

R E T A R D A T I O N I N C H I L D R E N

O F

H I G H I N T E L L I G E N C E

by

Violet Mitchell McLAREN, M.A., Ed.B.

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CHAPTER I

I N T R O D U C T I O N

With the increasing demand for the right of every child to an education suited to his age, ability and aptitude many children of normal and of superior intelligence because of their failure to master the fundamentals in reading, arithmetic and spelling, do not qualify for admission to secondary school courses of an academic type and thus constitute a serious educational problem. Although instances may be cited of school failures who became eminent in later life, the list including such names as those of Goldsmith, Darwin, Isaac Newton, Jonathan Swift, Byron, Hegel, Curie, Goethe, Pasteur, George Eliot, Lord Macaulay, John Stuart Mill and Napoleon, a situation in which an intelligent child is making less progress than his mental capacity would warrant presents a challenge to the educator and calls for investigation.

THE PROBLEM

This study is an attempt to determine the causes of scholastic retardation in intelligent children.

What is the origin of the discrepancy between the intellectual capacity and educational achievement? Is the problem that of the learner himself or does it arise from his conditioning experiences? Why does the scholastic performance of some intelligent children transcend that of others equally

endowed? What, if any, are the differences in physical, scholastic, social and emotional circumstances between children of good mental capacity who succeed in school and those who do not?

What part is played by the physical factor? Are physical defects more frequent in the failing group than in the general school population? Are auditory or visual or physical defects associated with failure in one subject rather than in all?

What is the effect of the social factor? When allowance is made for differences in intelligence, do certain school subjects present difficulty to children of a particular social grade? For example, does reading present special difficulty to underprivileged children? Do particular social environments, as distinct from emotional blocking, contribute to the continuance of scholastic failure? What is the effect of the home situation? Is the loss of a parent associated with failure in one subject rather than in another?

What is the significance for learning of the emotional factor and of behaviour difficulties arising therefrom? Does a particular temperamental set predispose a child towards finding difficulty in certain subjects?

What is the effect of behaviour as a causative factor in learning? Are particular types of behaviour, such as theft, associated more with failure in one subject than in all? Is

truancy more frequently associated with failure in arithmetic, in reading or in spelling? Are special behaviour symptoms, such as soiling, enuresis or tics, associated with a particular temperamental set, with social status of the home or with failure in specific subjects rather than in all?

To what extent is capacity to learn affected by the emotional atmosphere of the home or by the presence there of neurotic parents? What is the effect of place in the family on educational development? What percentage of first-born or only children, as compared with last-born, are aggressive or negative or overdependent, and how does their emotional condition affect their capacity to succeed in school?

What is the effect of failure in one subject? Is failure in certain subjects commoner with one sex than with the other?

Is much of the retardation preventible and what can be done in home and school to reduce the number of normally intelligent pupils who are educationally retarded?

THE CRITERION AND MEASUREMENT OF RETARDATION

Before proceeding with the proposed investigation it is necessary to possess a criterion of educational retardation.

When may a child be said to be educationally retarded? Hamley¹

1. Hamley, H.R., The Education of Backward Children, London: Evans Brothers Limited, 1936, p.6.

reminds us that we compare the dull and backward with other children of the same age but we compare the retarded with

themselves. This was the earliest criterion of retardation. Age-grade tables were prepared, and a pupil who was, say, two classes behind for his age was regarded as retarded. Scottish Primary School Organisation is an illustration of an investigation adopting this criterion.

The retarded have been defined as 'those who fail in spite of their mental capacity' and as 'those who do not achieve what they may reasonably be expected to achieve'. Statements of this kind give rise to more problems than they solve, as they imply the existence of reliable standards of both intelligence and educational competence. The term 'retarded' is generally applied to pupils whose scholastic ages, obtained from the application of scholastic tests, have been found to be noticeably lower than their mental ages obtained by the application of intelligence tests. The intelligence rating is regarded as the criterion, and when the educational age is lower than the mental age the discrepancy is regarded as evidence of backwardness in learning.

The comparison between mental and scholastic age as a measure of learning proficiency is based on a number of assumptions. It is taken for granted that the sole determinant of academic success is intelligence, as defined by Witmer¹:

1. Witmer, L., "Psychological Diagnosis and the Psychonomic Orientation of Analytical Science". Psychological Clinic, vol. XVI., March, 1925, pp. 1-18.

"the ability to acquire, retain and organise knowledge"; that intelligence tests measure innate capacity; and that scholastic

tests provide a reliable measure of the influence of training on capacity.

This raises the issue of the relation of intelligence tests to scholastic tests. It is assumed that intelligence tests measure one quality, namely capacity, whereas scholastic tests measure another - scholastic achievement or acquired ability. In a Memorandum on Intelligence and Comprehension submitted to the Scottish Council for Research in Education in 1932, Rusk pointed out that school abilities are implied in some intelligence tests - writing from dictation, reading, etc. - and that it is impossible on the ground of content alone to maintain the distinction between intelligence tests and achievement tests. It would appear that what is acquired by the child unwittingly can serve as an intelligence test, but what is acquired by deliberate instruction can be employed as an achievement test; but what one child acquires by direct instruction another acquires through social intercourse, so that even this distinction cannot be maintained consistently*. All intelligence tests, as has frequently been

* If equality of educational opportunity was realised, scholastic tests would serve as measures of intelligence.

stated, are in a sense achievement tests; they test what a child can do, not how he acquired the ability.

Wesman¹ holds that the content of intelligence tests is one

1. Wesman, A.G., A Study of Transfer of Training from High School Subjects to Intelligence. T.C. Columbia University. New York: Contributions to Education, No. 909, 1945, pp. 68-9.

of the crucial questions and that any interpretation of a

correlation coefficient between a measure of achievement and one of intelligence which fails to consider the composition of each of the measures is invalid. As there is no method of testing intelligence directly, intelligence tests, saturated with achievement material, measure intelligence by noting what the product of intelligence in operation is. The extent of the correlation between achievement and intelligence is largely predetermined by the amount of achievement content included in the material of the intelligence test. The specific content of each measuring instrument should be known by the interpreter of the correlation coefficients.

The influence of educational attainment, information and skill on the intelligence test score must then be considered. Experimental attack on the influence of education on intelligence, as measured by the Binet-Simon Scale, has been primarily along two lines. The first approach has been through the method of partial correlation, and the second through the comparison of intelligence ratings obtained from retests. Burt¹, who, using

1. Burt, C., Mental and Scholastic Tests. London: Staples Press Limited, 1947, p.283.

the first method, made an extensive study of the issue, has stated recently that the techniques of factorial analysis and analysis of variance might prove more satisfactory.

Complementary opinions on the influence of educational ability and experience on the test score obtained by the Binet-Simon Scale are typified by the views of Terman² and Burt³.

2. Terman, L.M., Mental Tests and School Re-organisation.
 3. Burt, C., op.cit., p.194.

The former regards schooling as a constant without estimating its influence, whereas the latter estimates the effects. Burt estimated that of the gross mental age one ninth was attributable to chronological age, one third to intellectual endowment and over one half to scholastic attainment. He found a correlation of +0.91 between mental age and educational age; with age eliminated the partial coefficient was reduced to +0.61. Taken as a whole Burt's data show that intelligence, as measured by the Binet Scale, is unquestionably influenced by academic achievement, a result which was corroborated by the researches of Gordon¹ and Gaw².

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1. Gordon H., Mental and Scholastic Tests Among Retarded Children. London: Board of Education Pamphlet, No. 44, 1924.
 2. Gaw, F., "A Study of Performance Tests". British Journal of Psychology, vol. XV, 1925, p.390.
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Results do not indicate how great this influence is. It is impossible to identify the causal factor. Is a Binet mental age largely determined by the information acquired in home and school, or are both mental age and acquired information related to other factors which influence them similarly, if not equally? Gates and La Salle³, whose data cause them to agree with Terman,

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3. Gates, A.I. and La Salle, J., "Predictive Value of Certain Tests". Journal of Educational Psychology, vol. XIV, December, 1923, pp.517-37.
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point out that the value of Burt's conclusions depends on the validity of his criterion of pure intelligence, and emphasise that few would be willing to accept Burt's Reasoning Tests as a criterion. Until a measure of pure intelligence can, if ever,

be devised, it will be impossible to estimate the influence of educational attainment on the Binet score.

The assumption that mental age is a function solely of native intelligence unaffected by experience is open to question. Intelligence is always a development of potential ability stimulated by the influence of environment, and only manifests itself in response to present needs; all responses are modified by experience. Bell¹ has suggested that the mental

1. Bell, T.C., Journal of Educational Psychology, vol. XI, Editorial Note, p.45.

age is an index of learning under the ordinary conditions of life and may be taken as predictive of future learning. If, as C.S. Myers² warned us, an intelligence test is a form of achieve-

2. Myers, C.S., British Medical Journal, No. 2613, pp. 196-7.

ment test, it is probably not free from the influence of factors that affect the ordinary achievement test performance - health, home conditions, motivation, industry, etc. In his opinion the tests constituting the Binet Scale are 'tests of production' rather than 'psychological' tests. They determine how much an individual can work, how much he knows, rather than how he works or how he knows. This means, as Wilson³ has indicated, that in

3. Wilson, W.R., "The Misleading Accomplishment Quotient". Journal of Educational Research, vol. XVIII, January, 1928, pp. 1-10.

making use of mental age and educational age we are really using the mental age as a control when we wish to measure industry, although a control should not include the factor that we are attempting to measure.

The use of the formula for expressing the ratio of achievement to intelligence assumes that intelligence tests measure a common mental capacity or general intelligence, conceived as a unitary factor completely and exclusively, and that the various school subjects avail themselves equally of this capacity. Is there a general factor - 'g', or a number of specific factors? This is the issue that long divided Spearman and Thomson. As Chapman¹ has indicated, we measure intelligence and scholastic

1. Chapman, J.C., "The Unreliability of the Difference Between Intelligence and Educational Ratings". Journal of Educational Psychology, vol. XIV, January, 1923, pp. 103-8.

achievement, and then use the difference to estimate the extent to which an individual is taking advantage of his educational opportunities. The single measure of intelligence and the single measure of achievement have both been treated as though they were isolated traits. We have forgotten the partial similar nature and common error of tests of intelligence and educational tests. It is possible that the two measure the same traits to a certain extent and are themselves unreliable, yet the difference in achievement in the tests is made the basis of a judgment of the individual's industry. Burt² has pointed

2. Burt, C., The Distribution and Relations of Educational Abilities. Memorandum III. London: P.S. King and Son, 1917, p.45.

out that 'a hazardous assumption is involved in treating each child as of equal ability in all subjects'. Is there a common factor determining in varying degrees attainment in each and

every subject, or are the various activities quite unrelated? Although among individuals in an ordinary school class, ability in one subject tends on the whole to be matched to a greater or less degree with ability in nearly every other subject, the correspondence is never quite complete, and intelligence tests correlate differently with different subjects.

It is assumed that intelligence tests can be employed to predict scholastic achievement precisely, and that the correlation between intelligence and scholastic achievement is unity, although it has been established that a typical coefficient of correlation is too low for much more than chance prognosis. Turney¹ points

1. Turney, A.H., Factors Other Than Intelligence That Affect Success In High School. Minneapolis: University of Minnesota Press, 1930, p.1.

out that the correlation runs from +0.4 to +0.6 with +0.5 as an accepted average. This is corroborated by Chapman² who claims

2. Chapman, J.A., op. cit.

that the difference between intelligence level and scholastic level accruing from a single test of each is very unreliable.

Kohn³ reports that Pintner, when compiling the correlations

3. Kohn, H.A., "Achievement and Intelligence Examinations Correlated with Each Other and with Teacher's Rankings". Journal of Genetic Psychology, vol. LII, June, 1938, pp.433-37

between intelligence and achievement as reported by 14 authors, found a correlation of from +0.28 to +0.6 with 'r' +0.46 as a mean. Theisen⁴ found that the highest Pearson 'r' between

4. Theisen, W.W., "The Relative Progress of VII-B Groups Selected on the Basis of Ability". Journal of Educational Research, vol. V, April, 1922, pp. 295-305.

intelligence and school subjects was found in arithmetic, reading and language ranking second and third, the figures being +0.5, +0.44, and +0.37 respectively. Correlations between intelligence and scholastic tests fall generally between +0.35 and +0.5, and rarely do they rise beyond +0.55 which gives an estimate only 16% better than chance, a probability too low to be of any value as a prediction of achievement.

Various reasons have been advanced to explain the less-than-unity correlation. Many bright children who are promoted by chronological age do not get an opportunity to do advanced work. Pintner and Marshall¹ and Terman² (in the early days) concluded

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1. Pintner, R. and Marshall, H., "A Combined Mental-Educational Survey." Journal of Educational Psychology, vol. XII, January, 1921, pp. 32-48.
 2. Terman, L.M., Mental Tests and School Re-organisation.
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that the greatest amount of retardation exists among the brighter pupils who are working below capacity although maintaining the average level of the class. The factor of attenuation may be operating, as inaccuracies in the measuring instruments tend to lower the correlations. Other factors are special abilities, lack of motivation, poor living conditions, poor attendance, mal-nutrition and unsatisfactory personal traits. Charters³ concludes

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3. Charters, W.W., Ohio University Bulletin, XXIX, 1924.
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that many traits are operating - social forcefulness, sociability, industry, interest, leadership, ambition, self-confidence and resourcefulness; Theisen⁴ suggests that success depends not

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4. Theisen, W.W., op. cit.
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only upon intelligence but upon general maturity, previous scholarship, effort and several other factors. Beeson and Tope¹ have

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1. Beeson, M.F. and Tope, R.E., "The Educational and Achievement Quotients as an Aid in the Classification of Pupils". Journal of Educational Research, vol. IX, April, 1924. pp. 281-92.
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indicated that educational age is really a resultant of many factors not covered by this method of grouping. Whatever the cause, it is clear that the correlation of intelligence with school achievement is far from perfect; and the obtained correlation is measuring only about one half of the measurable factors.

The use of the formula is based on the assumption that the range in educational age and in mental age is equal. This raises the question concerning the difference between the numerical significance of the EQs and IQs. Ruch² and Burt³ found that the

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2. Ruch, G.M., "The Achievement Quotient Technique". Journal of Educational Psychology, vol. XIV, September, 1923, pp. 334-43.
3. Burt, C., Mental and Scholastic Tests. London: P.S. King and Son, 1921, p. 158.
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general range of deviation is much narrower for educational attainment than for intelligence. The latter states that 'individuals vary distinctly more in intelligence than they do in educational ability, about a quarter as much again'. That the distribution of EQs is narrower has been noted also by Rand⁴, who was unable

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4. Rand, G.A., "A Discussion of the Quotient Method of Specifying Test Results". Journal of Educational Psychology, vol. XVI, December, 1925, pp. 599-618.
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to provide any information on the comparative variability of the EQ at different ages or for different scales. If this difference

exists the assumption that a child's scholastic achievement should accord with his mental age is unwarranted. If the standard deviation of EQ is smaller than that of the IQ then the retardation of a proportion of pupils is statistical rather than educational. According to McNemar¹ the standard deviations for different mental

1. McNemar, Q., The Revision of the Stanford-Binet Scale: An Analysis of the Standardization Data. New York: Houghton Mifflin Co., 1942.

ages vary on the Binet Scale, hence educational retardation would be greater at thirteen years than at nine or eleven years. Moreover, it is doubtful whether intelligence test scores are normally distributed; they appear rather to be skewed toward the upper end as 5 per cent. of the population are found to have IQs over 130. If scholastic test scores are normally distributed, say $1\frac{1}{2}$ per cent. over 130 EQ, then retardation from this cause alone is inevitable.

The assumption that a translation of scores on intelligence tests and scholastic tests into mental ages and educational ages makes them comparable may also be questioned. Franzen² has

2. Franzen, R.H., "Statistical Issues". Journal of Educational Psychology, vol. XV, September, 1924, pp. 367-382.

criticised the use of age as a common denominator of test scores on the ground that it assumes a like correlation with chronological age for all tests; he points out that educational age and mental age are not simple variables but positions on the regressions of score-age correlation scatters. He criticises Chapman's³ conclusion

3. Chapman, J.C., "The Unreliability of the Difference Between Intelligence and Educational Ratings." Journal of Educational Psychology, vol. XIV, January, 1923, pp. 103-08.

that if the correlation between an intelligence test and a product test is +0.7, the reliabilities of the intelligence test and of the product test must each be +0.93 in order to have a correlation of +0.75 between repeated indices. From Chapman's formula it follows that if the reliabilities are both +0.9, and the correlation between intelligence and product is also +0.9, the correlation of the indices is zero. Chapman considers that 'it is reasonable to assume that the true correlation of the ideal intelligence test and of the ideal scholastic test is +0.7'. Franzen says that 'it is not at all reasonable', since such a correlation is a function of the instrument, and varies from +0.5 to +0.9.

Comparisons between scholastic age and mental age must be limited therefore by the correlations between tests. Before we can say that a child with a mental age of 10 years should obtain a reading age of 10 years we must know that both tests correlate alike with age and that the correlation between the tests is high. 'Since different tests correlate differently with age, it is wrong to assume that the same precocity in different tests means the same degree of excellence'. Contrariwise the same degree of excellence may be indicated by different ages; a child who has been allocated a mental age of 12, a reading age of 10 and an arithmetic age of 11, may have done as well on the reading test as on the arithmetic test if the two tests have different correlations with age.

DISCUSSION OF THE MEASURES

The next issue concerns the choice of a measure to be adopted to evaluate the efforts of the pupil. All such measures are found to be measures of effort relative to capacity; all compare directly the achievement and intelligence scores; all assume that the correlation between intelligence and any subject is unity, and that there is no difference in the coefficient of correlation between one subject and another.

Such measures can be classified in two ways depending on the computing technique used. One produces a quotient or ratio while the other provides an index of difference between educational and intelligence scores.

The most common of the measures are the F, or Effort Score, the ER or Efficiency Ratio, and McCall's 'T Score' which is less popular. The commonest, and most generally accepted, measure is the Achievement Quotient or Accomplishment Ratio, known respectively as the AQ and the AR.

The Accomplishment Ratio

The first attempt to bring the two measures of intelligence and educational achievement into relationship with one another in order to ascertain the agreement between capacity and performance was made by Monroe and Buckingham¹ in their Illinois Examination.

1. Illinois Examination - W.S. Monroe. "The Illinois Examination". University of Illinois Bulletin, vol. XIX, No. IX. Urbana: University of Illinois, 1921; Monroe, W.S. and Buckingham, B.R., "The Illinois Examination I and II". Teacher's Handbook, Bloomington, Illinois: Public School Publishing Co., 1920.

The intelligence score is found in terms of mental age and the achievement score in terms of achievement age, which is found by comparing the pupil's raw score with a series of achievement norms which are the median scores made by pupils of different mental ages. The measure, known as the Achievement Quotient, was used at one time by Franzen who renamed it the Accomplishment Ratio and who later criticised its use as a measure of effort on the ground that other factors such as special abilities are involved in its production.

The AQ or AR which expresses the results of mental and educational tests in one measure, expresses the ratio of EQ to IQ or of EA to MA, the equation being:

$$\frac{EA}{MA} = \frac{\frac{EA}{CA}}{\frac{MA}{CA}} = \frac{EQ}{IQ} = AQ$$

The use of such a measure assumes that mental tests gauge native capacity and that educational tests measure the results of training. The ratio is regarded as a summary of what the pupil has accomplished in comparison with what he is capable of accomplishing as judged by his intelligence rating which is supposed to predict in fair measure his educational success. It follows that, since the coefficients show no tendency to approach unity, the degree of disparity is regarded as a rough measure of the amount of effort the pupil is expending on school work.

The AQ, whose validity depends upon the clearness of the distinction between the measures of native capacity and of training,

and upon the accuracy of the measures of both these factors, has been criticised from the philosophical, the analytical and the statistical points of view.

On the philosophical side the most important criticism of the formula is the neglect of the child as a developing being whose education should aim at the development of wholesome personality rather than at the acquisition of the type of information which the educational tests measure. Real achievement cannot be evaluated in such narrow terms, as the emphasis is on factual knowledge, and the more important educational aims such as the development of attitudes, interests, appreciations and ideals are disregarded; education is something more than the mere acquisition of subject matter.

On the analytical side the criticism has centred on the factors measured by the different tests and on the possible causes of variation. The AQ technique seems to imply that the score on the intelligence test gives a measure of native capacity which is independent of training, and that the educational test provides an independent measure of achievement. The distinction between what is measured by the two types of test is not as clear as is implied in the assumption, as tests are not highly refined measures. As already stated, standardised intelligence tests have much in common with educational batteries, although the former are general in scope while the latter are more specific in their reference. The fact that an intelligence rating and an educational rating have much in common raises doubts regarding the AQ technique.

The hypothesis that the variation between the intelligence score and the achievement score is due solely to intellectual factors, and that a pupil of a given mental age who makes high achievement scores must be credited with an approximation to maximum effort whereas one who makes low scores must be considered as indifferent or lazy, is doubtful. All tests of intelligence and of achievement are crude instruments, their probable errors of measurement being such that a ten year old child who earns a mental age of 10 may have a real mental age in the range of 9 to 11 years. These variations occur because educational age and mental age are variables subject to modification through the operation of many factors uncontrolled in the testing situation and because of certain inadequacies in all tests.

A further criticism is that the interpretation of the measure has not been clear. It is sometimes held that the AQ measures the relationship between one's capacity and one's achievement. Freeman¹ has stated that, according to this definition, an AQ of

1. Freeman, F.M., Mental Tests. London: G.G. Harrap & Co., 1939, p.27; p.152; p.303.

above 100 would be impossible as no one can achieve beyond capacity. This difficulty is avoided if the AQ is described as a measure of relationship between the mental age and the accomplishment age, using these terms to represent empirical measures instead of assuming that they measure exactly capacity and achievement.

Toops and Symonds² have indicated that there is considerable

2. Toops, H.A. and Symonds, P.M., "What Shall We Expect of the AQ?" Journal of Educational Psychology, vol. XIII, December, 1922, pp. 513-28 and vol. XIV, January, 1923, pp. 27-38.

disagreement even among the originators of the AQ technique.

Franzen¹, who regards the measure as a device for combining the

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1. Franzen, R.H., "The Accomplishment Quotient". Teachers' College Record, XXIII: 434, November, 1920. Also Teachers' College Record, vol. XXI, No. 5, November, 1920, pp. 432-440.
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results of mental and educational tests into a measure of educational achievement relative to the pupil's capacity to progress, says that the AQ is to be considered "the degree to which a pupil's actual progress has attained to his potential progress by the best possible measure of both". Monroe and Buckingham², on the other hand, define it as "a simple method

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2. Monroe, W.S. and Buckingham, B.R. op. cit.
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of comparing a pupil's achievement age with his mental age (learning capacity)".

The concept of an AQ has been interpreted differently by different workers. In the view of Franzen it indicates 'optimum accomplishment' or 'what a pupil is able to do under the best conditions'. An AQ of less than 100 means that the pupil is doing less than is normal for his mentality; an AQ of more than 100 is impossible, and those over 100 are regarded as spurious. According to this view we can measure the approximation to ideal educational performance in any elementary school-subject of any child through the approximation of his AQ to 100. Monroe and Buckingham, on the other hand, regard an AQ of 100 as evidence that the pupil has achieved exactly as well as the average pupil of his mental age. If his AQ is 75, he has achieved only 75 per cent. of the average of the pupils of his mental age; if

it is 130 he has achieved 30 per cent. more. According to Pintner¹ who worked with the index difference between intelligence

1. Pintner, R. and Marshall, H., *op. cit.* p.38.

and accomplishment instead of with the ratio, an index difference of zero or a corresponding AQ of 100 means that the pupil is doing exactly what "is usually accomplished by the child of like mentality. A minus difference means that the child is doing less educational work than he has the ability to accomplish". He does not suggest that a plus difference indicates that the pupil is doing more work than he has the ability to accomplish. He noted that there are more bright pupils not working to capacity than dull ones who are doing more than is expected. He assumes that anyone whose educational index is more than eight points in advance of his mental index is advanced in motivation.

It has been pointed out that AQ bears an inverse ratio to IQ not because the relationship is an inherent one but because it has been produced through the artificial system of the school with its improper grading and classification and its inequality of educational opportunity. As Witty and Kopel² have indicated, the child of

2. Witty, P. and Kopel, D., Reading and the Educative Process.
Chicago: Ginn and Company, 1939, p. 227.

very high IQ usually has an AQ below 100; his attainment as measured by educational tests is usually superior but his educational level is below his mental ability. It is absurd to designate as a weak scholar the child of 10 years who is mentally 15 and who reads, counts and spells on the 13-14 year old level. The use of the

formula simply serves to isolate a few bright pupils who work well but whose educational ages are below their extremely high mental ages.

The score on an intelligence test has been used as an estimate of the pupil's capacity to perform on a scholastic achievement test. Johnson¹ computed the AQs of 50 ninth-grade

1. Johnson, H.G. "Does The Gifted Child Have A Low AQ?" Journal of Educational Research, vol. XXXVI, October, 1942, pp. 91-9.

pupils by dividing the score on the Miller Intelligence Test by their indicated capacity to achieve on this test, as indicated by Terman IQs. When the AQs were correlated with the intelligence quotients derived from the Terman test the coefficient was found to be -0.44. McPhail² found that the correlation between IQ and

2. McPhail, A.H., "The Correlation between IQ and AQ". School and Society, vol. XVI, Nov. 18, 1922, pp. 586-88.

AQ, as obtained by testing children from thirteen elementary school classes, ranged from -0.02 to -0.71, and Ruch³ reported negative

3. Ruch, G.M., op. cit.

correlations of -0.3; -0.56; and -0.75 in four elementary school classes. As a result of applying the Stanford-Binet test to 200 children Franzen⁴ found that the correlation was negative, but not

4. Franzen, R., The Accomplishment Ratio: A Treatment of the Inherited Determinants of Disparity in School Product. T.C. Columbia University, New York: Contributions to Education, No. 125, 1922, p.14.

significant. He has shown the difficulty of raising markedly the correlation of IQ and school achievement. Popence⁵, as a result

5. Popence, H., "A Report of Certain Significant Deficiencies of the Accomplishment Quotient". Journal of Educational Research, vol. XVI, June, 1927, pp. 40-47.

of testing 500 elementary school children found that the correlation between IQ and AQ was in every case negative. Even those who represented the highest per cent. of intelligence in the school, that is, those whose IQs fell between 130 and 140, were not able to attain an AQ of 96. In no case did an individual having a high IQ get a favourable AQ. He concluded that an AQ means a different thing in one part of the range from what it does in another, and that pupils do not have an equal chance*. When the mean IQ and mean AQ of the

* See above for statistical explanation.

school were considered, much the same situation was found. The obtained correlation of -0.59 means that instead of having an even chance of getting a high mean AQ "the IQ was such a significant factor in the situation that the AQ had nearly become no measure at all".

The main criticism on the statistical side has been concerned with the fact that the correlation between AQ and IQ is always negative; different reasons have been advanced in explanation of this phenomenon. Freeman¹ attributes it to the fact that the correlation between IQ and EQ is less than perfect; Douglass and Huffaker² suggest that it is due to the unique nature of the correlation coefficient between a variable and a ratio of which the first variable is the denominator. They disagree with Wilson³

1. Freeman, F.N., op. cit.

2. Douglass, H.R. and Huffaker, C.L., "The Correlation between IQ and AQ." Journal of Applied Psychology, vol. XIII, 1929, pp. 76-80.

3. Wilson, W.R., op. cit.

who attributes it to chance errors of measurement, that is, where the real correlation is zero, since he found that by introducing

chance errors into hypothetical true IQs a negative correlation of -0.38 was produced between AQ and IQ. In his view the larger the relative influence of chance errors the greater is the regression towards zero. Douglass and Huffaker draw attention to the fact that AQs are calculated by dividing by the IQ the obtained EQ, not the EQ estimated by means of the regression equation as is done in the proofs by Wilson and by Toops and Symonds¹; further, that if

1. Toops, H.A. and Symonds, P.M., op. cit.

one employs the regression line of IQ on EQ, instead of that of EQ on IQ (as employed by Wilson), exactly the opposite conclusion is reached - that the AQs of slow pupils tend to decrease with the decreasing IQs, and those of bright pupils to increase, thereby ensuring, due to errors of measurement, a positive correlation coefficient where no correlation exists. They assert that under present conditions of testing it is practically impossible to obtain anything but a negative correlation between IQ and AQ. The negative correlation is a necessary result except in the very impossible instance where IQ and EQ are perfectly correlated and where each is measured perfectly. Douglass and Huffaker agree with Ruch, Franzen and others that this negative phenomenon causes the bright to appear retarded and the dull to be accelerated, the correlation being negative and significant.

Instead of inferring that the bright child is indolent, an assumption based on the fact that the correlations between IQs and AQs are consistently negative and often significant, Johnson² offers

2. Johnson, H.G., op. cit.

Galton's regression towards the mean as an explanation of the consistently negative correlation. He declared that children do not have uniform capacity to succeed in the various subjects, that specialisation exists, and that this causes them to rank high on the basis on which they were selected but lower on other subjects. In using the IQ as denominator we have selected the pupils on the basis of their ability to succeed on the intelligence test - a specialised ability. They do not rank so highly on educational tests therefore the tendency to regression towards the mean with EQs lower than IQs. Terman¹ found that the gifted averaged 150 in IQ and 140 in EQ. It

1. Terman, L.M. et al., "Mental and Physical Traits of a Thousand Gifted Children." Genetic Study of Genius, vol. I. Stanford University Press, Stanford University, California, 1926.

is inevitable that they get low EQs. To this specialisation of abilities and to chance errors which enter into our measures and give the pupil a high rank on one test and perhaps a low rank on another Johnson attributes this tendency of EQs to regress towards the mean when compared with IQs. The amount of the regression and the size of the negative correlation depend on the correlation between EQ and IQ and on the variability of EQ and IQ.

When there is a high correlation between IQ and EQ and the range is almost equal in each, correlation approximately zero will be obtained. Where the variability in the numerator (EQ) is much greater than in the denominator the same situation holds. Specialisation or chance errors or any factor that contributes to a lower correlation between IQ and EQ will tend to increase the size of the negative correlation.

According to Johnson if pupils are selected on the basis of EQ the IQs will regress towards the mean, thus producing a positive correlation between EQ and AQ. Rand¹, Burt² and others have

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1. Rand, G.A., op. cit.
 2. Burt, C., Mental and Scholastic Tests. London: P.S. King and Son, 1921, p. 158.
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pointed out that the IQs have greater variability than the EQs, and this helps to increase the size of the negative correlation.

Rand and others criticise the concept on the ground of the procedure of dividing one unit by another which has not been shown to be the equivalent of the first unit at other points than the median. If the EQ is a smaller unit than the IQ then for cases falling increasingly above the median the EQ would be increasingly smaller than the corresponding IQ. The effect is that the brighter the child the lower would be his AQ, even if there were no actual difference in his intellectual and educational states, and at the other end of the scale the duller he is the higher his EQ. Beeson and Tope³ found that pupils whose IQs were above 100

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3. Beeson, M.F. and Tope, R.E., op. cit.
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invariably had lower AQs, while those whose IQs fell below 100 had higher AQs, and only three whose IQs were below 100 made lower AQs. These exceptions were those pupils whose IQs fell close to the median. The correlation between IQ and EQ was high +0.9; the correlation between IQ and AQ was significantly negative -0.46; and the correlation between EQ and AQ was -0.27.

A third criticism has been concerned with the reliability of

the measure. Huffaker¹, Kelley² and Ruch³ have noted the need of

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1. Huffaker, C.L., "The Probable Error Of The Accomplishment Quotient." Journal of Educational Psychology, vol. XXI, October, 1930, pp. 550-51.
 2. Kelley, T.L., "The Significance of Differences in Intelligence and Achievement Test Scores." Journal of Educational Psychology, vol. XIV, September, 1923, pp. 321-33.
 3. Ruch, G.M., op. cit.
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a measure of the reliability of the AQ which is in some respects unreliable since it expresses the relationship between ratings on two tests both imperfect. The formula of the correlation applying to ratios should be used, and since we are using reliability coefficients the two measures should be comparable, that is, they should have the same means and standard deviations. Thorndike⁴, Thomson⁵, Toops and Symonds⁶ have drawn attention to the dangers in

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4. Thorndike, E.L., "The Influence of the Chance Imperfections of Measures upon the Relation of Initial Score to Gain or Loss." Journal of Experimental Psychology, vol. VII, June, 1924, pp. 225-32.
 5. Thomson, G.H., "A Formula to Correct for the Effect of Errors of Measurement on the Correlation of Initial Values with Gains." Journal of Experimental Psychology, vol. VII, August, 1924, pp. 321-24.
 6. Toops H.A. and Symonds, P.M., op. cit.
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the interpretation of a correlation if imperfect measures are used, while Chapman⁷ has shown the unreliability of measures of difference

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7. Chapman, J.C., op. cit.
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between intelligence and educational test scores. Kelley who insists that the interpretation of such a quotient should be made in the light of its probable error, has pointed out that while Chapman judges of the excellence of one fallible difference by comparing it with another fallible difference he would have obtained a truer idea

of the significance of his fallible measure had he compared it with a true difference. He complains also that Chapman's illustrations are not well chosen as the functions involved are not as disparate as are other functions for which fairly reliable measures are readily obtainable. Herring¹ says that accomplishment differences

1. Herring, J.P., "The Reliability of Accomplishment Differences." Journal of Educational Psychology, vol. XV, September, 1924, p. 530.

are differences between intelligence and educational estimates, and stresses the fact that the reliability of such differences varies directly with the reliability of the tests employed and inversely with the correlation between intelligence scores and achievement scores. These two relationships are implied in Chapman's formula for the reliability of accomplishment differences which are comparatively reliable when the correlation between achievement and capacity is comparatively low. Toops and Symonds and Chapman have set forth the limitations of accomplishment ratios and of accomplishment differences respectively.

Popenoe² who states that the concept of educational age contains

2. Popenoe, H., *op. cit.*

many fallacies which contribute to the unsatisfactory nature of the AQ, reminds us that the probable error of an AQ cannot be computed from a knowledge of the probable error of its component parts because of the difficulty of establishing the difference of any ratio based upon two variables which are both influenced by chance fluctuation, but must be arrived at as a result of experiment. Experimenting with 600 pupils of from 9 to 14 years of age he gave tests of

intelligence, reading, spelling and arithmetic. A second form of the same four tests was applied three days later and the first AQ was correlated with the second. The product moment correlation was +0.278, which, as Popenoe states, is much lower than the reliability of any educational measure which should be retained in use. He stresses that if the goal is to be equally attainable by all, the correlation between AQ and IQ must be zero, that is, the amount of AQ must be independent of the amount of IQ, in which case the coefficient of correlation should be no larger a magnitude than might readily be ascribed to chance fluctuations from zero. In an experiment in a school of 469 pupils of mean IQ 103 and mean AQ 96 Popenoe assumed that all had a fair chance to get an AQ of 100 or at least an equal chance of getting an AQ of 96. He found that the correlation coefficient was -0.455, giving a coefficient of alienation of +0.89.

Chapman, who has shown that the reliability of the measure of the differential achievement in intelligence and school work is dependent on the degree of correlation between the differences when found with a second set, states that the various intelligence tests among themselves and the various scholastic tests among themselves cannot be relied upon to correlate higher than +0.7.

Measures of Capacity Relative to Achievement

In an attempt to assess capacity relative to achievement various methods have been used. Burt¹ says that "for scientific

1. Burt, C., The Distribution and Relations of Educational Abilities. Memorandum I. London: P.S. King and Son, 1917, p.14.

work the employment of the standard deviation seems indisputably the best device". Instead of mental age he has adopted as a measure of backwardness and mental deficiency the standard deviation of normal pupils. He finds the standard deviation to be about one-tenth of chronological age. Backward children are those who deviate below the normal by at least $1\frac{1}{2}$ times the standard deviation of individuals of the same age group; and therefore are retarded by 15 to 20 per cent. of their age. Pintner¹ who did not use the

1. Pintner, R. and Marshall, H. op. cit.

quotient method of estimating achievement but the difference in standardised educational and intelligence ratings based on the standard deviation as a unit, found that only 21 per cent. of the pupils showed inability in scholastic attainment as compared with mental ability.

Otis² obtained a quotient by dividing the academic attainment

2. Otis, A.S., Cited by Peters, C.C., Journal of Educational Research, vol. XIV, September, 1926, p.109.

reduced to sigma values by the intelligence score, also in sigma values, multiplied by the correlation between intelligence and achievement. The correlation between intelligence and achievement was empirically adjusted until the correlation between intelligence and accomplishment quotients became zero. By multiplying the IQ by the correlation between achievement and intelligence it is possible to find for any given position in the intelligence series the mean academic achievement that corresponds to it. This is the normal achievement for this intelligence since this is the mean academic attainment made by those with this intelligence. The AQ is then

equal to the scholastic score divided by r_{AI} where each is measured from the mean, starting from -50 as a zero point.

$$AQ = \frac{5 + A}{5 + 1 \times r_{AI}}$$

Peters¹ objected to this method on the ground that Aqs

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1. Peters, C.C., "A Method for Computing Accomplishment Quotient in the High School and College Levels." Journal of Educational Research, vol. XIV, September, 1926, pp. 99-111.
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thus derived would have no standard meaning. He says that to get a true AQ we should divide a measure of what a pupil achieves by a true measure of what normal use of abilities and effort would enable him to achieve. He put measures of maturity and of achievement in parallel series measured from the same zero point (CA) and obtained the AQ by dividing a measure of position in one series by a measure of position in the other in such a way that the parallel position would give an AQ of 1.

Nygaard² proposed that the AQ should be found by dividing

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2. Nygaard, P.H., "A Revised Accomplishment Quotient." Journal of Educational Research, vol. XVIII, June, 1928, p. 87.
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the EA by the predicted EA which was to be found by means of the regression equation as follows:-

$$\text{Predicted EA} = \frac{\sigma_{EA}}{\sigma_{MA}} \times r (MA - \text{mean MA}) + \text{mean EA}.$$

By this method the average AQ for any group will be 100, irrespective of whether the group ranks high or low in average achievement. It is claimed that the use of this formula for calculating the AQ has advantages over the usual method since the negative correlation between the AQ and the IQ is eliminated; the formula allows for

the difference in variability between EA and MA; and the method yields Aqs in accordance with the extent to which each pupil has availed himself of the opportunities offered.

Sleight¹ who modified the usual procedure, based his correction

1. Sleight, G.F., "The Diagnosis and Treatment of the Dull and Backward Child" - unpublished Ph.D. Thesis in the University of London Library.

on the assumption that "for the average test in school subjects which involve a certain amount of 'g' we should expect the denominators in the calculation of Aqs to lie between CA and MA according to the saturation of the test with 'g'". This procedure assumes that other contributory factors in school progress remain constant. Schonell²

2. Schonell, F.E., The Education of Backward Children. London: Evans Brothers Ltd., 1936, p. 27.

points out that the method may only be an approximation to the correct figure and that what is required for a finer assessment of achievement in relation to intelligence is a carefully compiled set of learning norms for the various IQ groups. He states further that deficiencies in the calculation of the AQ can be remedied to some extent either by making provision for factors other than intelligence that affect school progress, or by establishing norms of progress for different IQ levels. These have not yet been definitely secured for the various periods of school life.

In the present investigation an attempt will be made to eliminate sources of error in the computation of the relationship between capacity and achievement. Raw scores, obtained by applying to a normal group of children standardised tests of reading, spelling

and arithmetic will be converted into educational ages. These ages, expressed in months, will then be transmuted into their standard score equivalents. By averaging the educational scores an educational age will be obtained. IQs will then be expressed in terms of standard scores. The difference between the intelligence and educational standard scores will then be obtained. In cases in which the obtained value is more than one standard deviation, the pupil will be regarded as retarded. This will vary with the level of IQ. Where the IQ is 130 or over, a difference in standard scores of $1\frac{1}{2}$ standard deviations will be regarded as evidence of retardation.

CHAPTER II

SURVEY OF THE LITERATURE BEARING ON THE PROBLEM : RELATED STUDIES

A survey of the literature concerning the basic causes of scholastic failure in intelligent children indicates that there is general agreement with Burt's¹ view that causation is nearly

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1. Burt, C., The Distribution and Relations of Educational Abilities. Memorandum II. London: P.S. King and Son, 1917, p. 37.
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always multiple.

