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AN INVESTIGATION INTO THE RELATION BETWEEN INTELLIGENCE AND INHERITANCE

BY
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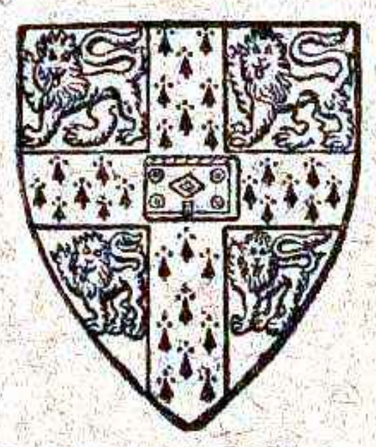

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PREFACE

THE enquiry here described was finished, and the account of it written, before the appearance, in 1928, of the *Twenty-seventh Year Book of the National Society for the Study of Education*. That admirable compilation contains, in addition to the reports of a number of investigations, a critical bibliography of work on the subject of Nature and Nurture. To it readers may be referred for data which the following study may serve to supplement.

I have many acknowledgments to make. I wish most warmly to thank: the Ratan Tata Fund for the grant which made this work possible, and Mr C. M. Lloyd, the Head of the Ratan Tata Department of the London School of Economics, for continuous help in smoothing out difficulties; Dr C. S. Myers for permission to use data collected by the National Institute of Industrial Psychology; the Eugenics Society for help in finding suitable institutions for my purpose, and for the purchase of the test material; the Directors of the institutions for permission to carry out the tests; and the British Psychological Society, the Ratan Tata Foundation, and the University of London for financial assistance towards the publication of the study. I am also deeply indebted to the following, for help and advice at various stages of the work: Professor Cyril Burt, Mr Callis, Dr Susan and Mr Nathan Isaacs, Professor Morris Ginsberg, Dr Mary MacTaggart, Mr Eldon Moore, and Professor Godfrey Thomson.

E. M. L.

October 1931

PART I

THE INVESTIGATION

Section 1. *Introduction*

THIS study was undertaken as an attempt to throw light on the question of the relative importance of heredity and environment in determining the level of intelligence of the individual. The main difficulty in the way of any such enquiry is the methodological one of finding factors which can be isolated for examination, or alternatively of obtaining groups large enough for relatively subtle trends to be revealed. It is almost impossible to discover a group where the environment is so homogeneous that any difference found in the individuals can with certainty be ascribed to hereditary factors. It is certainly not sufficient to take the inmates of an orphanage and say, "Here is a body of children with similar environment. All their unlikenesses are therefore due to heredity."

In the first place, even the most rigidly standardised institution provides anything but a uniform environment for its children. If their food and clothing, their hours of sleep and of work, their toys and the building they live in, are alike, yet their friendships, their age positions relative to their companions, the adults by whom they will be most influenced, the thousand casual contacts of their daily lives, will be different. And these latter may have a more profound influence upon them than any material circumstance or any course of instruction.

This difficulty, however, is a manageable one if a sufficiently large institution can be found, as any one kind of influence within the institution is unlikely to be confined to children of similar heredity, and unevennesses in the environment will probably cancel each other out.

The other obstacles are much more formidable. One is that few institutions contain children with widely differing heredity. They tend to cater for particular classes of people, for instance children of a given social class, or with a given physical or mental defect. As what is required is a group with the widest possible hereditary and the narrowest environmental range, selection of this kind makes them almost useless for this particular purpose.

A further difficulty is the fact that few institutions admit all their children very young. It is of little use to examine in the homogeneous

atmosphere of an institution children who have recently come there from the most heterogeneous homes, where they have spent the whole of their earliest and most impressionable years. Material from institutions of this kind is not altogether useless, however, as it is possible to look for changes in the children proportionate to the length of time they have been submitted to changed circumstances.

The problem may be approached from the other side, and an attempt made to find groups where the heredity is similar, or possibly similar, and the environment varied. Such groups are families of which the members have been separated, social classes whose members have climbed or sunk into the strata above or below, and such sections of any race or nation as have been brought up in an alien culture. The great difficulty here is to get a group of any size. Members of families are seldom separated at an early age; people of one race are seldom completely cut off in earliest infancy from contact with any other member of that race; pauper children adopted by dukes, or princes reared by shepherds, are more numerous in literature than in real life.

Yet another angle from which to attack the problem is to select a group for similarity of intelligence level or practical intellectual achievement, and to find out whether those who compose it have similar heredity, in circumstances which preclude similarity of environment, or similar environment but differing heredity. This is the method followed in the various studies of genius, of special abilities like music or mathematics, and of feeble-mindedness. Here one meets the obstacle that by the time the people one is studying have reached the stage of showing unmistakable genius, feeble-mindedness, or special ability, they have usually had a life-history so complex that the disentanglement of inherited and cultural threads is impossible.

The problems before the investigator then were:

(1) What questions can be asked, whose answers will throw any real light on the problem?

(2) What is the most promising accessible material which can be found to answer these questions?

Section 2. *The questions*

It was decided that only material dealing with children should be used, as this is probably the safest in the present state of our knowledge. The following were the questions asked:

Question 1. It is an established fact that a slight positive correlation exists between the intelligence level of children and the social class of

their parents. Is this correlation present when the child has not lived with its parents?

Question 2. Among children taken from their parents at different ages, do those taken young resemble their parents less, or fit less well into the level expected from their class, than those taken at a later age?

Question 3. If children from bad homes are put into an improved environment, does their intelligence increase in proportion to the length of time they have been in better circumstances?

Question 4. With children remaining in their own homes, does their likeness to their parents, or their parents' class, increase with age?

Question 5. Are children in a uniform environment more alike than those remaining in their own homes?

Question 6. The correlation between the intelligence of children and the class of their parents has usually been derived from tests with a linguistic bias. Is this correlation found when non-verbal tests are used?

Question 7. Can correlation be found between the child's intelligence and physical or environmental factors, such as health, home conditions, or legitimacy?

Section 3. *The material*

The first search was for an institution of any size which admitted its children very young, kept them for a considerable period, and had some record of the parental history of each child. One such place was found, and permission obtained to give intelligence tests to its children. The institution desires to remain anonymous. For ease in reading it will be given a fictitious name, Dr Smith's Home, in the following report.

Dr Smith's Home is a large and important charitable institution, subsisting mainly on the funds of a 200-year-old foundation. Its purpose is to provide a healthy and moral home for illegitimate children who would otherwise be brought up under degrading conditions; and secondly, by relieving the mother of the trouble and humiliation involved in the possession of an illegitimate child, to enable her to start afresh and recover what she may have lost of social status.

For these reasons only the first illegitimate child of any mother is received. It is felt that to take others would be encouraging her in immorality. Where the father can by some coercion be compelled to

provide for the child, the mother is assisted in applying that coercion, in preference to being relieved of the baby. As a result, all the cases are ones of desertion by the father. Careful enquiries into all the circumstances of the case are made, and it is insisted on that the mother should give the father's name and occupation as well as her own. No child more than a year old is taken. The numbers admitted at from 1 to 6 months are about equal to those from 6 months to a year. This means that the average age of admission is 6 months. British born children from any part of the British Isles are eligible. If a child is accepted into the institution, the mother resigns all claim to it, and in most cases does not see it again. A mother wishing to reclaim her child later is permitted to do so if she satisfies the authorities that she is able to maintain it and that it is in the interests of the child that she should do so. The children are given fictitious names, and are entirely ignorant of their parents' identity and circumstances.

