT O** on the mark schedule.

SPECIAL PLACE EXAMINATIONS

4. The total marks obtained for the whole paper should be entered in the top right-hand corner of the front sheet of the script in the rectangular space provided.
5. When the scripts contained in an envelope have been marked, the marks of each candidate should be entered in **BLACK INK** opposite his name in the mark schedule.
6. The scheme of marking must be followed in every detail.
7. No credit should be given for answers crossed out by the candidates.
8. If a candidate has written more than one composition and has not crossed out all but one, the first complete one not crossed out should be marked.
9. All spelling, grammatical and mechanical punctuation mistakes for which deductions are being made in accordance with the detailed instructions for marking questions I (7) and II should be indicated by a ring round the mistake.
10. The scripts should be replaced in the envelopes in the order given on the mark schedules.

Allocation of Marks.

Question I. (1) 3; (2) 2 + 4; (3) 3 + 3; (4) 7; (5) 12; (6) 10... 44	44
Question I (7). Thought and Structure	20
Question II. Thought and Structure ...	24
Questions I (7) and II. Mechanical Accuracy	12
	100

Question (1) to (6). Notes.

- (1) Reserve 3 marks for short complete titles such as "Saved by a dog," "The Brave Dog," "The Brave Rescue."
Give 0 for such titles as "The Mainmast," "Christmas Eve."
- (2) For the second part give 4 for any reference to the sun. Give 2 for "They could see people on the beach" or "There were people on the beach."
- (4) Wednesday : 7 marks. Tuesday or Thursday: 3 marks.
- (5) If words are in sentences but not underlined, give 1 mark each. If words not in the passage but with right meaning are given, give $\frac{1}{2}$ mark each (0 if in sentences).

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- (6) Give 3 marks for saying (a) is untrue and 4 marks for saying (d) is untrue. Give 1 mark each for omitting (b), (c) and (e) from the untrue ones.

Question I (7).

Thought : 10 marks. This mark is for including all relevant and no irrelevant items. If the story is told by any other person, mark to a maximum of 5.

Structure : 10 marks. In estimating for Structure, consider the sentence-construction and punctuation as affecting sentence-construction; and quantity, quality and aptness of vocabulary.

Question II. 24 marks : Thought 12. Structure 12.

In estimating for Thought consider the quantity, quality and unity of the ideas (including relevance).

If the composition is entirely irrelevant to the title, mark for Thought to a maximum of 6 instead of 12. If, though relevant to the title, the composition rambles into irrelevancy, it should be penalised under "unity of ideas."

In estimating for Structure consider the quality of the opening and closing, the variety of sentence-construction and punctuation as affecting sentence-construction, the quantity, quality and aptness of the vocabulary.

An exceptionally good or an exceptionally poor answer to either question I (7) or question II may be marked without reference to detail, the total being entered directly in the left-hand margin. This applies only to answers falling in the following mark ranges :

	High	Low
Question I (7)	17—20	0—4
Question II.	20—24	0—5

Mechanical Accuracy. Questions I (7) and II. 12 marks.

Give 12 marks for the first 132 words, ignoring titles. Give less in proportion to the amount written. If more than 132 words have been written, mark off the end of 132 words and ignore the rest.

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From this mark for length deduct

- (a) One mark for each spelling mistake, one mark for each bad mistake in grammar and one mark for each mechanical mistake in punctuation.
- (b) Up to, but not more than two marks for omission or misuse of capital letters.
- (c) Up to, but not more than two marks for almost illegible handwriting, untidy or cramped work.

If a mistake under (a) is repeated it counts only once for deduction.

A word containing two mistakes (e.g. a spelling and a grammatical mistake) counts as only one mistake for deduction; but if the same word contains one kind of mistake in one place and another kind in another it counts as two mistakes for deduction.

Deductions must **not** be used to cancel marks already awarded under thought and structure. If, therefore, the deductions exceed the mark given for length, the mark for mechanical accuracy will be 0 and **not** a minus quantity.

Deductions under (a) and (b) may be added together and entered as one number.

Notes on Deductions. See (a) and (b) above.

- (1) Words wrongly divided, e.g., **woul-d**, will count as spelling mistakes.
- (2) Misuse or omission of **apostrophes** will count as spelling mistakes, but only two marks will be deducted for these; one for one or more mistakes in the possessive case, and one for one or more mistakes in abbreviation.
- (3) Not more than two marks are to be deducted for misuse of the **hyphen**, e.g. **every-thing**.
- (4) **Proper Nouns.** Not more than two marks are to be deducted for mistakes in the actual spelling of proper nouns, but proper nouns may also count for deductions in regard to the use of capital letters or apostrophes within the limits stated.
- (5) **Grammatical Mistakes.** Candidates should not be penalised for grammatical mistakes made in attempting unusual or difficult constructions, but only for such mistakes as "we was" or "the cup was broke in pieces."

- (6) **Punctuation.** Mistakes such as the use of a full stop where the sense does not warrant it are questions of structure. Mistakes such as the omission of question marks or inverted commas are questions of mechanical accuracy.
- (7) **Capital Letters.** One deduction should be made for a mistake connected with punctuation such as omission of a capital letter after a full stop, and one for a mistake connected with the permanent form of a word such as omission of a capital letter for a proper noun.

Notes on the County Minor English Examination by the Chief Examiner in English.

In accordance with instructions received, the paper was devised to conform as closely as possible in character and standard of difficulty with the paper set for the 1937 County Minor Scholarships Examination of the West Riding Education Committee.

The paper consisted of composition and comprehension tests. The comprehension test was tried out in a group of children of the 10:0 to 10:11 age range in a London Elementary School, and the final form of the paper fixed in the light of that try out. A marking scheme was drawn up after a preliminary marking of 200 scripts on the same lines as the schemes for the West Riding C.M.S. examination.

The marks of 500 candidates were analysed and percentiles drawn for each quarter of the age range. From these percentiles a scale of age allowances for eight mark ranges for each month of the age range was compiled in accordance with the method devised by Mrs. Thomson Davies.

The children were ranked by their earned marks plus or minus this age allowance. Before the final ranking was drawn up the papers of all tied candidates were revised and some slight adjustments made.

G. A. JONES.

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COUNTY MINOR ARITHMETIC.

First Paper.

10 minutes allowed.

Write your answer in the space provided for each question.

You should use no paper except this sheet.

1. Add :

$$\begin{array}{r} 766 \\ 38 \\ 477 \\ 965 \\ \hline \end{array}$$

2. Multiply :

£	s.	d.
5	18	$4\frac{1}{2} \times 5$
		5

=====		

3. Divide : fur. chains yards

$$\begin{array}{r} 6) 44 \text{ ,, } 6 \text{ ,, } 4 \\ \hline \end{array}$$

- | | |
|---|---|
| 4. Find the cost of 12 lb. apples at $4\frac{1}{2}$ d. a lb. | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 5. How much change will you have out of a ten shilling note after buying stockings costing 1s. 11d. and gloves costing 1s. 6d.? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 6. A pint of water weighs $1\frac{1}{4}$ pounds. How many pounds do $2\frac{1}{2}$ gallons of water weigh? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 7. A line called X measures 4.5 inches. A line called Y measures 1.8 inches. How much longer is X than Y? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 8. A line of 2 inches stands for 1 shilling. How many inches long should a line be if it stands for 3s. 9d.? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 9. A mother uses $\frac{1}{4}$ oz. of cocoa every day. She begins a new $\frac{1}{2}$ lb. tin of cocoa on a Sunday. On which day of the week will she use the last $\frac{1}{4}$ oz. from this tin? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |
| 10. How many squares of side 3 inches can be cut from a paper square of side 1 ft. 9 in.? | <div style="border: 1px solid black; width: 100%; height: 40px;"></div> |

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Second Paper.

40 minutes allowed.

Marks will be given for all **sensible working**, whether the sums are finished or not.

1. Express 58,860 pennies in £ s. d.
2. Find the number which is equal to $657 \times 9 - 488 \times 8$.
3. A farmer's wife went to market with 5s. 6d. in her purse. There she sold :

- 5 chickens at 2s. 6d. each.
- 15 lb. of butter at 1s. 0½d. a lb.
- 6½ dozen eggs at 1s. 6d. a dozen.

She then spent 18s. 7d. on her own shopping. How much money did she take home in her purse ?

4. A box containing 20 copies of a book weighs 1 stone 12 lb. The box weighs 2 lb. 4 oz. Find the weight of each book. Answer in lb. oz.

5. A post office sheet of 1½d. stamps consists of 20 rows of stamps with 12 in each row. A few stamps have been torn off the corner of the sheet shown here.

