

T H E S I S

SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

TO

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BY

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T I T L E.

An investigation of the Causes of  
Backwardness at the Qualifying Stage, with part-  
icular reference to the Percentage of Children  
scholastically retarded owing to Unsuitability of  
Curriculum. Non-scholastic Tests - Mechanical  
Apitiude Tests, Technical Information Tests and a  
Practical Test - for "Backward" Pupils.

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"The Dull are nearly always  
Retarded; but the Retarded are not  
necessarily Dull".

Burt. The Young Delinquent.

P. 337.

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## CHAPTER 1.

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### INTRODUCTION.

Illustrious men and women were not always promising at school.<sup>(1)</sup> It is a well-known fact indeed, that several men and women who lived to become figures of national importance, or world authorities in some particular field of study, were "backward" in school-work. Charles Darwin, for example, states, "I believe I was considered by all my masters as a very ordinary boy, rather below the common standard in intellect..... As I was doing no good at school my Father took me away, at an earlier age than usual",<sup>(2)</sup> Napoleon Bonaparte and Robert Fulton were, also, by some of their teachers, diagnosed as failures.<sup>(3)</sup> In spite of the fact that cases such as these are often cited, we are still too prone to conclude that backwardness in school work is the result of innate intellectual weakness, or else to ascribe it, without sufficient evidence, to one or more of a variety of reasons, such as late enrolment, irregularity of attendance, change of school, home circumstances, physical defects, etc. Although cases of illustrious men and women being unpromising as children in school, constitute a minority,<sup>(1)</sup> they are not, for that reason, unimportant, and they seem to indicate that in schools the abilities of pupils are sometimes misjudged, unperceived or misunderstood, perhaps owing to a stereotyped curriculum, or to unsuitable courses of instruction.

### BACKWARDNESS and its CAUSES.

"Backwardness in school work is a highly complex condition attributable to a variety and usually to a plurality of converging causes."<sup>(4)</sup> We must distinguish between primary or inborn backwardness, that is, an inherent backwardness in natural/

(1). Stenquist. The Case for the Low I.Q. (J.of Ed.Res.Nov.1921).

(2). Life and Letters of Charles Darwin (Ed.Francis Darwin P.32).

(3). Swift: Mind in the making. Ch.1.

(4). Burt. - Distributions and Relns of Ed.Abils. P.37.

natural ability due to slow development, and secondary backwardness, which is an accidental backwardness merely in acquired educational attainments, or in one word,

Illustrative Case  
of backwardness of secondary backwardness " (1) " Take the case of a girl (A) whose parents, dissatisfied with her educational reports from a large private school, and with her attitude to school, had her examined with mental and educational tests. Her Chronological Age was 6 years 11 months, Mental age 11 years 6 months and Intelligence Quotient 166. (Binet) (I.Q. 168 Northumberland Mental Tests No.1). Her performance in all school subjects except reading, was fully one year behind her Chronological Age. Her silent reading was that of a child of ten, but when tested orally she failed to recall any significant points of what was read, through, apparently, concentrating on reading with an affected accent. This failure was by no means due to a fault in memory, but was simply the result of her efforts to imitate other children in her school, or to her desire for self-display.

This child is an only child whose parents are in only moderate circumstances. Her pre-school history is interesting, as it is said by her parents that she learned without difficulty to read at the age of  $2\frac{1}{2}$  or 3 years. Before she was four she could read handwriting, according to the early history received, and once she caused considerable embarrassment by climbing on a visitor's knee and reading aloud part of a letter he was writing. It is said by her relatives that reading came to her as easily as walking, and that, in tramcars and buses, the child, when practically a baby, roused considerable comment by reading aloud the various advertisements, shop-keeper's/

← § (1). ~~Distributions and Relations of Ed. Abils. (Burt).~~  
 P. 37.

§ (2) (1) P. 335 The Young Delinquent - Burt.



shop-keeper's names &c., which were passed on the journey.

When examined individually and very carefully in arithmetic, it was found that she had no real difficulty with <sup>the</sup> subject. The mistakes in her tests were careless and were corrected by her without difficulty when told to try the sum again. The same held of the work brought home from school.

In school she was among children for the most part six months younger than herself. The reason for this, apparently, was, that when she was five her Mother took her to school, ignorant of the fact that she ought to have enrolled the child some time ~~p~~reviously. Owing to this, A. was six years of age before she was admitted to school, and when admitted she was placed in the lowest class. Her reading ability was not discovered by the teacher in her earlier school life. In this school, tests were given weekly, and every child in the class sat in the place deserved by the marks gained in the weekly test. A. was nearly foot of her class, and had never been very high up in it. This child was not popular in her class, the reason given by her Mother being that the other children <sup>were</sup> jealous because, this year, A. was asked often to read aloud a story while the teacher was out of the room or occupied with correction. The Mother again complained that A. was not treated fairly, owing to being penalised too heavily for poor writing.

This child, then, with an I.Q. of 166 and in the infant department of this private school, was suffering from what Burt would call secondary backwardness. Mr. Kennedy Fraser §(1) would describe her retardation in some school subjects as the result of inherent brightness, and too low a class for her capacity. The work was so easy that this small genius neglected to take pains, owing to lack of interest and as a result

§ (1). Unpublished Lectures to Teachers at St. Andrews Summer School. July, 1926.

result she found her small rivals gaining higher positions in class than she. This would not add to her happiness, and seems to be an explanation for the complaints about toothache, strained eyes &c., which secured her many a holiday, till the Doctor assured the Mother there was no foundation for the complaints.

The measures suggested were, naturally, for the parents to see the Headmistress of the School, and ask for A. to be promoted to a higher class, where the work would be more difficult, and consequently would demand more effort, and where the child's desire for self assertion would find the right outlet. Unfortunately the parents were under the impression that she ought to remain where she was, "in order to get a proper grounding". The parents apparently were unwilling to approach the school on the matter, and so no steps have been taken to help the child, beyond a few suggestions about books for reading in her leisure time.

*A similar case receiving proper treatment.*

lay case Curiously enough at this time the Headmistress of living a non-fee-paying primary school called my attention to a treatment small youth aged just eight years who was being promoted every six months instead of every year and who even then managed to get to the top of his class after he had been some time in it. His I.Q. was 167. At the time he was tested he was reading "Rob Roy", an Encyclopedia, the Glasgow Herald every day, and the Scots Observer weekly. He spontaneously defined a limpet as "a kind of slug, found on the sea-shore, with a conical or tent-like shell, the food of the sea-crab". He was difficult in school from the point of view that he always wanted to answer the questions asked, and to correct the teacher when necessary, or to add to her information where he considered it was inadequate. But he was under the most careful observation, and was promoted as often as he required to be, which at the time I saw him first was twice a session.

These illustrative cases show how complex a problem scholastic backwardness is.

DEFINITION  
 BACKWARDNESS.

Dunt's Definition of Backwardness

"By 'backward' may be understood children who, though not defective, are yet unable, about the middle of their school career, to do <sup>the</sup> work even of a class below their age, or more precisely, children who are retarded by 15% - 30% of their age, and therefore deviate below the normal by about twice the average or "standard" deviation of individuals of the same age group".<sup>(1)</sup>

In his investigation by the Method of Sampling, Burt found the following results:— *causal factors operating.*<sup>(2)</sup>

A. Causal Factors.

|                                                                                                                                                                                 | Per Cent. Cases. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Extraneous or non-mental (Backwardness acquired)<br><i>factors</i>                                                                                                              | 39.              |
| 1. Irregular attendance (Health)                                                                                                                                                | 5%               |
| 2. do do (Migration negligence)                                                                                                                                                 | 6%               |
| 3. Inefficient teaching in early years - e.g. change of method with change of school.                                                                                           | 4%               |
| 4. General Physical Defect (malnutrition).                                                                                                                                      | 10%              |
| 5. Special Physical Defect, a. Tonsils &c.,                                                                                                                                     | 3%               |
| 6. do do do b. Sensory e.g. speech.                                                                                                                                             | 4%               |
| 7. Defect of Character (laziness &c., - due to inborn instability or to repressed emotional experiences)                                                                        | 7%               |
| B.                                                                                                                                                                              |                  |
| Intrinsic or Mental Factors (Backwardness being apparently primary or innate)                                                                                                   | 61%              |
| 1. Weak general ability - inferiority apparently inborn and all round mental efficiency, often hereditary but not sufficiently pronounced to be diagnosed as mental deficiency. | 11%              |
| 2. Weak specific ability - inferiority apparently inborn of particular mental function "memory", "attention" "reasoning".                                                       | 2%               |
| 3. Weak general educational ability - inferiority apparently inborn affecting efficiency in several school subjects, often hereditary but unassociated with marked weakness of/ |                  |

§ (1). Distributions and Relations of Educational Abilities (Page.36. ) Burt.

§ (2). Loc. cit. P. 37-38.

- of general intelligence and often compensated by non-Scholastic ability and interests. 15%
- (4). Specific educational defect (inferiority apparently inborn affecting a group of allied subjects only, often compensated by interest or aptitude in other directions. 8%
- (5). Specific Educational defect (e.g. arithmetic). 9%
- (6). Defect of character, due chiefly to inborn emotional or moral instability, often hereditary. 11%
- (7). Intrinsic irregularity of mental growth, retarded development likely to be compensated later on often associated with slow physical development. 5%.

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During the session 1925-1926, an enquiry into the causes of backwardness was held in the schools of an industrial town in Scotland. *The children who acted as subjects were in non-fee-paying primary schools.*

M OF THE  
IGATION.

Aim.

The particular aim of the Investigation was to find the percentage of school children in this industrial town, over qualifying-age but non-qualified, whose backwardness in school work was due to the fact that the course of study which they were following was unsuitable, rather than due to low intelligence and actual incapacity.

The method of this investigation, then, was to find the percentage of children at the Qualifying stage, in the industrial town in which the investigation was carried out, whose retardation in school work was the result of extraneous causes and the percentage backward owing to intrinsic reasons. It was resolved, too, to pay particular attention to those children whose scholastic retardation, often unassociated with marked weakness in general intelligence, was compensated by non-scholastic ability and interests.

The Industrial Town selected.

The town in which the investigation was carried out is one which has suffered and is suffering, more than <sup>m</sup>any others/

(1) see next page.

others from trade depression and consequent poverty and unemployment.

In 1925-1926 it had an approximate population of 81,000, and for the same year the monthly average of unemployed was 6,300. 1,450 of these were receiving no money from the Employment Exchange and had to go to the Parish Council for Able-bodied Relief.<sup>(1)</sup> The number of dependants of these 1,450 was 3,760. In the following year the number of unemployed was considerably increased.

The primary school population of this particular town during the year 1925-26 was 12,723. In addition to fee-paying schools, a non-fee-paying secondary school, a special school for mentally and physically defectives and a school for the deaf, there were 17 non-paying elementary or primary schools. The Special school had in that year an enrolment of 80 on the mental side, and 234 children in the department for physical defectives. In the mental department the Intelligence Quotients of the children ranged, and still range, from 50-70. Only in very exceptional cases are children of a much higher grade of mentality admitted.

#### Explanation of The "QUALIFYING" Stage.

The Qualifying Stage in Scotland represents the highest Senior class, which, as a rule, is Senior 1. This consists usually of children between the ages of 11 and 13 years. For example the average "Qualifying Age" for the year 1925-26, in Renfrewshire, was 12 years 5 months, and in the following year there was no appreciable difference.

The importance of the examination at this stage is/

(1). Private letter from Employment Exchange.

To be filled up in duplicate, one copy to be retained in school, the other copy to be sent to the *EXECUTIVE OFFICER*, County Education Offices, PAISLEY, on or before 11th JUNE (or 27th JANUARY).

In addition, Form 62 (a), so far as it relates to the Pupils being promoted, to be forwarded to the Heads of all "receiving" Advanced Division Schools.

## Renfrewshire Education Authority.

Official Name of School, \_\_\_\_\_ No. \_\_\_\_\_

### LIST OF SCHOLARS

Qualified for Enrolment in Post-qualifying Courses

as from the "fixed date" \_\_\_\_\_ 192 .

As a rule no Pupil should be entered on this Schedule as to whose proficiency under the several heads mentioned below the Teacher, judging from his experience of the work of the Pupil in class, entertains any reasonable doubt. Pupils, however, who show slight weakness under one or at the most two of the heads specified may nevertheless be entered, provided their general efficiency is satisfactory.

#### STANDARD OF PROFICIENCY.

A Pupil presented as aforesaid will be expected—

- (a.) To read at sight, with good pronunciation and with intelligent phrasing, narrative prose of moderate difficulty.
- (b.) To write to dictation with good spelling and legible and regular handwriting a narrative passage previously unseen.
- (c.) To answer questions as to the subject matter of and meaning of words and sentences in the reading books in use in the class; these answers, when necessary, to be expressed in complete sentences or in a consecution of sentences.
- (d.) To write a composition, the heads being given, or to give in writing the substance of a passage read.
- (e.) To know the four rules of arithmetic as applied to whole numbers, easy vulgar fractions, and decimals to three places, and to be expert in applying this knowledge to the calculation, both mentally and on paper, of simple sums in money and in the common weights and measures.
- (f.) To be reasonably proficient in the other subjects included in the approved scheme of work of the class.

# LIST OF PUPILS QUALIFIED FOR ENTRY

| 1.<br>No. | II.<br><b>NAME.*</b><br>(The names should be entered in alphabetical order). | III.<br>Age as at<br>"Fixed Date." |    | IV.<br>Opinion † of the Class Teacher as to the proficiency of Pupil according to the standard specified under each of the subjects mentioned in the first page. |    |    |    |    |  |
|-----------|------------------------------------------------------------------------------|------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|--|
|           | Years.                                                                       | Months.                            | a. | b.                                                                                                                                                               | c. | d. | e. | f. |  |
| 1         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 2         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 3         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 4         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 5         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 6         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 7         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 8         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 9         |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 10        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 11        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 12        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 13        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 14        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 15        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 16        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 17        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 18        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 19        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 20        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 21        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 22        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 23        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 24        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 25        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 26        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 27        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 28        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 29        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |
| 30        |                                                                              |                                    |    |                                                                                                                                                                  |    |    |    |    |  |

\* Give first Christian name in full. Attention must be paid to the correct spelling of names.

† The opinion should be expressed in letter values—E., Excellent. V.G., Very Good. G., Good. F.G., Fairly Good. F., Fair.

The mark F.G. in any Subject should be given to Candidates who just reach the standard set forth on the first page in that Subject.  
The mark F. in any Subject should indicate that the Candidate falls below the standard in that particular Subject.





## Certificates of Teachers.

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1. I certify that the foregoing marks represent my opinion as to the proficiency of the candidates under the several heads specified, and that they are based upon the results of the Pupils' work in class during a sufficient portion of the present session, being not less than six months in the highest class of the Senior Division.

\_\_\_\_\_ }  
\_\_\_\_\_ } *Class*  
\_\_\_\_\_ } *Teacher(s).*

2. I certify that the Pupils named on this list have been placed in the highest class of the Senior Division of the School in the ordinary course of school promotion, and that they have been in regular attendance at that class for not less than six months, or have otherwise received instruction in the work proper to that class.

I further certify that I am satisfied from personal investigation that the marks given under the several heads may be taken as representing correctly the attainments of the Pupils under each head, and that each Pupil entered upon the Schedule is of good proficiency in the general work of the class according to the standard set forth on the first page.

\_\_\_\_\_  
*Head Teacher.\**

\* When the Head Teacher is also the Class Teacher he should sign both Certificates.

*Date of dispatch to the Executive Officer.*

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**FOR OFFICE USE.**

is not emphasised today so much as it was ten years ago. It is impressed on the children in all our schools and on the parents, that the entire work of the session is considered very carefully, and that no child is prohibited from passing on to ~~the~~ post-qualifying work if his class work has been on a satisfactory level.

His Majesty's Inspectors formerly conducted a uniform written examination of children at this stage all over the county. When this ceased in 1922, each Education Authority became responsible for its own arrangements for the examination of children in the highest Senior class, subject to the approval of the Department. <sup>(1)</sup>

To take an example - the following arrangements are in operation for the conduct of a "Qualifying" or "Control" Examination in Renfrewshire *at the present time.*

“

(1). A uniform examination shall be held in June and, if necessary in January, in all schools in the Education Area.

(2). His Majesty's Inspectors will set the papers.

(3). The Heads of transmitting schools shall supervise the examination.

(4). Form 62(a) shall be based on the record of work done during the preceeding 12 months and that record shall include the result of the examination. (see opposite).

(5). Form 62(a), so far as it relates to pupils being promoted, shall be furnished to the Heads of all ~~the~~ "receiving" schools. ”

In order to enter upon a course of study in a Secondary/

§ (1). Circular 44 of the Scot. Educ. Dept. (13th Dec., 1921)

Secondary school a child must pass the Qualifying Examination, or be capable of passing it. On the other hand, a child may enter upon an Advanced Division Course although he is incapable of reaching the standard set by the Qualifying Examination. The procedure lately, indeed, has been to urge "Heads" to pass on children who are over qualifying age and non-qualified to schools with Advanced Division Centres, so that they will be able to profit by the practical courses of instruction in which these Centres specialise. In actual practice, the difficulty often faced by Headmasters without Advanced Division Courses in their own schools, is to find a convenient Advanced Division Centre where there is accommodation for these non-qualified pupils. It is apparent that a number of children advanced chronologically and retarded scholastically are not, and will not be, welcomed among normal children in Advanced Division Courses, unless a special course of instruction is allowed and an extra teacher, if necessary, appointed to meet the obvious need. Few schools in crowded industrial areas have rooms to spare for this work, and in these days of economy, extra teachers are not readily appointed.

At the time <sup>the present</sup> ~~this~~ enquiry was carried out it was the custom, in the industrial town referred to above, to retain <sup>such</sup> ~~these~~ children <sup>as</sup> ~~who~~ could not qualify, in the primary department, and not <sup>to</sup> pass them on as <sup>un</sup> ~~un~~ qualified to an Advanced Division Course. Steps are now being taken to cater for these pupils in Advanced Division Centres.

#### The Subjects Tested and the Procedure of the Enquiry.

The backward pupils at the Qualifying stage in all the non-fee-paying elementary schools in this town were tested. The investigation was thus done in <sup>17</sup> ~~16~~ schools, 400 retarded children acting as subjects. In six of these schools the over-age and non/

non-qualified were segregated into a "backward" or a "Hospital" (now known as Tutorial) class, one such class being frankly called the "non-qualifying" and the children in it designating themselves, N.Q.s! The curriculum of these special classes did not, in 1925-26, differ in any essential respect from that of an ordinary class. In two ~~additional~~ <sup>other</sup> schools the backward children at this stage were in the Qualifying class except for 45 minutes daily, during which period they received tutorial instruction, in small groups, from a special teacher for backward children.

In the remaining schools the Headmasters drew up a list of the backward children at the particular stage desired. This list included those pupils who had previously been presented at the Qualifying Examination and who had failed to pass, those who never could be presented, and those who would be presented older than desirable, after very special coaching and attention. In those schools where the backward children were not segregated into a tutorial class, they were examined with their whole class, and so did not know that they were special objects of attention. As the total results for each school were minutely discussed with the Headmaster and the teacher of the class, there was little chance of any backward child who ought be included, being omitted from the investigation.

The Procedure of the Enquiry.

PROCEDURE  
ENQUIRY. The procedure may be briefly summarised. The Mental Age and Intelligence Quotient of each subject was found by means of the Northumberland Mental Tests No.1. (Professor Godfrey Thomson). Where the child's score was below 9 he was tested with the Terman Revision of the Binet - Simon Scale.

The following Educational tests were then given -

Composition/

Composition, Arithmetic (Fundamentals), Spelling and Writing (Burt - Mental and Scholastic Tests), Reading (Monroe Test 1, Form 1.) From these results, the Educational age of each pupil was estimated by taking a simple average of the various ages - Reading Age, Composition Age, Arithmetic Age, Spelling Age, and Writing Age. No attempt was made to weight the scores for each test according to the importance of the particular subject in the school curriculum.<sup>(1)</sup> In Arithmetic and Spelling Scottish norms were used.<sup>2</sup> §

The Accomplishment Quotient (A.Q.), which is the ratio of the Educational age to the Mental age, was calculated for each pupil. If a child is working up to his innate capacity, then the A.Q. approximates 100.<sup>3</sup>

#### ACCOMPLISHMENT QUOTIENT.

When dealing with the concept of the I.Q., it is well-known that we consider I.Qs. ranging from 85 or 90 <sup>(3)</sup> to 110 as showing normal or average intelligence. In the same way may we argue that A.Qs. of 85 or 90 <sup>(3)</sup> to 110 indicate normal or average performance in school-work? If a child aged 10 chronologically makes a nine year old performance on the Terman Tests, i.e. I.Q. 90, and is counted normal, may a child with a Mental Age of 10 and an Educational age of 9 similarly be given the credit of making a normal performance?

In this connection let us keep in mind that Burt<sup>4</sup> found the correlation between educational ratio and mental ratio only .738, and he draws the following inferences from his frequency table.<sup>(4)</sup>

(1). Children retarded mentally, <sup>(i.e. I.Q. 65 to 85)</sup> appear still more retarded educationally. It is common for a child to be lowered to/

§ (1). Discussed later. § (2). See below.

§ (3). Measurement of intelligence (Terman) P.79. Burt Mental & Scholastic Tests P.178.

§ (4). Mental & Schol. Tests. Burt P.178.

to an educational ratio 5% beneath his mental ratio.

"Feeble ability entails acquirement feebler still".

(2). Children with I.Qs. of 85-100 usually have an educational attainment greater than their inborn ability.

(3). Where the intelligence is slightly above normal the children are largely kept back scholastically, depressed to a stage which answers more closely to their actual years.

(4)½ Children with an I.Q. of more than 115 show the same repression. "The abler children are thus deprived of more than half of their advancement and over 10% of their Mental Age."

In the light of these facts and after careful consideration of the test results, and also through experience in tutorial teaching of backward children, where the aim was to raise the Accomplishment Quotient to 100, it was determined to consider as normal a performance which resulted in a child's educational ratio being lowered 5% beneath his mental ratio. In this investigation then, A.Qs. of 95 and upward were considered satisfactory, and such cases as had A.Qs. below 95 were given a further special examination.

The term Accomplishment Quotient is employed in two senses. (a) relating to achievement in a specific subject. (b). with reference to general progress in school work. *In the present investigation, the term Accomplishment Quotient is used in the second sense - with reference to general scholastic progress.*

Before the A.Qs. of different investigators can be compared and discussed in a valid and scientific manner, they must be defined in terms of the subject-matter ages included, and account must also be taken of how they are combined /

combined or weighted. §<sup>(1)</sup>

~~In this investigation the term Accomplishment Quotient is used in the second sense — with reference to general progress in school work.~~

"Apparently there is no single word in the English language which adequately expresses what is meant by the Accomplishment Quotient. In its statistical derivation it is quite as abstract a concept as  $\pi$  or  $r$ . § Its formula<sup>(2)</sup> is<sup>(2)</sup>

$$A.Q. = \frac{E.Q.}{I.Q.} = \frac{\frac{E.A.}{C.A.}}{\frac{M.A.}{C.A.}} = \frac{E.A.}{M.A.}$$

The A.Q. procedure is one of the most promising acquisitions of the educational psychologist.<sup>(3)</sup> It is the most exact and just present-day basis<sup>(4)</sup> for judging pupils, although its numerator and denominator are not perfect. "The A.Q. is a summary of what a child accomplishes educationally compared with what he is capable of accomplishing.<sup>(5)</sup>" §

The concept of the A.Q. under the name "Achievement Quotient" was advocated in July 1920 by Monroe and Buckingham as a measuring device for combining, in an effective way, the results of educational and mental tests, into a measure of educational achievement, relative to the pupil's capacity and progress.<sup>(6)</sup> In November of the same year Franzen published an article on the A.Q. Franzen states that the A.Q. may be considered as "The degree to which a pupil's actual progress has attained to his <sup>(4)</sup>potential progress by the best possible measures of both." §

§ (1). What shall we expect of the A.Q. Journal of Ed. Psy. Vol. 13. P. 516. (Toops).

§ (2). Loc. cit. P.514. § (3). J.Ed. Psy. V.13. No.9.

§ (4). McCall. How to measure in Education P.86.

§ (5). J.Ed. Psy. V.13. P.392. Stebbins and Pechstein.

§ (6). Monroe and Buckingham. Ill. Exam. Tchrs.Hdbk.Univ. p.211.  
*Bur. Ed. Res. July 1920 P.31.*

§ (7). Franzen The A.Q. Tchrs Coll. Rec. Vol.21. No.5.  
 Nov. 1920 P.432-440 P.436.

(1)..  
 Monroe and Buckingham define it as a simple method of comparing a pupil's schievement age with his mental age. Franzen strongly recommends the use of the A.Q. as a school mark and believes its value lies in the fact that it will detect strength and weakness in school systems, in individual methods, and also in individual classes. Stebbins and Pechstein<sup>(2)</sup> stress the view that it reveals the efficiency of the Teacher.

(3) Pintner's method like McCall's "F" score (4).  

$$F(\text{i.e. effort or efficiency}) = T_e - T_i(\text{i.e. educational T score} - \text{mental T score})$$
 is a difference method. His technique consists in transmuting mental test scores and scholastic test scores into index values ranging from 0-100 for a given age. The average ability in each case is 50. His measure of motivation is:-

$$\text{Difference} = \text{Educational Index} - \text{Mental Index.}$$

The difference obtained between mental and educational indices, therefore, is used as a device for determining whether a given child or class is achieving as much as the average child or class. Pintner's method assumes a normal distribution of both mental and educational talent.

In interpreting A.Qs. some differences of opinion are shown by the various advocates of this method of measurement. Franzen<sup>5</sup> thus considers an A.Q. of 100 as what a subject performs under the most favourable conditions, as an "optimum accomplishment" while according to Pintner<sup>6</sup> an index difference of zero (i.e. mental index = educational index), corresponding/

- (1). Loc cit. P.11. (2). J. Ed. Psy. Vol. 13 P.392.  
 (3). Pintner & Marshall. J. of ED. Psy. Vol.12 No.1 P.32/43  
 (4). McCall How to Expt. in Educ. P.276. P.82/92.  
 (5). Tchrs. Col. Rec. P.432/440.  
 (6). Pintner & Marshall. Loc. cit. P.38.



corresponding to an A.Q. of 100, indicates that the pupil is doing, educationally, exactly "what is usually accomplished by children of like mentality". Monroe and Buckingham,<sup>(1)</sup> again mean by an A.Q. of 100 that "the pupil has achieved exactly as well as the average of pupils of his mental age". While Franzen states, therefore, that an A.Q. of less than 100 implies that the subject's school performance is less than normal for his capacity, he does not imply that, with an A.Q. of more than 100, he is doing better work than he has the ability to accomplish. Franzen emphasises, as is theoretically true, that an A.Q. of more than 100 is impossible.<sup>(2)</sup> He states, "One's differences when Educational Quotient is subtracted from Intelligence Quotient are always positive when they are large enough to be significant, and small enough to seem spurious when they are negative. It is safe, therefore, for practical purposes, to assume the "optimum" Accomplishment Quotient is 1.00". Monroe and Buckingham<sup>(3)</sup> state, "If a pupil's Achievement Quotient is .75, we have evidence that he has achieved only 75% as much as the average pupils of his mental age. Pintner, when confronted with a minus difference, states that the child is doing less educationally than he has the ability to accomplish.<sup>(4)</sup> Again Monroe and Buckingham say "If a pupil's Achievement Quotient is 130, he has achieved 30% more than the average of the pupils of his Mental Age (P.38 loc.cit). By a plus difference Pintner means that the child is doing more scholastically than is usually accomplished by children of like mental equipment" (4).

In the articles already quoted, Pintner, Monroe and Buckingham, record examples of pupils making A.Qs. greater than 100. As has been previously stated Franzen looks on

an/

(1). Monroe & Buckingham, loc. cit. P.11.

(2). Franzen, loc.cit. P.436.

(3). Monroe & Buckingham, loc.cit. P.11.

(4). Pintner and Marshall, loc. cit. P.38.

(5). J. of Ed. Psy. (7) XIII. P. 523.

(6). The Achievement Quotient Tech. J. Ed. Psy. 1923 (4) P.341.

an A.Q. of 100 as an ideal. Pintner's comment on this concept is "It is useless to attempt to set up any such ideal standard of what ought to be accomplished under ideal conditions where each child is working up to the limit of his capacity.

No criticism of the differences of opinion stated above, is offered, as this enquiry is not concerned particularly with pupils who make a high A.Q., but rather with those who have low A.Qs. and there is but little controversy on such cases.

The motivation value of the Accomplishment Quotient raises considerable discussion. "If half or more of the dull pupils can expend more than normal effort why cannot all humanity do likewise and make more than an A.Q. of 100?..... Does not the greatest value of the A.Q. consist not in its measuring but in its incentive value, in its getting teachers and pupils interested in progress".<sup>(1)</sup>

The motivation value of the A.Q. is readily seen in remedial and tutorial teaching especially, and this idea of self-emulation can be introduced with very great effect, particularly, if, at regular intervals, the pupils draw graphs of their own progress. The use of the A.Q., from this point of view, lays emphasis on self rivalry rather than on rivalry between one child and another. In this connection, however, we have to keep in mind the warning - "May it not be good school policy to keep A.Qs. from going above 100 in order to ensure that the school will not put too much emphasis merely on the things which the test measures and allow opportunity for securing some of the appreciations or attributes which, though intangible, are valid objectives of Education".<sup>(2)</sup>

#### Criticisms of the A.Q.

Ruch points out that the A.Q. technique assumes that/

(1). J. of Ed. Psy. ( 7) Xl11. D. 523.

(2). The Achievement Quotient Tech. J. Ed. Psy. 1923 (4).P.341.

and validity of the Intelligence Tests and Scholastic Tests employed.

WEIGHTING OF RESULTS.

The Problem of combining Subject Ages to form the Accomplishment Quotient

There is no case in which the weighting of test results has been done on purely scientific lines. One of the most interesting approaches to sound procedure is described in "Methods and Results of Testing School Children" -- (Dewey Child and Ruml)<sup>(1)</sup> In selecting the tests, the writers chose those which showed the highest correlation with age for constant values of other tests and, consequently, the method was that of partial correlations. In this way emphasis was placed on the developing factors in each test. The weighting of the tests was carried out on the same principle. Each test was given a weight determined on the basis of its correlation with Age for constant values of other tests. The statistical procedure was thus exactly the same as that used by Burt in determining the relative effects of age, school attainment &c., on scores in the Binet Tests.<sup>(2)</sup>

In the work of Dewey, Child and Ruml, the following regression equations are used in order to find the total score which a given boy makes in the Maturity Scale.

Final Regression Equations (Boys)

$$I. \text{ (i.e. index of maturity) } = 5.642 + .145 T1 + .196 T2 + .166 T3 + .338 T4 + 0.48 T5 - .021 T6 + .115 T7.$$

$$I. \text{ (i.e. index for Child's Age) } = 6.086 + .4758 \text{ Age.}$$

(Maturity Scale - Boys. (P.118).

Weights.

|                                            |         |
|--------------------------------------------|---------|
| T1. = Yerkes N.15.(Comprehending question) | + .145. |
| T2. = Yerkes N.19.(Hard Definitions)       | + .196. |
| T3. = Threading needles.                   | + .166. |
| T4. = Cancellation Index.                  | + .338. |
| T5. = Card Construction Score 1 and 2.     | + .48.  |
| T6. = Card sorting time.                   | + .021. |
| T7. = Problem Box.                         | + .062. |

The/

§ (1). P.116. § (2). P.175/183. Burt. - "Mental & Scholastic Tests"

The index of maturity is an absolute measure and does not tell very much apart from the child's <sup>h</sup> physical age. The normal index for the child's age had therefore to be found by means of another regression equation. The deviation of the child's actual index from the normal index for his age has to be compared with the standard deviation of the indices.

Accordingly, ~~the~~ procedure described above is fairly refined, but other factors must be taken into consideration before the method is scientifically precise.

(1). In the scientific weighting of tests it is necessary to take account of the reliability of the various tests as measured by the self-correlation between two or more applications of the same test. But although we can measure the reliability of a test and its independent contribution to mental maturity, it would be difficult to get a formula to combine them in order to get one weighting.

(2). If there are variations between two tests in the rise in the scores for progressive ages, should the test showing a steep rise in the scores have more weight, as it is apparently better able to separate out one age from another? Apparently this would seem to be rather the problem of selecting the particular tests than one of weighting though, in certain cases like the maturity scale referred to above, it is a question of weighting.

(3). McCall<sup>§</sup> states that tests should be weighted according to the variability of their scores. But here he does not assume comparability of units. In any scientific weighting the first step is to consider the units, because in a battery of tests, a difference in the kind of units would change the weighting. To reduce scores in tests to/

to comparable units we may use (1) the S.D. as unit (2) subject ages (3) percentile ranks (4) T. scale or B. scale (5) grade units.

Here, again, the variability aspect would seem to affect the selection rather than the weighting.

(4). Ease of application and simplicity of scoring, obviously, should not affect the weighting but the selection of tests.

(5). The weight assigned a particular test will vary according to the end for which the test was constructed.

(6). A serious problem in connection with weighting of tests, is, that the weighting should change as you go up the age scale. This vitiates the Binet Scale. No systematic attempt has yet been made to deal with that problem.

West, on his article on "The weighting of Test Scores" points out that it is possible to spend a great deal of time and effort in the computation and use of weighted scores with no adequate return in the improved differentiation, of pupils in an average group.<sup>(1)</sup> In this investigation, as has been stated above, no attempt was made to weight the scores for each test but a simple average of the various ages was calculated.

#### Note on Scottish Norms.

The application of the scholastic tests employed in this enquiry to Edinburgh children in the two preceding years, showed that in Arithmetic<sup>2</sup> (Fundamentals) and in Spelling<sup>3</sup> London/

§ (1). J. Ed. Psy. 1924 (15) P.308.

§ (2). Burt, Mental & Scholastic Tests P.366/369.

§ (3). do P.354.