The babies, on leaving their mothers, are boarded out in approved cottage homes in the country, at convenient distances from the town from which the organisation is controlled. The cottagers who receive the children are usually agricultural labourers of the better type. All homes are inspected at intervals. The children become very attached to their foster-mothers, whom they usually regard as their real mothers. When they give up the children, many of the foster-mothers keep in touch with them for years, visiting them at intervals, writing to them and sending them presents.

At between 5 and 6 years old all children are brought to head-quarters, which is the original old building of the foundation. This is their home until they are 15 or 16. It is near the centre of a big town, but is entirely secluded within its own walls. The building has sufficient space around it to form big playgrounds for the children. The older girls and boys live almost entirely separately, though under the same wide roof. Each group has its own dormitories, dining hall, play-rooms, and its own side of the big playground. They see each other at Sunday chapel, across the playground, and once or twice a week at singing practice, but the only occasion on which they meet socially is a yearly party, when they are allowed to play together freely.

The food of these children is very plain, but its nutritive value is carefully calculated, and to judge from the appearance of the children, is entirely adequate. As a group they look exceptionally strong, healthy, and well developed.

The Home has its own schools within the grounds. There is an infant school where girls and boys between 5 and 7 years of age are educated together for about a year after admission to headquarters. They are then promoted to separate schools for boys and girls, where the instruction is about that of an ordinary good elementary school. The buildings are old-fashioned and the classes large.

All the children in Dr Smith's Home were given intelligence tests. This material, consisting as it does of children removed from their parents in earliest infancy, was felt to be sufficiently important for particular care in testing to be taken. Each child was therefore given an individual Stanford-Binet test. In addition all the children over 9 were given a Simplex group intelligence test. It was not possible, by the rules of the institution, for the investigator to see the case papers of these children, but the mother's occupation and that of the father were obtained.

Other institutions of this type being undiscoverable, a home which admitted children of all social classes at varying ages, from the earliest infancy upwards, was sought. Permission was obtained to test the children of a large institution which fulfilled these conditions. This also will be given a fictitious name—the British Homes.

The British Homes were founded about 70 years ago, and have branches all over the country. They admit any children in need of a home, for any cause whatever. As a consequence they draw their children from almost all the social classes. Some are middle-class children from good homes who happen to have been orphaned and to have no relatives able or willing to support them. Others are pauper children passed on from Poor Law authorities. Some have been taken away from their parents because of cruelty or neglect, after investigations by the National Society for the Prevention of Cruelty to Children. Yet others are the children of imprisoned or executed criminals.

The headquarters of the British Homes is in London, but none of the children live there. The institution has its own homes of various types in different parts of England. In a few of the smaller branches the children live in large houses adapted for the purpose, but most of them are in large communities with specially devised buildings. Usually there is a group of houses, each in its own small garden, built round a central green. Each branch has a school of its own, attended only by children from the institution. The schools are of the ordinary elementary type, and boys and girls are taught together.

In five branches of these Homes, all the children old enough to work a Simplex group test were tested. In addition, all children where there were several of one family in the Homes, and all those admitted before they were 3 years old, were given a Stanford-Binet test. As the whole organisation is closely directed from headquarters, and children, teachers, governors, and matrons are frequently moved from one branch to another, these children were treated as a single group (or rather as two groups, one of boys and one of girls). The investigator was given permission to examine the case papers of each child tested. It was thus possible to discover the parents' occupations, the type of home, whether the child was legitimate or not, and the age at which it was admitted to the Home.

Two other institutions afforded groups for comparison. These were Poor Law Homes maintained by the Guardians of two of the Metropolitan Unions, one in the west of London, the other in the east. Both Homes were in the country some distance from London. They were run on modern methods, and were not unlike those of the British Homes. They were in large private enclosures, had their own workshops and schools, and the children lived in a number of separate houses within the grounds. Unfortunately it was impossible to obtain any particulars about these children. Generally speaking, they were from the lowest class of the community, though there would be a few exceptions, children of parents not of the pauper grade, who had become destitute through some unpreventable misfortune. In the schools of these two Homes all children older than 9 were given a Simplex test, and in one of them 45 children who had been admitted when less than 3 years old were given a Stanford-Binet test. In the absence of particulars no intensive study of these groups could be made. In any case there would have been little range of social class among the children. But the distribution of scores and the absolute level of their intelligence as compared with that of other children is of interest.

Another valuable source of material was the National Institute of Industrial Psychology. The Institute was at the time (1925 onwards) carrying out its experiment in vocational guidance, which involved the testing of a large number of children of school leaving age, i.e. 14, drawn from half a dozen schools in a poor part of London. Permission was obtained to use any relevant material collected in this way, as part of this study. The testing was done by the staff of the Institute, with the exception of about 50 of the Stanford-Binet tests, which were given by the writer. Unfortunately from the point of view of

this investigation, the group test used was not the Simplex, but the Institute's group test 34. The results obtained from this group were therefore not strictly comparable with the rest of the material, but group test 34 is of the same general nature as the Simplex test, and there is no reason to suppose that the results would have been very different if the Simplex had been used. Moreover, a preliminary group of 100 children was given a full Stanford-Binet test, and the figures thus obtained compared with the bulk of the material.

The data from the different schools were put together to form one group. This procedure is not to be defended where it can possibly be avoided. In this case, however, the group from any one school was too small to be of much value. The schools were very much alike, and were all within a fairly circumscribed area. It was therefore thought permissible to combine the schools to make a group of sufficient size to be of some statistical value.

In addition to the Stanford-Binet test, and the group tests already referred to, which have at times been objected to on the ground of their linguistic bias, all the children examined by the Institute were given a performance test. As is generally known, performance tests are designed to test intelligence, but they are worked independently of the use of language.

Each child examined for vocational guidance was also given a careful medical examination, to be described later. It was therefore possible to make comparisons of data which it would have been beyond the power of the investigator to obtain single-handed.

A control group of children living in their own homes was still needed. The Institute's data were of little use as a control, partly because different tests had been used, partly because the neighbourhood from which the children were drawn was such a bad one that its inhabitants could in no sense be regarded as a representative selection of the population—even of the working-class population. All the children therefore in the upper departments of an ordinary London elementary school who were old enough to work a Simplex test were tested. A school was chosen which faced a big main street, but which had a poor neighbourhood behind it. This meant that the pupils were drawn from as wide a range of social classes as would be likely to supply the population of any one school. This school had already been chosen by one of the London inspectors as being the most typical London elementary school with which he was acquainted. Six children in a central school, and two in a secondary school, who would

otherwise have been in the elementary school at the time of testing, were also tested, and their results included with the rest, so that the school should not suffer unfairly by the removal of its brightest pupils. No medical figures were available for these children, but the fathers' occupations were known.