In suggesting that learning is conditioned by five types of factors - physical, mental, educational, emotional and social, Courtis² maintains that while the first three are easier to measure

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2. Courtis, S.A., Why Children Succeed. Detroit, Michigan: Courtis Standard Tests, 1925, p. 207.
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than the others, the latter are more influential in determining success in certain situations. In attributing occasional discrepancies between mental age and scholastic performance to other factors than intelligence Terman³, in addition to the factors

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3. Terman, L.M., The Intelligence of School Children. G.G. Harrap & Co. Ltd., 1921, p. 97.
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mentioned by Courtis, draws attention to the importance of regularity of attendance, degree of application, attitude to the teacher and to school work, amount of encouragement at home, lack of self-confidence, mental inertia and psychopathic heredity. The importance of attitudes, industry and sex is stressed by Miller⁴ and also by

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4. Miller, W.S., "The Administration Use of Intelligence Tests in The High School." Twenty-first Yearbook of the National Society for the Study of Education. Bloomington, Illinois: Public School Publishing Co., 1922, Chapter VII, pp. 189-222.
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Blanchard and Paynter¹ who emphasise the influence of interests as

1. Blanchard, P. and Paynter, R.H., "The Problem Child." Mental Hygiene, vol. VIII, 1924, pp. 26-54.

additional causative factors. According to Burt² conditions of

2. Burt, C., The Backward Child. London: University of London Press, 1937, p. 565.

major importance most frequently noted are social, including the intellectual and moral status of the home. Physical conditions are fairly frequent while school conditions and temperamental peculiarities are less evident.

PREVIOUS INVESTIGATIONS

To ascertain the cause of the discrepancy between mental capacity and educational attainment several experiments have been conducted. These have differed in respect of the age and level of mental capacity of the subjects, in methodology, in the factors investigated and in the presence or absence of a control group.

Few studies have been concerned with primary school children, attention having been directed mainly to the attainment of secondary school pupils and of college students. While the subjects have been generally of high intelligence, children of poor mental capacity have been included in certain investigations.

Two methods characterise the studies; the first has emphasised the importance of the individual case study while in the second the stress has been laid on the statistical treatment of the data. It would appear that the concept of educational retardation

has been variously interpreted by different workers. Certain studies have made use of standardised tests, while in others the assessment of retardation has been more or less dependent upon subjective estimates.

The factors investigated as possibly causative are physical health, mental capacity, emotional characteristics, character traits, habits of work, attitudes to teachers and to school, and the socio-economic status of the home.

Although the stress on the psychological side has been laid on aspects of personality and conduct, the psychometric aspect has also been emphasised, attempts having been made to discover the relationship between failure to pass certain items on the Stanford-Binet Scale and backwardness in scholastic subjects.

Several studies have been concerned with different aspects of personality. Since the different factors are interrelated there is much overlapping which makes it almost impossible to decide which is cause and which effect. An emotionally unstable child finds difficulty in concentrating on the task in hand and becomes backward, while retardation may give rise to symptoms of an inhibitory type. This is specially true of retarded pupils of normal and of superior intelligence; the dull are less inclined to worry over their failure to progress.

Results have been influenced to a great extent by the technique employed. Investigators using the case-study method tend to agree that there is a significant relationship between emotional instability and poor scholastic standing. Those employing statistical

techniques are more at variance; some indicate that the relationship between the two variables is significant, but others can find no evidence of a positive correlation. The lack of a control group has caused certain studies to be less conclusive than they might have otherwise been.

PHYSICAL CONDITION AS A CAUSATIVE FACTOR IN RETARDATION

Investigators have not been in complete agreement regarding the importance of physical defects as causative factors in retardation, although it is generally accepted that physical status affects the mental well-being and energy of the individual.

Burt¹, who conducted the most thorough survey, attributes

1. Burt, C., The Backward Child. London: University of London Press, 1937, pp. 164-207.

retardation to many minor conditions rather than to one disease and points out that many defective conditions do not appear to be causative factors although others are related in varying degrees to school failure. He reminds us that although a certain condition may be correlated with backwardness, there is no proof that it is an efficient cause. In his view the presence of physical defects rarely constitutes a primary cause of retardation, and ill-health and physical weakness prove to be contributory factors only, although they may hinder ultimate development.

Schonell² who agrees that the effect on learning of adverse

2. Schonell, F.E., Backwardness in the Basic Subjects. London: Oliver & Boyd, 1942, Chapter II.

physical conditions appears to be slight, stresses the effect on

personality of physical variations, and draws attention to the fact that various defects may have an inhibitory effect on learning since they lead to a lack of self-assertion in some and to the development of self-pity in others. The emotional attitudes which result, may constitute a handicap which will tend to reduce efficiency, although with certain children progress may be a compensation for physical defects. Like Burt, he emphasises the effect on learning of lowered vitality and susceptibility to fatigue.

In a study of pupils who failed to be promoted, Stalnaker and Roller¹ discovered that the most prevalent physical defects occurred

1. Stalnaker, E.M. and Roller, R.D., "A Study of Non-Promoted Children." Journal of Educational Research, vol. XVI, November, 1927, pp. 265-270.

with almost equal frequency in the group making normal progress. The defects studied were enlarged or diseased tonsils, enlarged thyroid, carious teeth, undernourishment, nasal obstruction and defective hearing. There was evidence that physical condition was not the cause of retardation in the non-promoted group.

Gates² reported that "the influence of physical status as

2. Gates, A.I., "The Nature and Educational Significance of Physical Status and of Mental, Physiological, Social and Emotional Maturity." Journal of Educational Psychology, vol. XV, September, 1924, p. 347.

measured by tests of achievement among children as we find them in a first rate school is real but on the average slight".

Hoeffler and Hardy³, on the other hand, state that when 409 pupils

3. Hoeffler, C. and Hardy, M.C., "The Role of Health in the Child's Development." The Elementary School Journal, vol. XXXV, No. 6 February, 1935.

in different elementary schools were kept under observation continuously for a period of three years it was found that "without exception the children who were in poor health tended to be less proficient in their schoolwork than were their healthier classmates".

In an investigation concerning pupils at the secondary school level Hughes¹ found that laziness and carelessness were often associated with poor health.

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1. Hughes, A.G., "Discrepancies Between the Results of Intelligence Tests and Entrance Examinations to Secondary Schools." *British Journal of Educational Psychology*, vol. IV, November, 1934, pp. 221-235.
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Burt² found that marked defects of hearing and speech, slight

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2. Burt, C., The Backward Child. London: University of London Press Ltd., 1937, pp. 171-72.
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defects of hearing, enlarged tonsils and adenoids, stunted growth, rickets, marked malnutrition, recurrent catarrh, organic nervous disease, a series of four or more zymotic illnesses, adenoids, left-handedness and defects of vision appeared to be highly correlated with backwardness, these conditions being arranged in order of their apparent influence.

The greatest bar to scholastic progress would appear to be defective hearing, the extent of the handicap depending on the degree of hearing loss. In groups of children who were progressing normally, auditory defect was evident in only one per cent. Although the teacher may make allowance for the disability, there is no doubt that the defect sometimes persists undetected for long periods following the child's admission to school. Burt reports that otorrhoea appeared to have no demonstrable correlation with

backwardness.

Little experimental evidence on the effect on reading of hearing loss is available. In controlled experiments Wallin¹, White and Poull², and Wawrik³ failed to find any evidence of

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1. Wallin, J.E.W., "Congenital Word Blindness". Training School Bulletin, vol. XVII, 1920-21, pp. 76-84; 93-99.
 2. White, A. and Poull, L.E., Reading Ability and Disability With Subnormal Children. New York: Dept. of Public Welfare, 1921.
 3. Wawrik, M., Cited by Jastah, J., "Interferences In Reading." Psychological Bulletin, vol. XXXI, April, 1934, pp. 244-72.
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a relationship between auditory defect and reading disability.

Bond⁴ who found that a positive relationship existed between the

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4. Bond, G.L., The Auditory and Speech Characteristics of Poor Readers. T.C. Columbia University, New York: Contributions to Education, No. 657, 1935, p. 48.
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two variables concluded that the influence of auditory acuity as a factor in reading depended on the teaching method employed, auditory acuity being apparently of more significance when the method was largely phonetic. On comparing the results of tests of auditory acuity and auditory discrimination with scores of reading achievement Kennedy⁵ discovered that the differences were not significant, although

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5. Kennedy, H., "A Study of Children's Hearing as it Relates to Reading." Journal of Experimental Education, vol. X, June, 1942, pp. 238-51.
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she admits that there was a fairly consistent difference in favour of the better hearing group. Monroe⁶ reports that only two per cent.

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6. Monroe, M., Children Who Cannot Read. Chicago: University of Chicago Press, 1932, p. 95.
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of her reading defect cases were rated as defective in hearing on the whispered-voice and watch-tick tests. Such tests cannot be regarded as adequate measures of auditory acuity, although they may

disclose noticeable degrees of deafness. Schonell¹, on the other

1. Schonell, F.E., The Education of Backward Children. London: Evans Brothers Limited, 1936, p. 39.

hand, found that the number who suffer from auditory defects is higher among those backward in reading and spelling than among pupils who are progressing normally in these subjects.

Burt² found that defects of visual acuity were of comparatively

2. Burt, C., The Backward Child. London: University of London Press Ltd., 1937, p. 221.

little importance as a factor in backwardness and that they were related only to the extent of about +0.15. Monroe³ states that

3. Monroe, M., op. cit. p. 81.

defective vision may hamper a child in learning to read owing to confusion of patterns, and that poor visual acuity appeared to be a cause of the failure of certain pupils. On the other hand, the lack of adequate visual acuity was not found to be a highly frequent cause and did not distinguish the reading-defect groups from other groups who read normally. She concluded that "while poor visual acuity is undoubtedly a hindrance to reading, it does not necessarily disrupt the reading progress". Seventy-seven per cent. of poor readers were found to have visual acuity above seven-tenths vision in both eyes as compared with seventy-three per cent. of good readers. Eames⁴, who inquired into the incidence of eye defects

4. Eames, T.H., "A Study of Eye Defects and Sex among Poor Readers." Journal of Educational Research, vol. XXXIII, March, 1940, pp. 524-27.

among poor readers of both sexes, decided that the frequency of eye defect in the two groups did not equal the proportion of failures.

Buswell¹, on making an analysis of visual defects among a thousand

1. Buswell, G.T., How Adults Read. Supplementary Education Monographs, No. 45. Chicago: University of Chicago Press, 1937.

adults and comparing his results with a test of reading, found that visual efficiency did not account for differences in reading ability.

Stulken² maintained that as a rule defective visual acuity is not a

2. Stulken, E.H., "Retardation In Reading And The Problem Boy In School." Elementary English Review, vol. XIV, No. 5, May, 1937, p. 59.

frequent cause of inability to profit from instruction in reading.

Witty and Kopel³, after comparing the visual defects of a group of

3. Witty, P. and Kopel, D., "Factors Associated with the Etiology of Reading Disability." Journal of Educational Research, vol. XXIX February, 1936, pp. 449-459.

poor readers with those of a control group of good readers, concluded that the poor readers did not show a greater incidence of visual defects.

Other investigations, however, have produced results that are widely divergent, and the conclusion reached is that there is a definite relationship between eye abnormality and reading difficulty.

Study of the effects of the different types of visual defect has shown that hypermetropia and astigmatism are most likely to hamper school work as they cause dislike of reading. Short sight, which makes it difficult for the child to see the blackboard, may affect the learning of arithmetic. Burt⁴ found no proof of any

4. Burt, C., The Backward Child, p. 201.

connection between squint and backwardness, although the emotional effect engendered may have an inhibitory influence on learning.

Unhealthy conditions of nose and throat would appear to have a detrimental effect on learning, possibly as a result of toxic absorption. The two chief sources of fouling are a diseased condition of the naso-pharynx due to infected adenoids or tonsils, and carious or decaying teeth. The toxins affect the nutrition of the brain cells resulting in dullness. The child victim often suffers vaguely from nervous irritation, restlessness and occasional pain. Tonsillar trouble was found in thirty-seven per cent. of Burt's backward group, and several children appeared to advance scholastically after tonsils and adenoids had been excised. The frequent occurrence of catarrh was commented on by Burt who suggests that emotional instability may be a direct result of the rheumatic or quasi choreic condition to which these catarrhal infections give rise. He points out that as the child's catarrhal state will affect his power of concentration, subjects like arithmetic may suffer. Like Schonell, he considers that many physical defects affect educational output chiefly by their detrimental effect on the general health and vitality of the learner.

Diseases like chorea and epilepsy which affect the central nervous system appear to be fairly highly correlated with educational retardation. Burt considers that the effects, which are detrimental to the emotions rather than to the intellect, tend to inhibit steady, persistent effort. Schonell¹, investigating the importance of such

1. Schonell, F.E., The Education of Backward Children. London: Evans Brothers Limited, 1936, pp. 38-39.

disorders, found that "no less than sixteen per cent. of every

backward group could be classified as highly-strung showing flightiness of attention, motor incoordination and symptoms of chorea and neurasthenia". General excitability and anxiety states were correlated with backwardness to the extent of +0.2. Burt discovered that where a child is subject to continuous pain as in headache, toothache and earache, arithmetic suffers most.

Educational ability would appear to vary with the physical state; Burt¹ notes "that several of the mild cardiac cases showed

1. Burt, C., The Backward Child, p. 201.

a curious variability in scholastic tests when retested on various occasions".

Schonell stresses the importance of infectious diseases as a contributory factor, and Burt mentions that the correlation between educational retardation and the history of four or more zymotic illnesses was appreciable. He suggests that the feverish conditions which accompany such illnesses may be a causative factor.

Motor incoordination is often found to be a source of disability in reading and writing although arithmetic does not appear to be adversely affected. In attempting to determine causation it has to be remembered that emotional disturbance is often a concomitant, and the child of markedly poor coordination is often a rebel and a truant. Marum and Molitor² who compared the

2. Marum, O. and Molitor, P., Reported in Jastak, J., "Interferences in Reading." Psychological Bulletin, vol. XXXI, April, 1934, pp. 244-272.

performance of non-readers and good readers on tests of motor

precision concluded that motor deficiency was a cause of poor reading. Such children may be unable to follow a line of print with the eye or even with the finger.

THE PSYCHOMETRIC ASPECT AS A FACTOR IN RETARDATION

It is generally agreed that the Binet Scale provides a quantitative and qualitative measure of the child's general level of proficiency and of his educational potentiality. It appears to have diagnostic value by indicating specific abilities and attainments, but there is some doubt as to whether mental capacity can be adequately explored by the limited means of mental tests. In mitigation of the criticism that the Binet Scale stresses verbal ability unduly, it has to be remembered that language is a very important factor in school progress. Through this medium instruction is largely given, and proficiency is tested, thus the child's command of language becomes increasingly significant in school work.

Of studies in this field two are specially notable, that of Chipman¹ who studied feebleminded and borderline defective subjects,

1. Chipman, C.E., "The Correspondence of School Achievement And Industrial Efficiency With Mental Age As Obtained By The Stanford-Binet." The Psychological Clinic, vol. XVIII, No. 18, March, 1929, p. 21.

and that of Wolf² who was concerned with children rated by their teachers as of normal intelligence.

2. Wolf, S.J., "A Comparative Study of Two Groups of Girls of Relatively Equal Intelligence but Differing Markedly in Achievement." Journal of Applied Psychology, vol. XXI, 1937, pp. 304-310.

Chipman, examining the relationship between scholastic achievement and industrial efficiency, attacked the problem from the angle of the test. She denies the diagnostic power of the Binet Scale to differentiate mental types, complains that it gives no indication of special abilities and disabilities, and suggests that it may appear to credit certain children of the verbalist type with a mental capacity which they do not possess. She further questions the relationship between scholastic achievement and native ability.

She studied the records of thirty-seven subjects with mental ages ranging from seven years to eleven years four months and with IQs from fifty to seventy-seven, in order to isolate those whose school work did not equal expectation, the criterion of retardation being a difference of two or more years between mental age and educational age in at least two of the following subjects - arithmetic, reading and spelling. An analysis was made of the responses to the test items of the scale from six to fourteen years, and the percentages of successes and failures were calculated. The test items were divided into two classes, (a) those requiring associative memory and (b) those dependent upon observation. It was found that the failing-group tended to fail certain tests more frequently than did the achievers. The less successful obtained credits on the easier items of the scale - those depending on rote memory, facility in the use of language and ability to deal with a simple, concrete situation. The conclusion, merely tentative, was that the Binet Scale places too high a premium on mere language facility.

Wolf compared two groups of girls - fifty in each - of relatively equal intelligence but differing markedly in achievement as measured by standardised tests. In the selection of subjects the teachers were asked to designate the pupils whom they considered to be of equal intelligence, and records were studied to determine place of birth, length of attendance, school grade, physical status and age. It was conjectured that a significant number of girls in the failing group might possess special non-verbal abilities, and these might account for their probable disinterest in verbal tasks. The intelligence tests, it was expected, might reveal differences between the groups as to rote memory for numbers, visual memory, comprehension, planfulness and vocabulary. Achievement tests were administered in the hope that they might indicate differences as to types of successes and failures in the two groups.

Wolf reports that the intelligence tests revealed differences between the groups, but, while an item analysis of test years X and XII of the Stanford Revision of the Binet Scale indicated differences between the groups, these varied in reliability from completely significant to negligible. The one item that differentiated the groups with complete reliability in favour of the more successful group was that of "Dissected Sentences". There was no discrepancy as to basal and terminal years. The failing group was not characterised by non-verbal abilities that might warrant a lack of interest in non-verbal tasks.

Achievement tests applied to disclose differences as to types of successes and failures in the two groups, indicated that the groups differed most in subjects which required reasoning, for

example, arithmetic, and differed least in drill subjects, for example, spelling. The basic subject, reading, ranked fifth among the nine school subjects arranged in order of decreasing differences between the groups.

EMOTIONAL INSTABILITY AS A FACTOR IN RETARDATION

Considerable difference of opinion among investigators exists regarding the extent of the relationship between emotional instability and learning disability. Studies have varied with respect to the criterion of emotional instability adopted, the method employed, and the presence or absence of a control group. Some children have been studied in groups while others have been subjected individually to psychiatric and psychological examination. In some investigations the opinion of the teacher regarding the child's emotionality has been the deciding factor, while in others more objective tests of temperament have been applied. Even when so-called objective tests are employed, much depends on the manner in which results are interpreted; the 'halo' illusion, it is said, tends to operate, with the result that the teacher rates more highly on desirable traits the child who does well in class.

It has been suggested that the maladjusted child may have a higher intelligence quotient than that actually obtained, and that emotionally unstable children exhibit a tendency to low achievement, but some investigators dissent from this view. The popular view that emotionality is a concomitant of superior endowment has been supported by some clinical psychologists, and it has even been

suggested that stability of temperament may be detrimental to scholarship. As a result of testing students in Colgate University Young¹ states,

From the armchair one would expect the students who were psychoneurotic to be especially likely to fail in their college work. As a matter of fact the exact opposite is revealed by our records. There are twice as many students with stable emotions leaving because of failure than students with unstable emotional outlets.

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1. Young, J.B., "How Emotional Traits Predispose To College Failure". Journal of Educational Psychology, vol. XVIII, December, 1927, pp. 631-636.
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Although the effect of instability on test performance on the different versions of the Binet test is not known, a wide 'scatter' in the intelligence test is sometimes regarded as evidence of emotional maladjustment in the testee. Rosen² and Mathews³ found that the average number of years 'scatter' was not appreciably greater for the emotional group, but Mateer⁴, and Irwin and Marks⁵,

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2. Rosen, E.K., A Comparison of the Intellectual Status of Neurotic and Normal Children in Public Schools. T.C. Columbia University, New York: Contributions to Education, No. 188, 1925.
3. Mathews, J., "Irregularity in Intelligence Tests of Delinquents." Journal of Delinquency, vol. VI, March, 1921, pp. 355-61.
4. Mateer, F., The Unstable Child. New York: D. Appleton and Co., 1924, p. 170.
- "The Diagnostic Fallibility of Intelligence Ratios." Pedagogical Seminary, vol. XXV, December, 1918, pp. 369-92.
5. Irwin, E.A. and Marks, L.A., Fitting the School to the Child. New York: Macmillan Co., 1924, p. 187; pp. 206-207.
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considered that the opposite was the case. In recent revisions of the scale certain items would appear to be erroneously allocated with the result that 'scatter' may be due to arrangement of items rather than to emotionality on the part of the subject.

The view that emotional maladjustment constitutes a handicap

to learning is held by Burt¹, Hollingworth², Fernald³, Terman⁴, Schonell⁵, and others who consider that so much mental energy is

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1. Burt C., "The Unstable Child." Child Study Magazine, vol. X, 1917, pp. 61-79.
 2. Hollingworth, L.S., Special Talents and Defects. New York: Macmillan Co., 1923, pp. 69-70.
Gifted Children. New York: Macmillan Co., 1926, pp. 126-131.
 3. Fernald, G., Remedial Techniques in the Basic School Subjects. New York: McGraw - Hill Book Co., 1943, p. 7.
 4. Terman, L.M., Genetic Studies of Genius, vol. III, The Promise of Youth. London; G.G. Harrap & Co., 1930, p. 193.
 5. Schonell, F.E., The Education of Backward Children. London: Evans Brothers Limited, 1936, p. 37.
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being used up in personal conflict that the learner is unable, owing to lack of persistence and drive, to utilize his capacity. Blanchard⁶, Hincks⁷, Tulchin⁸, Leland⁹, and Monroe¹⁰ reported the incidence of emotional problems to be high among poor readers.

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6. Blanchard, P., "Reading Disability in Relation to Maladjustment." Mental Hygiene, vol. XII, 1928, pp. 772-788.
 7. Hincks, E.M., Disability in Reading and its Relation to Personality. Cambridge, Mass: Harvard Monographs in Education, No. 7, Harvard University Press, 1926.
 8. Tulchin, S.H., "Emotional Factors in Reading Disabilities in School Children." Journal of Educational Psychology, vol. XXVI, September, 1935, pp. 443-447.
 9. Leland, B.M., "Environmental and Psychological Handicaps among Non-Readers." Journal of Exceptional Children, vol. III, 1937, pp. 152-156.
 10. Monroe, M., Children Who Cannot Read. Chicago: University of Chicago Press, 1935, p. 102.
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The effects of emotion on learning have not been studied extensively nor have the effects on the emotions of failure to learn been adequately considered. Schonell¹¹ who suggests that two

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11. Schonell, F.E., Backwardness in The Basic Subjects. London: Oliver & Boyd, 1942, p. 494.
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sets of influences are operative, draws attention to the emotional attitudes entertained by the pupil towards his disability and towards

his teachers. In his view, acquired emotional reactions arising from continued failure constitute a more effective barrier to the pupil's improvement than temperamental qualities. Carter¹ showed

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1. Carter, H.D., "Emotional Correlates of Errors in Learning." Journal of Educational Psychology, XXVII, January, 1936, pp. 55-67.
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that pleasantness of association may be directly connected with learning. Failure may lead to frustration or fear which may inhibit further progress. Sherman² points out that those who are ashamed

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2. Sherman, M., "Emotional Disturbances and Reading Disability." Recent Trends in Reading. Supplementary Education Monographs, No. 49. Chicago: University of Chicago Press, 1939, pp. 126-134.
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of their failure may adopt defensive reactions. Irritation and loss of interest were reported by Thorndike and Woodyard³ and Kendrew⁴.

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3. Thorndike, E.L., and Woodyard, E., "Influence of the Relative Frequency of Successes and Frustrations." Journal of Educational Psychology, vol. XXV, April, 1934, pp. 241-250.
4. Kendrew, E.N., "A Note on the Persistence of Moods." British Journal of Psychology, vol. XXVI, October, 1935, pp. 165-173.
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Baruth⁵ describes learning as "a process of adjustment to

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5. Baruth, A., "The Effects Of Emotionalized Attitudes Upon Learning." The Emotionalized Attitudes, (Briggs, E., et al.) T.C. Columbia University, New York: 1940, Chapter III.
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environment which an individual makes with his whole personality", and reminds us that although the influence of emotional attitudes on learning has been realised, the extent and precise ways in which scholarship is affected is not known, and the fact that studies have been concerned with classroom attitudes has tended to limit the conclusion. The validity of the assessment is open to question, and, as yet, the subjective elements have not been effectively isolated, measuring techniques being subjective, invalid and unreliable;

partial correlation, for example, does not allow for overlapping of the various factors concerned, thereby causing difficulty in the interpretation of results. As far as school learning is concerned, several investigators have suggested that attitudes condition learning.

Flemming¹, in an analysis of achievement in high school,

1. Fleming, C.W., A Detailed Analysis of Achievement in High School. T.C. Columbia University, New York: Contributions to Education, No. 196, 1925.

studied twenty-seven variables in junior high school and thirty-three in senior high school and correlated them with a criterion of academic achievement as determined by teachers' marks. School attitude, which was defined somewhat narrowly in terms of initiative, interest in tasks and alertness, was found to be the most important factor, next to intelligence, in its association with scholarship.

In a study involving sixteen high school students Pressey²

2. Pressey, S.L., "An Attempt to Measure the Comparative Importance of General Intelligence and Certain Character Traits in Contributing to Success at School." Elementary School Journal, vol. XXI, 1920, pp. 220-229.

found a high correlation between school attitude and academic achievement in terms of teachers' marks.

It is difficult to decide whether the emotional condition is a cause or merely a concomitant of inferior scholarship. Witty and Kopel³ consider that "the result of failure in a subject has many

3. Witty, P. and Kopel, D., Reading and the Educative Process. New York: Ginn and Company, 1939, p. 228.

consequences; its concomitants are many and varied". Emotional maladjustments inhibit further learning and thereby create more

emotional difficulty. Tinker¹ states that pupils exhibiting signs

1. Tinker, M.A., "Remedial Methods for Non-Readers." School and Society, vol. XL, October, 1934, p. 526.

of emotional upset are unable to use the sustained effort required in learning to read. Failure then gives rise to feelings of inferiority, and personality and behaviour deviations may occur.

In a summary of research done in this field Bennett² concluded that

2. Bennett, C.C., An Inquiry into the Genesis of Poor Reading. T.C. Columbia University, New York: Contributions to Education, No. 755, 1938, p. 36.

children who suffer from emotional conflicts find difficulty in learning to read and that this has a detrimental effect on the development of personality, a view which is supported by Tulchin³ and by Monroe and Backus⁴ who listed the emotional factors as

3. Tulchin, S.H., "Emotional Factors in Reading Disabilities in School Children." Journal of Educational Psychology, vol. XXVI, September, 1935, p. 446.

4. Monroe, M. and Backus, B., Remedial Reading. Boston, Mass: Houghton Mifflin Co., 1937, pp. 25-26.

withdrawal, daydreaming, defeatism, hypertension and anxieties.

Saunders⁵ discovered that reading failures were not aggressive;

5. Saunders, M.J., "The Short Auditory Span Disability." Childhood Education, vol. VIII, October, 1931, pp. 59-65.

they played alone and avoided social contacts until they were considered antisocial and became behaviour problems. Monroe and Backus⁶ express the opinion that in backward readers the primary

6. Monroe, M. and Backus, B., Remedial Reading. A Monograph in Character Education. Boston, Mass.: Houghton Mifflin & Co., 1937, pp. 25-26.

emotional factors - general emotional immaturity, excessive timidity and predilection against all school activities - were

causes. Gates¹ listed as symptoms of personality maladjustment in

1. Gates, A.I., "Failure in Reading and Social Maladjustment." Journal of the National Education Association, vol. XXV, October, 1936, pp. 205-206.

poor readers nervous tensions and habits, sullenness and defiance, withdrawing reactions, daydreaming, extreme self-consciousness, laziness and indifference. Bird² found that thirty per cent. of

2. Bird, G.E., "Personality Factors in Learning." Personnel Journal, vol. VI, June, 1927, pp. 56-59.

children studied between four and six years of age had handicaps of personality, such as shyness and lack of confidence, that interfered with reading.

Burt³ reports that nine per cent. of his backward group showed

3. Burt, C., The Backward Child. p. 542-549.

evidence of a neurotic condition, while twenty per cent. manifested some type of excitement, depression or anxiety. McKinney⁴

4. McKinney, F., "Certain Emotional Factors in Learning and Efficiency." Journal of General Psychology, vol. IX, July, 1933, pp. 101-116.

considers that emotion affects learning to a considerable extent and that it can influence an intellectual task. Treating of emotional maladjustment in bright children Regensburg⁵ suggests

5. Regensburg, J., "Emotional Handicaps to Intellectual Achievement in Supernormal Children." Mental Hygiene, vol. X, 1926, pp. 480-494.

that the maladjustments result from lack of uniformity in the rate of emotional and intellectual growth making it difficult for the child to fit into his school group. In a study of seventy-seven maladjusted pupils of over 110 IQ Schott⁶ found that forty-eight

6. Schott, E.L., "School Maladjustments of Some Mentally Superior Patients in a Psychiatric Clinic." The Psychological Clinic, vol. XXI, December, 1932, pp. 202-207.

were backward educationally.

Irwin and Marks¹ who hold that emotional status and conduct

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1. Irwin, E., and Marks, L., Fitting The School To The Child.
New York: Macmillan Co., 1924.
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disorders determine the pupil's educational history, mention the poor scholastic records of criminals which show that the latter did not get on well at school, and express the opinion that emotional instability is a significant factor in the learning situation.

Rosen² who compared the intellectual and educational status

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2. Rosen, E.K., A Comparison of the Intellectual and Educational Status of Neurotic and Normal Children in Public Schools.
T.C. Columbia University, New York: Contributions to Education, No. 188, 1925.
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of fifty normal and fifty neurotic children matched as to sex, grade and school, failed to find any feature in the test performance likely to differentiate the groups. No significant differences were found in their performance on the Pintner and Thorndike Handwriting Scale, four cancellation tests, or on the Stanford Revision of the Binet Scale. No particular item on the Scale was consistently passed or failed by any particular group, the amount of 'scatter' was the same in both, and a retest of the children two weeks later showed that the IQs were equally constant for the two groups. Test scores failed to provide evidence of any disparity in capacity and attainment between them; the average IQs of the groups were closely similar and the total educational scores were almost identical. This was a result of pairing by age and grade. Comparison of the scores of the groups with those of an unselected sample of the school population revealed that when judged by this

criterion the neurotics and the adjusted children were found to be below average in grade status and in intelligence, the average Stanford-Binet quotient being only ninety-two.

Rosen concluded that a greater proportion of neurotics was found among stupid children. Their scholastic attainment, which was equal to that of a selected group of the same age-grade standing, was found to be poor when compared with the work of an unselected sample of school children. It is suggested that the poor achievement in both groups may have been attributable to low intelligence, since there was no proof that the educational achievement of the neurotics was affected by emotional factors.

Gates¹, assuming that children were emotionally and socially

1. Gates, A.I., "The Nature and Educational Significance of Physical Status and of Mental, Physiological, Social and Emotional Maturity." Journal of Educational Psychology, vol. XV, September, 1924, pp. 329-358.

mature if they were free from personality difficulties and emotional disorders, found that emotional and social maturity did not have any effect on educational achievement since the correlations between the variables, although positive, were low, being about +0.26.

This view was corroborated by Paynter and Blanchard² who

2. Paynter R.H. and Blanchard, P., The Educational Achievement Of Problem Children. New York: Commonwealth Fund, 1929.

conducted what is probably the most notable study in this field, their data being obtained from the case records of child guidance clinics in Los Angeles and in Philadelphia. Three hundred and thirty pupils, referred on account of personality and behaviour

difficulties, were studied. All were above 80 IQ on the Stanford-Revision of the Binet Scale. The measures of emotional and social behaviour were described as rough. The factors investigated were personality deviations, behaviour difficulties, physical defects and social factors.

The intelligence quotients of the Los Angeles group ranged from 84 to 154 with a mean of 102.6, whereas those of the Philadelphia group ranged from 80 to 149 with a mean of 100. Children were regarded as retarded if they were unfit to enter the third grade at $8\frac{1}{2}$ or 9 years, the normal age being eight years three months.

Results proved that misgrading was less for chronological age than for mental or educational age. Personality and behaviour difficulties in combination appeared about six and a half times as frequently as personality difficulties alone, and about twenty times as frequently as behaviour difficulties alone.

Comparisons of the ratings according to intelligence quotients, educational quotients and accomplishment ratings of the children with the most frequently occurring personality and behaviour difficulties were made, the children with each personality or behaviour difficulty being classified in two groups - those with ratings below one hundred and those with ratings of one hundred and over in the measures considered.

A large proportion of children with feelings of inferiority and inadequate personalities had educational quotients below one

hundred while only fifty-eight per cent. of all the children had educational quotients below one hundred. Of the Los Angeles children with educational quotients below one hundred 84.3 per cent. manifested feelings of inferiority and 87.5 per cent. were of poor personality. The findings for the two groups were not in agreement, as the Philadelphia children characterised by feelings of inferiority were fairly equally divided in proportion to the educational quotients below and above one hundred.

When educational quotients and accomplishment ratios were considered the data indicated that specific behaviour difficulties appear to have comparatively little effect on educational achievement. There was no proof that personality and behaviour difficulties of any specific type interfere with scholastic accomplishment although feelings of inferiority appeared in conjunction with low intelligence and low educational ratings. The only personality difficulty associated with scholastic failure in the Philadelphia group was daydreaming.

Paynter and Blanchard inferred that too much stress had been laid on emotional instability as a deterrent to learning and that problem children show no general tendency to low educational achievement. They admit, however, that this does not mean that educational adjustment is never affected by the child's difficulties in other than intellectual fields, and suggest that there may be a very definite relationship between the child's problems and his school failure. They conclude:

There has perhaps been too much of a temptation to generalise on the basis of individual case-studies and to imply that the existence of personality and behaviour deviations will necessarily impair achievement. All that we wish to point out as a result of our investigation is the absence of any such general trend. It still remains true that in certain pupils the failure to rise to normal levels of achievement is the result of emotional maladjustments, but it would appear that the number of cases is smaller than one would think after reading some of the literature.

The lack of a control group was a defect of the study. If data regarding personality, behaviour and physical conditions of an unselected sample of pupils had been compared with their discrepancies in educational achievement differences might have been found between the experimental and the control groups. As various physical conditions and social factors are occasionally co-existent with personality traits the resulting overlapping tends to cause difficulties in the statistical interpretation of data. It is therefore impossible to determine the significance of any particular factor.

As a check on Rosen's study Keys and Whiteside¹ attempted

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1. Keys, N. and Whiteside, G.H., "The Relation of Nervous-Emotional Stability to Educational Achievement." Journal of Educational Psychology, vol. XXI, September, 1930, pp. 429-441.
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by a different method to ascertain the differences in attainment and intelligence as measured by the Stanford Revision between emotionally maladjusted pupils and their contemporaries who appeared to be normally adjusted, one hundred and eighty-two pupils being studied. A composite of the ratings of three teachers and scores obtained by the application of the Woodworth-Cady Questionnaire provided the criterion of emotional instability.

Ratings and test scores were transmuted into standard scores and averaged. Pupils who were found to be one or more standard deviations above the average of the group were regarded as the "Emotional Group", while those one or more standard deviations below were described as the "Stable Group". Each of the resulting groups consisted of thirty children.

The correlations between mental and chronological age were approximately the same for both groups, being +0.69 for the emotional and +0.65 for the stable group. A study of test performance showed that 'scatter' was not appreciably greater for the stable group. Nevertheless when the differences between intelligence and attainment test scores were examined, they were found to be from four to seven times the probable error. The unstable children were more than one year retarded on an age-grade basis, nearly two years lower in mental and educational age, and eighteen points in IQ lower than the stable children.

The authors point out that the implications as to the bearing of emotional traits upon learning are not clear, as various factors may have operated to cause the agreement between emotionality and inferior mentality to appear larger than it actually is. A high rating in emotionality may be the result of the teacher's general impression of the pupil and of his attainment rather than an indication of the pupil's real emotional status. The nervous child may be at a disadvantage in test situations, and his test scores may be no criterion of his real intelligence and attainment. Hughes who says that a number of children for various reasons are bound to fail to do themselves justice in any type of examination,

mentions that Ballard¹ investigated a small number of discrepant

1. Ballard, P.B., Unpublished report, 1927. (cited by Hughes, op. cit.)

cases in 1927 and found that "in some instances the scholarship examination fails to capture quite brilliant children". Hastings² ✓

2. Hastings, J.T., "Tension and School Achievement Examinations." Journal of Experimental Education, vol. XII, March, 1944, No. 3, pp. 143-164.

has shown that when pupils are classified into 'high tension' and 'low tension' although high tension does not necessarily accompany low examination scores, nor contrariwise, the predicability of the examination score is less with high tension than with low tension pupils. The problem as to whether the opinion, generally expressed, that in the judgment of teachers certain pupils do not do themselves justice in examinations is valid, was investigated by the Scottish Council for Research in Education. Teachers were asked to indicate in a preliminary order of merit the pupils who, in their opinion, were of this type. The order of merit of these pupils, based on the results of an actual examination, was also available. When the percentile rankings of the pupils, based on teachers' order and examination results, were compared it was inferred that "the teachers' estimate is not only useless but even less reliable than mere guesswork".³

3. Examination Inquiry - Two Aspects. The Scottish Council for Research in Education - Supplement to The Scottish Educational Journal, No. 7, May, 1932.

Keys and Whiteside then attempted to determine as accurately as possible the influence of nervous - emotional traits upon achievement. To minimise the obscuring effects of the irrelevant

factors already mentioned, two groups, matched as to age and intelligence test scores but differing in their emotional characteristics were secured. Owing to marked differences in age and intelligence in the two groups it was possible to include only sixteen of the thirty pupils in each of the matched groups.

Although the chronological ages and intelligence quotients in the two groups were not identical, the differences between the groups were too small to be significant. On the other hand, differences in grade standing and educational attainments were large, the emotionally unstable group being on an average 0.63 of a year retarded in grade placement and more than one year lower in educational attainment. The differences were found to be significant. The authors concluded that when children of like sex and intelligence but widely emotional traits are compared, the unstable tend to average appreciably lower in grade placement and educational achievement than the stable. The accomplishment quotient of the emotional group averaged 95.4 as compared with 103.7 for the stable.

There is some doubt regarding the incidence of emotional causes affecting learning. Although Robinson¹ found that emotional

1. Robinson, H.M., Why Pupils Fail in Reading. Chicago: University of Chicago Press, 1947, p.225.

factors were present in forty-one per cent. of reading-problem cases studied, in only thirty-two percent. of them reading failure was attributable to emotional difficulties. That the percentage of cases showing emotional problems may be lower than that reported

by some investigators was considered also by Gates¹ who found that

1. Gates, A.I., "The Role of Personality Maladjustment in Reading Disability." Journal of Genetic Psychology, vol. LIX, September, 1941, pp. 77-83.

"The Nature and Educational Significance of Physical Status and of Mental, Social and Emotional Maturity." Journal of Educational Psychology, vol. XV, September, 1924, pp. 329-358.

although emotional difficulties were apparent in seventy-five per cent. of retarded readers studied by him the emotional problem was a causative factor in failure in only nineteen per cent. of the cases.

The discrepancy in the different studies between the relative number of cases exhibiting maladjustment may be due to the fact that interpretations of the term 'emotional maladjustment' may differ.

PERSONALITY TRAITS AS CAUSATIVE FACTORS IN LEARNING

Research reveals the importance for scholastic success of persistence, industry and dependability on the part of the learner. Carelessness, laziness and lack of interest would appear to be causative factors in educational retardation. Prescott² reminds

2. Prescott, D.A., Emotion and the Educative Process. Washington: American Council on Education, 1938, Chapter I.

us that experimental data on affective factors are scarce. Character traits are closely related to emotional attitudes, with the result that there is much overlapping and it is difficult to determine which is cause and which effect.

To determine the importance of factors other than intelligence which influence success in high school, Turney³ compared a group

3. Turney, A.H., Factors Other Than Intelligence That Affect Success In High School. Minneapolis: The University of Minnesota Press, 1930.

of pupils whose educational attainment was relatively higher than was to be expected from their intelligence quotients with a group whose scholastic achievement was comparatively low when judged by the same criterion. The groups differed significantly in industry, co-operativeness, perseverance and dependability, as these qualities had been estimated by teachers. "Each of the traits appeared to be equal to or greater than the intelligence quotient in its effect upon achievement as measured by teachers' marks." Pupils who were successful were characterised by a greater interest in school work than were those who failed, irrespective of their level of intelligence. Turney realised that these qualities were to a certain extent measuring the same factor.

Each pupil was rated by his teachers on industry, perseverance, dependability and ambition, the reliability coefficients for these estimates being +0.80. Intercorrelations computed between chronological age, mental age, intelligence quotient and academic grades and each of the four traits showed that the latter appeared to be more closely related to scholastic success than either the intelligence quotient or the mental age. In Turney's view the traits represent the extent to which the pupils were motivated in class, and he concluded that motivation and intelligence are the most important factors in educational achievement.