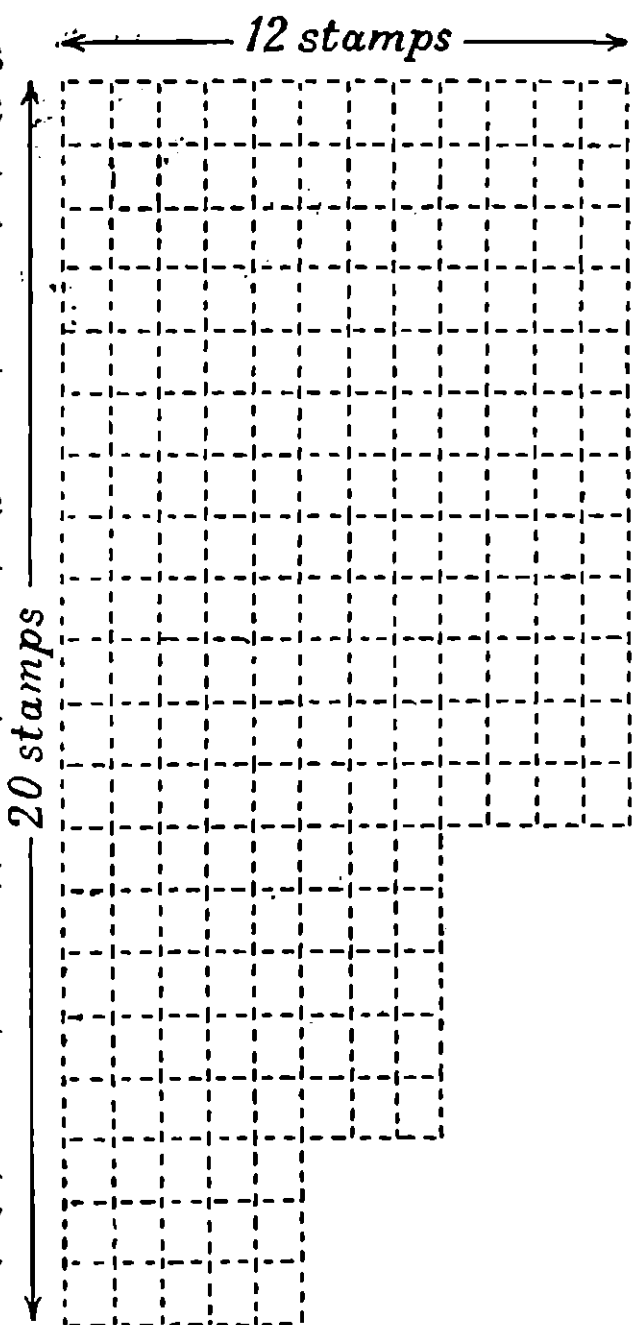
(a) How many stamps have been torn off ?

(b) What is the value of all the stamps left ? Give your answer in £ s. d.

6. Needlework lessons are on Mondays and Wednesdays from 1.30 p.m. to 2.45 p.m. In 13 school weeks a girl, who was absent only two needlework days, just finished a nightdress.

(a) How many hours altogether did she take to make the nightdress ?

(b) If she had made it at home in the holidays, when she is free to sew every day for 2½ hours, in how many days could she have finished it ?



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County Minor Papers in Arithmetic.

Detailed Marking Scheme.

First Paper.

Total Marks—25.

Question	Answer	Mark
1.	2,246	3 or 0
2.	£29 11s. 10½d. But £29 11s. 10d. (Allow 2).	3 or 0
3.	7 fur. 4 ch. 8 yd. or 74 ch. 8 yd. Otherwise	3 0
4.	4s. 6d. 4½s. or 54d. Otherwise	2 1 0
5.	6s. 7d. 79d. Otherwise	2 1 0
6.	25 1 st. 11 lb. Otherwise	2 Allow 1 0
7.	2.7 inches	2 or 0
8.	7½ 6 + 1½, or 6, 1½ or 6 & 1½ Otherwise	2 1 0
9.	Wednesday or 4th day Otherwise	3 0
10.	49 28 or 14 or 21 or 147 or 7 (7 explicit or implicit) Otherwise	3 1 0

Second Paper.

Calculation Errors: In each question allow the maximum mark warranted by the stages covered in working or in reasoning, and then from this maximum deduct 2 marks per calculation error; but not more than 6 in any one question.

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Question 1.	58,860 pence	Marks
	= 4,905 s.	4
	= £245 5s.	3
		<u>Total ... 7</u>

Alternative.		Marks
	$58860 \div 240 = 245 \text{ r. } 60$	5
	£245 5s.	2
		<u>Total ... 7</u>

Frequent Error.		Marks
	$58860 = 495\text{s.}$	2
	$495\text{s.} = \text{£}24 \text{ } 15\text{s.}$	1
		<u>Total ... 3</u>

Question 2.		Marks
	$657 \times 9 = 5913$	2
	$488 \times 8 = 3904$	2
	$5913 - 3904 = 2009$	2
		<u>Total ... 6</u>

Frequent Error I.		Marks
	$657 \times 9 = 5913$	2
	$5913 - 488 = 5425$	0
	$5425 \times 8 = 43,400$	2
		<u>Maximum ... 4</u>

Frequent Error II.		Marks
	5913	2
	$448 \times 8 = 3584$	0
	$5913 - 3584 = 2329$	1
		<u>Maximum ... 3</u>

Frequent Error III.		Marks
	$657 - 488 = 169$	0
	$8 \times 9 = 72$	0
	$169 \times 72 = 12,168$	2
		<u>Maximum ... 2</u>

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Frequent Error IV.	Marks
657—488 = 169	0
9—8 = 1	0
169 x 1 = 169	0
	—
<u>Maximum ...</u>	<u>0</u>

Question 3.	Marks
Chickens 12s. 6d.	2
Butter 15s. 7½d.	2
Eggs 9s. 9d.	2
Total sold 37s. 10½d.	2
Add 5s. 6d. in purse: 43s. 4½d.	4
Spent 18s. 7d.: left 24s. 9½d.	4
	—
<u>Total ...</u>	<u>16</u>

Alternative I.	Marks
Chickens 12s. 6d.	2
Butter 15s. 7½d.	2
Eggs 9s. 9d.	2
In purse at first 5s. 6d.	2
Total in purse 43s. 4½d.	4
Spent 18s. 7d.: left 24s. 9½d.	4
	—
<u>Total ...</u>	<u>16</u>

Alternative II.	Marks
Total sold as above 37s. 10½d.	8
Spent 18s. 7d.: net gain 19s. 3½d.	4
In purse 5s. 6d. total 24s. 9½d.	4
	—
<u>Total ...</u>	<u>16</u>

Alternative III.	Marks
As above 37s. 10½d.	8
18s. 7d.—5s. 6d.=13s. 1d.	4
13s. 1d. needed for shopping	2
37s. 10½d.—13s. 1d. or 24s. 9½d. left from sales	2
	—
<u>Total ...</u>	<u>16</u>

If 5s. 6d. is introduced in any method but in the wrong direction, allow 1 instead of the 4.

SPECIAL PLACE EXAMINATIONS

Question 4.	Marks
1 st. 12 lb.—2 lb. 4 oz. (idea)	2
= 1 st. 9 lb. 12 oz. or	
23 lb. 12 oz. or 380 oz.	3
Idea of division by 20	2
1 lb. 3 oz. ...	4
	—
Total ...	11

Frequent Wrong Answer I.	Marks
1 st. 12 lb. + 2 lb. 4 oz. = 2 st. 4 oz. ...	1
Idea of division by 20	1
1 lb. $6\frac{3}{5}$ oz.	4
	—
Maximum ...	6

Frequent Wrong Answer II.	Marks
1 st. 12 lb.	0
Idea of division by 20	1
1 lb. $4\frac{4}{5}$ oz.	4
	—
Maximum ...	5

Question 5. (a).	Marks
5 x 4 = 20	1
3 x 7 = 21	3
20 + 21 = 41	2
Allow final 2 only if both items correct.	
	—
Total ...	6

Alternative I.	Marks
3 x 3 = 9	1
4 x 8 = 32	3
9 + 32 = 41	2
As above	
	—
Total ...	6

Alternative II.	Marks
3 x 3 = 9	1
4 x 5 = 20	1
4 x 3 = 12	2
9 + 20 + 12 = 41	2
As above	
	—
Total ...	6

SPECIAL PLACE EXAMINATIONS

Alternative III.	Marks
$7 \times 8 = 56$	2
$3 \times 5 = 15$	1
$56 - 15 = 41$	3
	—
Total ...	6

No Working.

For correct answer 41, without any working or statement allow 6 marks.

For wrong answer 29, without any working or statement allow 3 marks.

Question 5. (b).	Marks
Total No. of stamps = 20×12	2
$= 240$	2
Left $240 - 41$	2
or 199	2
199 at $1\frac{1}{2}d. = \text{£}1 \ 4s. \ 10\frac{1}{2}d.$	4
	—
Total ...	12

Alternative I.	Marks
Value of sheet = 30s.	6
Sold 41 for 5s. $1\frac{1}{2}d.$...	3
Value left = $\text{£}1 \ 4s. \ 10\frac{1}{2}d.$	3
	—
Total ...	12

Alternative II.	Marks
$12 \times 12 = 144$	2
$5 \times 8 = 40$	2
$3 \times 5 = 15$	2
Total = 199	2
Value = $\text{£}1 \ 4s. \ 10\frac{1}{2}d.$	4
	—
Total ...	12

Alternative III.	Marks
Worked in values: 18s.	3
5s.	3
1s. $10\frac{1}{2}d.$...	3
Total = $\text{£}1 \ 4s. \ 10\frac{1}{2}d.$...	3
	—
Total ...	12

SPECIAL PLACE EXAMINATIONS

If answer to 5 (a) is 29, answer to 5 (b) is 211 stamps at $1\frac{1}{2}$ d. or 26s. $4\frac{1}{2}$ d. **Marks—12.**

Question 6. (a).

	Marks
$1\frac{1}{4}$ hr. a day	2
$2\frac{1}{2}$ hr. a week	2
$2\frac{1}{2} \times 13 = 32\frac{1}{2}$	4
$(32\frac{1}{2} - 2\frac{1}{2})$ hr. = 30 hr.	2
	—
Total ...	10

Alternative I.

	Marks
$1\frac{1}{4}$ hr. a day	2
$2\frac{1}{2}$ hr. a week	2
Equivalent of 12 weeks	2
$2\frac{1}{2} \times 12 = 30$	4
	—
Total ...	10

Alternative II.

	Marks
$1\frac{1}{4}$ hr. a day	2
26 days ...	2
$1\frac{1}{4} \times 26 = 32\frac{1}{2}$	4
30 hr. as above	2
	—
Total ...	10

Alternative III.