It is very much to be regretted that no institution of any kind can be found that draws its members from all ranks of society. Children from the topmost levels are not to be found in anything but the most negligible numbers in institutions, and even the higher professional ranks are almost unrepresented. Dr Smith's Home and the British Homes had a few children of professional people, but the groups were small and unrepresentative. A study of the children of the upper and professional classes living at home would have been useful to compare with the other figures, but there was no time for this, and it must be left for a future occasion. It is possible to insert for comparison, however, the results of Stanford-Binet tests given by the writer to a very small group of children belonging to the professional classes in a private school in a university town. There was no direct selection of the children attending the school; but it was a highly experimental school, and its nature would exert a certain selective influence upon the parents. The fathers were for the most part on the staff of the university, and several of them were distinguished men with international reputations in the scientific world. In seven cases out of the twenty-one the mothers also had a profession. The children at this school were all between 3 and 9 years old.

A summary of the groups tested, with the ages of the children, is given in Tables I, II, III, IV and V.

Table I

Summary of groups tested

SIMPLEX TEST

Institution	No. of children tested		Average age				S.D. of age			
	Boys	Girls	Boys		Girls		Boys		Girls	
			y.	m.	y.	m.	y.	m.	y.	m.
Dr Smith's Home	119	92	12	7	12	5	1	6	1	6
British Homes	331	289	11	9	11	6	1	5	1	5
London elementary school	239	242	12	2	12	11	1	2	1	2
Poor Law school (O)	101	75	12	7	12	7	1	11	1	2
Poor Law school (B)	137	102	12	3	12	4	1	5	1	2
Totals...	927	800								

Table II

Summary of groups tested

STANFORD-BINET TEST

Institution	No. of children tested		Average age				s.d. of age			
	Boys	Girls	Boys		Girls		Boys		Girls	
			y.	m.	y.	m.	y.	m.	y.	m.
Dr Smith's Home	231	153	10	7	10	10	2	4	2	8
British Homes	99	85	11	1	10	0	2	11	3	3
Poor Law school (O)	30	14	8	11	9	9	3	9	3	11
Private school (I)	13	8	5	9	6	2	–	—	–	—
Nat. Inst. Ind. Psych.	54	34	14	0	14	0	–	—	–	—
Totals...	427	294								

Table III

Summary of groups tested

GROUP TEST 34

Institution	No. of children tested		Average age				s.d. of age			
	Boys	Girls	Boys		Girls		Boys		Girls	
			y.	m.	y.	m.	y.	m.	y.	m.
Nat. Inst. Ind. Psych.	194	161	14	0	14	0	—	—	—	—

Table IV

Summary of groups tested

GROUP TEST 33

Institution	No. of children tested		Average age				s.d. of age			
	Boys	Girls	Boys		Girls		Boys		Girls	
			y.	m.	y.	m.	y.	m.	y.	m.
Nat. Inst. Ind. Psych.	54	32	14	0	14	0	—	—	—	—

Table V

Summary of groups tested

PERFORMANCE TEST

Institution	No. of children tested		Average age		s.d. of age	
	Boys	Girls	Boys	Girls	Boys	Girls
			y. m.	y. m.	y. m.	y. m.
Nat. Inst. Ind. Psych.	194	160	14 0	14 0	— —	— —

Section 4. *The tests*

In the selection of the intelligence tests to be used there were two problems. In the first place, as real a measure of inborn intelligence as was available was needed. Secondly, it was necessary to get as many children as possible tested, and by the same person. There is little doubt that the best measure of general intelligence so far devised is Binet's test, as revised by Terman. Even this is far from perfect, and cannot with any validity be looked upon as more than a rough indicator of the intelligence of any given child. It might be argued that if no better instrument can be found, inferences drawn from the results of its use are almost worthless, and sociological work of the kind now being described might as well be left for the future. Doubtless this would be true if one could be sure that no one would form opinions upon sociological questions until exact data were at hand. But all kinds of problems—political, ethical, social—are tackled in the light of current sociological opinion, and opinion based on rough data is better than that based on no data at all. One hears repeated statements such as that the poor come of inferior stock and that it would be well if we could limit their increase and promote that of the "upper classes," or, alternatively, that given equal opportunity they would do just as well as anybody else. In the attempt to bring some light into the darkness, the sociologist must not be blamed for seizing a taper until he can get an arc lamp.

To return to the tests: the Stanford-Binet is the best we have, and it was used in this enquiry as far as was possible. The giving of the tests, however, takes about 40 minutes for each child, and the number that can be got through by a single person is very small. This test was therefore given only to those children, such as the ones in Dr Smith's Home, whose circumstances were so unusual as to make their test

results of special value, and therefore worth careful and lengthy methods. The form used was not quite identical with that used by Terman. His wording is for American children, and is not entirely suitable for use in England. The National Institute of Industrial Psychology has therefore revised it for English children, and made slight modifications in one or two of the tests. It was this revised form as used at the Institute that was employed.

For the bulk of the children tested it was necessary to be content with a group test—that is, one in which a whole class of children can be tested together. Group tests are even less satisfactory than the Stanford-Binet. They are so extraordinarily difficult to devise and standardise that not one could be found which was free from anomalies and absurdities. But here again, though a rough measure, they are a real measure of something which may provisionally be called intelligence. This is proved by the fact that entirely different ones, given to the same set of children, will provide results which correlate highly with each other. Where large numbers of children are to be graded there is no doubt that the combined results of their scores on one of the better group tests will give a grading not too poor to be useful.

For its vocational guidance purposes the National Institute needed to measure the intelligence of its children in its more practical aspects. Each child was therefore given a performance test. The battery used was that described by Miss Frances Gaw in "A Study of Performance Tests," *Brit. Journ. of Psych.* XV, Pt. 4, April 1925. It includes the Porteus mazes, picture completion tests, and various form boards. In this connection it may be remarked that the Institute's group test 34 contains more graphic material than most group tests, and so is slightly more like a performance test than the rest. It correlates highly with the Stanford-Binet, however.

In Dr Smith's Home and the British Homes, where the same children were given the Stanford-Binet and the Simplex test, the results of the two tests were correlated. The correlations were as follows:

		r	No.
Dr Smith's Home	Boys	$0{\cdot}79 \pm 0{\cdot}02$	117
	Girls	$0{\cdot}72 \pm 0{\cdot}03$	92
British Homes	Boys	$0{\cdot}74 \pm 0{\cdot}04$	59
	Girls	$0{\cdot}69 \pm 0{\cdot}06$	34

The results of the present study go to confirm the opinion now generally accepted that the Stanford-Binet tests, and consequently the group tests whose standardisation is based on that of the Stanford-

Binet tests, are wrongly standardised for older children. All the groups tested show a fairly steady decline in intelligence rating with increase in age. It does not seem likely that the majority of children get more stupid as they get older, or even that all these particular groups were doing so. It seems much more likely that the tests get proportionately more difficult in the older years. This imperfection in the tests reduces the apparent intelligence level of all groups of older children. It causes groups, like that tested by the National Institute, containing only 14-year-old children, to compare unfavourably with younger groups which may not be more intelligent. The slight inaccuracy which it introduces also tends to lower the correlations based on these tests. In one instance, a correlation of 0·22 was obtained from a group of children of the ages 10 to 14. The correlations were then worked out for the four age groups separately, and the mean found. The figure was increased to 0·34. Similarly, one of 0·27 was raised to 0·3.