In an attempt to discover how often it is possible for a pupil whose intelligence quotient is below the class mean to rise above the mean in attainment, and to isolate personality traits which may

be related to scholastic success Ames¹ found a correlation between

1. Ames, V., "Factors Related To High School Achievement." Journal of Educational Psychology, vol. XXXIV, April, 1943, p. 229.

intelligence and attainment of +0.54. Fifteen per cent. of one class and from twelve to fourteen per cent. of two other classes were able to achieve grades above the mean grade of their class although their individual intelligence quotients fell below the average of the class. Factors other than intelligence appeared to be operating; persistence, common sense and dependability correlated with achievement as highly as did intelligence, the coefficients being +0.60, ± 0.05 ; +0.52 ± 0.05 and +0.54 ± 0.05 , respectively.

Two methods, objective and subjective, were employed in a study conducted by Van Alstyne² of ten gifted children of 120 IQ-

2. Van Alstyne, D., "A Study of Ten Gifted Children Whose School Progress Was Unsatisfactory." Journal of Educational Research, vol. III, September, 1923, pp. 122-35.

and-over whose scholastic progress was unsatisfactory. Each pupil's perseverance at long tasks, speed of work, accuracy of execution, method of attack on new problems and performance on educational and on psychophysical tests, including tests of manual ability, were investigated. A subjective estimate was made of the spirit of attack on work, conscious or unconscious resistance, emotional preoccupation, trouble due to indifference or over-anxiety, and previous habits of work; a general estimate was also furnished by the teacher. Educational tests were given to assess the child's educational status in the same terms as his mental standing, and the

differences in score were noted. Since it is impossible to determine how much progress a child of a certain level of intelligence should make on a given educational test, the tests were administered also to a control group selected on the basis of similar intelligence quotients, ages and grades, the only difference being that the members of the group were making satisfactory educational progress according to their intelligence quotients.

Causative factors in retardation appeared to be laziness, shyness, daydreaming, indifference, sensitiveness to criticism and hypochondriacal fears resulting in irregular attendance. Personal problems were classified as neuropathic tendencies, innate character-defects, abnormal home-environment and troublesome behaviour in class. Van Alstyne considered that emotional instability, which characterised six out of nine pupils, was a causative factor in their failure. She suggests that the child with superior language ability may be rated too highly on the Stanford Revision and that language ability may not always correlate highly with general intelligence. If this is so, then pupils of the verbalist type may score too high on the intelligence test.

In an inquiry into discrepancies between the results of a scholarship examination and intelligence tests with individual pupils Hughes¹ assumed that since intelligence tests are designed to measure

1. Hughes, A.G., op. cit.

innate capacity, the results are less likely to be affected by extraneous handicaps in the testees than are the results of a scholarship examination. Home environment, health, character traits

and regularity of attendance at school were investigated although no estimate was made of the relative reliability of the two types of examination. One hundred and twenty pupils were studied. When those who did not win scholarships but who would have done so if the awards had been made on the results of the intelligence test, were compared with scholarship winners who would have been unsuccessful if the awards had been made on the results of the intelligence test, there was considerable overlapping. Pupils who were higher on the intelligence test than on the educational test suffered from extraneous handicaps to a greater extent than the others. Carelessness and laziness were often associated with bad home-conditions and with poor health. In some the laziness had been of long duration since it had been reported in the infant room. Hughes concluded that hereditary predisposition in the form of a phlegmatic or sanguine temperament may affect learning.

In a study of one hundred and thirty-two problem cases in the University of Chicago High School Reaves¹ found personality

1. Reaves, W.C., Pupil Adjustment in Junior and Senior High School. Boston: Heath, 1926.

difficulties to be second in frequency among the causes of poor educational achievement, the order of importance being: ineffective habits of work, personality difficulties, deficiencies in training, physical disabilities, mental disorders and psychophysical defects.

Richards², in a report on forty-four maladjusted pupils in a

2. Richards, E.L., "The Elementary School And The Individual Child." Mental Hygiene, vol. V, 1921, pp. 707-723.

school in Baltimore says,

The academic troubles of the remaining nineteen - not mentally handicapped, were associated with laziness, shyness, inattention, vicious tendencies, sensitiveness to criticism, day-dreaming and hypochondriacal fears.

In a group of thirty-four pupils Preston¹ found that with

1. Preston, I., Reported by Terman, L.M., The Intelligence Of School Children. London: G.G. Harrap & Co. Ltd., 1921, pp. 97-99.

twenty-nine the quality of the work as rated by the teacher was poorer than their mental age would warrant, whereas with five it was better. Where attainment exceeded expectation, the cause was attributed to exceptional application on the part of the pupil or to responsiveness influencing the teacher's judgment. On the other hand, inferior work appeared to be due to timidity, lack of self-confidence, physical defect, lack of application, emotional instability, psychopathic heredity and home 'spoiling'.

It would appear that a common cause of backwardness is laziness or lack of application. ✓ Terman, who suggests that girls make better use of their intelligence than boys, cites Virgil Dickson² who found that, when rated by teachers for school work,

2. Dickson, V.E., "What First Grade Children Can Do In School As Related To What Is Shown By Mental Tests." Journal of Educational Research, vol. II, June, 1920, pp. 475-480.

girls make better showing.

It may be that the school curriculum is better adapted to the needs and interests of girls, that girls excel in industry and application, that girls are more willing to submit to direction and are better behaved than boys.

BEHAVIOUR MALADJUSTMENT AS A FACTOR IN LEARNING

Results of research on the effect of conduct disorders on learning are not conclusive. As failure to learn may give rise to behaviour disturbances, it is difficult to identify the causative factor. The child who is failing in school may compensate for his inferiority by troublesome behaviour which in turn may prove a deterrent to further progress.

In an investigation into the relationship between scholastic retardation and maladjusted behaviour Johnson¹ compared one hundred

1. Johnson, E.H., School Problems In Behaviour. Hartford: Hartford School of Religious Education, 1925.

and twenty-three 'classroom' problems and one hundred and seven truants with a control group of well behaved children from the same school. She concluded that although troublesome behaviour and retardation are frequently associated, either may be the cause or the result of the other.

Burt² found that delinquent children were on an average retarded

2. Burt, C., The Young Delinquent. London: University of London Press, Ltd., 1938, p. 293; pp. 336-37.

by two years in general intelligence and by a further two years in educational attainments. Holmes³ also draws attention to the

3. Holmes, A., Backward Children. Indianapolis: Bobbs, Merrill Co. 1915, p. 110.

detrimental effect of misconduct on learning.

Paynter and Blanchard⁴, on the other hand, concluded that

4. Paynter, R.H. and Blanchard, P., op. cit.

problem children show no general tendency to low educational achievement. They base this finding on the fact that the percentage of

problem children with accomplishment quotients below one hundred in the Los Angeles group was 64.7 whereas among 4325 school children in the city the percentage was 66.2. The statistical form of the results nevertheless tends to obscure the fact that individual pupils in the group may suffer from behaviour disorders.

THE EFFECT OF ENVIRONMENTAL FACTORS ON LEARNING

Any study of factors affecting learning must be concerned with the whole network of circumstances which affects the pupil. The interaction between the individual and his environment is a dynamic, changing one, and the relationship which develops between a child and his parents, siblings or teachers defies measurement. Although no definite conclusion regarding the influences, favourable or unfavourable to learning, has as yet been reached¹

1. Thirty-Ninth Yearbook of the National Society for the Study of Education, Part I, Intelligence: Its Nature and Nurture.
Bloomington, Illinois, Public School Publishing Co., 1940.

there can be no doubt but that an environment which fails to provide an appropriate stimulus to learning constitutes a serious check to development. Influences which cause the security and receptivity of the learner to diminish have an inhibitory effect on progress.

Investigators have been concerned with the effect on learning of the socio-economic factor, the cultural influence of the home, the attitude of parents to the school and to learning, and the emotional atmosphere of the home. The child's attitude to life and to school may also be determined by his ordinal position in the family and by his relationship with his siblings.

The Socio-Economic Factor

A major factor in the educational situation is the socio-economic status of the learner, of all aspects of environment, perhaps the most difficult to define and measure. As Cattell¹

1. Cattell, R.B., "The Concept of Social Status." Twentieth Century Psychology. New York: The Philosophical Library. pp. 128-144.

has indicated, the difficulty is due in part to the fact that socio-economic status is a purely psychological entity. The term 'socio-economic status', which Chapin² has defined as

the position that an individual or family occupies with reference to the prevailing average standards of cultural possessions, effective income, material possessions and participation in group activity of the community,

2. Chapin, F.S., "A Quantitative Scale for Rating the Home and Social Environment of Middle Class Families in an Urban Community." Journal of Educational Psychology, vol. XIX, January, 1928, pp. 99-111.

refers not only to the cultural background but to the living conditions and probably also to the physical and emotional state of the individual. It may be, as Loevinger³ and Gough⁴ have suggested,

3. Loevinger, J., "Intelligence as Related to Socio-Economic Factors." Thirty-Ninth Yearbook, Part I, pp. 159-210.

4. Gough, H.G., "The Relationship of Socio-Economic Status to Personality Inventory and Achievement Test Scores." Journal of Educational Psychology, vol. XXXVII, October, 1946, pp. 527-539.

that some of the elements in the concept are unrelated. In the absence of a reliable standardised scale of socio-economic status the combination of intellectual, cultural and environmental variables makes it difficult to ascertain the causal factor in any situation.

Influence of the Socio-Economic Factor on IQ

Since Binet and his immediate successors recognised that there is a positive relationship between intelligence and social level there have been many attempts to discover the part played by the latter variable in determining the IQ, and to establish the degree of correspondence which exists between intelligence and various social levels - a difficult undertaking in the absence of "a perfectly homogeneous society in which status is a quality grading from one extreme to the other".¹ Study in this field is

1. Cattell, R.B., *op. cit.*, p. 132.

further complicated by the need to make use of a truly representative sample, a valid, reliable and adequately standardised test, a type of social classification which will apply equally to all the testees and an effective statistical technique. In the majority of the studies data have been stated in terms of group averages, correlation coefficients and measures of dispersion. Interpretation of the data is rendered more difficult, since, as Fleming² has pointed out

2. Fleming, C.M., "Socio-Economic Level and Test Performance." British Journal of Educational Psychology, vol. XIII, February, 1943, pp. 74-82.

in a survey of the work done in this field, the numerical size of the coefficient has varied with the sample tested, the test used and the type of social classification employed. In the more important studies the coefficients have varied from +0.21 to +0.53 indicating that the relationship is positive, but, in dealing with a subject in which the circular relationship, involved in the interacting associations of socio-economic status, intelligence and other

variables, complicates the issue, it is doubtful if the correlation method is the correct statistical technique. Neff¹, who has

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1. Neff, W.S., "Socio-Economic Status and Intelligence: A Critical Survey." *Psychological Bulletin*, vol. XXXV, December, 1938, pp. 727-57.
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criticised its use on the grounds that the distribution of intelligence is normal (although this is also open to question)^{2 & 3}

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2. Rusk, R.R., "The Intelligence of Scottish Children." *Thirty-Ninth Yearbook*, Part II, 1940. Chap. XVIII, pp. 269-73.
 3. McNemar, Q., *The Revision of the Stanford-Binet Scale*. New York: Houghton Mifflin Co., 1942. p. 17.
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whereas the distribution of socio-economic status is skewed, considers that presentation in distribution form would be preferable. Loevinger⁴ has suggested that, in situations where the units of

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4. Loevinger, J., *op. cit.*
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measurement are not absolute, analysis of variance would be the best statistical method.

In investigating the relationship between socio-economic status and IQ attempts have been made to study the effect on intelligence of (1) the social status of the child as determined by the father's occupation; (2) the effect of residence in a poor cultural environment; and (3) the effect of placing children in a better environment. Pre-school children have been studied in an effort to discover how early in life the differences manifest themselves.

In attempts to determine the relationship between the intelligence of the child and social status based on the occupational level of the parent it has been found as a rule that groups of children of fathers in the higher occupational levels have a higher mean IQ but the

interpretation of this relationship is not clear since the parent supplies both the heredity and the background. As a rule the intelligent parent tends to provide a much richer cultural background, but it must be remembered that the question of stimulation is also involved in learning and there is no independent measure of this variable. The presence of books and other cultural influences does not ensure their effect on the learner unless he is brought into active contact with them, and where there are neglectful parents or emotional difficulties the learner may derive little cultural stimulus from the environment.

In a study of British children Isserlis¹ found a positive

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1. Isserlis, L., The Relation between Home Conditions and the Intelligence of School Children. Medical Research Council Special Report Series, No. 74, London: H.M. Stationery Office, 1923.
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correlation of +0.30 to +0.24 between the intelligence of the children and the environment, status being determined by the economic position of the home, the care taken, or by the clothing of the children. In California, Terman and Merrill² in revising their scale for measuring

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2. Terman, L.M. and Merrill, M.A., Measuring Intelligence. London George G. Harrap & Co. Ltd., 1937, p. 48.
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intelligence found a spread of intelligence corresponding closely to that found in England by Duff and Thomson³. In general, children

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3. Duff, J. and Thomson, G.H., "Social and Geographical Distribution of Intelligence in Northumberland." British Journal of Psychology, vol. XIV, December, 1923, pp. 192-198.
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of unskilled labourers are found to average about 20 IQ points lower than do children of professional people at the top of the IQ scale, although there is considerable overlap throughout all the

distributions. Positive relationships have been found in the majority of the studies, including those of Bridges and Coler¹, Pressey and Ralston², Pressey³, Dexter⁴, Haggerty and Nash⁵, Sandiford⁶, Collins⁷, Jordan⁸, Freeman, Holzinger and Mitchell⁹, Stroud¹⁰, Goodenough and Shapiro¹¹, but not in all. An interesting recent study was that of Havighurst and Breese¹² who applied the

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1. Bridges, J.W. and Coler, L.E., "The Relation of Intelligence to Social Status." Psychological Review, vol. XXIV, January, 1917, pp. 1-31.
 2. Pressey, S.L., and Ralston, R. "The Relation of the General Intelligence of School Children to the Occupation of their Fathers." Journal of Applied Psychology, vol. III, December, 1919, pp. 266-73.
 3. Pressey, L.W., "The Influence of (a) Inadequate Schooling and (b) Poor Environment upon Results with Tests of Intelligence." Journal of Applied Psychology, vol. IV, March, 1920, pp. 91-96.
 4. Dexter, E.S. "The Relation between Occupation of Parent and Intelligence of Children." School and Society, vol. XVII, 1923, pp. 612-614.
 5. Haggerty, M.E. and Nash, H.B., "Mental Capacity of Children and Paternal Occupation." Journal of Educational Psychology, vol. XV, December, 1924, pp. 559-72.
 6. Sandiford, P., "Paternal Occupation and the Intelligence of Offspring." School and Society, vol. XXIII, 1926, pp. 117-19.
 7. Collins, J.E., "The Intelligence of School Children and Paternal Occupation." Journal of Educational Research, vol. XVII, March, 1928, pp. 157-69.
 8. Jordan, A.M., "Paternal Occupation and Children's Intelligence Scores." Journal of Applied Psychology, vol. XVII, March, 1933, pp. 103-19.
 9. Freeman, F.N.: Holzinger, K.J., and Mitchell, B.C., "The Influence of Environment on the Intelligence, School Achievement and Conduct of Foster Children." Twenty-Seventh Yearbook of the National Society for the Study of Education, Part I, 1928, pp. 103-217.
 10. Stroud, J.B., "A Study of the Relation of Intelligence Test Score of Public School Children to the Economic Status of Their Parents." Journal of Genetic Psychology, vol. XXXV, March, 1928, pp. 105-11. ✓
 11. Goodenough, F.L. and Shapiro, G., "The Performance of Pre-School Children of Different Social Groups on the Kuhlmann-Binet Tests." Journal of Educational Research, vol. XVIII, December, 1928, pp. 356-61.
 12. Havighurst, R.J. and Breese, F.H., "Relations Between Ability and Social Status in a Midwestern Community. III Primary Mental Abilities." Journal of Educational Psychology, vol. XXXVIII, April, 1947, pp. 241-47.
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Thurstone Tests of Primary Mental Abilities to all the children of twelve to thirteen years in a Mid-western city of 6,000 inhabitants. The measure of social status was based on four socio-economic factors - occupation, source of income, house type and area in which house was located. The correlation coefficient ranged from +0.2 to +0.4, and overlapping was reported. The conclusion was that children representing the lowest social range are definitely low in all the abilities measured. Byrns and Henman¹ as a result of applying tests to High School students,

1. Byrns, R. and Henman, V.A.C., "Parental Occupation and Mental Ability." Journal of Educational Psychology, vol. XXVII, April, 1936, pp. 284-91.

concluded that there was overlapping of ability within the various parental occupational groups and that the differences within every group were greater than the differences between groups. The correlation found between parental occupation and mental ability of the pupil was only +0.18. Woodworth² states that the finding

2. Woodworth, R.S., Psychology: A Study of Mental Life. 13th edition, 1942, p. 125.

that the intelligence of children corresponds more or less to the occupations of their fathers (the children of professional men and executives being highest in the scale and the children of unskilled labourers lowest), has been corroborated by investigations carried out in America, England, Soviet Russia, Poland, Czechoslovakia and Japan.

The most notable studies concerning the effect on the IQ of residence in a poor environment are those of Gordon, Asher and

Klineberg¹. Gordon², as a result of testing canal-boat children at the lowest extreme of social and cultural level, found a mean IQ of 69.6 on the Stanford Revision of the Binet scale, the correlation between length of residence in the environment and IQ level being -0.76. A correlation of -0.43 was obtained from the results of tests applied to gipsy children who had received about 30 per cent. of normal schooling. Similar results were obtained by Asher³, who examined East Kentucky mountain children living at

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1. Klineberg, O., Negro Intelligence and Selective Migration. New York: Columbia University Press, 1935.
 2. Gordon, H., Mental and Scholastic Tests Among Retarded Children. London: Board of Education Pamphlet, No. 44, 1924, p. 92.
 3. Asher, E.J., "The Inadequacy of Current Intelligence Tests for Testing Kentucky Mountain Children." Journal of Genetic Psychology, vol. XLVI, June, 1935, pp. 480-486.
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an extremely low social and cultural level, the median IQ ranging from 67.5 to 72.9 on three different tests. Jordan⁴, who tested

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4. Jordan, A.M., op. cit.
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the children of millworkers in North Carolina, found that the median IQ decreased from about one hundred at age 6 to about eighty-five at age 13. While accepting the general conclusion of Gordon, Asher, Jordan and Lawrence⁵ that the IQ may be depressed by exposure to a

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5. Lawrence, E.M., "An Investigation into the Relationship between Intelligence and Inheritance." British Journal of Psychology, Monograph Supplement, XVI, 1931, p. 80.
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low cultural environment it must be remembered that the tests used had been standardised on children of a superior environment and that variations of the Binet scale assume equality of educational experience.

The effect on IQ of the transfer of children to a relatively better cultural and social environment has been studied by testing foster children who have been placed in good adoptive homes. The findings, which reveal the importance of social status as a purely environmental factor, vary with the degree to which the importance of certain variables has been recognised, the most conclusive studies being those in which attention was paid to age on adoption, length of time in the foster home, IQ level on entering, and the educational and cultural level of the foster-parents. Practically all studies of foster children show a higher level of intelligence in children who have been placed in good adoptive foster homes than would be expected from the socio-economic level of their true parents.

Burks¹, who tested 200 foster children between five and fourteen

1. Burks, B.S., "The Relative Influence of Nature and Nurture upon Mental Development: A Comparative Study of Foster Parent - Foster Child Resemblance and True Parent - True Child Resemblance." Twenty-Seventh Yearbook of the National Society for the Study of Education, Part I, 1928, pp. 219-316.

years, adopted before they were twelve months old, concluded that from seventy-five to eighty per cent. of the IQ variance is due to innate and heritable causes and attributed the mean gain of seven points of IQ to the effect of environment. She concluded that

the maximal contribution of the best home environment is about 20 IQ points, or the least cultured, least stimulating environment may depress the IQ as much as 20 points.

Freeman, Holzinger and Mitchell², working with an older group

1. Freeman, F.N.: Holzinger, K.J., and Mitchell, B.C., op. cit.

found that age at transfer was an important factor, those over twelve

years at placement showing no gain while those under twelve gained an average of six points, and concluded that the environmental variable may exert a great influence on intelligence test scores.

Leahy¹ confirmed Burks' results, finding a positive correlation of

1. Leahy, A.M., "Nature - Nurture and Intelligence." Genetic Psychology Monograph. XVII, 1935, pp. 235-303.

+0.25 between foster parent and foster child as compared with correlations of from +0.45 to +0.50 for true parent and child.

Skeels², who tested a group of children adopted before the age of

2. Skeels, H.M., "Mental Development of Children in Foster Homes." Journal of Genetic Psychology, vol. XLIX, 1936, pp. 91-106; also Journal of Genetic Psychology, Vol. L., June, 1937, pp. 427-39.

six months, applying the Kuhlmann revision of the Binet scale to the younger children and the Stanford Revision to the older, found that fifty-seven per cent, of true parents and only 4.8 per cent. of foster fall in the two lowest groups, whereas only 2.6 per cent. of true and 23.8 per cent. of foster parents appear in the two highest. The results indicated complete lack of relationship, no resemblance being found to exist between the characteristics of these foster children and those of either their foster or true parents.

Age, Socio-Economic Status and Intelligence

In assessing the influence of environment in determining the differences it is necessary to discover how early in life occupational differences in intelligence appear. It would be difficult to attribute intellectual differences to environment if the intelligence

of children in the first few months of life is found to correspond to the social level of their parents. On the other hand, if the relationship between social level and intelligence was non-existent at first and only began to appear as the child grew older it might be regarded as evidence of the effect of environmental factors. The results of experiments in this field are conflicting as they appear to depend on the type of test used. Terman¹ and others, using

1. Terman, L.M. and Merrill, M.A., Measuring Intelligence.

variations of the Binet Scale, found differences corresponding to occupational status as early as the two-year level, no results being obtainable at earlier levels as the tests are unreliable when used with children under two years. Goodenough² found intellectual

2. Goodenough, F.L., The Kuhlmann-Binet Tests for Children of Pre-School Age. Minneapolis: University of Minnesota Press, 1928.

differences between social classes at the age of two years and suggested that this was due to innate differences in capacity. On the other hand, Furfey³ and Bayley⁴, who applied infant tests to

3. Furfey, P.H., "The Relation Between Socio-Economic Status and Intelligence of Young Infants as Measured by the Linfert-Hierholzer Scale." Journal of Genetic Psychology, vol. XXXV, June, 1928, pp. 478-80.

4. Bayley, H., "Mental Growth During the First Three Years." Genetic Psychology Monograph, vol. XIV, No. 1. 1933, p. 41.

children of eighteen months, found zero correlations between the mental ability of infants and the socio-economic status of their parents. Furfey and Muehlenbein⁵ who retested with the Stanford

5. Furfey, P.H., and Meuhlenbein, J., "The Validity of Infant Intelligence Tests." Journal of Genetic Psychology, vol. XL, March, 1932, pp. 219-23.

Revision a group of children already tested with the Linfert-Hierholzer infant scale four years earlier, also report a zero correlation between relative scores on the two tests. The discrepancy in results may be accounted for by the fact that the different tests may not be measuring the same abilities. Until infant tests which correlate highly with valid and reliably standardised intelligence tests are available the question of the nature of the relationship between age, intelligence and socio-economic status must remain unsolved. It may be, as Neff¹ suggests,

1. Neff, W.S., op. cit.

that the positive relationship between age and socio-economic status is non-existent below a certain age level.

In an attempt to discover the relationship between socio-economic status and intelligence when heredity is held constant, studies have been made of the intelligence of identical twins who have been reared apart since birth. The only reliable study is that of Freeman, Holzinger and Newman² who concluded that significant

2. Newman, H.H., Freeman, F.N., and Holzinger, K.J., "Twins: A Study of Heredity and Environment." Chicago: The University of Chicago Press, 1937.

changes in social intelligence and educational achievement resulted from differences in educational and social environment. The average difference in IQ found was about eight points. Ellis³ has pointed

3. Ellis, R.S., "Individual Differences." Twentieth Century Education. New York: The Philosophical Library, New York, p. 259

out that the difference is not statistically significant since the average differences found for retests of the same individual may vary from four to seven points.

Socio-Economic Status and Scholastic Attainment

There have been fewer attempts to establish the relationship between socio-economic status and scholastic achievement. In most instances the school has been taken as the criterion of social grading and investigators agree with Burt¹ that educational back-

1. Burt, C., Mental and Scholastic Tests: also The Backward Child, Chap. V. London: The University of London Press.

wardness is most prevalent in the poorer areas. All agree that there is a wide range of ability in every social grade and that there is overlapping between the grades, correlations being higher where the cultural levels of the home have been considered. While positive correlations have been found in the majority of the studies some investigators have found negative correlations between the two variables.

Nemzek² found that measures of educational and occupational

2. Nemzek, C.L., "The Value of Certain Non-intellectual Factors for Direct and Differential Prediction of Academic Success." Journal of Social Psychology, vol. XII, 1940, pp. 21-30. (cited by Gough, H.G. op. cit.)

status of the father had no value for the prediction of the academic success of the children as determined by grade point averages.

Heilman³, using measures of the cultural and socio-economic back-

3. Heilman, J.D., "The Relative Influence upon Educational Achievement of some Heredity and Environmental Factors." The Twenty-Seventh Yearbook for the Study of Education, Part II, Nature and Nurture: their Influence upon Achievement. Bloomington, Illinois: Public School Publishing Company, 1928, pp. 35-66.

ground, concluded that not more than one per cent, of variation in educational age was due to the socio-economic status of the home, and

Snyder and Snyder¹ in a study of matched pairs of orphanage and non-

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1. Snyder, B.J. and Snyder, W.U., "Some Relationships between Children's Symptoms of Maladjustment and Background Factors." Journal of Clinical Psychology, vol. II, 1946, pp. 13-22.
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orphanage children found no difference in scholastic attainment

between the two groups. Anderson and Kelley² found no significant

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2. Anderson and Kelley, An Inquiry into Traits Associated with Reading Disability. Smith College Studies in Social Work, II, No. 1. (cited by M. Monroe: "Children Who Cannot Read": University of Chicago Press, p. 100).
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differences between good and poor readers with regard to socio-

economic position of the parents and Ladd³ found that socio-economic

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3. Ladd, M.R., The Relation of Social, Economic and Personal Characteristics to Reading Ability. T.C. Contributions to Education No. 582, New York: T.C. Columbia University, 1933. (cited by Witty, P.A. and Kopel, D., "Reading and the Educative Process", Ginn and Company, Boston.)
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status as measured by the Sims Score Card proved to have little

relation to reading proficiency. In this connection Witty and

Kopel⁴ indicate that

significant effects upon the reading of individuals are associated with subtle and interrelated environmental conditions many of which are not measured by the Sims Scale.

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4. Witty, P. and Kopel, D., Reading And The Educative Process. New York: Ginn and Company, 1939, p. 231.
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Preston⁵, Bennett⁶ and Loutitt⁷ agree that estimates of

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5. Preston, M.I., "The Reaction of Parents to Reading Failures." Child Development, vol. X, No. 3, September, 1939, p. 173.
6. Bennett, C.C., An Inquiry into the Genesis of Poor Reading. T.C. Columbia University, New York: Contributions to Education, No. 755, 1938, p. 68.
7. Loutitt, C.M., Clinical Psychology. New York: Harper and Bros., 1936, p. 210.
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economic status did not appear to be related to failures in reading

but Loutitt suggests that there might be a lack of stimulation in homes in the lower socio-economic groups. Robinson¹ found that the

1. Robinson, H.M., Why Pupils Fail In Reading. Chicago: University of Chicago Press, 1946.

education of the parents, occupation of fathers, and number of books, magazines and newspapers appeared to be unrelated to reading failure. Bennett also concluded that the number of books in the home was not significant as a cause of failure to read.

As a rule the relationship between the two variables has been found to be positive. In an investigation of junior high school subjects Coleman² revealed a positive relationship between socio-economic status and achievement and this finding was confirmed by Gough³ and also by Shaw⁴ who found a correlation of +0.41 between

2. Coleman, H.A., "The Relationship of Socio-Economic Status to the Performance of Junior High School Students." Journal of Experimental Education, vol. IX, 1940, pp. 61-63.

3. Gough, H.G., "The Relationship of Socio-Economic Status to Personality Inventory and Achievement Test Scores." Journal of Educational Psychology, vol. XXXVII, October, 1946, pp. 527-40.

4. Shaw, D.C., "The Relation of Socio-Economic Status to Educational Achievement in Grades IV to VIII." Journal of Educational Research, vol. XXXVII, November, 1943, pp. 197-201.

the scores on the Sims Score Card and the Stanford Achievement Test.

As a result of applying tests of intelligence, of arithmetic and of word recognition to children who had been transferred to a better housing area Dawson⁵ concluded that there was "slight acceleration in the transferred group". Davidson⁶, (cited by Witty and Kopel)

5. Dawson, S., "Environmental Influence on Mentality." British Journal of Psychology, vol. XXVII, October, 1936, pp. 129-34.

6. Davidson, H.P., "An Experimental Study of Bright, Average and Dull Children at the Four Year Mental Level." Genetic Psychology Monographs, vol. IX, nos. 3 & 4, 1931. (cited by Witty, P.A. and Kopel, D., op. cit.)

reports that bright three-year old children from socially superior homes were superior in reading to four-year old and five-year old children from poorer homes and that their speech was much better. Stulken¹, Monroe and Backus² report that a large proportion of

1. Stulken, E.H., op. cit.

2. Monroe, M., and Backus, B., op. cit.

poor readers came from homes where the educational background was poor and where educational material was lacking. In investigating the relationship between mental proficiency and social class Winch³

3. Winch, W.H., "Social Class and Mental Proficiency in Elementary School Children." Journal of Experimental Pedagogy, vol. I, pp. 9-18; pp. 118-28.

found that the work of the pupils from under-privileged homes was inferior to that of children from privileged homes and drew attention to the fact that one outstanding difference was in arithmetic.

The positive relationship has been confirmed also in several recent Scottish surveys. In studying the attainment in reading and arithmetic of Scottish children from eight to twelve years, classified in five socio-economic groups, Fleming⁴ reported evidence

4. Fleming, C.M., op. cit.

of differences in attainment between pupils of the same age at the different social levels, those from the more privileged being more successful.

Three recent surveys undertaken at the "Qualifying" or transfer to secondary school-stage have investigated the effect of socio-economic status on attainment. The Statistical Report of the

Glasgow Qualifying Examination, 1939, describes investigations of (a) attainment in relation to necessity, (b) attainment in relation to housing, and (c) retardation in relation to necessity. The results indicate that average attainment in English and in arithmetic at this stage decreases as the percentage necessity increases, that higher scholastic attainment is associated with better housing conditions and that the proportion of retarded pupils increases with percentage necessity. In an investigation on a similar group in another Scottish city it was found that when schools were arranged in descending order of social rating the average marks for English, arithmetic and intelligence were also found to be in descending order¹. Similar results were found

1. McClelland, W., Selection for Secondary Education. Scottish Council for Research in Education Publication No. XIX. London: The University of London Press. p. 232.

in an earlier investigation into attainment in arithmetic at the Qualifying stage conducted in Glasgow in 1931 by Hunter², who

2. Hunter, J. Report on Special Voluntary Test in Arithmetic at Qualifying Stage, 1931. Glasgow Education Committee.

divided the testees into four socio-economic groups.

Language Development and Socio-Economic Status

The studies by Day³, Van Alstyne⁴, and Davis⁵ are notable

3. Day, E.J., "The Development of Language in Twins. A Comparison of Twins and Single Children." Child Development, vol. III, 1932, pp. 179-99.

4. Van Alstyne, D., The Environment of Three-Year-Old Children: Factors Related to Intelligence and Vocabulary Tests. T.C. Columbia University. New York: Contributions to Education, No. 366, 1929.

5. Davis, E.A., The Development of Linguistic Skill in Twins, Singletons with Siblings, and Only Children from Age Five to Ten Years. University of Minnesota Press, Child Welfare Series, No. 14, 1937.

examples of the research which has been completed on the relationship between socio-economic status and language development. Children from better homes appear to be more advanced in this respect than those from the poorer occupational levels. Descoedres¹, who compared

1. Descoedres, A., "La Mesure du Langage de l'Enfant." Journal de Psychologie, vol. XXI, 1924, pp. 43-54. (cited by Collins, M., "Modern Trends in Child Psychology" in The Study of Society. London: Kegan Paul, Trench, Trubner & Co. Ltd., 1939.)

the vocabularies of children from two to seven years, drawn from educated homes and from working class families, found that children from superior homes were advanced by almost as much as eight months at each stage. Smith², who carried out an investigation in three

2. Smith, J.C., Report of the Committee of Council on Education in Scotland, 1905-1906, p. 287. (cited by Rusk, R.R., "Experimental Education")

typical Glasgow schools in an attempt to determine the actual vocabulary of the average five-year old child, found that while the English vocabulary of a slum child was limited to two or three dozen words the child from the middle-class home was familiar with at least one thousand English words. The implication for success in the early stages of schooling is obvious.

The correlation ratio between the cultural level of the home and ability in written English was found to be +0.48 by Schonell³

3. Schonell, F.J., Backwardness in the Basic Subjects. Edinburgh: Oliver & Boyd, p. 347, footnote.

who studied the causal conditions associated with backwardness in the written composition of ninety-three pupils. He states that almost thirty-nine per cent. of the backward cases as compared with twelve per cent. of the controls came from poor homes.

ENVIRONMENTAL AND SOCIAL CHARACTERISTICS AS FACTORS IN
RETARDATION

A number of social factors have been studied in relation to failure. Since the home atmosphere determines to a marked extent the attitudes and interests of the learner abnormal conditions would appear to have a detrimental effect on school progress.

Van Alstyne¹ reports that the home environment of school failures was not normal; Richards² concluded that unhealthy habits of adaptation originating in the home were carried into school life; Sands and Blanchard³ attribute failure to emotional circumstances arising out of difficult home situations, and Holmes⁴, finding that temporarily retarded children improved following their removal from unsatisfactory homes traces retardation to environment. Hughes⁵

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1. Van Alstyne, D., "A Study of Ten Gifted Children Whose School Progress Was Unsatisfactory." Journal of Educational Research, vol. VII, September, 1923, pp. 122-35.
 2. Richards, E.R., "The Elementary School and The Individual Child." Mental Hygiene, vol. V, No. 4, October, 1921, pp. 707-723.
 3. Sands R. and Blanchard, P., Abnormal Behaviour. New York: Dodd, Mead and Co., 1923, Chap. XI.
 4. Holmes, A., Backward Children. Indianapolis: Bobbs Merrill Co., 1915, p. 110.
 5. Hughes, A.G., "Discrepancies Between The Results Of Intelligence Tests And Entrance Examinations To Secondary Schools." British Journal of Educational Psychology, vol. IV, November, 1934, pp. 221-35.
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reports that pupils who won scholarships awarded on the results of intelligence tests suffered from extraneous handicaps to a much greater extent than did those who succeeded on educational tests. The latter enjoyed more favourable home-conditions and were encouraged by their parents. Some of the children studied were over-indulged while others were neglected by their parents.

Burt¹ and Schonell² have drawn attention to the importance of

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1. Burt, C., The Backward Child. London: University of London Press, 1937, p. 118.
 2. Schonell, F.E., Backwardness In The Basic Subjects. London: Oliver and Boyd, 1942, pp. 347-49.
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adverse home circumstances as a deterrent to educational progress.

Monroe and Backus³ believed that children were influenced by the

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3. Monroe M. and Backus, B., Remedial Reading: A Monograph in Character Education. Boston, Mass.: Houghton Mifflin Co., 1937.
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parental attitude towards learning, and that lack of co-operation on the part of the parents towards the school had a detrimental effect on progress.

One determinant of home conditions is the emotional status of the parents. In a study of the parents of problem children Lotz⁴ found that forty-three per cent. of the latter manifested

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4. Lotz, E.R., "Emotional Status of the Parents of Problem and Psychopathic Children." School and Society, vol. II, 1077, August, 17, 1935, pp. 239-240.
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difficulties traceable to a neurotic heredity. These parents did not co-operate with the school. The characteristics investigated were broken homes, strained marital relationships, confused atmosphere, and jealous and suspicious parents. The latter were described as subject to unreasoning anger, domineering, irritable, excitable, hysterical, repressed, depressed, unsympathetic, over-sympathetic, fault-finding, unfair in their judgments of the children, quarrelsome, pathetic and hyperemotional. Fourteen or more of these characteristics were present in some parents. In ninety-seven per cent. of children showing marked disturbances of behaviour the cause was traced to parental maladjustment. Bird⁵ found that

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5. Bird, G.E., "Personality Factors in Learning" Personnel Journal, vol. VI, June, 1927, pp. 56-59.
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introverts came from environments of repression, harshness, and uneven treatment, while overindulgence by parents appeared to produce extroversion in the children.

The relationship between the emotional atmosphere of the home and the child's ability to succeed in school has been less extensively investigated, one reason probably being the difficulty of assessing parental attitudes. The effect on learning is probably indirect, the real causal factors being the adjustment and behaviour of the offspring as these are conditioned by home atmosphere. Where parental maladjustment has been studied as a causative factor in scholastic retardation the investigator has usually been concerned with failure in reading. Monroe¹ suggested that broken homes might be responsible for failure, but this view was not supported by Bennett². Robinson³, who found that mal-

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1. Monroe, M., Children Who Cannot Read. Chicago: University of Chicago Press, 1932, p. 100.
 2. Bennett, C.C., An Inquiry Into The Genesis Of Poor Reading. T.C. Columbia University, New York: Contributions to Education, No. 755, 1938, p. 68.
 3. Robinson, H.M., Why Pupils Fail In Reading. Chicago: University of Chicago Press, 1947, p. 222.
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adjusted homes or unsatisfactory inter-family relationships were contributory causes in fifty-four per cent. of the cases studied, remarks that this is higher than anything reported in the literature, and suggests that the higher percentage may be due to the thorough investigation of the cases and to the highly selective nature of the population studied. She stresses the fact that a child's failure may be caused by circumstances beyond the control of the

pupil and of the school. Ladd's¹ study emphasised the value of personal, social and economic factors as demonstrated by pupils' responses to tests. Preston², in a more intensive investigation,

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1. Ladd, M.R., The Relation Of Social, Economic And Personal Characteristics To Reading Ability. T.C. Columbia University, New York: Contributions to Education, No. 582, 1933.
 2. Preston, M.I., "The Reaction Of Parents To Reading Failures." Child Development, vol. X. No. 3, September, 1939, p. 173.
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studied the attitudes of parents towards their children before and after reading problems had developed in the latter. Many who had previously been overindulgent became impatient and scolding with the result that the children's reactions "progressed from bewilderment to hostility and anti-social behaviour". Insecurity at home and at school increased with inability to progress.

In considering the importance of the broken home it is necessary to distinguish between the home which is disrupted by discord and that broken by the death of a parent. The effects have been manifested in studies of delinquents. In homes disrupted by separation the child has often been exposed to a disturbing atmosphere over a period and may be torn in his loyalty to both parents. The death of a parent usually results in severe emotional disturbance. The different types of reaction were dealt with by Burt³. The average frequency of father being deceased

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3. Burt, C., The Young Delinquent. London: University of London Press, 1938, Chap. III.
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per hundred delinquents was 12.2 compared with 12.5 for non-delinquents; where the father was absent from the home on account

of separation the frequency was 9.1 for delinquents and 0.2 for non-delinquents. The death of the mother results in a different relation, as in the delinquent group the frequency is 13.7 compared with 4.0 for non-delinquents.

ORDINAL POSITION IN THE FAMILY AS A CAUSATIVE FACTOR
IN RETARDATION

The influence of ordinal position in the family on personality and on intelligence has been studied but there would appear to be little available data on its effect on learning. This may be due to the difficulty of conducting such investigations, a fact noted by Sutherland and Thomson¹ in their attempt to correlate ordinal

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1. Sutherland, H.E.G. and Thomson, G.H., "The Correlation Between Intelligence And Size of Family." British Journal of Psychology, vol. XVII, No. I, July, 1926, pp. 88-91.
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position and size of family with intelligence test scores of siblings.