	Marks
$1\frac{1}{4}$ hr. a day	2
24 days	4
$1\frac{1}{4} \times 24 = 30$	4
	—
Total ...	10

Alternative IV.

	Marks
$1\frac{1}{4}$ hr. a day	2
$1\frac{1}{4} \times 13 = 16\frac{1}{4}$	4
$16\frac{1}{4} \times 2 = 32\frac{1}{2}$	2
30 hr. as above	2
	—
Total ...	10

Alternative V.

	Marks
$1\frac{1}{4}$ hr. a day	2
Equivalent of 12 weeks	4
$1\frac{1}{4} \times 12 = 15$	2
$15 \times 2 = 30$	2
	—
Total ...	10

SPECIAL PLACE EXAMINATIONS
MORAY HOUSE STANDARDISED TESTS.

An examination paper in what may be called "test" form consists of a number of short questions, the answers to which are given by the children either by underlining the correct answer out of a number of alternatives, or by writing a word or two in brackets. A minimum of writing is thus required of the child, so that the result of a test is almost independent of speed of writing.

The answers to the questions are unique, and are marked right or wrong from an answer key provided with the test. The score obtained by any child is therefore independent of the personal judgment of an examiner.

Standardisation of the test consists of the construction of a conversion table by which the scores obtained in a test are converted into standard scores (usually called Intelligence, English, or Arithmetic Quotients) which make correct allowance for age at all levels of ability. Standardisation is thus effected on the actual results of the examination and makes allowance for any adventitious effects operating in the group of children examined.

INTELLIGENCE TESTS.

The Intelligence Tests used in the course of the experiment were Moray House Tests M.H.T. 21, M.H.T. 23 and M.H.T. 26. Each test comprises 100 questions and occupies 45 minutes. There is no internal timing of the test. The questions are mostly of verbal type, well known to give high discrimination amongst children of varying ability, and to yield high correlation with teachers' estimates of children's intelligence. It is not possible to publish the tests here, since they are still in current use by Education Authorities.

The instructions preceding the test are as follows :—

Read the following carefully :—

1. When you are told to begin, answer the questions as quickly and as carefully as you can.
2. Begin at the beginning and go straight through.
3. If you cannot do any question, leave it out and go on to the next.
4. When you finish one page, go on to the next.
5. You will have 45 minutes and you will be told the time every quarter of an hour. No one is expected to do everything. Just do as much as you can.

SPECIAL PLACE EXAMINATIONS

6. Make your alterations clearly.
7. Ask no questions at all.

We give below a few examples of each type of question taken from older Moray House Tests, the instructions to which have been abbreviated.

Analogies.

Underline the answer in the brackets.

Needle is to Prick as Knife is to (sharp/fork/point/blade/cut).
Pleasure is to Rejoice as Doubt is to (sorrow/lament/believe act/hesitate).

Opposites.

Underline the word most nearly opposite in meaning to the word in capital letters.

BRING..... (take/think/make/mend/drop)
CAUTIOUS... (publish/appoint/suit/careful/heedless)

Number Series.

Write in the brackets the number which should come after the last in each line.

2, 2, 3, 3, 4... (.....)
2, 6, 18, 54, 162 (.....)
6, 12, 20, 30 (.....)

Disarranged Sentences and Words.

Write the last letter of the last word in the proper sentence.

NEEDS MUCH GRASS WATER ... (.....)
USEFUL TO VERY IS MAN COAL (.....)

Write the first letter of the proper word.

HANIC is the name of an Eastern Country (.....)
LPATEEHN is a large animal... (.....)

Pairing Statements.

Put a cross in the brackets after each of the two statements which mean nearly the same.

He is carrying coals to Newcastle (.....)
He is a coalminer ... (.....)
Newcastle exports coal (.....)
His labour is unnecessary (.....)

SPECIAL PLACE EXAMINATIONS

Classification, Differences.

Underline the "different" word.

Dog/cat/sheep/grass/goat.

Carpenter/teacher/tailor/lawyer/suitor.

General.

Jane is smaller than Mary and Mary is taller than Anne
Who is tallest? (Jane/Mary/Anne).

Write the letter which occurs in the alphabet immediately after
the middle letter of the word MACHINE (.....)

If the year began on March 1st, what would be the last letter
of the fourth month? (.....)

Fill in the missing figure in this addition sum

$$\begin{array}{r} 33 * 84 \\ 29647 \\ \hline 63231 \end{array}$$

ENGLISH TEST, M.H.E. 8.

This test was constructed in 1935 for admission examinations to Secondary Schools. It was therefore somewhat too difficult for the 10 year olds of the present experiment. It contains 150 questions for which 40 minutes are allowed.

Questions of a similar type to those in the test are given below.

Interpretation of Prose Passages.

“ My first rough manuscript, without any intermediate copy, has been sent to the press. Not a sheet has been seen by any human eyes, excepting those of the author and the printer ; the faults and merits are exclusively my own.”

How many times did the author write out his work? (.....)

How many people saw the manuscript? ... (.....)

Who was responsible for the mistakes in it?

(The author/the printer/the manuscript/the human eye)

Sentence Completion.

Underline in the brackets the ONE word which best fits there.

Once upon a time there was a woodman (who/which/whom) had (too/two/to) sons.

You cannot have both (this/that/these) books. (Which/who what/) will you take ?

SPECIAL PLACE EXAMINATIONS

Synonyms.

Underline that word which has most nearly the same meaning as the word is capital letters.

READY (red/awake/prepared/steady/early)

CAPTAIN (subordinate/helper/commander/grocer/capstan)

Spelling. ¹

Underline in the brackets the word which is correctly spelt.

(Sissors/scissors/scissors/sisores) are used for cutting things.

A man who makes tables is called a (carpender/carpenter carpentar/carpentor/carpendor)

Parts of Speech.

We is a(noun/pronoun/verb/adjective/adverb)

Abbreviations.

What is the meaning of viz. ?

(because/that is/namely/the other way about/for example)

Punctuation.

Put in clearly the punctuation marks which have been left out in the following sentence.

The lady is tall thin and beautiful.

General.

Write the plural of " ox " (.....)

Write the feminine of " tiger " (.....)

ARITHMETIC TEST, M.H.A. 8a.

Like the English test, this test was constructed in 1935 for 11 year olds and was in consequence too difficult for 10 year olds.

It is divided into two sections. Section 1 consists of 42 sums in the four rules, and contains sums in cardinal numerals, £ s. d. avoirdupois, liquid measure, time and length. It includes one sum in addition of decimals containing one decimal figure. With the exception of long multiplication and long division, the sums are laid out so that the child has only to fill in the answer. Fifteen minutes are allowed for Section 1.

Section 2 contains 60 short problems, for which fifteen minutes are allowed.

One mark is awarded for each correct answer in either Section, the scores in the two Sections being added together to give the score for the whole test.

¹ This type of spelling test has since been abandoned by Moray House in favour of one in which the word is presented in skeleton form in a context, the pupil writing the word out in full. (See S. D. Nisbet, Brit. Journ. Ed. Psych., 1939, 9, 29.)

CHAPTER VI.

Report on Statistical Work carried out at Moray House, University of Edinburgh.

1. OUTLINE OF EXPERIMENT.

The object of the experiment was to determine the relative effectiveness of two types of examination in selecting children for Secondary School education.

The first type of examination was that conducted every year by the West Riding Education Authority and known as the County Minor Scholarship Examination (referred to in this report as C.M.). This examination comprises a Moray House Intelligence Test, and English and Arithmetic examination papers set for the purpose by examiners of wide experience. The marks in the three sections of the examination are corrected for differences in age of the candidates. Those of the intelligence test are converted into intelligence quotients according to norms based on the performances of several thousand children, both in the West Riding district and in other parts of England, while the marks for the English and Arithmetic papers are adjusted for age in the light of data derived from performances of previous years in the examination.¹ The final assessment of the examinees is determined by giving equal weight to each section of the examination. For the present experiment a facsimile of the C.M. Examination was prepared, for which special English and Arithmetic papers were set by the usual examiners and an Intelligence Test, M.H.T. 21, was supplied from Moray House.

The second type of examination was one in which standardised Moray House Tests were used throughout. The Intelligence Test was M.H.T. 23, the English Test M.H.E. 8, and the Arithmetic Test M.H.A. 8a.

In addition to these two examinations a supplementary intelligence test was given. All the Moray House Tests were standardised on the results obtained from the experimental group which comprised 1,586 children who took all five tests.

The criterion with which the two types of examination were compared was the head teachers' estimates of their pupils as expressed in an order of merit drawn up for each school. In forming this order of merit, the teachers were requested to grade the children in such a way that they would have no complaint to make if the examination classified them in the same order. The teachers were also advised that they should as far as possible make due allowance for differences in age of the children.

The experiment thus resolved itself into finding correlation coefficients between each type of examination and the criterion of the school order of merit.

¹ See page 4, "Marking of the Scripts."
See page 8, first paragraph.

2. THE EXPERIMENTAL GROUP.

The number of schools represented in the experiment was 39, of which one school, No. 22, did not complete the experiment and is excluded from our survey. All the children in these schools within the age range of 10:0 to 10:11 on March 1st, 1937, were given the examinations. The total number of children taking part was about 1,800. There were of course several absentees, and the children who failed to take all the papers numbered about 200.

The schools were selected to represent as far as possible an average of the whole district. That this object was satisfactorily achieved will be seen from Section 5 on the standardisation of the Moray House Tests.

The object of testing every child within the selected age range was first to obtain a representative sample from which accurate norms could be obtained, and secondly to obtain a series of correlations free from the influence of selection.