The question of what intelligence tests measure still remains. Objection is occasionally made to work of this kind on the ground that the validity of the tests is so uncertain that no useful work can be based on them. It is said, for instance, that we have no proof that they measure intelligence; that success in them may depend on specialised aptitudes, useful for this particular purpose, but no indication of general mental capacity. It is beyond the scope of this enquiry to enter into theoretical discussion of this question. It has in a large measure been answered already. The great amount of work that has been done in the last few years on the theory of intelligence and the relation to it of performance in the better intelligence tests has left very little doubt of their validity. Even were this not so, if the difference between those scoring high in the tests and those scoring low were not one of intelligence, enough has been done to show that this difference in the quality of mental output is of great practical significance, and remains, under any circumstances, of interest to the scientist—useful to note, and if possible to measure.

But the nature of the tests themselves makes it unlikely that they could measure only special aptitudes. The separate tasks included in them are so diverse, and cover so many aspects of mental effort, that it is difficult to believe that any very specialised ability could ensure success in all of them. Moreover, most people who have actually given a large number of tests to individual children find very convincing evidence in the reactions of different children to the tests that these do turn upon what is generally meant when intelligence is talked of.

When one has seen the look of dull incomprehension on the faces of some children when confronted with the new problems presented by the tests, and contrasted it with the sparkle of understanding with which other children equally young, equally shy, equally badly educated, greet the same questions, one's confidence in the efficacy of the tests is bound to be raised.

Finally, the course of the present enquiry should throw some further light on the tests. If some hereditary factors should be shown to be in direct relation with test performances, it will provide further confirmation of the fact that what is being measured is both important and general.

Section 5. *Measurement of social class*

To find an adequate measurement of social class was difficult. The data to be obtained concerning the social circumstances of these children were meagre. Details given for one group were lacking for others. Further, even if several factors were known, there is no way of weighting and combining these to form a reliable social index. The one thing that was known for nearly all the cases, except the two Poor Law groups, was the father's occupation. This is probably a more useful indication of social class than any other single factor, and has the advantage of bringing this work into line with many other investigations. The groups were not large enough to allow each separate occupation to form a class of its own. All the occupations, therefore, were grouped into five classes—A, B, C, D and E. This gives five broad social strata, into one of which each child could be fitted.

Class A, a small one, was the professional class, and in it would have been included children from the highest social levels if any had been found. Class B was that of tradesmen, clerks, and a few of the most highly skilled artisan groups, such as compositors, lithographers, and engine drivers. Class C was the big middle group of skilled and semi-skilled workers, of which bricklayers, tram and bus drivers, and policemen are typical examples. Class D contained the unskilled workers, such as porters, navvies, farm labourers, and unskilled factory hands. Class E was a residual group, containing dock labourers, street pedlars, gypsies and paupers.

There were certain occupations which could only doubtfully and with difficulty be fitted into these categories. They were the ones in which workers from a wide range of social classes are engaged. For instance, the farming class is a very wide one, ranging from

country gentlemen, on the border-line of aristocracy, to the small working farmer little above the class of small tradesmen. It was finally decided to put farmers into class A to form, with elementary school teachers, the lowest border-line of that class. Since this work was done, the Registrar-General has put elementary school teachers into the second class. They certainly do not rank socially with doctors and lawyers, but on the other hand they are usually on a rather different level from that of clerks and small shopkeepers, who form the bulk of class B. There are border-line cases where all the classes are divided, and probably a certain number of cases at the limits of each group will be wrongly classified. But the difficulty cannot be avoided, and it will not do more than slightly lower the correlations. Class A is rather an anomalous one. It has fewer members than the intermediate classes, and covers a wider range. Its members certainly do not come from class A of the population as a whole, and it does not even contain a representative selection from professional classes, but is distinctly on their lower border. It can, however, be distinguished from the class below it, and for the purposes of this study that is the main thing necessary.

PART II

RESULTS

Section 6. *General remarks*

BEFORE examining the results of the testing in detail, it may be as well to compare the average levels of the different groups examined (see Figs. 1 and 2 and Tables VI and VII). They tell us nothing about the

Table VI

Means[1] *and standard deviations*

STANFORD-BINET TEST

Institution	Boys			Girls		
	Mean I.Q.	S.D.	Cases	Mean I.Q.	S.D.	Cases
Private school	128·62	7·51	13	125·37	11·3	8
Dr Smith's Home	101·36	12·06	231	98·69	13·12	153
British Homes	99·55	15·49	99	98·42	16·96	85
Nat. Inst. Ind. Psych.	91·33	11·66	57	87·28	13·07	43
Poor Law school (O)	87·63	13·53	30	87·14	15·67	14