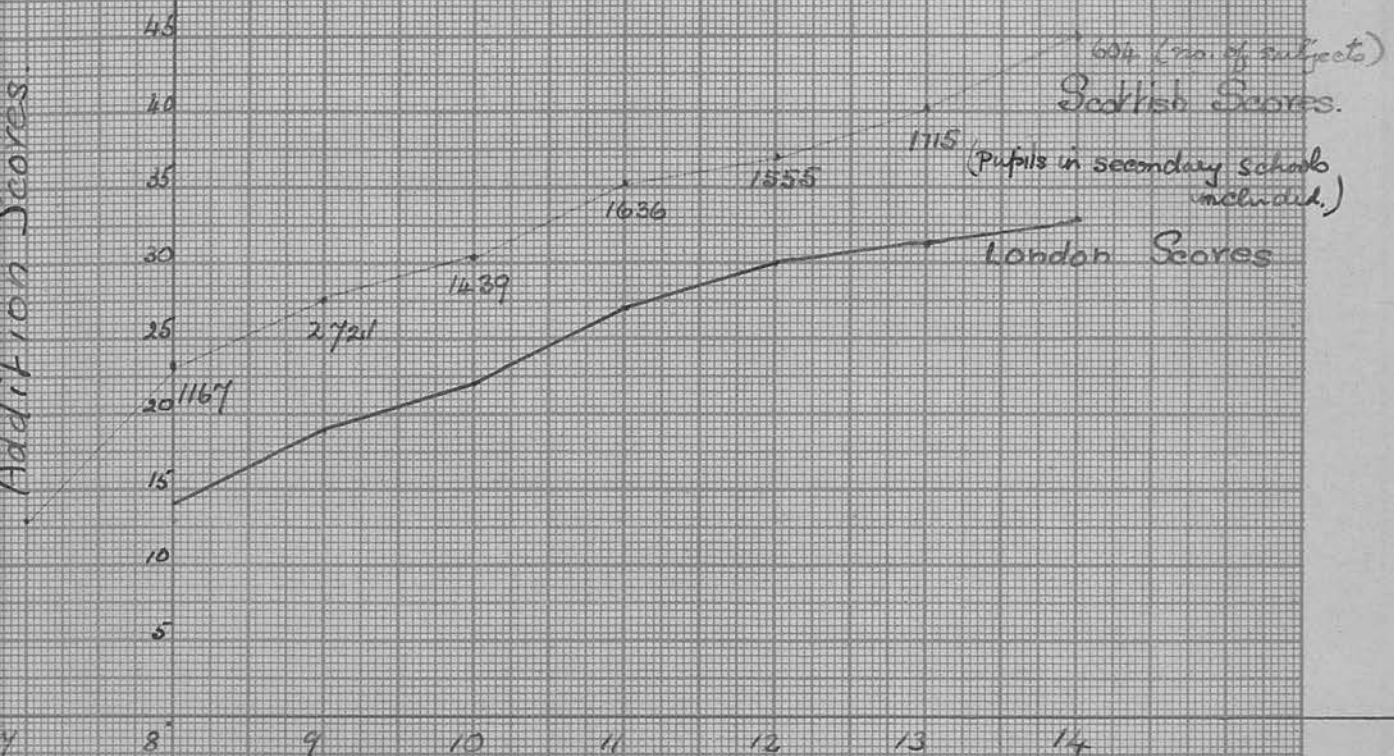
London Norms were not suitable for evaluating the work of children in Scottish Schools. Accordingly all the Scottish children aged 9, 10, 11 and 12 years in a particular area were examined with tests on these subjects and Scottish Norms were drawn up. Children of 7, 8, 13 and 14 years were also examined but <sup>in some cases</sup> the standards at these ages are tentative only, and no claim for their reliability or validity is made, owing to the small number of children examined.

The results of this effort to secure fairly reliable norms in Arithmetic and Spelling are shown on the following pages. As nearly all the schools were "mixed" schools and boys and girls were taught in the same class and by the same teacher no attempt was made to keep separate the results of boys and girls. Burt, in his "Mental and Scholastic Tests", gives norms for boys and norms for girls of corresponding age side by side, and so these have been averaged, when determining the particular London standard for children of a certain age. For example § a London boy aged 8 and of normal capacity ought to have a score of 13.8 in addition. From a London girl of the same age a score of 14.4 would be expected. Hence for a London child of 8 years the standard score would be 14.1.

Some of the children in this particular area were also given Burt's Composition Test on school <sup>(1)</sup> and the results from applying this Test are also given graphically below. It was found that the London norms were quite satisfactory for Scottish Schools, and here again, it should be noticed, that the exceptional children at 12, the bright children at 13 and 14 years, and the dull children at 7 and at 8, were not examined. The fact that the performance in Composition at 7 and 8 years is so/

§(1). Burt Mental & Schol. Tests. P.405. §(2). do. P.395.

Graph showing the performance of Scottish and London children.



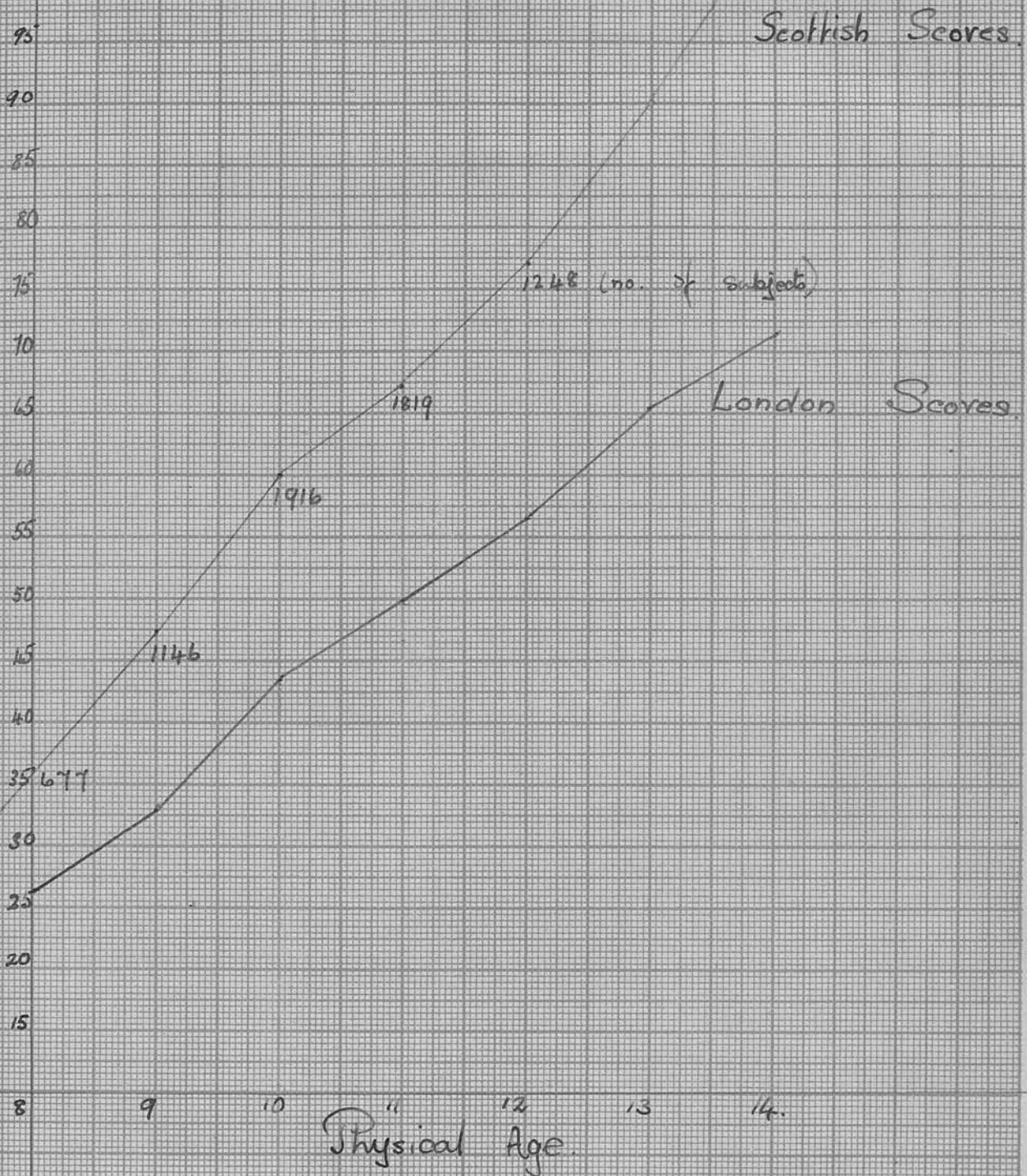
### Physical Age.

This graph shows that Scottish children are considerably superior to London children in Addition. This conclusion does not imply that Scottish children are taught arithmetic better than London children are, but means that, in the area where the norms were obtained, we tend to drill the children more in mechanical work than is done in London, and I have no hesitation in adding after giving tests in 100 schools, this at the expense of problem arithmetic.

The Arithmetic tests were given in the following order — Addition, Multiplication, Subtraction and Division, as this was found to yield better results than giving subtraction after addition.

# Multiplication (Fundamentals) Burt's Test.

Graph showing the performance of Scottish and London children.



In Multiplication, the same drilling in mechanical work is evident in the Scottish schools examined.

A fair number of subjects at each age was examined, as will be seen from the calculations in the appendix, and from the figures given above.

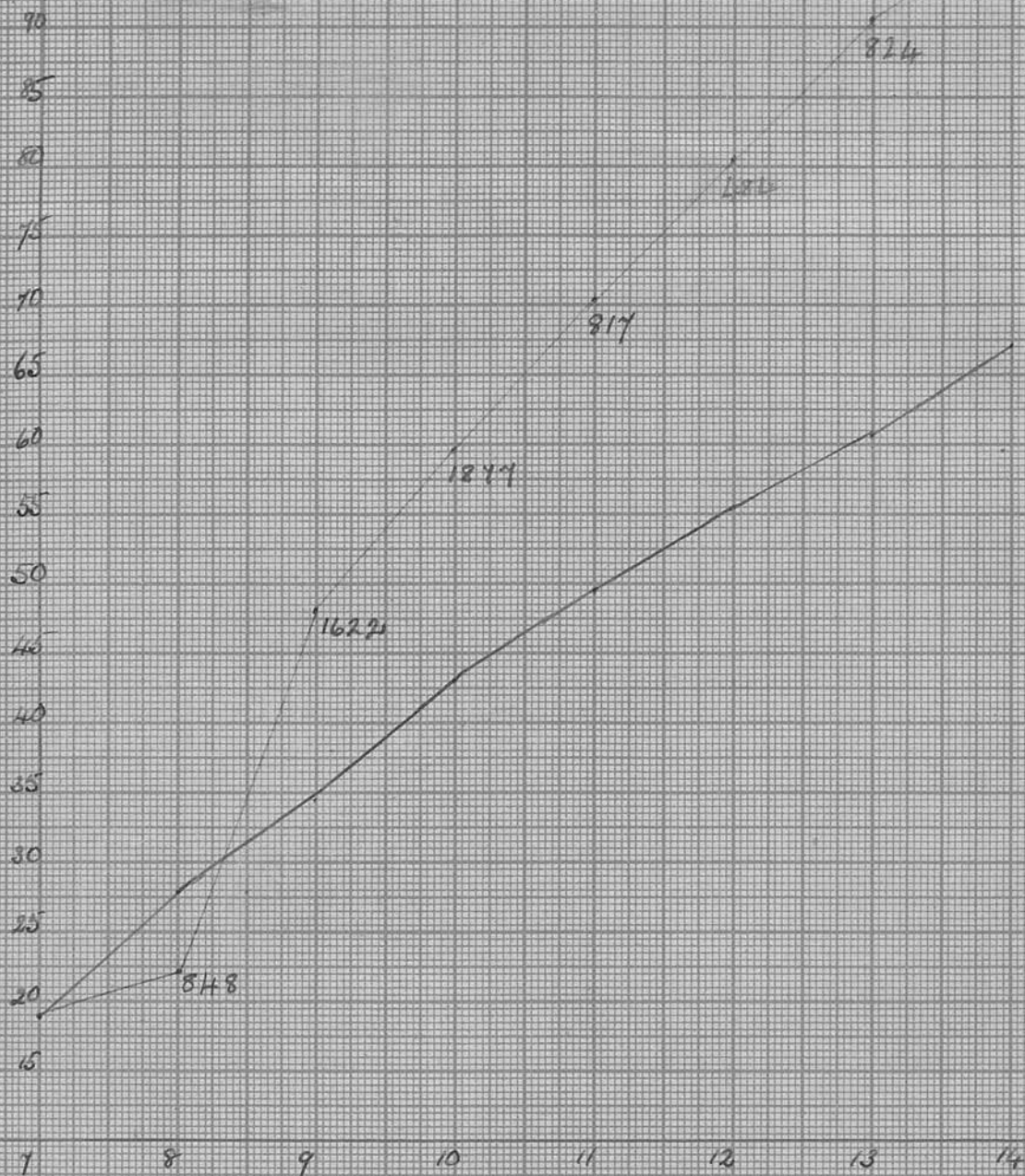


# Subtraction (Fundamentals)

Burt's Test.

188 (no. of subjects)

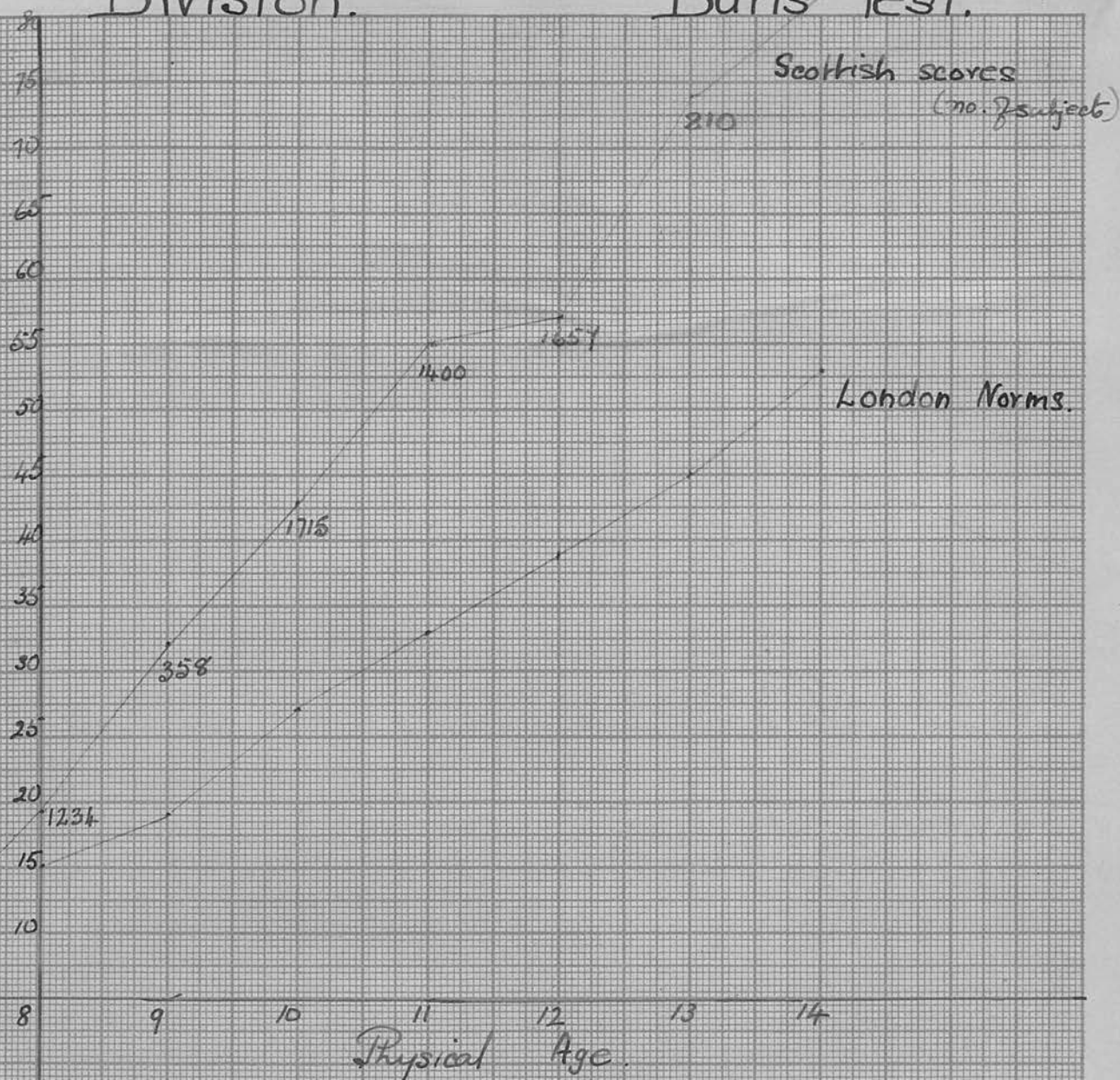
Subtraction Scores.



## Physical Age

At age VIII the Scottish results are below the London ones. Only 848 subjects were examined so the <sup>normal</sup> results may not be very reliable. At age IX the same drilling noted above, is apparent, and this tendency is also shown at ages X, XI, XII, XIII and XIV.

Division Scores



Physical Age.

Again Scottish children have had more practice in mechanical work in divisions. When shown this graph one teacher was surprised that I did not know problem work in arithmetic was not done in the junior school! This is an extreme case, and I find that Inspectors are emphasising problem work in the infant and junior departments, at the present time.

## Burt's Arithmetic Test.

Average Marks.

Fundamentals.

Ages 7-14

Scottish Norms

| Age | Score<br>+ | Score<br>X | Score<br>— | Score<br>÷ |
|-----|------------|------------|------------|------------|
| 7   | 13         | 25         | 18         | 9          |
| 8   | 23.7       | 36.2       | 22.9       | 18.5       |
| 9   | 27.9       | 47.7       | 48.3       | 32.4       |
| 10  | 30.4       | 60.16      | 59.8       | 43         |
| 11  | 35.6       | 67.7       | 70.3       | 55         |
| 12  | 37.6       | 77         | 80.9       | 57         |
| 13  | 40.7       | 90         | 90.1       | 74.6       |
| 14  | 45.4       | 106        | 106.2      | 83         |

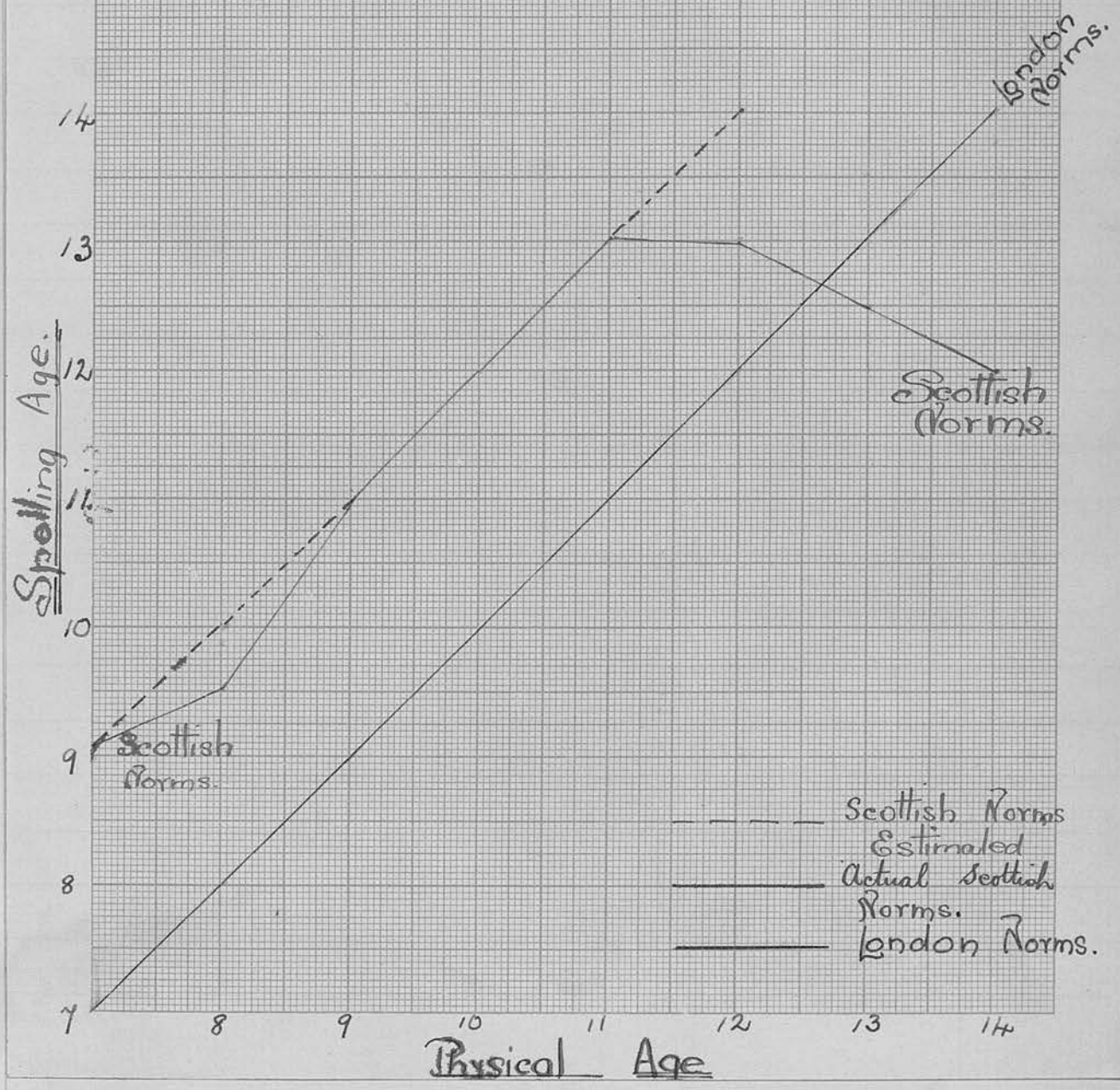
Calculations given in the appendix.

# Spelling.

## Burt's Graded Vocabulary Test.

London and Scottish Norms.

Graph showing Scottish children about 2 years ahead.



Tables A+B, showing the average number of words correct for each age, are shown on the next page. Table B was utilised in the present enquiry to find Spelling ages. The graphical results indicate that Scottish children are about two years ahead of London children, and so the "estimated" results are based on this fact. (see Burt's Table P. 402. Mental + Schol. Tests.)

Actual Results

Spelling - Graded Vocabulary - Burt.

Table A

| Age | Average no. of words correct. | No. of subjects Tested |
|-----|-------------------------------|------------------------|
| 7   | 46*                           | 116                    |
| 8   | 48.5*                         | 95                     |
| 9   | 61                            | 1010                   |
| 10  | 72                            | 1943                   |
| 11  | 81.1                          | 1476                   |
| 12  | 80*                           | 780                    |
| 13  | 76.9*                         | 416                    |
| 14  | 72.5*                         | 213                    |

\* results not reliable.

Table B

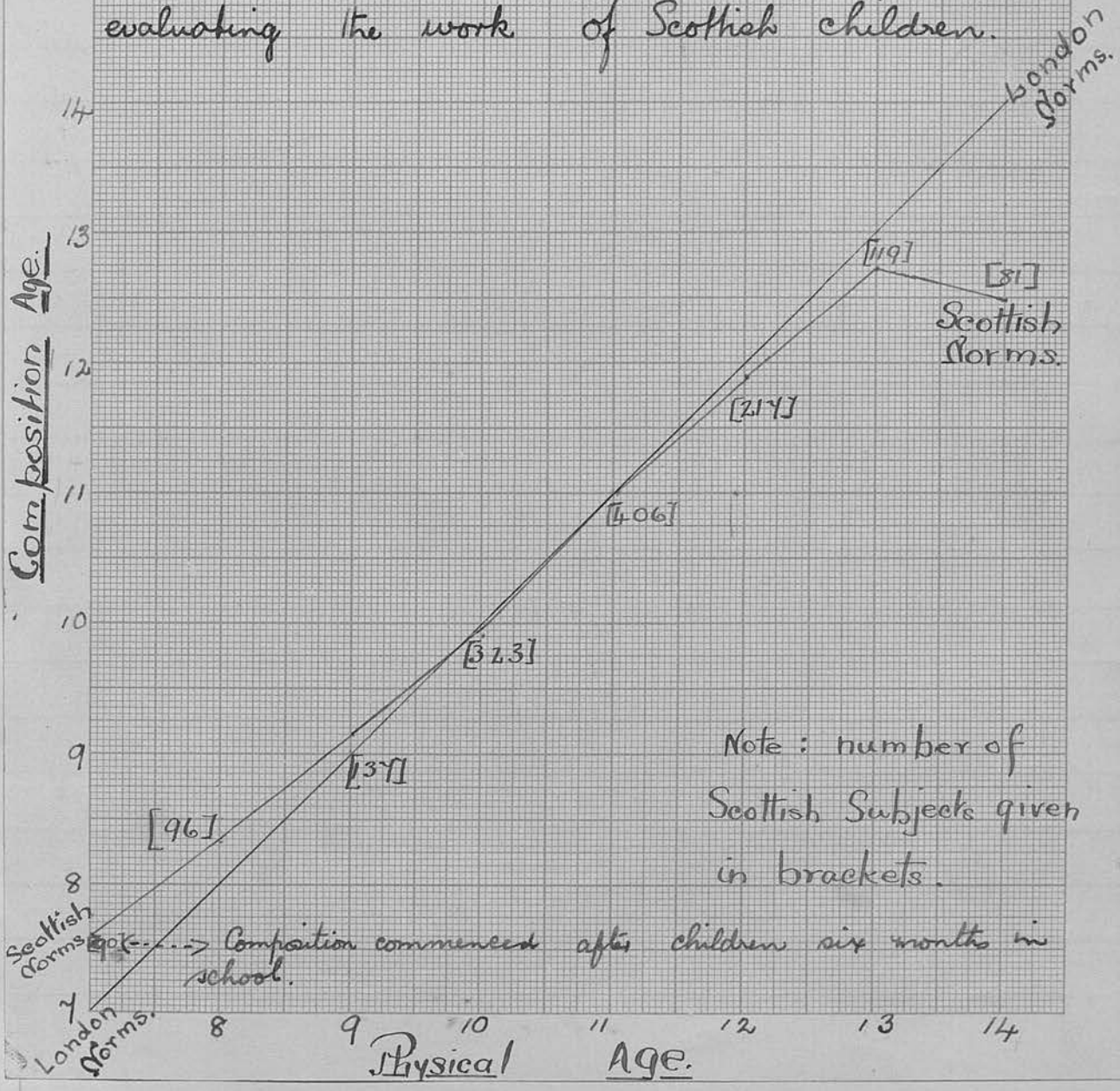
Actual + Estimated Results.

| Age | Average no. of words correct. |           |
|-----|-------------------------------|-----------|
| 7   | 44.7                          | Estimated |
| 8   | 52.3                          | Estimated |
| 9   | 61.2                          | "         |
| 10  | 73                            | "         |
| 11  | 80.6                          | "         |
| 12  | 91.8                          | Estimated |

# Composition on "School." Burt's Test.

## 16 London and Scottish Norms.

15 London results were found suitable for evaluating the work of Scottish children.



It is interesting to note that, in a recent survey, about 13000 children aged 10 to 13 years were examined with an intelligence test, in this area, and the average score for the twelve-year-olds was somewhat less than the average score for the eleven-year-olds. This indicates that the brightest children at 12 have passed on to post-qualifying work, and that children in post-qualifying courses would have to be examined, in order to get

## CHAPTER. 11.

The Results Obtained.

SULTS  
ED.

Since the name of the ~~in~~ industrial town in which this investigation was carried out is not given, the schools are not given their proper names either, but are simply designated A.B.C.&c. This enquiry, as has been stated above, was not carried out by the Method of Sampling, but the children retarded at the Qualifying Stage in every school were included. Thus children from poor, average and good homes were taken into consideration and no social type of school was given undue weight. The tables of results for each school are given below, in random order, as it was not thought necessary to classify the various schools according to their social type.

| School<br>A.<br>PUPIL. | PSYCHOLOGICAL MEASUREMENT |            | INTELLIGENCE QUOTIENT |       | COMPOSITION |      | HEARING |      | ARITHMETIC |       | SPELLING |      | WRITING |     | EDUCATIONAL QUOTIENT |       | ACCOMPLISHMENT QUOTIENT |      | REMARKS.                       |
|------------------------|---------------------------|------------|-----------------------|-------|-------------|------|---------|------|------------|-------|----------|------|---------|-----|----------------------|-------|-------------------------|------|--------------------------------|
|                        | Chron. Age                | Yrs. mths. | Yrs.                  | mths. | Age         | Yrs. | mths.   | Age  | Yrs.       | mths. | Age      | Yrs. | mths.   | Age | Yrs.                 | mths. | Age                     | Yrs. |                                |
| 1.                     | 12                        | 9          | 9                     | 8     | 76          | 11   | 10.6    | 10.8 | 10.5       | 13    | 11.2     | 88   | 116     |     |                      |       |                         |      | Terman Test. I.Q. 84           |
| 2.                     | 11                        | 9          | 10                    | 8     | 91          | 10   | 10.9    | 15   | 11         | 13    | 12       | 102  | 112     |     |                      |       |                         |      |                                |
| 3.                     | 13                        | 0          | 10                    | 8     | 82          | 10   | 14.8    | 10.4 | 10.2       | 12    | 11.5     | 87   | 107     |     |                      |       |                         |      |                                |
| 4.                     | 14                        | 0          | 10                    | 0     | 71          | 10   | 10.3    | 9.6  | 10.5       | 13    | 10.7     | 76   | 106     |     |                      |       |                         |      |                                |
| 5.                     | 12                        | 8          | 10                    | 10    | 86          | 10   | 12      | 12.2 | 10.5       | 13    | 11.5     | 90   | 105     |     |                      |       |                         |      |                                |
| 6.                     | 11                        | 6          | 10                    | 8     | 93          | 10   | 10.1    | 11.9 | 10.6       | 13    | 11.1     | 96   | 104     |     |                      |       |                         |      | Terman Test. I.Q. 88           |
| 7.                     | 11                        | 11         | 10                    | 0     | 87          | 10   | 10.3    | 8.8  | 10.9       | 12    | 10.4     | 87   | 103     |     |                      |       |                         |      |                                |
| 8.                     | 12                        | 9          | 10                    | 8     | 84          | 10   | 11.4    | 11.2 | 10.3       | 12    | 11       | 86   | 103     |     |                      |       |                         |      | (Vision Poor Corrected) normal |
| 9.                     | 13                        | 11         | 13                    | 6     | 97          | 12   | 14.6    | 12.9 | 11.5       | 14    | 13       | 93   | 96      |     |                      |       |                         |      |                                |
| 10.                    | 12                        | 8          | 11                    | 2     | 88          | 13   | 9.8     | 12   | 10         | 10.5  | 11.1     | 87   | 99      |     |                      |       |                         |      |                                |
| 11.                    | 11                        | 2          | 10                    | 2     | 91          | 8    | 9.6     | 8.8  | 10.5       | 13    | 10.      | 89   | 98      |     |                      |       |                         |      | Terman Test - I.Q. 86          |
| 12.                    | 12                        | 11         | 11                    | 6     | 89          | 11   | 10.6    | 10.1 | 10.5       | 13    | 11       | 85   | 96      |     |                      |       |                         |      |                                |
| 13.                    | 13                        | 3          | 11                    | 10    | 89          | 9    | 11.8    | 12.8 | 10.6       | 13    | 11.4     | 85   | 95.     |     |                      |       |                         |      |                                |
| 14.                    | 12                        | 11         | 11                    | 5     | 88          | 10   | 9.6     | 10   | 10.6       | 13    | 10.6     | 81   | 92      |     |                      |       |                         |      | (Very Poor Home Circumstances) |
| 15.                    | 12                        | 2          | 12                    | 10    | 105         | 11   | 11.2    | 11.2 | 11.6       | 13    | 11.6     | 94   | 90      |     |                      |       |                         |      |                                |
| 16.                    | 12                        | 6          | 12                    | 1     | 97          | 9    | 10.7    | 11.5 | 10.6       | 13    | 11       | 88   | 91      |     |                      |       |                         |      |                                |
| 17.                    | 11                        | 7          | 12                    | 10    | 111         | 11   | 12.4    | 11.5 | 11         | 12    | 11.6     | 99   | 90.     |     |                      |       |                         |      |                                |
| 18.                    | 13                        | 0          | 12                    | 0     | 92          | 9    | 11      | 10.2 | 13         | 10    | 10.6     | 81   | 87.     |     |                      |       |                         |      |                                |
| 19.                    | 11                        | 8          | 12                    | 8     | 108         | 10   | 11.5    | 10.9 | 10.2       | 13    | 11.1     | 95   | 88      |     |                      |       |                         |      |                                |



PUPIL.

School A.

| PUPIL. | Age, Yrs. |       | Mental Age | I.Q.             | Reading Age | Spelling Age | Writing Age | Chronological Age | S.E.Q. | I.Q. | Temperament      |
|--------|-----------|-------|------------|------------------|-------------|--------------|-------------|-------------------|--------|------|------------------|
|        | Yrs.      | Mths. |            |                  |             |              |             |                   |        |      |                  |
| 20.    | 11        | 1     | 13         | 118              | 10.9        | 10.2         | 11          | 14                | 11.4   | 102  | 87               |
| 21.    | 11        | 6     | 12         | 107              | 9.9         | 10.6         | 10.2        | 14                | 10.9   | 93   | 87               |
| 22.    | 12        | 8     | 12         | 95               | 11.1        | 9.7          | 11          | 12                | 10.3   | 81   | 85               |
| 23.    | 13        | 9     | 12         | 71 <sup>88</sup> | 9.1         | 10           | 9           | 13                | 10     | 73   | <del>82</del> 84 |
| 24.    | 11        | 6     | 13         | 114              | 9.5         | 10           | 10.5        | 12                | 10.4   | 90   | 79               |
| 25.    | 12        | 9     | 13         | 106              | 10.2        | 11.3         | 10.7        | 13                | 10.8   | 84   | 79               |
| 26.    | 11        | 10    | 15         | 131              | 12.7        | 12.4         | 11.1        | 13                | 12     | 101  | 78               |

These 26 children were in an ordinary class, the total number of children in the class being 50. No 9 is normal in intelligence and ought to have been excluded from the table given above, owing to his satisfactory school work. One child, no 14, suffered from very poor home circumstances which seriously affected her school work. No 26 is an interesting "temperamental" case.

In this school 25 backward cases were subjects, and of those 12 were children whose scholastic retardation was adequately accounted for by low intelligence; two were backward in school work owing to discoverable causes, and so 11 cases remained, with their poor school-work unaccounted for.