3. THE ADMINISTRATION OF THE EXAMINATION.

In order to equalise the effect of practice on the two types of examination, the schools were divided into two groups, group A and group B, group A taking the facsimile County Minor Examination first, and group B the standardised tests first. In group A were approximately 1,020 children, and in group B approximately 720 children.

The several papers were administered under the auspices of the head teachers. The time-table of the examination was as follows :—

Group A Schools.

March 2nd, 1937—

Morning, C.M. English and Arithmetic papers.

Afternoon, Intelligence Test, M.H.T. 21.

March 9th, 1937—

Morning, Standardised English and Arithmetic Tests, M.H.E. 8 and M.H.A. 8a.

Afternoon, Intelligence Test, M.H.T. 23.

March 16th, 1937—Intelligence Test, M.H.T. 26.

Group B Schools.

March 2nd, 1937—as March 9th programme for Group A.

March 9th, 1937—as March 2nd programme for Group A.

March 16th, 1937—Intelligence Test, M.H.T. 26.

A preliminary practice test, lasting 10 minutes, preceded the administration of the Intelligence Test on March 2nd.

The duration of the several sections of the examination was as follows :—

Each Intelligence Test—45 minutes.

English Test, M.H.E. 8—40 minutes.

Arithmetic Test, M.H.A. 8a—30 minutes.

County Minor English Paper—65 minutes.

County Minor Arithmetic Papers—50 minutes.

SPECIAL PLACE EXAMINATIONS

The distribution of raw scores in the several papers is shown in Table I below—

TABLE 1.
Showing Distribution of Raw Scores, Mean Score, and Standard Deviation.

Score Interval.	County Minor Exam.			Standardised Tests.			Supplementary Intelligence Test M.H.T. 26
	M.H.T. 21 Intell.	C.M. English	C.M. Arith.	M.H.T. 23 Intell.	M.H.E. 8 English	M.H.A. 8a Arith.	
120 - 129	—	—	—	—	0.2	—	—
110 - 119	—	—	—	—	0.8	—	—
100 - 109	—	—	—	—	2.8	—	—
90 - 99	0.8	0.6	1.5	0.1	4.5	0.1	0.3
80 - 89	3.6	2.9	4.9	2.6	7.2	0.4	3.8
70 - 79	8.7	6.1	6.4	9.2	10.8	1.3	9.3
60 - 69	12.2	9.2	6.9	14.3	13.8	3.2	14.9
50 - 59	16.2	12.3	9.4	17.0	14.2	7.3	17.7
40 - 49	14.5	11.8	8.3	17.6	16.4	13.4	20.1
30 - 39	14.7	12.7	10.1	14.7	12.2	17.3	14.3
20 - 29	12.0	14.2	12.2	12.1	7.9	22.2	9.9
10 - 19	9.5	14.5	17.9	7.3	4.4	23.8	6.1
0 - 9	7.8	15.7	22.4	5.1	4.8	11.0	3.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of children	1747	1773	1774	1765	1777	1784	1733
Maximum possible score	100	100	100	100	150	102	100
Mean score	43.15	35.90	33.50	44.76	53.43	28.79	47.06
Standard Deviation	22.16	23.44	25.89	20.29	25.08	17.01	19.74

- NOTES**—1. The frequencies are expressed as percentages.
 2. Age allowances are included in the scores of the County Minor English and Arithmetic paper, but not in those of the standardised tests.
 3. The returns from School 22 are excluded from the above table. This school did not complete the experiment.

4. STATISTICAL RETURNS.

Returns were sent at the end of the examination to Moray House showing for each child his age and score made in each of the papers. The raw scores in the County Minor English and Arithmetic papers had been adjusted for differences in age, while no correction had been applied to any of the scores in the Moray House Tests. In addition the children were classified in school and the order of merit in that school.

It will be seen from Table 1 that the three intelligence tests, M.H.T. 21, M.H.T. 23, and M.H.T. 26, scatter the children fairly well over the full range of the tests. On the other hand, the English and Arithmetic tests and papers are too difficult for the duller children. This was not unexpected as the County Minor papers were designed for children selected for their chances of obtaining scholarships, while the Moray House English and Arithmetic Tests were designed for 11 year olds. The latter tests were however the only tests available at the time the experiment was initiated.

The table shows that the scatter of scores in the County Minor Arithmetic paper, as measured by the standard deviation, is about $1\frac{1}{2}$ times that of the Moray House Arithmetic Test. This results in part from the greater difficulty of the latter test, and in part from its shorter duration, viz.: 30 minutes as against 50 minutes. Ordinarily the standard deviation of raw scores of a year group in a Moray House Arithmetic Test is 21 or 22.

5. STANDARDISATION OF THE MORAY HOUSE TESTS.

As far as the main object of the experiment is concerned, the correlation between raw scores in the several tests would yield results almost as accurate as the correlation between such scores corrected for differences in age, for when the age range is as small as one year the influence of age on the correlation does not exceed 0.01. As, however, some interesting side issues could be examined by the use of Intelligence, English, and Arithmetic Quotients in place of the corresponding raw scores, it was decided to standardise the tests and prepare tables of norms by which conversion of raw scores into quotients could be effected.

The Moray House system of standardisation is to give a quotient (Intelligence, English, or Arithmetic) of 100 to the child whose score is equal to the average score for his age. Quotients above and below 100 are allotted so that their scatter is represented by a standard deviation of 15. This is equivalent to giving the following quotients to children who occupy the stated positions (percentile ranks) in a representative group of 100 children.

SPECIAL PLACE EXAMINATIONS

Percentile Rank	Quotient	Percentile Rank	Quotient
98	130	40	96
95	125	30	92
90	119	20	87
84	115	16	85
80	113	10	81
70	108	5	75
60	104	2	70
50	100		

The numerically greater percentile ranks correspond to higher levels of ability.

The quotients thus obtained give due allowance for age at all levels of ability.

In order that the norms for the five Moray House Tests should be strictly comparable, it was decided for purposes of standardisation to restrict the cases considered to those children who took all five tests. In this way the numbers were reduced from about 1,760 to 1,586. Tabulations for these 1,586 cases were obtained by the Hollerith appliances of the British Tabulating Machine Co. of Glasgow, showing the numbers of children of each month of age obtaining scores from 0 up to the maximum score in the test in groups of 10's, i.e. 0 to 9, 10 to 19, etc. On investigation it was found that this sample of 1,586 children had an average ability closely corresponding to that of other centres which had used the same tests, while the scatter of ability also was almost the same. We, therefore, have every confidence that the sample was a fair representative sample.

On the other hand, it transpired that the increment of score from month to month was somewhat less for the lower reaches of ability than that obtaining in other educational areas. This monthly increment of score is the age allowance, and in the tables of norms prepared for the experiment age allowances more in accordance with our experience in other centres were used. As explained above, a slight inaccuracy in the age allowance allotted will have no appreciable influence on the correlations which are to be calculated, for as we have seen even if no age allowance at all is given the correlations are but little affected.

From the tables of norms thus prepared for the five tests each child was given five quotients, namely three intelligence quotients, one English quotient, and one Arithmetic quotient. These quotients were calculated to the nearest half point.

SPECIAL PLACE EXAMINATIONS

6. REVIEW OF INTELLIGENCE QUOTIENTS.

From the performances in the three intelligence tests a table was prepared giving three mean intelligence quotients for each school. These figures are given in Table 2.

The mean quotients for the whole body of children, shown in the summary table, are very close to 100. The cases considered include some 180 children who did not take all the five Moray House Tests, and since these absentees were found to be of somewhat less average ability than the 1,586 children who took all five tests and whose scores were used for purposes of standardisation, the average I.Q.'s of the latter group would be almost exactly 100. There is here good confirmation of the accuracy of the norms.

TABLE 2.

Showing the Numbers of Children in each School taking the Three Intelligence Tests and the Mean Intelligence Quotient for each School.

Three mean Intelligence Quotients are given for each school, one for each of the three tests.

Returns from School 22 are not included in this table.

School No.	M.H.T. 21		M.H.T. 23		M.H.T. 26	
	Number of Pupils	Mean I.Q.	Number of Pupils	Mean I.Q.	Number of Pupils	Mean I.Q.
GROUP A—SCHOOLS taking M.H.T. 21 before M.H.T. 23.						
1	55	91.04	57	96.36	58	93.29
2	73	89.55	77	91.45	75	90.79
3	23	89.85	25	93.20	23	92.65
4	37	101.43	37	103.81	36	101.65
5	55	91.22	54	91.64	51	90.37
6	45	97.58	44	100.75	48	97.19
7	74	98.26	75	102.29	69	105.48
8	38	97.08	44	97.02	39	97.37
9	49	103.31	49	102.78	49	102.97
10	47	95.94	45	97.92	43	97.25
11	30	91.73	26	97.23	24	94.62
12	45	98.11	45	101.19	45	100.81
13	111	96.00	109	97.60	107	97.00
14	39	92.39	49	92.57	47	92.71
15	46	112.14	48	106.65	44	109.95
16	35	91.80	38	91.54	36	91.25
17	41	91.01	44	93.54	42	96.33
18	61	90.99	61	93.04	65	92.09
19	38	100.42	43	101.70	43	100.65
20	44	94.03	45	97.29	44	95.87
21	35	92.06	32	93.97	33	94.03

SPECIAL PLACE EXAMINATIONS

School No.	M.H.T. 21		M.H.T. 23		M.H.T. 26	
	Number of Pupils	Mean I.Q.	Number of Pupils	Mean I.Q.	Number of Pupils	Mean I.Q.
GROUP B—SCHOOLS taking M.H.T. 23 before M.H.T. 21.						
23	38	108.84	39	104.58	34	105.06
24	35	97.58	35	91.33	35	93.08
25	34	107.23	34	103.56	34	104.44
26	37	98.55	34	98.68	38	100.10
27	19	94.50	19	92.76	19	92.60
28	24	103.83	25	101.64	22	101.91
29	39	101.49	39	100.59	40	98.79
30	30	100.82	28	101.00	31	99.63
31	19	100.95	20	102.57	19	102.97
32	50	104.65	50	101.75	46	102.91
33	43	100.17	44	97.85	42	98.88
34B	29	103.62	29	99.91	28	101.61
34G	38	108.93	38	104.59	36	105.28
35	66	105.17	66	100.14	65	103.87
36	31	114.61	30	112.87	32	111.19
37	48	111.64	48	107.14	47	107.05
38	87	110.17	84	107.67	86	109.13
39	59	111.68	56	107.60	58	111.39

Summary of Table 2.