Table VII

Means[1] *and standard deviations*

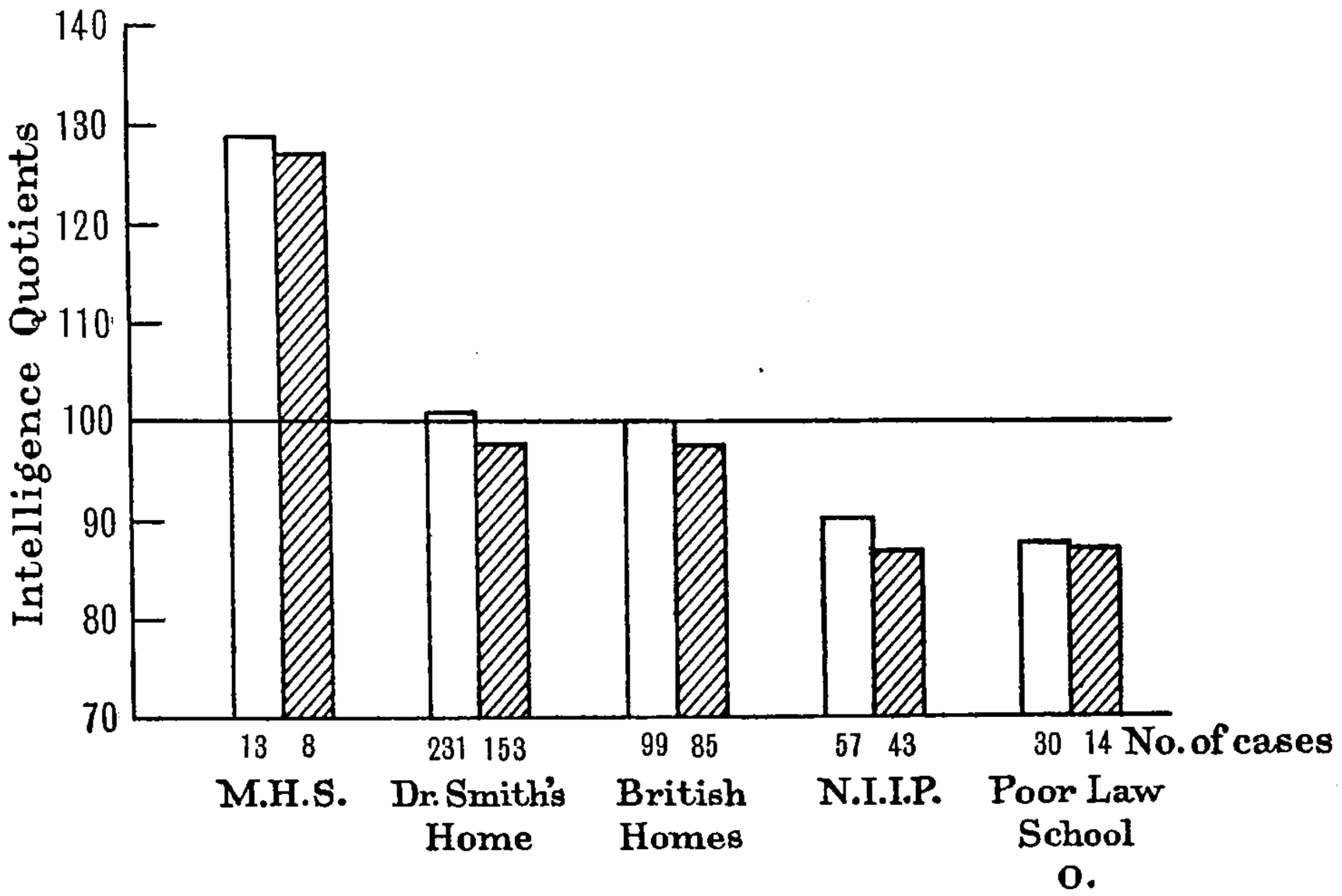
SIMPLEX TEST

Institution	Boys			Girls		
	Mean I.Q.	S.D.	Cases	Mean I.Q.	S.D.	Cases
Elementary school	100·45	15·58	239	100·4	14·18	242
Dr Smith's Home	98·55	13·73	119	96·74	12·51	92
British Homes	97·21	14·95	331	94·94	13·27	289
Poor Law school (O)	87·36	11·42	101	88·17	12·1	75
Poor Law school (B)	86·36	12·89	137	88·87	13·15	102

[1] The differences between the average intelligence of the boys and girls in the various groups is interesting. They are very small, but except in the two Poor Law groups they are all in the same direction. The boys are slightly superior to the girls. The results of intelligence testing in general do not support these results. It is usual for the figures to swing sometimes in one direction, sometimes in the other. Certain American investigators (cf. Bridges and Coler) have found that girls tend to do better than boys in the less-favoured groups. These results on the whole rather support this view, though the differences are too slight to have much significance.

Mean I.Q.'s

STANFORD-BINET TEST

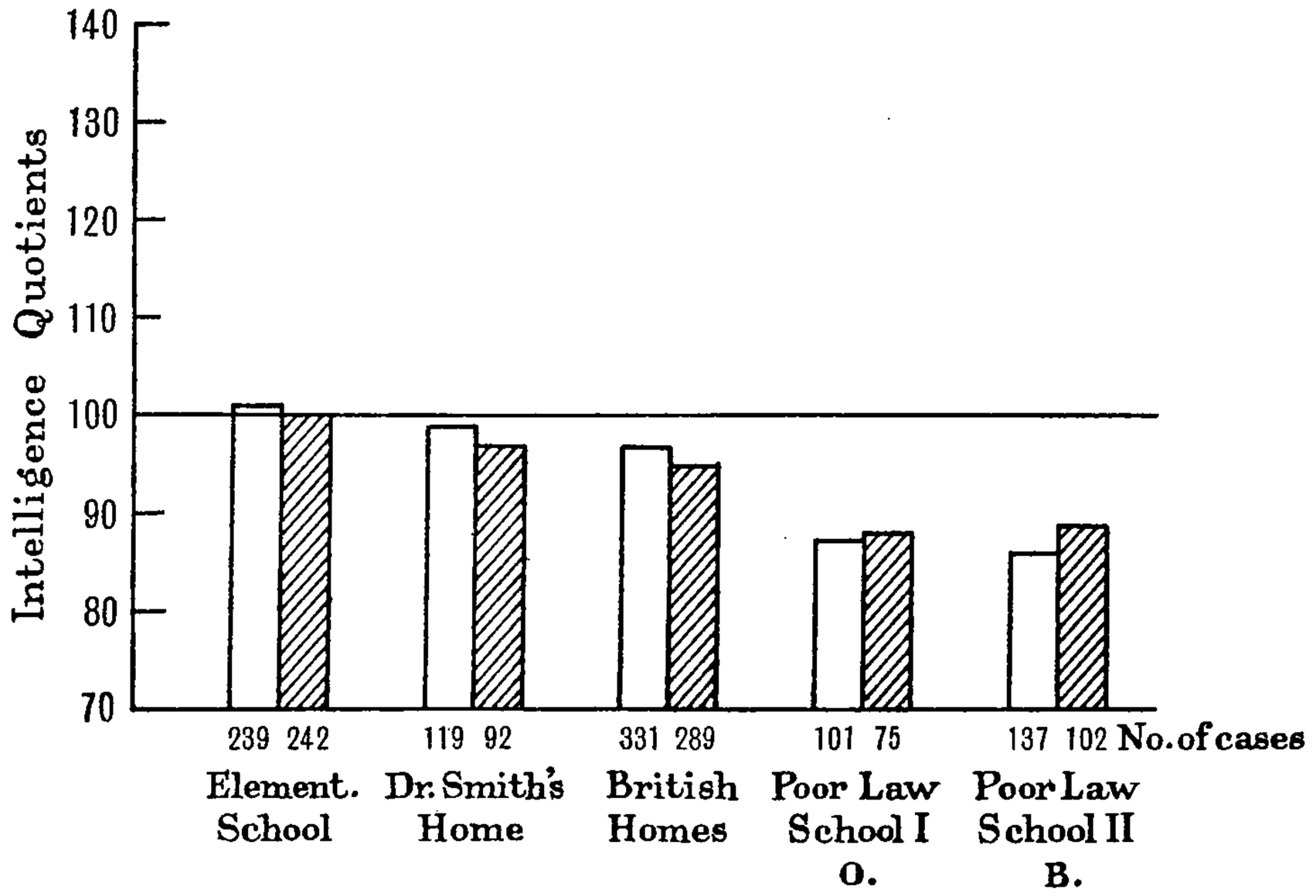


Blank = Boys. Shaded = Girls.

Fig. 1

Mean I.Q.'s

SIMPLEX TEST



Blank = Boys. Shaded = Girls.

Fig. 2

native endowment of the children, because, as the latter were brought up in different surroundings, it is impossible to tell how far their achievements are due to those surroundings. But it is interesting to note the kind of differences in the final product which actually exist. These differences are very considerable. The group of private school children is too small to have any statistical significance, but it has been included for what it is worth, as it is in accordance with the result of other examinations of groups of the same type.

The range then, is from a level of about 130 I.Q. for the private school group, through 100 I.Q. for an average elementary school, down to about 88 for the Poor Law schools. When we consider that an I.Q. of 70 is usually held to be the border-line of mental deficiency, while 130 indicates very high ability, this range is highly significant. The difference in human efficiency between a person with an I.Q. of 88, and one with an I.Q. of 130 is enormous. The first is a really stupid person, incapable in a general way of tackling new problems with any measure of success. On the other hand, the individual with an I.Q. of 130, unless badly educated, or hampered by some serious temperamental difficulty, should have the powers of insight and forethought, of common-sense and judgment which we think of when we talk of high intelligence. The distributions of intelligence in the various groups set out in Tables VIII and IX amplify the impression made by the differences in average. As we go down the scale from the higher to the lowest class, we see the weight of distribution gradually shifting over from above the 100 level to considerably below it.