Difficulties are related to the interpretation of terms. For purposes of investigation siblings have been classified as only, oldest, intermediate and youngest. Blatz and Bott² have mentioned

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2. Blatz, W.E. and Bott, E.A., "Studies In Mental Hygiene Of Children." Pedagogical Seminary, vol. XXXIV, December, 1927, p. 574.
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the need to consider the changing character of the home. The first-born, unless a twin, is for a time an only child, and each child is for a period the youngest member of the family. A youngest child born after his siblings have reached adolescence is frequently treated as an only child. The effect of the death of siblings

has also to be considered. In one study the difficulty was overcome by ignoring all deaths occurring before the subject was three years of age and by including, as if living, all deceased siblings whose death had occurred before the subject had reached that age. The investigators realised that in adopting this course they were ignoring the direct effect on the survivors of the death of the sibling and the indirect effect which might accrue from a change in the parents' attitude to the other children.

The age factor is important since the younger the subjects the greater will be the proportion of incomplete families and of only children and the higher will be the expected ratio of youngest to oldest.

Size of family must be considered. Hogben, Johnstone and Cross¹ state that "as it happens more than one third of all

1. Hogben, L., Johnstone, M.M. and Cross, W.K., "Identification of Medical Documents." British Medical Journal, 3rd April, 1948, p.632.

children born are first born". A recent national survey of an eleven-year-old age group gave the following result: first member of family, 38.3%; second, 24.6%; third, 14.8%; fourth, 8.86%; fifth, 5.2%; sixth, 2.9%; seventh, 1.5%; eighth, 0.61%; ninth, 0.13%; above ninth, 3.1%. Only against such a background have the percentages given for delinquency, etc., any significance.

Sex differences may play a part. The only boy in a family of girls or the only girl in a family of boys has a different home environment from children with siblings of their own sex.

Thurstone and Jenkins¹ hold that having a next older or younger

1. Thurstone, L.L. and Jenkins, R.L., Order of Birth, Parent-age, and Intelligence. Chicago: University of Chicago Press, 1931.

sibling of the opposite sex tends to improve the chances of successful adjustment.

Ordinal Position and Educational Failure

There is some difference of opinion regarding the influence of ordinal position as a factor in educational success. Busemann² and Bohannan³ report that only children are below average in attainment, but Wulker⁴ found no differences between the educational

2. Busemann, A., Cited by Loutitt, C.M., Clinical Psychology. New York: Harper & Brothers, 1947, p. 50.

3. Bohannan, E.W., "The Only Child In A Family." Pedagogical Seminary, vol. V, 1898, pp. 475-496.

4. Wulker, L., Cited by Loutitt, C.M., Clinical Psychology, 1947, p. 51.

achievement of one hundred and forty-six girls who were only children and that of the group of five hundred and twenty-seven girls of which they formed part. Dyer⁵ found no differences in scores in

5. Dyer, D.T., "Are Only Children Different?" Journal of Educational Psychology, vol. XXXVI, May, 1945, pp. 297-302.

academic grades between groups of one hundred only and non-only students paired in respect of chronological age and socio-economic background. Dealing with studies in reading ability Robinson⁶

6. Robinson, H.M., op. cit., p. 96.

asserts that "it appears from the few studies presented that the ordinal position of the child in the family may be related to reading failure but results may be due to chance". She points out that two

studies in reading retardation showed that the ordinal position in the family appeared to be the only factor which was related to reading failure. Bennett¹ found that fewer only children and oldest children were reading problems than children who were intermediate or youngest. Anderson and Kelley² report that one half

1. Bennett, C.C., op. cit., p. 68.

2. Anderson, M. and Kelley, M., "An Inquiry Into Traits Associated With Reading Disability." Smith College Studies in Social Work, vol. II, September, 1931, pp. 46-63.

of the reading control group and one third of the reading disability cases were oldest or only children. They suggest that parents probably assist oldest or only children more than children of a larger sibship.

The effects of position in the family or of size of family on the development of a child are relatively unknown as studies are not in agreement regarding the possible influences of ordinal position.

The Only Child

Campbell³ asserts that earlier investigators were inclined to believe that growing up as an only child was unsatisfactory from the point of view of mental hygiene. Friedjung⁴ reports that eighty-seven

3. Campbell, C.M., American Journal of Psychiatry, vol. IV, 1925, pp. 471-5. (Cited by Blatz, W.E. and Bott, E.A., op. cit., p. 556.)

4. Friedjung, J.K., cited by Loutitt, C.M., Clinical Psychology, New York: Harper & Brothers, 1947, p. 50.

per cent. of only children exhibited such behaviour symptoms as fear, disturbed sleep, capriciousness, anorexia, enuresis and constipation, whereas only thirty-one per cent. of children with siblings manifested these traits, and that the former were physically inferior;

a view held also by Bohannan¹. Busemann² concluded, on the basis

1. Bohannan, E.W., op. cit.

2. Busemann, A., op. cit.

of self-ratings of four hundred children, that only children and those from small families were more introverted and dissatisfied with themselves. They were rated by their teachers as more restless and hyperactive. Goodenough and Leahy³ also found that only

3. Goodenough, F. and Leahy, A.M., "The Effects Of Certain Family Relationships Upon The Development Of Personality." Pedagogical Seminary, vol. XXXIV, March, 1927, pp. 45-71.

children were more distractable, more excitable and more unstable than oldest or youngest children. They showed high ratings in negativism, persistent disobedience in home and school and temper tantrums, such characteristics being reported for seventy-one per cent. of only children as compared with fifty-five per cent. of oldest, thirty-nine per cent. of middle and fifty-six per cent. of youngest. Only children appear to be more aggressive and more self-confident than any of the other groups, they show the greatest proportion of cases of extreme fondness for physical demonstrations of affection and are highly gregarious in their social interests.

On the other hand Witty⁴ found that only children were superior in health, physical development, intelligence and character traits, while Blatz and Bott⁵ found that they had the best records when

4. Witty, P.A., "The Only Child Of Age Five." The Psychological Clinic, vol. XXII, No. 2, June-August, 1933, pp. 73-87.

5. Blatz, W.E. and Bott, E.A., op. cit., p.574.

teachers listed the misdemeanours of fourteen hundred school children.

The relationship between ordinal position and delinquency has

been studied. Burt¹ found 12.2 per cent. of only children in his

1. Burt, C., The Young Delinquent, p. 64, T.IV.

delinquent groups as opposed to 1.7 per cent. in the non-delinquent group. These findings were not in accordance with those reported by Slawson³ who found a slight but significant correlation between

3. Slawson, J., "Size of Family and Male Juvenile Delinquency." Journal of Criminal Law and Criminology, vol. XV, 1925, pp. 631-40. (cited by Goodenough, F.L. and Leahy, A.M., op. cit., p. 46.

size of family and male juvenile delinquency. It is to be noted that the only child in the sense in which Burt uses the term does not always mean a child without siblings. Children who were only children during their early years or youngest children whose siblings were much older were also included. In a study of one hundred and thirty-one delinquent girls Purcell Guild⁴ found that nineteen were only children. Merrill⁵ found, in a study of delinquents, that the

4. Purcell-Guild, J., "A Study of One Hundred Thirty-one Delinquent Girls held at the Juvenile Detention Home in Chicago," (1917). (Cited by Goodenough, F.L. and Leahy, A.M., Pedagogical Seminary, vol. XXXIV, March, 1927, p. 46.

5. Merrill, M.A., Journal of Delinquency, 1926, vol. X. (Cited by Blatz, W.E. and Bott, E.A., op. cit., p. 573.

only child was not the typical case. Burt maintains that there are six per cent. as many children appearing in the Juvenile Courts in London as in the control group which he employed.

It is pointed out that since parents of only children may be more likely to protect them from the consequences of anti-social behaviour a small proportion of only children may be brought before the court even although their behaviour may be in no way different from that of children in larger families. Moreover, the social

factor may be operating; the only child may be more frequently the product of unhappy marital relations which have resulted in separation. Maladjustment may thus be more frequent among only children without being related to the only child situation per se. It is difficult to determine the significance of onliness as a causative factor. The closer contact between the only child and his parents and the attention which he probably receives may tend to hinder the development of independence and to cause retardation in school work due to lack of effort and initiative.

The Oldest Child

In Adler's¹ view the first born member of a family is at a

1. Adler, A., "Characteristics Of The First, Second And Third Child." Children, vol. III, 1928, pp. 14-52. Cited by Loutitt, C.M., op. cit. p. 53.

disadvantage. It may be that he is subjected to conditions which make satisfactory adjustment difficult. The oldest child is an only child for a period until another child appears and monopolises adult attention.

Thurstone and Jenkins² and Levy³ found that first-born children

2. Thurstone, L.L. and Jenkins, R.L., op. cit.
 3. Levy, J., "A Quantitative Study of Behaviour Problems in Relation to Family Constellation." American Journal of Psychiatry, vol. X, 1931, pp. 637-654. (Cited by Loutitt, C.M. op. cit. p.52)

were problem children more frequently than those in any other ordinal position. In reports of children studied in child guidance clinics the number of oldest children would appear to be large.

Rosenow⁴ asserts that the incidence of first born children presenting

4. Rosenow, C., "The Incidence Of First-Born Among Problem Children." Journal of Genetic Psychology, vol. XXXVII, March, 1930, pp. 145-51.

problems is somewhat higher than theoretical expectation would warrant.

The disproportion of oldest children found among delinquents may be occasioned by real differences of personality. However, the smaller number of cases of only as compared with youngest makes the comparison between oldest and only children less reliable.

In a study of five hundred and forty-eight delinquent boys Breckenridge and Abbott¹ found that one hundred and thirty-eight were oldest children, while Reynolds² found that twenty-seven

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1. Breckenridge, S.P. and Abbott, E., The Delinquent Child and the Home. Russell Sage Foundations Publishing Co., New York, 1912. (Cited by Goodenough, F. and Leahy, A.M., op. cit. p.46)
 2. Reynolds, B.C., Environmental Handicaps of 400 Habit Clinic Children. Hospital Social Service, vol. XII, 1925. (Cited by Goodenough, F. and Leahy, A.M.; op. cit. p.47)
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per cent. of a group of four hundred problem cases were oldest children. This is less than the expected frequency of 38.3. On the other hand, Goodenough and Leahy³ found that the proportion of

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3. Goodenough, F. and Leahy, A.M., op. cit. p.53.
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youngest to oldest among problem children at the kindergarten stage was two to one.

The general opinion is that oldest children as a group show few outstanding tendencies. Temper tantrums are frequent, especially among girls. As compared to only and to youngest, oldest children are markedly non-aggressive, twenty-one per cent. of cases in one study exhibiting non-aggressiveness in a decided form. They are more suggestible, they lack self-confidence and qualities of leadership and show a marked tendency to introversion and seclusiveness.

Middle Children

Hug-Hellmuth¹ considers that the middle child feels an

1. Hug-Hellmuth, H., Cited by Loutitt, C.M., op. cit. p.53.

uncertainty about his position in the home. It is said that reports of negative attitudes, refusal to submit to authority, bullying and cruelty are less frequent in this group than in any other, and they stand lowest in reports of nervousness, timidity, fears, night terrors and worrying. While they are more aggressive than the oldest, they are less so than either of the other two groups. Like the only children they tend towards the flighty, distractable type of behaviour, the differences in this respect as compared with oldest and youngest children being significant. They are more influenced by suggestion and are likely to display more than the usual craving for physical demonstrations of affection. They are more gregarious in their social attitudes, although individuals showing marked divergence towards the opposite extreme are also found in this group. Many are unpopular with other children.

Middle children rank high in truancy, and stealing is more frequent in this group, this being true of both boys and girls, the incidence being thirty-five per cent. as opposed to twenty-four per cent. of oldest, twenty-one per cent. of youngest and twenty-seven per cent. of only. Age differences may operate.

The Youngest Child

The youngest child occupies an important position in terms of his own development. Not only parents but his siblings, who

are his superiors in age, may exert authority over him. This may be specially true in cases where the youngest is much younger than the others. It is difficult for a child in such a situation to develop an attitude of independence. The total size of the sibship probably decides the effects on the child of being the youngest. Brill¹ emphasised the peculiarity of only and of

1. Brill, A.A., Psychoanalysis: Its Theories And Its Practical Application. Philadelphia: Saunders, 1914.

youngest children because of paternal solicitude and lack of competition.

It is impossible to predict what the influence of ordinal position may be on any child. As Loutitt² has suggested the

2. Loutitt, C.M., Clinical Psychology, p.53.

possibility of jealousy among the siblings, favouritism on the part of parents, over-solicitude and other parental attitudes may be definitely influenced by such ordinal differences.

As far as intelligence is concerned there was no strong relationship either with size of family or with position therein, according to the findings of Sutherland and Thomson³ who report

3. Sutherland, H.E.G. and Thomson, G.H., op. cit., pp. 88-91.

our general impression from all this is that there is no clear proof of any correlation between intelligence and position in family. . . .

We have set out the possible errors in our work as fully as we can. But after allowing for them we conclude that there is a correlation of approximately -0.2 between size of family and intelligence of members among unselected children.

Recent findings indicate that the larger the family the lower the

average intelligence quotient of the representatives in a given age-group. However, Thomson¹ warns us that conclusions about the

1. The Trend of Scottish Intelligence. Publication of the Scottish Council for Research in Education, No. XXX. London: University of London Press, 1949.

influence of position in the family must be interpreted with caution since the influence of position in the family is closely related to the influence of size of family and a year group is not a suitable sample from which to deduce average family size.

CHAPTER III

PLAN OF PRESENT INVESTIGATION

Since scholastic success is believed to be conditioned by physical, mental, educational, emotional and social factors it was decided to make a detailed study of intelligent but retarded pupils in order, if possible, to discover the causative factors of retardation.

SCOPE AND LIMITATION OF THE STUDY

A child of good intelligence is one who has obtained an intelligence quotient of 110 or more on the Terman-Merrill Revision of the Binet Scale. To allow for possible variations in testing and for variability in performance this limit was reduced to 105. All pupils under this level were excluded to ensure that any variation in educational achievement would not be attributable to low intelligence. Others omitted from the study were those who had failed to make at least eighty-five per cent. of attendances at school during the previous two years or who had been frequently absent from school in earlier years when the fundamentals were being acquired.

Pupils under eight years six months and those over thirteen years five months were not included. An age range from nine to thirteen years was chosen, as at this stage children are generally free from the epidemics which occasion absence from school, and the tests of reading, spelling and arithmetic standardized on West of Scotland children are fairly reliable within this range.

SELECTION OF THE SUBJECTS

The Experimental Group

All pupils in the Experimental Group had been referred to a child-guidance clinic, some on account of scholastic retardation and some for other reasons, but all had been found, when judged by the accepted criterion, to be more retarded educationally than tested mental capacity would warrant. An examination of available clinic records revealed that two hundred children - 150 boys and 50 girls - of over 105 IQ who had failed to make satisfactory progress, were in this category.

Control Groups A & B

Since the evidence regarding the influence of the emotional factor on learning is conflicting, and investigators have perhaps been too ready to accept the existence of personality and behaviour deviations as a causative factor in the impairment of achievement, a group of one hundred emotionally maladjusted children who were making satisfactory progress according to the accepted criterion, together with a control group of one hundred children who were reported to be normal in adjustment and in scholastic achievement, were included. These constituted Control Group A and Control Group B respectively.

Control Group A consisted of seventy-two boys and twenty-eight girls, the latter forming twenty-eight per cent. of the total group as against twenty-five per cent. of the Experimental Group.

With these percentages in mind Control Group B, consisting of

seventy-five boys and twenty-five girls, was chosen. The pupils were matched with those of the Experimental Group in terms of sex, age and socio-economic status of the schools from which they were drawn. In addition a note was made of the occupation of the father, a modified form of the Taussig Scale being used for the purpose.

SOCIO-ECONOMIC SCALES

In early investigations carried out to decide the importance of the socio-economic factor in education the testees were grouped in three categories - better class, average and poor class. In the Stanford Revision of the Binet Scale Terman¹ used five social

1. Terman, L.M., The Measurement of Intelligence. London: Geo. G. Harrap and Co. Ltd., 1919, pp. 72-3; pp. 114-5.

groupings - very superior, superior, average, inferior and very inferior. Later, several scales giving a continuous grading of social level were devised, many of them utilising the occupation of the father as a criterion of social status.

Perhaps the best known of the occupational scales is that of Taussig² who divided social scales into five categories - day

2. Taussig, F.W., Principles of Economics. Third Edition. New York: The Macmillan Co., 1928.

labourers; unskilled workmen; lower middle-class; clerical and semi-intelligent occupations; well-to-do professional and business men and managers of industry. All revisions of this scale have stressed the intelligence concomitant of the occupation rather than the economic aspect with the result that the measurement of socio-economic status includes an intellectual factor. The high positive

correlation between socio-economic status and intelligence may be due in part to the inclusion of this factor in the scales. Variants of the scale are those of Nystrom¹, Sims², and Barr³.

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1. Nystrom, P.H., Economic Principles of Consumption. New York: Ronald Press, 1929.
 2. Sims, V.M., The Measurement of Socio-Economic Status. Bloomington, Illinois: Public School Co., 1928.
 3. Barr, F.E., "A Scale for Measuring Mental Ability in Vocations and Some of its Implications." (In Genetic Studies of Genius, vol. I, 1925).
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Terman who tends to rely on the Barr Scale, which was constructed by having a number of judges rate representative occupations according to the degree of intelligence demanded by each, questions the reliability of the Sims Scale. Other occupational classifications, the most notable of which is the Minnesota Scale for Occupational Classification, based on the Taussig, the Barr and the U.S. Census list of occupations, differ from the Taussig in dividing occupations into six or seven categories and in including agricultural workers.

A measure of socio-economic status by a non-occupational criterion, devised by Williams⁴ and known as the Whittier Scale

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4. Williams, J.H., Journal of Delinquency, vol. I, 1916, pp. 273-86.
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for Grading Home Conditions, rated socio-economic status in five categories depending upon presence of necessities, neatness and size of the home, parental condition and parental supervision. Measures of cultural possessions, income and material possessions were also devised by Chapin⁵.

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5. Chapin, F.S., op. cit.
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Many composite scales, such as the University of California Socio-Economic Index and the Index of Status Characteristics utilise both occupational and non-occupational information, such as education, income, cultural possessions and neighbourhood conditions. The index, being a number, may be used in computing the product moment coefficient of correlation.

In addition to the scales commonly used many others have been constructed by Leahy¹, Burks², Bayley³, Stroud⁴, and others for the

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1. Leahy, A.M., "Nature-Nurture and Intelligence." The Genetic Psychology Monograph, vol. XVII, 1935, pp. 235-203.
 2. Burks, B.S., "The Relative Influence of Nature and Nurture upon Mental Development: A Comparative Study of Foster-Parent - Foster-Child Resemblance." Twenty-seventh Yearbook of the National Society for the Study of Education, Part I, 1928, pp. 219-36.
 3. Bayley, H., "Mental Growth During The First Three Years." Genetic Psychology Monograph, vol. XIV, No. 1, 1943, p.41.
 4. Stroud, J.B., "A Study of the Relation of Intelligence Test Score of Public School Children to the Economic Status of Their Parents." The Journal of Genetic Psychology, vol. XXXV, March, 1928, pp. 105-111.
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purposes of their own investigations. Some type of questionnaire has also been used.

In the present investigation it was possible to make use of a definite index of environment, as the data which had been used in the investigation concerning the Glasgow Qualifying Examination, 1939, were available. This extract from the report⁵ defines

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5. Statistical Report of Examination, 1939. The Corporation of Glasgow Education Department - Qualifying Examination Board.
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'environment' as it has been considered in this study.

The term 'environment' so far as pupils are concerned includes feeding, clothing, parental control, school mates and other companions, etc. Now, in general, all these are

conditioned for any one family by the family income. In Glasgow three grades of necessity are recognised which are based on the family income and on the number of persons in the family. All children whose parents are in any of these three grades of necessity are entitled to free milk in school. The average number of children receiving free milk and the average attendance for each of the schools presenting candidates for the Qualifying Examination were obtained. The percentage of pupils receiving free milk in any of these schools was then calculated. For any school this percentage number has been taken as an index of necessity or social environment of the school. It actually gave the percentage number of pupils in the school whose parents were in receipt of Public Assistance in some form or other and ranges from zero to seventy per cent.

Using the above-mentioned data the Primary Schools in Glasgow were grouped according to percentage necessity. Keeping them in ascending order of necessity the schools were divided into eight groups, the average percentage necessity of each group being 0.63, 5.59, 13.73, 24.94, 35.50, 43.07, 49.20, and 62.30 respectively.

METHOD OF STUDY

The case histories of all children included in the Experimental Group and Control Group A were then studied and data were recorded.

Clinical examination of each child involved a study of his physical condition, mental capacity and scholastic attainment. In addition, his adjustment to school, home and family; his behaviour, personal characteristics and habits of work were assessed.

The medical schedule provided data relating to the medical history, physical development and nutrition; the circulatory, respiratory and alimentary systems; renal and haemoporetic conditions; bodily and sensory defects, particularly of vision

and hearing; irregular movements; abnormal reactions and persistent habits such as eye-blinking, nose-picking, nail-biting, head-twitching, nervous tension, tremor or hyperactivity of the limbs; endocrine and other glandular conditions; handedness; sleep and speech.

The psychiatric report furnished information concerning the child's attitudes to home and school and indicated the various problems which were troubling him. His emotional conflicts regarding his parents, siblings, companions and teachers had been discussed, and some account was provided of his thoughts, feelings, interests and ambitions. Emotionality was measured by the word-reaction test, free and controlled association, free drawings, Raven's Projection Test and the Loewenfelt Mosaics. Personality and behaviour symptoms were thoroughly investigated, and a full inquiry was made into personality characteristics and habits of work; habits of listlessness, apathy, industry and persistence being noted as were also fears and anxieties. The report concluded with a general appraisal of the child and of the reasons for his behaviour.

The psychological examination was concerned with the ascertainment of mental capacity, the Terman-Merrill Revision Form L. being used. Language ability is undoubtedly an overwhelming factor in determining success in this test, and good language comprehension would appear to be the basis of the Scale. Performance on this Revision is considered to bear a close

relationship to the testee's capacity to succeed in scholastic work. Many of the pupil's personality traits, which may have considerable influence on his ability to progress in school, are revealed in his responses to the different items of the test which provides therefore not only a quantitative but also a qualitative estimate of intellectual capacity.

The educational inquiry utilised the Vernon Graded-Word Reading Test, the Burt Four Fundamental Rules Arithmetic Test and Burt's Graded Vocabulary Spelling Test, the norms used being those obtained when the tests were standardised on West of Scotland children. As the clinic records did not provide the relevant data it was impossible to assess the child's ability to comprehend matter read or to deal with functional arithmetic. In this connection it is to be noted that in describing the reading scale Vernon¹ claims that "the scale agrees with speed and comprehension

1. Vernon, P.E., The Standardisation of a Graded Word Reading Test. Scottish Council for Research in Education Publication No. XII. London: University of London Press.

tests to just about the same extent as do judgments of reading ability made by experienced class teachers". In an investigation of reading in the Infant Division the relationship between the power to recognise words and the power to comprehend matter read was $+0.76^2$. Although Burt³ has warned us that efficiency in

2. McLaren, V.M., "A Study In Infant Reading." Studies in Reading, Vol. II, Scottish Council for Research in Education Publication. London: University of London Press, 1949.

3. Burt, C., The Distribution and Relations of Educational Abilities. Memorandum III. London: P.S. King and Son, 1917, p. 55.

mechanical computation is no criterion of educational ability, most teachers will agree that a high standard of computational accuracy is necessary if children are to deal adequately with arithmetical problems.

It is realised that the measures used in the mental and educational examinations represent only an approximate index of the child's inherent capacity and educational attainment, and that the numerical expression of these measures does not have the precision which is too often accorded to it. The Terman-Merrill Revision has a range of variation in either direction from the one obtained even under the best conditions of examination, and educational measures may be subject to even greater errors of interpretation.

The domestic situation of the pupils studied was also investigated and notes were made of the presence in the home of both parents, a stepmother or stepfather, grandparents or other relatives. The marital status and the adjustment of the parents to each other and also to the children were considered, as was also the socio-economic status of the family, special attention being paid to sleeping conditions and to overcrowding. The emotional atmosphere and any special crisis which had arisen were considered, and the parental attitude to school and to learning in general was investigated. An attempt was made to estimate the personality characteristics of the parents and to note whether they were over-anxious, ambitious, encouraging,

nagging, domineering, quarrelsome, bullying, pampering, over-indulgent, possessive, neurotic, melancholic or harsh. The family status of the child, his place in the family, and the sex of the siblings were also recorded. His reactions to his superiors and to inferiors were noted.

An inquiry was also made regarding the child's extra-curricular activities, outside interests and membership of juvenile organisations.

These topics were investigated to discover how various situations arising in the child's life have contributed to the development of habits, conditioned responses, emotional disturbances and behaviour patterns which characterise him and which may have affected his capacity to learn.

When the case histories of the children in the Experimental Group and in Control Group A had been examined, mental and scholastic tests were applied to all children in Control Group B. Relevant information regarding these children was also obtained.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA

The Experimental Group was composed of one hundred and fifty boys and fifty girls of normal and of superior intelligence who were failing in school work. Control Group A, consisting of emotionally maladjusted pupils who were making satisfactory progress, contained seventy-two boys and twenty-eight girls. Control Group B was composed of seventy-five boys and twenty-five girls who were well adjusted in all respects and whose educational attainment was normal.

The findings are reported in tabular form showing the distribution in the three groups of the pupils in respect of chronological age, intelligence quotients, socio-economic status, placement in class on the basis of chronological age and mental age, physical defects, behaviour difficulties and personality disorders.

Comparison of the data in the different groups is based on the chi-squared technique.

DISTRIBUTION ACCORDING TO CHRONOLOGICAL AGE, INTELLIGENCE QUOTIENTS AND SOCIO-ECONOMIC STATUS

The distribution of pupils according to chronological age is shown in Table I.

The highest percentage of children in the Experimental Group and in Group A - the emotionally maladjusted, is found in the

TABLE I

DISTRIBUTION ACCORDING TO CHRONOLOGICAL AGE OF PUPILS IN
EXPERIMENTAL GROUP, GROUP A AND GROUP B

Age in years	Number of Pupils											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
8 ⁶ / ₁₂ - 9 ⁵ / ₁₂	23	4	27	13.5	14	3	17	17.0	13	3	16	16.0
9 ⁶ / ₁₂ - 10 ⁵ / ₁₂	30	16	46	23.0	14	4	18	18.0	17	6	23	23.0
10 ⁶ / ₁₂ - 11 ⁵ / ₁₂	29	8	37	18.5	9	3	12	12.0	16	6	22	22.0
11 ⁶ / ₁₂ - 12 ⁵ / ₁₂	30	8	38	19.0	21	4	25	25.0	16	4	20	20.0
12 ⁶ / ₁₂ - 13 ⁵ / ₁₂	38	14	52	26.0	14	14	28	28.0	13	6	19	19.0
	150	50	200		72	28	100		75	25	100	
Mean age (in months)	134.1				134.5				133.0			
S.D.	17.6				18.6				15.9			
N	200				100				100			

thirteen-year-old group. The mean chronological age is closely similar in the three groups, being eleven years two months in the Experimental Group and in Group A, and eleven years one month in Group B - the normally adjusted.

The distribution of the pupils on the basis of intelligence quotients is shown in Table II.

TABLE II

DISTRIBUTION ACCORDING TO INTELLIGENCE QUOTIENT OF PUPILS
IN EXPERIMENTAL GROUP, GROUP A AND GROUP B

IQ	Number of Pupils											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
105 - 114	85	32	117	58.5	18	12	30	30.0	9	7	16	16.0
115 - 124	30	12	42	21.0	25	7	32	32.0	20	2	22	22.0
125 - 134	22	6	28	14.0	10	4	14	14.0	22	7	29	29.0
135 - 144	10	-	10	5.0	7	3	10	10.0	10	3	13	13.0
145 - 154	3	-	3	1.5	6	-	6	6.0	8	4	12	12.0
155 - 164	-	-	-	-	5	2	7	7.0	5	2	7	7.0
165 - 174	-	-	-	-	1	-	1	1.0	1	-	1	1.0
	150	50	200		72	28	100		75	25	100	
Range	105-152				105-167				105-166			
Mean IQ	115.7				124.4				129.8			
S.D.	9.0				16.2				14.8			

Children in Group B are of higher IQ than those in the Experimental Group, the mean IQs for the Experimental Group, Group A and Group B being 115.7, 124.4 and 129.9 respectively.

Data in Table III indicate that the clinical groups differ significantly in IQ.

TABLE III

MEANS, MEAN DIFFERENCES, S.E. DIFFERENCES AND DIFF./S.E. DIFF. OF CHRONOLOGICAL AGES AND INTELLIGENCE QUOTIENTS OF PUPILS IN THE EXPERIMENTAL GROUP AND IN GROUP A.

Variable	Exp. Group Mean	Group A Mean	Mean Diff.	S.D. Diff.	<u>Diff.</u> S.E. Diff.
C.A. (months)	134.1	134.5	0.40	2.238	0.18
IQ	115.7	124.4	8.70	1.741	5.00

In the 105-124 IQ range are found seventy-nine and a half per cent. of the pupils in the Experimental Group, sixty-two per cent. of pupils in Group A and thirty-eight per cent. of pupils in Group B.

When the upper range of intelligence, (i.e. IQ135), is considered, only six and a half per cent. of children are found in the Experimental Group, as compared with twenty-four per cent. in Group A and thirty-three per cent. in Group B. The criterion of retardation in this study is based on the discrepancy between intelligence and scholastic scores expressed in terms of standard deviation.

The distribution of pupils in the three groups on the basis of socio-economic status is shown in Table IV (p.115).

In the Experimental Group and in Group A the number of pupils in the highest socio-economic level is larger than in any of the other socio-economic levels, indicating that a considerable number

TABLE IV

DISTRIBUTION ACCORDING TO SOCIO-ECONOMIC STATUS OF CHILDREN IN
EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Socio- economic Group	N u m b e r o f P u p i l s											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
I	40	10	50	25.0	14	9	23	23.0	20	6	26	26.0
II	20	12	32	16.0	16	5	21	21.0	9	5	14	14.0
III	28	11	39	19.5	17	3	20	20.0	14	6	20	20.0
IV	21	4	25	12.5	12	7	19	19.0	12	2	14	14.0
V	13	5	18	9.0	7	1	8	8.0	6	2	8	8.0
VI	14	5	19	9.5	2	-	2	2.0	7	3	10	10.0
VII	7	-	7	3.5	2	2	4	4.0	3	-	3	3.0
VIII	7	3	10	5.0	2	1	3	3.0	4	1	5	5.0
	150	50	200		72	28	100		75	25	100	

of children of high IQ who fail to make progress are drawn from the levels where the percentage of necessity is least. This may be due to two causes; the standard expected and realised in schools attended by children of higher socio-economic status may be more exacting, or privileged children may have too much done for them at home with the result that they make less effort.

Of maladjusted children who were making satisfactory educational progress twenty-two per cent. were drawn from the highest socio-economic level; the lowest contained five per cent. of children from the Experimental Group and three per cent. from Group A.

Children who fail are not drawn exclusively from the least-privileged classes. It may be that conditions noted in schools attended by children of higher socio-economic status are overlooked in the less privileged areas, probably because the standards are lower. An investigation conducted in Glasgow schools indicated that the discrepancy in English and in Arithmetic between schools in the highest

and lowest socio-economic levels was as high as thirty per cent. ¹

1. Statistical Report of Examination, 1939. The Corporation of Glasgow Education Department - Qualifying Examination Board.

The level and range of intelligence at the different socio-economic levels were studied. The distribution is indicated in Table V (p.117) and Table VI (p.118).

The mean IQs of the children at the different socio-economic levels in the Experimental Group, Group A and Group B are shown in Table VII (p.118).

Data in Tables V, VI and VII show that there is overlapping in IQs in the different socio-economic levels; mean IQs range from 132.6 in Level I to 116.5 in Level VIII.

THE SCHOLASTIC BACKGROUND

The scholastic background of the pupils was then studied, attention being paid to school placement in relation to chronological age and to mental age, to placement in class and to change of school.

Retardation and Acceleration in School

The average age of entrants to the first class in the Primary Division is seven years. Retardation or acceleration in grade-placement was computed for the pupils in the three groups. The average age of the class attended by the child and the amount of retardation or acceleration were noted in each case, the estimates being based on chronological age and on mental age. Since pupils are promoted at six-monthly intervals the amount of retardation or acceleration is estimated in half-yearly periods. The discrepancies

TABLE V

DISTRIBUTION OF INTELLIGENCE QUOTIENTS IN THE DIFFERENT SOCIO-ECONOMIC LEVELS AS FOUND IN THE EXPERIMENTAL GROUP (X), GROUP A AND GROUP B

IQ	Groups X, A, B	Number of Pupils Socio-economic Level								Total	%	T.
		I	II	III	IV	V	VI	VII	VIII			
105 - 114	X	16	19	29	17	11	13	5	7	117	58.5	
	A	2	4	6	9	4	-	3	2	30	30.0	
	B	-	2	1	4	2	5	-	2	16	16.0	
	Total	18	25	36	30	17	18	8	11	163		163
115 - 124	X	12	10	7	5	2	2	1	3	42	21.0	
	A	7	9	6	9	1	1	-	-	33	33.0	
	B	1	6	4	4	4	1	1	1	22	22.0	
	Total	20	25	17	18	7	4	2	4	97		97
125 - 134	X	13	2	2	2	4	4	1	-	28	14.0	
	A	3	4	4	1	-	-	1	-	13	13.0	
	B	9	2	7	5	2	2	-	2	29	29.0	
	Total	25	8	13	8	6	6	2	2	70		70
135 - 144	X	7	1	1	1	-	-	-	-	10	5.0	
	A	1	2	3	1	1	-	1	1	10	10.0	
	B	4	2	3	1	-	2	1	-	13	13.0	
	Total	12	5	7	3	1	2	2	1	33		33
145 - 154	X	2	-	-	-	1	-	-	-	3	1.5	
	A	4	1	-	-	1	-	-	-	6	6.0	
	B	8	1	3	-	-	-	-	-	12	12.0	
	Total	14	2	3	-	2	-	-	-	21		21
155 - 164	X	-	-	-	-	-	-	-	-	-	-	
	A	5	-	1	-	-	1	-	-	7	7.0	
	B	3	1	2	-	-	-	1	-	7	7.0	
	Total	8	1	3	-	-	1	1	-	14		14
165 - 174	X	-	-	-	-	-	-	-	-	-	-	
	A	-	1	-	-	-	-	-	-	1	1.0	
	B	1	-	-	-	-	-	-	-	1	1.0	
	Total	1	1	-	-	-	-	-	-	2		2

in months of chronological age and of mental age appear in Tables VIII (p.119), IX (p.120) and X (p.120).

Data in Table VIII disclose that forty-three and a half per cent. of pupils in the Experimental Group were normally placed for age as compared with fifty-six per cent. in Group A and twenty per cent. in Group B. Of those below the average age of the class the percentage for

TABLE VI

PERCENTAGE NUMBER OF CHILDREN AT VARIOUS IQ LEVELS IN THE DIFFERENT SOCIO-ECONOMIC LEVELS.

IQ	Percentage Number of Children Socio-economic Levels							
	I	II	III	IV	V	VI	VII	VIII
105 - 114	18.3	37.3	45.3	51.0	51.5	58.1	53.4	61.0
115 - 124	20.4	37.3	21.3	30.5	21.2	12.9	13.3	22.2
125 - 134	25.5	12.0	16.4	13.5	18.2	19.3	13.3	11.2
135 - 144	12.2	7.4	8.7	5.0	3.0	6.5	13.3	5.6
145 - 154	14.3	3.0	4.2	-	6.1	-	-	-
155 - 164	8.2	1.5	4.1	-	-	3.2	6.7	-
165 - 174	1.1	1.5	-	-	-	-	-	-

TABLE VII

MEAN IQs OF CHILDREN IN THE DIFFERENT SOCIO-ECONOMIC LEVELS IN EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Group	Mean Intelligence Quotients Socio-economic Levels								Mean	S.D.
	I	II	III	IV	V	VI	VII	VIII		
Experimental Group	122.4	114.6	112.2	113.4	116.4	113.0	112.1	111.0	115.7	9.0
Group A	134.5	125.0	121.6	115.9	120.0	137.0	119.5	119.3	124.4	16.2
Group B	141.0	126.9	133.4	122.3	120.0	120.4	137.0	119.2	129.9	14.8
Mean IQ	132.6	122.2	122.4	117.2	118.8	123.4	122.8	116.5		

the Experimental Group, Group A and Group B were ten and a half, eleven and twenty, while of those above the class average the percentages were forty-six, thirty-three and sixty respectively. It is to be noted, however, that fifty-four per cent. of the latter were older by no more than six months. Thirty and a half per cent. of the children in the Experimental Group, as compared with four per cent. in Group A and six per cent. in Group B were older by more than six months.

However, as a proportion of retardation or acceleration may be affected by the chance of date of birth, date of admission or date of

TABLE VIII

PLACEMENT IN SCHOOL IN RELATION TO CHRONOLOGICAL AGE OF CHILDREN
IN EXPERIMENTAL GROUP, GROUP A AND GROUP B.

School Placement in relation to C.A.	N u m b e r o f P u p i l s											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Normal for class average	67	20	87	43.5	34	22	56	56.0	18	2	20	20.0
Younger than class average:	18	3	21	10.5	8	3	11	11.0	12	8	20	20.0
Younger by 1-6 months	11	2	13	6.5	5	3	8	8.0	9	8	17	17.0
Younger by 7-12 months	6	-	6	3.0	2	-	2	2.0	2	-	2	2.0
Younger by 13-18 months	-	1	1	0.5	1	-	1	1.0	1	-	1	1.0
Younger by 19-24 months	1	-	1	0.5	-	-	-	-	-	-	-	-
Older than class average:	65	27	92	46.0	30	3	33	33.0	45	15	60	60.0
Older by 1-6 months	19	12	31	15.5	27	2	29	29.0	39	15	54	54.0
Older by 7-12 months	33	12	45	22.5	3	1	4	4.0	5	-	5	5.0
Older by 13-18 months	11	2	13	6.5	-	-	-	-	1	-	1	1.0
Older by 19-24 months	-	1	1	0.5	-	-	-	-	-	-	-	-
Older by 25-30 months	1	-	1	0.5	-	-	-	-	-	-	-	-
Older by 31-36 months	-	-	-	-	-	-	-	-	-	-	-	-
Older by 37-42 months	1	-	1	0.5	-	-	-	-	-	-	-	-

promotion, those who were classified as one year retarded or one year accelerated might be regarded as normal. If this plan were followed, results would appear as shown in Table IX (p.120).

In each of Groups A and B one per cent. of the pupils were younger than the average of the class, but eight per cent. of those in the Experimental Group were older than the class average as compared with one per cent. in Group B.

TABLE IX

PLACEMENT IN SCHOOL IN RELATION TO CHRONOLOGICAL AGE OF CHILDREN
IN EXPERIMENTAL GROUP, GROUP A AND GROUP B.

School Placement in relation to Chronological Age	Experimental Group				Number of Pupils				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Normal for age	136	46	182	91.0	71	28	99	99.0	73	25	98	98.0
Younger than class average	1	1	2	1.0	1	-	1	1.0	1	-	1	1.0
Older than class average	13	3	16	8.0	-	-	-	-	1	-	1	1.0

Placement in school in relation to mental age is shown in Table X.

TABLE X

PLACEMENT IN SCHOOL IN RELATION TO MENTAL AGE OF PUPILS IN EXPERIMENTAL
GROUP, GROUP A AND GROUP B.

School Placement in relation to Mental Age.	Experimental Group				Number of Pupils				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Normal for class average	5	-	5	2.5	-	-	-	-	-	-	-	-
Younger than class average	-	-	-	-	-	-	-	-	-	-	-	-
Older than class average	145	50	195	97.5	72	28	100	100.0	75	25	100	100.0
Older by -												
1-6 months	7	5	12	6.0	1	-	1	1.0	2	-	2	2.0
7-12	17	9	26	13.0	6	4	10	10.0	2	1	3	3.0
13-18	28	11	39	19.5	9	6	15	15.0	2	4	6	6.0
19-24	28	5	33	16.5	15	6	21	21.0	13	2	15	15.0
25-30	21	9	30	15.0	10	1	11	11.0	7	2	9	9.0
31-36	10	4	14	7.0	6	4	10	10.0	10	1	11	11.0
37-42	9	3	12	6.0	7	2	9	9.0	12	3	15	15.0
43-48	10	2	12	6.0	-	1	1	1.0	6	3	9	9.0
49-54	6	1	7	3.5	5	-	5	5.0	3	3	6	6.0
55-60	4	1	5	2.5	3	1	4	4.0	4	1	5	5.0
61-66	1	-	1	0.5	3	1	4	4.0	5	1	6	6.0
67-72	1	-	1	0.5	1	-	1	1.0	2	-	2	2.0
73-78	2	-	2	1.0	1	-	1	1.0	1	2	3	3.0
79-84	1	-	1	0.5	2	1	3	3.0	3	2	5	5.0
85-90	-	-	-	-	-	1	1	1.0	3	-	3	3.0
91-96	-	-	-	-	2	-	2	2.0	-	-	-	-
97-102	-	-	-	-	1	-	1	1.0	-	-	-	-

Ninety-seven and a half per cent. of pupils in the Experimental Group and all those in the other groups were older in mental age than the average age of the class in which they were placed. Misgrading for mental age is much greater than that for chronological age.