	M.H.T. 21		M.H.T. 23		M.H.T. 26		Difference y - x
	No. of Pupils	Mean I.Q. (x)	No. of Pupils	Mean I.Q. (y)	No. of Pupils	Mean I.Q.	
Group A Schools	1021	95.55	1047	97.30	1021	96.90	1.75
Group B Schools	726	105.71	718	102.69	712	103.78	— 3.02
All Schools	1747	99.77	1765	99.49	1733	99.73	—

A feature of Table 2 is the higher I.Q.'s of Group A children in test M.H.T. 23 than in M.H.T. 21, and vice versa for the Group B children. The difference amounts to 1.75 points of I.Q. for Group A and 3.02 points of I.Q. for Group B.

The effect partly arises from the fact that the norms for these two tests are based on the raw scores of children who had had different amounts of practice in working intelligence tests. Thus, for M.H.T. 21 the Group B children had had more practice than Group A, as they had already worked M.H.T. 23. The recorded I.Q.'s of the Group A children, as found from the M.H.T. 21

norms, will therefore be depressed below their true value by reason of the better performance in the same test of the practised Group B ; and similarly for Group B in M.H.T. 23. Compensation is of course effected in the second intelligence test, where the recorded I.Q. will be somewhat higher than the true. It follows that the average of the I.Q.'s obtained from M.H.T. 21 and M.H.T. 23 is a better measure of a child's intelligence than that from either test by itself.

The third intelligence test, M.H.T. 26, was taken by children who had all had the same amount of practice. We thus expect I.Q.'s obtained in this test to be intermediate between those from M.H.T. 21 and M.H.T. 23 for each group of schools, indeed we expect them to be the average of the two latter. In point of fact, for Group A the average of the two I.Q.'s from M.H.T. 21 and M.H.T. 23 for all children is 96.42, and from M.H.T. 26 alone it is 96.90. Corresponding figures for Group B are 104.20 and 103.78. The agreement is obviously close.

For these reasons it must not be thought that the rise in I.Q. from first to second test is a just measure of the effect of practice: it is in large part consequent on the plan of the experiment, whereby the two types of examination were taken "in rotation" by the two Groups of children. The standardisation of the tests precludes the appearance of any practice effect when all the children are considered together, for their average I.Q. in each test is 100.

This artificial raising and lowering of the true I.Q. will have no influence on the correlations, since they were computed separately for each school and all the children in the school will be equally affected.

7. THE CORRELATIONS OF THE SEVERAL TESTS WITH THE CRITERION.

We first calculated the correlations between the orders of merit given by the head teachers and age. For this purpose we took 611 children from the eight largest schools, the resulting weighted mean correlation being 0.188 with probable error of 0.026. We may compare with this correlation that of age with raw scores in Intelligence, English, and Arithmetic tests, that is, with scores uncorrected for age. Such correlations based on over 6,000 children with an age range of 12 months are from 0.15 to 0.16. It is fair to conclude therefore that in the present experiment attempts to make allowance for age in the ranking of the pupils have not been successful. We are not surprised at this result, for enquiries in many other areas show that the difficulty is insurmountable unless standardised tests have been used as the basis of assessment.

The next step in the statistical procedure was to calculate for each school correlations between each pair of the eight variables. Since, however, the number of children in some of the schools was too small to warrant the labour of calculating correlations, we restricted ourselves to those schools which had presented the greatest number of pupils.

Two series of correlations were calculated—

- (a) for all children in the larger schools who took any pair of papers,
- (b) for those children whose I.Q.'s were not less than 105, as measured by their performance in intelligence test M.H.T. 21. The data were worked out for this selected group, since the County Minor English and Arithmetic papers had been designed for children who would normally take the entrance examination to secondary schools, and such papers would therefore be too difficult for the duller children of a representative group of the whole population.

Product-moment correlations were calculated by the method of diagonal adding. The school ranks were treated as if they were inverse marks. Although the distribution of such ranks is not normal, preliminary trials showed that the correlation was not appreciably changed by re-grouping the ranks into normal distribution. This result accords with theoretical conclusions.

The correlations for the several schools were formed into a weighted average by means of Fisher's 'z' technique, each correlation coefficient being weighted in approximate proportion to the number of children represented.

(a) Correlations obtained from the unselected sample of children.

In Table 3 we present the inter-correlations of the eight variables. They were obtained from about 1,100 children from Schools Nos. 2, 5, 7, 8, 9, 10, 12, 13, 14, 15, 18, 19, 20, 23, 32, 33, 34, 35, 37, 38, 39.

The correlations are seen to be all large, and in particular, show a fairly high degree of correspondence between the heads' judgments of their pupils (i.e. school ranks) and the several papers. It is noticeable that the Arithmetic standardised test correlates more highly than any of the other variables with the school rank. This superiority of the Arithmetic test is however significant only in relation to the two English papers. In any case we are loth to draw the conclusion that performance in arithmetic is the best criterion of future success, since it is likely that Arithmetic results

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TABLE 3.

Showing the averaged correlations between the eight variables for the unselected group of pupils.

The number of pupils is shown in brackets under the correlation coefficient.

	School Rank	C.M. Engl.	C.M. Arith.	M.H.T. 21 I.Q.	M.H.T. 23 I.Q.	M.H.T. 26 I.Q.	M.H.E. 8 E.Q.	M.H.A. 8a A.Q.	Age
School Rank	—	.806 (1170)	.827 (1172)	.831 (1163)	.840 (1154)	.830 (1114)	.795 (1140)	.842 (1139)	.188 (611)
C.M. Engl.	.806	—	.769 (1172)	.838 (1166)	.838 (1142)	.822 (1106)	.832 (1130)	.757 (1132)	
C.M. Arith.	.827	.769	—	.812 (1162)	.808 (1145)	.808 (1107)	.729 (1130)	.874 (1132)	
M.H.T. 21 I.Q.	.831	.838	.812	—	.916 (1136)	.918 (1102)	.878 (1119)	.832 (1124)	
M.H.T. 23 I.Q.	.840	.838	.808	.916	—	.927 (1092)	.861 (1133)	.840 (1131)	
M.H.T. 26 I.Q.	.830	.822	.808	.918	.927	—	.851 (1084)	.839 (1085)	
M.H.E. 8 E.Q.	.795	.832	.729	.878	.861	.851	—	.770 (1135)	
M.H.A. 8a A.Q.	.842	.757	.874	.832	.840	.839	.770	—	

Probable Errors.

The following probable errors are calculated on the assumption that the correlation coefficients were obtained from one sample with the stated number of cases.

(1) The largest correlation coefficient in the table, viz. 0.927 (N=1092), has a probable error of 0.0029.

(2) The smallest correlation coefficient in the table (excluding that of school rank with age), viz. 0.729 (N=1130), has a probable error of 0.0094.

(3) The correlation of school rank with age, viz. 0.188 (N=611) has a probable error of 0.0263.

play too large a part in the estimate formed by head teachers of a child's ability. This follows from the fact that the scatter of scores in an Arithmetic class examination is usually higher than that in other subjects, so that undue weight will be given to this subject. In actual fact our own enquiries based on later performance in Secondary Schools show that the intelligence test is the best single prognostic agent.

The lowest correlations appearing in the table are those between the English papers, or tests, and the Arithmetic. This is an expected feature since each subject is measuring a different aspect of ability. It is also a desirable feature, for the relatively low inter-correlation between these two subjects helps to swell the correlation of the **sum** of the different papers or tests with the criterion, and increases the efficacy of the whole examination.

The next step in the investigation was to calculate the correlation between the sum of the scores in the three papers in each type of examination with the criterion, and to compare the results. We have now arrived at the main issue of the whole experiment.

We first give the results when each section of the examination receives equal weight.

Correlation of School Rank with County Minor Examination,

(Intelligence Test, M.H.T. 21; County Minor English Paper; and County Minor Arithmetic Paper) = **0.880**.

Correlation of School Rank with Standardised Tests,

(Intelligence Test, M.H.T. 23; English Test, M.H.E. 8; and Arithmetic Test, M.H.A. 8a) = **0.879**.

The probable errors of these correlations is of the order of 0.004. It follows that when the papers are equally weighted the two types of examination have exactly equal value as agents for predicting headmasters' opinions of their pupils.

It is also desirable to know the maximum possible correlation (known as the Multiple Correlation) with the criterion which results from the optimum weighting of each section of the examination. These correlations follow.

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Multiple Correlation of County Minor Examination with School Ranks = 0.881.

Best Weighted team—Intelligence Test, M.H.T. 21	32.7%
C.M. English Paper	27.0%
C.M. Arithmetic Paper	40.3%
	100.0

Multiple Correlation of Standardised Tests with School Ranks = 0.883.

Best Weighted team—Intelligence Test, M.H.T. 23	32.6%
English Test, M.H.E. 8	21.3%
Arithmetic Test, M.H.A. 8a	46.1%
	100.0

In each case the best weighted team gives a correlation with the criterion differing inappreciably from that obtained when each paper receives the same weight. This is the natural consequence of the high intercorrelations between the three sections of the examination.