NOTE: - /



| Yr. | Chron. Age | Mental Age | I. Q. | Comp. Age | Read. | Arith. | Spelling | Writing. | E. A. | E. Q. | Intelligence Quotient | Specific weakness in Arith. |
|-----|------------|------------|-------|-----------|-------|--------|----------|----------|-------|-------|-----------------------|-----------------------------|
| 1.  | 12         | 9.6        | 77    | 9         | 9.5   | 14     | 11       | 12       | 11.1  | 90    | 117                   |                             |
| 2.  | 12         | 9.0        | 75    | 9         | 9.5   | 12.1   | 9        | 12       | 10.3  | 86    | 114                   |                             |
| 3.  | 12         | 9.0        | 74    | 9         | 9.5   | 9.17   | 11       | 12       | 10.1  | 84    | 113                   |                             |
| 4.  | 13         | 9.0        | 67    | 9         | 9.5   | 9.5    | 10.5     | 12       | 10.1  | 75    | 112                   |                             |
| 5.  | 14         | 9.0        | 65    | 9         | 9.5   | 8.7    | 10       | 12       | 9.8   | 69    | 107.                  |                             |
| 6.  | 13         | 9.2        | 69    | 9         | 9.5   | 10.18  | 8.5      | 12       | 9.8   | 73    | 105.                  |                             |
| 7.  | 12         | 9.0        | 70    | 9         | 7     | 9.9    | 10       | 13       | 9.8   | 76    | 107                   |                             |
| 8.  | 10         | 9.0        | 85    | 8         | 9.5   | 8.5    | 8.5      | 12       | 9.3   | 88    | 102                   |                             |
| 9.  | 13         | 10.4       | 80    | 9         | 10.3  | 11.2   | 10.5     | 12       | 10.6  | 81    | 101                   |                             |
| 10. | 12         | 11.0       | 90    | 9         | 10.5  | 12.9   | 10       | 12       | 10.8  | 87    | 97                    |                             |
| 11. | 13         | 9.10       | 74    | 8         | 9.5   | 7      | 8.5      | 11       | 8.8   | 65    | 96                    |                             |
| 12. | 13         | 10.10      | 80    | 10        | 11.3  | 9.1    | 10.2     | 12       | 10.5  | 77    | 96                    |                             |
| 13. | 11         | 10.2       | 88    | 9         | 9.5   | 9.6    | 8        | 13       | 9.8   | 84    | 95                    |                             |
| 14. | 14         | 9.6        | 67    | 9         | 8     | 8.6    | 10       | 10       | 9     | 63    | 95                    |                             |
| 15. | 13         | 11.1       | 81    | 9         | 11.3  | 10.8   | 10       | 12       | 10.6  | 77    | 95                    |                             |
| 16. | 14         | 9.0        | 64    | 8         | 7     | 7.2    | 9        | 10       | 8.2   | 58    | 90                    |                             |
| 17. | 12         | 11.8       | 91    | 10        | 9.7   | 7.5    | 10       | 13       | 10    | 78    | 86                    |                             |
| 18. | 13         | 11.1       | 83    | 8         | 9.5   | 8      | 10.5     | 12       | 9.6   | 71    | 86                    |                             |
| 19/ |            |            |       |           |       |        |          | Writing. | E. A. | E. Q. | A. Q.                 |                             |

| SCHOOL.<br>C (contd).<br>CHILD. | Physical Mental |       | Intelligence Quotient. |       | Composition Age (Yrs) |       | Reading Age (Yrs) |       | Spelling Age (Yrs) |       | Writing Age (Yrs) |       | Educational Quotient. |       | Accomplishment Quotient. |                                 | REMARKS. |
|---------------------------------|-----------------|-------|------------------------|-------|-----------------------|-------|-------------------|-------|--------------------|-------|-------------------|-------|-----------------------|-------|--------------------------|---------------------------------|----------|
|                                 | Age<br>Yrs.     | Mths. | Yrs.                   | Mths. | Yrs.                  | Mths. | Yrs.              | Mths. | Yrs.               | Mths. | Yrs.              | Mths. | Yrs.                  | Mths. | Yrs.                     | Mths.                           |          |
| 19.                             | 12              | 6     | 11                     | 9     | 94                    | 10    | 10.1              | 8.8   | 10.2               | 12    | 10.2              | 81    | 86.                   |       |                          | Specific weak-<br>ness in Arith |          |
| 20.                             | 12              | 10    | 11                     | 4     | 88                    | 9     | 10.1              | 9     | 8.5                | 13    | 9.9               | 76    | 86.                   |       |                          |                                 |          |
| 21.                             | 13              | 0     | 12                     | 2     | 94                    | 9     | 9.5               | 9     | 10.5               | 13    | 10.2              | 78    | 84.                   |       |                          |                                 |          |
| 22.                             | 12              | 1     | 11                     | 5     | 95                    | 9     | 9.9               | 8.3   | 8.5                | 12    | 9.6               | 79    | 83.                   |       |                          |                                 |          |
| 23.                             | 12              | 6     | 10                     | 9     | 86                    | 8     | 8                 | 8.7   | 8                  | 11    | 8.75              | 69    | 80.                   |       |                          | Poor Home.                      |          |
| 24.                             | 11              | 1     | 10                     | 0     | 91                    | 7     | 7                 | 7     | 8                  | 12    | 8.2               | 74.   | 81.                   |       |                          |                                 |          |

In school C, 17 cases were retarded scholastically, owing to low intelligence, 2 had a specific weakness in arithmetic, 1 child was adversely influenced by a very poor home, and 4 cases remained for further examination, as no cause could be discovered to account, satisfactorily, for their educational backwardness.

| SCHOOL D. | Chron. Age<br>yrs mths | Mental Age<br>yrs mths | I. Q. | Comp. Age | Read. Age | Arith. Age | Spel. Age | Writ. Age | E. A. | E. Q. | A. Q. | REMARKS.                    |
|-----------|------------------------|------------------------|-------|-----------|-----------|------------|-----------|-----------|-------|-------|-------|-----------------------------|
| 1.        | 13 7                   | 9 10                   | 72    | 14        | 13.8      | 8.2        | 12.2      | 13        | 12.2  | 87    | 124.  |                             |
| 2.        | 13 9                   | 9 6                    | 70    | 10        | 12.4      | 12.1       | 13        | 12        | 11.5  | 83    | 120.  | Very ill-nourished.         |
| 3.        | 12 3                   | 9 6                    | 77    | 10        | 11.3      | 10.9       | 12.1      | 13        | 11.5  | 93    | 120.  |                             |
| 4.        | 12 10                  | 8 0                    | 62    | 8         | 9.5       | 9          | 8         | 12        | 9.3   | 72    | 115   |                             |
| 5.        | 13 6                   | 10 2                   | 75    | 11        | 11.8      | 12         | 12        | 12        | 11.75 | 86    | 115.  |                             |
| 6.        | 12 0                   | 9 2                    | 76    | 9         | 9.5       | 10         | 12        | 12        | 10.5  | 87    | 113.  |                             |
| 7.        | 12 1                   | 9 0                    | 74    | 10        | 12        | 8.9        | 9.3       | 10        | 10    | 83    | 111.  |                             |
| 8.        | 12 10                  | 11 0                   | 86    | 10        | 15.7      | 12.1       | 8.4       | 12        | 11.6  | 90    | 104.  |                             |
| 9.        | 12 9                   | 11 6                   | 90    | 11        | 12.9      | 13         | 12        | 13        | 12.4  | 97    | 104.  | Excluded from Investigation |
| 10.       | 12 5                   | 9 0                    | 92    | 9         | 10.8      | 6.5        | 7.9       | 14        | 9.6   | 77    | 105.  |                             |
| 11.       | 13 2                   | 11 5                   | 87    | 10        | 11.2      | 12.5       | 12.5      | 13        | 11.8  | 89    | 102.  |                             |
| 12.       | 12 4                   | 12 0                   | 98    | 11        | 12.9      | 12         | 12        | 13        | 12.2  | 99    | 101.  | Excluded from Investigation |
| 13.       | 13 1                   | 12 0                   | 92    | 10        | 14.1      | 11         | 13        | 13        | 12.2  | 93    | 101.  | do                          |
| 14.       | 13 8                   | 10 4                   | 76    | 10        | 12.4      | 8.8        | 8.2.      | 13        | 10.5  | 76    | 101.  |                             |

|         |        |    |                                               |    |     |    |                                           |      |      |    |                                       |      |     |     |
|---------|--------|----|-----------------------------------------------|----|-----|----|-------------------------------------------|------|------|----|---------------------------------------|------|-----|-----|
| 15.     | 13     | 5  | 12                                            | 0  | 89  | 13 | 11.9                                      | 9    | 12   | 12 | 12                                    | 11.8 | 87  | 97. |
| 16.     | 13     | 8  | 11                                            | 8  | 86  | 10 | 14.2                                      | 10   | 11   | 13 | 11.6                                  | 84   | 99. |     |
| 17.     | 13     | 3  | 10                                            | 10 | 82  | 9  | 13.3                                      | 10.8 | 11   | 11 | 10.6                                  | 80   | 97. |     |
| 18.     | 13     | 4  | 11                                            | 8  | 87  | 8  | 12.4                                      | 12   | 12.1 | 12 | 11.3                                  | 81   | 96. |     |
| 19.     | 13     | 10 | 10                                            | 10 | 78  | 9  | 10                                        | 9.8  | 12   | 10 | 10.2                                  | 74   | 94. |     |
| 20.     | 12     | 0  | 9                                             | 0  | 75  | 11 | 6                                         | 7    | 7    | 10 | 8.2                                   | 68   | 92. |     |
| 21.     | 13     | 0  | 11                                            | 8  | 89  | 10 | 11.8                                      | 9    | 10.8 | 12 | 10.7                                  | 81   | 90. |     |
| 22.     | 12     | 7  | 13                                            | 6  | 107 | 10 | 14.6                                      | 12   | 13.5 | 12 | 12.4                                  | 98   | 91. |     |
| 23.     | 13     | 6  | 12                                            | 1  | 90  | 10 | 12.8                                      | 9    | 10   | 13 | 10.9                                  | 80   | 90. |     |
| 24.     | 12     | 9  | 9                                             | 8  | 76  | 7  | 9.6                                       | 7.1  | 8.9  | 11 | 8.7                                   | 75   | 89. |     |
| 25.     | 12     | 8  | 12                                            | 2  | 96  | 10 | 12                                        | 9.2  | 9.5  | 13 | 10.7                                  | 84   | 87. |     |
| 26.     | 14     | 0  | 12                                            | 4  | 88  | 10 | 10.6                                      | 9    | 9.8  | 14 | 10.6                                  | 75   | 86. |     |
| 27.     | 13     | 9  | 12                                            | 4  | 90  | 10 | 12.1                                      | 9    | 10.6 | 12 | 10.7                                  | 77   | 86. |     |
| 28.     | 12     | 5  | 12                                            | 5  | 100 | 9  | 10.9                                      | 9    | 10.1 | 10 | 9.8                                   | 78   | 78. |     |
| 29.     | 13     | 4  | 13                                            | 4  | 100 | 9  | 13                                        | 9    | 10   | 9  | 10                                    | 75   | 75. |     |
| 30.     | 12     | 8  | 10                                            | 0  | 79  | 9  | 12.4                                      | 8    | 8    | 10 | 9.4                                   | 74   | 93. |     |
| SCHOOL. | § (1). |    | Congenital disease & Poor Home Circumstances. |    |     |    | § (2). T.B. Attends School only half day. |      |      |    | § (3). Parents notoriously Alcoholic. |      |     |     |

Son of a Travelling Gipsy.  
 → Poor Auditory Memory. Low I.Q.

Erratic.

Malnutrition. Miserable home circumstances. do

(1). § vision

(no 27) 2

§ (1).  
 § (2).  
 § (3).

3 children were found normal educationally, 16 suffered from low intelligence, 2 from some circumstances, 1 from reason, 1 from change of school, 1 from temperamental reasons, 1 from physical defects, and 2 cases remained for further consideration.

SCHOOL. Physical Mental. Intelligence. Composition. Reading. Arith. Spelling. Writing. Educational Age. Educational Quotient. Accomplishment Quotient. REMARKS.

| (    | 12 | 9 | 10 | 8  | 83  | 13 | 10.6 | 11.2 | 14 | 13 | 13 | 12.5  | 98  | 117.) |                              |
|------|----|---|----|----|-----|----|------|------|----|----|----|-------|-----|-------|------------------------------|
| ( 1. | 12 | 9 | 10 | 8  | 83  | 13 | 10.6 | 11.2 | 14 | 13 | 13 | 12.5  | 98  | 117.) | omitted                      |
| ( 2. | 12 | 1 | 10 | 4  | 85  | 13 | 10.5 | 10.8 | 13 | 13 | 13 | 12.06 | 100 | 116 ) | do                           |
| ( 3. | 12 | 6 | 11 | 6  | 92  | 14 | 10.5 | 10.1 | 12 | 14 | 14 | 12.9  | 102 | 111.) | do                           |
| ( 4. | 12 | 9 | 11 | 1  | 87  | 12 | 9.5  | 12.6 | 14 | 14 | 14 | 12.4  | 97  | 111.) | do                           |
| ( 5. | 11 | 3 | 10 | 6  | 93  | 12 | 10.4 | 12.3 | 12 | 13 | 13 | 11.5  | 102 | 109.) | do.                          |
| ( 6. | 10 | 9 | 11 | 9  | 109 | 14 | 10.9 | 12   | 13 | 13 | 13 | 12.6  | 115 | 106.) | {described later.<br>omitted |
| ( 7. | 12 | 2 | 12 | 2  | 100 | 13 | 11.4 | 11.8 | 14 | 12 | 12 | 12.4  | 105 | 105.) | {healthy<br>omitted          |
| 8.   | 13 | 5 | 11 | 0  | 82  | 13 | 9.9  | 9.3  | 13 | 13 | 13 | 11.6  | 86  | 105.) | omitted                      |
| ( 9. | 12 | 2 | 11 | 9  | 99  | 12 | 9    | 15   | 12 | 13 | 13 | 12.2  | 100 | 104.) | omitted                      |
| 10.  | 13 | 7 | 10 | 10 | 80  | 13 | 11.4 | 10.1 | 10 | 12 | 12 | 11.5  | 83  | 104.) |                              |
| 11.  | 13 | 8 | 11 | 6  | 84  | 14 | 10.4 | 10   | 11 | 14 | 14 | 11.9  | 86  | 102.  |                              |
| (12/ |    |   |    |    |     |    |      |      |    |    |    |       |     |       |                              |

Table continued.









(Contd.)  
 IUFIL. Yrs. Mths. Yrs. Mths. Age. Intelligence Quotient. Age (Yrs) Age (Yrs) Age (Yrs) Age (Yrs) Mental Age Quotient. I.Q. Quotient. Remarks.

|     | 11 | 4  | 12 | 9  | 112 | 9  | 10.8 | 10.7 | 9.9  | 13 | 10.7 | 93 | 83. |
|-----|----|----|----|----|-----|----|------|------|------|----|------|----|-----|
| 18. | 11 | 4  | 12 | 9  | 112 | 9  | 10.8 | 10.7 | 9.9  | 13 | 10.7 | 93 | 83. |
| 19. | 12 | 10 | 12 | 10 | 100 | 10 | 12.7 | 9.1  | 9.5  | 12 | 10.7 | 82 | 82. |
| 20. | 11 | 9  | 12 | 4  | 105 | 11 | 9.8  | 9.4  | 10.7 | 10 | 10.2 | 86 | 82. |
| 21. | 13 | 3  | 13 | 2  | 99  | 10 | 11   | 10.8 | 10   | 12 | 10.8 | 80 | 81. |
| 22. | 11 | 9  | 12 | 8  | 108 | 19 | 10.9 | 10.8 | 10   | 10 | 10.1 | 86 | 80. |
| 23. | 12 | 0  | 14 | 0  | 117 | 9  | 12.4 | 9.8  | 10.5 | 14 | 11.1 | 92 | 79. |
| 24. | 12 | 1  | 13 | 10 | 115 | 10 | 9.7  | 10.2 | 11   | 13 | 10.8 | 88 | 77. |

*4 children were scholastically backward owing to low intelligence, & owing to miserable home conditions 13 cases remained for further examination.*

Pupil No. 1, 2 and 5 were doing satisfactory work after receiving extra tutoring and they were ~~the~~ subjects of special interest <sup>to</sup> the Headmaster.

Pupil No. 8 was scholastically retarded owing to low general intelligence. She was however quite an artist and was interested in painting, drawing, fancy-needlework and handwork of all kinds. A picture drawn and coloured by this child was selected from a variety of masterpieces, to adorn the Headmaster's Room, and the girl was delighted with the honour gained. Her curriculum was modified slightly, to give scope for her talent, and she was anxious to take up painting of Xmas Cards when she left school. Her gift was encouraged in school and fostered very carefully.

*home circ*

F

| Yr. in Sch. | Yrs. in Sch. | Age (Yrs.) | Age (Mths.)  | Intelligence Quotient | Reading Age (Yrs.) | Spelling Age (Yrs.) | Whit. Age (Yrs.) | Personal Age (Yrs.) | Intelligence Quotient | Final Quotient | Remarks |       |       |       |                        |
|-------------|--------------|------------|--------------|-----------------------|--------------------|---------------------|------------------|---------------------|-----------------------|----------------|---------|-------|-------|-------|------------------------|
| School 9.   | 1.           | 13         | 8            | 9                     | 4                  | 68                  | 11               | 12.2                | 8.9                   | 14             | 13      | 11.8  | 85    | 125.  |                        |
|             | 2.           | 13         | 8            | 11                    | 2                  | 82                  | 13               | 12.7                | 14.2                  | 14.1           | 14      | 13.6  | 99    | 121.  |                        |
|             | 3.           | 12         | 3            | 10                    | 6                  | 86                  | 12               | 12                  | 11.9                  | 14.6           | 12      | 12.5  | 101   | 118.  |                        |
|             | 4.           | 11         | 7            | 10                    | 2                  | 88                  | 11               | 14.1                | 8                     | 13             | 14      | 12    | 104   | 118.  | § (1).<br>see page 75. |
|             | 5.           | 13         | 10           | 10                    | 8                  | 82                  | 13               | 10                  | 12                    | 14.5           | 13      | 12.5  | 95    | 116.  |                        |
|             | 6.           | 12         | 8            | 10                    | 6                  | 83                  | 12               | 14                  | 8.8                   | 13.5           | 13      | 12.2  | 96    | 116.  |                        |
|             | 7.           | 13         | 9            | 9                     | 10                 | 72                  | 10               | 10                  | 9.2                   | 14.2           | 14      | 11.5  | 83    | 116.  |                        |
|             | 8.           | 13         | 0            | 10                    | 9                  | 83                  | 14               | 11.1                | 9.6                   | 14.4           | 14      | 12.6  | 96    | 116.  |                        |
|             | 9.           | 12         | 2            | 9                     | 10                 | 81                  | 11               | 10                  | 10.7                  | 13             | 12      | 11.34 | 93    | 115.  |                        |
|             | 10.          | 13         | 6            | 10                    | 4                  | 77                  | 10               | 11.8                | 12.4                  | 12.2           | 12      | 11.67 | 86    | 112.  |                        |
|             | 11.          | 13         | 9.           | 9                     | 10                 | 72                  | 11               | 9.8                 | 9.2                   | 12.4           | 13      | 11.1  | 80    | 112.  | omitted                |
|             | (12.)        | 12         | 5            | 12                    | 0                  | 97                  | 13               | 14                  | 12.2                  | 14.7           | 14      | 13.6  | 108   | 112)  | omitted,               |
|             | (13.)        | 12         | 5            | 11                    | 4                  | 91                  | 13               | 13.8                | 10.9                  | 12.7           | 13      | 12.7  | 101   | 111)  | omitted                |
|             | (14.)        | 11         | 6            | 11                    | 5                  | 99                  | 11               | 14.1                | 9.4                   | 14             | 14      | 12.5  | 108   | 109)  |                        |
|             | (15.)        | 13         | 2            | 11                    | 4                  | 83                  | 12               | 10.8                | 13.7                  | 12.5           | 12      | 12.3  | 93    | 108.  |                        |
|             | 16.          | 13         | 7            | 10                    | 10                 | 80                  | 10               | 11.75               | 10.6                  | 13.5           | 13      | 11.8  | 86    | 108.  |                        |
| 17/         |              | Chron. yr. | Chron. mths. | Age Mental            | ago                | T. Q.               | Composition      | Reading             | Arith                 | Spelling       | Whit.   | E. A. | E. Q. | A. Q. | #                      |
|             |              | yr.        | mths.        | ago                   | mths.              |                     | Age              | Age                 | age                   | Age            | Age.    |       |       |       |                        |











SCHOOL I. Physical Mental (contd.)  
 Yrs. Mths. Yrs. Mths. Age. Intelligence Quotient. Age (Yrs) Composition Age (Yrs) Reading Age (Yrs) Arith. Age (Yrs) Spelling Age (Yrs) Writing Age (Yrs) Educational Age Quotient. Educational Quotient. Accomplishment Quotient. REMARKS.

|     |    |   |    |   |     |      |      |      |    |    |      |    |     |
|-----|----|---|----|---|-----|------|------|------|----|----|------|----|-----|
| 34. | 12 | 9 | 12 | 0 | 94  | 10.9 | 10   | 9.9  | 10 | 11 | 10.4 | 81 | 86. |
| 35. | 13 | 0 | 13 | 0 | 100 | 10.6 | 12   | 10.5 | 10 | 12 | 11   | 85 | 85. |
| 36. | 11 | 8 | 10 | 9 | 92  | 10   | 10.9 | 9.8  | 9  | 10 | 9.9  | 84 | 91. |

Exceptionally poor home circumstances

27 cases were backward in school-work owing to low intelligence; 2 were the victims of home circumstances; 7 cases remained for further testing.

School

Remarks.

A.Q.

S.Q.

E.A.

Wid.A.

Spel A.

Arith. A.

Rd. A.

Comp. A.

I. Q.

Mental Age

Physical Age

SCHOOL, J.

|    |    |    |    |    |     |      |    |      |     |     |      |    |      |
|----|----|----|----|----|-----|------|----|------|-----|-----|------|----|------|
| 1. | 13 | 0  | 9  | 6  | 73  | 10.4 | 13 | 9.8  | 10  | 11  | 10.8 | 82 | 113. |
| 2. | 12 | 6  | 9  | 0  | 72  | 11.4 | 9  | 8    | 9   | 12. | 9.9  | 73 | 108. |
| 3. | 13 | 2  | 9  | 10 | 75  | 11.5 | 9  | 10.2 | 8.8 | 12  | 10.3 | 73 | 104. |
| 4. | 13 | 2  | 9  | 2  | 73  | 11.1 | 9  | 9.3  | 9.  | 10  | 9.7  | 73 | 104. |
| 5. | 13 | 5  | 9  | 0  | 67  | 9.8  | 8  | 8    | 8   | 11  | 8.9  | 66 | 98.  |
| 6. | 13 | 0  | 9  | 0  | 69  | 8.   | 8  | 8    | 8   | 12  | 8.8  | 67 | 96.  |
| 7. | 13 | 2  | 11 | 6  | 87  | 9.8  | 9  | 12   | 11  | 12  | 10.8 | 81 | 92.  |
| 8. | 12 | 10 | 10 | 2  | 79  | 9    | 9  | 9    | 9   | 11  | 9.4  | 72 | 91.  |
| 9. | 12 | 11 | 12 | 11 | 100 | 10   | 9  | 10   | 10  | 12  | 10.2 | 78 | 78.  |

§ Very Poor home.

I. Q. 91 Verma

low I. Q.

§ This

7 children were backward owing to low intelligence, and, 2 remained for special examination.



(Contd.)

|     | Chronological Age | Yrs. Mths. | Age | Intelligence Quotient | Composition Age (Yrs) | Reading Age (Yrs) | Arith. Age (Yrs) | Spelling Age (Yrs) | Writing Age (Yrs) | Educational Age | Educational Quotient | Accomplishment Quotient | REMARKS                        |
|-----|-------------------|------------|-----|-----------------------|-----------------------|-------------------|------------------|--------------------|-------------------|-----------------|----------------------|-------------------------|--------------------------------|
| 18. | 12                | 8          | 3   | 65                    | 6                     | 7                 | 8.1              | 8                  | 10                | 7.8             | 60                   | 93.                     |                                |
| 19. | 14                | 0          | 0   | 78                    | 8                     | 8.9               | 9                | 9.1                | 14                | 9.8             | 69                   | 87.                     |                                |
| 20. | 14                | 0          | 8   | 69                    | 7                     | 8                 | 7.5              | 7.9                | 11                | 8.3             | 58                   | 85.                     | From another School.           |
| 21. | 12                | 6          | 9   | 78                    | 8                     | 8.4               | 7                | 7                  | 10                | 8               | 64                   | 82.                     |                                |
| 22. | 13                | 9          | 0   | 65                    | 0                     | 4                 | 6                | 5                  | 12                | 6.7             | 47                   | 73.                     | } Twin                         |
| 23. | 13                | 9          | 10  | 64                    | 0                     | 4                 | 7                | 4                  | 12                | 6.7             | 47                   | 74.                     | } Brothers.                    |
| 24. | 14                | 4          | 4   | 58                    | 0                     | 5                 | 7                | 5                  | 9                 | 6½              | 45                   | 78.                     |                                |
| 25. | 12                | 2          | 0   | 65                    | 0                     | 6                 | 7                | 6.5                | 7                 | 6.6             | 53                   | 81.                     | From another School.           |
| 26. | 12                | 10         | 6   | 66                    | 0                     | 6                 | 5                | 5                  | 8                 | 6               | 46                   | 70                      | Poor Home.                     |
| 27. | 12                | 2          | 0   | 76                    | 7                     | 7                 | 6                | 6.5                | 9                 | 7.1             | 53                   | 78.                     |                                |
| 28. | 13                | 7          | 10  | 65                    | 7                     | 7.9               | 6.5              | 7                  | 8                 | 7.2             | 52                   | 81.                     | From another School.           |
| 29. | 12                | 11         | 5   | 80                    | 7                     | 8.3               | 7.9              | 7.5                | 11                | 8.3             | 63                   | 79.                     | Poor Home                      |
| 30. | 13                | 2          | 0   | 75                    | 8                     | 8                 | 7.9              | 9                  | 12                | 8.9             | 66                   | 87.                     | Poor Home.                     |
| 31. | 12                | 9          | 6   | 98                    | 9                     | 10                | 9.9              | 9.8                | 11                | 9.9             | 76                   | 78.                     | Ill-nourished. Very Poor Home. |

30 children were below normal in intelligence, and 1, normal in intelligence, was handicapped by a very poor home.

Chronological Age

Mental Age

Comp. Age

Rd. Age.

Arith. Age

Spel. Age

Writ. Age

E. A.

E. Q.

A. Q.



| PUPIL. | Chron. Age |       | Mental Age |       | I. Q.    |     | Comp. |       | Rd.  |       | Arith. |       | Spels |       | Writ. |       | E. A. |       | E. Q. |       | REMARKS.                                       |      |
|--------|------------|-------|------------|-------|----------|-----|-------|-------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------------------------|------|
|        | Yrs.       | Mths. | Yrs.       | Mths. | Quotient | Age | Yrs.  | Mths. | Yrs. | Mths. | Yrs.   | Mths. | Yrs.  | Mths. | Yrs.  | Mths. | Yrs.  | Mths. | Yrs.  | Mths. |                                                |      |
| 1.     | 13         | 0     | 10         | 6     | 80       | 11  | 12    | 11.1  | 11   | 14    | 11.8   | 90    | 111.  |       |       |       |       |       |       |       |                                                |      |
| 2.     | 12         | 11    | 10         | 6     | 81       | 11  | 11.5  | 11.6  | 11   | 13    | 11.6   | 89    | 109.  |       |       |       |       |       |       |       |                                                |      |
| 3.     | 13         | 4     | 9          | 2     | 68       | 8   | 9.8   | 8     | 10   | 14    | 9.9    | 73    | 106.  |       |       |       |       |       |       |       |                                                |      |
| 4.     | 12         | 10    | 9          | 6     | 74       | 8   | 9.9   | 9.4   | 11   | 12    | 10     | 78    | 105.  |       |       |       |       |       |       |       |                                                |      |
| 5.     | 12         | 10    | 9          | 10    | 76       | 8   | 9.5   | 8.9   | 11   | 14    | 10.2   | 79    | 103.  |       |       |       |       |       |       |       |                                                |      |
| 6.     | 11         | 11    | 10         | 0     | 84       | 9   | 11.3  | 10.8  | 8.9  | 12    | 10.4   | 87    | 103.  |       |       |       |       |       |       |       |                                                |      |
| 7.     | 14         | 1     | 11         | 5     | 81       | 11  | 12.8  | 10.5  | 12   | 12    | 11.6   | 83    | 102.  |       |       |       |       |       |       |       |                                                |      |
| 8.     | 12         | 10    | 9          | 6     | 74       | 8   | 8.9   | 8.9   | 9.5  | 13    | 9.6    | 74    | 100.  |       |       |       |       |       |       |       |                                                |      |
| 9.     | 12         | 11    | 10         | 6     | 81       | 9   | 10.9  | 10.1  | 11   | 12    | 10.6   | 81    | 100.  |       |       |       |       |       |       |       |                                                |      |
| 10.    | 12         | 5     | 9          | 2     | 73       | 7   | 9.8   | 9     | 8.9  | 11    | 9.1    | 72    | 99.   |       |       |       |       |       |       |       |                                                |      |
| 11.    | 12         | 6     | 9          | 6     | 76       | 8   | 7     | 9.5   | 8.6  | 14    | 9.4    | 75    | 98.   |       |       |       |       |       |       |       |                                                |      |
| 12.    | 12         | 5     | 10         | 4     | 83       | 10  | 10    | 8     | 10   | 12    | 10     | 80    | 96.   |       |       |       |       |       |       |       |                                                |      |
| 13.    | 12         | 4     | 10         | 0     | 81       | 9   | 9.8   | 8.2   | 9    | 12    | 9.6    | 77    | 95.   |       |       |       |       |       |       |       |                                                |      |
| 14.    | 12         | 10    | 10         | 6     | 81       | 9   | 10    | 9.1   | 9    | 11    | 9.6    | 74    | 90.   |       |       |       |       |       |       |       | retardation<br>in general<br>inelligence<br>do |      |
| 15.    | 12         | 7     | 8          | 4     | 66       | 7   | 8     | 7     | 8    | 9     | 7.8    | 60    | 92.   |       |       |       |       |       |       |       |                                                |      |
| 16.    | 12         | 6     | 11         | 2     | 89       | 9   | 9.3   | 9.4   | 10   | 11    | 9.7    | 77    | 86.   |       |       |       |       |       |       |       | Excellent                                      |      |
| 17.    | 13         | 3     | 10         | 10    | 81       | 8   | 9.9   | 8.9   | 9.5  | 11    | 9.4    | 71    | 86.   |       |       |       |       |       |       |       | do at History.                                 |      |
| 18.    | 12         | 8     | 10         | 2     | 80       | 9   | 9.5   | 8.7   | 8.5  | 10    | 9.1    | 72    | 86.   |       |       |       |       |       |       |       | do                                             |      |
| 19.    |            |       |            |       |          |     |       |       |      |       |        |       |       |       |       |       |       |       |       |       |                                                | A-Q. |

M

| School M.                                                                                                                                                                                              | Physical Age | Mental Age | Intelligence Quotient | Composition Age | Reading Age | Spelling Age | Writing Age | Educational Age | IQ | Remarks                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------|-----------------|-------------|--------------|-------------|-----------------|----|------------------------------------|
| 19.                                                                                                                                                                                                    | 13           | 10         | 80                    | 8               | 8.3         | 8.1          | 10          | 8.6             | 65 | 81. retardation in general intell. |
| 20.                                                                                                                                                                                                    | 13           | 11         | 88                    | 9               | 9.8         | 8.5          | 11          | 9.4             | 72 | 81. Interested in Farming.         |
| 21.                                                                                                                                                                                                    | 12           | 9          | 73                    | 7               | 7.6         | 7            | 9           | 7.7             | 59 | 80. low I.Q.                       |
| 22.                                                                                                                                                                                                    | 12           | 10         | 100                   | 9               | 10          | 9.5          | 14          | 10.2            | 79 | 79.                                |
| 23.                                                                                                                                                                                                    | 13           | 11         | 86                    | 8               | 8.9         | 8.5          | 10          | 9.1             | 68 | 78. Home.                          |
| 24.                                                                                                                                                                                                    | 13           | 9          | 72                    | 7               | 7           | 7.8          | 11          | 7.8             | 56 | 78. low I.Q.                       |
| 25.                                                                                                                                                                                                    | 12           | 13         | 110                   | 9               | 12          | 11           | 12          | 10.7            | 84 | 76.                                |
| 26.                                                                                                                                                                                                    | 12           | 12         | 100                   | 6               | 9           | 6            | 14          | 9               | 73 | 73. Spelling.                      |
| 27.                                                                                                                                                                                                    | 12           | 10         | 86                    | 7               | 8           | 7.5          | 8           | 7.5             | 57 | 66. 10 Schools.                    |
| <p>20 cases were backward owing to low intelligence, owing to weakness in a special subject, owing to home circumstances, owing to change of school, and 4 remained to examine with special tests.</p> |              |            |                       |                 |             |              |             |                 |    |                                    |