There has been little clear evidence hitherto to explain how these differences of level arise. They have been found to a greater or less degree in every investigation into the intelligence of groups of differing social class. It is true that between the groups at present under discussion there have been immense environmental differences. The children in the private school had, generally speaking, highly intellectual parents: parents, moreover, especially interested in education and anxious to do everything in their power to make the most of their children's intelligence. They had had fresh air and space, sensible clothing and good food, plenty of sleep, travel, stimulating companionship, and a school technique which aimed at giving the fullest possible chance to every ounce of mental and physical ability they possessed. Most of the Poor Law children, on the other hand, came, certainly, from homes showing every diversity of squalor, misery, stupidity and insecurity. Many of them had probably, all their lives until they

entered the institution, been dragged round from home to home, from school to school, ill-fed, neglected and frequently ill-treated. We cannot, however, decide on our general data alone, how much (or how little) these differences in circumstance affect the level of performance.

No amount of investigation into the crude mental levels of the various groups will in fact throw any light upon the causes of the association between environment and intelligence. Our only chance of doing so is to break up these groups in some way, and to examine more closely how these averages are made up. We will therefore proceed to such answers as have been found to the questions asked at the beginning of the enquiry.

The plan has been to present the actual results in their entirety as far as possible, as it was felt that inspection of the distributions of intelligence is of more value in the understanding of the facts than elaborate statistical workings-over of the figures. Mean differences, probable errors, correlation coefficients, may give an impression of spurious exactness to work which cannot at present be more than rough, vague and tentative. Means, correlation ratios, etc., have been worked out, but from the tables it can be seen exactly how these various groups of children responded to the tests, where the anomalies are, and exactly where outstanding successes and failures occurred.

Section 7. *Correlation of intelligence quotient and social class in children who have not lived with parents*

Our first question was as to the possible connection between parents' occupation and children's intelligence when the children and parents have lived apart.

If such a connection is present, it should give some indication of the extent to which ability is inherited. Dr Smith's Home, the home for illegitimate children, was by far the best field for this enquiry. None of the children had ever lived with their fathers at all. The average age of admission to the Home is 6 months, and desertion of the mother by the father is one of the conditions of acceptance of the child into the Home. The babies have, on the average, lived with their mothers for 6 months, and it will be interesting to note whether the correlation of the mother's class with the child's intelligence is greater than is the father's. Unfortunately, some of the information regarding these children was inadequate. Many of them were born during the war,

and the father's occupation was simply given as "soldier." This was quite useless for determining social class, since in war time, when people of all classes were in the ranks, it might mean anything. Information about the mother was also often defective. Many were given as "living at home" without any indication of the social class of the home. This meant that all cases of this kind had to be discarded from the groups, thus reducing the numbers.

The results of the testing in this institution are given in Tables XII to XXIX, and those of the control group of London elementary school children in Tables X and XI. The control group will be discussed first. No separate knowledge of the mother's as distinct from the father's occupation and social class was obtained. Only rarely do working class couples diverge in social class to any extent, and so it was considered safe to take the father's occupation as an index of the social class of both. The tables show the numbers of children at each intelligence level in the five classes, together with the average intelligence quotients of the classes. The correlation ratio between the social class and intelligence level (worked on Pearson's η formula[1]), and the standard deviation of the whole group, are given. The same slight shift across of the numbers of cases from the higher to the lower levels of intelligence, as we move down from class A to class E, is seen, as was there when the groups from different schools were compared, though the range is not as great. The average varies from about 110 to about 94 within the one school, whereas it ranged from 129 to 88 in the total groups. This may be largely explained by the fact that any children of the A class found in an elementary school will be from the lowest fringe of that group, and from entirely unselected parents; whereas the 21 private school children were from a class of parents (university staff, etc.) highly selected for intelligence alone, and also from a higher level in the A class. Similarly the E children found in the elementary school will be from the highest of that group, while those found in a Poor Law school will be from parents selected from the general population by the very fact of failure. It may also be that education within a single school may tend to make the children more alike in their test results. These results compare very closely with those

[1] $\eta^2 = \frac{S\{n_p(\bar{y}_p - \bar{y})^2\}}{S(y-\bar{y})^2}$, where p is any array, y is one variable. Only the one form of the correlation ratio, that in which the five social classes form the arrays, has been employed, because here the differences between members of the arrays are measured quantities. The alternative form, in which the different levels of I.Q. form the arrays, has been omitted, as here the difference between members of the arrays is in terms of a qualitative grouping only.

of Duff and Thomson[1] in Northumberland. Their range is from 112 in the professional class, to 96 in the low-grade occupations, and their correlation between social class and intelligence, by Pearson's first contingency method, is 0·28, whereas that of the present investigation is 0·26 (boys) and 0·21 (girls).

In Table X it will be seen that the boys in class E have a higher average intelligence than those in class D. This result is no doubt due to the smallness of the numbers in these groups. Similar discrepancies occur from time to time in the other tables, and as they do not interfere with the general trend of the figures and the main conclusions, they will not be referred to again.

We now come to the figures from Dr Smith's Home. It was possible to work out the results for the fathers' and mothers' occupations separately. It was also thought that some point midway between the class of the father and that of the mother might give a truer indication of that of the child than either taken separately. A mid-parent class was therefore devised for each child. For example, a child with a father in B and a mother in D, was reckoned as being in class C. One with a father in B and a mother in C, was reckoned as being in B −. The final five classes are constituted as follows:

A = A,
B = A − and B,
C = B − and C,
D = C − and D,
E = D − and E.

It is possible that an average of the Stanford-Binet and the Simplex test results might measure the child's intelligence more accurately than a mental ratio based on one test alone. For those children who were given both tests, therefore, this average was found, and the distributions, means and correlations for those figures worked out for the mothers', fathers' and mid-parents' classes separately (Tables XVI, XVII, XXII, XXIII, XXVIII and XXIX).

In all these tables, it does not seem wise to pay too much attention to a detailed comparison of the correlation ratios. The results of correlations are always very difficult to interpret. Two similar ratios may represent sets of facts which differ considerably. It is therefore perhaps safer to draw our conclusions from the size of the averages and from the general trend of the distributions, than from the correlation ratios alone. It will be seen that in every table there is some correla-

[1] Duff, J. F. and Thomson, G. H. "Social and geographical distribution of intelligence in Northumberland," *Brit. Journ. of Psych.* XIV, 1923, 192–8.