Place in Class

Teachers had been requested to state the position of the child in class with regard to merit, that is, in comparison with others of his age and grade. The class was divided into four quarters. The distribution of the pupils with regard to placement is shown in Table XI.

TABLE XI

DISTRIBUTION OF PUPILS IN EXPERIMENTAL GROUP, GROUP A AND GROUP B WITH REGARD TO PLACEMENT IN THE TOP, SECOND, THIRD OR LOWEST QUARTER OF THE CLASS.

Quarter of Class	Experimental Group			Number of Pupils				Group B				
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Top	12	6	18	9.0	51	23	74	74.0	72	25	97	97.0
Second	23	10	33	16.5	13	5	18	18.0	3	-	3	3.0
Third	27	9	36	18.0	5	-	5	5.0	-	-	-	-
Lowest	88	25	113	56.5	3	-	3	3.0	-	-	-	-

It is interesting to note that eight per cent. of children in Group A were in the third and lowest quarters of the class although their work was satisfactory when judged by standardised tests.

Change of school was considered as a possible cause of retardation. The number of pupils who have experienced change of school is shown in Table XII (p.122).

The incidence is similar in the three groups.

TABLE XII

DISTRIBUTION OF PUPILS WHO HAVE EXPERIENCED CHANGE OF SCHOOL.

N u m b e r o f P u p i l s											
Experimental Group				Group A				Group B			
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
5	2	7	3.5	2	2	4	4.0	2	1	3	3.0

PHYSICAL CONDITION

The physical condition of each child was then considered, special attention being paid to birth injury; size for age; state of development and nutrition; presence of early disease; incidence of frequent illness; muscular condition; conditions of ear, throat and nose; acuity of vision and hearing; handedness; speech defects; conditions of heart and lungs that might be detrimental to educational progress; chorea; palpably enlarged cervical glands; tubercular glands; endocrine disturbances; and the incidence of zymotic illnesses.

Birth Injury

The incidence of birth injury in children in the different groups is shown in Table XIII.

TABLE XIII

INCIDENCE OF BIRTH INJURY OCCURRING IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

N u m b e r o f P u p i l s											
Experimental Group				Group A				Group B			
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
1	-	1	0.5	-	-	-	-	-	-	-	-

Only one child in the Experimental Group had suffered birth injury

and no case was reported in the other groups. Birth injury would not appear to be a cause of retardation in the population studied.

Size for Age

Information relating to size of the pupils was obtained from the medical schedules on which the children had been described as 'normal', 'large' or 'small' for age. Data are tabulated in Table XIV.

TABLE XIV

DISTRIBUTION ACCORDING TO SIZE FOR AGE OF PUPILS IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Size for Age	Experimental Group				Number of Pupils Group A				Pupils Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Normal	130	41	171	85.5	66	23	89	89.0	75	23	98	98.0
Large	3	2	5	2.5	-	2	2	2.0	-	1	1	1.0
Small	17	7	24	12.0	6	3	9	9.0	-	1	1	1.0
Small	χ^2				df.	P						
	0.613				1	> 0.30						

The percentage of children described as 'normal' was higher in Group B than in the other groups, but the percentage of pupils described as 'large' was almost identical for the two clinical groups. Although there is a discrepancy of three per cent. between children in the Experimental Group and in Group A who are described as 'small' the difference is not significant.

Development and Nutrition

Children were classified as 'very good', 'good' and 'fair' with respect to this factor. The number of children in each category is shown in Table XV (p. 124).

TABLE XV

STATE OF DEVELOPMENT AND NUTRITION OF CHILDREN IN EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Development and Nutrition.	Experimental Group				Number of Children Group A				Children Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Very Good	1	1	2	1.0	-	-	-	-	1	1	2	2.0
Good	99	34	133	66.5	59	18	77	77.0	72	24	96	96.0
Fair	28	6	34	17.0	6	4	10	10.0	1	-	1	1.0
Poor	22	9	31	15.5	7	6	13	13.0	1	-	1	1.0
Poor	χ^2 0.347				df.	1			P	> 0.50		

No child in Group A was described as of 'very good' development and nutrition, but all children in Group B appeared to be well nourished. When the chi-squared procedure was applied to the figures relating to 'poor' development in children in the Experimental Group and in Group A they were not found to be significant.

Presence of Early Disease

Data concerning the presence of early disease in pupils in the three groups are presented in Table XVI.

TABLE XVI

INCIDENCE OF EARLY DISEASE IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Experimental Group	Number of Children Group A				Children Group B							
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
12	4	16	8.0	3	-	3	3.0	1	-	1	1.0	
Early disease	χ^2 2.760				df.	1			P	> 0.05		

Although a number of children in the two clinical groups had been subject to early disease, the chi-squared criterion indicated that there was no significant difference with regard to this factor. However, comparison of data in the Experimental Group and in Group B suggests that although the presence of early disease may not be a cause of backwardness it probably is a determinant of maladjustment.

Frequent Illness

The number of children in the three groups who had suffered from frequent illness is shown in Table XVII.

TABLE XVII

INCIDENCE OF FREQUENT ILLNESS IN PUPILS IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Experimental Group				Number of Pupils				Group B				
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%	
12	6	18	9.0	8	2	10	10.0	2	1	3	3.0	
				X^2				df.				P
Frequent illness				0.087				1				> 0.70

Data indicate that the presence of frequent illness does not appear to have been a cause of retardation in the population studied.

Muscular Condition

Information regarding muscular condition was obtained from the medical schedules. Data are indicated in Table XVIII (p.126).

For all children in Group B muscular coordination, posture, gait and motor control were described as 'good'. The percentage of pupils of this type was higher in Group A than in the Experimental Group, but when

data relating to 'poor' muscular control were examined they were not found to be significant.

TABLE XVIII

MUSCULAR CONDITION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Muscular Condition	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Good	102	39	141	70.5	61	24	85	85.0	75	25	100	100.0
Fair	30	8	38	19.0	7	4	11	11.0	-	-	-	-
Poor	18	3	21	10.5	4	1	5	5.0	-	-	-	-
	χ^2				df.				P			
Poor	2.590				1				> 0.10			

Conditions of Ear, Throat and Nose

Conditions of ear, throat and nose—tonsillectomy and adenoidectomy, the presence of enlarged tonsils or adenoids, bronchial and nasal catarrh and otorrhoea — were noted as possible causes of retardation. Data will be found in Table XIX.

TABLE XIX

INCIDENCE OF CONDITIONS OF EAR, THROAT AND NOSE IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Conditions of Ear, Throat and Nose.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
T. and A. operation	24	2	26	13.0	14	3	17	17.0	18	6	24	24.0
Enlarged T. and A.	12	2	14	7.0	5	1	6	6.0	-	-	-	-
Bronchial Catarrh	3	-	3	1.5	-	2	2	2.0	-	1	1	1.0
Nasal Catarrh	8	2	10	5.0	5	-	5	5.0	1	-	1	1.0
Otorrhoea	4	1	5	2.5	2	-	2	2.0	1	-	1	1.0
	χ^2				df.				P			
Enlarged T. and A.	0.118				1				> 0.70			

The percentages of those suffering from bronchial and nasal catarrh and from otorrhoea are almost similar for the three groups. The result of the application of the chi-squared statistic would appear to indicate that the presence of enlarged tonsils and adenoids was not likely to be a factor in retardation in the children studied, although in particular cases it may have acted as a deterrent to learning. The percentage of pupils who have suffered tonsillectomy and adenoidectomy is higher in Group B than in the other groups. The lowest percentage is that recorded for children in the Experimental Group.

Auditory and Visual Acuity

Auditory and visual defects were noted as possible causes of scholastic failure, information being obtained from medical schedules. The degree of visual acuity is dependent upon the better eye. Defects have been classified, according to Burt, as 'slight' - cases where vision with the better eye is only $\frac{6}{12}$ to $\frac{6}{9}$; and 'marked' - where with the better eye vision is worse than $\frac{6}{12}$. This differentiates those whose vision is (i) rather more than half the normal and (ii) decidedly less than half the normal.

Data apply only to defective visual acuity which had been detected during the medical examination and which was therefore uncorrected. The incidence of strabismus was also noted. Data relating to poor auditory and visual acuity are provided in Table XX (p.128).

As theoretical frequencies were small it was impossible to apply the chi-squared procedure to data relating to auditory defects, but these were relatively infrequent in both the Experimental Group and Group A.

The percentage of visual defects was higher in the latter. No child in the school control group suffered from visual defect although two pupils had defective hearing.

TABLE XX

INCIDENCE OF DEFECTIVE AUDITORY AND VISUAL ACUITY IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Auditory and Visual Defects.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Auditory defects	5	2	7	3.5	2	-	2	2.0	2	-	2	2.0
Visual defects	15	1	16	8.0	9	2	11	11.0	-	-	-	-
(i) Slight	12	-	12	6.0	5	2	7	7.0	-	-	-	-
(ii) Marked	3	1	4	2.0	4	-	4	4.0	-	-	-	-
Strabismus	6	2	8	4.0	3	-	3	3.0	-	-	-	-

	χ^2	df.	P
Visual defects	0.732	1	> 0.30

Handedness

Handedness was judged by the child's preference for the hand in writing as no special tests for handedness had been applied. The incidence of left-handedness is shown in Table XXI.

TABLE XXI

INCIDENCE OF LEFT-HANDEDNESS IN PUPILS IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Experimental Group	Number of Pupils											
	Group A				Group B							
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%	
10	-	10	5.0	1	2	3	3.0	3	1	4	4.0	

Left-handedness would not appear to be important as a factor in retardation; four per cent. of normal children were left-handed compared

with five per cent. in the Experimental Group. The chi-squared technique was not applied owing to the smallness of the expected frequency.

Disorders of Speech

Speech disorders fall roughly into four categories - psychogenic, articulatory, neurological and organic. Psychogenic disorders include aphonia, stammering and stuttering; defects of articulation include retarded speech, lisping and lalling, nasal speech and dyslalia. No neurological or organic defects appeared in either of the groups. The incidence of speech disorders is shown in Table XXII.

TABLE XXII

INCIDENCE OF SPEECH DISORDERS IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Disorders of Speech	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Psychogenic	22	3	25	12.5	21	6	27	27.0	1	-	1	1.0
Articulatory	16	5	21	10.5	9	1	10	10.0	-	-	-	-

Disorders of the psychogenic type were confined to stuttering. A higher percentage was recorded in Group A than in the Experimental Group. It would appear that stuttering is not a cause of retardation. The percentage of articulatory defects was almost identical for the two clinical groups. McAllister found that speech troubles and poor educational attainment were related*.

* McAllister, A.H., Clinical Studies In Speech Therapy. London: University of London Press, 1937.

Other Conditions

Other factors that might be detrimental to learning include conditions of heart and lungs, chorea, palpably enlarged cervical glands, the presence of tubercular glands and endocrine disturbances. The incidence of these disorders appears in Table XXIII.

TABLE XXIII

THE INCIDENCE OF OTHER CONDITIONS APPEARING IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Other Physical Conditions	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Heart	1	-	1	0.5	1	-	1	1.0	-	-	-	-
Lungs	3	-	3	1.5	6	1	7	7.0	2	-	2	2.0
Chorea	5	-	5	2.5	-	-	-	-	-	-	-	-
Asthma	2	-	2	1.0	5	1	6	6.0	1	-	1	1.0
Enlarged cervical glands	2	-	2	1.0	1	2	3	3.0	1	-	1	1.0
Tubercular glands	1	-	1	0.5	-	1	1	1.0	-	-	-	-
Endocrine disturbances	1	1	2	1.0	-	-	-	-	-	-	-	-
Total	15	1	16	8.0	13	5	18	18.0	4	-	4	4.0

The incidence was found to be higher in Group A than in the Experimental Group when total conditions were considered. The only marked discrepancy was in the case of lung conditions, the higher percentage being recorded in the case of children who were learning satisfactorily. It is to be noted that chorea appears in children in the Experimental Group but not in the other groups. The conditions recorded above do not appear to be a frequent cause of retardation although they may be concomitant with it. The incidence of asthma is higher in Group A. Owing to the smallness of the frequencies the chi-squared procedure was not applied.

Zymotic Illnesses

The number of children in the three groups who have experienced zymotic illnesses is shown in Table XXIV.

TABLE XXIV

NUMBER OF PUPILS IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B WHO HAVE SUFFERED FROM ZYMOTIC ILLNESSES.

Zymotic Illnesses	Number of Pupils											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Measles	103	32	135	67.5	55	20	75	75.0	56	21	77	77.0
Mumps	24	8	32	16.0	14	8	22	22.0	19	7	26	26.0
Chickenpox	47	19	66	33.0	20	10	30	30.0	36	10	46	46.0
Whooping Cough	59	26	85	42.5	36	11	47	47.0	30	13	43	43.0
Pneumonia	19	4	23	11.5	4	-	4	4.0	4	1	5	5.0
Diphtheria	10	4	14	7.0	6	3	9	9.0	8	1	9	9.0
Scarlet Fever	26	5	31	15.5	12	4	16	16.0	10	5	15	15.0
			χ^2				df.					P
Pneumonia			4.579				1					< 0.05
Chickenpox			0.276				1					> 0.50

The most frequent illnesses are measles and whooping cough. The percentages of children with measles, mumps, whooping cough, diphtheria and scarlet fever is higher in Group A than in the Experimental Group. When the chi-squared criterion is applied to the frequencies for pneumonia in Group A and in the Experimental Group the difference is found to be significant. Pneumonia may act as a deterrent to progress.

The distribution of pupils having one or more zymotic illnesses is shown in Table XXV (p.132).

The majority have had two or three illnesses of the febrile type, although twenty-two per cent. of pupils in the Experimental Group, fourteen per cent. in Group A and nine per cent. in Group B have had none.

TABLE XXV

DISTRIBUTION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B WHO HAVE HAD ONE OR MORE ZYMOTIC ILLNESS.

Number of Zymotic Illnesses.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
-	34	10	44	22.0	10	4	14	14.0	8	1	9	9.0
1	17	16	33	16.5	7	6	13	13.0	15	5	20	20.0
2	47	13	60	30.0	31	9	40	40.0	21	11	32	32.0
3	34	11	45	22.5	18	6	24	24.0	22	3	25	25.0
4+	18	10	28	14.0	6	3	9	9.0	9	5	14	14.0
4+ Zymotic illness	χ^2 1.512				df. 1				P > 0.20			

When the chi-squared statistic was applied to the numbers of children having four or more illnesses it was found that the figures in the Experimental Group and in Group A did not differ significantly. The fact that a child has had four or more zymotic illnesses does not appear to be a deterrent to learning.

Anaemia and Appendectomy

The number of children in the three groups who have experienced anaemia and appendectomy is indicated in Table XXVI.

TABLE XXVI

INCIDENCE OF ANAEMIA AND APPENDECTOMY IN PUPILS IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Disorder	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Anaemia	10	3	13	6.5	3	4	7	7.0	-	2	2	2.0
Appendectomy	4	-	4	2.0	1	-	1	1.0	1	1	2	2.0

THE SOCIAL AND DOMESTIC BACKGROUND

Attention was given to contacts which the child made with others as a member of a juvenile organisation and to personal relationships in the home. Socio-economic status, living conditions, social handicaps, parental control and the emotional status of the parents were all studied.

Membership of Juvenile Organisations

As it was possible that contacts made with other children may affect progress, membership of juvenile organisations was recorded, such organisations as Scouts, Guides, Lifeboys and Sunday School being represented. Some children were members of several organisations. The number of children attending organisations of one kind or another is shown in Table XXVII.

TABLE XXVII

DISTRIBUTION OF CHILDREN IN EXPERIMENTAL GROUP, GROUP A AND GROUP B ATTENDING JUVENILE ORGANISATIONS.

Experimental Group				Group A				Group B			
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
72	19	91	45.5	33	10	43	43.0	61	19	80	80.0
χ^2				df.				P			
0.175				1				> 0.50			

Children in the two clinical groups - A and B - do not join juvenile organisations to the same extent as do those who are reported to be normal in home and school. The frequency of membership of organisations in the Experimental Group and in Group A proved to be closely similar.

The Home Situation

The domestic situation was considered as a possible factor in retardation. Information was obtained regarding the presence in the home of both parents or of one only; the presence of a step-parent; an orphan living with relatives; children reared by grandparents and illegitimate children. The distribution in the different groups appears in Table XXVIII.

TABLE XXVIII

HOME SITUATION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Home Situation	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Both parents in the home	121	41	162	81.0	56	27	83	83.0	66	25	91	91.0
Mother only in the home	19	5	24	12.0	3	1	4	4.0	6	-	6	6.0
Father only in the home	4	3	7	3.5	2	-	2	2.0	2	-	2	2.0
Child living with relative	3	-	3	1.5	-	-	-	-	-	-	-	-
Has stepmother	8	4	12	6.0	1	1	2	2.0	1	-	1	1.0
Has stepfather	5	2	7	3.5	3	1	4	4.0	1	-	1	1.0
Reared by grandparents	11	6	17	8.5	8	2	10	10.0	5	1	6	6.0
Illegitimate child	5	2	7	3.5	1	-	1	1.0	2	-	2	2.0
				χ^2				df.				P
Mother only in the home				4.988				1				< 0.05
Child has a step-parent				1.041				1				> 0.30

Owing to the fact that frequencies were small it was impossible in some instances to apply the chi-squared criterion to the data. The percentage of homes in which both parents reside is closely similar in the Experimental Group and in Group A. The mother alone is in the

home in twelve per cent. of cases in the Experimental Group and in four per cent. of cases in Group A. The difference was found to be significant. It would appear that the absence of the father from the home acts as an effective deterrent to learning. Owing to the small frequencies involved it was impossible to apply the chi-squared procedure to data concerning the presence in the home of a stepmother or stepfather. When the statistic was applied to the combined data in the Experimental Group and in Group A the difference was not significant.

Occupational Status of the Father

The occupational status of fathers of children in the different groups was recorded, a modified form of the Taussig Scale being used.

The groups were as follows:

- Class I : professional men and business executives;
- Class II : clerks, shopkeepers, salesmen, teachers;
- Class III : all skilled workmen;
- Class IV : factory and mill workers doing simple types of operation;
- Class V : labourers, all totally unskilled, untrained manual workers.

The number of children of fathers in the different occupational classes is shown in Table XXIX (p. 136).

Living Conditions

The effect on learning of overcrowded conditions and of dirty, careless homes was considered. The number of children living in overcrowded homes is shown in Table XXX (p.136). Number per room

TABLE XXIX

INCIDENCE OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B OF FATHERS IN THE DIFFERENT OCCUPATIONAL CLASSES.

Father's Occupational Group.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
I	34	19	53	26.5	13	3	16	16.0	12	1	13	13.0
II	36	7	43	21.5	14	6	20	20.0	16	8	24	24.0
III	43	17	60	30.0	35	14	49	49.0	32	11	43	43.0
IV	27	5	32	16.0	5	2	7	7.0	13	3	16	16.0
V	10	2	12	6.0	5	3	8	8.0	2	2	4	4.0

ranged from homes where the number of persons per room was less than one to those in which ten people occupied one room.

TABLE XXX

LIVING ACCOMMODATION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Number of Persons per Room.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Less than 1	25	8	33	16.5	10	5	15	15.0	13	4	17	17.0
1	17	5	22	11.0	12	5	17	17.0	13	2	15	15.0
1+	48	11	59	29.5	18	4	22	22.0	20	8	28	28.0
2	22	10	32	16.0	12	3	15	15.0	13	6	19	19.0
2+	25	1	26	13.0	12	6	18	18.0	8	4	12	12.0
3	3	6	9	4.5	3	2	5	5.0	2	1	3	3.0
3+	3	2	5	2.5	2	2	4	4.0	-	-	-	-
4	4	5	9	4.5	-	-	-	-	2	-	2	2.0
4+	1	-	1	0.5	-	-	-	-	-	-	-	-
5	1	-	1	0.5	-	-	-	-	3	-	3	3.0
6	1	1	2	1.0	2	1	3	3.0	-	-	-	-
8	-	1	1	0.5	-	-	-	-	-	-	-	-
9	-	-	-	-	1	-	1	1.0	-	-	-	-
10	-	-	-	-	-	-	-	-	1	-	1	1.0

Of homes where the number of persons per room is three or more, that is, where the home may be said to be overcrowded, fourteen per cent.

are found in the Experimental Group, thirteen per cent. in Group A and nine per cent. in Group B. When the data for the Experimental Group and Group A were compared the differences were not significant. As far as living accommodation is concerned, pupils in Group B would appear to be more fortunate than pupils in the other groups.

Home Conditions

Home conditions of children in the groups were studied, attention being given to aspects of home life which might act as a deterrent to scholastic progress. These included dirty, careless conditions, insufficient opportunity for restful sleep, low cultural level, low moral tone, lack of mental stimulus, and unfavourable emotional atmosphere. The incidence of home conditions affecting the children in the three groups appears in Table XXXI.

TABLE XXXI

INCIDENCE OF UNFAVOURABLE HOME CONDITIONS OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Unfavourable Home Conditions.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Overcrowded home	13	15	28	14.0	8	5	13	13.0	8	1	9	9.0
Dirty, neglected home	18	11	29	14.5	3	2	5	5.0	1	-	1	1.0
Insufficient rest	9	8	17	8.5	12	4	16	16.0	1	-	1	1.0
Low moral tone	3	8	11	5.5	3	1	4	4.0	-	-	-	-
Low cultural level	37	21	58	29.0	18	11	29	29.0	4	1	5	5.0
Lack of mental stimulus	41	21	62	31.0	18	12	30	30.0	4	1	5	5.0
Bad emotional atmosphere	52	19	71	35.5	19	16	35	35.0	-	-	-	-

	χ^2	df.	P
Overcrowded home	0.063	1	> 0.80
Dirty, neglected home	5.931	1	> 0.02
Low moral tone	0.316	1	> 0.50
Lack of mental stimulus	0.035	1	> 0.80

As far as home conditions are concerned children in Group B are more fortunate than those in the other groups. When the chi-squared procedure was applied to data in the Experimental Group and in Group A the difference was found to be significant in the case of dirty, neglected homes, but in the case of the other aspects the differences were not significant. The percentages recorded for children from homes of low cultural level were identical, and those noted for children from homes where the emotional atmosphere was unfavourable were nearly so.

Social Handicap

The number of children in the three groups who are socially handicapped is shown in Table XXXII.

TABLE XXXII

INCIDENCE OF SOCIAL HANDICAP IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Experimental Group				Group A				Group B			
B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
43	20	63	31.5	15	8	23	23.0	8	2	10	10.0
χ^2				df.				P			
2.383				1				> 0.10			

The highest incidence of social handicap appears in the Experimental Group but there was no significant difference between the frequencies in this group and those in Group A.

Home Control

The type of control in the home was then considered as a possible

cause of or concomitant to scholastic failure, attention being given to such factors as heedless or encouraging parents; over-protective, over-indulgent or over-possessive parents; harsh and critical parents; inconsistent discipline or over-discipline; divided control; poor parental attitude to learning; and heavy domestic duties burdening the child. Data are presented in Table XXXIII.

TABLE XXXIII

TYPE OF CONTROL IN HOMES OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Type of Home Control.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Heedless parents	25	9	34	17.0	8	4	12	12.0	-	-	-	-
Encouraging parents	11	6	17	8.5	5	5	10	10.0	-	-	-	-
Over-protective parents	38	3	41	20.5	5	2	7	7.0	-	-	-	-
Over-indulgent parents	45	8	53	26.5	15	5	20	20.0	-	-	-	-
Over-possessive parents	13	2	15	7.5	2	1	3	3.0	-	-	-	-
Over-disciplined child	6	2	8	4.0	2	3	5	5.0	1	-	1	1.0
Harsh parents	10	6	16	8.0	1	1	2	2.0	-	-	-	-
Critical parents	18	5	23	11.5	6	4	10	10.0	-	-	-	-
Inconsistent discipline	19	4	23	11.5	9	2	11	11.0	-	-	-	-
Divided control	7	1	8	4.0	5	3	8	8.0	-	-	-	-
Poor parental attitude	3	-	3	1.5	1	-	1	1.0	-	-	-	-
Heavy domestic duties	3	4	7	3.5	2	2	4	4.0	-	-	-	-
			χ^2				df.					P
Over-indulgent parents			1.507				1					> 0.20
Over-possessive parents			2.394				1					> 0.10
Heedless parents			1.259				1					> 0.20
Encouraging parents			0.183				1					> 0.50
Critical parents			0.153				1					> 0.50
Over-protective parents			9.103				1					< 0.01
Harsh parents			4.255				1					< 0.05

More than one-fifth of the children in the Experimental Group, compared with only seven per cent. from Group A, come from homes where they are over-protected, the difference between the frequencies being significant. There was little difference in percentage in the two groups concerning over-discipline and inconsistent discipline. The incidence of heavy domestic duties was almost identical in the Experimental Group and in Group A. The differences between the groups were not significant regarding over-indulgent, over-possessive, heedless, encouraging or critical parents. The presence in the home of harsh parents or of over-protective parents would appear to be a cause or at least a concomitant of learning difficulty.

The Parents

Since the nature of home life depends to a great extent on the parents and on the relationship between them a study was made of this factor, attention being paid to the presence in the home of parents suffering from chronic illness, and of those permanently worried, anxious or neurotic. The marital status was also considered. Data are recorded in Tables XXXIV, XXXV (p.141) and XXXVI (p.142).

TABLE XXXIV

DISTRIBUTION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B WHOSE PARENTS ARE NEUROTIC

Neurotic Parents.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Father neurotic	4	2	6	3.0	1	1	2	2.0	-	-	-	-
Mother neurotic	19	-	19	9.5	4	-	4	4.0	-	-	-	-
One parent neurotic	23	2	25	12.5	5	1	6	6.0	-	-	-	-
Both neurotic	2	-	2	1.0	1	1	2	2.0	-	-	-	-
			χ^2				df.					P
Mother neurotic			2.895				1					> 0.05
One parent neurotic			2.997				1					> 0.05

The incidence of neurotic mothers is higher in the Experimental Group than in Group A, but the difference is not significant. More boys than girls described as maladjusted would appear to be the offspring of neurotic mothers. When the groups are compared regarding the presence in the home of one neurotic parent the differences are not significant.

TABLE XXXV

INCIDENCE OF ILL, WORRIED AND PSYCHOTIC PARENTS OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Frequently Ill, Worried and Psychotic Parents	Experimental Group				Number of Children				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Father ill or psychotic	5	-	5	2.5	3	-	3	3.0	-	-	-	-
Mother ill or psychotic	3	-	3	1.5	-	1	1	1.0	-	-	-	-
Both ill or psychotic	-	-	-	-	1	-	1	1.0	-	-	-	-
Father worried and anxious	3	1	4	2.0	1	-	1	1.0	-	-	-	-
Mother worried and anxious	16	10	26	13.0	12	5	17	17.0	-	-	-	-
Both worried and anxious	6	3	9	4.5	4	2	6	6.0	-	-	-	-
Mother worried and anxious				χ^2 0.891				df. 1	$P > 0.30$			

Although there was little difference between the clinic groups as far as chronic illness of the parents was concerned, twenty-six per cent. of pupils in the Experimental Group and seventeen per cent. in Group A were the children of neurotic mothers. It is notable that children from such homes find their way to child guidance clinics.

TABLE XXXVI

INCIDENCE OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B WHO RESIDE IN BROKEN OR QUARRELSOME HOMES OR WHOSE PARENTS ARE SEPARATED OR DIVORCED.

Home Situation.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Unhappy or Quarrelsome	15	15	30	15.0	8	7	15	15.0	-	1	1	1.0
Separated or Divorced	7	9	16	8.0	2	1	3	3.0	-	-	-	-
				χ^2				df.				
Separated or Divorced				2.760				1				
									P > 0.05			

The percentage of children from unhappy or quarrelsome homes is identical for the Experimental Group and Group A. Only one child in the normal group came from such a home.

Ordinal Position.

Ordinal position as a possible cause or concomitant of failure was noted. The incidence of children in the three groups in the different positions in the family is shown in Table XXXVII (p.143).

The percentages of first children, including only children, are closely similar for the three groups. The groups do not differ significantly as regards percentage of middle and youngest children, nor do they differ markedly when the percentages of only children, only boy among girls and only girl among boys are compared.

As already stated it has been said that "as it happens more than one third of all children born are first born".¹ The number of first

1. Hogben, L., Johnstone, M.M. and Cross, W.K., "Identification of Medical Documents." British Medical Journal, 3rd April, 1948, p.632.

TABLE XXXVII

INCIDENCE OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B OCCUPYING DIFFERENT POSITIONS IN THE FAMILY.

Ordinal Position.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
First children (including only)	73	25	98	49.0	34	14	48	48.0	44	13	57	57.0
Middle children	37	10	47	23.5	19	7	26	26.0	14	6	20	20.0
Youngest children	40	15	55	27.5	19	7	26	26.0	17	6	23	23.0
First children (including only)	73	25	98	49.0	34	14	48	48.0	44	13	57	57.0
Second children	38	15	53	26.5	25	5	30	30.0	24	5	29	29.0
Third children	20	2	22	11.0	4	2	6	6.0	4	2	6	6.0
Fourth children	14	4	18	9.0	6	-	6	6.0	3	4	7	7.0
Fifth children	2	4	6	3.0	1	6	7	7.0	-	-	-	-
Sixth children	1	-	1	0.5	1	1	2	2.0	-	-	-	-
Seventh children	1	-	1	0.5	-	-	-	-	-	-	-	-
Eighth children	1	-	1	0.5	-	-	-	-	-	-	-	-
Ninth children	-	-	-	-	1	-	1	0.5	-	-	-	-
Twelfth children	-	-	-	-	-	-	-	-	-	1	1	1.0
Only children	25	7	32	16.0	8	5	13	13.0	19	6	25	25.0
Only Boy among girls	30	-	30	20.0	19	-	19	26.4	24	-	24	32.0
Only Girl among boys	-	9	9	18.0	-	7	7	25.0	-	9	9	36.0
			χ^2				df.					P
First children (including only)			0.030				1					> 0.80
Middle children			0.235				1					> 0.50
Youngest children			0.077				1					> 0.70
Only children			0.471				1					> 0.30
Only boy among girls			1.147				1					> 0.20
Only girl among boys			0.580				1					> 0.30

born children in each of the groups is high, the percentages for the Experimental Group, Group A and Group B being forty-nine, forty-eight and fifty-seven respectively.

The percentages derived were then compared with data from a large

eleven-year-old sample¹. The percentages of children in the

1. Derived from The Trend of Scottish Intelligence. Publication of the Scottish Council for Research in Education, No. XXX. London: University of London Press, 1949, Table XVII, p.107.

Experimental Group and in the eleven-year-old sample who occupy different positions in the family are shown in Table XXXVIII. There were no significant differences between the groups with the exception of the group of fifth or higher children.

TABLE XXXVIII

PERCENTAGE OF CHILDREN IN THE EXPERIMENTAL GROUP AND IN A LARGE ELEVEN-YEAR-OLD SAMPLE OCCUPYING DIFFERENT POSITIONS IN THE FAMILY

Ordinal Position	Experimental Group %	11-year-old Sample %
First children	49.0	38.0
Second children	26.5	25.0
Third children	11.0	15.0
Fourth children	9.0	9.0
Fifth or higher children	4.5	13.0

	χ^2	df.	P
First children	2.460	1	> 0.10
Second children	0.060	1	> 0.80
Third children	0.708	1	> 0.30
Fourth children	0.0	1	-
Fifth or higher children	4.524	1	> 0.02

It is of interest to note that one quarter of the normally adjusted children who were reported to be satisfactory in school were only children. First children, as distinct from only children, comprised the highest percentage recorded for each group.

In some cases there were large intervals between the child and his/her immediately preceding sibling, the discrepancies ranging from five to thirteen years. Data are tabulated in Table XXXIX (p.145).

TABLE XXXIX

NUMBER OF CHILDREN WHO ARE THE JUNIORS OF THEIR IMMEDIATELY PRECEDING SIBLINGS BY AMOUNTS VARYING FROM FIVE TO THIRTEEN YEARS.

Years.	N u m b e r o f C h i l d r e n											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
5	1	-	1	0.5	2	-	2	2.0	2	2	4	4.0
6	2	-	2	1.0	1	-	1	1.0	-	1	1	1.0
7	3	4	7	3.5	2	2	4	4.0	1	-	1	1.0
8	1	-	1	0.5	1	1	2	2.0	2	-	2	2.0
9	-	-	-	-	2	-	2	2.0	1	-	1	1.0
10	1	-	1	0.5	1	-	1	1.0	-	1	1	1.0
11	1	2	3	1.5	1	-	1	1.0	1	1	2	2.0
12	-	-	-	-	-	-	-	-	-	1	1	1.0
13	-	-	-	-	-	-	-	-	1	-	1	1.0
Total	9	6	15	7.5	10	3	13	13.0	8	6	14	14.0

Thirteen per cent. of children in Group A and fourteen per cent. of those in Group B are much younger than their immediately preceding siblings.

Adjustment to Home and to Others

Data regarding the adjustment of the child to his/her home, parents, siblings and adults in general are supplied in Table XL (p.146).

About as many boys as girls are maladjusted to their homes. Maladjustment to the father is greater than that towards the mother, but the commonest type of antagonism is directed towards siblings. Children in Group A tend to manifest more bad feeling towards other children and to adults in general than do pupils in the Experimental Group. The difference between the groups relating to poor adjustment towards the father was not significant.

TABLE XL

NUMBER OF CHILDREN WHO ARE MALADJUSTED TO HOME, PARENTS, SIBLINGS, ADULTS AND OTHER CHILDREN

Maladjustment	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
To home	14	8	22	11.0	5	3	8	8.0	-	-	-	-
To both parents	2	-	2	1.0	1	1	2	2.0	-	-	-	-
To father	13	4	17	8.5	3	-	3	3.0	-	-	-	-
To mother	5	4	9	4.5	-	-	-	-	-	-	-	-
To stepfather	1	-	1	0.5	-	-	-	-	-	-	-	-
To stepmother	1	1	2	1.0	-	-	-	-	-	-	-	-
To siblings	35	11	46	23.0	20	6	26	26.0	-	-	-	-
To grandmother	1	-	1	0.5	-	-	-	-	-	-	-	-
To adults	3	2	5	2.5	2	2	4	4.0	-	-	-	-
To other children	8	4	12	6.0	4	6	10	10.0	-	-	-	-
			χ^2				df.					P
To father			3.292				1					>0.05
To home			0.666				1					>0.30

HABIT DISORDERS

The various habit disorders comprised nail-biting, habit spasms, masturbation, enuresis, soiling, sleepwalking, night terrors, neurotic sickness, food fads, nervous headache and a tendency to fatigue easily. The incidence of the various disorders, as they were manifested by children in the three groups, is shown in Table XLI (p.147).

The incidence of such disorders as nail-biting, enuresis and night terrors was higher in children in Group A than in those in the Experimental Group. Percentages were closely similar in the case of masturbation, sleepwalking, neurotic sickness, food fads, nervous headache, and fatiguability. In no case was the difference significant.

TABLE XLI

INCIDENCE OF HABIT DISORDERS IN CHILDREN IN THE EXPERIMENTAL GROUP,
GROUP A AND GROUP B.

Habit Disorders.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Nail-biting	29	6	35	17.5	16	6	22	22.0	-	-	-	-
Habit spasms	43	4	47	23.5	10	5	15	15.0	-	-	-	-
Masturbation	7	2	9	4.5	3	1	4	4.0	-	-	-	-
Enuresis	31	8	39	19.5	16	5	21	21.0	-	-	-	-
Soiling	5	-	5	2.5	-	-	-	-	-	-	-	-
Sleepwalking	10	2	12	6.0	6	1	7	7.0	-	-	-	-
Night terrors	10	6	16	8.0	8	4	12	12.0	-	-	-	-
Neurotic sickness	6	3	9	4.5	4	-	4	4.0	-	-	-	-
Food fads	15	4	19	9.5	5	4	9	9.0	-	-	-	-
Nervous headaches	4	2	6	3.0	3	1	4	4.0	-	-	-	-
Fatiguability	1	2	3	1.5	1	1	2	2.0	-	-	-	-
				χ^2				df.				P
Habit spasms				2.972				1				> 0.05

BEHAVIOUR DISORDERS

Behaviour disorders were noted as possible causes or concomitants of failure in school. These include theft, truancy, lying, aggressiveness and quarrelsomeness, disobedience, infantile behaviour, overdependence, temper tantrums, exhibitionism, jealousy, destructiveness, resentment of authority, unsociableness, antisocial conduct and rebelliousness. The incidence of the different disorders as they appear in children in the Experimental Group, Group A and Group B is shown in Table XLII (p.148).

There is much overlapping as some pupils were guilty of several behaviour disorders. In the Experimental Group the incidence is higher of infantile behaviour, aggressiveness, theft, lying, exhibitionism and disobedience; in Group A theft, overdependence,

TABLE XLII

INCIDENCE OF BEHAVIOUR DISORDERS IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Behaviour Disorders.	N u m b e r o f C h i l d r e n											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Theft	34	16	50	25.0	14	6	20	20.0	-	-	-	-
Truancy	22	13	35	17.5	10	6	16	16.0	-	-	-	-
Lying	34	14	48	24.0	4	6	10	10.0	-	-	-	-
Cruelty	15	3	18	9.0	12	1	13	13.0	-	-	-	-
Aggressiveness	43	13	56	28.0	4	7	11	11.0	-	-	-	-
Quarrelsomeness	19	1	20	10.0	14	5	19	19.0	-	-	-	-
Disobedience	25	14	39	19.5	12	5	17	17.0	-	1	1	1.0
Infantile behaviour	48	9	57	28.5	12	5	17	17.0	-	-	-	-
Overdependence	30	.1	31	15.5	17	3	20	20.0	-	-	-	-
Temper tantrums	18	6	24	12.0	9	2	11	11.0	-	-	-	-
Exhibitionism	26	6	32	16.0	3	4	7	7.0	-	-	-	-
Jealousy	10	4	14	7.0	15	5	20	20.0	-	-	-	-
Destructiveness	12	2	14	7.0	4	-	4	4.0	-	-	-	-
Resents authority	8	5	13	6.5	6	2	8	8.0	-	-	-	-
Unsociableness	27	4	31	15.5	11	4	15	15.0	-	-	-	-
Antisocial tendency	5	1	6	3.0	2	-	2	2.0	-	-	-	-
Rebelliousness	3	1	4	2.0	-	-	-	-	-	-	-	-

	χ^2	df.	P
Theft	0.913	1	> 0.30
Truancy	0.106	1	> 0.70
Lying	8.912	1	< 0.01
Aggressiveness	11.048	1	< 0.01
Disobedience	0.286	1	> 0.50
Infantile behaviour	13.799	1	< 0.01
Temper tantrums	0.072	1	> 0.70
Exhibitionism	4.775	1	< 0.05
Destructiveness	1.064	1	> 0.30

jealousy, disobedience and infantile behaviour were fairly frequent.

Such positive behaviours as lying, aggressiveness, theft and exhibitionism are more common among boys. The incidence of unsociableness is almost the same in the two groups and there is little difference in the frequency of temper tantrums. The differences were found to be significant in the

case of exhibitionism, infantile behaviour, lying and aggressiveness. It is possible that infantile behaviour is a cause of scholastic failure as children manifesting this type of conduct make little effort; exhibitionism, lying and aggressiveness are probably only concomitant. Exhibitionism is possibly a form of compensation while aggressiveness and lying may be a form of defence.

SPECIAL CRISES

Special crises or difficulties arising in the life of a child that might predispose him to failure were considered. Such factors were noted as the death of a parent or of a sibling; an operation or serious accident to the child; serious illness of a parent; trouble in the home; the desertion of the children by the mother; the re-marriage of either parent and the result of enemy action in wartime. The incidence of special crises, as these occurred to pupils in the Experimental Group, Group A and Group B, is shown in Table XLIII.