W





| PUPIL. (contd.)                                                                                                                                                                                                    | Chron. Age | Mental Age | I. Q. | Comp. Age | Spelling | Writing | E. A. | E. Q. | A. Q. | Remarks |           |      |      |                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-------|-----------|----------|---------|-------|-------|-------|---------|-----------|------|------|--------------------------------------------|
|                                                                                                                                                                                                                    |            |            |       |           |          |         |       |       |       |         | Yrs. mths | Yrs. | Yrs. | Yrs.                                       |
| 18.                                                                                                                                                                                                                | 13         | 4          | 12    | 9         | 96       | 11      | 12    | 10    | 10.6  | 12      | 11.1      | 83   | 87.  | <i>retardation in general intelligence</i> |
| 19.                                                                                                                                                                                                                | 13         | 3          | 10    | 10        | 81       | 9       | 8.9   | 8.5   | 9.9   | 11      | 9.4       | 71   | 86.  |                                            |
| 20.                                                                                                                                                                                                                | 14         | 0          | 13    | 1         | 93       | 10      | 11    | 10.2  | 11.2  | 13      | 11.1      | 79   | 85.  |                                            |
| 21.                                                                                                                                                                                                                | 12         | 9          | 11    | 11        | 93       | 8       | 12    | 9     | 10    | 10      | 9.8       | 76   | 81.  |                                            |
| 22.                                                                                                                                                                                                                | 11         | 11         | 12    | 6         | 105      | 8       | 9.9   | 10    | 9.8   | 13      | 10.1      | 85   | 81.  |                                            |
| 23.                                                                                                                                                                                                                | 12         | 6          | 11    | 2         | 90       | 8       | 10    | 8.5   | 9     | 10      | 9         | 72   | 81.  |                                            |
| 24.                                                                                                                                                                                                                | 13         | 0          | 10    | 5         | 80       | 8       | 9.1   | 8.2   | 8.1   | 10      | 8.6       | 65   | 81.  |                                            |
| 25.                                                                                                                                                                                                                | 12         | 7          | 11    | 5         | 90       | 9       | 9.1   | 8.5   | 8.7   | 10      | 9         | 72   | 80.  |                                            |
| 26.                                                                                                                                                                                                                | 14         | 3          | 13    | 9         | 96       | 10      | 11.2  | 11    | 11.5  | 12      | 11        | 77   | 80.  |                                            |
| 27.                                                                                                                                                                                                                | 12         | 8          | 11    | 5         | 90       | 8       | 10.2  | 8.9   | 9.1   | 10      | 9.2       | 72   | 80.  |                                            |
| 28.                                                                                                                                                                                                                | 15         | 6          | 14    | 0         | 90       | 10      | 12    | 10    | 10    | 14      | 11.2      | 72   | 80.  |                                            |
| 29.                                                                                                                                                                                                                | 12         | 6          | 12    | 6         | 100      | 9       | 10.2  | 9.7   | 9.9   | 12      | 10.1      | 80   | 80.  |                                            |
| 30.                                                                                                                                                                                                                | 12         | 8          | 12    | 9         | 101      | 10      | 10.1  | 9.9   | 10    | 11      | 10.2      | 80   | 79.  |                                            |
| 31.                                                                                                                                                                                                                | 12         | 9          | 12    | 9         | 100      | 8       | 9.2   | 10    | 9.8   | 12      | 9.8       | 76   | 76.  |                                            |
| 15 cases were backward owing to low intelligence, 2 owing to health reasons, 2 owing to language difficulty, 2 owing to change of schools, 1 owing to a physical defect, and 9 remained for further consideration. |            |            |       |           |          |         |       |       |       |         | %         |      | 54   |                                            |





| PUPIL. | Physical Age |       | Mental Age |       | Intelligence Quotient | Composition Age (Yrs) | Reading Age (Yrs) | Arithmetic Age (Yrs) | Spelling Age (Yrs) | Writing Age (Yrs) | Chronological Age | Mental Age | I. Q. | Comp. Age | Read. Age | Arith. Age | Spel. Age | Writ. Age | E. A. | E. P. | A. P. | Ill. Health. | Remarks |
|--------|--------------|-------|------------|-------|-----------------------|-----------------------|-------------------|----------------------|--------------------|-------------------|-------------------|------------|-------|-----------|-----------|------------|-----------|-----------|-------|-------|-------|--------------|---------|
|        | Yrs.         | Mths. | Yrs.       | Mths. |                       |                       |                   |                      |                    |                   |                   |            |       |           |           |            |           |           |       |       |       |              |         |
| 1.     | 12           | 7     | 10         | 5     | 82                    | 9                     | 10.8              | 11.5                 | 10.7               | 14                | 11.2              | 88         | 107.  |           |           |            |           |           |       |       |       |              |         |
| 2.     | 13           | 10    | 10         | 9     | 77                    | 10                    | 10.5              | 11.9                 | 10.3               | 13                | 11.1              | 75         | 103.  |           |           |            |           |           |       |       |       |              |         |
| 3.     | 12           | 7     | 10         | 5     | 82                    | 8                     | 9.9               | 12                   | 11                 | 13                | 10.8              | 85         | 102.  |           |           |            |           |           |       |       |       |              |         |
| 4.     | 13           | 5     | 11         | 0     | 82                    | 9                     | 11.6              | 10.5                 | 10.9               | 14                | 11.2              | 83         | 101.  |           |           |            |           |           |       |       |       |              |         |
| 5.     | 14           | 8     | 12         | 2     | 83                    | 10                    | 12.8              | 11.3                 | 14                 | 14                | 12.4              | 84         | 101.  |           |           |            |           |           |       |       |       |              |         |
| 6.     | 14           | 8     | 12         | 3     | 83                    | 11                    | 11.4              | 12.7                 | 14                 | 14                | 12.4              | 84         | 100.  |           |           |            |           |           |       |       |       |              |         |
| 7.     | 13           | 9     | 10         | 8     | 77                    | 8                     | 9.9               | 10.9                 | 11.5               | 14                | 10.8              | 77         | 100.  |           |           |            |           |           |       |       |       |              |         |
| 8.     | 12           | 10    | 10         | 5     | 81                    | 10                    | 11                | 10.                  | 10.5               | 11                | 10.5              | 81         | 100.  |           |           |            |           |           |       |       |       |              |         |
| 9.     | 12           | 11    | 10         | 9     | 83                    | 10                    | 10.1              | 10.8                 | 10.7               | 13                | 10.9              | 83         | 100.  |           |           |            |           |           |       |       |       |              |         |
| 10.    | 12           | 6     | 9          | 8     | 77                    | 7                     | 8.5               | 8.5                  | 10.9               | 14                | 9.8               | 77         | 100.  |           |           |            |           |           |       |       |       |              |         |
| 11.    | 12           | 7     | 12         | 3     | 97                    | 10                    | 9.8               | 11                   | 13                 | 14                | 11.6              | 90         | 93.   |           |           |            |           |           |       |       |       |              |         |
| 12.    | 12           | 9     | 11         | 9     | 92                    | 10                    | 10.1              | 9.2                  | 10.6               | 14                | 10.8              | 83         | 90.   |           |           |            |           |           |       |       |       |              |         |
| 13.    | 13           | 1     | 13         | 1     | 100                   | 11                    | 11.5              | 11.3                 | 14                 | 14                | 12.3              | 93         | 93.   |           |           |            |           |           |       |       |       |              |         |
| 14.    | 12           | 6     | 12         | 8     | 101                   | 10                    | 11.1              | 11.9                 | 13                 | 13                | 11.8              | 93         | 92.   |           |           |            |           |           |       |       |       |              |         |
| 15.    | 12           | 9     | 13         | 5     | 105                   | 11                    | 10.9              | 12                   | 11.1               | 14                | 11.8              | 91         | 87.   |           |           |            |           |           |       |       |       |              |         |
| 16.    | 12           | 11    | 11         | 8     | 90                    | 9                     | 9.9               | 10.8                 | 10.9               | 11                | 10.3              | 79         | 87.   |           |           |            |           |           |       |       |       |              |         |
| 17.    | 13           | 4     | 13         | 4     | 100                   | 10                    | 11.1              | 10.9                 | 11.9               | 13                | 11.3              | 84         | 84.   |           |           |            |           |           |       |       |       |              |         |
| 18./   |              |       |            |       |                       |                       |                   |                      |                    |                   |                   |            |       |           |           |            |           |           |       |       |       |              |         |



School Q. Physical Mental Age Yrs. mths Yrs. mths. Quotient Age Yrs. mths. Quotient Age Yrs. mths. Quotient Age Yrs. mths. Quotient Age Yrs. mths. Quotient Age Yrs. mths. Quotient Age Yrs. mths. Quotient

| PUPIL. | 12 | 7                 | 9          | 0    | 71    | 10    | 11     | 8.5   | 9.7   | 13   | 10.4 | 82   | 114. |
|--------|----|-------------------|------------|------|-------|-------|--------|-------|-------|------|------|------|------|
| 1.     | 12 | 7                 | 9          | 0    | 71    | 10    | 11     | 8.5   | 9.7   | 13   | 10.4 | 82   | 114. |
| 2.     | 12 | 9                 | 10         | 4    | 80    | 9     | 10.8   | 10.7  | 11    | 14   | 11.1 | 86   | 107. |
| 3.     | 12 | 5                 | 10         | 1    | 81    | 9     | 11     | 9.1   | 10.8  | 13   | 10.5 | 83   | 103. |
| 4.     | 13 | 1                 | 10         | 9    | 76    | 9     | 10     | 11    | 11.2  | 14   | 11   | 84   | 102. |
| 5.     | 12 | 10                | 10         | 5    | 80    | 10    | 10.3   | 9.9   | 10    | 13   | 10.6 | 81   | 101. |
| 6.     | 13 | 3                 | 11         | 0    | 83    | 11    | 10.1   | 10.6  | 10.5  | 14   | 11.2 | 84   | 101. |
| 7.     | 13 | 3                 | 9          | 1    | 68    | 7     | 9.9    | 8.4   | 7.9   | 11   | 8.8  | 65   | 94.  |
| 8.     | 13 | 11                | 11         | 4    | 82    | 9     | 10.9   | 10.7  | 11    | 12   | 10.7 | 76   | 93.  |
| 9.     | 12 | 1                 | 12         | 5    | 103   | 11    | 12     | 10.5  | 9.9   | 14   | 11.5 | 94   | 92.  |
| 10.    | 12 | 0                 | 12         | 4    | 103   | 10    | 11.4   | 12.6  | 9.6   | 14   | 11.4 | 94   | 92.  |
| 11.    | 13 | 2                 | 11         | 5    | 87    | 9     | 12     | 9.8   | 10    | 13   | 10.8 | 81   | 92.  |
| 12.    | 12 | 5                 | 11         | 1    | 90    | 8     | 10.1   | 10.6  | 10.9  | 12   | 10   | 80   | 90.  |
| 13.    | 13 | 6                 | 12         | 1    | 90    | 10    | 12.4   | 9.4   | 10    | 13   | 11   | 80   | 90.  |
| 14.    | 13 | 7                 | 13         | 3    | 98    | 10    | 12.1   | 11    | 13    | 14   | 12   | 88   | 90.  |
| 15.    | 12 | 4                 | 13         | 11   | 113   | 12    | 14     | 10.6  | 12    | 14   | 12.5 | 101  | 90.  |
| 16.    | 12 | 7                 | 11         | 8    | 93    | 11    | 9.7    | 10    | 10    | 13   | 10.7 | 84   | 90.  |
| 17.    | 12 | 6                 | 12         | 8    | 101   | 12    | 10.7   | 11.8  | 10    | 12   | 11.3 | 90   | 89.  |
| 18.    | 12 | 11                | 13         | 3    | 103   | 10    | 12     | 12.2  | 12    | 14   | 11.9 | 91   | 88   |
| 19/    |    | Chronological Age | Mental Age | I.Q. | Comp. | Read. | Arith. | Spel. | Dict. | E.A. | E.P. | A.P. |      |

how I. Q.  
I. Q. below normal.  
illness.



# Notes on School A

NOTE:- These 26 children were in an ordinary class, the total number of children in the class being 50. The most interesting case is without doubt No.26. This boy gave a considerable amount of trouble to the teachers, especially in his first years in school. On his first admission to school, nearly seven years previously, his mother confessed that she could not control him. His behaviour considerably improved as he grew older, but his school work was never considered good enough for his capacity. His response to these scholastic tests came as a considerable surprise to the Headmaster of the school and <sup>to</sup> the boy's teacher, who would have rated his educational age below eleven years. In this particular instance, the tests had a very stimulating effect. He enjoyed the Northumberland Mental Tests so much that he asked for others like it, and immediately following the battery of tests given, a distinct effort to improve in school work was shown by him. The boy's career in school was followed up, and he is now doing good work in a secondary school, gaining distinction in languages, and holding his own in mathematics.

I.Q. 131.  
A.P. 78.  
Chron. Age.  
11 yrs 10m.

Q. 131  
A. 12y 10m  
A. 15y 6m  
Q. 78.

E.A.  
= 12 yrs?

*A similar* *Similar case.*  
~~Another case of this kind~~ has been found by me in a

lay  
se  
in  
Special  
school

class, held at a Special School, for boys who stammer. The Head of the school and the teacher of this class maintained that the boy was mentally Defective, showing an I.Q. of about 60, found from one or more applications of the Terman Tests. At this time Dr. Drever's Scale of Tests for the Deaf was not yet demonstrated, and resort was made to the Pintner-Paterson scale of Performance Tests. In this instance the actual performance of the boy was relatively unimportant <sup>compared</sup> to the variety of other things discovered. He tackled the work timidly at first, using his left hand only, but when he completed the first two tests successfully, threw his heart and soul into the <sup>problems.</sup> ~~work.~~ His eagerness and delight were good to see and he obviously /



obviously seemed to feel he was achieving good results. His performance was certainly not that of a Mentally Defective, although it was slightly below average. Shortly after this performance - testing it was reported, that progress in school work was being achieved, "purely as a result of the stimulation given by the special picture-tests" This boy has now returned to the ordinary school from the Special School, and is a member of a Tutorial class, in which he is making satisfactory progress. The boy's parents, who were extremely anxious about his slow scholastic development, stated that his attitude to school was quite changed, after he had acquitted himself well, in a special examination given by "a new school-nurse".

In these two instances, the only remedial treatment necessary, was actually found in the diagnostic instruments themselves. The battery of tests in both cases <sup>stirred</sup> proved latent talents, and, for, I believe, the first time in these two boys' careers, they experienced the keen joy and satisfaction of surmounting with success, obstacles and difficulties in school.

A.Q. 92:    I.Q. 88.

I.Q. 88

A.Q. 92.

No. 14 was physically strong and was seldom absent on account of illness. Her home environment was deplorable as she lived in a room with her mother and several illegitimate children belonging to her mother, all of whom had different fathers. The mother did not know whom this child's father was. One of her children stayed with the grandmother and this child, in the infant department of the school, was also failing to make satisfactory progress.

School. B.

Pupil/

SCHOOL D.

Nos. 9. 12. 13 have not been included in the Investigation as they are normal in intelligence and do quite good school work.

(no.19). C.A. = 13yrs 10mths : M.A. = 10yrs 10mths. I.Q. = 78 : A.Q. = 74

No.19 is a bright-eyed, merry boy, robust in appearance, the son of a travelling gipsy and has never been longer than a few weeks in one school in his life. He was not enrolled in any school till the age of 7 years. His performance on the intelligence test will also be influenced by this lack of proper schooling.

Nos. 23. 24. 25. 28 and 29 come from poor miserable homes. No.23 was particularly ill-nourished and was given free soup at school, as the Teacher was convinced she showed signs of starvation. (I.Q. 90)

(no.27) C.A. = 13yrs 9mths. M.A. = 12yrs 4mths. I.Q. = 90 : A.Q. = 86.

No.27 suffers from defective vision uncorrected by glasses. On enquiry it was found that he had been seen by the <sup>Authority's</sup> ~~Anthony's~~ specialist and glasses had been prescribed. The parents showed no sign of providing the glasses at a reduced cost, and, when sent for, the Mother explained that the Father would never allow his son to wear such a thing. When the Mother was shown how seriously the boy was handicapped by the Father's prejudice, she paid for the glasses on the condition that they were used only in school, and were left there at nights. This was done although the Headmaster would have preferred the Father to have been told about the arrangement. The boy used the glasses for a few weeks with benefit, until the fact was discovered by the Father, who arrived at school in a furious temper, demanded the glasses, and smashed them in front of the Headmaster. This case has been fully given ~~fully~~ because this attitude on the part of a parent is not a very uncommon/

uncommon one, although the parents are usually more self-controlled.

C.A. = 12 yrs 7 mths. M.A. = 13 yrs 6 mths. I.Q. = 107 A.Q. = 91.

No. 22 is an erratic girl whose work cannot be depended on. Her parents led an unhappy life together and now are separated.

C.A. = 12 yrs. M.A. = 9 yrs I.Q. = 75. A.Q. = 92

No. 20 is quite seriously retarded in general intelligence. His auditory memory (immediate) for syllables and number is below the level of a six year old.

#### SCHOOL E.

#### School E.

The pupils of this "backward" class in school E. had been collected, ten months previous to the testing, from various senior classes, where their work was unsatisfactory, and for that period, they had been taught by an experienced teacher who had a particular liking for a class such as this.

C.A. = 10 yrs 9 mths. M.A. = 11 yrs 9 mths. I.Q. 109. A.Q. 106 (omitted)

Pupil No. 6 had been, for years, rather notorious in school. She is a pretty girl with a rather affected manner, and, at the time I saw her, was perhaps more daintily dressed than the other members of her class, who belong to fairly comfortable homes. From the first this child demanded considerably more notice than did the other children, and the Infant Mistress was convinced that she was exceptionally spoiled at home, although she was not an only child. Later on this tendency expressed itself in the child becoming argumentative in the class, and so causing considerable annoyance and vexation to her teachers. Until this child was placed in the Tutorial class, her work was unsatisfactory in all scholastic subjects. When she was aged 8, ~~At the age of 8~~ her father, who had occupied a position of trust, was found to have speculated with money belonging to his Employers, and had to meet and suffer the inevitable consequences/

consequences and disgrace. During this trying time the Mother and children went to reside in England, where for some months this child attended a small private school. After an absence of 9 months, Pupil No.6 returned to School E. On her return the child appears to have been on the defensive. She adopted a still more superior attitude, which made her very unpopular with her classmates. Her manner was also such as made it difficult for teachers to like her. Her scholastic performance was inferior to the class standard, and, on a good many occasions, she was found cheating at tests. To solve this difficulty she was placed about the age of 11 in the adjustment class, the results of which are given above. Here she developed an extraordinarily keen interest in, and liking for, composition, under the enthusiastic guidance of one of the finest teachers in the country. Her arithmetic and spelling also made rapid progress, although her work was often erratic. She did not reform wholly, or immediately, as regards her tendency to cheating. On the few occasions this occurred, and was detected, in the Backward class, the silent disapproval and deep disappointment shown by her teacher caused her violent agony of grief, and her wild longing to find favour in the Teacher's eyes spurred her on to overcome her scholastic difficulties, once the paroxysms of grief had subsided. The difficulty the teacher was faced with, was that she could find little help in the home. The Mother appeared to care for dress, and an affected accent, more than <sup>for</sup> high ideals of conduct, and it would be difficult to approach the father with advice about the upbringing of his child. This little girl qualified before the age of 12 years and was sent to a Secondary School. The bond established between her and the "Adjustment" Teacher was no superficial one, because the child later visited School E at regular intervals, to <sup>to her former teacher</sup> report on her progress and doings. ~~this~~ <sup>this</sup> firm friendship between teacher and pupil has, for me, rather a pathetic ending, because, while writing about this case, two letters have been delivered to me - one in the welcome, well-known handwriting of

~~I have before me a letter from the "Adjustment" Teacher,~~  
 saying how pleased she is to see Elsa from time to time,  
 and how she hopes to keep in touch with her throughout  
 her Secondary Course. The other letter is a curt intimation  
 of the Teacher's death. Although the child was in the  
 Tutorial class at the time of the Tests, she has not been  
 included in the results, as she was pronounced no longer  
 backward, but "cured", and fit to proceed to more advanced  
 study.

C.A. = 12 yrs 2 mths. M.A. = 12 yrs 2 mths. I.Q. 100. A.Q. 105 (omitted)  
 No. 7 was, and is, a rather delicate and painstaking  
 child who, through health reasons, was absent frequently  
 throughout her school career. Although this irregularity  
 of attendance did not affect her school work seriously the  
 child became worried and anxious when, for example, she found  
 on her return to school that her schoolmates were tackling  
 new types of sums, and so, with the full consent of the child's  
 parents, she was removed into the Tutorial class where she  
 often did individual work, and did not feel that she was  
 suffering from a handicap.

None of the members of this class did quite so  
 well in the reading test as their Teacher had expected  
 (note No. 22). This fact convinced the teacher that a great  
 deal more silent reading ought to be done in a class of this  
 kind, than was done, and that much more individual work should  
 be given than had been attempted during that session. Although  
 the Northumberland Mental Test is also a Reading Test, when  
 doing it the child is not flurried through being rushed for  
 time. Rarely does the slowest child tested fail to complete  
 all he is capable of solving, and it is quite common for children  
 to finish, and be quite satisfied with what they have done, when  
 only half the given time has elapsed. On the other hand the

Reading  
 Age  
 8 yrs  
 C.A. = 10.8  
 yrs.

= 10.8  
 Age  
 = 8 yrs

Monroe Reading Test is only a four minute one, and a child trained to go carefully and slowly through what he has done, in order to see if it is correct, sometimes fails to do himself justice in the Test. The test is a very valuable one, and was very greatly appreciated by teachers, many of whom had thought reading was only of one kind — oral reading — and, the more slowly it was done, the better was everyone pleased. It came as a surprise to some teachers, accustomed to say — "Read this over very slowly and carefully", to hear the instructions, "Work rapidly, but remember that your answers must be right in order to count". Another teacher, who confidently said that her best group of children were all at the same stage at reading, was surprised to find that one of them finished the test correctly in three minutes, instead of four, and looked quite disgusted at having such a babyish piece of work set before her. On investigation a great many interesting facts were discovered about her home reading, which had not previously been brought to light, and, after that, the child was not troubled with the ordeal of the oral reading lesson, except occasionally, from the point of view of elocution.

Pupils No. 1, 2, 3, 4, 5, 9, 12, 13, 14, 15, 16, 17, 18, and 21 were not seriously backward, <sup>although</sup> when they were placed in the Tutorial class. Their work was not up to the standard expected. There was a general carelessness and in some cases a specific weakness though not an outstandingly serious one. They all profited greatly by the months spent in the Tutorial class, and not only did they do homework, but went to school voluntarily at 9 a.m., instead of at 9.30, for an extra half-hour's tuition.

Since, by the help of extra coaching and teaching in the Tutorial class, these children's work was brought up

to a normal standard for their age, they have been omitted from this investigation, as they were not actually "backward" at the time they were examined.

C.A. 12 yrs 10 mths. M.A = 11 yrs 6 mths. I.Q. 90. A.Q. 91.  
 No. 28 is a bright-eyed mischievous boy whose

10.5.  
 82

Father has no control over him. As his mother is dead and the house is superintended by a succession of housekeepers, the child is at a disadvantage compared to the children around him. His holidays are spent in driving round in funeral carriages and motors owned by his father, and the boy is very proud of the fact that he enjoys riding in a hearse. Until just before he was tested he had no idea at all of number. Now he is making great progress, and although he will always be slow at Arithmetic, he will not be "deficient" at it. (Teacher's report). His work could be better, said this teacher, if he was sent to bed at a proper hour at night, but as he spends hours playing and roaming about in the evenings, he is thoroughly tired out through the day and unfit to concentrate. This is hardly the child's fault, as the house is locked often, and he does not get admission till late. The boy requires tactful handling and the utmost of patience. On one occasion just before the class was tested, and while the Teacher was completing an oral lesson in Geography, he very quietly stood up and in a clear firm voice said to the teacher, who had made a remark about the size of a river in Africa, — "I am sorry but you are wrong". He was quite unexcited, but quietly determined in his manner, and remained standing quite politely, waiting for the consequences of his unusual behaviour. The Teacher asked him to go outside with her, where she pointed out to him that he had been guilty of very great rudeness, and that no gentleman ever did such a thing as contradict a lady, especially one teaching him. The boy apologised, and there the matter ended. This incident was the only interesting one I witnessed, though/

though his behaviour was frequently unusual. This boy has been classed as being backward owing to temperamental factors, though his backwardness might more truly be said to be the result of his unfortunate home circumstances.

C.A. = 14 yrs 2 mths. M.A. = 15 yrs I.Q. = 106 A.Q. = 85

No.34 is a "temperamental" girl who works by fits and starts and who can never be relied upon to do her best. She has well-to-do parents and enjoys a fair amount of social life. She is an only child and her people wish her to remain at home when she leaves school.

100  
2 11  
5 1111  
3 111  

---

10.

Take 7 pencils away from  
3 pencils.  
XXXXXXXX  

---

Answer is 4

The next step taken was to hold up both of the tables in concrete and write them out. Reading and writing this counting by three was done on the top of the table with cardboard coins, the child was asked to count the pennies and put down a card to mark the end of the count. As she was supplied with her own set of cards to use as a guide and to prevent any confusion, she was able to do this very quickly and with little error. She was very anxious to do the work and anticipated the end of the work with the same interest as she could be expected to show.



SCHOOL G. I.Q. 74 A.Q. 93

no 31. § (2). In addition to this boy's retardation being the result of low general intelligence he suffers from a very serious stammer. Nos. 30 and 33 have I.Qs. below 85.

C.A. 12 yrs 5 months : M.A. = 11 yrs 5 mths. I.Q. 92. A.Q. 103.

no 34. § (3). This girl is good at all her school work except one subject. Her scholastic retardation is the result of a specific weakness in arithmetic. When I saw her first about the age of eleven, she could not tell correctly how many halfpennies there were in a penny and a halfpenny, nor could she do correctly a simple sum, involving the use of the four fundamental rules. She was at once given concrete material to work with, and with the aid of pretty coloured counters, added and subtracted. She could recognise the number symbols without difficulty and knew their meaning. After several days with this work she did several sums by means of drawing strokes and counting them individually:-

ADD.  
 2 11  
 5 11111  
 3 111

Take 7 Pencils away from  
 9 Pencils.

XXXXXXXX11

10.

Answer = 2

The next step taken was to build up some of the tables in concrete and write them out. Having mastered a little counting by these means, and by the help of playing shop with cardboard coins, the child was eager to commence multiplication, and put down a sum to show the kind she wanted. As she was supplied with her set of tables to act as a guide, and to prevent her establishing wrong associations, she managed the simple multiplication sums with credit, and without being shown how to "carry" figures. The next achievement she was anxious to master was multiplication by two figures which she was quite convinced she could do. Thus:-

(Multiply)/

(Multiply)            3 4 6 1 2 3

$$\begin{array}{r}
 34. \\
 \hline
 13443872 \\
 107846 \\
 \hline
 \end{array}$$

She was carefully observed and was allowed to work alone this first sum by two figures although I saw at once where her error lay. At a first glance it seems as if the answer for the line multiplied by four was the result of the child not knowing four times table. This was not so. She was using her tables and using them correctly from her own point of view. Her method was this:-

4 times 3 are 12 (put down the 2).

3 times 4 are 6 and 1 are 7,

4 times 2 are 8,

3 times 1 are 3,

4 times 6 are 24 (put down the 4).

3 times 4 are twelve and 2 are 14 (put down the 4).

4 times 3 are 12 and 1 are 13.

The child now proceeded to the next line without any hesitation and quite proud of her performance:-

3 times 2 are 6"(put it a place in because you don't say 3 x 3 are 9, put down the 9, and so you have a space with nothing in it)".

4 times 1 are 4

3 " 6 " 18. (put down the 8)

4 " 4 " 16. ( and 1 are 17 )

3 " 3 " 9 ( and 1 are 10 )

When first seen the child was in a large class and the Teacher could not give her the extra attention she required. How she did not even master the method of multi-

plication/

plication by two figures in a class lesson, I cannot yet understand. In the same way, in addition, in testing her I wrote down:-

|                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|
| <u>ADD</u>                    | <u>ADD</u>                    | <u>ADD.</u>                   |
| 5                             | 3                             | 4                             |
| <u>2</u>                      | <u>4</u>                      | <u>2</u>                      |
| Child's<br>Answer. <u>52.</u> | Child's<br>Answer. <u>34.</u> | Child's<br>Answer. <u>42.</u> |

and received the enlightening answers noted above. She had to be shown very carefully how putting 5 and 2 together made 7. The idea of the putting together of what the two number symbols represented, was a brilliant and happy solution of a problem that had been unsolved by her before. At the age of eleven in a normal class children are not given such simple problems to do, and no doubt the Teacher had no idea the defect in arithmetic was so deep-rooted as it was. The child must have left the infant room unable to add together two simple numbers, or even to add on one, and at each stage was left further and further behind. It was argued that her composition, reading, spelling and writing were good, why should she be kept back simply for Arithmetic? Certainly she should have been promoted, but at the Arithmetic period she should have sought more suitable surroundings in a younger class. Since this work was done, there are more teachers doing tutorial work in schools — teaching classes or groups of children who are not deriving benefit from the ordinary class conditions. Thus, in many schools now, a child like this in the Infant, Junior or Senior Department would receive extra attention for her weak subject for a certain period per day. After over a year's not too regular coaching, this girl had scores corresponding to an arithmetic age of 7 years 5 months on the (Fundamentals) Test.

C. A. = 11 yrs 7 mths. I. Q. 88. A. Q. 118.

§ (1). Pupil No. 4 slightly retarded in intelligence, also ✓

also suffered from a rather serious weakness in Arithmetic. The Headmaster of the school was convinced that the Arithmetic of the whole school was not up to a normal standard compared to the rest of the County, and since he had been appointed to School G three months previous to the testing, he had made efforts to stimulate the work in that subject. Although many of the pupils in the lists above had made vast improvement in Composition, Reading and Spelling, they were not, in his opinion, yet sufficiently masters of problem work and more complex mechanical arithmetic than embraced in Burt's (Fundamentals) Tests to be considered normal. This opinion was verified by His Majesty's Inspector.

C. A. = 13 yrs 8 mths. M. A. = 9 yrs 4 mths I. Q. = 68 A. Q. = 125.

While Pupil 1 is also low in the Arithmetic Age, his performance on Arithmetic is nearly at the level of his performance on the Intelligence Test. He was retested with the Binet Tests, and was found to have an I. Q. of 72. (Jerma)

Nos. 6, 7, 8, 13, 14, 17, 18, 20, 22, 23, 25, 27, 31, and 33 show a poorer performance on Arithmetic than on their other school subjects. Of these pupils 27 and 14 are normal in intelligence and are roughly two years retarded in arithmetic. Pupil No. 24 is poorer at reading by the test result but the teacher accounts for this and for the fairly low score on the Arithmetic Test by the fact that he is nervous and does not do himself justice in a speed test.

After a discussion with the Headmaster, pupils 12, 13, 14, 24 and 26, 27 and 28 were considered not to deviate sufficiently from the normal sufficiently to be called backward, and so they were omitted from the investigation. They were originally included in the testing not because they were labelled backward, but more because the Headmaster wanted an independent estimate of their capacities.

SCHOOL.J. C. A. = 13yrs 5mths. M. A. = 9yrs: I. Q. = 67, A. Q. = 98.

no 5. § This boy lives alone with an elder brother in a small flat in a poor part of the town. His mother and father are dead and this leaves him in charge of, and supported by, this elder brother who is an unskilled labourer. There is no housekeeper to attend to things in the house, so the two boys have to share the work and cooking. The boy is naturally neglected and ill-attended to, as well as being ill-nourished. He attends school regularly, but keeps late hours at night and has questionable companions. He was tested with the Binet Tests and was found to have an I.Q. below 70.

... so great that steps were taken to identify her and re-  
... consider her to be a normal child. A report was received from  
... this special school stating that as a result of the individual  
... methods of instruction given her, and of the time spent for  
... observing her at work she had attained sufficient scholastic  
... work to enable her to return to an ordinary class. The  
... teacher who received her at the ordinary school absolutely  
... agreed with the report from the special school and was delighted  
... with the progress achieved by the special school and the quality  
... of the girl's work. Her handwriting is very good and her  
... general tests were applied and it was found that her I.Q. reached  
... above 70. When first examined by me (1925) she was at the  
... age of 13 years, in a class of children aged 10, and was doing  
... good average work. Her compositions consisted of short, simple,  
... but correct sentences. They were unimaginative, a trifle dull,  
... and extremely ordinary, but they carried spelling, punctuation,  
... capital letters, and grammatical accuracy which would  
... have brought relief to many a harassed teacher of a large class.  
... She could write a delightful letter to a friend or relative -  
... again an unimpaired performance - but again with something  
... rather attractive in its child-like presentation. Her school  
... work in arithmetic was particularly accurate if somewhat

SCHOOL K.

A de-certified case.C.A. = 13 yrs 2 m. M.A. = 9 yrs 6 mths. I.Q. = 72. A.Q. 119.

Pupil 1 three years previously had been sent to a Special School owing to being unable to profit by the instructions of the ordinary school. She spent two years there and was taught by purely individual methods. She rapidly acquired a great interest in and liking for reading, and was fascinated by the little problem cards in arithmetic, given when she had mastered the art of reading them. Her visual and motor memory being excellent, spelling presented no serious difficulty to her, and her educational development was so great that steps were taken to decertify her and re-transfer her to her former school. A report was received from this special school stating that, as a result of the individual methods of instruction given her, and of the time found for observing her at work, she had mastered sufficient scholastic work to enable her to return to an ordinary class. The teacher who received her in the ordinary school absolutely agreed with the report from the special school, and was delighted with the progress achieved in the special school and the quality of the girl's work, in consideration of the mental capacity. Several tests were applied, and in no case did the I.Q. reach above 74. When first examined by me (1926) she was at the age of 13 years, in a class of children aged 10, and was doing good average work. Her compositions consisted of short, simple, but correct sentences. They were unimaginative, a trifle dull, and extremely ordinary, but their correct spelling, pleasing appearance, unvarying simplicity, and grammatical accuracy would have brought relief to many a harassed teacher of a large class. She could write a delightful letter to a friend or relative — again an uninspired performance — but again with something rather attractive in its child-like presentation. Her mechanical work in arithmetic was particularly accurate, if somewhat slow/

slow, and she was quite an adept at "Bills". In hand work of all kinds she was easily the best of her class. In appearance the girl was not robust, and she was obviously from a fairly poor home. Her manner was quiet and gentle, She was a general favourite with the 10 year olds of her class, and was very happy in her school life.

C.A. = 13 yrs 9 mths. M.A = 9 yrs + 8 yrs 10 mths respectively. I.Qs. 65 + 64.

Twin boys No. 22 and 23 are twin brothers from a rather poor home. At the <sup>mature</sup> age of 10 they were reported to the Medical Officer as alleged defective, but as the parents were unwilling they should be sent to a special school the matter was dropped. Neither can read the simplest word but <sup>they</sup> are making some slight headway with counting. They were both of course tested alone, one immediately after the other, and their similarity was so great I could not see any difference between them. Both were confused when asked to name various letters, and gave the wrong response, and neither could associate the sound of a letter with its name.

When the first boy was asked to write down the word "cat" he wrote "cea". His brother wrote "kam". For "box" the first wrote "ace" and for "up", "anr". The brother spelt "and" — "mto". Both had extraordinarily poor immediate memory for sound, and showed no sign of deafness. Many school children with poor immediate memory for syllables and numbers are found, on testing with whispered commands, and with a watch at varying distances from the ear, to suffer from deafness, but there was no sign of such with these two boys. On the other hand their visual memory was excellent, and probably the best way for them to learn reading and spelling would be by a look-and-say method, such as the Decroly Method, which is much more suitable for many children than the phonetic system.

Comparison between the twin boys and the boys at Broadfield.  
These two boys reminded me to a great extent of

some of the boys at Broadfield Institution, Port-Glasgow, <sup>wherein</sup> *I have had valuable teaching experience.* Broadfield ~~which~~ is a certified Institution under the Paisley District Board of Control, and was opened in August 1925 for "ineducable" boys. Most of the ~~se~~ boys have been in an ordinary school, and in a special school later, from which they were dismissed through being unable to profit by the education given. There are, of course, some who have been to no school at all, and who, later, will be detained in an asylum. It was thought, however, by members of the Board of Control that the higher grade cases in the institution ought to be given some scholastic instruction, and, accordingly, an evening class was commenced in January, 1926, one teacher teaching about 8 boys, on Tuesdays and Thursdays from 6 p.m. - 7.30 p.m. Throughout the day the boys work outside in the grounds and fields belonging to the Colony, which has a fine healthy situation. Among the 8 boys who composed the class, 7 could not read or write, spell or count, the 8th could read with excellent speed and comprehension. The boys were all anxious to learn, and one declared he had been in a "job", and had lost it through not being able to sign his name. They all started with the idea that they were capable of reading and counting like other boys, for once all scholastic instruction had been removed they felt a grievance, and a wish to be like normal people. The class was of course conducted on purely individual lines. The youngest boy was aged 10, and the oldest was two years older than the teacher. Before the experiment had gone very far, each member of the class discovered he had a particular gift which distinguished him from other people and the oldest boy was so proud of his fine writing, the lack of which had lost him his job, that he was quite unashamed of the fact that the youngest could count better than he. But once the writing was mastered, with spelling and reading in its train, his counting made rapid strides, till it seemed as if a block had been removed which had inhibited progress.

This/



This boy was the Poultry-man of the Institution or Farm Colony, and I was fortunate to find an excellent book on poultry, not a childish book, but one that, while easy and delightful, had a certain appealing dignity about it, to a man who was thoroughly keen on his work among the Institution hens. He greedily absorbed paragraph after paragraph, and having learnt to read a passage to his satisfaction, took additional pleasure <sup>in</sup> ~~of~~ writing it out.