The fact that the best weighted team gives practically the same correlation with the criterion as the team with tests equally weighted shows that any differences in weight between the two teams are subject to high errors, and are almost certainly not significant.

It is of interest to compare these multiple correlations with that between the best weighted team of all seven variables and the criterion. The comparison is as follows :—

Multiple Correlation with Criterion of School Ranks.

County Minor Examination—	0.881.
Standardised Tests	—0.883.
All seven variables	—0.896.

It follows that the predictive value of either examination would be only slightly increased by an increase in the number of papers of the same type.

We also calculated the correlation of the sum of the three intelligence tests M.H.T. 21, M.H.T. 23, and M.H.T. 26, each equally weighted, with the school rank. This correlation was 0.857, a figure not much higher than that of any one of these tests taken by itself. This result follows from the high intercorrelations of the three intelligence tests, which very largely measure the same aspect of ability.

(b) Correlations obtained from the selected sample of children.

This sample comprised children with I.Q.'s of not less than 105, as measured from performance in Intelligence Test M.H.T. 21. The process of selection reduced considerably the numbers in each school available for correlation purposes, with the result that we have calculated correlations only for about 300 children from schools 7, 13, 15, 23, 32, 34, 35, 37, 38, 39.

The correlations are given in Table 4 on page 55. They are lower than those of Table 3 since they reflect the attenuating influence of selection.

Here again we notice that the arithmetic test M.H.A. 8a gives the best correlation with school rank. Its superiority over C.M. English, English Test M.H.E. 8, and Intelligence Test M.H.T. 21 is moreover significant. But as previously explained the higher correlation with head teachers' assessments may have arisen from the excessive influence of Arithmetic in determining those assessments. The lowest correlations in the table are those between the English papers or tests and the Arithmetic, as was also found for the unselected group.

The correlation of the equally weighted sum of the three sections of each examination with school rank was as follows :—

County Minor Examination	—0.773
Standardised Tests	—0.797

The correlation of the best weighted team in each type of examination with school rank was as follows :—

County Minor Examination	—0.781
Standardised Tests	—0.812

The best relative weights for the two sets of papers were as follows :—

County Minor Examination.

Intelligence Test, M.H.T. 21	—27.2%
C.M. English Paper	—24.4%
C.M. Arithmetic Paper	—48.4%
	—
	<u>100.0</u>

Standardised Tests.

Intelligence Test, M.H.T. 23	—31.1%
English Test, M.H.E. 8	—15.6%
Arithmetic Test, M.H.A. 8a	—53.3%
	—
	<u>100.0</u>

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TABLE 4.

Showing the average correlations between the eight variables for pupils with I.Q.'s not less than 105.

The number of pupils is shown in brackets under the correlation coefficient.

	School Rank	C.M. Engl.	C.M. Arith.	M.H.T. 21 I.Q.	M.H.T. 23 I.Q.	M.H.T. 26 I.Q.	M.H.E. 8 E.Q.	M.H.A. 8a A.Q.
School Rank	—	.614 (326)	.715 (330)	.671 (330)	.708 (320)	.681 (312)	.614 (316)	.762 (315)
C.M. Engl.	.614	—	.546 (330)	.643 (330)	.666 (319)	.603 (312)	.659 (315)	.598 (316)
C.M. Arith.	.715	.546	—	.657 (330)	.658 (319)	.679 (312)	.531 (315)	.797 (315)
M.H.T. 21 I.Q.	.671	.643	.657	—	.798 (319)	.799 (312)	.717 (315)	.685 (315)
M.H.T. 23 I.Q.	.708	.666	.658	.798	—	.803 (306)	.662 (315)	.678 (315)
M.H.T. 26 I.Q.	.681	.603	.679	.799	.803	—	.687 (300)	.682 (300)
M.H.E. 8 E.Q.	.614	.659	.531	.717	.662	.687	—	.583 (314)
M.H.A. 8a A.Q.	.762	.598	.797	.685	.678	.682	.583	—

Probable Errors.

The following probable errors are calculated on the assumption that the correlation coefficients were obtained from one sample with the stated number of cases.

(1) The largest correlation coefficient in the table, viz. $r = .803$ ($N = 306$) has a probable error of 0.0137.

(2) The smallest correlation coefficient in the table, viz. $r = .531$ ($N = 315$), has a probable error of 0.0273.

It will be seen that for the selected group the standardised tests have a slight advantage over the County Minor Examination, but this superiority is not statistically significant.

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We also worked out the correlation of the equally weighted sum of the three intelligence tests with school rank. For this selected group of pupils the correlation was 0.738.

In conclusion, it is advisable to refer to the use of the head teachers' assessments of their pupils as a criterion. At the present stage of the enquiry, it is the only criterion available. It was chosen as a temporary criterion because many think that a teacher can assess a pupil more accurately than an objective examination, since he can make allowance for difficult home conditions, bad health, temperamental qualities, etc. The ultimate criterion however is performance in the secondary school, and in a later extension of this enquiry the validity of the elementary school teachers' assessments will be tested in the light of this criterion.

(Signed) GODFREY H. THOMSON.
W. G. EMMETT.

Moray House,
University of Edinburgh,
28th June, 1938.

CHAPTER VII.

SOME CONCLUSIONS.

Methods of Selection.

When the number of places, available in Secondary (Grammar) Schools, becomes sufficient to accommodate all children, who are fitted to profit by the education which such schools furnish, and who wish to avail themselves of it, the decision as to the type of post-primary education to which a child should be promoted, at the age of 11 plus, should be made after consultation between the Head Teacher of the Junior School, in which the child is being taught, and the Heads of the various schools to which he may be transferred. Regard should be paid also to the wishes of the parent. The decision will depend upon certain factors—the child's capacity, his attainments, his character traits and his interests. To this end, the factors upon which the decision is to be based should be assessed and recorded systematically during the child's Primary School career, the assessment being, as far as possible, objective in character.

Record Card.

The child's record card should show his :—

1. Home Environment as it requires consideration during his Secondary School career.
2. Physical Condition as it indicates the need for special treatment of the child in the Secondary School.
3. Intelligence Quotient obtained from the application, annually, of a written Group Test of Intelligence specially compiled for the purpose of this record, and, where the field is large enough, standardised on the results of the application to this field. Where the field of an Education Authority is not large enough to allow of the standardisation of the Intelligence Test, on the results of its application to its own field, two or more Authorities should combine for this purpose.
4. Education Quotients obtained by a yearly examination by means of given standardised objective tests in :—
 - (a) Reading for i Mechanical Accuracy
ii Comprehension
 - (b) Arithmetic i Fundamental Processes
ii Reasoning
5. Will-Temperament
 - (a) Speed and fluidity of reaction
 - (b) Forcefulness and decisiveness of reaction
 - (c) Carefulness and persistence of reaction

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(Either determined objectively, or assessed by the teacher on a five-grade scale of classification :—Excellent, Very Good, Good, Fair, or Poor).

6. Attitude towards Work assessed upon the above five-grade scale.
7. Interests
 - (a) in school
 - (b) out of school.

It must be understood that Record Cards are the absolute property of the schools concerned and are for the sole use of the Heads of those schools. The information recorded on the cards is private and confidential and must not, in any case, be divulged to extra-scholastic authorities. The cards are intended to serve an educational purpose only.

So long as Grammar Schools are unable to accommodate more than a limited number of children selected from those who are fitted to profit from attendance at them, the results of an external examination must be substituted for the judgment of the teacher.

Two facts which emerge from the investigation of the relative validities of the various forms of examination will assist in the selection of the external examination and in the conditions of its application.

The first fact is that the three forms of examination do not differ appreciably in validity. The coefficients of correlation with the criterion are :—County Minor examination, 0.880; Standardised Tests, 0.879, three Intelligence Tests, 0.857. (It should be borne in mind here that the criterion is probably based more largely upon attainment than upon capacity, and the fact that the Standardised Test in Arithmetic correlates more highly than any of the other variables with the school rank suggests that this is so.) From the point of view, therefore, of the selection of the children for education in Secondary (Grammar) Schools it matters little which type of examination is employed.

From other points of view, however,—effects on the curriculum, time-table, teaching methods, and status and reputation of the Junior School, reliability and speed of marking—the Intelligence Test has many advantages over the other forms of examination, and the external examination for the selection of pupils for secondary education of the Grammar School type should therefore be a written Group Intelligence Test.

The second fact which emerges from the investigation is that of the unreliability of the single opportunity.

The coefficients of correlation (r) of the examination results with the criterion are all of the order of 0.88, and this means that the general tendency of the examination to select the right children is very high.

O'Dell says,¹ however, that the Element of Dependability, that is, the accuracy of prediction in the case of an individual candidate, is represented by the expression $1 - \sqrt{1 - r^2}$ which in this case is 0.53, and this coefficient reveals more patently than does the correlation coefficient, that correlation between examination results and the criterion is low enough to permit many errors of selection in respect of individual candidates. Professor Thomson states that, although the recorded correlations are high, they are not inconsistent with injustice in many individual cases. The practical inference from this is that whatever form of examination is employed there must, in justice to the individual candidate, be some safeguard against its unreliability.

The Safeguard.

Candidates for the Special Place Examination from each Primary School should be ranked on entry according to their capacity to profit by education of the Grammar School type, and also graded as Excellent, Very Good, or Good, on a five-point scale which would include the whole age group. Their class in the Primary School, the number of pupils in it and the average age, with their positions in that class, should also be given.