Table VIII

Distribution of intelligence

ALL GROUPS (IN PERCENTAGES). BOYS

Institution	I.Q.																					No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
Private school	.	.	.	.	.	.	.	.	.	.	5	.	5	14	10	19	24	14	10	.	.	21
Elementary school	.	.	.	**1**	**3**	**4**	**7**	**12**	**7**	**13**	**14**	**13**	**7**	**7**	**2**	**4**	**2**	**1**	.	**0·4**	**1**	239
Dr Smith's Home	.	.	.	.	1	2	6	7	14	12	19	14	8	11	3	1	1	0·4	.	.	.	231
	.	.	.	**1**	**4**	**4**	**5**	**13**	**13**	**13**	**13**	**14**	**9**	**7**	**3**	**2**	.	.	**1**	.	.	119
British Homes	.	.	.	2	5	5	7	8	13	7	13	10	11	10	1	5	1	.	1	.	.	99
	.	.	**1**	**2**	**4**	**5**	**7**	**16**	**10**	**10**	**12**	**9**	**11**	**6**	**5**	**1**	**1**	.	.	.	.	331
Nat. Inst. Ind. Psych.	.	.	.	5	5	4	11	16	18	28	4	4	4	2	2	.	.	.	.	.	.	57
Poor Law school (O)	.	5	2	5	7	9	18	11	5	16	11	7	2	2	.	.	.	.	.	.	.	44
	.	.	**2**	.	**9**	**13**	**17**	**23**	**11**	**8**	**11**	**4**	**1**	**1**	**1**	.	.	.	.	.	.	101
Poor Law school (B)	.	1	2	5	6	18	13	17	13	7	9	4	2	1	1	.	.	.	.	.	.	137

Ordinary type—Stanford-Binet test; Heavy type—Simplex test.
N.B. In the Private school and Poor Law school (O) Binet test, boys and girls are reckoned together.

Table IX

Distribution of intelligence

ALL GROUPS (IN PERCENTAGES). GIRLS

Institution	I.Q.																					No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
Elementary school	.	.	**0·4**	**0·4**	**1**	**3**	**5**	**13**	**15**	**12**	**15**	**10**	**7**	**7**	**3**	**5**	**1**	**1**	**1**	.	.	242
Dr Smith's Home	.	.	.	1	3	1	8	12	12	18	18	10	5	4	5	1	1	1	.	1	.	153
	.	.	.	**2**	**1**	**9**	**5**	**11**	**13**	**18**	**14**	**10**	**10**	**5**	**1**	.	.	.	.	.	.	92
British Homes	2	.	1	2	4	5	7	5	5	14	20	13	12	4	4	.	.	.	.	.	.	85
	.	.	**1**	**2**	**4**	**5**	**10**	**15**	**14**	**12**	**13**	**11**	**7**	**1**	**2**	**1**	**1**	.	.	.	.	289
Nat. Inst. Ind. Psych.	.	.	2·3	5	16	12	9	16	9	9	9	.	9	2	.	.	.	.	.	.	.	43
Poor Law school (O)	.	.	**1**	**4**	**8**	**12**	**15**	**13**	**20**	**9**	**5**	**7**	**1**	**3**	**1**	.	.	.	.	.	.	75
Poor Law school (B)	.	.	.	**3**	**6**	**14**	**13**	**22**	**15**	**11**	**8**	**4**	**4**	**2**	.	.	.	.	.	.	.	102

Ordinary type—Stanford-Binet test; Heavy type—Simplex test.

Table X

London elementary school

SIMPLEX TEST

BOYS

Parents' class	Distribution of I.Q.'s*																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	1	.	2	.	2	.	1	.	.	.	.	.	111·3	6
B	.	.	.	.	.	.	.	1	.	3	8	5	4	1	3	1	1	1	.	.	.	108·82	28
C	.	.	.	2	4	8	7	19	11	21	14	15	10	9	2	7	3	1	.	1	2	100·24	136
D	.	.	.	.	3	1	8	3	3	3	6	5	3	1	.	1	.	.	.	.	.	94·95	37
E	.	.	.	.	.	.	.	.	2	1	.	.	1	.	.	.	.	.	.	.	.	97·75	4
Total...	.	.	.	2	7	9	15	23	16	29	28	27	18	13	5	10	4	2	.	1	2	100·72	211

Correlation ratio $\eta = 0{\cdot}27 \pm 0{\cdot}04$; Standard deviation 15·75.
* 50 = 50 to 54; 55 = 55 to 59, etc.

Table XI

London elementary school

SIMPLEX TEST

GIRLS

Parents' class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	1	3	.	.	.	1	1	2	.	.	.	.	.	109·88	8
B	.	.	.	.	.	1	1	2	2	7	5	8	5	3	2	1	.	1	.	.	.	104·79	38
C	.	.	1	.	1	2	8	16	24	14	25	14	8	7	5	8	2	1	1	.	.	100·8	137
D	.	.	.	.	1	4	3	5	9	2	3	3	4	4	.	.	.	.	1	.	.	96·59	39
E	.	.	.	.	.	.	.	1	1	3	1	.	.	.	.	.	.	.	.	.	.	94·83	6
Total...	.	.	1	.	2	7	12	24	37	29	34	25	17	15	8	11	2	2	2	.	.	100·91	228

Correlation ratio $\eta = 0{\cdot}22 \pm 0{\cdot}04$; Standard deviation 14·12.

Table XII

Dr Smith's Home

STANFORD-BINET TEST

BOYS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	3	4	2	5	.	2	4	.	.	.	.	.	.	.	102·0	20
B	.	.	.	.	.	1	.	1	4	4	9	8	6	6	2	.	1	1	.	.	.	106·02	43
C	.	.	.	.	2	1	9	7	8	8	10	10	6	7	2	.	2	.	.	.	.	99·87	72
D	.	.	.	.	.	2	1	1	3	5	4	5	1	.	.	1	.	.	.	.	.	98·22	23
E	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	92·0	2
Total...	.	.	.	.	2	4	10	12	21	19	28	23	15	17	4	1	3	1	.	.	.	101·46	160

Correlation ratio $\eta = 0{\cdot}22 \pm 0{\cdot}05$; Standard deviation 12·55.

Table XIII

Dr Smith's Home

STANFORD-BINET TEST

GIRLS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	1	4	1	4	1	2	.	1	.	.	.	.	.	.	100·13	15
B	.	.	.	.	.	.	1	1	2	8	2	4	.	4	1	.	1	.	.	.	.	102·75	24
C	.	.	.	.	1	1	7	7	7	9	11	4	1	1	1	.	.	.	.	.	.	95·34	50
D	.	.	.	1	2	.	2	4	2	4	1	2	.	.	1	.	.	1	.	.	.	94·5	20
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	3	1	11	13	15	22	18	11	3	5	4	.	1	1	.	.	.	97·48	109

Correlation ratio $\eta = 0{\cdot}26 \pm 0{\cdot}06$; Standard deviation 12·49.

Table XIV

Dr Smith's Home

SIMPLEX TEST

BOYS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	1	.	4	2	3	1	2	1	2	.	.	.	.	.	.	.	97·85	16
B	.	.	.	.	.	.	1	3	4	3	3	2	4	3	3	1	.	.	.	.	.	104·37	27
C	.	.	.	1	1	3	2	5	5	6	8	7	3	1	.	1	.	.	1	.	.	97·45	44
D	.	.	.	.	1	2	1	2	1	1	2	2	2	.	.	.	.	.	.	.	.	93·79	14
E	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	98·0	2
Total...	.	.	.	1	2	6	4	14	13	13	14	14	10	6	3	2	.	.	1	.	.	98·85	103

Correlation ratio $\eta = 0{\cdot}26 \pm 0{\cdot}06$; Standard deviation 13·65.