I find it quite beyond me to explain this boy's progress. It was all the result of a felt need on his own part. I, as a teacher, played little part, except being present in the classroom, and explaining a difficulty when consulted. This was one of the boys who specially asked the Matron's permission to be allowed to attend school, once he heard satisfactory reports from the younger boys. He was considered too old by the members. If I had commenced with the phonetic system, I'm sure he would not be able to read yet, and that the analysing of each word into its separate sounds would have caused him great irritation. His report from the Special School showed him to be moody, irritated, and on the defensive, and as a result he was kept constantly at rug-making, which he loathed. I am glad to say that the Parish Council were so pleased with this boy's progress that they found him another 'job', in which he is doing well, and is happy. It may be interesting to know that the Poultry book, belonging to the Renfrewshire Education Authority and kindly lent by an interested Headmaster, has been missing from the school since William left to earn his living.

This is by no means the only one of the seven boys who has made good progress, and the strange thing, in reading, is that the majority recognise the words much more easily as wholes, than <sup>by</sup> analysing the words into various sounds, and integrating the/

the sounds. In teaching the boys, further, I have been again and again amazed at the amount of help they give me as regards their best method of learning. It is quite common for one to say something like this - "Stewart, (the boy who could read before he came to Broadfield) told me what this word is, teacher; if you write it in my book three or four times, I'll go over it, and then write it alone. After that, I will hunt for it in the picture books on the shelf". Again another boy of 11 years often <sup>comes</sup> came to the school-room crying enthusiastically, "Teacher, I want to learn lots of new words tonight. Show me Lion, Tiger, Elephant, Camel, &c." One boy who is now a good reader, comparatively speaking, has come to some idea of the sounds owing, I think, to the fact that he had to learn to write down words, as he was very anxious to write a letter home to his mother. The sounds are here secondary, and are deduced by the boy from the words he knows.

One young man, a so-called non-reader, hated reading so much that I did not bother him with it for a year, and he now sometimes voluntarily selects reading material and occupies himself with that. All the words he has mastered up till now are look-and-say words. He has excellent visual discrimination and good motor memory, and as he has been gradually made to see that he can read, if he wants to, I'm quite sure he will do well later on.

These twin brothers in the ordinary school were thus inferior in reading and spelling to certain boys about the same age who are being given some scholastic instruction in a certified institution. I have a strong suspicion, too, that the twins were difficult behaviour cases in the ordinary school, but no definite report on this was given. It must be kept in mind, however, that the regularity of Institution life, the good food, fresh air, abundant rest, and bright environment, would have/

have a very stimulating effect upon the boys, and while progress was nil under the poor, dull conditions of their home environment, with the change of environment and improved physical health, progress was possible.

*C. A. = 14 yrs 4 m. M. A. 8 yrs 4 m. I. Q. 58. A. Q. 78.*  
 no 24 § (3). This boy was seen by me for the first time two days before he finally left school. The Headmaster was convinced he was not Mentally Defective, as he was bright and intelligent to talk to, and could be trusted to deliver an important message with the greatest care. The Headmaster said his peculiarity was not one of low general intelligence, "but consisted of a psychological or physiological defect, for example, in the connection between the eye and the ear"

In reading the boy knew 3 two-letter words, and was approximately at the level of a seven year old in arithmetic. He had an astigmatism uncorrected by glasses. When asked about glasses he replied that he had had a pair, but only wore them for a day or two, as the boys laughed at him, and called him "goggles". When attempting to write "See the little boy" (Terman VIII. alt. 2), it was obvious that he suffered from what he called a "shaky" hand. The right hand shook so badly that it was almost impossible for him to complete what he was attempting to do. It looked like some form of writer's cramp, and was so serious I suggested using the left hand, and holding a soft pencil easily and without clutching it. He had never tried to write with the left hand before, but there was no indication of a shakiness when he tried it. This case recalled one at Broadfield Institution — the boy of excellent reading ability used to suffer from a similar peculiarity. He was sent to Dr. Henderson, of the Royal Mental Hospital, Glasgow, about March 1926, with a full report on his behaviour and family and educational history. This boy has an I.Q. of 84. He is said to/

to have a dangerous temper, and on one occasion in his childhood is alleged to have attempted to take the lives of the family, by turning on the gas when all were asleep. On other occasions he was found being cruel to smaller members of the household. He was unhappy at home, and under his step-mother's care, and was badly up against things before being removed to an institution. At the Royal Mental Hospital he was found to suffer from congenital syphilis, and since then he has been having regular and beneficial treatment. The boy can now write normally with pen or pencil.

Pupil No.24 in school K. was supersensitive about his hand shaking and about wearing glasses. While there is a retardation in general intelligence, there seem also to be emotional factors at work to account for some of the extreme retardation. Unfortunately, there was no opportunity of finding out any more about him, as he left school immediately.

on her way to the clinic for treatment, looking rather to right not left, an antenatal, instead of a joyous and free child. She lives alone with her father and a small child not yet school-age. The father gives both children breakfast in the morning, puts them on to the street, locks the house door, goes to work with the key in his pocket and returns after six or eight. The children apparently wander about until school time when the young one is left alone to roam here and on the streets. At noon a kind-hearted neighbour gives the little girl bread and fruit as well as milk and the older child gets some bread (1/2) at school. In spite of rain and cold these two children have to wait until their father returns at night. He has the reputation of being a very good man, when all but forgetting as the father of a very good child, and as a result several neighbours are very kind to them.

SCHOOL. L. I.Q. 95. A.Q. 73.

Age = 13yr 8hr. No. 11 is a French boy who has been staying with his parents in Scotland for two years previous to being examined.

C.A. = 13yr 1 month. M.A. = 10yr 1 mth. I.Q. = 82. A.Q. 78.

No. 10 takes fits and is consequently very irregular in her attendance. She is absent one day or so during ~~the~~ each week and for longer periods.

I.Q. 61. A.Q. 91.

No. 4 is a very pathetic case — a small, stunted girl, insufficiently clad, neglected and very dirty. She is never free from the irritation and pain from a trouble on her face and arms, which, though it sometimes lessens, rapidly becomes worse and, though apparently not infectious, must cause her great discomfort. She is emaciated, and is the very picture of hopelessness and misery. During the many days I spent at School L. I ~~had~~ never once <sup>saw</sup> seen this small careworn creature smile and often I have met her on the street, on her way to the Clinic for treatment, looking neither to right nor left, an automaton, instead of a joyous carefree child. She lives alone with her father and a small sister not yet school-age. The Father gives both children breakfast in the morning, puts them on to the street, locks the house door, goes to work with the key in his pocket and returns after six at night. The children, apparently, wander about until school time, when the younger one is left alone to amuse herself on the streets. At noon a kind-hearted neighbour gives the little girl bread or food of some kind and the elder child gets soup and bread (1½<sup>d</sup>) at school. In spite of rain and cold, these two children have to wait about, till their father's return at night. He has the reputation of entertaining women of bad reputation as his guests at different times, and as a result several unsuccessful attempts have been made to remove the children to a better environment.

I. Q. 98

A. Q. 77.

Pupil 12 is another pathetic case though in a different way. Her people are earnest parents, anxious to do the best for their family but they are in great poverty. The Father gave up a good position, joined up in 1914, and served in the forces until the conclusion of the War. On his return he found someone else satisfactorily filling his post, and, in despair of getting anything to do, he at last went to America. For some time he found employment with a substantial salary, but as this good fortune was followed by months of idleness, he was soon as desperate as before, and worked his passage home. This journey to America deprived him of an unemployment allowance, and the family of eight were practically in starvation, before Parish Relief was procured. No work has been obtained by the father yet. This girl, No. 12 obviously lacks proper nourishment, and, although otherwise carefully attended to at home, she has little energy to spend on her scholastic work and even on games, compared with well-fed rosy-cheeked children. The Binet tests were, in this case, used to determine the Mental Age. (Terman Revision)

I. Q. 98.

A. Q. 77.

No. 13 had just returned to school after a long and very serious illness, when the tests were given. She had been absent for a complete year and had orders from the Doctor to be very careful not to worry over her lessons, or excite herself on her return to school. Her father was killed in the War and her mother now goes out to clean offices to help to provide for her young family.

I. Q. 93.

A. Q. 80.

No. 14 had been operated on for tonsils and adenoids just before the testing. She was neglected in appearance and disgustingly dirty in spite of frequent complaints sent to the mother. The mother was careless and lazy, up-in-arms against any school nurse or teacher who suggested that the child was in/

in no fit condition to mix with clean children, but unwilling to keep the child properly. She forced this young girl to go with milk in the mornings, and made her work at night and at dinner time too, till this was stopped.

C.A = 14 yrs 3 mths. M.A = 11 yrs 6 mths I.Q = 80. A.Q. 87.  
Pupil No.15 who is below average in intelligence

has a miserable home environment. He also has a collection of unfamiliar words and nonsense syllables. His visual acuity, perception, imagery and immediate memory are weak for his mental level, but superior to his auditory perception and memory. His medical card indicates that he did not speak till the age of four years, and on that account was taken to a Doctor, whose advice was to give him plenty of time, and not to try to force him to speak. The doctor reported no physical defect, but there is no record of the child's response to any hearing tests. The boy's home was not the kind where his next minute wants would meet with immediate attention that he would not feel the need to speak. The conditions of his early childhood would be rather the reverse. In spite of the fact that no abnormality can be seen in the speaking apparatus, the boy speaks slowly, and with exact stammer, as if from an emotional cause. This is not a regular habit but an occasional occurrence. His pronunciation is somewhat slovenly and reveals in such spelling errors as "play that" for "played at". One of his most common errors is one of anticipation, e.g. "life" for "live".

C.A = 14 yrs 3 mths. M.A = 11 yrs 6 mths. I.Q = 80. A.Q. = 87.  
Pupil No. 23 is the youngest of a large family.

His father left shortly after his birth for America, and promptly forgot to send any financial help home. The mother consequently has had a struggle to keep the home together and to provide for her children and herself. At the time he was tested, this boy was reported as being shy and ill-tempered.

SCHOOL.M.

C.A. = 12 yrs 6 m. I.Q. = 100. A.Q. = 73.

Pupil No.26 is of normal intelligence, bright and obliging in his manner, and very popular with both pupils and teachers. His medical card indicates no sign of deafness at present, to account of his very apparent ~~sign of~~ weakness in spelling, which makes his composition also a collection of unfamiliar words and nonsense syllables. His visual acuity, perception, imagery and immediate memory <sup>are</sup> ~~is~~ weak for his mental level, but superior to his auditory perception and memory. His medical card indicates that he did not speak till the age of four years, and on that account was taken to a Doctor, whose advice was to give him plenty of time, and not to try to force him to speak. The doctor reported no physical defect, but there is no record of the child's response to any hearing tests. The boy's home was not the kind where his most minute wants would meet with such immediate attention that he would not feel the need to speak. The conditions of his early childhood would be rather the reverse. In spite of the fact that no abnormality can be seen in the speaking apparatus, the boy speaks slowly, and when excited stammers, as if from an emotional cause. This is not a regular habit but an occasional occurrence. His pronunciation is somewhat slovenly and results in such spelling errors as, "play that" for "played at" One of his most common errors is one of anticipation, e.g. "fife" for "life". The case of Tommy.

C.A. = 13 yrs 4 m. M.A. = 11 yrs 6 m. I.Q. = 86 E.A. = 9.1 A.Q. = 78

Pupil No.23 is the youngest of a large family.

His father left shortly after his birth for America, and promptly forgot to send any financial help home. The mother consequently has had a struggle to keep the home together and to provide for her children and herself. At the time he was tested, this boy was reported as being sulky and ill-tempered and /



and, to use his own expression, "fed-up". He would throw down his slate violently on the floor, and would refuse to do any work at all, if his sum were obstinate in working out correctly. His compositions varied from a mass of nonsense syllables ~~To~~ fairly good attempts, but if any criticism, kind or otherwise, was given, he would mutter under his breath "I'll tell my mother, wait till I get home and I'll tell my Mother". His case was so interesting that the mother was sent for. She was a clean, respectable woman, with a shawl instead of a coat, and was accompanied by a baby and a small boy, her grandchildren, who stayed with her. The grandchildren were in charge of the grandmother, as their mother was in a situation near at hand, and their father was in Australia. There were three grandchildren, the baby, the small boy, and a boy about the same age as Pupil No. 12 who was at school too.

23

Pupil No. ~~12~~ (Tommy)'s mother said the child was sulky and difficult at home, but she did not have time to try and understand him, as she worked outside whenever she had an opportunity. She said Tommy was extremely fond of the baby, and when he occasionally got a penny for running messages for a neighbour, the penny was entirely spent on the baby. On the other hand, <sup>Tommy and</sup> his "cousin" as he called him, - his nephew, about the same age as himself - were at continual enmity. War between them was most frequently waged on the delicate question as to who should go for a basketful of messages for Tommy's mother. Both thought the other should go every time the question was raised; they quarrelled violently, and both were whipped. When Tommy's "cousin's" mother had an afternoon "off" however, and came to see how her children were keeping, she heard long tales of woe about how her eldest son was treated, how he was sent for messages when he was tired, and whipped when it was all Tommy's fault. The mother, Tommy's eldest sister, accordingly laid

laid down the law to her own mother, and the problem of who should go for the messages was thus settled beyond dispute. Poor Tommy nursed a grievance and resentment. His mother knew he was tired, and deprived of his rightful play-time, but she was tired too, with hours of work, and with the thankless task of caring and providing for her daughter's children. The quarrels between the boys still continued. Tommy's mother was irritable and cross with anxiety, and the easy way to secure order was to whip Tommy.

Before the mother left, the Headmaster of the School showed her how very serious were the effects of the home environment on a sensitive and rather nervous child <sup>like</sup> as Tommy. He particularly urged that, as in school, the teacher refrained from punishing the boy for his abnormal behaviour, though sometimes this was difficult in a big class, so at home she was to try and treat him differently, and especially, never on any occasion, to punish him unjustly.

The result of this interview was good. The mother took a sympathetic interest in her boy and a pride in the scholastic progress he made in time. The fits of temper and sulkiness went, and in the following weeks and months, when I came in contact with him, I found Tommy to be an earnest, unselfish boy, with an exquisite taste for choosing the right words to suit a phrase or passage in a composition or letter. I have seen him writing an essay or attempting a poem, with flushed cheeks and bright eyes, literally quivering with eagerness and delight, at some combination of words he had made which appealed to his ear. It hurt him to hear a stolid, unimaginative youth in his class refer to a number of flowers as "a bunch of flowers" and <sup>he</sup> unhesitatingly suggested that the word bunch should be changed <sup>to</sup> ~~for~~ posy or cluster. When this matter was re-adjusted, he was heard to mutter - "Bunch! who ever heard of a/  
a/

a bunch of Flowers, what a horrid word for lovely things, he's a silly ass!" On one occasion a great "cluster" of daffodils were brought to the classroom, and each vase and jar in the room was made radiant with them, till it seemed as if Spring had come to school during the night, and stayed to welcome the children next morning. The pupils all obviously felt pleasure in the transformation, but Tommy was speechless with ecstasy. He went to the Teacher's table on which were still lying a few daffodils, very reverently picked one up, and gazed at it, as if magnetised by its living beauty. His joy was unbounded when, at the end of a happy school day, he was given some of the daffodils to take home to his mother. When asked by the headmaster to write a few sentences on the prettiest thing he ever saw, he wrote:- " The prettiest thing I ever saw was the marsh-marigold. The marsh-marigold is to be found at the edge of a river and in marshy ground. Its cousin is the butter-cup which is to be found on the road-side." Samples of his work are given opposite. These were produced about 8 months after the interview with his mother, and were done under my supervision. In arithmetic he also improved, and the good story books of adventure obtained in the class library were a great delight and a great benefit to him. Just before I lost touch with him, his eldest sister and her children sailed for Australia, leaving Tommy vexed at the baby's departure, but otherwise thoroughly happy.

This boy was backward at the time he was examined and his scholastic retardation has been classified as being the result, of the home environment. As his sulkiness and bad temper disappeared when the cause was discovered and remedied, he has not been labelled a "temperamental" case. I am of the opinion that his I.Q. is considerably more than 86, and all who know him say the same thing. Unfortunately I did not have the/

the opportunity of re-testing him after I had gained his confidence. This intelligence test result was obtained at a time when he was badly up against people at home, boys at school, and a teacher.

*C.A. 12 yr 10 mths. I. Q. 86. E. A. 7.5 yr. A. Q. 66.*

Pupil No. 27 has actually been in 10 Schools, and did not go to the first school till he was aged 7 years. His Father is an agricultural labourer of roving spirit, who stays only a short time on each farm. Often the father moves with his family to a new district, say a month before the school summer vacation, and does not bother sending his children to school for that month. On no occasion has he been known to send them voluntarily, but is content to wait until the Attendance Officer <sup>learns</sup> finds of his arrival, with children of school-age. It is sometimes weeks before the Attendance Officer gets to know about these children not attending school, because if the previous farm labourer has had no children at school, the attendance officer is ignorant of the change in the farm hands.

*Age 13. I. Q. 88. E. A. 9.4 yr. A. Q. 81.*

Pupil No. 20 is quite frank about the fact that he does not like school and that he is patiently waiting till he is 14 to leave. Some time before he was tested, he had, on several successive occasions, failed to make any attempt to do some homework like the other members of the class, and quite within his capacity. The headmaster punished him, and later on met the father who owns a small farm at some distance from the School. The father was quite sympathetic about his son's lack of interest in school, and pointed out that all his "coos" and horses were different from each other. Each required different treatment, and what suited one did not suit the other. So with boys. The Father further pointed out that his son had all the schooling he needed. When he left school he would work outside from morning till night, and seldom write a single letter or/

or even sign his name. "He may be a fool at the school but, man, he is a grand milker and I have never seen the like of him with coos and horses"!

Slightly built and delicate looking and is a rather nervous child. He is somewhat nervous but is gaining confidence as his father approves.

*C. R. 13 years old. H. A. 11 years old. T. P. 90. A. G. 91.*

Pupil No. 23 was also much below the standard in health till some months before the writing he was sent to the Chief School Medical Officer to a Holiday Home where, for three months, he ran wild in the country, forgetting all of school and school. On his return he was very much brighter and more energetic than before. His father is very helpful and he continued to advance.

*C. A. 14 years old. H. A. 11 years old. T. P. 90. A. G. 91.*

Pupil No. 25 was also below the standard in health till he was sent to a Holiday Home where, for three months, he ran wild in the country, forgetting all of school and school. On his return he was very much brighter and more energetic than before. His father is very helpful and he continued to advance.

SCHOOL N.  
C. A. 12 yrs 9 mths : M. A = 11 yrs 11 mths. I. Q = 93.  
A. Q = 81.

Pupil No.21 has had several throat operations and has been off school for many months at a time. He is slightly built and delicate looking, and is a quiet, earnest child. He is somewhat nervous but he is gaining confidence as his health improves.

C. A. 12 yrs 6 mths. M. A = 11 yrs 2 mths. I. Q = 90 A. Q. = 81.

Pupil No.23 was also much below the standard in health, till, some months before the testing, he was sent by the Chief School Medical Officer to a Holiday Home, where, for three months, he ran wild in the country, forgetful of illness and school. On his return he was very much brighter and stronger and much more energetic than before. He has made some progress since his return and the Teacher is very hopeful about his continued advance.

C. A. 12 yrs 7 mths. M. A = 11 yrs 3 mths. I. Q = 90 : A. Q. = 80.

Pupil No.25 although not from abroad has two languages, one for use at home, and one he learnt at school. He came, at the age of 11 years, from Glasgow, where he had stayed in one of the poorest quarters of the town. The report from his first school shows that it was almost impossible to distinguish what he said at the beginning of his school career, and his mother's language also requires translation. This is quite a definite case of bi-lingualism. Another pupil

C. A = 12 yrs 8  
I. Q = 90  
A. Q = 80

in this school, No.27 is backward in school work principally owing to a language difficulty. He is the son of parents who are both deaf mutes and who keep very much to themselves, avoiding meeting neighbours and people, whenever possible. When the boy was a baby, and up to the age of 5 years 3 months, he did not hear much speaking. No one spoke in the house, and when old enough he was not allowed to leave the garden round about the little old house where <sup>he</sup> stayed, to play with other children. Thus on entering school he was faced with the problem of mixing and/

Summary

SUMMARY.  
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The Total number of pupils examined was 430, but 30 of these did not deviate sufficiently from the normal to be considered backward, so were excluded from the investigation. Thus, the total number of backward children found at the qualifying stage was 400.

Of these 182 had Accomplishment Quotients of 95 and above 95, that is, in spite of the fact that they were working at or above their innate ability their scholastic performance was distinctly inferior to that of the normal qualifying child and so their retardation in school work was the result of low intelligence. <sup>Other</sup> Additional pupils to the number of 48 were distinctly below normal in intelligence, <sup>and</sup> but were not working up to their innate capacity. Of these a number were in a class along with normal children aged 12 years, and were given no additional help with any school subject. It seems that many of them were promoted a class each year, along with normal children, till they reached the Qualifying Stage, and at each level they got further and further behind. There is no doubt that many of them would cease trying, through being disheartened at the difficulty of the work. Some of these were ill-nourished and from poor homes, and it now and again seemed as if the low intelligence itself was the result of the physical condition of the child. 230, in all, then, that is 57.5% of the over-qualifying age and non-qualified children, in the schools of this industrial town, were backward owing to low intelligence.

170 Cases therefore remained for consideration and each was carefully entered into. Where necessary the School Medical Officer and the Parent were consulted, in addition to the teacher and Headmaster. The following conclusions were arrived at — 5 children were retarded in general school work owing to weakness/



9

weakness in a particular subject or group of subjects. Those five are very definite cases, selected on the basis of Teachers' and Headmasters' reports, and by the fact that their performance on that subject or group of subjects, was much below the level of their performance on other school subjects of equal importance, and about three years below the level of their mental age. No other reason was discoverable to account for the fact that these children were non-qualifiers. 1.25% of children were backward, therefore, owing to weakness in a specific subject.

Since a satisfactory explanation of the retardation of 235 pupils has been found, 165 cases remain for consideration. Of these 18 were handicapped by home circumstances which appeared to tell severely on their scholastic work. This reason covers not only misery, neglect and lack of care, but extreme poverty in good homes, the outcome of the Father's unemployment since the finish of the War.<sup>(1)</sup> 8 Pupils, of good ability, were scholastically retarded owing to illness or owing to bad health, while 4 suffered from a language difficulty. Only four children could be/

§ (1) "If it be asked why has unemployment not affected the health of children more than appears to be the case, I think the answer is that:

(A). There has been an increased responsibility among the parents for the children's welfare.

(B), There have been forthcoming various momentary aids, of the nature/

(continued at foot of next page.)

be excused for their poor school work on the grounds of change of school and late enrolment. 4 very definite "temperamental" cases were discovered. It was suggested at a meeting of the Scottish Branch of the British Psychological Society that this number is probably an underestimation. 2 children suffered from physical defects which interfered with their scholastic progress, in spite of normal general intelligence. This small number can be counted for by our splendid clinics and special schools for *physically* defectives. Thus 125 cases out of 400 were left, the causes of backwardness not being obvious, or discovered after consultation with the Teachers, Headmasters, School Medical Officer, and Parents. These ~~were~~ children <sup>had</sup> with I.Q.'s. over 85, and so were of normal intelligence. The results obtained so far are Summarised below.

Table 1./

Working amount of  
 No. of cases backward  
 100%

§ (contd.) nature of relief, insurance and union's payments and these have in part made up for the loss of wage.

(C). There has been the supervision, assistance and nurture of the School Medical Service.

It may be safely assumed that from 80% to 90% of children are born healthy, and with the potentiality of leading normal, healthy lives. Whatever be the facts of parentage, the tendency of nature is to reassert the right of each new generation to the heritage of healthy birth. After the first year of life, the young child has to bear a heavy burden of environmental neglect, associated with bad housing, poverty and absence of hygienic supervision. As a result the School medical Service is faced with the hard issue that, out of an infant population born healthy, 35-40% of these children who are admitted to school at five years of age, bear with them physical defects which could have been either prevented or cured.

Table I

| School. | Low Intelligence. | Specific Weakness<br>(in Spelling or<br><i>arithmetical</i> e.g.) | Home Cir- cumstances | Illness Health. | Language Difficulty | Change of School. | Temper- ament. | Physical Defects | Causes yet undiscovered | TOTAL. |
|---------|-------------------|-------------------------------------------------------------------|----------------------|-----------------|---------------------|-------------------|----------------|------------------|-------------------------|--------|
| A.      | 12.               | —                                                                 | 1.                   | —               | —                   | —                 | 1              | —                | 11.                     | 25.    |
| B.      | 4.                | 1.                                                                | 1.                   | —               | —                   | —                 | —              | —                | —                       | 6.     |
| C.      | 17.               | 2.                                                                | 1.                   | —               | —                   | —                 | —              | —                | 4.                      | 24.    |
| D.      | 16.               | —                                                                 | 5.                   | 1.              | —                   | 1.                | 1.             | 1.               | 2.                      | 27.    |
| E.      | 6.                | —                                                                 | —                    | —               | —                   | —                 | 2.             | —                | 16.                     | 24.    |
| F.      | 4.                | —                                                                 | 4.                   | —               | —                   | —                 | —              | —                | 13.                     | 21.    |
| G.      | 25.               | 1.                                                                | —                    | —               | —                   | —                 | —              | —                | 3.                      | 29.    |
| H.      | 12.               | —                                                                 | —                    | —               | —                   | —                 | —              | —                | 2.                      | 14.    |
| I.      | 27.               | —                                                                 | 2.                   | —               | —                   | —                 | —              | —                | 7.                      | 36.    |
| J.      | 7.                | —                                                                 | —                    | —               | —                   | —                 | —              | —                | 2.                      | 9.     |
| K.      | 30.               | —                                                                 | 1.                   | —               | —                   | —                 | —              | —                | —                       | 31.    |
| L.      | 11.               | —                                                                 | 2.                   | 1.              | 1.                  | —                 | —              | —                | —                       | 15.    |
| M.      | 20.               | 1.                                                                | 1.                   | —               | —                   | 1.                | —              | —                | 4.                      | 27.    |
| N.      | 15.               | —                                                                 | —                    | 2.              | 2.                  | 2.                | 0.             | 1.               | 9.                      | 31.    |
| O.      | 6.                | —                                                                 | —                    | 1.              | —                   | —                 | —              | —                | 24.                     | 31.    |
| P.      | 10.               | —                                                                 | —                    | 2.              | —                   | —                 | —              | —                | <del>25.</del> 11       | 23.    |
| Q.      | 8.                | —                                                                 | —                    | 1.              | 1.                  | —                 | —              | —                | <del>25.</del> 17       | 27.    |
| TOTAL.  | 230.              | 5.                                                                | 18.                  | 8.              | 4.                  | 4.                | 4.             | 24               | 125.                    | 400.   |

Table II.

|                  |       | Cause of Backwardness. |       |                     |      |                  |    |                      |    |                  |    |             |    |                  |     |              |        |
|------------------|-------|------------------------|-------|---------------------|------|------------------|----|----------------------|----|------------------|----|-------------|----|------------------|-----|--------------|--------|
| Low Intelligence | 54.5% | Specific Subject.      | 1.25% | Home Circumstances. | 4.5% | Illness, Health. | 2% | Language difficulty. | 1% | change of school | 1% | Temperament | 1% | Physical Defects | .5% | Undiscovered | 31.25% |
| Cases.           |       |                        |       |                     |      |                  |    |                      |    |                  |    |             |    |                  |     |              |        |



The next step in the investigation was to find whether the weak educational ability of this 31.25% was compensated for by non-scholastic ability and out of school interests. Three sets of tests were constructed for this purpose -- Technical Information Tests, Picture Tests and a Practical Test. These Technical Tests and the Practical Test are described in an article on **Non-Scholastic Tests for Backward Pupils in the <sup>"Forum"</sup> ~~Form~~ of Education,** June, 1927.

## CHAPTER.111.

Non - scholastic Tests.SCHOLASTIC  
FOR BACK-  
PUPILS.

The tests described below are non-scholastic in the sense that they do not deal with information and abilities generally cultivated in the elementary school. For the child whose reading ability is poor, the picture tests<sup>(1)</sup> have been prepared, because in this test the subject receives all the instructions orally, and replies by simply pointing. The picture Tests do not penalise the child with a speech defect either. They are, too, very effective with shy children. This particular type of test often results in the subject telling the experimenter what his father does, or what he himself is going to do when grown-up. Perhaps of the three sets of non-scholastic Tests the picture ones achieve more than either the technical or the practical Tests, in the sense that they lead to a much better understanding of the subject, of his interests, aims, hopes, outside-of-school occupations and activities. Owing to the greater difficulty of the practical test, even when given individually, it does not have the same power of breaking down a difficult child's reserve as do the picture Tests.

These three sets of non-scholastic tests are occasionally referred to as Practical Tests, but the word practical is here used in a limited sense. They are not tests of manual ability or of bodily skill, of speed, or of precision in a movement. The picture tests for boys call for the ability to recognize parts of ordinary mechanical devices and each page involves accurate perception, reasoning and judgement. The technical tests show up the boy who has gained a store of information from his observation of, and perhaps participation, in the work of, say, a garage or work-shop. The special tests for girls, as a rule, test household interests, and the girl

who/ <sup>Photographs of</sup>  
§(1) the Picture Tests are sent in with Thesis. (See 3.106+ after)

who has spent some of her leisure time gazing at the household articles so temptingly arranged in shop windows, has an advantage, even though her home is poor.

These Non-scholastic Tests are not intended to be vocational, but are tests which point to an avenue of approach to some backward or difficult pupil.

THE MECHANICAL APTITUDE TESTS (or Picture Tests.) The picture tests constructed for this investigation were suggested by the Stenquist Mechanical Aptitude Tests. In his Manual of Directions for Mechanical Aptitude Tests, Stenquist points out that, of 2000 pupils given these tests, some possess practically no information about the nature of things mechanical, having practically no aptitude for solving problems that require reasoning in mechanical terms, while others have unusual ability of this kind, and show a remarkable understanding of the nature of mechanical devices. . . . . "The explanation of the fact that one pupil knows a great deal and another almost nothing about the mechanical principles of the hundreds of devices, toys and machines, with which both are surrounded, must certainly be based in large measure upon original nature—the native interests and aptitude of each individual child. At first thought it would seem entirely a matter of training, — that the boy who has had shop and science courses must in every case know much more about this field than the one who has not. This however, we do not find to be the case. Special training provided in courses, is, to be sure, one important factor. But ~~this child~~ <sup>the child</sup> who is by nature mechanically inclined, obtains a general knowledge, and develops a certain mechanical reasoning ability, that is almost uncanny, out of his everyday experience. Every toy, every machine, every workshop that he sees contribute to his general knowledge of this field, because of his native interest in them. . . . . There is a line of demarcation between /

between the nature of the child who is attracted by the mere novelty of bright colours, or of moving objects, and that of the one who feels a genuine thrill and joy in the contemplation, or operation, of a machine, because of its intrinsic mechanical nature -- with the almost human characteristic that he attributes to it, particularly if it is the creation of his own hand!" § (1).

Stenquist points<sup>§</sup> out, too, that the choice of vocation by the typical child is too often based, upon the most trivial grounds. Very often a "mechanical career" is recommended to a child for the simple reason that he is backward at abstract school-work.<sup>(2)</sup> But, continues Stenquist, there is no evidence to show that, because a pupil scores low in general intelligence, he is likely to score high in general mechanical ability. "The facts are rather the reverse the correlation between the two abilities ranging from .2 to .4. The more important point to keep in mind, is, that these two types of ability are largely independent of each other: that the so called stupid child may possess marked mechanical ability, but the bright child is even more likely to possess marked ability of the same sort"<sup>(3)§</sup>

It is, therefore, dangerous to predict a pupil's mechanical interest and ability from his scholastic performance. Stenquist's own tests are constructed to provide a means of obtaining one definite estimate of the comparative abilities of school children. No claim is made that they measure all that it is desirable to measure in diagnosing mechanical ability.

What is claimed, is that they furnish one standardised measurement/

- § (1). Manual & Directions. P.4-5 (Stenquist Mech.Apt.Tests)
- § (2). Page 5 Manual of Directions.
- § (3). Page 6 Manual of Directions.



measurement of this ability which can be interpreted in well-defined terms. They are designed to serve in preliminary surveys of the mechanical information and aptitude possessed by school children in general.

Test 1. consists of a series of 95 problems presented in the forms of pictures. The subject, in each problem, must determine and record which one of five pictures belongs with each of five others. In this test the pictures are only of ordinary mechanical objects and no trade has been selected as a basis or is any picture dealing with highly specialised skills included.

Test 2. (page 12. Manual) consists partly of material similar to that of test one and also of questions applied to cuts of machines and machine parts. The questions are of a general nature and do not presuppose that the pupil has necessarily had actual first-hand experience with the particular machines shown. They call for keen mechanical perception, and the ability to reason out a mechanical problem.

Mechanical ability (P.14. Manual of Directors) does not vary with grade as it does with age and it does not vary greatly with age, from ages 12 to 15. The significant thing is the wide variation between individuals of the same age.

In Test 1. and Test 11. a short Practice Test is given. For Test 1. 45 minutes are allowed and for Test 11. 10, 18. 10 and 12 minutes are given respectively for Exercise 1., Exercise 11., Exercise 111.A, and Exercise 111.B. The scoring is simple.

These Tests of Stenquist's are neither tests of general intelligence or are they trade tests. Picture Tests 1. and 11. correlate approximately equally well with shop and science teacher's rank for "general mechanical aptitude".

The coefficients of correlation for 15 classes had a median value of .67.

The correlations between the Stenquist Assembling Tests and the Stenquist Mechanical Aptitude Tests 1. and 11. had median values of .69 and .66 respectively. Thus Picture tests 1. and 11. measure mechanical aptitude of a kind very similar to that considered by shop and Science Teachers when ranking people for "general mechanical" ability. The statistical results also show that the picture tests measure very many of the same general traits that are tested by the assembling Tests, although the actual trial at manipulating mechanical objects is sacrificed.

Stenquist's mechanical aptitude Tests were much too hard for the children at the Qualifying Stage and so simplified tests on the same lines had to be constructed — one for boys and one for girls. These were constructed on the model of Stenquist's Test 1. They include, like Stenquist's, a sample exercise or practice test, and could be printed for use as group tests. They have been given as individual tests only, as the estimate given for producing one of them in group form was £85. One rather important change was made. It was found, when trying out these tests on children and on adults, that after four answers were found correctly, the fifth answer followed correctly as a natural consequence even although the relationship between the fifth picture on one side of the page and the unclaimed picture on the other side was utterly unknown or impossible to guess at. Thus if four pairs were known, the fifth pair could be deduced by the process of elimination. In order to avoid this, and in order to make the test <sup>a</sup> fairer one, five pictures were placed on the one side as before and seven usually on the other side, leaving, on that side, two odd pictures <sup>bearing no relationship to any picture</sup> on the corresponding page.