Where there is discrepancy between the findings of the external examination and the teachers' estimate, or the child's school record, a supplementary examination of the children, in whose cases discrepancy occurs, should take place. Where the external Examination consists of a Group Intelligence Test only, the supplementary examination should be by means of a Group Intelligence Test. If the external examination includes tests of attainment in English and Arithmetic, the supplementary examination should be by means of standardised tests in English and Arithmetic (with a Group Intelligence Test if such a test formed part of the original examination), in order that the results of the supplementary examination can be compared with the results of the original examination. A further advantage of the employment of standardised tests is that the marking can be done quickly, so that the notification of successful candidates need not be long delayed.

It is characteristic of Intelligence Tests that they express their findings in terms of Intelligence Quotients. The Intelligence Quotient of an individual remains constant throughout his life,

¹ "Statistical Method in Education," Chas. W. O'Dell. D. Appleton-Century Co., Inc., London and New York.

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and though variations in the findings of Intelligence Tests employed to measure this constant occur from test to test, these findings tend to settle round a constant mean, and the variations from this mean will diminish as the tests employed are perfected. If, therefore, an Intelligence Test is the external examination, the safeguard can be imposed before the examination takes place. We suggest that this be done by applying, as is suggested in connection with the Junior School record card, an Intelligence Test to each pupil in the Junior School towards the end of each year. For this purpose Group Intelligence Tests suitable for 8 year old children will have to be devised. Where there is discrepancy between the teachers' estimate and the finding of the examination, comparison of the Intelligence Quotient obtained in the final examination with those obtained in the three previous years will suggest whether the examination finding or the teachers' estimate is the more correct assessment of the child's ability.

In this case the employment of the safeguard causes no delay in the publication of the list of awards.

The Place of Examination.

The practice of the West Riding Education Committee is, as has been said, to hold its County Minor Scholarship Examination at a number of convenient centres throughout its area. For most of the children taking the examination the realisation of the importance of success in the examination induces an emotional disturbance which produces inconsistencies between the findings of the examination and the real ability of the child. Many children have to travel relatively long distances, sometimes by public service vehicles which are not convenient for the time of the examination. Children are excited by the prospect of the ordeal which they are to undergo, and start out for their test often without an adequate meal—indeed the West Riding Education Committee advises children who have to travel a distance and consequently leave home early, to take some food with them to the examination. Physical and mental distress, too, often result from the candidate's want of knowledge of the sanitary arrangements of the school at which he is being examined.

We suggest that the examination should be held in the school which the child attends, and on a school day, as is done in the case of the Northumberland Education Committee's Examinations.

Age of Candidates.

For some years, up to the 1937 examination, candidates for the West Riding Committee's Examination had been required to be between the ages of 10 and 12 years on the first of April (in 1937, 1st March) of the year of the examination. This age-

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range allowed children two opportunities of sitting for the examination.

Teachers in the Primary Schools, however, saw two objections to this age-range.

1. Children took the examination at different stages of their school careers.

In areas in which the age of transfer from Infants' to Junior Departments was the normal 7 plus, a child born in the months September to March took the examination as a Junior candidate after $2\frac{1}{2}$ years in the Junior School, and as a Senior candidate after $3\frac{1}{2}$ years in the Junior School; whereas a child born in the months April to August took the examination as a Junior candidate after $3\frac{1}{2}$ years in the Junior School, and as a Senior candidate after six months in the Senior School. (In many districts in the West Riding, the age of transfer from Infants' to Junior Departments is 8 plus and in those areas a child would be required to sit for the examination as a Junior candidate after only $1\frac{1}{2}$ years in the Junior School.)

2 (which is implicit in 1). Some children sat for the examination after their transfer to the Senior School. It seemed highly undesirable that the child should be disturbed by a transfer to the Senior School in September, an examination in the following February, and, if successful, transfer to a Grammar School in the September following.

Teachers in the Grammar Schools also objected to the age-range—because some children who were successful at the County Minor Scholarship Examination were not received by them until they were approximately $12\frac{1}{2}$ years of age, and, being required to remain at the Grammar School only until the end of the term in which they reached the age of 16, they were not given the five years' preparation for the School Certificate Examination that was thought to be desirable.

The members of the Central Examinations Council who were serving in Elementary Schools asked that the date from which ages for the purpose of admission to the County Minor Scholarship Examination were calculated should be the same as that from which ages for the purpose of transfer from Infants' to Junior and from Junior to Senior Departments were calculated, viz. 1st September. If that request had been granted, and 10 to 12 years of age as on 1st September following the examination, taken as the range for admission to the examination, all candidates would have taken the Junior examination after $2\frac{1}{2}$ years, and the Senior Examination after $3\frac{1}{2}$ years, in the Junior School. Their ages on the day of the examination (in February) would have been :—Juniors $9\frac{1}{2}$

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to $10\frac{1}{2}$, and Seniors $10\frac{1}{2}$ to $11\frac{1}{2}$ years, and on admission to the Grammar School, Juniors 10 to 11 and Senior 11 to 12 years.

It was objected, that for any child to be subjected to a severely selective examination so young, and after so short a period in the normal work of the Junior School, was highly undesirable. For that reason, and also in order that all successful candidates should be able, if desired, to have a 5 years' course up to the School Certificate Examination, the age of admission to the examination was changed to 10 to 11 years on 1st March of the year in which the candidate was examined. One important effect of this change is that candidates now are allowed only one opportunity of sitting for the examination.

The modification of the age range for admission to the examination has effected one improvement in the situation. It prevents, in normal cases, the entry for County Minor Scholarships of children who have been transferred to the Senior School.

It does not, however, remove the teachers' objections :

1. Different children still take the examination at different stages of their Junior School careers.

A child born in the months of August to March, takes the examination $3\frac{1}{2}$ years after admission to the Junior School, whereas a child born in the months September to February is required to sit for the examination after only $2\frac{1}{2}$ years in the Junior School, and $1\frac{1}{2}$ years (an unreasonably long time) before the end of his normal Junior School course.

2. Some children are still compelled to sit for a severely selective examination at a very tender age—some of them have only just reached the age of 10—and in the case of those districts where the age of transfer from Infants' to Junior Departments is 8 plus (and there are many such districts in the West Riding) half the children (those born in the months September to February) are required to sit for the examination after only $1\frac{1}{2}$ years in the Junior School, a requirement which, it is admitted, is highly undesirable.

We recommend that transfer from primary to post-primary education of every type should take place once each year at the age of 11 plus, and that the type of post-primary education for which a child's capacity and attainment fit him should be determined during the last year of his Junior School course. To give effect to this recommendation, the age-range for admission to the County Minor Scholarship Examination must be 10 to 11 years, on 1st September preceding the examination. Children would then have an age-range of $10\frac{1}{2}$ to $11\frac{1}{2}$ years at the date of the

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examination and of 11 to 12 years on admission to their Secondary Schools. All children would take the examination after $3\frac{1}{2}$ years of the Junior School course, and the undesirably long gap between the examination and the transfer to the Senior School of unsuccessful candidates would be avoided.

The desired 5 years' course up to the School Certificate Examination would be secured by requiring the parents of successful candidates to undertake to allow their children to remain at the Grammar School until the end of the school year in which they reached the age of 16 years. Against this, it is urged that it would concentrate all leavers, each year, into the month of July, with consequent difficulties in the way of their absorption into employment. It is probable, however, that even now the large majority of children who leave the Grammar Schools do so in the month of July.

We recommend also that the Special Place examination should be held as near the end of the educational year as administrative conditions will permit.

The Year of Transition.

It was decided to admit to the 1937 examination of the West Riding Education Committee, in addition to those candidates who would be not less than 10 years and not more than 11 years of age on 1st March, 1937, candidates who would, but for the modification of the age-range, have been the normal 1937 Senior group of candidates, viz. children who were born between 1st April, 1925 and 28th February, 1926.

The West Riding Committee's examination had usually selected for the receipt of awards rather more than 10 per cent. of each age-group, approximately 6 per cent. of the age-group receiving awards as Junior candidates and another 4 to 5 per cent. receiving awards in the following year, as Senior candidates. At the 1936 examination 6.6 per cent. of the 23,207 children who formed the Junior age-group received awards, and we asked the West Riding Education Committee to increase the number of its awards for 1937 by 900, in order that the Senior group of that year could receive the balance of the 10% of awards that it had not received in 1936, without robbing the 1937 Junior group of its 10%, which it ought to receive in entirety in that year seeing that it would not be allowed a second opportunity of competing. The Education Committee were unable on financial grounds to grant any additional scholarships in 1937; instead, because the decline in birthrate had resulted in a smaller field, from which potential candidates could be drawn, it reduced the number of its awards by 224. It did, however, make one slight concession in the direction of removing the injustice to the Junior candidates of

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1937, by allowing the 400 unsuccessful candidates who approached most nearly the pass mark in 1937 to sit again in 1938 to compete for 200 reserved awards.

The Junior School.

In the course of its deliberations the Committee had frequently to discuss questions of ideals and aims, curricula and time-tables, teaching methods and technique, in the Junior School.

As a consequence, it is felt by the Committee that either the West Yorkshire Committee alone, or the West Yorkshire Committee in conjunction with the Committee of the West Riding Teachers' Association, should set up a " Junior School " Sub-Committee to consider and report on these questions. Such a Sub-Committee would do useful work.

CHAPTER VIII.

SUMMARY OF RECOMMENDATIONS.

I. Selection.

- a. When Secondary (Grammar) School accommodation is adequate for all children capable of profiting by attendance at such schools, the type of post-primary education (Grammar School, Selective Central School, Senior School) to which a child is transferred at the end of his Junior School course should be determined after consultation between the Head Teacher of the Junior School and the Heads of the various Secondary Schools to which the child could be transferred, and after consideration of the child's capacity, attainments, character traits and interests, and of the wishes of his parents. The assessment of the child's capacity, attainments and character traits should, as far as possible, be objective in character, and recorded systematically during the child's primary school career.
- b. Under present conditions of accommodation in Secondary (Grammar) Schools, and whenever a Local Education Authority insists that the decision as to the type of secondary education for which a child is fitted shall be made by an external examination, children should be selected for Special Places in Secondary (Grammar) Schools by means of a given written Group Intelligence Test.