TABLE XLIII

INCIDENCE OF SPECIAL CRISES OCCURRING IN CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Special Crises	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Death of father	11	1	12	6.0	2	-	2	2.0	2	-	2	2.0
Death of mother	8	3	11	5.5	1	-	1	1.0	1	-	1	1.0
Death of sibling	2	-	2	1.0	-	-	-	-	-	-	-	-
Illness of father	-	-	-	-	3	2	5	5.0	-	-	-	-
Illness of mother	-	-	-	-	1	-	1	1.0	-	-	-	-
Re-marriage of father	-	-	-	-	-	1	1	1.0	-	-	-	-
Re-marriage of mother	1	-	1	0.5	-	-	-	-	-	-	-	-
Desertion by mother	-	-	-	-	-	1	1	1.0	-	-	-	-
Accident to child	8	3	11	5.5	5	1	6	6.0	1	-	1	1.0
Operation to child	-	-	-	-	1	-	1	1.0	-	-	-	-
Home disturbance	5	11	16	8.0	4	6	10	10.0	-	-	-	-
Result of enemy action	1	-	1	0.5	-	-	-	-	1	-	1	1.0

The incidence of parental deaths is greater with parents of children in the Experimental Group. The chi-squared criterion was not applied. Re-marriage of father or mother is not likely to be a frequent cause of retardation in this group as the occurrence is equal to only one-half per cent. The incidence of serious accidents sustained by the child was almost the same for the two groups. The percentage of children from seriously disturbed homes was higher in Group A.

PERSONALITY DIFFICULTIES

The term 'personality difficulties' refers to certain traits and includes the neurotic, the hyperkinetic, the hypokinetic, emotional and inadequate personality types. Personality is not a static, unchanging condition and the traits, many of which are manifested in connection with school, are not mutually exclusive.

The personality difficulties of each child were noted. These were apparent during the psychological and psychiatric examination or were indicated in the social history obtained from home and school. They include withdrawal tendencies, instability, anxiety, lack of initiative and submissive and assertive tendencies.

The seclusive child plays by himself and remains aloof, immersed in daydreams and phantasy. He is shy, quiet and reserved and is often ill adapted to school life.

The hyperactive child is restless, talkative, overactive and impatient; the hyperkinetic pupil is slow in his physical and mental reactions, lacks energy and initiative and is apathetic.

The neurotic child is fearful, indecisive, constantly worrying and complaining. Like the hyperkinetic child the neurotic is frequently physically weak.

The emotionally unstable pupil is easily excited and upset and is over-sensitive and easily discouraged. Being erratic and impulsive he is often quite unable to concentrate on school tasks for any appreciable period.

Feelings of inferiority arise from a sense of insecurity and of inability to compete with classmates, siblings or environmental situations. The feelings, which may be associated with physical, mental or social status often appear as attitudes of self-depreciation, lack of self-confidence and feeling of failure.

The occurrence of personality difficulties is recorded in Table XLIV (p.152).

Children in the Experimental Group and in Group A differ in respect of certain traits. Feelings of inferiority are much more frequent in those in the former group. This may be the result of their retardation. More children in the Experimental Group appear to be inhibited, seclusive, unstable, excitable, depressed, restless, apathetic, lacking in initiative and given to daydreaming. Children in Group A are anxious, reserved and hypersensitive to a greater extent than those in the Experimental Group. As is to be expected children in the two clinic groups tend to be more reserved, hypersensitive, nervous, obstinate, insecure, assertive, restless and more liable to daydreaming than those in the normal group.

TABLE XLIV

DISTRIBUTION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B
ACCORDING TO PERSONALITY DIFFICULTIES.

Personality Difficulties.	Number of Children											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Feels inferior, lacks confidence	13	5	18	9.0	2	1	3	3.0	-	-	-	-
Conceited, over- confident	13	2	5	2.5	2	2	4	4.0	-	-	-	-
Inhibited	36	13	49	24.5	9	3	12	12.0	-	-	-	-
Reserved, shy	19	4	23	11.5	12	5	17	17.0	3	1	4	4.0
Solitary, seclusive	26	5	31	15.5	10	2	12	12.0	-	-	-	-
Hypersensitive	4	1	5	2.5	4	2	6	6.0	1	-	1	1.0
Daydreamer	40	8	48	24.0	12	5	17	17.0	4	-	4	4.0
Markedly unstable	25	13	38	19.0	7	6	13	13.0	-	-	-	-
Excitable, unrepressed	42	7	49	24.5	15	4	19	19.0	5	3	8	8.0
Repressed	13	2	15	7.5	5	1	6	6.0	-	-	-	-
Nervous	35	15	50	25.0	20	7	27	27.0	4	-	4	4.0
Neurotic	14	11	25	12.5	9	1	10	10.0	-	-	-	-
Hysterical	7	6	13	6.5	1	2	3	3.0	-	-	-	-
Obstinate, sullen	20	8	28	14.0	9	5	14	14.0	1	-	1	1.0
Moody	9	3	12	6.0	3	-	3	3.0	-	-	-	-
Timid, withdrawn	18	6	24	12.0	9	2	11	11.0	-	-	-	-
Anxious, insecure	46	17	63	31.5	26	9	35	35.0	2	1	3	3.0
Over-conscientious	1	-	1	0.5	1	1	2	2.0	-	-	-	-
Depressed	21	8	29	14.5	1	2	3	3.0	-	-	-	-
Submissive	11	1	12	6.0	4	1	5	5.0	-	-	-	-
Assertive	22	3	25	12.5	7	5	12	12.0	3	-	3	3.0
Lacks initiative	26	3	39	19.5	4	2	6	6.0	-	-	-	-
Restless, hyper- active	51	8	59	29.5	14	10	24	24.0	2	-	2	2.0
Hypokinetic, apathetic	65	15	80	40.0	11	-	11	11.0	-	-	-	-

	χ^2	df.	P
Feels inferior	2.687	1	> 0.10
Inhibited	6.383	1	< 0.02
Reserved	1.779	1	> 0.10
Solitary	0.647	1	> 0.30
Daydreamer	1.951	1	> 0.10
Markedly unstable	1.701	1	> 0.10
Excitable	1.170	1	> 0.20
Repressed	0.230	1	> 0.50
Nervous	0.133	1	> 0.70
Neurotic	0.420	1	> 0.50

TABLE XLIV (Contd.)

	χ^2	df.	P
Hysterical*	1.576	1	> 0.20
Moody*	1.263	1	> 0.20
Timid	0.071	1	> 0.70
Anxious	0.361	1	> 0.50
Depressed	9.321	1	< 0.01
Submissive*	0.137	1	> 0.70
Assertive	0.013	1	> 0.90
Lacks initiative	13.818	1	< 0.01
Restless, hyperactive	1.026	1	> 0.30
Hypokinetic	26.449	1	< 0.01

* The theoretical frequencies were rather small in these cases.

Owing to the smallness of the frequencies it was not always possible to apply the chi-squared procedure. Depressed children would appear to be more retarded than others. Differences between the groups were significant in the case of hypokinetic and inhibited children and in those who lack initiative.

HABITS OF WORK

The habits of work of the pupils were considered, attention being paid to such factors as industry, perseverance, power of concentration and purposefulness. Data are provided in Table XLV (p.154)

Only three per cent. of children in the Experimental Group and in Group A are described as being very industrious. Pupils in the former group tend to be less persevering, more lacking in concentration and more erratic in purpose than those in Group A. They make less effort to succeed.

It would appear that those who are erratic and who have a poor attitude to and a tendency to avoid work are more inclined than others

TABLE XLV

DISTRIBUTION OF CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B
ACCORDING TO HABITS OF WORK.

Habits of Work.	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Very industrious	5	1	6	3.0	1	3	3	3.0	6	-	6	6.0
Unpersevering	61	10	71	35.5	10	2	12	12.0	-	-	-	-
Lacks concentration	47	14	61	30.5	8	3	11	11.0	-	1	1	1.0
Erratic in purpose	17	6	23	11.5	-	-	-	-	-	-	-	-
Poor attitude to work	21	3	24	12.0	2	1	3	3.0	-	-	-	-
Avoids work	22	-	22	11.0	2	-	2	2.0	-	-	-	-

	χ^2	df.	P
Unpersevering	18.468	1	< 0.01
Lacks concentration	13.898	1	< 0.01
Erratic	11.904	1	< 0.01
Poor attitude to work	6.594	1	< 0.02
Avoids work	7.335	1	< 0.01

to be backward in school. The differences between the two groups were found to be significant in the case of pupils who are unpersevering and who lack concentration.

TEST 'SCATTER'

The number of years' 'scatter' on Scale L. of the Terman-Merrill Revision was computed for the pupils in the different groups. Results are shown in Table XLVI (p.155).

Data indicate that the average amount of 'scatter' is 5.23 years, 5.68 years and 5.92 years in the Experimental Group, Group A and Group B respectively. As far as this factor is concerned there is little difference between the clinical groups and the normal group.

TABLE XLVI

DISTRIBUTION OF YEARS' 'SCATTER' ON THE TERMAN-MERRILL SCALE FOR CHILDREN IN THE EXPERIMENTAL GROUP, GROUP A AND GROUP B.

Scatter in Years.	N u m b e r o f P u p i l s											
	Experimental Group				Group A				Group B			
	B.	G.	T.	%	B.	G.	T.	%	B.	G.	T.	%
Two years	8	3	11	5.5	2	2	4	4.0	2	1	3	3.0
Three years	25	9	34	17.0	8	5	13	13.0	8	2	10	10.0
Four years	22	6	28	14.0	13	3	16	16.0	11	7	18	18.0
Five years	37	16	53	26.5	15	9	24	24.0	15	7	22	22.0
Six years	23	6	29	14.5	11	3	14	14.0	10	5	15	15.0
Seven years	14	-	14	7.0	5	1	6	6.0	10	2	12	12.0
Eight years	9	7	16	8.0	10	2	12	12.0	10	2	12	12.0
Nine years	5	1	6	3.0	4	-	4	4.0	3	-	3	3.0
Ten years	6	2	8	4.0	2	-	2	2.0	3	-	3	3.0
Eleven years	1	-	1	0.5	-	2	2	2.0	1	1	2	2.0
Twelve years	-	-	-	-	1	1	2	2.0	1	-	1	1.0
Thirteen years	-	-	-	-	1	-	1	1.0	1	-	1	1.0

Mean - 5.23 years Mean - 5.68 years Mean - 5.92 years.

SCHOLASTIC RETARDATION

The number of pupils in the Experimental Group who were found to be backward in reading, spelling, addition, subtraction, multiplication and division is provided in Table XLVII. A child was considered to be retarded in a subject if his standard score was less than the norm by at least one standard deviation.

TABLE XLVII

DISTRIBUTION OF PUPILS IN THE EXPERIMENTAL GROUP WHO ARE RETARDED IN SCHOLASTIC SUBJECTS.

Retarded in	Number of Pupils			
	B.	G.	T.	%
Reading	30	12	42	21.0
Spelling	72	22	95	47.5
Addition	76	18	94	47.0
Subtraction	76	21	97	48.5
Multiplication	97	33	130	65.0
Division	91	31	122	61.0

Only twenty-one per cent. of children in the Experimental Group were backward in reading but forty-seven and a half per cent. were retarded in spelling. The subject which appears to have presented most difficulty is multiplication; the percentage of children backward in division is less than that recorded for multiplication, although it is generally agreed that division is a more difficult process.

CAUSE OF MALADJUSTMENT

All children in the Experimental Group and in Group A had been referred to a child guidance clinic. An attempt was made to determine the origin of the maladjustment, that is, to attribute the cause to (1) the nature of the child, (2) the home, or (3) the school. Where the cause was in the home it was found to centre on the father or mother or on a sibling; at times it was traced to faulty training or to domestic circumstances generally. Data are supplied in Table XLVIII, (p.157).

The cause of maladjustment in children in the Experimental Group was attributed in thirty per cent. of the cases to the child, in sixty-seven and a half per cent. to the home and in one per cent. to the school.

In Group A the cause was attributed to the child in forty-one per cent. of cases and to the home in fifty-nine per cent. In the majority of cases referred to a clinic the chief cause of maladjustment would appear to have its origin in the home.

TABLE XLVIII

DISTRIBUTION OF CAUSES OF MALADJUSTMENT OF PUPILS IN THE EXPERIMENTAL GROUP AND GROUP A

Cause of Maladjustment	Number of Pupils.							
	Experimental Group				Group A			
	B.	G.	T.	%	B.	G.	T.	%
Cause in Child	49	11	60	30.0	34	7	41	41.0
" " " (physical)	3	-	3	1.5	-	-	-	-
Cause in home	97	38	135	67.5	38	21	59	59.0
" " " (Mother)	12	4	16	8.0	11	7	18	18.0
" " " (Father)	7	5	12	6.0	3	-	3	3.0
" " " (Siblings)	-	-	-	-	4	1	5	5.0
" " " (Training)	8	2	10	5.0	4	1	5	5.0
" " " (Other Circumstances)	70	27	97	48.5	16	12	28	28.0
Cause in School	1	1	2	1.0	-	-	-	-
			χ^2		df.		P	
Cause in Child			3.579		1		> 0.05	
Cause in Home Circumstances			2.133		1		> 0.10	

CHAPTER V

S P E C I F I C F A C T O R S A N D R E T A R D A T I O N

Data were further analysed in an attempt to determine:

- (i) the relationship between retardation in the different subjects and physical condition; socio-economic level; the social and domestic background; habit disorders; behaviour disturbances and personality difficulties;
- (ii) the relationship between socio-economic status and the factors already mentioned;
- (iii) the relationship between ordinal position in the family and physical handicaps; membership of juvenile organisations; habit disorders; behaviour disturbances and personality difficulties;
- (iv) the effect of different types of parental control on behaviour disturbances and on personality difficulties; and
- (v) the relationship between habit disorders and personality difficulties, and between behaviour disorders and personality difficulties.

Data are recorded in tabular form. For purposes of comparison the chi-squared criterion and the standard error of a percentage and of a difference between percentages are employed.

PHYSICAL CONDITION AND RETARDATION IN THE BASIC SUBJECTS

Two hundred children - one hundred and fifty boys and fifty girls - were retarded in the basic subjects. The number and percentages of those who suffer from physical handicaps are shown in Table XLIX (p.159).

The percentage in each case is based on the total number of children retarded in the various subjects.

TABLE XLIX

INCIDENCE OF PHYSICAL HANDICAPS IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS

Physical Handicaps	Number and Percentage of Retarded Pupils										Retarded in every Subject			
	Reading		Spelling		Addition		Subtraction		Multiplication			Division		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor nutrition	7	16.7	13	13.7	12	12.8	10	10.3	19	14.6	17	13.9	1	5.9
Frequent illness	7	16.7	9	9.5	10	10.6	9	9.3	14	10.8	12	9.9	3	17.6
Poor muscular condition	4	9.5	11	11.6	9	9.6	10	10.3	13	10.0	13	10.6	1	5.9
Enlarged T. & A.	5	11.9	9	9.5	9	9.6	7	7.2	9	6.9	7	5.7	1	5.9
Poor auditory acuity	3	7.2	5	5.3	4	4.3	5	5.2	7	5.4	6	4.9	-	-
Poor visual acuity	1	2.4	5	5.3	11	11.7	9	9.3	11	8.5	14	11.5	-	-
Pneumonia	6	14.3	14	14.7	11	11.7	11	11.3	16	12.3	15	12.3	13	76.5
4+ zymotic illnesses	7	16.7	16	16.8	9	9.6	12	12.4	18	13.8	15	12.3	2	11.8
No. of retarded pupils	42		95		94		97		130		122		17	

Inspection of this table reveals that there are eight forms of physical handicap and that there are six subjects in each of which pupils may be retarded. An individual may suffer from more than one handicap and may be retarded in more than one subject.

There are forty-eight cells and two hundred individuals. The number of ways in which an individual may be handicapped is:

$$8 + {}^8C_2 + {}^8C_3 + {}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + 1 = 8 + 28 + 56 + 70 + 56 + 28 + 8 + 1 = 255$$

The number of ways in which an individual may be backward is:
 $6 + {}^6C_2 + {}^6C_3 + {}^6C_4 + {}^6C_5 + 1 = 6 + 15 + 20 + 15 + 6 + 1 = 63$
 Therefore, the number of mutually exclusive categories is 63×255 or 16,065. Since the total score is expressed as a frequency each individual scores one or zero in each category. As it would be impossible to deal with all possible permutations it was decided to examine the data and to study further those in which differences appeared to be appreciable.

In the Experimental Group the incidence of failure in spelling is higher than that in reading; the difference is statistically significant, the critical ratio being 6.2.

The highest incidence of reading failure is found in pupils who have experienced poor nutrition, frequent illness and at least four zymotic illnesses. The incidence of zymotic illnesses, pneumonia and poor nutrition is high also for pupils who fail in spelling and in arithmetic.

Poor Nutrition

To discover whether one subject is more affected than another by this physical handicap the differences between percentages in Table XLIX (p.159) were investigated. Data are recorded in Table L, (p.161).

Although the incidence of failure is higher in spelling, more reading failures suffer from poor nutrition. However, the critical ratio indicates that the incidence of poor nutrition is not significantly greater in retarded readers.

TABLE L

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN RETARDED IN READING, SPELLING AND SUBTRACTION WHO ARE ILL-NOURISHED

Subjects compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading vs. Spelling	7	16.7	3.0%	6.75%	0.44
Reading vs. Subtraction	7	16.7	6.4%	6.52%	0.98
	13	13.7			
	10	10.3			

When a similar comparison was made for children retarded in reading and in subtraction the difference was not significant.

From observation it would appear that where the factor of poor nutrition is concerned, the differences relating to failure in the other subjects are not statistically significant.

Frequent Illness

The effect of frequent illness on successful learning was considered, percentages of those retarded in reading and in spelling being compared. Data in Table LI show that the difference is not significant.

TABLE LI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN RETARDED IN READING AND SPELLING WHO ARE SUBJECT TO FREQUENT ILLNESS

Subjects compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading vs. Spelling	7	16.7	7.2%	6.49%	1.11
	9	9.5			

Poor Visual Acuity

To ascertain the influence of poor visual acuity, on the learning of the basic subjects percentages were compared and critical ratios were determined. It may be that the frequencies are too small to reveal significant differences. Data appear in Table LII.

TABLE LII

THE EFFECT OF POOR VISUAL ACUITY ON RETARDATION IN READING, SPELLING, ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION.

		Reading 2.38%	Spelling	Addition	Subtraction	Multiplication
Spelling 5.26%	% diff.	2.88%				
	S.E. diff.	3.27%				
	C.R.	0.88				
Addition 11.7%	% diff.	9.32%	6.44%			
	S.E. diff.	4.06%	4.03%			
	C.R.	2.30	1.60			
Subtraction 9.27%	% diff.	6.89%	4.01%	2.43%		
	S.E. diff.	3.77%	3.73%	4.43%		
	C.R.	1.84	1.08	0.55		
Multiplication 8.45%	% diff.	6.07%	3.19%	3.25%	0.82%	
	S.E. diff.	3.38%	3.33%	4.11%	3.82%	
	C.R.	1.80	0.96	0.79	0.21	
Division 11.5%	% diff.	9.12%	6.24%	0.20%	2.23%	3.05%
	S.E. diff.	3.72%	3.68%	4.38%	4.12%	3.77%
	C.R.	2.46	1.70	0.05	0.54	0.81

The only significant differences are those between reading and addition and reading and division; these are significant at about the two per cent. level.

When the chi-squared procedure was applied to percentages of retardation in the basic subjects for children suffering from poor visual acuity the data as a whole were found to be homogeneous.

$$\chi^2 = 5.25$$

5 df.

P. > 0.30

Left-handedness

The effect of left-handedness on successful learning of the various subjects was then investigated. Data are supplied in Table LIII.

TABLE LIII

INCIDENCE OF LEFT-HANDEDNESS IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS

Reading	Spelling	Addition	Subtraction	Multiplication	Division	Every	Subj.						
No.	%	No.	%	No.	%	No.	%						
5	11.9	9	9.5	6	6.4	5	5.2	8	6.2	8	6.6	4	23.5
$\chi^2 = 2.924$				5 df.		$P > 0.70$							

When the chi-squared technique was applied it was evident that the data are homogeneous. Left-handedness does not appear to affect one subject more than another although the percentage of failure in reading is higher.

Disorders of Speech

Data relating to speech disorders appear in Table LIV; they were found to be homogeneous.

TABLE LIV

INCIDENCE OF SPEECH DISORDERS IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS.

Speech Defects.	Number and Percentage of Children Retarded in										Retarded in every Subject.			
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Stammer	3	7.2	12	12.6	11	11.7	6	6.2	15	11.5	11	9.0	-	-
Articulatory defect	5	11.9	12	12.6	9	9.6	9	9.3	11	8.5	12	9.9	1	5.9
Stammer and Retardation					$\chi^2 = 3.11$		5 df.		$P > 0.50$					
Articulatory Defects and Retardation					1.19		5		$P > 0.90$					

It was found that 7.2 per cent. of retarded readers stammered while 11.9 per cent. had some type of articulatory defect. The difference is not statistically significant. Data will be found in Table LV.

TABLE LV

INFLUENCE OF STAMMER VERSUS ARTICULATORY DEFECTS ON RETARDATION IN READING

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Stammer vs. Articulatory Defect	3	7.2	4.7%	6.39%	0.74
	5	11.9			

SOCIO-ECONOMIC LEVEL

The influence of socio-economic level on retardation in the basic subjects was studied.

To facilitate comparison the eight socio-economic levels were reduced to three*. Levels I and II were combined to form Level I; Levels III, IV, V and VI formed Level II; and Levels VII and VIII became Level III. The three resulting groups correspond to 20 per cent. (Level I); 53.3 per cent. (Level II); and 26.7 per cent. (Level III) of the Glasgow school population generally.

The distribution of children at the different socio-economic levels who are retarded in the basic subjects is recorded in Table LVI (p.165).

* Cf. pp. 106-107.

TABLE LVI

DISTRIBUTION OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHO ARE RETARDED IN READING, SPELLING, ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION

Retarded in	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Reading	19	23.2	20	19.8	4	23.5
Spelling	39	47.6	49	48.5	7	41.2
Addition	39	47.6	56	55.4	5	29.4
Subtraction	37	45.1	53	52.5	7	41.2
Multiplication	51	62.2	68	67.3	11	64.7
Division	48	58.5	66	65.3	8	47.1
Number of children	82		101		17	

There were eighty-two pupils in Level I, one hundred and one in Level II and seventeen in Level III.

To determine the relationship between socio-economic status and retardation in specific subjects the chi-squared technique was applied to the number of children at the different socio-economic levels who were backward in each subject. Data in Table LVII (p. 166) disclose that the data relating to specific subjects were homogeneous.

To obtain an idea of the general trend the percentages of pupils retarded in Addition in Level II and in Level III were compared. Data in Table LVIII (p.166) indicate that the difference is significant at the five per cent. level. The percentage of retardation in Addition would appear to be higher in pupils in Level II.

THE SOCIAL AND DOMESTIC BACKGROUND

The effect of certain social and domestic conditions on failure to learn was investigated, attention being given to such factors as

TABLE LVII

COMPARISON OF RETARDATION IN THE BASIC SUBJECTS IN PUPILS IN THE DIFFERENT SOCIO-ECONOMIC LEVELS

Subject	χ^2	df.	P.
Reading	0.2689	2	> 0.80
Spelling	0.1443	2	> 0.90
Addition	2.1378	2	> 0.30
Subtraction	0.6991	2	> 0.70
Multiplication	0.1806	2	> 0.50
Division	1.0268	2	> 0.50

TABLE LVIII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVELS II AND III WHO ARE RETARDED IN ADDITION

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level II vs Level III	56	55.4	26.0%	12.103%	2.15
	5	29.4			

membership of juvenile organisations, unfavourable home circumstances, the parents, ordinal position in the family and the child's adjustment to the home.

Membership of Juvenile Organisations

Data relating to membership of juvenile organisations appear in Table LIX (p.167).

Are those who join juvenile organisations more or less backward than those who do not? When the chi-squared procedure was applied it was found that the percentage of backward readers who are not members of such organisations would appear to be higher than that of members. Data in Table LIX (p.167) reveal that the differences were found to be significant for pupils backward in multiplication, division and reading but not for spelling failures.

TABLE LIX

DISTRIBUTION OF CHILDREN RETARDED IN THE BASIC SUBJECTS WHO ATTEND JUVENILE ORGANISATIONS.

Attendance at Juvenile Organisations	Number and Percentage of Children Retarded in													
	Read- :ing		Spell- :ing		Addition		Subtract- :ion		Multi- :plication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	15	35.7	43	45.3	41	43.6	42	43.3	56	43.0	49	40.1	7	41.2
No	27	64.3	52	54.7	53	56.4	55	56.7	74	57.0	73	59.4	10	58.8
% age Diff.	28.60		9.40		12.80		13.40		13.90		19.30		17.60	
S.E. Diff.	10.46		7.22		7.24		7.11		6.13		6.25		16.88	
C.R.	2.73		1.30		1.77		1.88		2.27		3.09		1.04	

Home Conditions

The incidence of unfavourable home conditions of children retarded in the basic subjects is presented in Table LX (p.168).

When the chi-squared statistic was applied to data relating to such conditions as overcrowding, neglected homes, insufficient rest, lack of mental stimulation and unfavourable emotional atmosphere there was no evidence that one subject was more affected than another by such factors.

When the effects of overcrowding versus lack of mental stimulation on failure in reading and in spelling were studied, it was noted that the percentage of pupils from homes where mental stimulus was lacking was higher, the difference being statistically significant.

When a similar comparison was made regarding the effects of unfavourable emotional atmosphere versus lack of mental stimulation the differences were not significant for pupils retarded in reading and in spelling. Data are tabulated in Tables LXI (p. 168) and LXII (p.168).

TABLE LX

INCIDENCE OF UNFAVOURABLE HOME CONDITIONS OF CHILDREN WHO ARE RETARDED
IN THE BASIC SUBJECTS

Unfavourable Home Conditions	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Overcrowded home	7	16.7	11	11.6	15	16.0	13	13.4	21	16.2	18	14.8	3	17.6
Neglected home	7	16.7	15	15.8	13	13.8	16	16.5	20	15.4	19	15.6	3	17.6
Insufficient rest	4	9.5	6	6.3	7	7.4	5	5.2	11	8.5	9	7.4	1	5.9
No mental stimulus	17	40.5	32	33.7	29	30.9	31	32.0	44	33.8	38	31.1	7	41.2
Bad emotional atmosphere	19	45.2	35	36.8	24	36.2	43	44.3	49	37.7	44	36.1	10	58.8
					X^2				df.			P		
Overcrowded homes					1.103				5			> 0.95		
Neglected homes					0.276				5			> 0.99		
Insufficient rest					1.304				5			> 0.90		
No mental stimulus					1.079				5			> 0.95		
Bad emotional atmosphere					1.748				5			> 0.80		

TABLE LXI

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF READING AND SPELLING FAILURES (1) WHO LIVE IN OVERCROWDED HOMES AND (2) WHO LACK MENTAL STIMULATION

Subjects compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading (1)	7	16.7			
(2)	17	40.5	23.8%	9.51%	2.50
Spelling (1)	11	11.6			
(2)	32	33.7	22.1%	8.81%	2.51

TABLE LXII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF READING AND SPELLING FAILURES (1) WHO LIVE IN AN UNFAVOURABLE EMOTIONAL ATMOSPHERE AND (2) WHO LACK MENTAL STIMULATION

Retarded in	No.	%	% Diff.	S.E. Diff.	C.R.
Reading (1)	19	45.2			
(2)	17	40.5	4.7%	10.78%	0.44
Spelling (1)	35	36.8			
(2)	32	33.7	3.1%	6.92%	0.45

Home Control

What is the effect of the nature of home control on learning? Is a nagging parent or an indulgent parent more detrimental? The percentages of children retarded in reading who fall in either of these categories were compared. Data are presented in Table LXIII.

TABLE LXIII

DISTRIBUTION OF CHILDREN REARED UNDER VARIOUS TYPES OF PARENTAL CONTROL WHO ARE RETARDED IN THE BASIC SUBJECTS

Type of Home Control	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Nagging parent	7	16.7	13	13.7	12	12.8	13	13.4	16	12.3	16	13.1	3	17.6
Over-protective parent	8	19.1	19	20.0	15	16.0	19	18.6	25	19.2	24	19.7	2	11.8
Over-indulgent parent	17	40.5	30	31.6	32	34.0	28	28.9	34	26.2	34	27.9	7	41.2
Over-disciplined child	1	2.4	2	2.1	3	3.2	3	3.1	4	3.1	3	2.5	1	5.9
Harsh parents	6	14.3	8	8.4	8	8.5	7	7.2	12	9.2	11	9.0	3	17.6
Inconsistent discipline	8	19.1	12	12.6	12	12.8	13	13.4	13	10.0	17	13.9	4	23.5
Divided control	3	7.2	4	4.2	3	3.2	5	5.2	5	11.5	5	4.1	2	11.8
No home control	8	19.1	20	21.1	18	19.1	17	17.5	23	17.7	23	18.9	4	23.5

Data in Table LXIV (p.170) indicate that where learning to read is concerned an indulgent parent would appear to be more of a hindrance to learning than a nagging one. However, when a similar comparison was made for pupils backward in every subject the difference was not statistically significant.

TABLE LXIV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF PUPILS WHO FAIL IN READING AND IN EVERY SUBJECT (1) WHO HAVE NAGGING PARENTS OR (2) INDULGENT PARENTS

Retarded in	No.	%	% Diff.	S.E. Diff.	C.R.	
Reading	(1)	7	16.7	23.8%	9.51%	2.50
	(2)	17	40.5			
Every Subject	(1)	3	17.6	23.6%	15.09%	1.57
	(2)	7	41.2			

The Parents

The effect on learning of the presence in the home of neurotic parents was then investigated. Data in Table LXV show that more mothers than fathers were neurotic.

TABLE LXV

DISTRIBUTION OF CHILDREN RETARDED IN THE BASIC SUBJECTS WHOSE PARENTS ARE NEUROTIC

Neurotic Parents.	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Father neurotic	1	2.4	2	2.1	-	-	2	2.1	4	3.1	4	3.3	-	-
Mother neurotic	6	14.3	10	10.5	12	12.8	11	11.3	13	10.0	11	9.0	3	17.6

The percentage of reading failures from homes where the father was neurotic was compared with the percentage from homes where the mother was neurotic. An inspection of Table LXVI (p.171) reveals that the difference was significant. Children of neurotic mothers rather than those of neurotic fathers tend to fail in reading.

TABLE LXVI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF READING FAILURES WHO ARE THE CHILDREN OF NEUROTIC PARENTS

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Father neurotic vs. Mother neurotic	1	2.4	11.9%	5.895%	2.01
	6	14.3			

The influence of the domestic situation - as it is determined by the marital status of the parents - on backwardness in every subject was considered. Data are recorded in Table LXVII.

TABLE LXVII

INCIDENCE OF CHILDREN RESIDING IN QUARRELSOME AND BROKEN HOMES WHO ARE RETARDED IN THE BASIC SUBJECTS

Home Situation	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unhappy, quarrelsome Separated or divorced	13	31.0	18	18.9	13	13.8	17	17.5	24	18.5	25	20.5	5	29.4
	8	19.1	11	11.6	8	8.5	10	10.3	12	9.2	12	9.9	1	5.9

Are children reared in broken homes more likely to be backward in every subject than are those reared in quarrelsome homes? Data in Table LXVIII indicate that there is no significant difference.

TABLE LXVIII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF FAILURES IN EVERY SUBJECT WHO LIVE IN (1) BROKEN HOMES AND (2) QUARRELSOME HOMES

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Broken Homes vs. Quarrelsome Homes	1	5.9	23.5%	12.44%	1.9
	5	29.4			

Ordinal Position in the Family

The bearing of ordinal position in the family on retardation in the basic subjects was studied. Data are recorded in Table LXIX.

TABLE LXIX

INCIDENCE OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO ARE RETARDED IN THE BASIC SUBJECTS

Ordinal Position	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
First Child	14	33.3	29	30.5	33	35.1	33	34.0	44	33.8	44	36.1	5	29.4
Middle Child	8	19.1	24	25.3	22	23.4	21	21.6	35	27.0	28	23.0	4	23.5
Youngest Child	14	33.3	28	29.5	21	22.3	24	24.7	35	27.0	32	26.2	5	29.4
Only Child	7	16.7	14	14.7	18	19.1	19	19.6	16	12.3	17	13.9	3	17.6
Only Boy	10	23.8	16	16.8	16	17.0	16	16.5	17	13.1	18	14.8	5	29.4
Only Girl	1	2.4	4	4.2	1	1.1	3	3.1	5	3.8	5	4.1	-	-

In reading failure the percentages of oldest and of youngest children are identical; in spelling they are almost the same. There is greater discrepancy in addition in which first children appear to be more backward than youngest, but the difference is not significant.

There is no evidence that only children are more backward in one subject than in another.

Data are recorded in Table LXX.

TABLE LXX

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF FAILURES IN ADDITION WHO ARE (1) FIRST CHILDREN AND (2) YOUNGEST CHILDREN.

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
First Children	33	35.1			
vs.			12.8%	6.532%	1.96
Youngest Children	21	22.3			

Only Boy/Only Girl Situation

The percentage of 'only' boys who fail in reading is much higher than that of 'only' girls. Data in Table LXXI would indicate that the 'only' boy situation is more conducive to retardation in this subject.

TABLE LXXI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF READING FAILURES WHO ARE ONLY BOYS/ONLY GIRLS

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Only Boy vs. Only Girl	10	23.8	21.4%	6.982%	3.1
	1	2.4			

Adjustment to Home

The distribution of pupils retarded in the basic subjects who are maladjusted to their homes is shown in Table LXXII.

TABLE LXXII

DISTRIBUTION OF CHILDREN RETARDED IN THE BASIC SUBJECTS WHO ARE MALADJUSTED TO THEIR HOMES

Number and Percentage of Children Retarded in													
Read- :ing	Spell- :ing	Addition		Subtraction		Multiplication		Division		Every Subject.			
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
6	14.3	13	13.7	9	9.6	15	15.5	14	10.8	15	12.3	2	11.8

When the percentages of reading failures and of failures in addition were compared the difference was not statistically significant. Data are presented in Table LXXIII (p.174).

TABLE LXXIII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF PUPILS RETARDED IN READING AND IN ADDITION WHO ARE MALADJUSTED TO THEIR HOMES.

Subjects compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading	6	14.3			
vs.			4.7%	29.95%	0.16
Addition	9	9.6			

HABIT DISORDERS

The relationship between habit disorders and retardation in the basic subjects was considered. Data are tabulated in Table LXXIV.

TABLE LXXIV

INCIDENCE OF HABIT DISORDERS IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS

Habit Disorders	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Enuresis	8	19.1	17	17.9	16	17.0	17	17.5	20	15.4	22	18.0	2	11.8
Neurotic sickness	2	4.8	3	3.2	3	3.2	3	3.1	6	4.6	6	4.9	-	-
Fatiguability	1	2.4	2	2.1	-	-	1	1.0	2	1.5	2	1.5	-	-

The percentages of children retarded in the different subjects who are enuretic were closely similar. Enuresis is reported more frequently than is neurotic sickness or a tendency to fatiguability.

Data in Table LXXV show that enuresis is more common than neurotic sickness among poor readers.

TABLE LXXV

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF POOR READERS WHO ARE SUBJECT (1) TO ENURESIS AND (2) TO NEUROTIC SICKNESS.

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Enuresis	8	19.1			
vs.			14.3%	6.904%	2.07
Neurotic sickness	2	4.8			

BEHAVIOUR DISORDERS

The incidence of behaviour disorders in children retarded in the basic subjects appears in Table LXXVI.

TABLE LXXVI

INCIDENCE OF BEHAVIOUR DISORDERS IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS

Behaviour Disorders	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Theft	10	23.8	23	24.2	27	28.7	32	33.0	35	27.0	33	27.0	6	35.3
Truancy	6	14.3	19	20.0	15	16.0	19	19.6	26	20.0	28	23.0	4	23.5
Lying	7	16.7	21	22.1	20	21.3	27	27.8	29	22.3	31	25.4	4	23.5
Aggressive-ness	11	26.2	27	28.4	21	22.3	23	23.7	33	25.4	32	26.2	3	17.6
Dis-obedience	9	21.4	16	16.8	19	20.2	22	22.7	23	17.7	25	20.5	5	29.4
Overdepend-ence	9	21.4	15	15.8	11	11.7	13	13.4	21	16.2	19	15.6	3	17.6
Unsociable-ness	4	9.5	14	14.7	15	16.0	16	16.5	17	13.1	19	15.6	2	11.8

Of children retarded in reading the highest percentage was recorded of those who manifest aggressiveness, more than twenty-five per cent. of the cases falling in this category.

When the percentage of retardation in subtraction was compared with that recorded for reading for pupils accused of theft the difference was not significant statistically. Data are recorded in Table LXXVII.

TABLE LXXVII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF PUPILS ACCUSED OF THEFT WHO ARE RETARDED (1) IN READING AND (2) IN SUBTRACTION

Retarded in	No.	%	% Diff.	S.E. Diff.	C.R.
Reading	10	23.8			
vs.			9.2%	8.122%	1.13
Subtraction	32	33.0			

It is said that a tendency to thieve may be associated with retardation in arithmetic. There is no evidence that this is the case in the population studied. When pupils who were backward in every subject were considered those guilty of theft were in the majority. When the chi-squared procedure was applied the data were found to be homogeneous.

$$x^2 \quad 1.706 \qquad 5 \text{ df.} \qquad P > 0.80$$

PERSONALITY DIFFICULTIES.

Data concerning the incidence of personality difficulties in retarded children are shown in Table LXXVIII (p. 177).

The highest incidence of backwardness in every subject is recorded for inhibited, anxious, hyperactive and hypokinetic pupils. Over forty per cent. were hyperactive and more than sixty per cent. were hypokinetic; the difference was not significant. Data appear in Table LXXIX (p.177).

When a similar comparison was made for children who were retarded in reading the difference was found to be statistically significant. More hypokinetic than hyperactive children would appear to be found among reading failures. Data are recorded in Table LXXX (p. 178).

The effect on the learning of the different subjects of a tendency to be submissive was investigated. When the percentages of submissive children who were backward in reading and in addition were compared the difference was not significant. Data are presented in Table LXXXI (p.178).

TABLE LXXVIII

INCIDENCE OF PERSONALITY DIFFICULTIES IN CHILDREN WHO ARE RETARDED IN THE BASIC SUBJECTS

Personality Difficulties	Number and Percentage of Children Retarded in													
	Reading		Spelling		Addition		Subtraction		Multiplication		Division		Every Subject	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Feels inferior	4	9.5	11	11.6	11	11.7	11	11.3	13	10.0	12	9.9	2	11.8
Inhibited	8	19.1	27	28.4	23	24.5	29	29.9	34	26.2	36	29.5	5	29.4
Solitary, seclusive	3	7.2	11	11.6	17	18.1	16	16.5	18	13.8	18	14.8	2	11.8
Daydreamer	8	19.1	21	22.1	25	26.6	24	24.7	33	25.4	29	23.8	2	11.8
Markedly unstable	7	16.7	18	18.9	18	19.1	23	23.7	28	21.5	26	21.3	3	17.6
Nervous	10	23.8	23	24.2	17	18.1	20	20.6	29	22.3	26	21.3	4	23.5
Neurotic	5	11.9	10	10.5	11	11.7	8	8.2	17	13.1	14	11.5	2	11.8
Hysterical	1	2.4	4	4.2	5	5.3	6	6.2	7	5.4	8	6.6	1	5.9
Obstinate, sullen	3	7.2	8	8.4	13	13.8	14	14.4	16	12.3	11	9.0	2	11.8
Anxious, insecure	11	26.2	27	28.4	28	29.8	30	30.9	36	27.7	35	28.7	5	29.4
Depressed	5	11.9	15	15.8	14	14.9	14	14.4	21	16.2	19	15.6	2	11.8
Submissive	6	14.3	6	6.3	6	6.4	6	6.2	8	6.2	7	5.7	3	17.6
Lacks initiative	9	19.1	16	16.8	16	17.0	25	25.8	23	17.7	24	19.7	2	11.8
Hyperactive	13	31.0	27	28.4	29	30.9	28	28.9	33	25.4	30	24.6	7	41.2
Hypokinetic	23	54.8	38	40.0	44	46.8	45	46.4	56	43.1	55	45.1	11	64.7

TABLE LXXIX

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF PUPILS RETARDED IN EVERY SUBJECT WHO ARE (1) HYPERACTIVE OR (2) HYPOKINETIC

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Hyperactive vs. Hypokinetic	7	41.2	23.5%	16.64%	1.41
	11	64.7			

Retardation in reading was found to be more frequent in the case of submissive rather than of obstinate and sullen children. Data are presented in Table LXXXII (p.178.).