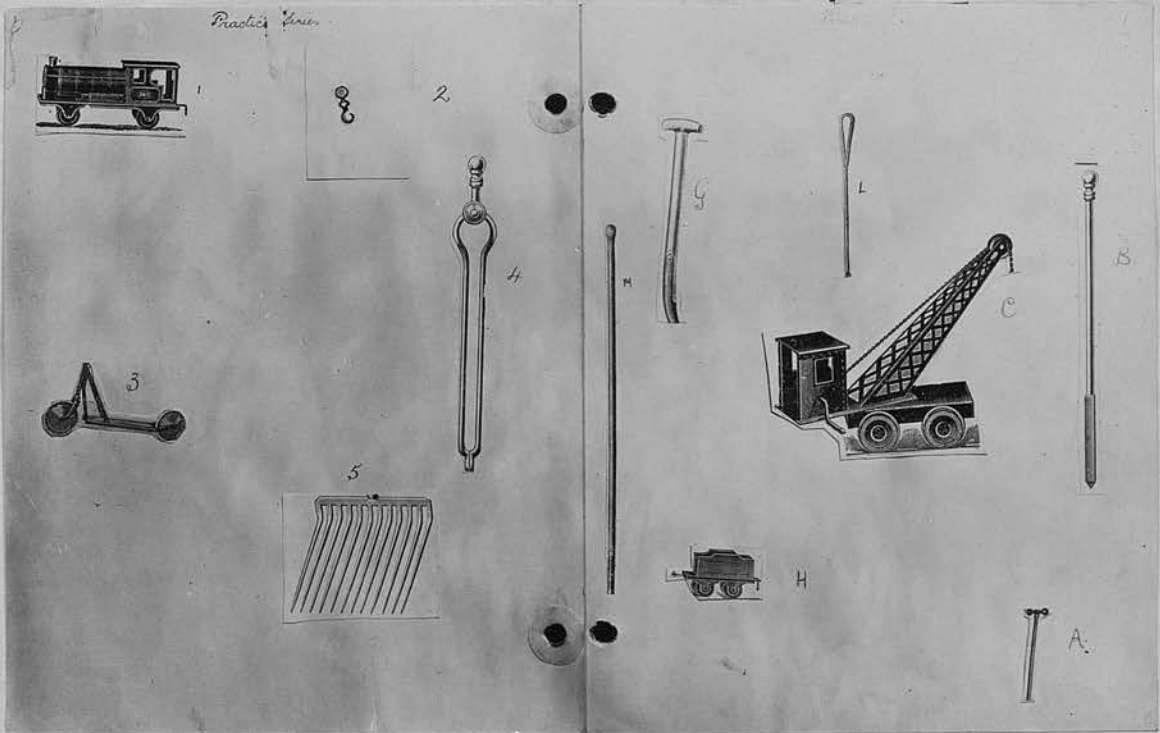
# Mechanical Aptitude Test.

Boys.

## Photograph of Practice Test.

Left-hand side.

Right-hand side.



THE MECHANICAL APTITUDE TEST for Boys.

Instructions. Mechanical Aptitude Test — Boys

INSTRUCTIONS. — Open the Test at the Practice Series and say— "Look at this. Each object on this page, (pointing to left hand page) is used along with or belongs to something on the other page, (pointing to right hand page). Thus (pointing to the tongs), this is used along with that (pointing to the poker). This, (pointing to the hook) belongs to that, (pointing to the crane). Now try the others yourself". (Give help if necessary).

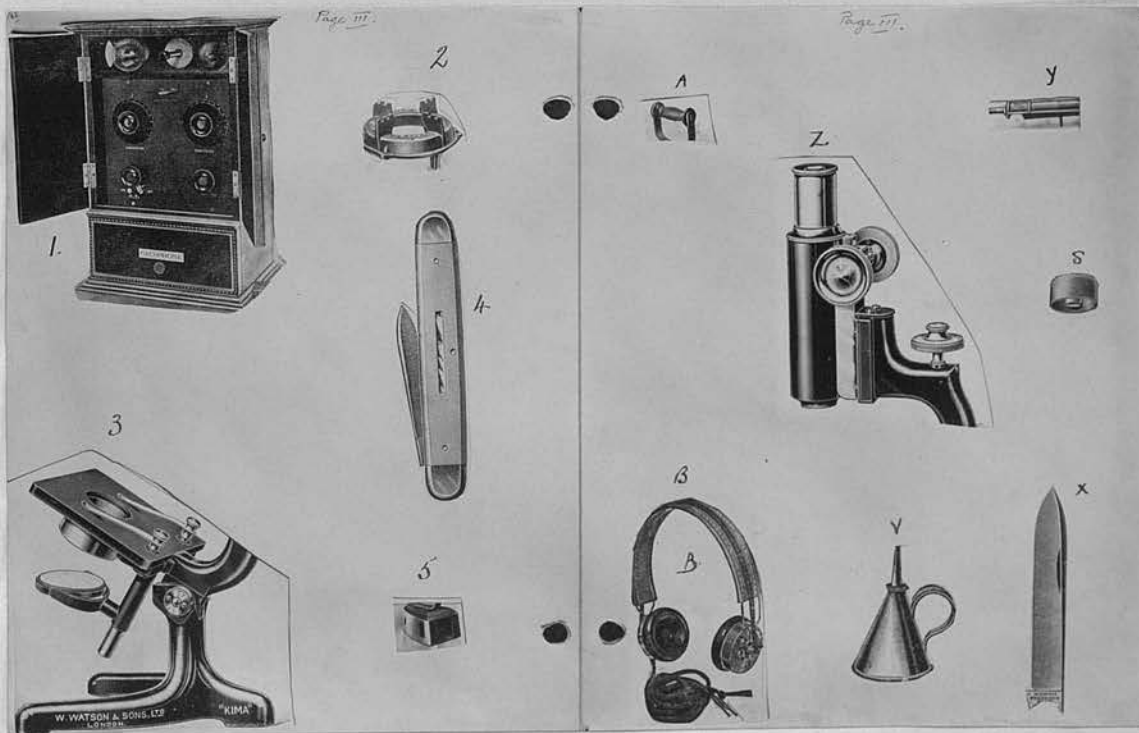
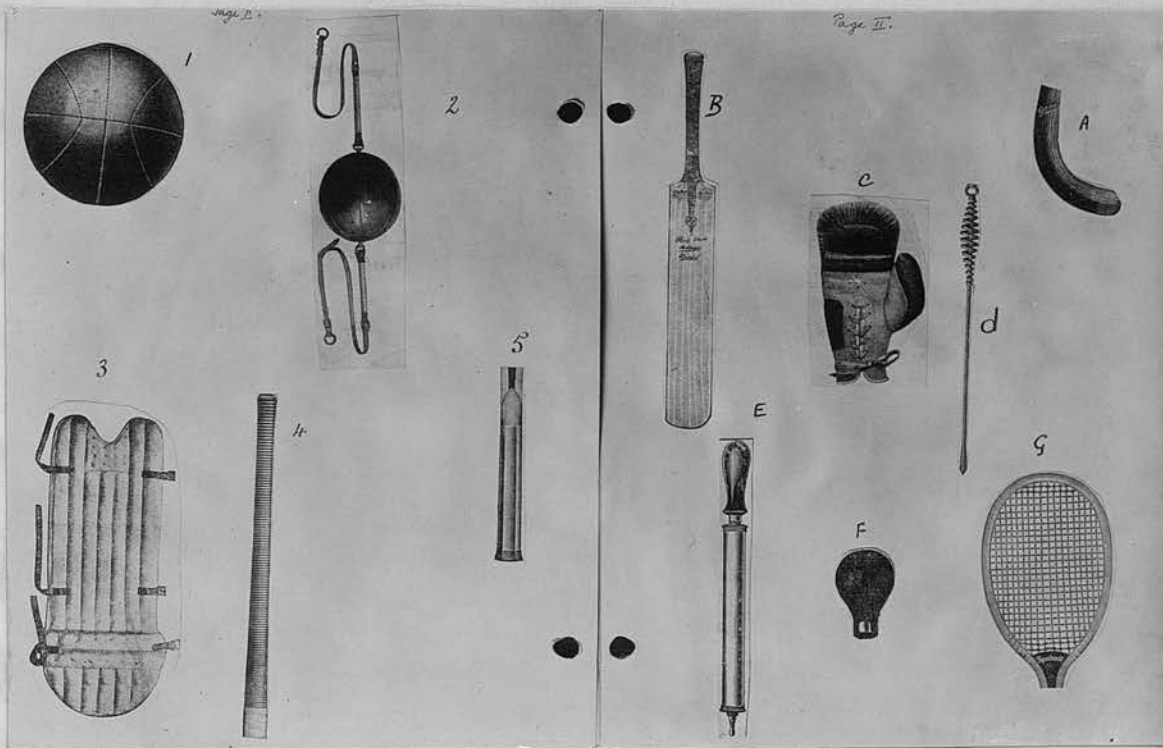
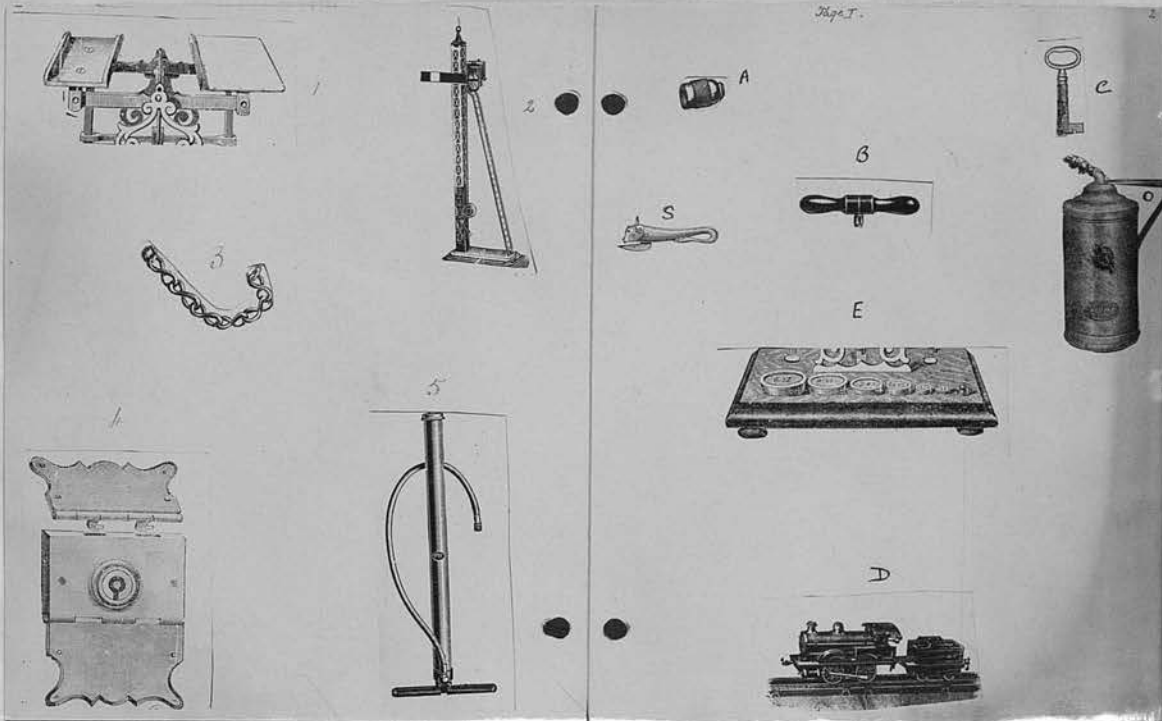
"You will notice (pointing to left hand page) that here <sup>there</sup> are only five pictures while (pointing to right hand page) on this side there are seven pictures. That is, on this side there may be two extra pictures which we need not bother about".

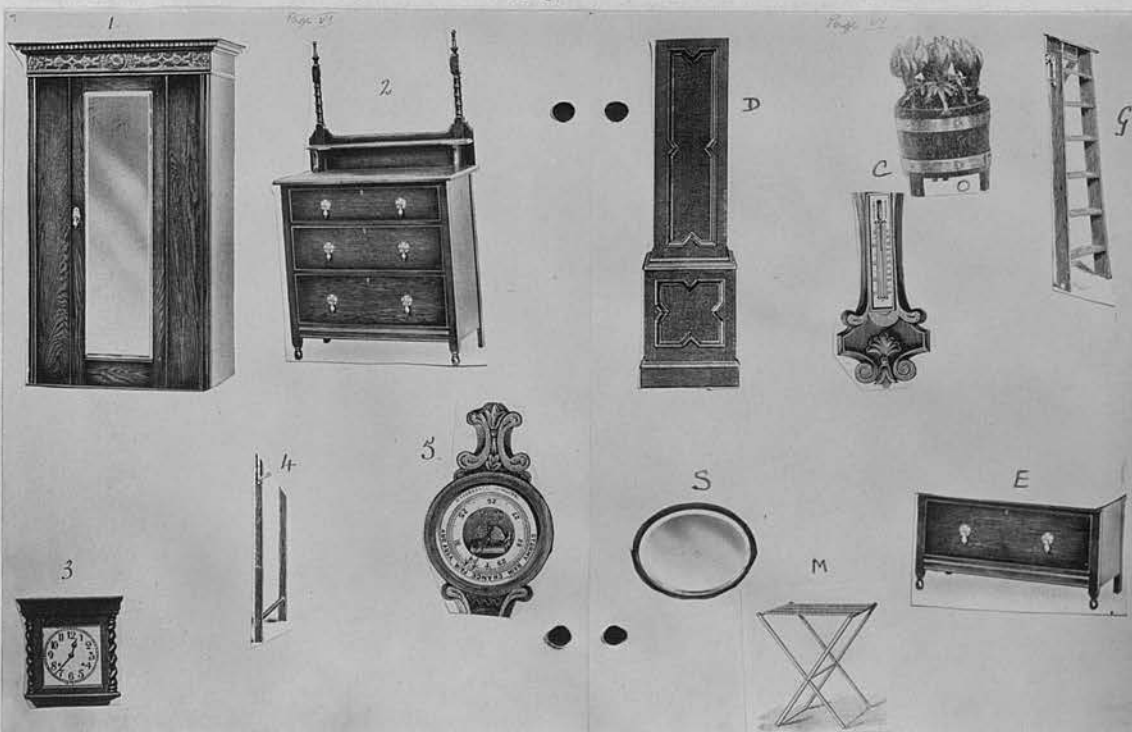
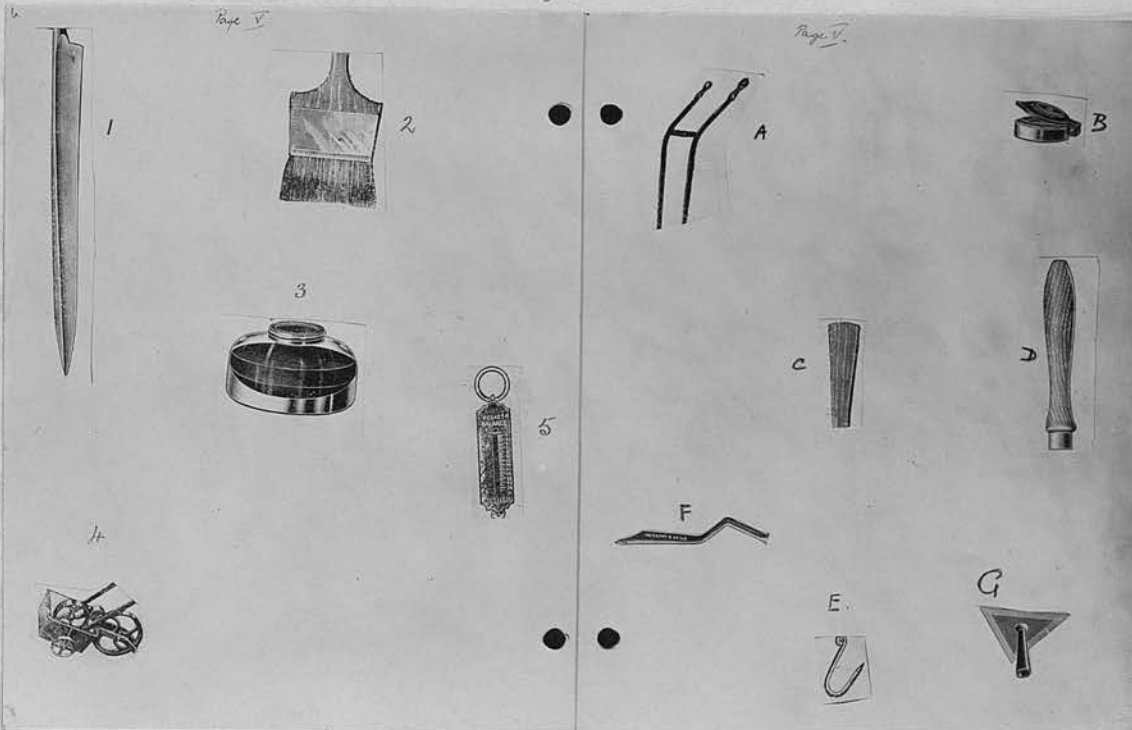
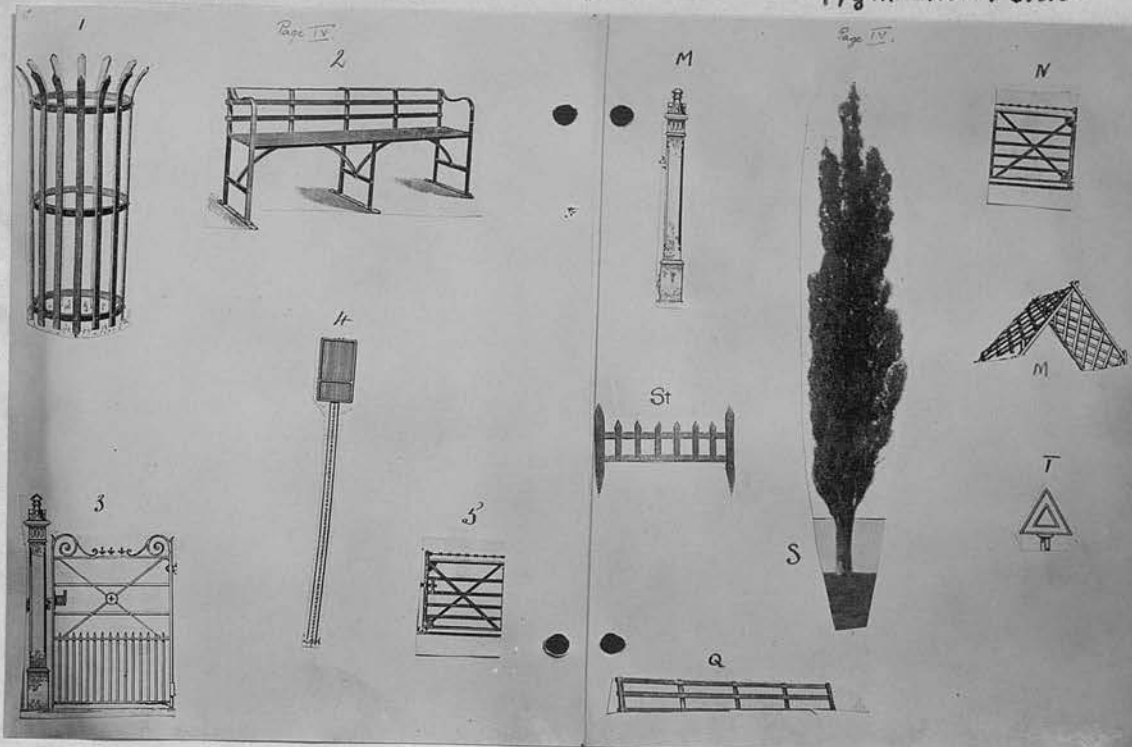
"Now I am going to turn over the page and let you do the rest yourself. Remember that each object on one page is used along with, or belongs to, something on the other ~~page~~".

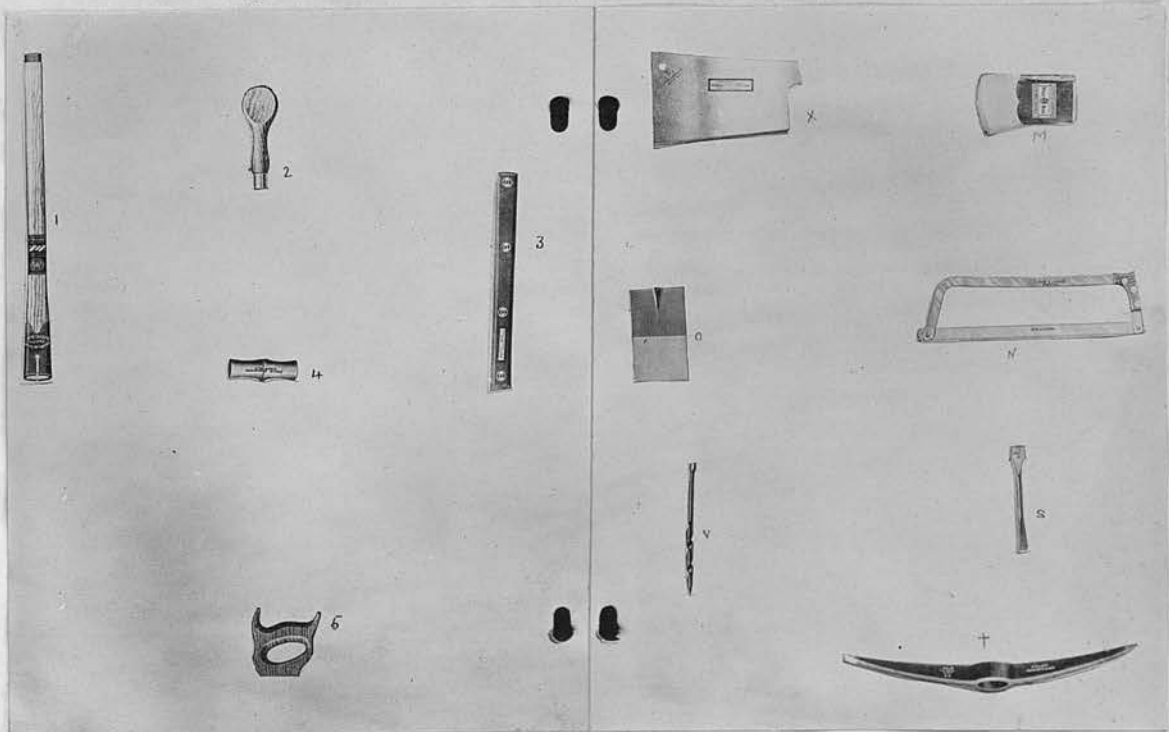
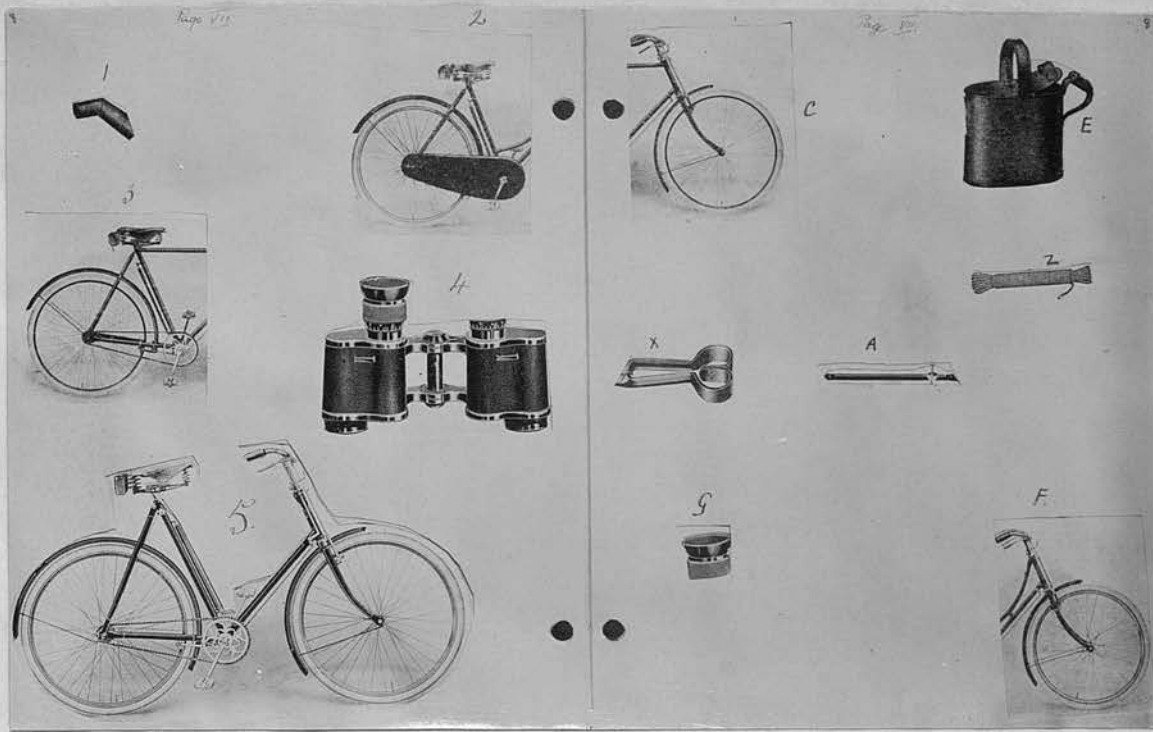
As a rule the subject requires no further encouragement to commence the test, and goes through it without the instructions being repeated. If, however, he tends to point to an object on one page and say it belongs to, or is part of, an object on the same page the instructions are repeated. If, in an extreme case, the subject ~~makes~~ no effort to commence the test when shown page 1., the experimenter pointed <sup>s</sup> to the signal (No.2) and asked <sup>s</sup> what it belonged <sup>s</sup> to or ~~was~~ <sup>is</sup> used along with.

On the left-hand page numbers have been placed beside the various pictures, on the ~~left~~ <sup>right</sup> hand page letters have been printed. These are not to be used by the child when the test is given individually, but would be utilised by the pupils if the test were given as a group one. These numbers and letters are used by the Experimenter in scoring and this will be discussed below.

Page I.

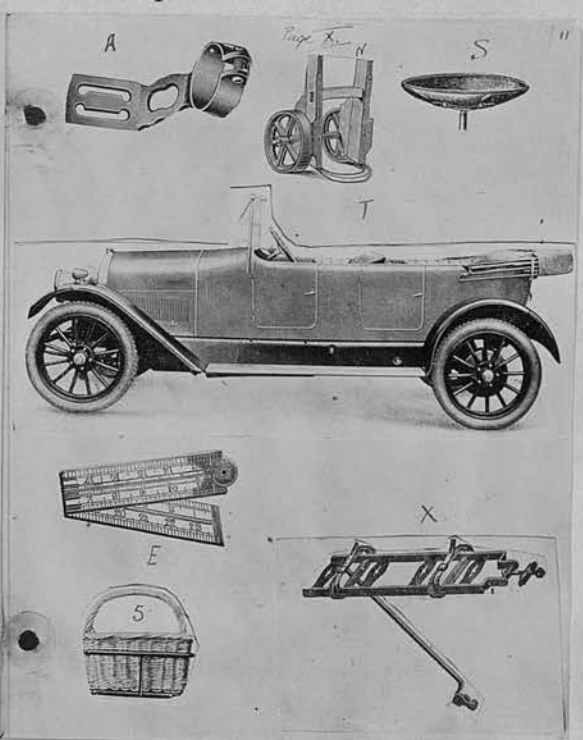
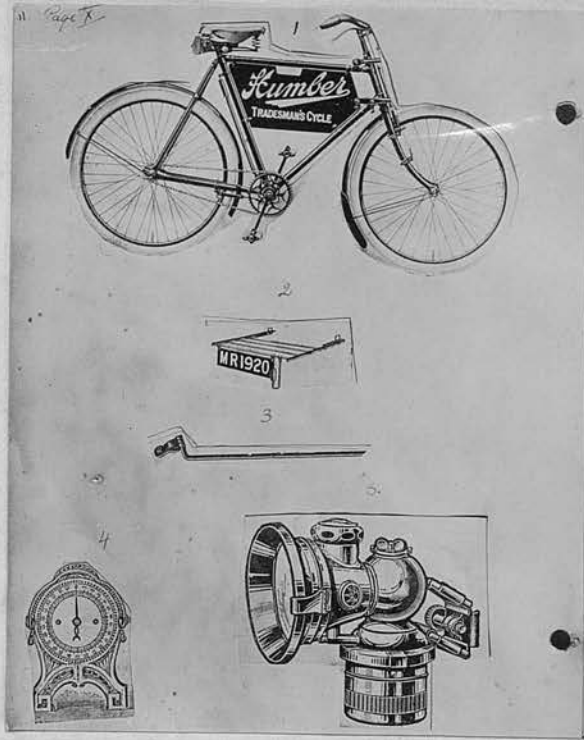






left-hand page

right-hand page.





The Boys' Test consists of 10 pages. Each page has five answers and each answer gets one mark. The Total score therefore is 50.

Page I. Answers.

| Left-hand Page No. of Picture. | Right-hand Page Letter of Corresponding Picture | SCORE. |
|--------------------------------|-------------------------------------------------|--------|
| 1.                             | E.                                              | 1.     |
| 2.                             | D.                                              | 1.     |
| 3.                             | A.                                              | 1.     |
| 4.                             | C.                                              | 1.     |
| 5.                             | B.                                              | 1.     |

Page II. Answers.

| Left-Hand Page | Right-hand page. | SCORE. |
|----------------|------------------|--------|
| 1.             | E.               | 1.     |
| 2.             | C.               | 1.     |
| 3.             | B.               | 1.     |
| 4.             | A.               | 1.     |
| 5.             | G.               | 1.     |

Page. III. Answers.

| Left-hand Page | Right-hand Page | SCORE. |
|----------------|-----------------|--------|
| 1.             | B.              | 1.     |
| 2.             | Y.              | 1.     |
| 3.             | Z.              | 1.     |
| 4.             | X.              | 1.     |
| 5.             | A.              | 1.     |

Page IV. Answers.

| Left-hand Page | Right-hand Page | SCORE. |
|----------------|-----------------|--------|
| 1.             | S.              | 1.     |
| 2.             | Q.              | 1.     |
| 3.             | M.              | 1.     |
| 4.             | T.              | 1.     |
| 5.             | N.              | 1.     |

Page V. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | D.               | 1.     |
| 2.              | C.               | 1.     |
| 3.              | B.               | 1.     |
| 4.              | A.               | 1.     |
| 5.              | E.               | 1.     |

Page VI. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | E.               | 1.     |
| 2.              | S.               | 1.     |
| 3.              | D.               | 1.     |
| 4.              | G.               | 1.     |
| 5.              | C.               | 1.     |

Page VII. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | E.               | 1.     |
| 2.              | F.               | 1.     |
| 3.              | C.               | 1.     |
| 4.              | G.               | 1.     |
| 5.              | A.               | 1.     |

Page VIII. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | E.               | 1.     |
| 2.              | D.               | 1.     |
| 3.              | F.               | 1.     |
| 4.              | A,               | 1.     |
| 5.              | C.               | 1.     |

Page IX. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | T.               | 1.     |
| 2.              | S.               | 1.     |
| 3./             |                  |        |

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 3.              | X.               | 1.     |
| 4.              | V.               | 1.     |
| 5.              | N.               | 1.     |

Page X. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | E.               | 1.     |
| 2.              | F.               | 1.     |
| 3.              | X.               | 1.     |
| 4.              | S.               | 1.     |
| 5.              | A.               | 1.     |

When recording the subject's performance, I usually do it this:-

Page.1. | Page. 11. | Page.111. | Page.1V. &c.,  
 ✓✓✓✓✓ | ✓✓✓✓✓ | ✓✓2=A/5=S | ✓4=M/5=9/2=N.

at a glance I can see the subject had every answer correct for Page 1. and Page 2. On Page 111. he got numbers 1, 3 & 4, matched correctly, 1 with B. 3 with Z. and 4 with X. but on consulting the test I find he said the gas ring (no two) was part of the handle of the iron (A). and that number 5 was found along with S, or part of S, instead of A. Again at Page 1V. he found what went with pictures 1 and 3 correctly, but failed at the sign-post, field gate, and garden seat. If at a later date I ever have to refer to this test result, I am able to say whether or not the subject showed any apparent knowledge<sup>A</sup>, or apparent recognition of, a particular object or not, when the results are recorded in this manner. At first I recorded them so:-

Page 1. &c.  
 1 = E.  
 2 = F.  
 3 = C.  
 4 = G.  
 5 = A.

but this consumed too much time and required careful interpretation afterwards with the tests continually before me. Now, when the number and letter is given, I know the subject has chosen the wrong pair of pictures belonging to each other and if the pupil is an interesting delinquent case, for example, and I require to find out which objects he failed to recognise, I then open the test.

This method is preferable to recording the results:-

|         |          |           |              |
|---------|----------|-----------|--------------|
| Page.1. | Page.11. | Page 111. | Page 1V. &c. |
| ✓✓✓✓✓   | ✓✓✓✓✓    | ✓XX       | ✓XX          |

because this gives no indication of what pictures the child has gone wrong ~~in~~ failed to recognise.

An endeavour was made, in constructing these Picture Tests, to cover as wide a field as possible. The Pictures for boys include pictures of bicycles, motors, ear-phones, tools, furniture, knives, and in addition to other interests, there is a page for the boy fond of sport. Perhaps of all the pictures, the pair the boys are most enthusiastic about, is that connected with wireless. It is quite common for a boy to say (Page 111., 1 and B.) "These go together, and they both belong to wireless. You put on the earphones to listen in. The band goes over your head and the round things over your ears. If you don't use earphones, you need to buy a loud speaker and it costs far more money. If you have a big valve set, you might hear music from America". When a subject feels he is doing well in the test, he often adds explanations or relevant information, as he says "this goes along with that", and points to the particular pictures he is pairing. There is no flurry or rush to get the test completed in time, as there is no time limit imposed. The Test is usually completed well within twenty minutes. Although no emphasis has been laid on speed in these non-scholastic Tests/

Tests, the importance of speed is recognised. "Speed of reaction is an important and probably the most important factor in individual differences in the Intelligence Act".

Tentative norms for this Test are as follows.

No. boy examined had a perfect score :-

| Age. | Norm.               | No. of Subjects. |
|------|---------------------|------------------|
| 9.   | 13 . $\sigma$ 5     | 29               |
| 10.  | 20 . $\sigma$ 5.6   | 50               |
| 11.  | 28 . $\sigma$ 8.5   | 89               |
| 12.  | 35.8 . $\sigma$ 7.5 | 80               |
| 13.  | 38.1 . $\sigma$ 6   | 80               |
| 14.  | 41.1 . $\sigma$ 7.5 | 101              |

#### A PUPIL WITH A MOTOR OBSESSION.

One of the most interesting cases examined with this test was that of a boy of 12, with an I.Q. of 84, in a school for Mentally Defectives. At the time I first saw him, he had been in the Special School for over three years, and was able to count, write, spell and read, fairly well. No record of his previous scholastic history accompanied him, and whether he was originally reported for transfer to the Special School on the grounds of behaviour, or of educational attainment, I could not discover. At the time I was sent to see him, he had been convicted of breaking into a house along with several other boys, and his case was being brought up two days later. The Education Authority was anxious that the boy should not be birched, as this would most certainly have a very serious effect on his attitude and character.