2. Safeguards.

- a. Whatever form of external examination is employed for the selection of children for Special Places in Secondary (Grammar) Schools, some means of combating the unreliability of the single examination should be adopted.
- b. The most acceptable means is the comparison of the examination results with the judgment of the teacher, expressed before the examination, through an order-of-merit ranking of his candidates, together with a grading of those candidates on a five-point scale.
- c. Where selection is by means of a written Group Intelligence Test, discrepancies, between the examination results and the teachers' judgment, can be checked by means of supplementary Group Intelligence Tests, applied, at yearly intervals, before the Special Place Examination takes place.

3. Place of Examination.

The Special Place Examination should be held in the school which the child attends, and on a school day.

4. Age of Candidates.

The transfer from primary to post-primary education should be made once each year. The Secondary School course should be preceded by a four-year course in the Junior School. The child should enter the Junior School at the beginning of the educational year next following his seventh birthday, and should be transferred to the secondary stage of his education at the beginning of the educational year next following his eleventh birthday. Candidates for the examination should, therefore, be between the ages of 10 and 11 on 1st September preceding the examination.

The Special Place Examination should be held during the last year of a child's Junior School course and as near the end of the school year as administrative demands will allow.

5. Preliminary Examination.

No suggestion is made that the Preliminary Examination of the West Riding Education Committee should be discarded or modified. As the teacher's recommendation for admission to the examination is based upon the results of the Preliminary Examination, or upon the general school record of the pupil, or upon both combined, and as the examination is entirely an internal one, the papers set and marked by the school, and the results retained by the school, it is felt that teachers can have no objection to it. On the other hand, the holding of a formal examination, of the character and scope of the examination proper, may result in the discovery of suitable candidates who might otherwise be overlooked. The interval between the Preliminary Examination and the examination proper should be shortened.

6. Local Scholarship Committees.

The Local Committees set up by the West Riding Education Committee serve a useful purpose in widening the field of interest, and in increasing the confidence of the teachers in the Examination, but it is felt that these aims can be achieved more effectively if Local Scholarship Committees are given the benefit of the greater knowledge of the Examination which the members of the Central Examinations Council possess. This could be done by allocating a member of the Central Examinations Council to each Local Committee.

7. Transfer System.

It is highly important that there should exist means of correcting errors made when determining, at the age of 11 plus,

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the type of post-primary education for which children are fitted. To this end there should be in operation a system of easy transfer from a school of any one type of secondary education to a school of any other type. The measure of capacity to profit by secondary education of the Grammar School type should not be ability to pass the School Certificate Examination.

8. **Results of Examination.**

There does not appear to be any good reason for keeping from the teacher the knowledge of the details of the performance of his candidates in the Examination. On the other hand, the divulging of such information may secure the confidence of teachers who are often disturbed by the incidence of awards.

9. **The List of Awards.**

The practice of the West Riding Education Committee of issuing its lists of awards without indication of the Primary Schools which successful candidates attend is to be commended.

10. **The Junior School.**

The West Yorkshire County Association should set up a "Junior School" Sub-Committee to consider, and report on, questions of ideals and aims, curricula and time-table, teaching methods and technique, of the Junior School.

APPENDIX.

Comments of the West Riding County Minor Chief Examiners.

After this Report was in proof its Editors asked the Chief Examiners for their comments. At that stage it was found difficult to incorporate some of these comments in the Report itself. At the Editors' request a summary is appended.

Reliability.

We disagree with the last paragraph on page 14 for the following reasons. (1) The C.M.S. examination as a whole is different from any of its parts. (2) Professor Thomson's Investigation into the West Riding Secondary School Follow-up finds that $A + E + 2I$ gives a significantly better prognosis of Secondary School success than any single test or paper: of the three A, E and I taken separately, he finds that I is best. (3) Other investigations published at different times suggest the same thing.

See, for example, *The Reliability of Examinations*, pp. 97-100 (C. W. Valentine: Univ. of London Press, 1932); *Examination and Intelligence Test Forecasts of School Achievement* (A. D. Amos in *British Journal of Educational Psychology*, 1931, Vol. 1, p. 73); *Prediction Value of Intelligence Tests* (J. W. Collier in *B.J.E.P.*, Vol. III, p. 65); *Discrepancies between Results of Intelligence Tests and Entrance Examinations to Secondary Schools* (A. G. Hughes in *B.J.E.P.*, 1934, Vol. IV, p. 221).

(4) Through the courtesy of the Committee of the West Yorkshire County Association of the National Union of Teachers and of Professor Thomson we have had access to information which, together with data obtained from our association with the West Riding County Council, has supplied us with full details about the results of two examinations of County Minor type (C.M.S. 1937 and N.U.T. Mock County Minor Experiment) for a small but representative sample of 176 County Minor 1937 candidates. For these we have (a) worked out product-moment correlation coefficients; (b) made out award lists for the top quarter of the candidates in both examinations and compared the personnel of these two lists to find how many children selected by the County Minor Scholarship Examination, 1937, would have been displaced had the N.U.T. Mock County Minor taken its place; (c) finally examined what proportion of these displacements is truly borderline and what beyond the borderline. We have found that in every case A and E separately take the place of least reliability, A in two instances, E in one. The third from lowest place in all three enquiries was taken by the Intelligence Test standing alone. Apparently a little more reliable than the Intelligence Test is $A + E$, but by far the most reliable results are on $A + E + 2I$. The correlation coefficient in the latter case rose significantly from the 0.74 to 0.81 of English, Arithmetic and Intelligence taken

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separately to 0.90. The number of displacements made by taking the different examination falls from the 25 to 35 per hundred awards for Intelligence, English and Arithmetic taken separately to 15 per hundred awards. Of these displacements only about 7 per cent., that is, about one per 100 awards, fall outside the borderline range as against 38 to 43 per cent. for Intelligence, English and Arithmetic taken singly. These results are admittedly on a small sample of candidates, but they include mining districts, a heavy textile district and an agricultural district, and they are based on the work of the actual children who entered for County Minor awards in 1937: the awards lists were made exactly as the County Minor ones are made. They reinforce, incidentally, the appeal for safeguards.

Ties.

Another difficulty arises if awards are to be made on a single Intelligence Test. If the Intelligence Test is applied to C.M.S. candidates only, the spread of its scores is usually about one half of the spreads of either the Arithmetic or English marks. Hence the doubling of I in $A + E + 2I$. The great majority of the candidates have I.Q.'s between 100 and 129. Referring to the Report on the 1938 Examination we see that 4,536 ten-year-old candidates were in this range of 30 points, an average of 150 to each I.Q. This would result in ties of at least 150 children about the lowest I.Q. for an award: in 1938, 1,549 had I.Q.'s between 120 and 129. The present system of $A + E + 2I$ results in ties of about 50 at the lowest aggregate mark for an award, and the number of offers of special places can be fitted to the bottom of a tie. This would be much more difficult with ties of at least 150.

Effect of Examinations on the Junior School.

We refer in particular to page 10, last paragraph, and page 11, paragraph 1; page 12 (viii); page 15, paragraph 3.

From our point of view teachers in Junior Schools with wisdom beyond temptation, together with proper organisation of classes and of groups within one class, should meet the difficulties of the situation. The Junior School has no business to be "Pre-occupied with examination results." We can understand anxiety about all ten-year-olds with a view to the right transfer of them at eleven, but that is a different matter. We question as a fact whether "Perfect freedom for self-development" will follow on the abolition of English and Arithmetic tests for children in Junior Schools. Moreover, looking before and after, we question the desirability of this complete freedom as an ideal.

In considering the form of the cumulative record card (see page 57, 4) we wish to ask whether ability to write English is to

be ignored. On page 15, in paragraph 5, last line, composition is again ignored despite its necessity for good Secondary School work.

Tests of Attainment.

We refer in particular to page 15, paragraph 4. We cannot agree with this separation of innate ability and scholastic attainment. Moray House Intelligence Tests do test attainment; County Minor English and Arithmetic papers do test innate ability. Each contributes evidence as to the child's ability and his knowledge. To find the exact ratio between the weighting of Attainment and Intelligence in the West Riding Education Committee's County Minor Scholarship Examination would require at least complicated calculation based on the correlation coefficients between the different parts of the examination. That attainment bears to Intelligence the ratio of 2 to 1 is mathematically unjustifiable.

The Evils of Special Preparation.

We refer to page 7, paragraph 2. This is constantly in the Examiners' minds. At the moment they are perturbed by some evidence that modern methods of coaching for Intelligence Tests, special text-books containing a selection of test material being in weekly use in some schools, exercise an undue influence on the results of Special Place Examinations. We wish to point out that practice over an extended period leads to increase in speed and so to an increase in score on tests where speed makes a vital contribution. If a child's score is increased so as to give a rise of even 5 points in his I.Q., his County Minor aggregate mark is increased by 10, which makes a considerable difference to his position on the list. Certain sections of intelligence tests seem more open to improvement by practice than do others, even if it is only speed that improves.

We refer the reader to the *British Journal of Educational Psychology*, November, 1938, for "Intelligence Test Sophistication" by P. E. Vernon, p. 237, and a summary of a research thesis "Effects of Practice upon Intelligence Tests" by K. J. Dave, p. 313.

Standardisation of Marking.

We take objection to the implications of the picture of standardised marking given on page 9, "Defects (i)." The extent of the danger of missing examiners' blunders we believe to be here exaggerated. Later information about West Riding standardisation will be found in the Report on the 1939 Examination.

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