TABLE LXXX

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF PUPILS RETARDED IN READING WHO ARE (1) HYPERACTIVE OR (2) HYPOKINETIC

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Hyperactive vs. Hypokinetic	13	31.0	23.8%	10.48%	2.27
	23	54.8			

TABLE LXXXI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF SUBMISSIVE PUPILS WHO ARE RETARDED (1) IN READING AND (2) IN ADDITION

Subjects compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading vs. Addition	6	14.3	7.9%	5.96%	1.33

TABLE LXXXII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF READING FAILURES WHO ARE (1) OBSTINATE AND (2) SUBMISSIVE

Factors compared	No.	%	% Diff.	S.E. Diff.	C.R.
Obstinacy vs. Submissiveness	3	7.2	7.1%	6.72%	1.06
	6	14.3			

SOCIO-ECONOMIC STATUS AND SPECIFIC FACTORS

To investigate further the effect on retardation of social and economic circumstances a study was made of the relationship between socio-economic status and certain specific factors, such as physical condition, speech disorders, the social and domestic background, habit disorders, behaviour disturbances and personality difficulties.

Four hundred pupils were involved; two hundred were in the

Experimental Group, one hundred were in Group A and one hundred were in Group B. Of these, one hundred and sixty-six children were in the highest socio-economic level, two hundred and two were in Level II and thirty-two were in Level III, the lowest level.

The number and percentage of children manifesting different conditions are presented in the following tables. Percentages are based, in each case, on the number of children comprising the socio-economic level concerned. To ascertain the reliability of the results the techniques of the standard error of a percentage and of a difference between percentages were employed.

PHYSICAL CONDITION

The incidence of physical handicaps in children at the different socio-economic levels is shown in Table LXXXIII.

TABLE LXXXIII

INCIDENCE OF PHYSICAL HANDICAPS IN CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Physical Handicaps	Number and Percentage of Children					
	S-E. Level I		S-E. Level II		S-E Level III	
	No.	%	No.	%	No.	%
Poor nutrition	12	7.2	29	14.4	4	12.5
Frequent illness	9	5.4	18	8.9	4	12.5
Poor muscular condition	12	7.2	13	6.4	1	3.1
Enlarged T. & A.	5	3.0	13	6.4	2	6.3
Poor auditory acuity	5	3.0	6	3.0	-	-
Poor visual acuity	12	7.2	12	5.9	3	9.4
Pneumonia	7	4.2	21	10.4	4	12.5
4+ Zymotic illnesses	24	14.5	24	11.9	3	9.4
Anaemia	12	7.2	8	4.0	2	6.3
Total number of children	166		202		32	

The incidence of pupils suffering from poor nutrition, from frequent illness and from pneumonia is higher in Level II and Level III than in Level I. On the other hand the number of anaemic children and of those who have experienced at least four zymotic illnesses is higher in Level I.

Development and Nutrition

The percentages of pupils in Level I, Level II and Level III who suffer from poor nutrition were compared. Data are tabulated in Table LXXXIV.

TABLE LXXXIV

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN SOCIO-ECONOMIC LEVELS I, II AND III WHO SUFFER FROM POOR NUTRITION

S.E. Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I vs. Level II	12	7.2	7.2%	3.18%	2.26
Level I vs. Level III	12	7.2	5.3%	6.18%	0.86
	4	12.5			

The difference between Level I and Level II is significant, but that between Level I and Level III is not. It may be that the number of cases in Level III is too small to indicate a significant difference.

Frequent Illness

Although the incidence of frequent illness appears to be higher in pupils in Level III than in Level I, data in Table LXXXV (p.181) reveal that the difference is not statistically significant. There is no

evidence that pupils in the lowest socio-economic levels are more likely to be subject to frequent illness.

TABLE LXXXV

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVEL I AND LEVEL III WHO ARE SUBJECT TO FREQUENT ILLNESS

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I	9	5.4			
vs.			7.1%	6.11%	1.16
Level III	4	12.5			

Pneumonia

Susceptibility to pneumonia in children at the different socio-economic levels was investigated, the percentage of pupils in Level I who had suffered from this disease being compared with that in Level III. Data in Table LXXVI disclose that the difference is not significant statistically. There is no evidence that the frequency of pneumonia is greater in underprivileged pupils than in those in the higher socio-economic groups, although the percentage would appear to increase with the percentage of necessity.

TABLE LXXXVI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVEL I AND LEVEL III WHO HAVE SUFFERED FROM PNEUMONIA

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I	7	4.2			
vs.			8.3%	6.05%	1.37
Level III	4	12.5			

Zymotic Illnesses

The percentage of pupils who have experienced at least four zymotic illnesses is highest in Level I. Although the percentage would appear to decrease as the percentage of necessity increases, data in Table LXXXVII indicate that the difference is not significant.

TABLE LXXXVII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVEL I AND LEVEL III WHO HAVE EXPERIENCED AT LEAST FOUR ZYMOTIC ILLNESSES

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I	24	14.5			
vs.			5.1%	5.84%	0.87
Level III	3	9.4			

Disorders of Speech

The distribution of children at the different socio-economic levels who manifest speech defects appears in Table LXXXVIII.

TABLE LXXXVIII

DISTRIBUTION OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHO MANIFEST SPEECH DEFECTS

Speech Defects	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Stammer	18	10.8	33	16.3	2	6.3
Articulatory Defect	8	4.8	20	9.9	3	9.4
Total number of children	166		202		32	

Since the frequency of stammer in Level III is small, a comparison was made between Level I and Level II. As indicated in Table LXXXIX (p. 183) the difference is not significant.

When a similar comparison was made of children with articulatory defects no significant difference resulted.

TABLE LXXXIX

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN IN LEVEL I AND LEVEL II WHO SUFFER FROM DISORDERS OF SPEECH

Speech Disorder	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Stammer	Level I	18	10.8	5.5%	3.54%	1.55
	vs. Level II	33	16.3			
Defects of Articulation	Level I	8	4.8	5.1%	2.66%	1.92
	vs. Level II	20	9.9			

THE SOCIAL AND DOMESTIC BACKGROUND

The relationship between socio-economic status and the social and domestic background was considered, attention being paid to such factors as membership of juvenile organisations, unfavourable home circumstances, the parents, ordinal position in the family and adjustment to the home.

Membership of Juvenile Organisations

Data relating to socio-economic status and membership of juvenile organisations are presented in Table XC.

TABLE XC

DISTRIBUTION OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS ATTENDING JUVENILE ORGANISATIONS

Number and Percentage of Children					
S.E. Level I		S.E. Level II		S.E. Level III	
No.	%	No.	%	No.	%
100	60.2	106	52.5	8	25.0
166		202		32	

The percentage of membership would appear to be highest among privileged children and to decrease as the percentage of necessity increases. Sixty per cent. of children in Level I and only twenty-five per cent. in Level III are members of juvenile organisations. Data in Table XCI show that the difference between the percentages is statistically significant.

TABLE XCI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVEL I AND LEVEL III WHO ATTEND JUVENILE ORGANISATIONS

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I	100	60.2			
vs.			35.2%	8.55%	4.12
Level III	8	25.0			

Home Conditions

The incidence of unfavourable home conditions of children at the different socio-economic levels is presented in Table XCII.

TABLE XCII

INCIDENCE OF UNFAVOURABLE HOME CONDITIONS OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Unfavourable Home Conditions	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Overcrowded home	3	1.8	40	19.8	7	21.9
Neglected home	7	4.2	21	10.4	7	21.9
Insufficient rest	13	7.8	18	8.9	3	9.4
No mental stimulus	19	11.4	59	29.2	19	59.4
Bad emotional atmosphere	48	28.9	51	25.2	5	15.6
Total number of children	166		202		32	

The percentage of children from overcrowded homes is much higher in Level II and in Level III than in Level I, and more children in Level II and in Level III live in careless, neglected homes. Many more children in Level II and Level III live under conditions in which mental stimulus is lacking and where the home atmosphere is unfavourable. Data in Table XCIII disclose that the differences between the percentages are significant, with the exception of that relating to insufficient rest.

TABLE XCIII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN IN LEVEL I, LEVEL II AND LEVEL III WHOSE HOME CONDITIONS ARE UNFAVOURABLE

Home Conditions	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.																																														
Overcrowded Home	Level I	3	1.8	18.0%	2.99%	6.02																																														
	vs. Level II	40	19.8				Neglected home	Level I	7	4.2	6.2%	2.65%	2.34	vs. Level II	21	10.4	Insufficient Rest	Level I	13	7.8	1.6%	5.56%	0.29	vs. Level III	18	9.4	No Mental Stimulus	Level I	19	11.4	17.8%	4.04%	4.40	vs. Level II	59	29.2	Level II	59	29.2	30.2%	9.25%	3.26	vs. Level III	19	59.4		Level I	19	11.4	48.0%	9.02%	5.32
Neglected home	Level I	7	4.2	6.2%	2.65%	2.34																																														
	vs. Level II	21	10.4				Insufficient Rest	Level I	13	7.8	1.6%	5.56%	0.29	vs. Level III	18	9.4	No Mental Stimulus	Level I	19	11.4	17.8%	4.04%	4.40	vs. Level II	59	29.2		Level II	59	29.2	30.2%	9.25%	3.26	vs. Level III	19	59.4		Level I	19	11.4	48.0%	9.02%	5.32		vs. Level III	19	59.4					
Insufficient Rest	Level I	13	7.8	1.6%	5.56%	0.29																																														
	vs. Level III	18	9.4				No Mental Stimulus	Level I	19	11.4	17.8%	4.04%	4.40	vs. Level II	59	29.2		Level II	59	29.2	30.2%	9.25%	3.26	vs. Level III	19	59.4		Level I	19	11.4	48.0%	9.02%	5.32		vs. Level III	19	59.4															
No Mental Stimulus	Level I	19	11.4	17.8%	4.04%	4.40																																														
	vs. Level II	59	29.2					Level II	59	29.2	30.2%	9.25%	3.26	vs. Level III	19	59.4		Level I	19	11.4	48.0%	9.02%	5.32		vs. Level III	19	59.4																									
	Level II	59	29.2	30.2%	9.25%	3.26																																														
	vs. Level III	19	59.4					Level I	19	11.4	48.0%	9.02%	5.32		vs. Level III	19	59.4																																			
	Level I	19	11.4	48.0%	9.02%	5.32																																														
	vs. Level III	19	59.4																																																	

Home Control

The distribution of children reared under various types of parental control at the different socio-economic levels is shown in Table XCIV.

TABLE XCIV

DISTRIBUTION OF CHILDREN REARED UNDER VARIOUS TYPES OF PARENTAL CONTROL AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Type of Home Control	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Nagging parent	23	13.9	11	5.4	1	3.1
Over-protective parent	24	14.5	21	10.4	3	9.4
Over-indulgent parent	34	20.5	34	16.8	5	15.6
Over-disciplined child	9	5.4	3	1.5	1	3.1
Harsh parents	6	3.6	12	5.9	-	-
Inconsistent discipline	16	9.6	17	8.4	1	3.1
Divided control	10	6.0	5	2.5	1	3.1
No home control	9	5.4	29	14.4	8	25.0
Total number of children	166		202		32	

The highest percentage recorded for nagging parents is found in Level I, the difference between percentages in Level I and Level III being significant statistically. Although the percentages of over-indulgent and over-protective parents were higher in Level I, the differences were not significant; more homes in Level I were characterised by divided control but the difference was not significant. Reliable discrepancies were noted for over-disciplined children and for children from homes where adequate control was lacking. Five per cent. of children in Level I were over-disciplined, whereas twenty-five per cent. of children in Level III enjoyed too much freedom. Results of these comparisons are presented in Table XCV (p.187).

TABLE XCV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN REARED UNDER VARIOUS TYPES OF PARENTAL CONTROL AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Home Control	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Nagging Parents	Level I	23	13.9	10.8%	4.07%	2.65
	vs. Level III	1	3.1			
Over-protective Parents	Level I	24	14.5	5.1%	5.84%	0.87
	vs. Level III	3	9.4			
Over-indulgent Parents	Level I	34	20.5	4.9%	7.14%	0.69
	vs. Level III	5	15.6			
Over-disciplined Child	Level I	9	5.4	3.9%	1.95%	2.0
	vs. Level II	3	1.5			
Inconsistent Discipline	Level I	16	9.6	6.5%	3.82%	1.70
	vs. Level III	1	3.1			
Divided Control	Level I	10	6.0	3.5%	2.15%	1.63
	vs. Level II	5	2.5			
No Home Control	Level I	9	5.4	19.6%	7.85%	2.50
	vs. Level III	8	25.0			

The Parents

The incidence of children from homes where the father or the mother is neurotic is shown in Table XCVI (p.188).

Eight children come from homes where the father is neurotic; twenty-three have neurotic mothers. Children of neurotic fathers are all in the highest socio-economic level. The percentage of neurotic mothers increases with the increase in percentage of necessity, but the difference is not statistically significant. Data are tabulated in Table XCVII (p.188).

TABLE XCVI

DISTRIBUTION OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHOSE PARENTS ARE NEUROTIC

Neurotic Parents	Number and Percentage of Children					
	S.E. Level I.		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Father neurotic	8	4.8	-	-	-	-
Mother neurotic	8	4.8	12	5.9	3	9.4
Total number of children	166		202		32	

TABLE XCVII

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN SOCIO-ECONOMIC LEVELS I AND III WHOSE MOTHERS ARE NEUROTIC

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I vs. Level III	8	4.8	4.6%	5.41%	0.85
	3	9.4			

The distribution of pupils at the different socio-economic levels who reside in quarrelsome homes is shown in Table XCVIII. The differences between the percentages are not significant.

TABLE XCVIII

INCIDENCE OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHO RESIDE IN BROKEN OR QUARRELSOME HOMES

Home Situation	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Unhappy, quarrelsome	17	10.2	25	12.4	3	9.4
Total number of children	166		202		32	

Ordinal Position in the Family

The number and percentage of children at the different socio-economic levels occupying different positions in the family are

presented in Table XCIX.

TABLE XCIX

INCIDENCE OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS OCCUPYING DIFFERENT POSITIONS IN THE FAMILY

Ordinal Position	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
First Child	56	33.7	68	33.6	9	28.1
Middle Child	33	19.9	51	25.2	9	28.1
Youngest Child	41	24.7	51	25.2	12	37.5
Only Child	36	21.7	32	15.8	2	6.3
'Only' Boy	39	23.5	27	13.4	7	21.9
'Only' Girl	11	6.6	14	6.9	-	-
Total number of children	166		202		32	

Adjustment to the Home

The distribution of children at the different socio-economic levels who are maladjusted to their homes is tabulated in Table C.

TABLE C

DISTRIBUTION OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHO ARE MALADJUSTED TO THEIR HOMES

Maladjustment	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
To home	9	5.4	19	9.4	2	6.3
Total number of children	166		202		32	

When the percentage of children in Level I is compared with that in Level II the difference is not significant, as shown by data in Table CI (p.190).

TABLE CI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN IN LEVEL I AND LEVEL II WHO ARE MALADJUSTED TO THEIR HOMES

Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Level I vs. Level II	9	5.4	4.0%	2.70%	1.48
	19	2.4			

HABIT DISORDERS

The distribution of children in the different socio-economic levels who suffer from habit disorders is tabulated in Table CII.

TABLE CII

INCIDENCE OF HABIT DISORDERS IN CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Habit Disorders	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Nail-biting	29	17.5	34	16.8	8	25.0
Habit spasms	21	12.7	33	16.3	8	25.0
Enuresis	24	14.5	30	14.9	6	18.8
Night terrors	14	8.4	11	5.4	3	9.4
Neurotic sickness	3	1.8	8	4.0	2	6.3
Fatiguability	3	1.8	2	1.0	-	-
Total number of children	166		202		32	

Nail-biting was the most frequently noted of all the habit disorders. However, data in Table CIII (p.191) indicate that when percentages of children in the different levels are compared in no case is the difference between the levels significant.

BEHAVIOUR DISTURBANCES

The incidence of behaviour disturbances in children in the different socio-economic levels is presented in Table CIV (p.191).

TABLE CIII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN IN THE DIFFERENT SOCIO-ECONOMIC LEVELS MANIFESTING HABIT DISORDERS

Habit Disorders	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Nail-biting	Level II	34	16.8	8.2%	8.09%	1.01
	vs. Level III	8	25.0			
Habit Spasms	Level I	21	12.7	12.3%	8.08%	1.52
	vs. Level III	8	25.0			
Enuresis	Level I	24	14.5	4.3%	7.43%	0.58
	vs. Level III	6	18.8			
Night Terrors	Level II	11	5.4	4.0%	5.40%	0.74
	vs. Level III	3	9.4			
Neurotic Sickness	Level I	3	1.8	4.5%	4.42%	1.02
	vs. Level III	2	6.3			

TABLE CIV

INCIDENCE OF BEHAVIOUR DISTURBANCES IN CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Behaviour Disturbances	Number and Percentage of Children					
	S.E. No.	Level I %	S.E. No.	Level II %	S.E. No.	Level III %
Theft	24	14.5	39	19.3	7	21.9
Truancy	19	23.2	28	13.9	4	12.5
Lying	26	15.7	28	13.9	4	12.5
Aggressiveness	30	18.1	31	15.3	6	18.8
Disobedience	27	16.3	27	13.4	3	9.4
Over-dependence	25	15.1	21	10.4	5	15.6
Unsociableness	23	13.9	19	9.4	4	12.5
Total number of children	166		202		32	

When percentages relating to such disorders as theft, truancy, lying, disobedience, over-dependence and unsociableness are compared no

significant differences are revealed. Data are tabulated in Table CV.

TABLE CV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN AT DIFFERENT SOCIO-ECONOMIC LEVELS WHO MANIFEST DISTURBANCES OF BEHAVIOUR

Behaviour Disturbances	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Theft	Level I	24	14.5	7.4%	7.81%	0.95
	vs. Level III	7	21.9			
Truancy	Level I	19	23.2	10.7%	6.70%	1.60
	vs. Level III	4	12.5			
Lying	Level I	26	15.7	3.2%	6.49%	0.49
	vs. Level III	4	12.5			
Disobedience	Level I	27	16.3	6.9%	5.90%	1.17
	vs. Level III	3	9.4			
Over-dependence	Level I	25	15.1	4.7%	3.51%	1.34
	vs. Level II	21	10.4			
Unsociableness	Level I	23	13.9	4.5%	3.38%	1.33
	vs. Level II	19	9.4			

PERSONALITY DIFFICULTIES

Data concerning the relationship between personality difficulties and socio-economic status are recorded in Table CVI (p. 193).

When percentages noted for the different types of personality difficulties are compared, no significant differences result with the exception of daydreaming. Children in less privileged areas would appear to have a greater tendency to daydream, perhaps as a compensation for their deprivations. Data are tabulated in Table CVII (p. 194).

TABLE CVI

INCIDENCE OF PERSONALITY DIFFICULTIES IN CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS

Personality Difficulties	Number and Percentage of Children					
	S.E. Level I		S.E. Level II		S.E. Level III	
	No.	%	No.	%	No.	%
Feels inferior	7	4.2	13	6.4	1	3.1
Inhibited	20	12.0	33	16.3	8	25.0
Solitary, seclusive	18	10.8	22	10.9	3	9.4
Daydreamer	25	15.1	34	16.8	10	31.3
Markedly unstable	23	13.9	28	13.9	-	-
Nervous	34	20.5	40	19.8	7	21.9
Neurotic	17	10.2	15	7.4	3	9.4
Hysterical	7	4.2	8	4.0	1	3.1
Anxious, insecure	39	23.5	53	26.2	9	28.1
Submissive	8	4.8	9	4.5	-	-
Lacks initiative	20	12.0	22	10.9	3	9.4
Hyperactive, restless	39	23.5	39	19.3	7	21.9
Hypokinetic, apathetic	40	24.1	45	22.3	6	18.8
Total number of children	166		202		32	

ORDINAL POSITION IN THE FAMILY AND SPECIFIC FACTORS

To discover the relationship between ordinal position in the family and such probable determinants of educational success or failure as frequent illness, handedness, speech disorders, membership of juvenile organisations, habit disorders, behaviour disorders and difficulties of personality four hundred retarded pupils of high intelligence were studied; of whom thirty-three per cent. were oldest children, twenty-three per cent. were middle children, twenty-six per cent. were youngest children and eighteen per cent. were only children. The number and percentage of pupils in each category are recorded in tabular form, the percentage being based in each case on the number of children in the particular group under review.

TABLE CVII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN AT THE DIFFERENT SOCIO-ECONOMIC LEVELS WHO MANIFEST PERSONALITY DIFFICULTIES

Personality Difficulties	Levels compared	No.	%	% Diff.	S.E. Diff.	C.R.
Feels inferior	Level I	7	4.2%	2.2%	2.32%	0.95
	vs. Level II	13	6.4%			
Inhibited	Level I	20	12.0%	13.0%	8.06%	1.61
	vs. Level III	8	25.0%			
Daydreamer	Level I	25	15.1%	16.2%	4.2%	3.78
	vs. Level III	10	31.3%			
Neurotic	Level I	17	10.2%	2.8%	2.99%	0.94
	vs. Level II	15	7.4%			
Anxious	Level I	39	23.5%	4.6%	8.6%	0.53
	vs. Level III	9	28.1%			
Lacks initiative	Level I	20	12.0%	2.6%	5.74%	0.45
	vs. Level III	3	9.4%			
Hyperactive	Level I	39	23.5%	4.2%	4.31%	0.97
	vs. Level II	39	19.3%			
Hypokinetic	Level I	40	24.1%	5.3%	7.66%	0.69
	vs. Level III	6	18.8%			

FREQUENT ILLNESS

The incidence of frequent illness in children occupying different positions in the family is shown in Table CVIII (p.195).

In the group of four hundred pupils thirty-one suffered from frequent illness. Of these eleven were oldest, five were middle, ten were youngest

TABLE CVIII

INCIDENCE OF FREQUENT ILLNESS IN CHILDREN OCCUPYING DIFFERENT POSITIONS
IN THE FAMILY

Position in Family	Number and Percentage of Children	
	No.	%
Oldest	11	35.5
Middle	5	16.1
Youngest	10	32.3
Only	5	16.1

Total number of children subject to frequent illness - 31

and five were only children. Data in Table CIX indicate that the differences between oldest and middle and between oldest and youngest children are not significant. There is no evidence that children in one position in the family are more susceptible to frequent illness than those in another.

TABLE CIX

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN
OCCUPYING DIFFERENT ORDINAL POSITIONS IN THE FAMILY WHO ARE SUBJECT TO
FREQUENT ILLNESS

Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Oldest vs. Middle	11	35.5	18.9%	10.82%	1.75
Oldest vs. Youngest	11	35.5	3.2%	12.02%	0.27
	10	32.3			

HANDEDNESS

The distribution of left-handedness in children occupying different positions in the family is presented in Table CX (p.196).

TABLE CX

INCIDENCE OF LEFT-HANDEDNESS IN CHILDREN OCCUPYING DIFFERENT POSITIONS
IN THE FAMILY

Position in Family	Number and Percentage of Children	
	No.	%
Oldest	5	29.4
Middle	6	35.3
Youngest	6	35.3
Only	-	-

Total number of left-handed children - 17

In the group of four hundred children seventeen were left-handed. None of the only children was left-handed. Data in Table CXI reveal that the difference between oldest and middle children is not significant statistically. It would appear that children in one position are no more likely to be left-handed than those in another.

TABLE CXI

PERCENTAGE DIFFERENCE, S.E. DIFFERENCE AND CRITICAL RATIO OF CHILDREN
OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO ARE LEFT-HANDED

Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Oldest vs. Youngest	5	29.4	5.9%	16.01%	0.37
	6	35.3			

DISORDERS OF SPEECH

The distribution of children in different positions in the family whose speech is defective is shown in Table CXII (p.197).

Of the total group of four hundred retarded children of high intelligence fifty-three pupils stammered and thirty-one suffered from defective articulation. Percentages are based on the number of children in each group - psychogenic or articulatory.

TABLE CXII

INCIDENCE OF SPEECH DISORDERS IN CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY

Disorder of Speech	No.	Number and Percentage of Children			
		Oldest No. %	Middle No. %	Youngest No. %	Only No. %
Psychogenic	53	17 32.1	12 22.6	16 30.2	8 15.1
Articulatory	31	10 32.3	11 35.5	8 25.8	2 6.5

The incidence of stammering is highest in oldest and lowest in only children, the difference being significant. The difference between oldest and youngest is slight. That between oldest and middle children is not significant, nor is that between oldest and youngest. Data are shown in Table CXIII.

TABLE CXIII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO SUFFER FROM DEFECTS OF SPEECH

Speech Disorder	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Stammer	Oldest vs. Middle	17	32.1	7.75%	7.40%	1.05
		12	22.6			
Stammer	Oldest vs. Only	17	32.1	17.0%	8.08%	2.10
		8	15.1			
Stammer	Youngest vs. Only	16	30.2	15.1%	7.99%	1.89
		8	15.1			
Articulation	Oldest vs. Youngest	10	32.3	6.5%	11.5%	0.57
		8	25.8			
Articulation	Youngest vs. Only	8	25.8	19.3%	9.02%	2.14
		2	6.5			

When defects of articulation were studied no significant difference was found between oldest and youngest children, but that between youngest and only was significant.

MEMBERSHIP OF JUVENILE ORGANISATIONS

The number and percentage of children occupying different positions in the family who attend juvenile organisations are tabulated in Table CXIV.

TABLE CXIV

DISTRIBUTION OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY ATTENDING JUVENILE ORGANISATIONS

Number and Percentage of Children								
Oldest		Middle		Youngest		Only		
No.	%	No.	%	No.	%	No.	%	
75	35.0	48	22.4	49	22.9	42	19.6	
Number of children attending organisations							-	214

Two hundred and fourteen children were members of juvenile organisations. Percentages are based on this number. Thirty-five per cent. were oldest, twenty-two per cent. were middle, twenty-three per cent. were youngest and twenty per cent. were only children. When percentages were compared significant differences were found between oldest and middle children and between oldest and only children. It is to be noted that membership of certain organisations is restricted to those who have attained a certain age. This may account for the higher percentage recorded for oldest children. Data are presented in Table CXV (p.199).

HABIT DISORDERS

Data relating to habit disorders, as these manifest themselves in retarded children of high intelligence occupying different positions in

TABLE CXV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO ATTEND JUVENILE ORGANISATIONS

Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Oldest vs. Middle	75	35.0	12.6%	4.33%	2.91
Oldest vs. Only	75	35.0	15.4%	4.24%	3.63
	48	22.4			
	42	19.6			

the family, are shown in Table CXVI.

TABLE CXVI

INCIDENCE OF HABIT DISORDERS IN CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY

Habit Disorders	No.	Number and Percentage of Children							
		Oldest		Middle		Youngest		Only	
		No.	%	No.	%	No.	%	No.	%
Nail-biting	57	23	40.4	14	24.6	14	24.6	6	10.5
Habit spasms	62	22	35.5	21	34.0	10	16.1	9	14.5
Enuresis	60	27	45.0	15	25.0	15	25.0	3	5.0
Sleepwalking	19	6	31.6	5	26.3	3	15.8	3	15.8
Neurotic sickness	13	2	15.4	1	7.7	8	61.5	2	15.4
Fatiguability	5	3	60.0	-	-	-	-	2	40.0

Percentages are based on the numbers of children exhibiting particular disorders. For example, forty per cent. of children in the group of those who are subject to nail-biting are oldest children.

To discover whether certain habit disorders are characteristic of children in one position in the family rather than in another percentages were compared. Data are presented in Table CXVII (p.200).

The incidence of nail-biting, habit spasms, enuresis, sleepwalking

TABLE CXVII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO EXHIBIT HABIT DISORDERS

Habit Disorders	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Nail-biting	Oldest	23	40.4	29.9%	8.89%	3.36
	vs. Only	6	10.5			
Nail-biting	Oldest	23	40.4	15.8%	8.65%	1.83
	vs. Youngest	14	24.6			
Habit spasms	Oldest	22	35.5	21.0%	7.55%	2.78
	vs. Only	9	14.5			
Habit spasms	Oldest	22	35.5	19.4%	7.66%	2.53
	vs. Youngest	10	16.1			
Enuresis	Oldest	27	45.0	20.0%	8.52%	2.35
	vs. Youngest	15	25.0			
Enuresis	Oldest	27	45.0	40.0%	7.01%	5.71
	vs. Only	3	25.0			
Enuresis	Youngest	15	25.0	20.0%	6.26%	3.19
	vs. Only	3	5.0			
Sleep-walking	Oldest	6	31.6	15.8%	13.56%	1.17
	vs. Youngest	3	15.8			
Neurotic sickness	Only	2	15.4	46.1%	16.80%	2.74
	vs. Youngest	8	61.5			
Fatiguability	Oldest	3	60.0	20.0%	30.98%	0.64
	vs. Only	2	40.0			

and fatiguability appears to be highest in oldest children; neurotic sickness appears more frequently in youngest children than in only. When percentages of oldest and of youngest children who bite their nails were compared, the difference was not significant. Habit spasms are characteristic of oldest rather than of youngest or only children. Enuresis would appear to be more common among oldest than among youngest or only children. When youngest and only were compared more of the former than of the latter were found to be enuretic, the difference being significant. A significant difference was found also for neurotic sickness when youngest and only children were compared.

BHAVIOUR DISORDERS

The distribution of behaviour disorders in retarded children of high intelligence occupying different positions in the family appears in Table CXVIII.

TABLE CXVIII

INCIDENCE OF BEHAVIOUR DISORDERS IN CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY

Behaviour Disorders	No.	Number and Percentage of Children							
		Oldest		Middle		Youngest		Only	
		No.	%	No.	%	No.	%	No.	%
Theft	70	24	34.3	20	28.6	16	22.9	10	14.3
Truancy	51	19	37.3	15	29.4	14	27.5	3	5.9
Lying	58	18	31.0	16	27.6	14	24.1	10	17.2
Aggressiveness	67	31	46.3	21	31.3	11	16.4	4	6.0
Disobedience	57	28	49.1	12	21.1	10	17.5	7	12.3
Overdependence	51	17	35.3	10	19.6	18	35.3	6	11.8
Unsociableness	46	17	37.0	11	23.9	8	17.4	10	21.7

The highest incidence of behaviour disorders is that recorded for theft, but aggressiveness and lying are also frequent. Percentages are

based on the number of pupils guilty of a particular offence.

In oldest children the most frequently noted misdemeanour is disobedience; in middle children the characteristic disorder would appear to be aggressiveness while youngest and only children would appear to be overdependent and unsociable respectively.

Data in Table CXIX (p. 203) show that when percentages were compared of those guilty of theft a significant difference was found between oldest and only children; the former would appear to be more given to this type of offence. No significant differences appeared for this type of misbehaviour when oldest were compared with youngest and when the latter were compared with only children.

Oldest and youngest children truant more frequently than do only children, the differences being significant. No significant differences were found in respect of lying when oldest and only children were compared.

When a study was made of aggression middle children proved to be more aggressive than either only or youngest, the differences being significant. It is obvious that oldest children are more aggressive than either youngest or only and they are more disobedient than youngest.

In regard of overdependence no significant difference was found between oldest and middle children, but oldest children were found to be more overdependent than only. The former were seen to be more unsociable than youngest children, the difference being significant statistically. There is no difference between oldest and only children with respect to this factor.

TABLE CXIX

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO MANIFEST DISORDERS OF BEHAVIOUR

Behaviour Disorders	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Theft	Oldest	24	34.3	11.4%	7.58%	1.50
	vs. Youngest	16	22.9			
Theft	Oldest	24	34.3	20.1%	7.05%	2.85
	vs. Only	10	14.3			
Theft	Youngest	16	22.9	8.6%	6.54%	1.31
	vs. Only	10	14.3			
Truancy	Oldest	19	37.3	31.4%	7.40%	4.24
	vs. Only	3	5.9			
Truancy	Youngest	14	27.5	21.6%	7.07%	3.06
	vs. Only	3	5.9			
Lying	Oldest	18	31.0	13.8%	7.84%	1.76
	vs. Only	10	17.2			
Aggression	Middle	21	31.3	25.3%	6.36%	3.98
	vs. Only	4	6.0			
Aggression	Middle	21	31.3	14.9%	7.25%	2.06
	vs. Youngest	11	16.4			
Disobedience	Oldest	28	49.1	31.6%	8.32%	3.80
	vs. Youngest	10	17.5			
Over-dependence	Oldest	17	33.3	13.7%	8.63%	1.59
	vs. Middle	10	19.6			
Over-dependence	Oldest	17	33.3	21.5%	7.99%	2.69
	vs. Only	6	11.8			

TABLE CXIX (Contd.)

Behaviour Disorders	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Unsociableness	Oldest	17	37.0	19.6%	9.05%	2.17
	vs. Youngest	8	17.4			
Unsociableness	Oldest	17	37.0	15.3%	9.36%	1.63
	vs. Only	10	21.7			

PERSONALITY DIFFICULTIES

The incidence of personality difficulties occurring in retarded children of high intelligence occupying different positions in the family is presented in Table CXX (p.205).

A feeling of inferiority is characteristic of oldest and middle rather than of only children, the difference between youngest and only being significant statistically. Oldest children tend to be more inhibited than only and more solitary than middle children, but there is no proof that they are more solitary than only children. Youngest children would appear to be more solitary than middle children.

Middle children are more given to daydreaming than youngest or only. Although thirty-seven per cent. of unstable pupils are oldest children differences were not significant when comparisons were made of oldest and middle and of youngest and only children; nor were significant differences found in respect of nervous, neurotic, hysterical and obstinate pupils. Oldest children were apparently more anxious than only children and more liable to depression than only or youngest; they appear also to be more hyperactive but no significant difference was noted between youngest and only in this respect. Although more oldest than middle children are hypokinetic

TABLE CXX

DISTRIBUTION OF CHILDREN OCCUPYING DIFFERENT POSITIONS IN THE FAMILY,
ACCORDING TO PERSONALITY DIFFICULTIES

Personality Difficulties	No.	Number and Percentage of Children							
		Oldest		Middle		Youngest		Only	
		No.	%	No.	%	No.	%	No.	%
Feels inferior	21	7	33.3	7	33.3	6	28.6	1	4.8
Inhibited	61	20	32.8	18	29.5	16	26.2	7	11.5
Solitary	43	14	32.6	2	4.7	11	25.6	8	18.6
Daydreamer	69	28	40.6	21	48.8	12	17.4	8	11.6
Markedly unstable	51	19	37.3	11	21.6	14	27.5	7	13.7
Nervous	81	27	33.3	17	21.0	23	28.4	14	27.5
Neurotic	35	11	31.4	7	20.0	10	28.6	7	20.0
Hysterical	16	4	25.0	4	25.0	5	31.3	3	18.8
Obstinate	43	-	-	17	39.5	13	30.2	13	30.2
Anxious	101	35	34.7	25	24.8	26	25.7	15	14.9
Depressed	32	16	50.0	6	18.8	6	18.8	4	12.5
Submissive	17	4	23.5	7	41.2	5	29.4	1	5.9
Lacks initiative	45	13	28.9	10	22.2	15	33.3	7	15.6
Hyperactive	85	33	38.8	22	25.9	16	18.8	14	16.5
Hypokinetic	91	32	35.2	21	23.1	23	25.3	15	16.5

no significant differences exist between oldest and youngest or between the latter and only children. Data are presented in Table CXXI.

TABLE CXXI

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN
OCCUPYING DIFFERENT POSITIONS IN THE FAMILY WHO MANIFEST PERSONALITY
DIFFICULTIES

Personality Difficulties	Positions compared	No.		% Diff.	S.E. Diff.	C.R.
		No.	%			
Feels inferior	Youngest	6	28.6	23.8%	10.91%	2.18
	vs. Only	1	4.8			
Inhibited	Oldest	20	32.8	21.3%	7.27%	2.93
	vs. Only	7	11.5			
Solitary	Oldest	14	32.6	27.9%	7.80%	3.58
	vs. Middle	2	4.7			

TABLE CXXI (Contd.)

Personality Difficulties	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Solitary	Oldest	14	32.6	14.0%	9.29%	1.51
	vs. Only	8	18.6			
Solitary	Middle	2	4.7	20.9%	7.40%	2.82
	vs. Youngest	11	25.6			
Daydreaming	Middle	21	48.8	37.2%	7.15%	5.20
	vs. Only	8	11.6			
Daydreaming	Middle	21	48.8	31.4%	7.55%	4.16
	vs. Youngest	12	17.4			
Markedly unstable	Oldest	19	37.3	15.7%	8.89%	1.77
	vs. Middle	11	21.6			
Markedly unstable	Youngest	14	27.5	13.8%	7.89%	1.74
	vs. Only	7	13.7			
Nervous	Oldest	27	33.3	12.3%	8.27%	1.49
	vs. Middle	17	21.0			
Neurotic	Oldest	11	31.4	2.8%	10.95%	0.26
	vs. Youngest	10	28.6			
Hysterical	Youngest	5	31.3	12.50%	15.16%	0.82
	vs. Only	3	18.8			
Obstinate	Middle	17	39.5	9.3%	10.23%	0.91
	vs. Youngest	13	30.2			
Anxious	Oldest	35	34.7	19.8%	5.92%	3.34
	vs. Only	15	14.9			
Depressed	Oldest	16	50.0	37.5%	10.60%	3.53
	vs. Only	4	12.5			

TABLE CXXI (Contd)

Personality Difficulties	Positions compared	No.	%	% Diff.	S.E. Diff.	C.R.
Depressed	Oldest	16	50.0	31.2%	11.22%	2.78
	vs. Youngest	6	18.8			
Submissive	Oldest	4	23.5	17.7%	15.76%	1.12
	vs. Middle	7	41.2			
Submissive	Youngest	5	29.4	23.5%	12.44%	1.88
	vs. Only	1	5.9			
Submissive	Oldest	4	23.5	5.9%	15.10%	0.39
	vs. Youngest	5	29.4			
Lacks initiative	Youngest	15	33.3	17.7%	8.87%	1.99
	vs. Only	7	15.6			
Lacks initiative	Middle	10	22.2	11.1%	9.37%	1.18
	vs. Youngest	15	33.3			
Hyperactive	Oldest	33	38.8	22.3%	6.64%	3.36
	vs. Only	14	16.5			
Hyperactive	Oldest	33	38.8	20.0%	6.78%	2.95
	vs. Youngest	16	18.8			
Hyperactive	Youngest	33	18.8	2.3%	5.85%	0.39
	vs. Only	14	16.5			
Hypokinetic	Oldest	32	35.2	9.9%	6.77%	1.46
	vs. Youngest	23	25.3			
Hypokinetic	Youngest	32	25.3	8.8%	5.99%	1.47
	vs. Only	15	16.5			
Hypokinetic	Oldest	32	35.2	12.1%	4.42%	2.74
	vs. Middle	21	23.1			

ONLY BOY/ONLY GIRL SITUATION

The distribution of behaviour disorders in 'only' boys and 'only' girls is shown in Table CXXII. There were forty-nine boys and sixteen girls in the group. Percentages are based on these figures.

TABLE CXXII

INCIDENCE OF BEHAVIOUR DISORDERS IN CHILDREN IN THE ONLY BOY/ONLY GIRL SITUATION

Behaviour Disorders	Number of Children			
	Only Boy		Only Girl	
	No.	%	No.	%
Theft	12	24.5	5	31.3
Truancy	6	12.2	2	12.5
Lying	11	22.4	4	25.0
Aggression	12	24.5	1	6.3
Overdependence	12	24.5	2	12.5
Total number of Only Boys/Only Girls	49		16	

Are certain behaviour disorders more frequent among 'only' boys than among 'only' girls? When percentages were compared no significant differences were found for theft, truancy, lying and overdependence but the difference for aggression was significant. 'Only' boys would appear to be more aggressive than 'only' girls. Data are presented in Table CXXIII (p.209).

The incidence of personality difficulties in children in the 'only' boy/'only' girl situation is presented in Table CXXIV (p.209). Percentages are based on the number of pupils in each group.

Significant differences were found between the groups for marked instability but not for other difficulties of personality. More 'only' girls than 'only' boys would appear to be unstable. The frequencies are small. Data are tabulated in Table CXXV (p.210).