The boy was thin and not well nourished. He looked not too clean. His clothes showed no sign of careful mending though/

though they were somewhat torn and his boots were badly in want of repair. On enquiry, I found that his Father was a Dentist!" Subsequent information showed that in theory he might be a dentist, but, in actual practice, he was a gentleman professionally interested in betting. The Mother and Father were both addicted to drink, and the Special School could obtain no co-operation in the home. For example, at lunch time, the boy would angrily push away a plate of soup or pudding, and say — "You can't force me to take that. My Father said you have no right to give me it, if I <sup>don't</sup> ~~didn't~~ want it". When the Headmaster approached the Father about ~~the~~ statements like this, the Father said the boy was quite right, and, on all occasions, took his part, even although it was subsequently found that the boy had been telling a lie.

The reason this case is being described, is, that this boy had an obsession about Motor Cars. He talked of them, acted them, spoke of them, lived in them. During his counting exercises he would rise half a dozen times, examine the engine of his imaginary car, fix on the handle, jerk it violently round till the engine reacted properly, then return to his seat puffing with the exertion. At an oral lesson he would have the imaginary steering wheel in his hands, and would be apparently unconscious that he was making peculiar hissing noises with his breath. During his lesson on raffia he would "change gear", "accelerate". At intervals he would loudly give vent to a sound, imitative of grinding brakes or of a motor horn.

He was too difficult a case to be given group work because he quarrelled violently with his companions on the slightest pretext. When he was in a particularly bad humour, he would hit his best friend, here called James Park,

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a quiet boy about the same age. On <sup>one</sup> occasion when this young motor-enthusiast was in a furious temper, and, angry without apparent cause at his best friend, he first hit him, then, before he was sorry, he drew a grave-stone on his book. On this gravestone was the following inscription:-

Here lies  
James Park,  
Be sorry,  
for he  
is  
dead.

When the fit of rage passed, the boy with the obsession felt very great regret at having hit James Park.

On another occasion, this young delinquent quarrelled violently with an older boy, and got the worst of the argument. When the violence of his rage subsided, he drew a dangerous looking cliff with one small figure perched securely on the top of it, and another figure hurling through the air to instant death. To this whirling figure was attached a large label, on which was written the name of the older boy who got the best of the dispute.

The most interesting drawing, however, was made after a quarrel with another school-boy companion. On this occasion, the boy he quarrelled with was made the victim of a motor accident. A motor-car was outlined, with the body of the boy under it, and an identification label attached.

Numerous other similar drawings were made after violent emotional outbursts, for example, one I remember was that of a prominent champion boxer, standing victorious over the inert form of a boy who had quarrelled with the boy obsessed.

One phase of the boy's obsession was that he was always collecting things about the class-room and school "to put under motors and make a scrunch".

If/

If his own stories can be relied upon, he rose early each morning, and went in the Co-operative Society Motor, to outlying districts to help collect huge cans of milk.

I wanted to examine this boy with the Picture Tests for two reasons, firstly, to get him to talk about himself and, if possible, about his recent trouble with the police, and, secondly, to see if he knew more than, or as much as, a normal boy of 12, about some mechanical objects. Unfortunately, the conditions of the testing were poor. I was only allowed to see the boy in the presence of a teacher, and he was very much on guard as to what he said. When we reached page X of the test the teacher had occasion to leave the room for a second or two, and, being faced with the picture of the car there, the boy told me morbid details of a motor accident, with great satisfaction, but when the Teacher returned he stopped the story. His performance on the whole test was one of the very poorest I have ever seen. It lacked care, judgement, reasoning and thought. For example he said (P.10) No.4, part of the weighing machine went inside the motor-car, and that the ruler went into the bicycle. Strangely enough, page VI. and Page VIII., were comparatively well done, and they deal mainly with furniture. I do not suggest that the boy would have done better in the test had the teacher not been there. Indeed, I am convinced he would have done no better, but he would have talked more, and I would have learnt more about him.

Since it was by no means the boy's first offence against the law, he was not allowed to escape the consequences of his deed. I am glad to say he was not whipped, but was sent to an industrial school. This particular industrial school is not allowed to accept mentally defectives, but it was pointed out to the Head that this boy was not of low grade intelligence. Indeed, I do not think that, if a similar problem again arose,



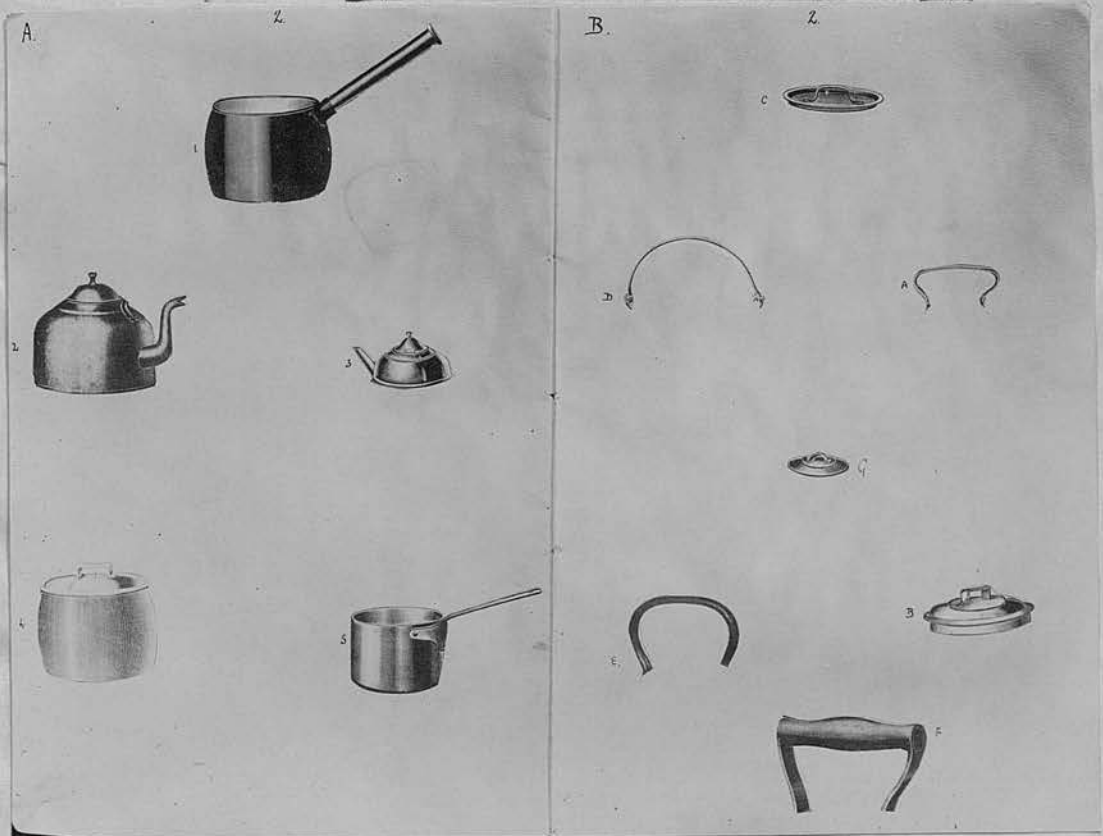
(Mechanical Aptitude Test  
Girls.

Specimen page.

Photograph of Page 2.

left-hand side

right-hand side



The original Mechanical Aptitude Tests have been retained for future use.

## PICTURE TESTS FOR GIRLS.

The Picture Test for Girls has additional modifications. On Page 1, five pictures have been placed on the left hand side, and only five on the right hand side. On most of the other pages there are 7 on the right hand side.

The Experimenter opens the Test at the practice series and says, "Look at this. Each object on this page (pointing to left-hand page) is used along with or belongs to something on the other page (pointing to the other page). Thus (pointing to the flour sifter) this is used along with that (pointing to A. on right hand page). This (pointing to 4) belongs to that (pointing to D). Now try the others yourself". (Give help if necessary).

"You will notice that (pointing to left hand page) here there are only 5 pictures, while on the other side (pointing to right hand side) there are 7 pictures. That is, on this side, there may be two extra pictures which we need not bother about.

Now I am going to turn over the page and let you do the rest yourself. Remember that each picture on one page is used along with, or belongs to, something on the other page".

The pictures on Page 1 usually delight the girls, who promptly place the cake in the cake-tin, and rarely insist on cooking the fish in the jelly-pan. It is very interesting to watch the performance at page 2, and it is remarkable how many girls say that the big lid (B) should go on the small pan (No.5) The various handles confuse many, and they have great difficulty in determining which handle belongs to a particular pot or kettle. On page 3 the Wireless pictures are again attractive, to girls as to boys, and many of the girls pair wardrobes and dressing tables

117  
tables correctly, by matching the handles. Page 4 is difficult in comparison with the other pages, and Page 5 is received with considerable enthusiasm, generally. On Page 6 the shade for the candle often acts as a stumbling block. Many of the girls do not know what it is, and it might be well to change this. Page 7 is somewhat different. On one side are five pictures, from a fashion book, of children dressed in frocks or coats, and on the other side 6 patterns of cloth are fixed. The subject, if further instructions are required, is asked to point to the kind of cloth which could be most suitable for making the garments on the opposite page. This test is much more difficult for children than one would imagine, and owing to its difficulty, it was simplified from having 7 pieces of cloth to choose from, to have only six patterns, and so just one odd one being left over. Page 8 is an attractive one, and fairly easy to the majority of children tested.

The test is further modified after Page 8. On Page 9 pictures of beds are shown and the subject is instructed to say which of the beds is better made. On page 10, pictures of two legs of mutton are shown, and the subject says which one looks fresher. The instructions for page XI. are :- "Coal fires cause a great deal of work. The pictures below show you how rooms are heated by other means to save labour. Point to the picture which shows the greater labour-saving device?"

On page 12 are <sup>pictures of</sup> ten patterns worked in wool. The child has to point to the 5 which are knitted, and then <sup>is</sup> asked how the rest are done. Very few children give the correct response to the latter half of the question.

Page 13 is a source of particular interest to most girls. Even girls from very poor homes enter into this part of the test with great interest and animation. Several have exclaimed /

exclaimed "I've seen rooms like these in the Pictures often". Very seldom does the test require further instructions. If a child hesitates the Experimenter says, pointing to page 13(a), "Which rooms do these go into".

The scoring of the test is simple:-

Page I. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | C.               | 1.     |
| 2.              | A.               | 1.     |
| 3.              | D.               | 1.     |
| 4.              | B.               | 1.     |
| 5.              | E.               | 1.     |

Page II. Answers.

| Left-hand Page. | Right-hand Page. | Score. |
|-----------------|------------------|--------|
| 1.              | B.               | 1.     |
| 2.              | E.               | 1.     |
| 3.              | A.               | 1.     |
| 4.              | D.               | 1.     |
| 5.              | C.               | 1.     |

Page III. Answers.

| Left-hand Page. | Right-hand Page | Score. |
|-----------------|-----------------|--------|
| 1.              | C.              | 1.     |
| 2.              | B.              | 1.     |
| 3.              | E.              | 1.     |
| 4.              | D.              | 1.     |
| 5.              | A.              | 1.     |

Page IV. Answers.

|    |    |    |
|----|----|----|
| 1. | B. | 1. |
| 2. | D. | 1. |
| 3. | C. | 1. |
| 4. | A. | 1. |
| 5. | E. | 1. |

Page V. Answers.

|    |    |    |
|----|----|----|
| 1. | B. | 1. |
| 2. | D. | 1. |
| 3. | A. | 1. |
| 4. | F. | 1. |
| 5. | G. | 1. |

Page VI. Answers.

|    |    |    |
|----|----|----|
| 1. | C. | 1. |
| 2. | G. | 1. |
| 3. | D. | 1. |
| 4. | A. | 1. |
| 5. | B. | 1. |

Page VII.

|    |    |    |
|----|----|----|
| 1. | V. | 1. |
| 2. | S. | 1. |
| 3. | D. | 1. |
| 4. | M. | 1. |
| 5. | K. | 1. |

| Left-hand Page. | Right-hand Page. | Score. |
|-----------------|------------------|--------|
| 1.              | B.               | 1.     |
| 2.              | C.               | 1.     |
| 3.              | E.               | 1.     |
| 4.              | A.               | 1.     |
| 5.              | D.               | 1.     |
| TOTAL           |                  | 5.     |

| Left-hand Page. | Right-hand Page. | Score. |
|-----------------|------------------|--------|
| Page IX.        | T.               | 1.     |
| " X.            | I.               | 1.     |
| " XI.           | N.               | 1.     |
| " XII. (a)      | 1,5,6,7,10.      | 1.     |
| (b).            | Crochet.         | 1.     |
| TOTAL           |                  | 5.     |

## Page 13. Answers.

| Left-hand Page. | Right-hand Page. | SCORE. |
|-----------------|------------------|--------|
| 1.              | E.               | 1.     |
| 2.              | C.               | 1.     |
| 3.              | D.               | 1.     |
| 4.              | B.               | 1.     |
| 5.              | A.               | 1.     |
| TOTAL.          |                  | 5.     |

As in the Mechanical Test for boys, the total score is again 50. At question Page XII (a) no credit is given unless patterns No. 1, 5, 6, 7, 10, are all given correctly. Tentative norms of comparison are given below.

| AGE. | NORM.             | No. of SUBJECTS. |
|------|-------------------|------------------|
| 9.   | 12 $\sigma$ 5     | 25               |
| 10.  | 18 $\sigma$ 6     | 48               |
| 11.  | 25 $\sigma$ 8.5   | 76               |
| 12.  | 33.7 $\sigma$ 7.5 | 91               |
| 13.  | 38.1 $\sigma$ 8   | 90               |
| 14.  | 42.4 $\sigma$ 6   | 80               |

The relationship between these mechanical aptitude Tests for boys and girls and general intelligence will be discussed later.

## THE TECHNICAL INFORMATION TESTS.

The Technical Information Tests for boys and for girls were suggested by the Thurston Technical Information Tests. Thurston's Technical Tests aim at ascertaining how much Technical Information a student acquired during his high school career ~~and~~, on his own initiative and by his own interest. Thus the items are mostly such as would represent activities outside of school. "They cover such Technical Information as a boy would gather from reading popular Technical Journals, constructing mechanical toys, enquiring about automobiles, engines, wireless telegraphy, and the various mechanical and electrical appliances in his immediate environment. If a boy has gained an extensive fund of such general and semi-popular technical information, one may be justified in assuming that his interests are fairly stable towards the engineering profession" (1) (§).

This test does not take longer than 30 minutes, but no definite time limit is imposed and the candidates are encouraged to give the most intelligent guess of which they are capable, even when they consider themselves quite ignorant of the subject matter of the questions. One point is allowed for each correct answer, and no partial credits are given. The score for the test is the number of correct answers, and the total score is thus 100. Each question has four printed answers and the subject has to underline one of the 4 printed answers, thus:-

What size of wire is most commonly used for wiring a house for 110 volts?

6

8

14

20.

As Thurston's Test is designed particularly for High School Seniors and College Freshmen, it was much too difficult for pupils aged 12-14 years and required modification.

(1). The Test for Boys.

Question 1 of Thurston's test was considered within the capacity of boys of the Qualifying Stage, with a slight change. Thurston's question is:-

(1). A magnet attracts

Brass, Copper, Iron, Platinum.

In the children's this was changed to:-

(1). A Magnet attracts

Brick. Wood, Steel, Slate.

Again question 7 in Thurston's Test was found simple enough for boys, and the only alteration was in the spelling of airplane.

No.11 of Thurston's Test:-

To keep the target rifle in good condition use - Corborundum paste, Dutch Cleanser, Vinegar, Three-in-one Oil was changed to:-

(25). To keep the barrel of a target rifle in good condition one often uses:-

Mansion Polish, Hudson's Soap, Petrol, Three-in-one Oil.

Again No.(4).

Bricks are made of:-

Clay, Granite, sandstone, Gneiss.

suggested:-

(4). Bricks are made of:-

Clay, Granite, Marble, Gneiss,-in the Test for children.

For No.42 Thurston's Test:-

Locks are Manufactured by:-

Corbin, Maybole, Starrett, Brown & Sharpe.

This was substituted:-

Locks are manufactured by:-

Chubbs, Co-operative Society, Maypole Co. Oliver.

No.54 of Thurston's Test was found quite easy for/

for boys aged 12-14 years and the only change made was that the word whet, was changed to sharpen, thus:- To sharpen a plane blade one should use -

Emery Cloth, File, Sandpaper, Oilstone.

No.58 of Thurston's:-

What material is used in making insulation of common bell or annunciator wire -

Wool, Rubber, Cotton, Silk.  
suggested No.43

An insulator is made of -

Copper Brass Rubber Iron.

No.59 Thurston's -

Ordinary Concrete contains -

Asphlat. Cement. Glass. Rubber  
was <sup>in</sup> concluded without alteration, also No.70 -

One part of the door is -

<sup>Lamb</sup> Paint. Head. Sill, Panel.

For No.76 of Thurston's -

Ordinary House Paint contains -

<sup>this was put:-</sup>  
(47). Oil, Water, Alcohol. Gasoline.  
Ordinary House Paint contains -

Oil, Concrete, Alcohol, Gasoline.

No.96 The volt is a measure of -

Current, Pressure, resistance, <sup>power</sup>,  
was simplified:-

(50). A Volt is

Instrument, Unit of Electricity, Cellar Leap.

The Correct answers for the test for boys are:-

1. Steel.
2. Oilstone.
3. <sup>Cycle</sup> ~~Clays~~.
4. Clay.
5. /
27. Receiver.
28. Chubbs.
29. Lift.Heavy Goods.
30. Engine.



Answers (contd.)

- 5. Wireless.
- 6. 7.
- 7. Joiner's Shop.
- 8. Glass.
- 9. Testing Plug.
- 10. Bow.
- 11. Motor Bus.
- 12. Vaseline.
- 13. Wireless.
- 14. Motor Cars,
- 15. Motor.
- 16. Riveting.
- 17. Place where motors raced.
- 18. Tool.
- 19. Coal.
- 20. Headle,
- 21. Ship's Signal.
- 22. Lime.
- 23. Mines.
- 24. Motor Cycle.
- 25. Three-in-one Oil.
- 26. Lathe.
- 31. Cement.
- 32. Expansion.
- 33. Gauze.
- 34. Left Hand.
- 35. Panel.
- 36. Machine Gun.
- 37. Wheel which does not revolve about its centre.
- 38. Magnet.
- 39. Overhead Wires.
- 40. Metal.
- 41. Engine.
- 42. Rubber Gloves.
- 43. Rubber.
- 44. Bridge.
- 45. Iron.
- 46. Léclanché' cells.
- 47. Oil.
- 48. Copper.
- 49. Mall.
- 50. Unit of Elictricity.

One <sup>mark</sup> ~~make~~ for each correct answer.

These Technical Tests have been printed twice, and the copies enclosed are the second effort<sup>ts</sup>. In the first edition some of the questions were too hard, and required modification. The first efforts were tried out on Edinburgh School children, but the improved tests only, were used in this industrial town.

(2). The Test for Girls.

This/

This test was more difficult to construct than the boys', and I feel it is inferior. It is received with great interest by the girls, however, and the only question I find to raise considerable disagreement among adults, is No. 7. Some maintain newspaper should be wrapped round fabrics. When setting this question I had in mind light, delicate fabrics which newspaper would soil, and the colour of which only blue paper would preserve. This test was sent to a Domestic Science expert in a large Edinburgh School, to criticise, before being printed, and she seemed to think No. 7 was quite satisfactory, although I do not know that she dwelt on it particularly.

The answers for the Girls Test are as follows:-

- |                                |                                  |
|--------------------------------|----------------------------------|
| 1. Sewing Machine.             | 26. Throw salt on Fire.          |
| 2. Sheep.                      | 27. Turpentine.                  |
| 3. Cold Water.                 | 28. 1 oz.                        |
| 4. Boracic.                    | 29. Boils quicker and saves gas. |
| 5. Red.                        | 30. Stimulate.                   |
| 6. Salt.                       | 31. Carpet Sweeper.              |
| 7. Blue.                       | 32. Fresh Milk and Fruits.       |
| 8. 1 Lb. Sugar to 1 Lb. Fruit. | 33. Soda.                        |
| 9. Curtain Material.           | 34. Never rub on soap.           |
| 10. Dish Cold Water.           | 35. Yellowish White.             |
| 11. Crust of Bread.            | 36. Keep head upright.           |
| 12. Roll in rug or blanket.    | 37. Lump of Sugar.               |
| 13. Hot Iron and brown paper.  | 38. According to grain of wood.  |
| 14. Pulses.                    | 39. Spotlessly clean.            |
| 15. Keep cover off saucepan.   | 40. Batine.                      |
| 16. Open top and bottom.       | 41. Stitch in Knitting.          |
| 17. Enamel.                    | 42. Linen.                       |
| 18. Scraped.                   | 43. Pin to fasten Meat.          |
| 19. Wool.                      | 44. Wool.                        |



absurd answers was obviously enjoyed, and throughout the test the children were quite entertained. One young man who appeared to enjoy his own test, went over to the Experimenter when he finished it, and asked in a whisper if he might look at the girls' one. It was vastly interesting to the Experimenter to see the various ways in which the Technical Tests were received. One class did it ~~so~~ stolidly, no ripple of a smile appearing at the idea of a cat's whisker being used in connection with fur coats, or at the suggestion that, to keep the kitchen sink sweet, one should wash it out with boiling water and sugar. In another class, where heads were industriously bent over the tests, now and then a head would be raised, and a pair of dancing eyes would meet the Experimenter's gaze. The corrected papers were very often eagerly asked back, "so that I can show my Father". Technical discussions sometimes took place afterwards. In one school so keen was the comment, and so enthusiastic were the boys of a backward class, that the master in charge of it gave a series of lessons, within the succeeding weeks, on points raised by the questions. In another school a Teacher saw, some days after the test was given, a group of boys in the playground, poring over an illustrated catalogue of motor cars and motor cycles, among which was a Harley Davidson.

It was desired to give these tests twice to the same group of children and to find the relationship between the results, but owing to the amount of discussion raised when the tests were completed, this was found to be impossible. It was tried with two Qualifying classes, but the results showed, without doubt, that such a procedure gave quite unreliable results. However, although a Teacher of backward children in a School, I was given advanced division classes to teach, owing to the continued illness of several teachers and I became well acquainted with those boys and girls in the advanced department.

We did silent reading tests daily, graphed the records of our progress, and did much exploring in books. We delighted in the use of a big and ornate vocabulary, and searched for light, colour and sound to relieve dull, everyday, diction, applying it when we found it with the liberal, confident hand of extreme youth. We were all poets, and all subjects were within power. Perhaps, when someone read aloud from a gem of English literature, we felt our own insignificance, but our self-confidence did not long remain dimmed.

Opposites, Analogies, synonyms, definitions, instructions, completion tests, absurdities and reasoning tests, were eagerly requested, and together we drew out a time-table, giving a certain amount of time per week to these exercises. The boys and girls kept their scores, and were greatly stimulated by this work. They were thus practised subjects, and when this practised stage was reached, I explained to them about a special test they could do if they wished. If they did the special test, they were to delay discussing it with each other, or anyone else, till I gave them permission to do so. If they did not feel able or willing to keep this condition, they were not to do the test. All were eager to do the test, and I think the result of this is very satisfactory. On the day after the Test, at the same hour, I gave out test copies again, and the test was once more attempted. After they were collected discussion was called for.

*retesting of children well known to me*  
The result of this, was so satisfactory that when I found teachers interested in this work, and willing to do the same thing, I gave them sufficient copies of the tests to take them twice and slumped the results. Thus, 697 boys and about the same number of girls were tested twice with the same Technical Test, and the correlation between the test results was worked out.  $r$  was found to be  $.95 \pm .0025$  (Boys) and  $.97 \pm .0017$  (Girls). These calculations are shown in the

Appendix.

About 700 children at each age were tested for standards of comparison, giving the following table of results:-

Boys - Technical Test.

| Age. | Provisional Norms. | n    |
|------|--------------------|------|
| 9.   | 13.8 $\sigma$ 6.9  | 702  |
| 10.  | 18.9 $\sigma$ 7.5  | 827  |
| 11.  | 22.2 $\sigma$ 6.1  | 750  |
| 12.  | 28.1 $\sigma$ 8.7  | 796  |
| 13.  | 34.27 $\sigma$ 8.1 | 1015 |
| 14.  | 38.5 $\sigma$ 6.6  | 1045 |

Girls - Technical Test.

| Age. | Provisional Norms. | n    |
|------|--------------------|------|
| 9.   | 12.4 $\sigma$ 6.9  | 749  |
| 10.  | 17.8 $\sigma$ 7.5  | 839  |
| 11.  | 22.04 $\sigma$ 6.3 | 739  |
| 12.  | 26.9 $\sigma$ 7.2  | 1003 |
| 13.  | 33.4 $\sigma$ 7.2  | 713  |
| 14.  | 38.3 $\sigma$ 6.6  | 1114 |

The Practical Test or The Plan Test.

This, test which is also a group of Tests, was constructed first of all for girls, but has been found equally valuable for boys. Each child is supplied with a sheet of ruled paper, as well as with <sup>a</sup> the copy of the test, and is told to look at the front page of the test, but not to open it, until the signal is given. As the subject's remarks are recorded by him on the ruled paper, the actual tests can be used many times, and are thus quite economical. The answers to this test are also written in pencil. On the front page of/

of the test there is a practice test containing a plan of two rooms, with special kinds of lines to indicate windows, doors and fireplaces. The instructions are:-

You know that, before a house is built, a plan of it is drawn, and, by reading a plan, we know how the house will look when finished. On this page you see part of the plan of a house, showing a bedroom and a parlour. Below there is a key telling you what the various lines mean. Now look carefully at it, and then point to the bedroom door ( Experimenter looks to see if everyone is correct), the parlour fireplace, the bedroom window, the parlour window, the bedroom fireplace.

Each child must be able to point to these correctly, before the experimenter asks the subjects to turn over the page to the real test.

In the real test the plans of two houses are shown, side by side. The instructions are:-

Here are the plans of two houses, both of which have the same number of rooms. One of the plans is very much better than the other. Examine both houses carefully. Write down, on the sheet of ruled paper ( experimenter holds a sheet up), which is the good plan, and say why. Although you choose the right plan, no marks will be given unless you give ~~the~~ correct reasons.

The scoring of this test presented more difficulty than that of the Technical Information Tests. In ascertaining the ~~mark~~ mark for each reason of preference, weight was given according to the importance of the fact pointed out, and also according to the degree of obscurity of the fact pointed out. For example, if a subject objects to the kitchen on the second plan having no window, he is given ten marks - six for the importance /

importance, and four for the obscurity, of the fact noticed by him. If he objects to the bathroom opening off the Kitchen he receives 8 marks - 6 for the importance and two for the obscurity of the reason given. While the facts of the Kitchen having no window, and the Bathroom being off the Kitchen, are regarded as equally important reasons for disliking plan No.2, the first objection is far harder to discover than the second, which can be seen at a glance. Accordingly, the second reason, being more obvious, only receives two marks for the degree of obscurity of the objection raised, while the first receives four marks.

The full scheme of marking is:-

| Reason.                                                                                                                                                                             | Weight given to importance | Weight given to degree of Obscurity. | Total SCORE. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------|--------------|
| 1). No Kitchen window in ll.                                                                                                                                                        | 6.                         | 4.                                   | 10.          |
| 2). Bathroom off Kitchen in ll.                                                                                                                                                     | 6.                         | 2.                                   | 8.           |
| 3). Back door in ll collides with Scullery door when both opened (4 Marks). Front door and Living Room door also (4 marks)                                                          | 3.                         | 5.                                   | 8.           |
| 4). Scullery should be near bathroom for water supply, as in l.                                                                                                                     | 2.                         | 4.                                   | 6.           |
| 5). Bedroom off Living Room in ll.                                                                                                                                                  | 4.                         | 1.                                   | 5.           |
| 6). Porch entrance in ll causes draught and (or) no privacy.                                                                                                                        | 3.                         | 1.                                   | 4.           |
| 7). Doors open wrong way in ll.                                                                                                                                                     | 1.                         | 3.                                   | 4.           |
| 8). Unnecessary corner in Living Room in ll and (or) in Lobby.                                                                                                                      | 1.                         | 2.                                   | 3.           |
| 9). Small central Hall in l; none in ll.                                                                                                                                            | 1.                         | 2.                                   | 3.           |
| 10) Sinks in ll too close to back door for safety of anyone standing washing when door opened.                                                                                      | 1.                         | 2.                                   | 3.           |
| 11) Windows in l provide better regulation of ventilation all over house or look more ornamental or are easier to raise or to clean, or cost less to replace when a pane is broken. | 3.                         | 0.                                   | 3.           |
| 12) Step in Porch in l not in ll (credit given if step called door)                                                                                                                 | 2.                         | 1.                                   | 3.           |
| 13) Bathroom - position of bath, &c., Superior in l.                                                                                                                                | 2.                         | 1.                                   | 3.           |
| 14) Press or Cupboard in Living Room, Kitchen and Bedroom of l. None in ll. (1 mark for each mentioned)                                                                             | 3.                         | 0.                                   | 3.           |
| 15) Superior position of Kitchen fireplace in l from Builders point of view or because nearer scullery or because of draught.                                                       | 1.                         | 1.                                   | 2.           |
| 16) Lobby larger in l.                                                                                                                                                              | 1.                         | 0.                                   | 1.           |

(17)/



Reason.

Weight given to importance  
Weight given to Degree of Obscurity.  
Total SCORE.

|                                         |    |    |     |
|-----------------------------------------|----|----|-----|
| 7). Kitchen bigger or rooms larger in 1 | 1. | 0. | 1.  |
| Highest Mark Possible.                  |    |    | 70. |

No marks are given when the wrong plan is chosen, or for statements such as: There are more windows in plan 1, the doors in plan 1 are better, one is cosier, plan 11 has too many corners, the Scullery in one is better, or for simply describing one or both plans, without attempting to say which is superior and giving reasons.

These marks, though arbitrary, were determined only after a considerable number of subjects were examined with the Plan Test. Two thousand, two hundred and eighty-two children (two with Intelligence quotients of 165 and 167 respectively), fifty reformatory boys, and twenty teachers were tested in all. Again no time limit was imposed, but children aged 12-14 years usually complete the test within three-quarters of an hour. The idea of the plan of a house does not, as a rule, appear so difficult for a child to understand as we might at first imagine. It is, as one small subject remarked, "Easier than maps" and as another said afterwards to her teacher, "It is just the same as when you play at houses in the garden with stones, and you have to pretend the walls and ceilings are there". One of the most interesting results obtained with this Test was from a girl aged 14 years and one month. (See School E) Throughout most of her school career, and, indeed, until exactly before the time she was tested by me, she was regarded as Mentally Defective. She was then taken in charge by a very experienced teacher, who coached a backward and over age class for the Qualifying Examination, The results from the Intelligence and/

and Educational Tests given, are: Mental Age 15 years 8 months, Intelligence Quotient 111, Reading Age, 9.9 years, Arithmetic (Mechanical) Age 9.9 years, Spelling Age, 12 years, Composition age 12 years, Writing Age, 14 years, Educational Age, 11 years 6 Months, Accomplishment Quotient 73. Her performance on the Plan Test was almost perfect and was as good as the best performance by any teacher tested, the best being from a Science Master with two Honours degrees. It should, perhaps, be added that, in the backward class of which this girl was for a year a member, very special emphasis was laid on Composition, This, no doubt, accounts for her Composition and Spelling Ages being higher than her Arithmetic and Reading Ages, the Composition and Spelling of the whole Class was particularly good for the level of Intelligence of the class.

*Age norms for the Plan Test are given in the Appendix.*

Correlation Coefficients for the Non-Scholastic Tests.

(1) Stenquist finds the correlation between the Assembly Test, Series 1, and an Intelligence Test to be  $.23 \pm .04$ , for 267 seventh and eight grade boys. Between Assembling Tests, Series 11, and the composite Intelligence score,  $r = .34 \pm .06$  for 100 seventh and eight-grade boys. Between Picture Test 11. and the same intelligence rating  $r = .34 \pm .03$  for 296 seventh and eight-grade boys. Combining all the four mechanical tests into one average T score (2) and correlating it with the same intelligence rating, he finds  $r$  drops to  $.21 \pm .04$  for 275 seventh and eighth grade boys.

The important inference he draws from these results is not with regards to the exact coefficients obtained, but with regard to the general fact of low correlation between the two kinds of ability here represented. Results obtained in the Army for over 14,000 men bear out the same general fact.

Stenquist /

(1) §. The case for the low I.Q. J. of Ed.

(2) This footnote is on next page.

Stenquist therefore concluded that an individual's position in general intelligence is largely independent of his position in General Mechanical Ability and Aptitude.

Dr. McFarlane in her Monograph (British Journal of Psychology) states that correlations between her practical tests and Intelligence Tests approach to zero (P.52). Dr. McFarlane uses the word "practical" in a more true sense than it is employed in the investigation. Her results suggest the speculation that if the general ability of a group is good one may expect all degrees of practical ability in the individuals, while if it is poor it is almost safe to predict that practical ability will tend to be poor also, that is to say, if general intelligence is low, the specific abilities alone do not carry a subject far towards success. (P.54).

Dr. McFarlane (P.56) conceives practical ability as a special ability differing from other special abilities, not so much in virtue of different mental progress involved, as in the nature of the material upon which these processes are directed. Like literary or mathematical ability, practical ability involves analysis and synthesis, judgement and conception. Its uniqueness lies in the fact that those persons possessing it in a high degree analyse and judge better about concrete spatial.

(2). How to measure in Education McCall P.296-306.

McCall proposes that a single common unit of measurement be adopted for all mental scales to be used in the elementary schools, namely, some function, preferably S.D. of the variability of 12 year old pupils. His T. Score, named in honour of Thorndike & Terman, is based upon the S.D. of the measures of ability of unselected children ranging in age from 12 years 0 mths. to 13 years. The T. Scale extends from 0 to 100, 50 representing the mean, median ability of 12 years old and each 10 points on the scale representing 1 S.D. of the distribution of scores of 12 year-old. Thus the zero point on the scale is at -5 S.D. and the 100 point at +5 S.D. The pupil who is just 1 S.D. above the median 12 year-old pupil has a T. Score of 60, the pupil who is 1 S.D. below the median 12 year-old pupil has a T. Score of 40.

spatial situations than do other individuals who perhaps excel in dealing with more highly abstract symbols. "It seems highly probable that persons who have great facility in dealing with material things may make use of quite different clues from those used by persons who express themselves in abstract ways."

Dr. McFarlane asks "To what degree of abstractness can "practical ability" be carried over, and does ability to deal with concrete spatial relations, mean also ability to deal with pictorial representations of these, and to very diagrammatic representations" She continues that the high correlations (.69 and .66) which Stenquist finds between his Assembly Tests and his Pictorial Mechanical Ability Tests suggest that the same ability holds in a somewhat less concrete field, but as success in both Assembly Test and the Picture Test depend very much on previous experience this evidence is not conclusive.