TABLE CXXIII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN IN THE ONLY BOY/ONLY GIRL SITUATION WHO MANIFEST BEHAVIOUR DISORDERS

Behaviour Disorders	Situations compared	No.	%	% Diff.	S.E. Diff.	C.R.
Theft	Only Boy	12	24.5	6.8%	13.12%	0.52
	vs. Only Girl	5	31.3			
Truancy	Only Boy	6	12.2	0.3%	9.50%	0.03
	vs. Only Girl	2	12.5			
Lying	Only Boy	11	22.4	2.6%	12.35%	0.21
	vs. Only Girl	4	25.0			
Aggression	Only Boy	12	24.5	18.2%	8.64%	2.11
	vs. Only Girl	1	6.3			
Over-dependence	Only Boy	12	24.5	12.0%	10.30%	1.17
	vs. Only Girl	2	12.5			

TABLE CXXIV

INCIDENCE OF PERSONALITY DIFFICULTIES IN CHILDREN IN THE ONLY BOY/ONLY GIRL SITUATION

Personality Difficulties	Number of Children			
	Only Boy		Only Girl	
	No.	%	No.	%
Feels inferior	3	6.1	2	12.5
Inhibited	10	20.4	2	12.5
Solitary	8	16.3	-	-
Daydreamer	10	20.4	2	12.5
Markedly unstable	5	10.2	7	43.8
Nervous	12	24.5	4	25.0
Neurotic	6	12.2	1	5.1
Obstinate	5	10.2	3	18.8
Anxious	14	28.6	5	31.3
Depressed	4	8.2	3	18.8
Submissive	3	6.1	-	-

Total number of Only Boys/Only Girls 49

16

TABLE CXXV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF ONLY BOYS/ONLY GIRLS WHO EXHIBIT PERSONALITY DIFFICULTIES

Personality Difficulties	Situations compared	No.	%	% Diff.	S.E. Diff.	C.R.
Feels inferior	Only Boy	3	6.1	6.4%	8.95%	0.72
	vs. Only Girl	2	12.5			
Inhibited	Only Boy	10	20.4	7.9%	10.07%	0.78
	vs. Only Girl	2	12.5			
Daydreamer	Only Boy	10	20.4	7.9%	10.07%	0.78
	vs. Only Girl	2	12.5			
Markedly unstable	Only Boy	5	10.2	33.6%	13.14%	2.56
	vs. Only Girl	7	43.8			
Neurotic	Only Boy	6	12.2	7.1%	7.22%	0.98
	vs. Only Girl	1	5.1			
Obstinate	Only Boy	5	10.2	8.6%	10.68%	0.81
	vs. Only Girl	3	18.8			
Anxious	Only Boy	14	28.6	2.7%	13.27%	0.20
	vs. Only Girl	5	31.3			
Depressed	Only Boy	4	8.2	10.6%	10.52%	1.01
	vs. Only Girl	3	18.8			

When a comparison was made of boys and girls in the group of four hundred children no significant difference was found between the sexes for aggression or for marked instability. Data are presented in Table CXXVI (p.211).

TABLE CXXVI

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF BOYS AND GIRLS WHO ARE (1) AGGRESSIVE AND (2) MARKEDLY UNSTABLE

Disorder	Sex	No.	%	% Diff.	S.E. Diff.	C.R.
Aggression	Boys	47	15.8	3.6%	4.43%	0.81
	vs. Girls	20	19.4			
Markedly unstable	Boys	32	10.7	7.7%	4.22%	1.82
	vs. Girls	19	18.4			

THE EFFECT OF PARENTAL CONTROL ON BEHAVIOUR DISTURBANCES AND ON PERSONALITY DIFFICULTIES

Since domestic circumstances influence a child's ability to learn the effect of parental control on behaviour and on personality in retarded children of high intelligence was investigated.

The distribution of behaviour disturbances in children of nagging and of over-protective parents and in those from homes in which discipline is inconsistent or in which one parent is deceased is presented in Table CXXVII (p.212). Percentages are based on the number of pupils guilty of particular misdemeanours.

Does theft tend to be associated with a specific type of home control? Are children reared in homes where discipline is inconsistent more inclined to thief than are those of nagging parents? Does the death of the father or of the mother act as a deterrent to learning by producing behaviour of a certain pattern?

When the effect on behaviour of nagging parents versus inconsistent discipline was considered no significant differences were found for theft, truancy, lying or unsociableness. No differences resulted for aggressior

TABLE CXXVII

INCIDENCE OF BEHAVIOUR DISTURBANCES IN CHILDREN REARED UNDER DIFFERENT TYPES OF PARENTAL CONTROL

Behaviour Disturbances	Number and Percentage of Children										
	Nagging Parents		Over-protective Parents		Inconsistent Discipline		Father deceased		Mother deceased		
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
Theft	70	12	17.1	-	-	14	20.0	10	14.3	9	12.9
Truancy	51	6	11.8	-	-	8	15.7	3	5.9	9	17.6
Lying	58	8	13.8	-	-	12	20.7	6	10.3	8	13.8
Aggression	67	14	20.9	15	22.4	-	-	8	11.9	5	7.5
Disobedience	57	12	21.1	-	-	-	-	10	17.5	5	8.6
Over-dependence	51	7	13.7	13	25.5	-	-	6	11.8	-	-
Unsociableness	46	5	10.9	-	-	3	6.5	4	8.7	5	10.9

and over-dependence when the influences of nagging and of over-protective parents were compared. There is no evidence that the death of the father rather than of the mother is likely to cause such offences as theft, truancy, aggression and disobedience in the children. Data are shown in Table CXXVIII (p.213).

The incidence of personality difficulties in retarded children of high intelligence reared under certain types of parental control is presented in Table CXXIX (p.214). Percentages are based on the number of pupils manifesting any particular personality disorder.

What is the effect on the personality of the child of the type of parental control under which he is reared? Is one form of control more detrimental to personality, and thereby to learning, than another? Does a particular type of control produce a specific type of personality in the child?

TABLE CXXVIII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN REARED UNDER DIFFERENT TYPES OF PARENTAL CONTROL WHO MANIFEST BEHAVIOUR DISTURBANCES

Behaviour Disturbances	Type of Parental Control	No.	%	% Diff.	S.E. Diff.	C.R.
Theft	Nagging parent vs.	12	17.1	2.9%	6.57%	0.44
	Inconsistent discipline	14	20.0			
Truancy	Nagging parent vs.	6	11.8	3.9%	6.81%	0.57
	Inconsistent discipline	8	15.7			
Lying	Nagging parent vs.	8	13.8	6.9%	6.99%	0.99
	Inconsistent discipline	12	20.7			
Unsociable-ness	Nagging parent vs.	5	10.9	4.4%	5.86%	0.75
	Inconsistent discipline	3	6.5			
Aggression	Nagging parent vs.	14	20.9	1.5%	7.11%	0.21
	Over-protective parent	15	22.4			
Over-dependence	Nagging parent vs.	7	13.7	11.8%	7.77%	1.53
	Over-protective parent	13	25.5			
Theft	Father deceased vs.	10	14.3	1.4%	5.79%	0.24
	Mother deceased	9	12.9			
Truancy	Father deceased vs.	3	5.9	11.7%	6.28%	1.86
	Mother deceased	9	17.6			
Aggression	Father deceased vs.	8	11.9	4.4%	5.10%	0.86
	Mother deceased	5	7.5			
Disobedience	Father deceased vs.	10	17.5	8.9%	6.25%	1.42
	Mother deceased	5	8.6			

TABLE CXXIX

INCIDENCE OF PERSONALITY DIFFICULTIES IN CHILDREN REARED UNDER DIFFERENT TYPES OF PARENTAL CONTROL

Personality Difficulties	Number and Percentage of Children										
	Nagging Parents			Over-protective Parents		Inconsistent Discipline		Father deceased		Mother deceased	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
Feels inferior	21	6	28.6	1	4.8	-	-	6	28.6	1	4.8
Inhibited	61	8	13.1	-	-	-	-	13	21.3	2	3.2
Solitary	43	4	9.3	-	-	-	-	5	11.6	3	7.0
Daydreamer	69	9	13.0	-	-	-	-	5	7.2	5	7.2
Markedly unstable	51	7	13.7	-	-	-	-	10	19.6	7	13.7
Nervous	81	9	11.1	-	-	9	11.1	10	12.3	4	4.9
Neurotic	35	2	5.7	-	-	3	8.6	-	-	-	-
Hysterical	16	1	6.3	-	-	-	-	-	-	-	-
Obstinate	43	6	13.9	-	-	5	11.6	9	20.9	4	9.3
Anxious	101	15	14.9	18	17.8	-	-	15	14.9	4	4.0
Depressed	32	2	6.3	-	-	-	-	-	-	-	-
Submissive	17	2	11.8	1	5.9	-	-	2	11.8	-	-
Hyperactive	85	-	-	-	-	-	-	-	-	13	14.1
Hypokinetic	91	2	2.2	11	12.1	-	-	-	-	-	-

Data in Table CXXX (p.215) would appear to indicate that children of nagging parents are more apt to feel inferior than do those who are over-protected. The latter tend to be hypokinetic. No difference was found for submissiveness when the offspring of nagging parents were compared with those of over-protective parents.

When the influence of nagging was contrasted with the effect of inconsistent discipline no significant differences were recorded for nervousness, neurosis or obstinacy in the children.

The loss by death of the father, rather than of the mother, would appear to result in inhibition and in a sense of inferiority in the children, the differences in each case being significant.

TABLE CXXX

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN REARED UNDER DIFFERENT TYPES OF PARENTAL CONTROL WHO PRESENT PERSONALITY DIFFICULTIES

Personality Difficulties	Type of Parental Control	No.	%	% Diff.	S.E. Diff.	C.R.																																																																																						
Feels inferior	Nagging parent vs. Over-protective parent	6	28.6	23.8%	10.91%	2.18																																																																																						
		1	4.8				Submissive	Nagging parent vs. Over-protective parent	2	11.8	5.9%	9.69%	0.61		1	5.9	Hypokinetic	Nagging parent vs. Over-protective parent	2	2.2	9.9%	3.75%	2.64		11	12.1	Neurotic	Nagging parent vs. Inconsistent discipline	2	5.7	2.9%	6.15%	0.47		3	8.6	Obstinate	Nagging parent vs. Inconsistent discipline	6	13.9	2.3%	7.19%	0.32		5	11.6	Feels inferior	Father deceased vs. Mother deceased	6	28.6	23.8%	10.91%	2.18		1	4.8	Inhibited	Father deceased vs. Mother deceased	13	21.3	18.1%	5.71%	3.17		2	3.2	Solitary	Father deceased vs. Mother deceased	5	11.6	4.6%	6.24%	0.74		3	7.0	Markedly unstable	Father deceased vs. Mother deceased	10	19.6	5.9%	7.35%	0.80		7	13.7	Nervous	Father deceased vs. Mother deceased	10	12.3	7.4%	4.37%
Submissive	Nagging parent vs. Over-protective parent	2	11.8	5.9%	9.69%	0.61																																																																																						
		1	5.9				Hypokinetic	Nagging parent vs. Over-protective parent	2	2.2	9.9%	3.75%	2.64		11	12.1	Neurotic	Nagging parent vs. Inconsistent discipline	2	5.7	2.9%	6.15%	0.47		3	8.6	Obstinate	Nagging parent vs. Inconsistent discipline	6	13.9	2.3%	7.19%	0.32		5	11.6	Feels inferior	Father deceased vs. Mother deceased	6	28.6	23.8%	10.91%	2.18		1	4.8	Inhibited	Father deceased vs. Mother deceased	13	21.3	18.1%	5.71%	3.17		2	3.2	Solitary	Father deceased vs. Mother deceased	5	11.6	4.6%	6.24%	0.74		3	7.0	Markedly unstable	Father deceased vs. Mother deceased	10	19.6	5.9%	7.35%	0.80		7	13.7	Nervous	Father deceased vs. Mother deceased	10	12.3	7.4%	4.37%	1.69		4	4.9						
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		4	4.9																																																																																									

TABLE CXXX (Contd.)

Personality Difficulties	Type of Parental Control	No.	%	% Diff.	S.E. Diff.	C.R.
Obstinate	Father deceased	9	20.9	11.6%	7.62%	1.52
	vs. Mother deceased	4	9.3			

PERSONALITY DIFFICULTIES, HABIT DISORDERS AND BEHAVIOUR DISTURBANCES

A study was made of the relationship between personality difficulties and habit disorders and between personality difficulties and behaviour disturbances in retarded children of high intelligence.

Are certain habit disorders allied to one type of personality difficulty rather than to another? For example, does nail-biting occur more frequently in hysterical children than in those who are neurotic; is enuresis characteristic of hyperactive or of hypokinetic children; is neurotic sickness more frequent in neurotic or in hysterical pupils?

Data concerning the incidence of habit disorders in children manifesting certain difficulties of personality are presented in Table CXXXI (p.217). Percentages are based on the number of pupils manifesting particular difficulties of personality.

When the frequencies of nail-biting, habit spasms, enuresis, sleep-walking, and neurotic sickness, as these occurred in children of different types of personality, were compared no significant differences resulted. Data are tabulated in Table CXXXII (p.218).

The distribution of behaviour disturbances as these occur in children manifesting different types of personality difficulties is presented in Table CXXXIII (p.219). Percentages are based on the number of pupils manifesting particular personality difficulties.

TABLE CXXXI

INCIDENCE OF HABIT DISORDERS IN CHILDREN MANIFESTING DIFFERENT TYPES OF PERSONALITY DIFFICULTIES

Personality Difficulties	Number and Percentage of Children										
	No.	Nail-biting		Habit Spasms		Enuresis		Sleep-walking		Neurotic Sickness	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
Feels											
inferior	21	4	19.0	2	9.5	1	4.8	-	-	-	-
Inhibited	61	13	21.3	20	32.8	15	24.3	2	3.3	2	3.3
Solitary	43	8	18.6	10	23.3	5	11.6	3	7.0	-	-
Daydreamer	69	18	26.1	20	29.0	22	31.9	8	11.6	3	4.3
Markedly											
unstable	51	14	27.5	12	23.5	15	29.4	8	15.7	3	6.0
Nervous	81	12	14.8	21	26.0	16	19.8	3	3.7	6	7.4
Neurotic	35	9	25.7	11	31.4	10	28.6	4	11.4	7	20.0
Hysterical	16	5	31.3	5	31.3	2	12.5	3	18.8	2	12.5
Obstinate	43	5	11.6	5	11.6	8	18.6	3	7.0	1	2.3
Anxious	101	21	20.8	35	34.7	23	22.8	7	6.9	7	6.9
Depressed	32	6	18.8	8	25.0	6	18.8	3	9.4	2	6.5
Submissive	17	2	11.8	4	23.5	-	-	1	5.9	-	-
Lacks											
initiative	45	8	17.8	8	17.8	7	15.6	4	8.9	-	-
Hyperactive	85	19	22.4	33	38.8	23	27.1	7	8.2	4	4.7
Hypokinetic	91	16	17.6	23	25.3	20	22.0	7	7.7	3	3.3

When the frequencies of such behaviour disturbances as theft, truancy, lying, aggressiveness, disobedience and over-dependence occurring in intelligent but retarded children were compared it was found that pupils who feel inferior are more prone to theft than are nervous children and that obstinate pupils are more inclined to lying than are those who are submissive. For other behaviour disturbances no significant differences were observed. With the exception of those mentioned above there is no evidence that children of one personality type are more susceptible than those of another to a particular type of behaviour difficulty. Data are presented in Table CXXXIV (p.220).

TABLE CXXXII

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN MANIFESTING CERTAIN PERSONALITY DIFFICULTIES WHO SUFFER FROM HABIT DISORDERS

Habit Disorders	Personality Types compared	No.	%	% Diff.	S.E. Diff.	C.R.																																																																																														
Nail-biting	Hysterical vs. Daydreamer	5	31.3	5.2%	12.74%	0.41																																																																																														
		18	26.1				Nail-biting	Hysterical vs. Neurotic	5	31.3	5.6%	13.75%	0.41	9	25.7	Nail-biting	Neurotic vs. Anxious	9	25.7	4.9%	8.42%	0.58	21	20.8	Habit Spasms	Anxious vs. Neurotic	35	34.7	3.3%	9.16%	0.36	11	31.4	Habit Spasms	Hyperactive vs. Hypokinetic	33	36.8	13.5%	6.97%	1.94	23	25.3	Enuresis	Daydreamer vs. Nervous	22	31.9	12.1%	7.15%	1.69	16	19.8	Enuresis	Markedly unstable vs. Anxious	15	29.4	6.6%	7.62%	0.87	23	22.8	Enuresis	Hyperactive vs. Hypokinetic	23	27.1	5.1%	6.48%	0.79	20	22.0	Sleep-walking	Hysterical vs. Neurotic	3	18.8	7.4%	11.15%	0.66	4	11.4	Sleep-walking	Neurotic vs. Nervous	4	11.4	7.7%	5.77%	1.33	3	3.7	Neurotic Sickness	Neurotic vs. Hysterical	7	20.0	7.5%	10.68%	0.70	2	12.5	Neurotic Sickness	Hyperactive vs. Hypokinetic	4	4.7
Nail-biting	Hysterical vs. Neurotic	5	31.3	5.6%	13.75%	0.41																																																																																														
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TABLE CXXXIII

INCIDENCE OF BEHAVIOUR DISTURBANCES IN CHILDREN MANIFESTING DIFFERENT TYPES OF PERSONALITY DIFFICULTIES

Personality Difficulties	Number and Percentage of Children							
	No.	Theft No. %	Truancy No. %	Lying No. %	Aggressive- ness No. %	Dis- obedience No. %	Over- dependence No. %	
Feels								
inferior	21	7 33.3	4 19.0	3 14.3	4 19.0	3 14.3	3 14.3	
Inhibited	61	10 16.4	11 18.0	14 23.0	22 36.1	8 13.1	14 23.0	
Solitary	43	10 23.3	5 11.6	10 23.3	10 23.3	5 11.6	9 20.9	
Daydreamer	69	9 13.0	8 11.6	12 17.4	28 40.6	17 24.6	14 20.3	
Markedly								
unstable	51	13 25.5	13 25.5	14 27.5	7 13.7	12 23.5	4 7.8	
Nervous	81	9 11.1	12 14.8	10 12.3	19 37.3	15 18.1	17 21.0	
Neurotic	35	5 14.3	6 17.1	4 11.4	12 34.3	7 20.0	9 25.7	
Hysterical	16	4 25.0	4 25.0	3 18.8	4 25.0	4 25.0	4 25.0	
Obstinate	43	13 30.2	10 23.3	15 34.9	16 37.2	17 39.5	9 20.9	
Anxious	101	15 14.9	14 13.9	11 10.9	24 23.8	15 14.9	16 15.8	
Depressed	32	8 25.0	5 15.6	8 25.0	10 31.3	3 9.4	7 21.9	
Submissive	17	2 11.8	2 11.8	2 11.8	3 17.6	2 11.8	7 41.2	
Lacks								
initiative	45	9 20.0	7 15.6	13 28.9	9 20.0	7 15.6	15 33.3	
Hyperactive	85	19 22.4	9 10.6	22 25.9	30 35.3	24 28.2	21 24.7	
Hypokinetic	91	21 23.1	16 17.6	25 27.5	21 23.1	24 26.4	18 19.8	

In the comparisons instituted in Table CXXXIV (p.220) no attempt was made to consider boys and girls separately since, as indicated in Table CXXXV (p.221), when percentages of boys and girls of high intelligence who were retarded in the basic subjects were studied no significant differences were found between the sexes in respect of any of the subjects concerned.

TABLE CXXXIV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF CHILDREN MANIFESTING CERTAIN PERSONALITY DISTURBANCES WHO SUFFER FROM BEHAVIOUR DIFFICULTIES

Behaviour Disturbances	Personality Types compared	No.	%	% Diff.	S.E. Diff.	C.R.																																																																																																										
Theft	Obstinate	13	30.2	18.4%	10.50%	1.75																																																																																																										
	vs. Submissive	2	11.8				Theft	Feels inferior	7	33.3	22.2%	10.86%	2.04	vs. Nervous	9	11.1	Truancy	Feels inferior	4	19.0	5.1%	9.23%	0.55	vs. Anxious	14	13.9	Truancy	Obstinate	10	23.3	11.5%	10.14%	1.13	vs. Submissive	2	11.8	Truancy	Hyperactive	9	10.6	7.0%	5.21%	1.34	vs. Hypokinetic	16	17.6	Lying	Obstinate	15	34.9	23.1%	10.68%	2.16	vs. Submissive	2	11.8	Lying	Anxious	11	10.9	3.4%	8.25%	0.41	vs. Feels inferior	3	14.3	Aggression	Hyperactive	30	35.3	12.2%	6.81%	1.79	vs. Hypokinetic	21	23.1	Aggression	Depressed	10	31.3	12.3%	11.85%	1.04	vs. Feels inferior	4	19.0	Disobedience	Obstinate	17	39.5	11.3%	8.91%	1.27	vs. Hyperactive	24	28.2	Over-dependence	Submissive	7	41.2	7.9%	13.85%	0.57	vs. Lacks initiative	15	33.3	Over-dependence	Hyperactive	21	24.7	4.9%	6.27%
Theft	Feels inferior	7	33.3	22.2%	10.86%	2.04																																																																																																										
	vs. Nervous	9	11.1				Truancy	Feels inferior	4	19.0	5.1%	9.23%	0.55	vs. Anxious	14	13.9	Truancy	Obstinate	10	23.3	11.5%	10.14%	1.13	vs. Submissive	2	11.8	Truancy	Hyperactive	9	10.6	7.0%	5.21%	1.34	vs. Hypokinetic	16	17.6	Lying	Obstinate	15	34.9	23.1%	10.68%	2.16	vs. Submissive	2	11.8	Lying	Anxious	11	10.9	3.4%	8.25%	0.41	vs. Feels inferior	3	14.3	Aggression	Hyperactive	30	35.3	12.2%	6.81%	1.79	vs. Hypokinetic	21	23.1	Aggression	Depressed	10	31.3	12.3%	11.85%	1.04	vs. Feels inferior	4	19.0	Disobedience	Obstinate	17	39.5	11.3%	8.91%	1.27	vs. Hyperactive	24	28.2	Over-dependence	Submissive	7	41.2	7.9%	13.85%	0.57	vs. Lacks initiative	15	33.3	Over-dependence	Hyperactive	21	24.7	4.9%	6.27%	0.78	vs. Hypokinetic	18	19.8						
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	vs. Hypokinetic	18	19.8																																																																																																													

TABLE CXXXV

PERCENTAGE DIFFERENCES, S.E. DIFFERENCES AND CRITICAL RATIOS OF BOYS AND GIRLS OF HIGH INTELLIGENCE WHO ARE RETARDED IN THE BASIC SUBJECTS

Subject	Sexes compared	No.	%	% Diff.	S.E. Diff.	C.R.
Reading	Boys	30	20.0	4.0%	6.87%	0.58
	vs. Girls	12	24.0			
Spelling	Boys	72	48.0	4.0%	8.12%	0.49
	vs. Girls	22	44.0			
Addition	Boys	76	50.7	14.7%	7.92%	1.86
	vs. Girls	18	36.0			
Subtraction	Boys	76	50.7	8.7%	8.09%	1.08
	vs. Girls	21	42.0			
Multi- plication	Boys	97	64.7	1.3%	7.75%	0.17
	vs. Girls	33	66.0			
Division	Boys	91	60.7	1.3%	7.94%	0.16
	vs. Girls	31	62.0			

CHAPTER VI

S U M M A R Y A N D C O N C L U S I O N S

To investigate the causes of scholastic retardation in children of high intelligence a study was undertaken of two hundred intelligent but retarded pupils ranging in age from nine to thirteen years, together with a control group of one hundred maladjusted children who were making favourable educational progress and a second control group of one hundred normally adjusted pupils who were reported to be satisfactory in school work, the pupils in the normal control group being matched with those in the Experimental Group according to sex, age and socio-economic status.

Physical, mental, educational, emotional and social factors were studied, comparison of data in the different groups being based on the chi-squared technique and on the standard error of a percentage and of a difference between percentages. Comparisons were concerned mainly with data derived from the two clinic groups - the Experimental Group and the Clinic Control Group.

As it was thought that the method of comparing groups might tend to obscure the effects on ability to learn successfully of certain factors data were further analysed to determine (i) the effect on retardation in the various school subjects of physical condition, socio-economic status, ordinal position in the family, the social and domestic background habit disorders, behaviour disturbances and personality difficulties, (ii) the relationship between socio-economic status and these factors, and (iii) the relationship between parental control, habit disorders, behaviour disturbances and difficulties of personality.

SUMMARY OF FINDINGS

In the two clinic groups - the Experimental Group and the Clinic Group - the highest percentages of children were in the thirteen-year-old group. The groups differed significantly in IQ, the mean IQs for the Experimental Group and for the Clinic Control Group being 115.7 and 124.4 respectively.

Forty-three and a half per cent. of pupils in the Experimental Group and fifty-six per cent. in the Clinic Control Group were normally placed for age. Eight per cent. of children in the former group and only one per cent. in the General Control Group were older than the class average. Misgrading was greater for mental age than for chronological age. The incidence of change of school was similar in the three groups.

Physical Condition

Birth injury does not appear to have been a cause of retardation in the group studied. When the groups of successful and of unsuccessful learners were compared no significant differences were found for size, malnutrition, the presence of early disease, muscular control, conditions of ear, throat and nose, left-handedness, auditory and visual defects, conditions of heart and lungs, palpably enlarged cervical glands and the experience of four or more zymotic illnesses. Chorea was noted in pupils in the Experimental Group only. The incidence of asthma was higher in the successful group, but the statistical criterion was not applied owing to the smallness of the frequencies. The number of children who had suffered from pneumonia was significantly greater in the failing group.

The Social and Domestic Background

Children in the two clinic groups did not attend juvenile organisations to the same extent as do normal children.

The groups of retarded and of successful pupils differed significantly with regard to the presence in the home of both parents or of one only. The percentage of retardation was higher in cases in which the mother only was in the home.

The clinic groups did not differ significantly with regard to overcrowded conditions, but children in the normal control group appeared to be more fortunate in this respect. More school failures resided in careless, neglected homes.

The percentages of children from homes where the emotional atmosphere was unfavourable were almost identical for the two clinic groups. In homes where parents were harsh and in those in which they were over-protective retardation was significantly greater. The incidence of neurotic mothers was higher in the Experimental Group, but the difference was not significant. Only one child in the normal group came from an unhappy home, but the percentages of children from seriously disturbed homes were identical in the clinic groups.

The percentage of first children, including only, were closely similar in the three groups, the number of first-born in each group being higher than that of children in other positions in the family. Comparison with percentages derived from a complete eleven-year-old age-group revealed no significant differences with the exception of fifth or higher children, the percentage of these being significantly lower than in the complete age-group. Twenty-five per cent. of the

normally adjusted pupils were only children. In some cases there were large intervals between the child and his/her immediately preceding sibling, discrepancies ranging from five to thirteen years, but the clinic groups did not differ significantly in this respect.

Maladjustment to the father was greater than that to the mother, but the greatest amount of maladjustment was to siblings. Data relating to poor adjustment to the father were not significant.

Habit Disorders, Behaviour Disturbances and Personality Difficulties

The clinic groups did not differ significantly in habit disorders.

Overlapping was noted for behaviour disturbances as several pupils were guilty of various misdemeanours. In the failing group the incidence was higher of infantile behaviour, aggressiveness, theft, lying, exhibitionism and disobedience, while in the Clinic Control Group theft, over-dependence, jealousy, disobedience and infantile behaviour were frequent. Such positive disturbances as lying, aggressiveness, theft and exhibitionism were commoner in boys. The retarded and the successful groups differed significantly in exhibitionism infantile behaviour, lying and aggressiveness, the frequency of these being higher in the failing group.

Children in the two clinic groups were more reserved, hypersensitive, nervous, obstinate, insecure and more prone to daydreaming than those in the normal control group. The differences between the clinic groups were significant statistically, retarded pupils tending to be more depressed, inhibited, hypokinetic and lacking in initiative than those who were successful in school.

Habits of Work

The unsuccessful pupils were less persevering, more lacking in concentration and more erratic than those who were satisfactory. They tended to avoid work and to have a poor attitude to learning.

Cause of Maladjustment

In the Experimental Group and in the Clinic Control Group the cause of maladjustment was traced in the majority of cases to the home. The difference between the groups was not significant. In only one per cent. of cases in the Experimental Group and in only one case in the Clinic Control Group was the cause attributed to the school.

Sex Differences in Retardation

No significant differences were found between the sexes in retardation in any of the basic subjects.

Test 'Scatter'

No difference was found between the groups in regard to number of years' 'scatter' on the intelligence test.

Specific Factors and Retardation in Particular Subjects

Physical Condition: Analysis revealed that the incidence of poor nutrition or of frequent illness was not significantly greater in retarded readers, and poor nutrition was not more frequent in pupils who were backward in reading and in subtraction. The percentage of children with poor visual acuity was higher in those retarded in addition and in division than in those who were backward in reading. Left-handedness and speech disorders do not appear to affect one subject rather than another.

Socio-economic Level: The percentage of retardation was higher in pupils in Socio-economic Level II than in those in Socio-economic Level III.

Social and Domestic Background: Significant differences concerning membership of juvenile organisations were found in pupils backward in reading and in arithmetic, the percentage of non-members being higher among those who fail in these subjects.

There was no evidence that one subject is more affected than another by overcrowding, neglected homes, insufficient rest, lack of mental stimulation and unfavourable home atmosphere. But, when the effects of overcrowding versus lack of stimulation on progress in reading and spelling were investigated the incidence of failure was higher in children from homes where mental stimulation was lacking. No significant differences were observed when the effects on success in reading and spelling of unfavourable emotional atmosphere versus lack of mental stimulation were studied. An indulgent parent would appear to be more of a hindrance to progress in reading than a nagging one. When a similar comparison was made for backwardness in every subject no significant difference resulted. More children of neurotic mothers than of neurotic fathers fail in reading. No significant differences were noted when a comparison was made for backwardness in every subject of those who lived in quarrelsome homes and in broken homes.

A study of ordinal position and retardation in specific subjects yielded no significant differences for children in different positions in the family.

Habit Disorders, Behaviour Disturbances and Personality Difficulties: Percentages of children retarded in the various subjects who were enuretic were closely similar. Enuresis was more frequent than neurotic sickness among poor readers.

The highest percentage of reading failure was recorded for those who were described as aggressive. There is no proof that a tendency to thieve is associated with failure in arithmetic.

More hypokinetic than hyperactive children were found among reading failures.

Socio-economic Level and Specific Factors

Physical Factors: There is no evidence that pupils in the lowest socio-economic levels are more likely to be subject to frequent illness or that the frequency of pneumonia is greater in underprivileged children although the percentage of cases would appear to increase with percentage of necessity. The percentage of pupils who had suffered from four or more zymotic illnesses was highest in Socio-economic Level I, but although the percentages decrease as the percentage of necessity increases, the differences between the levels were not significant statistically.

Social and Domestic Background: Membership of juvenile organisations was highest in privileged children and tended to decrease with the increase in percentage of necessity.

The percentage of children from overcrowded homes increased with the percentage of necessity. More children in the lower socio-economic grades lived in careless, neglected homes and under conditions in which mental stimulation was lacking.

The highest percentage of nagging parents was found in the highest socio-economic level, the difference between the highest and the lowest levels being significant statistically. Significant differences were noted also for over-disciplined children and for those from homes where control was inadequate; five per cent. of pupils in the highest socio-economic level were over-disciplined and twenty-five per cent. of those in the lowest levels enjoyed too much freedom.

Children of neurotic fathers were all in the highest socio-economic level. The percentage of neurotic mothers would appear to increase with percentage of necessity but the differences between the levels were not significant.

No reliable differences were found between the socio-economic levels for children from quarrelsome homes and for those who were maladjusted to their homes.

Habit Disorders, Behaviour Disturbances and Personality Difficulties:

No significant differences were observed in the incidence of habit disorders in pupils in the different socio-economic grades.

No significant differences were found in pupils in the different levels for theft, truancy, lying, disobedience, over-dependence and unsociableness.

There is no evidence that any specific personality difficulty is more frequent in one socio-economic grade than in another, with the exception of daydreaming which is commoner in underprivileged children.

Ordinal Position in the Family and Specific Factors

In the total group of four hundred children thirty-three per cent.

were oldest, twenty-three per cent. were middle, twenty-six per cent. were youngest and eighteen per cent. were only children.

Physical Condition: Children in one position in the family are no more likely to be left-handed than those in another.

The incidence of stammering is highest in oldest and lowest in only children, while more youngest than only children have articulatory defects. The differences in each case were statistically significant.

Social and Domestic Background: Significant differences were noted between oldest and middle and between oldest and only children when membership of juvenile organisations was investigated. A higher percentage of oldest than of middle, youngest or only children attend juvenile organisations.

Habit Disorders, Behaviour Disturbances and Personality Difficulties: Nail-biting, habit spasms, enuresis and fatiguability are reported more frequently in oldest children. Neurotic sickness and enuresis occur more often in youngest than in only children.

When behaviour disturbances were considered the highest incidence was that of theft, although aggression and lying were frequent. The most common behaviour disorders in oldest, middle, youngest and only children are disobedience, aggressiveness, over-dependence and unsociableness respectively. Oldest children are more inclined to thieve than only children, and youngest appear to truant more than do only, the differences in each case being significant. Oldest are more over-dependent than only and more unsociable than youngest children, the

differences being significant statistically.

A feeling of inferiority is characteristic of oldest and of middle children rather than of only; the former are more inhibited than only children. Oldest and youngest are more solitary than middle children, although the last are more inclined to daydreaming than are only or youngest. Oldest are more anxious than only, more hyperactive and depressed than only or youngest, and more hypokinetic than middle children.

No significant differences were found between 'only' boys and 'only' girls for theft, truancy, lying and over-dependence. 'Only' boys were more aggressive than 'only' girls, although in the total group of four hundred pupils no significant differences were found between boys and girls for aggressiveness. 'Only' girls would appear to be more unstable than 'only' boys, although in the total group no significant differences were found between boys and girls in instability.

The Effect of Parental Control on Behaviour Disturbances and Personality Difficulties

No significant differences were found for theft, truancy, lying and unsociableness when the effects on behaviour of nagging parents versus inconsistent discipline were compared. When the effects of nagging versus over-protective parents were considered no significant differences were noted for aggressiveness and over-dependence. No differences were found in the children for theft, truancy, aggressiveness and disobedience when the effects of the death of the father versus the death of the mother were studied.

Children of nagging parents are more apt to feel inferior than do the over-protected, who tend to be hypokinetic. No difference was found for submissiveness when the offspring of nagging parents were

compared with those of over-protective parents.

When the influence of nagging was contrasted with that of inconsistent discipline no statistically significant differences were found for nervousness, neurosis or obstinacy in the children.

The loss by death of the father rather than of the mother would appear to result in inhibition and in a sense of inferiority in the children, the differences in each case being significant.

Personality Difficulties, Habit Disorders and Behaviour Disturbances

No significant differences were observed for such habits as nail-biting, habit spasms, enuresis, sleepwalking and neurotic sickness when the frequencies of these in children of different personality types were compared.

Inferior children are more prone to thieving than nervous children and the obstinate are more inclined to lie than the submissive. There is no evidence that children of one type of personality are more given than those of another to particular behaviour disturbances.

CONCLUSIONS

Despite the fact that comparison of results yielded many statistically significant differences any conclusions drawn from such data must be regarded as merely tentative. Each pupil was studied as an individual, but statistical procedures were applied to data derived from groups and in many cases frequencies were small. Tests of capacity and of achievement are not highly refined measures and the assessment of personality is to a great extent subjective.

With these limitations in mind the following conclusions are advanced:

1. Many retarded children of high intelligence are drawn from the socio-economic grades in which the percentage of necessity is least.
2. Although the mean IQ was highest in children in the privileged classes there was much overlapping within the grades.
3. Change of school did not appear to be a cause of retardation in the group studied.
4. In retarded children of high intelligence misgrading for mental age is much greater than for chronological age.
5. The following do not appear to be the cause of retardation in intelligent children although they may be concomitant with backwardness: undersize for age; the presence of early disease; diseased conditions of ear, throat and nose; visual and auditory defects; four or more febrile illnesses; left-handedness; speech disorders; overcrowded conditions; over-indulgent, over-possessive or heedless parents; critical parents or inconsistent discipline; the presence in the home of a neurotic parent; quarrelsome homes; ordinal position in the family and poor adjustment to the home.
6. The following may act as deterrents to learning: pneumonia; absence of the father from the home; life in dirty, neglected homes; harsh or over-protective parents; infantile behaviour; exhibitionism; lying and aggressiveness. The last three may be concomitants.
7. Backward children of high intelligence tend to be more depressed, inhibited, lacking in initiative and hypokinetic than are those who learn adequately. They are less persevering and more distractible and erratic than those who are successful; they have a poor attitude to school and they tend to avoid work.
8. In the majority of cases of retarded children of high intelligence who have been referred to child guidance clinics the cause of maladjustment would appear to be in the home.
9. No significant differences appear to exist between the sexes for any of the subjects studied.

10. There is no evidence that capacity to learn one subject rather than another is affected by socio-economic status, poor nutrition, left-handedness, overcrowding, neglected homes, insufficient rest, lack of mental stimulation and unfavourable emotional atmosphere.
11. The incidence of failure is higher in spelling than in reading in children of high intelligence who fail to learn.
12. The lack of mental stimulation, the presence of a neurotic mother and a tendency to be hypokinetic would appear to be detrimental to success in reading. More hypokinetic than hyperactive children are found among reading failures. An indulgent parent is more detrimental to progress in reading than a nagging one. Enuresis is commoner than neurotic sickness among poor readers.
13. Children of high intelligence from broken homes are not more liable to be generally retarded than are those from quarrelsome homes.
14. There is no evidence that ordinal position in the family is associated with failure in one subject rather than in another.
15. A tendency to thief does not appear to be associated with failure in arithmetic rather than in any other subject.
16. The incidence of frequent illness, of pneumonia or of speech defect does not appear to be higher in underprivileged children than in those more fortunate in their circumstances.
17. The percentage of membership of juvenile organisations is highest in privileged children; membership decreases as the percentage of necessity increases.
18. Children of high intelligence who fail in school do not appear to join juvenile organisations to the same extent as do those who succeed.
19. More children in the lower socio-economic levels live in overcrowded, careless, neglected homes, under conditions in which mental stimulus is lacking and in which the emotional atmosphere is unfavourable.
20. More nagging parents live in homes in the highest socio-economic level. More over-disciplined children are found in the privileged grades, while more in the lowest socio-

economic levels enjoy too much freedom.

21. Children in the different social grades do not appear to differ in habit disorders, behaviour disturbances such as theft, truancy, lying, disobedience, over-dependence and unsociableness. Underprivileged children are more inclined to daydream.
22. Children in one position in the family do not appear to be more susceptible to frequent illness than are those in any other position.
23. The incidence of stammering would appear to be highest in oldest and lowest in only children. More youngest than only have articulatory defects.
24. More oldest than middle children or only children attend juvenile organisations.
25. The incidence of nail-biting, habit spasms, enuresis and fatiguability appears to be highest in oldest children. More youngest than only children are subject to neurotic sickness and to enuresis.
26. The behaviour disturbances characteristic of oldest, middle, youngest and only children are disobedience, aggressiveness, over-dependence and unsociableness respectively. Oldest are more prone to thieve than only children, but the latter are less given to truancy than are oldest or youngest children. Oldest are more aggressive than youngest or only; they are more over-dependent than only and more unsociable than youngest children.
27. More youngest than only children feel inferior. Oldest are more inhibited, anxious and depressed than only, and they are more solitary than middle children. Youngest also are more solitary than middle children. Oldest children are more hyperactive than youngest or only, but more oldest than middle children are hypokinetic.
28. The death of the father is no more likely than the death of the mother to lead to theft, truancy, aggressiveness and disobedience in the children.
29. Children of nagging parents rather than those of over-protective parents tend to feel inferior. The latter tend to be hypokinetic. Loss by death of the father appears to result in inhibition and in a sense of inferiority in the children.

30. Certain habit disorders like nail-biting, habit spasms, enuresis, sleepwalking, and neurotic sickness do not appear to be associated with any particular personality difficulty.
31. Pupils who feel inferior are more prone to thieving than are nervous children, while obstinate pupils are more inclined to lying than are those who are submissive. With these exceptions children of one type of personality do not appear to be more susceptible than those of another to particular behaviour disturbances.
32. It is necessary to impress upon parents and teachers the importance of the home in learning, to make them realise that an unfavourable emotional atmosphere and unsatisfactory conditions may be detrimental to educational progress even in children of high intelligence.
33. Adjustment classes should be provided for intelligent pupils who are not working to capacity, as continued failure may give rise to loss of interest and to a feeling of inferiority which will inhibit further learning.

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