Abelson in his article on the Mental Ability of Backward Children, finds the following correlations:-

|                                 | <u>BOYS.</u>  | <u>GIRLS.</u> |
|---------------------------------|---------------|---------------|
|                                 | r.            | r.            |
| Reading Ability and             |               |               |
| Imputed Practical Intelligence. | .54 (n = 43.) | .43 (n = 88.) |
| Arithmetic Ability and          |               |               |
| Imputed Practical Intelligence. | .46           | .51           |

By practical intelligence, Abelson meant common sense for everyday worldly matters, and, in ranking the children in order of practical ability, the teacher was to ask herself which of these children she would soonest trust on an errand, requiring the sharpest intellect, and to take this into consideration when drawing up her list.

Motor/

Motor Tests (e.g. Healy's (Psychomotor) tapping test star Test, Well's Peg Test and paper folding Test) show a marked tendency towards a negative relationship with Academical subjects.<sup>(1)</sup>

The correlations found for the special non-scholastic tests used in the investigation were:-

|                                        | r.                             |
|----------------------------------------|--------------------------------|
| Picture Test (Boys) and Mental Age.    | $\cdot 28 \pm \cdot 07$ (n=80) |
| Technical Test (Boys). and Mental Age. | $\cdot 45 \pm \cdot 012$       |
| Picture Test (Girls) and Mental Age.   | $\cdot 21 \pm \cdot 06$ (n=75) |
| Technical Test (Girls) and Mental Age. | $\cdot 4 \pm \cdot 01$         |
| Plan Test and Mental Age.              | $\cdot 54 \pm \cdot 04$        |

As the correlation between these non-scholastic tests and general intelligence is not high, ~~and~~ our results show that <sup>the special tests</sup> they have thus given us clues to abilities which would not necessarily be revealed by intelligence or scholastic tests alone. The Mechanical <sup>Aptitude</sup> ~~Scholastic~~ Tests show the lowest correlation with general intelligence. "The more verbal the tests the higher their correlation with an adequate criterion of intelligence or ability to get along in school"<sup>(2)</sup> §

Additional Tests, not utilized in the Industrial Town. When this enquiry was carried out in Edinburgh schools by the Method of Sampling, 1924-1925, tests of a constructive nature were also attempted. A model cart was prepared which could be taken to pieces and put together again, without the use of tools. It was made in such a way that there was only one right way of putting it together. Small nails projected from/

(1). § J. of Ed. Psy. 1922 Vol. XI. P. 497-8.  
 (2). § do 7 XI. P. 520.

from the floor of the cart, for example, and these fitted into little holes in the sides of the cart. But the spacing of the various nails and holes into which they fitted was such that, as we have said, there was only one way to construct the cart, although the order of putting together the various pieces might vary, slightly. This was a speed test, and notes were taken of the method of attack of particular subjects. Errors were penalised by the extra time taken.

The second attempt, at a constructive test to tap special interests, was a Bell-circuit Test. A battery, buzzer, switch and three suitable pieces of wire were put before the subject, who was told to fit the apparatus together and make the bell ring. It should be explained that this test was introduced for one special boy, and that little was done with it after the boy was tested.

Both of these tests were discarded, the former because the individual testing took too much time, the latter because it demanded previous experience, and was not seriously intended to be a test. It was found necessary in the Cart Construction Test, to provide a complete model cart for the pupils to examine and copy. Diagrams of these tests are given.

CHAPTER IV.

UNSUITABILITY of CURRICULUM.

It was found that 230 children were backward in school work owing to low intelligence, 5 owing to weakness in a specific subject, 40 owing to other discoverable causes and 125 cases remained with their scholastic retardation unaccounted for. The next step in the investigation was to find whether the weak educational ability of these 125 cases was compensated for by non-scholastic ability and out of school interests. Mechanical Aptitude Tests, Technical Information Tests, and a Practical Test, were constructed for this purpose. Each of the 125 cases was very carefully examined with the non-scholastic tests which were standardised by applying them to unselected children, and the following psychographs were prepared to illustrate results.

① The psychographs have had to be placed in a file accompanying this thesis.

They illustrate quite clearly that 102 pupils, retarded in schoolwork, make a performance superior to their scholastic performance, on at least one of the non-scholastic tests. Several excel on all three "practical" tests, some do poorly in the Technical Test (or reading Test), others find the Plan Test beyond them, with a few the Picture Test is felt to be difficult. But 102 subjects showed ability in some direction, superior to their school achievement. These children appear to have practical, technical or mechanical interests, more intense than their interest in schoolwork. Practical, Technical or mechanical work is, apparently, more suitable for them than the usual school curriculum, or would be an avenue of approach to their more scholastic work. The chief cause of their retardation in schoolwork would appear to be unsuitability of curriculum. "We perform best those tasks which suit us and interest us, and the only sure foundation for an educational system is the child's native capacity for understanding and enjoyment. The world of Education corresponds to the world of today. Just as the hand and brain worker are beginning to realise their mutual dependence, and their equal right to respect, so the old controversy between the practical and the abstract in Education is fading away. Looked at from the right point of view we are all "of use" utilitarian and the only matter of importance is that we choose the task to which we are most suited, and in which we can best express ourselves. This illustrates<sup>(2)</sup> yet again that the clash between the cultural and practical arises from the attempt to treat human minds as though their requirements were exactly similar. We are provided also with a possible explanation of why the rate-saving educational economists can find such a strong case in the ignorance of so many of our "educated" children. Those children have spent/

(1).§ J. of Nat. Inst. of Indus. P.268. Ed. of Ind. Earl de la Warr.

(2).§ P.269.



spent their school lives in having their minds forcibly applied to subjects for which they have no capacity.....

..Practical Education (P.270) does not mean a glorified apprenticeship system resulting in the production of an increased number of human cogs in the industrial machine. But it does mean the relation of the subjects taught to practical life. Thus in the country, let the children learn about milk, the soil &c., not to make him into an agricultural chemist or to limit his knowledge to purely local matters but to associate science and history in his mind, with matters that have for him a living reality".

These 102 children reminded me of a case described in the Journal of Applied Psychology (6) 1922 "Mental Tests as an aid in the Analysis of Mental Condition" (H.J.Baker). This youth was aged 16 years, M.A. 17 years 1 month, I.Q. 107. His scholastic work was very poor but he had an undoubted mechanical turn of mind. He did not study but spent all his spare time around <sup>laboratories</sup> labs. frequently getting minor injuries by unsupervised experiments. His test profile was possibly the result of good ability linked with poor application, and little development of specific abilities.. "In this case unless he can be induced to realise the value of traditional subjects it would seem well to allow to allow him immediately to work along his own natural bent as a major interest..... There should be some way provided by which his ability and interest can be cultivated, for he might easily be successful as a mechanic or inventor. Society needs to conserve its talent in such cases which at least have good chances of success."

Since 102 children were discovered to have specific abilities of a mechanical or technical nature, 23 cases remained whose educational retardation could not be accounted for by any known or discoverable cause.

The following tables have been prepared to summarise the results:-

| SCHOOL. | Low Intell-Specific Home Cir-<br>igence. Subject. cumstances. | Illness Health. Diff. | Change of Temper-<br>School. Defect. | Phys. Unsuit of<br>Curric. | Change of Lang-<br>School. Diff. | Change of Home<br>Circumstances. | Change of Illness.<br>Health. | Change of Language<br>Difficulty. | Change of Change of School. | Physical Defects. | Unsuitability of Curriculum. | Undiscovered. | Undiscovered. | CAUSE. | TOTAL. |
|---------|---------------------------------------------------------------|-----------------------|--------------------------------------|----------------------------|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|-----------------------------|-------------------|------------------------------|---------------|---------------|--------|--------|
| A.      | 12                                                            | 0                     | 1                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 0                 | 0                            | 0             | 2.            | 25.    |        |
| B.      | 4                                                             | 1                     | 1                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 0                 | 0                            | 0             | 0             | 6.     |        |
| C.      | 17                                                            | 2                     | 1                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 4                 | 0                            | 0             | 0             | 24.    |        |
| D.      | 16                                                            | 0                     | 5                                    | 1                          | 0                                | 0                                | 0                             | 1                                 | 0                           | 2                 | 0                            | 0             | 0             | 27.    |        |
| E.      | 6                                                             | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 14                | 0                            | 0             | 2             | 24.    |        |
| F.      | 4                                                             | 0                     | 4                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 13                | 0                            | 0             | 0             | 21.    |        |
| G.      | 25                                                            | 1                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 2                 | 2                            | 0             | 1             | 29.    |        |
| H.      | 12                                                            | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 2                 | 2                            | 0             | 0             | 14.    |        |
| I.      | 27                                                            | 0                     | 2                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 7                 | 7                            | 0             | 0             | 36.    |        |
| J.      | 7                                                             | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 1                 | 1                            | 0             | 1             | 9.     |        |
| K.      | 30                                                            | 0                     | 1                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 0                 | 0                            | 0             | 0             | 31.    |        |
| L.      | 11                                                            | 0                     | 2                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 0                 | 0                            | 0             | 0             | 15.    |        |
| M.      | 20                                                            | 1                     | 1                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 4                 | 4                            | 0             | 0             | 27.    |        |
| N.      | 15                                                            | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 6                 | 6                            | 0             | 3             | 31.    |        |
| O.      | 6                                                             | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 19                | 19                           | 0             | 5             | 31.    |        |
| P.      | 10                                                            | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 8                 | 8                            | 0             | 3             | 23.    |        |
| Q.      | 8                                                             | 0                     | 0                                    | 0                          | 0                                | 0                                | 0                             | 0                                 | 0                           | 11                | 11                           | 0             | 6             | 27.    |        |
| TOTAL.  | 230.                                                          | 5.                    | 18.                                  | 8.                         | 4.                               | 4.                               | 4.                            | 2.                                | 102                         | 23.               | 400.                         |               |               |        |        |

Note:— Total No. examined = 430.  
 No. found Normal & excluded = 30.  
 No. of "Backward" Children examined. = 400.

BACKWARDNESS IN SCHOOL WORK.

| PER CENT. | CAUSE.                       |
|-----------|------------------------------|
| 57.5      | Low Intelligence.            |
| 1.25      | Specific Subject.            |
| 4.5       | Home Circumstances.          |
| 2.        | Illness. Health.             |
| 1.        | Language Difficulty.         |
| 1.        | Change of School.            |
| 1.        | Temperament.                 |
| .5        | Physical Defects.            |
| 25.5      | Unsuitability of Curriculum. |
| 5.75.     | Undiscovered.                |

The most interesting group, from the point of view of the present investigation, is the 25.5%, a quarter of the children at the Qualifying stage who were retarded in school work.

Curriculum based on Practical Work.

It is not the aim or purpose of this investigation to decide what the precise nature of this curriculum for the 25.5% of scholastically retarded children should be. In a Memorandum<sup>s</sup> on "The Education Problem" some years ago, Mr. Gregor McGregor, Director of Education for Fife, concluded, "In all the Technical Courses, English, in the opinion of the writer, should be regarded as the main avenue of culture. The responsibilities of citizenship should likewise receive attention and emphasis should be placed on the duties of manhood and womanhood, rather than on the preparation for any particular type of future employment. Sense training should also be prominent, and in connection therewith a genuine effort should be made to train the hand and eye, the ear and voice, to an appreciation of the world's greatest joys in Art, Music and Handicraftsmanship".

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The actual practical courses of instruction given to pupils with mechanical interests, would, no doubt, be influenced, to some extent, by any special facilities or equipment possessed by the school, by qualifications and interests of teachers employed in teaching these pupils, by accommodation, by material available and so on. For instance, one school I know, is fitted up for Evening Continuation Classes, with machinery and apparatus for book-binding and printing. The Headmaster of the night-school is the teacher of backward boys in the day-school, and when first given charge of them he took the retarded boys to the workshop, where they made a simple note-book to use in class. A good proportion of their time is given over to making exercises for their writing and counting, making pencil cases, blotting pads, imitation leather pocket books for Christmas gifts, fancy boxes, albums for cigarette cards, and innumerable other fascinating objects, as well as useful things ~~as~~ <sup>like</sup> paste. Odds and ends of paper, cardboard, imitation leather &c., from the night classes are utilized in the day class, and, all odd pieces being carefully preserved for future use, the expenditure on material for the backward class of boys is very slight. The work of these backward pupils was examined by an expert from one of the largest printing and book-binding firms in Scotland, and, to the boys' delight, he praised it very highly. This school is situated in the heart of the City. It has no facilities for gardening or poultry-keeping and I do not expect that the master in charge of the backward class would know anything about gardening, or looking after poultry. Why should he when he is a well-known expert on book-binding and printing, in addition, <sup>to</sup> having other academic qualifications?

If this work were done in another school of which I am thinking, situated in the heart of the country, it would cost/

cost a great deal to the Education Authority. Apparatus would have to be purchased and installed, additions made to the school building, and material bought. Another teacher would have to be found because the "backward" enthusiast in this second school does not know how a book is made. He knows about every flower and plant in the surrounding district, and has fascinating tales to tell of birds and insects. His school gardens are the pride of the country-side and his boys are eager enthusiasts on gardening. The soup, for the children who cannot walk the long distance home for lunch, costs the Authority or the parents nothing, because the school provides abundance of vegetables and potatoes, and sells what it does not require. The school poultry are comfortably lodged at nights in cleverly constructed, in-expensive houses, and they require a Treasurer <sup>selected</sup> among the pupils to look after the profits.

If instructions on practical lines were commenced in any school or class which had little previous experience of, or facilities for, practical work, it does not signify that this step would cost more in the way of material and equipment than the ordinary educational system. At St. Andrew's Summer School, July, 1926, Mr. Marshall, then a lecturer on Educational Handwork at Edinburgh Provincial Training College, gave a three weeks' course of practical instructions for teachers, with special reference to the teaching of backward children. One of the chief aims of that course was to make the teachers see how much could be achieved at a minimum cost. If we wanted clay to make an historical model we did not go to a shop and buy it, but a trip was made to a likely spot in the neighbourhood, and the clay brought back free of cost. Again a variety of articles and pieces of furniture were made from pieces of wood and boxes which was gladly supplied by local tradesmen, for little or no cost. When a group thought of a new project, the members did,

did not ask "What material will we have to buy", but, "What material have we got that is suitable, or that will act as a substitute for something we need", or, "What can we make use of in our environment to help us, or obtain at a moderate cost". The nails required to fix together some of the products of our skill, were not bought from an iron-monger's shop, but were carefully taken from the wooden orange boxes, and other boxes, supplied us by tradesmen.

Again, in this course it was emphasised that the pupils were to make what they wanted to make, thus what they were really interested in, and they were to be allowed to use their muscles, and their energy, although the noise of hammering &c., was undue.

The trouble in some of the schools would not be the question of equipment, material and apparatus, so much as a spare room <sup>in which</sup> to carry out the work, ~~in~~ and the other serious fact of size of class. In industrial towns we are still up against the problem of accommodation. Even today (26/3/28) I was in a school built to hold 900 children and accommodating 1200! Many of the rooms were originally built to hold 80 children and now two teachers are teaching in these large rooms, a class of 40 each, simultaneously. There is a promise of a new school, but it will no doubt be some time in materialising. In that school there is a tutorial class of 46 children, and one does not need to ask why this tutorial class is so big, or why it is given no course based on practical work.

The problem of large classes is still a serious one and in answer to a question in Parliament recently Lord Eustace Percy stated that there were, on March 31st, last 43,094 classes with between 50 - 60 pupils and 278 with over 60. In "Primary School Notes" - Times Educational Supplement (March 3rd. 1928) - it is pointed out that the younger children have an undue share/

share of the ~~the~~ large classes.

"Of the classes with over 60 pupils, 79 per cent consist entirely of pupils under 11 years of age, and 50 per cent of the 73,600 classes consisting of these young people, have over 40 pupils on the roll. Of the 40,000 classes containing pupils under and over 11 years of age, 40 per cent contain over 40 pupils, while, we come to senior classes containing only pupils of 11 years and over, the percentage of larger classes falls to 26. While five-sixths of the classes of younger children, consist of both boys and girls the proportion falls to one-half in those containing pupils under and over 11 years, while, of those with pupils entirely over 11 years, rather more than one-third, are mixed.

Lord Eustace Percy has made the reduction of the number of classes with over 50 pupils one of the main aims of his administration, and he can claim to his credit a fall of nearly 5,000, one fifth of the number existing in 1923-24".

An effort is also still being made in Scotland to reduce the number of pupils in classes to 50, at the maximum. Although the average number of pupils per class in Renfrewshire is only about 43, the classes in the industrial centres are big, about 50, and some have even more pupils. It is the small rural school which affects the average number per class.

The problem of practical education and size of class is ably discussed by Mr. Gregor MacGregor in the article above quoted.

"For years various commercial men have slandered education, because in their opinion, it was not practical enough and did not produce the goods. If in any way education has/



has failed to produce the goods, the one cause which has contributed most towards that end, is the enforced instruction in mass rendered imperative by the large size of classes.

If it has not been practical enough, the obvious reason is that practical work is individual work, and individual instruction is simply impossible in the 40 to 60 class rolls so characteristic of our primary departments. In our public schools there is probably not a single class which does not exhibit a wide divergence in the abilities of pupils and great differences in temperament and disposition. To differentiate instruction to meet such differences is the ideal of every true teacher, and no system of education can be called progressive which does not take cognisance of such distinctions. The bigger, the class, however, the less easy it is to recognise distinctions, and the greater, in consequence, is the disadvantage that must accrue to those who differ from the normal. In mass instruction the rate of progress must approximate to that of the average, and as a consequence the clever pupils are retarded and the slow and backward are more or less neglected. By the exercise of mass discipline, the active and restless are suppressed, and their interest is lost. Through the lack of individual attention, and of practical instruction, the slow and backward lose their only chance of making progress according to their parts".

This plea for a course of instruction based on practical work is, as indicated by <sup>the</sup> ~~a~~ quotations given above, not intended to imply that children should be taught a trade. "Specialisation during the first 12 years of childhood is the exception rather than rule. Age alone betrays our idiosyncrasy.

Adolescence, / artistic spirit, and obligingly remained dull through out his infant, junior and senior career. If this explanation is trustworthy, this boy is one of our school failures in the sense that we did not take full advantage of and make the best

Adolescence is pre-eminently the period when many of these localised talents and specialised interests seem for the first time to mature. Accordingly, efforts at vocational guidance and educational specialisation must not be forced at too early a stage".

§ Burt. J. of Nat. Instit. of Indus. Psy. IV. Mental Diffes. between Indus. P.71.

CASES UNDISCOVERED.

No cause could be found to account for the scholastic retardation of 5.75%. In discussion<sup>ing</sup> this problem with Headmasters some were of the opinion that, because some of these children had older brothers and sisters who were backward, the infant and junior teachers had taken it for granted that the young members of the family were likewise slow and poor at school work. The Headmasters thought it likely that, in a few cases at least, this fact would account for the backwardness, and that, accordingly, these few children had been "made" backward.

One case in particular, was that of a boy, the youngest of a family of five, all of whom passed through the same school. The four older children were described as being "hopeless" all finding great difficulty with both counting and reading. It was suggested, therefore, that the boy was suffering owing to his brothers' and sisters' imperfections. By the time he arrived at school-age, the reputation of the family was made, and <sup>it</sup> may probably have been assumed that, because the others were dull, this boy was also a potential non-qualifier. If that was so, he, apparently, accepted the dullness which was thrust upon him in a fatalistic spirit, and obligingly remained dull throughout his infant, junior and senior career. If this explanation is trustworthy, this boy is one of our school failures in the sense that we did not take full advantage of, and make the best of /

of the material placed in our hands. We received material of good quality, and turned out an indifferent article.

In routine testing in a large education area, I found at least two children of this type. When it was impressed on the teacher, and <sup>on</sup> the child, that the latter was "clever", progress was made, and, in one of these instances, my enquiry as to how progress was being maintained after an interval, was met by an indignant denial that anything had ever been wrong with the child's work, the teacher forgetting, in the joy of progress, that six months previously she had alleged, in writing, the child to be Mentally Defective!

I think that probably some of these cases are temperamental cases whose peculiarities in character have not been detected.

“ The relatively low coefficients of correlation (about .5) between performance in Intelligence Test work and performance in school work, are generally recognised to be due, not so much to defects in the tests, as to the fact that school achievement involves other factors than those measured by means of the intelligence tests. A coefficient of correlation of .5, between record in an intelligence test and record in school work, is a statistical expression of the fact that some children do better in school than their intelligence test records would indicate that they should, while others do not do so well as they should when judged on this basis, but that on the whole success in the Intelligence Test and success in school go together.

One form of discrepancy noted, is due to the tendency on the part of teachers to spur on the inferior child, and to retard the superior child. But other causes must be sought, for/

for the fact that there are also some children who test low and do poorer school work than they should, and some children who test high and do better school work than they might be expected to do. Now the forces producing this condition are no doubt many and varied. Certainly health, home conditions &c., would play a part. An important group of other factors is indicated by the term character traits". (1).

Poffenberger & Carpenter believe it is quite feasible to construct an efficiency or competence test which measures, at one operation, the intelligence and the character traits vital to success. Two groups of children were selected by them for further study.

- (1). Success group - children with higher position in school work than in Intelligence Test score.
- (2). Failure Group - lower in school performance.

The average I.Q. for the successful group, was 106.6, and for the failure group 113. "This bears out the current view that there is a tendency to let the more intelligent children work below their capacity as measured by the tests" (2).

Poffenberger and Carpenter, in the same article, draw two conclusions -

(1). Certain so-called character traits do contribute to success or failure in school work. These are, on the whole, what common sense would lead us to expect. For instance, speed and flexibility of reaction, assurance, perseverance, and care for detail, are traits indicative of success, while the failures tend to lack speed and flexibility, to be careless and not persevering. Other traits take on significance when one goes back of the <sup>mere</sup> ~~name~~ name, and analyses the actual work performed/

- (1). J. of Exp. Psy. Vo.VII. No.1 P.67. Character Traits in School Success Poffenberger & Carpenter.
- (2). Loc.cit.

performed.

(2). These traits are such as can be measured by relatively simple test methods which might be incorporated into our present intelligence examination with slight modification.

It would be presumption to say that ~~any of~~ the backwardness at school work of this 5.75% was the result of bad teaching. It is, however, a well known fact that children who respond well to one teacher, sometimes make a much poorer response to another, and, if a class remains three or four years with one teacher, instead of having a different teacher each year or six months, injustice may occasionally, unconsciously be done to a child.

Only one case of alleged "bad teaching" has come to my knowledge and this is not in the <sup>town</sup> ~~area~~ where the investigation was carried out. It was alleged that the teacher spoilt every class she had, that no one in a class near could do proper work for the noise in this teacher's class, and that she was definitely, temperamentally unfitted for teaching. This teacher refused to take any advice from those under whom she worked, and said she "could show any teacher in the school how to teach". Her record showed that she had had a break in her teaching life of  $4\frac{1}{2}$  years, and this was in spite of the fact that her parents were in considerable poverty.

In this connection, it is interesting to select one of the compositions from a boy in the 5.75% group. It has been typed as it contained references which would have shown at once the school to which it belonged, name of headmaster and teacher &c., and these details have been omitted without any other change being made:-

Age 13. I.O. 90.

*one of*

School is said to be the most important places in Great Britain. I do not like school because I am a poor skoler/

sckoler but I like jommitery and moddeling. Today the boys play that football in the playground and it was fine. I want to leave school in the ottum to get a job. This school has a launch room for the teatchers hit helled the best abtendance for the whole of — last year. I do not think school is the best time in your fife.

---

On reading this over, and even without consulting the I.Q., I think it has been done by a boy with possibilities. The very effort of the first sentence shows a maturity, the only mechanical slip being in the spelling of Great. Again in the second sentence he explains why he doesn't like school, hastily adding the subjects which he does like. This, apparently, brings to his mind the absorbing game of football in which he has just glowingly participated, and the third sentence suggests also that he speaks in a somewhat slovenly manner. This is the case. He says "play that" not "played at". Again, the idea of not liking school is brought in. "I want to leave school in the ottum". He is still in an elementary school, with no advanced division course of its own, and everyone, friends neighbours, &c., knows he will leave without qualifying, and that he hasn't been clever enough to be "passed on". He is the only pupil in any school in this area to mention the fact of the average school attendance for the previous year. With the last sentence comes the rather pathetic repetition of the fact that he does not like school. He does not complain of being punished as some children do, whether they are or not. His last sentence seems to me a protest against the feeling of inferiority which is his lot.

It is perhaps unexpected that this boy did not do well in any of the special tests. Possibly in a construction test,

test he would have shown up better. He may be a temperamental case undiscovered. The teacher did not complain of sulkiness, or any unusual behaviour, and no apparent cause of retardation in the home, was discovered.. The damage may have been done at home before school age, and he may have gone to school convinced of utter inability in his five-year-old mind. The last possibility suggested is that of unsatisfactory teaching. A quotation I have kept, but the source of which I have long since lost, might offer some help:-

*childhood's*

"A host of other ~~children's~~ defects, of which perhaps the most common are awkwardness, clumsiness, stupidity, and failure to learn, are also psychic defences or protests against the feeling of being neglected".

*must not be*

It ~~is not~~ assumed that backwardness in school work is adequately accounted for by one discoverable cause. In very many of the cases found in this enquiry, a variety of causes were operating — a child had perhaps a poor home, with no mother to look after him, he was inadequately fed, poorly clad, and was handicapped with a stammer or a squint. He was perhaps kept off school, on little or no pretext by his father, and was not given the chance to prepare any homework at night, no matter how willing he might be. Again there may be serious causes operating, of which the teacher, Headmaster or Doctor <sup>is</sup> are unaware, and which even an interview with the parent fails to bring to light. There may be jealousies between children of one family, which pass almost unnoticed by the parents, or to which the parents blind themselves. Again the parent or parents may prefer one child to another, and yet wonder why the child not preferred is sullen and resentful. An unkind, cruel remark to one child, for example comparing him unfavourably with his brothers or sisters, may do a world of harm to a sensitive child, and may later account for scholastic backwardness or backwardness in one subject, if the facts were known.

To take one case, a child aged 7 years was sent to a music-teacher every Saturday for pianoforte tuition. She was

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extremely enthusiastic, as it felt very grown-up and important to have reached such a stage of advancement, and the music case given the child added to her satisfaction, as it was an attractive one of red leather with initials in gold. The music Teacher composed little pieces for the child, and it was no ~~handicap~~ <sup>hardship</sup> for her to give up a Saturday morning's play for a lesson in music. Two terms passed happily away, and before the end of the third one, the little girl was sent with her two sisters on a holiday. During this holiday a visit was paid to some friends, to an uncle of the child's mother and three grown-up cousins, all of whom prided themselves on their musical ability. It is perhaps natural that, as this story belongs to the days before wireless and gramophones were popular, everyone was asked to play and sing, and most of the people present performed with considerable pleasure. The two elder sisters of this child played quite brilliantly, and showed both talent and careful tuition. They played without music, and when the then youngest member of the family was commanded to perform she climbed with difficulty on to the high music stool, and played with great deliberation and painfully slowly, a small piece entitled "On the Sea". It was the first time probably she had played in public, perhaps the first time from memory, and as her legs dangled uncomfortably far above the pedals, it is quite to be expected that her playing was not entirely creditable. Her performance was followed by the uncle questioning her as to the name of the piece she had played and, on being told, he laughed and loudly remarked, "I thought it must have been something like that, because it made me feel quite sea-sick". This witty remark provoked a burst of laughter in which the child, crimson-faced and tremulous, nervously joined: and the story does not end there. When the three children visited other relatives on that holiday, the two elder ones related this tale with great enjoyment, unconscious of the deep, awful hurt they were aggravating. They knew they were good pianists themselves and saw only the humour of the witty/



witty remark made by their mother's uncle. When the children were taken home the story was again repeated, and was again enjoyed, although in a more kindly way, but, as at first, on each occasion it was told, the child tried to laugh with the others, while enduring untold agony of shame, and hurt to the very quick. In the years that followed these three girls went often on a holiday to friends, and the story was periodically unearthed and repeated. It came to be, and still is, a standing family joke, which is used to help to entertain a difficult visitor, or fill in a long, embarrassing pause in conversation, when guests are present. On the last occasion it was told in my presence, 16 years after the performance which provoked the remark, it still had the power to hurt, and I once more forced myself to join in the laughter, <sup>though</sup> and deeply conscious of a feeling of inferiority, because I was the child who played "On the Sea".

It is interesting to note that none of my relations can understand why I cannot play the piano. They know that up to the age of 15 I was regularly at <sup>music</sup> ~~the piano~~, that my progress was unsatisfactory in the extreme during these eight years, and that from the day on which I had my last lesson in music till this I have never touched a piano. Musical instruments of that type simply do not exist in my world. I listen as a rule to pianoforte performances, not with extreme distaste but quite indifferently, as if I were a spectator patiently watching something, which was almost meaningless to him, and the spirit of which he could not enter into. Some kind family critics say I have "no ear" but no test in the psychological laboratory has revealed any striking deficiency, and in doing psychological experiments I kept this probability in mind. I do not think there is any reason to prevent me playing the piano, in an uninspired, mechanical way, except the effect of the remark provoked by my childish performance.

Conclusion.

## CONCLUSION.

Although the utmost care was taken, in discovering the various causes of retardation for the 400 subjects, the 25.5% of cases suffering from unsuitability of curriculum and the 5.75% of cases, the cause of whose retardation was undiscovered, may be a somewhat rough estimate. The non-scholastic tests are not deemed anything but crude instruments, and their results accordingly will lack in reliability. Many other scholastic tests may have been required.

When this investigation was carried out in Edinburgh schools by the Method of Sampling, the results were strikingly similar to those obtained above. Roughly one quarter were found to be mal-adjusted to their existing curriculum. By other methods, the Fife Education Authority reach the same conclusion. The results obtained are sufficiently reliable, at least, to indicate that there is a big proportion of scholastically retarded cases which form a serious problem waiting for us to solve. We have, by these results, a big number of children with talents and abilities lying dormant in school, and we are not offering them work suitable, or intrinsically interesting. The result is that they are liable to degenerate, and this degeneration may take the form of laziness, or may show itself in mischiefmaking and waywardness. To leave children of good enough capacity in classes where they do poor school work, through lack of interest, is to tend to inculcate in them habits of laziness and discontent, and, by sheer neglect, wrong attitudes towards work which will later be a problem for us to solve. The school by failing to discover and help those backward-children-who-are-not-backward-in-intelligence, is failing to start them on their life's career as workers and useful citizens, who have learnt though young, the joy, the culture/

culture, and the dignity, of work.

Just as it is a notorious, though true, fact, that the class teacher objects to the loss of her brightest pupils by extra promotion, and feels the promise of clever children from the class below, but an insufficient compensation, so is it the case that we are sometimes blind to existing abilities in children, and to account for poor educational work, suppose a retardation in general intelligence, where it does not exist. It is a great comfort to delude ourselves, that, because a child is poor at reading and counting, he was born inferior mentally, and will never make much headway, in spite of our efforts. But to see that child outside, alive, full of energy and keen, vivid, eager interest in what goes on around him, or to startle him in school by some chance remark, into giving some unexpected, unusual information unknown to other boys, gives one food for thought.

Executive Officer.

The whole problem of scholastic backwardness, as distinct from mental defect, is becoming a centre of very great interest. Educational Journals offer interesting information on the subject, ~~and teachers~~ and holiday courses for teachers frequently advertise training for teachers of backward pupils, as well as <sup>for teachers</sup> of mentally defectives. In many schools I have been in, the Headmasters are carefully considering each case of definite educational retardation, and are recording the causes in the book shown opposite. They realise the very great complexity of the problem, the many types of backwardness, and in this area, indeed, there is a request for new terms to express the various degrees of backwardness and the various types.

With regard to ordinary educational backwardness, with an innate retardation not sufficiently acute to have the pupils sent to a special school, we are beginning to make progress in/

in this area. More of our schools are being given an extra teacher to tutor the children and here and there, an infant teacher is free in the afternoons to devote her time to coaching pupils. Again, in one small 4-teacher infant school in this area we have re-classified the children. Now, instead of having 4 infant classes we have three infant classes, and a smaller tutorial class. Also since the younger children now get home for good at 1 p.m., the teacher free after her lunch hour, tutors the children, in the other two infant classes, who require extra help. This is an experiment, although no opportunity was given to carry it out scientifically, with a control group. Even if a school has no extra room, or teacher, or special provision for backward children, the names of such are entered on the record book shown above. Mental Testing and Educational Testing is done, and suggestions about apparatus and material ~~is~~ given, if any school applies to the Executive Officer.

Professor Burt, who is our chief inspiration, states as a warning to these who think individual teaching alone is sufficient - (1). "Yet even for the backward, individual teaching may be no less wasteful - it will indeed be more wasteful than class teaching, unless it follow the appropriate method: and the appropriate method can only be discovered by an intensive study of the special needs of each particular child". With regard to the problem of <sup>the</sup> Mentally Defective we are beginning to see that he should not be sent to a Special School because of his inability to do the work of a normal class, but because of his inability to make satisfactory progress in a backward, tutorial or adjustment class, after a fair trial period.

To return to backwardness of the type with which  
this/

(1). Mental & Schol. Tests. P.268.

this investigation is chiefly concerned, it has been found that, as a result of a careful, individual examination of all alleged mentally defectives in the whole County, 2% are children of normal intelligence, but suffering from unsuitability of curriculum! A very important aspect of the problem, again, is, that Burt tells us in the chapters on "Intellectual Conditions" <sup>in</sup> and the "Young Delinquent", that young delinquents are found to be educationally backward far more often than they are estimated as M.D., and one of the most notable points <sup>he</sup> ~~is~~ <sup>makes,</sup> that even temporary illhealth, by resulting in backwardness in school, may help to bring about a state of disheartenment, and discontent, which facilitates crime. This warning of the serious, far-reaching effects of educational retardation, is surely sufficient to ~~cause~~ us to pay attention to the proportion of our pupils who are suffering from unsuitability of curriculum.

In the past school work has not taken sufficient account of practical, mechanical and technical subjects, and while this is immaterial for the normal child, in dealing with the problem child, mainly interested in these matters, this type of work cannot, with justice be ignored.

RENFREWSHIRE EDUCATION AUTHORITY.

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Record Book of Children  
Requiring Tutorial Instruction.

RENFREWSHIRE EDUCATION AUTHORITY.

RECORD BOOK OF CHILDREN  
REQUIRING TUTORIAL INSTRUCTION.

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.....*School.*

Division(s) of School from which Pupils are drawn.....

State whether a Tutorial Class exists in School or not.....

In Schools without a Tutorial Class state briefly measures in operation to remove backward condition of pupils.

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RECORD OF VISITS:—

| NATURE OF VISIT—GENERAL OR SPECIAL. | DATE. | SIGNATURE. |
|-------------------------------------|-------|------------|
|                                     |       |            |