Table XV

Dr Smith's Home

SIMPLEX TEST

GIRLS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	1	.	.	1	4	.	3	3	.	.	.	.	.	.	.	.	100·83	12
B	.	.	.	.	.	1	2	.	4	4	2	2	2	2	.	.	.	.	.	.	.	98·47	19
C	.	.	.	1	.	5	1	7	4	6	4	3	1	1	1	.	.	.	.	.	.	93·21	34
D	.	.	.	1	1	1	.	3	2	2	4	1	1	1	.	.	.	.	.	.	.	93·58	17
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	2	1	8	3	10	11	16	10	9	7	4	1	.	.	.	.	.	.	95·62	82

Correlation ratio $\eta = 0{\cdot}25 \pm 0{\cdot}07$; Standard deviation 12·28.

Table XVI

Dr Smith's Home

BINET-SIMPLEX AVERAGE

BOYS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	2	3	4	2	1	1	2	.	.	.	.	.	.	.	98·68	16
B	.	.	.	.	.	.	1	2	2	3	3	4	6	3	.	2	.	.	.	.	.	105·23	26
C	.	.	.	.	1	3	2	7	3	8	4	7	4	1	1	1	.	1	.	.	.	98·28	43
D	.	.	.	.	1	2	1	1	1	2	3	2	1	.	.	.	.	.	.	.	.	94·43	14
E	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	94·5	2
Total...	.	.	.	.	2	5	5	12	10	18	12	14	12	6	1	3	.	1	.	.	.	99·52	101

Correlation ratio $\eta = 0{\cdot}29 \pm 0{\cdot}06$; Standard deviation 12·75.

Table XVII

Dr Smith's Home

BINET-SIMPLEX AVERAGE

GIRLS

Father's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	.	2	2	4	1	1	1	.	.	.	.	.	.	.	99·42	12
B	.	.	.	.	.	.	1	2	3	4	4	1	3	1	.	.	.	.	.	.	.	99·32	19
C	.	.	.	.	1	2	4	4	9	5	4	1	3	1	.	.	.	.	.	.	.	93·56	34
D	.	.	.	1	1	1	.	4	3	1	3	1	1	.	.	1	.	.	.	.	.	92·94	17
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	2	3	6	10	17	12	15	4	8	3	.	1	.	.	.	.	.	95·62	82

Correlation ratio $\eta = 0{\cdot}25 \pm 0{\cdot}07$; Standard deviation 11·7.

Table XVIII

Dr Smith's Home

STANFORD-BINET TEST

BOYS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	1	1	2	.	.	1	1	.	.	.	.	.	.	.	101·0	6
B	.	.	.	.	1	.	3	4	3	8	8	6	7	6	3	2	.	1	.	.	.	104·08	52
C	.	.	.	.	1	1	6	3	10	12	19	12	3	12	2	.	3	.	.	.	.	102·3	84
D	.	.	.	.	.	2	2	6	10	5	12	6	5	4	.	.	.	.	.	.	.	98·54	52
E	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	108·0	1
Total...	.	.	.	.	2	3	11	14	24	27	39	25	16	23	5	2	3	1	.	.	.	101·77	195

Correlation ratio $\eta = 0{\cdot}18 \pm 0{\cdot}05$; Standard deviation 12·0.

Table XIX

Dr Smith's Home

STANFORD-BINET TEST

GIRLS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	104·0	3
B	.	.	.	.	.	2	2	4	4	6	6	2	3	3	3	1	.	.	.	.	.	100·56	36
C	.	.	.	.	1	.	6	6	6	9	5	4	4	1	2	1	.	.	.	.	.	97·35	45
D	.	.	.	1	1	.	4	5	7	9	7	9	.	1	1	.	.	1	.	1	.	98·58	47
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	2	2	12	15	17	24	20	16	7	5	6	2	.	1	.	1	.	98·76	131

Correlation ratio $\eta = 0{\cdot}11 \pm 0{\cdot}06$; Standard deviation 13·13.

Table XX

Dr Smith's Home

SIMPLEX TEST

BOYS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	1	.	.	.	1	.	.	1	2	.	.	.	.	.	.	.	103·4	5
B	.	.	.	.	.	1	.	5	3	3	1	5	1	.	2	.	.	.	.	.	.	98·86	21
C	.	.	.	.	2	.	2	5	6	6	5	5	2	2	1	2	.	.	1	.	.	100·44	39
D	.	.	.	1	1	1	3	4	2	3	8	4	3	3	.	.	.	.	.	.	.	96·97	33
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	3	3	5	14	11	13	14	14	7	7	3	2	.	.	1	.	.	99·08	98

Correlation ratio $\eta = 0{\cdot}13 \pm 0{\cdot}067$; Standard deviation 13·5.

Table XXI

Dr Smith's Home

SIMPLEX TEST

GIRLS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	111·0	2
B	.	.	.	.	.	3	.	.	1	4	5	4	3	.	1	.	.	.	.	.	.	100·76	21
C	.	.	.	.	.	4	1	4	3	3	2	4	2	3	.	.	.	.	.	.	.	96·54	26
D	.	.	.	1	.	1	3	5	5	6	5	.	1	2	.	.	.	.	.	.	.	93·52	29
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	.	8	4	9	9	13	12	8	8	5	1	.	.	.	.	.	.	96·92	78

Correlation ratio $\eta = 0{\cdot}3 \pm 0{\cdot}07$; Standard deviation 12·1.

Table XXII

Dr Smith's Home

BINET-SIMPLEX AVERAGE

BOYS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	.	1	.	1	.	1	1	.	.	.	.	.	.	.	101·8	5
B	.	.	.	.	.	1	1	3	2	4	3	1	2	2	.	1	.	.	.	.	.	99·99	20
C	.	.	.	.	.	.	2	6	4	7	5	5	5	1	1	2	.	1	.	.	.	101·54	39
D	.	.	.	.	1	3	.	6	2	5	4	6	3	2	.	.	.	.	.	.	.	97·09	32
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	.	1	4	4	15	9	16	13	12	11	6	1	3	.	1	.	.	.	99·74	96

Correlation ratio $\eta = 0{\cdot}16 \pm 0{\cdot}07$; Standard deviation 12·5.

Table XXIII

Dr Smith's Home

BINET-SIMPLEX AVERAGE

GIRLS

Mother's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	106·0	2
B	.	.	.	.	.	1	1	1	4	2	6	1	4	1	.	.	.	.	.	.	.	99·62	21
C	.	.	.	.	.	1	4	3	4	2	6	.	4	2	.	.	.	.	.	.	.	96·73	26
D	.	.	.	1	1	.	1	6	6	6	5	1	1	.	.	1	.	.	.	.	.	94·14	29
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	1	2	6	10	14	10	17	4	9	3	.	1	.	.	.	.	.	96·78	78

Correlation ratio $\eta = 0{\cdot}23 \pm 0{\cdot}07$; Standard deviation 11·35.

Table XXIV

Dr Smith's Home

STANFORD-BINET TEST

BOYS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	1	1	2	.	.	.	1	.	.	.	.	.	.	.	97·8	5
B	.	.	.	.	.	.	1	1	1	3	6	2	4	5	1	.	.	1	.	.	.	107·0	25
C	.	.	.	.	2	1	6	3	9	9	9	11	5	8	3	.	3	.	.	.	.	102·1	69
D	.	.	.	.	.	2	1	5	3	4	10	5	3	2	.	.	.	.	.	.	.	98·69	35
E	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	92·02	1
Total...	.	.	.	.	2	3	8	10	15	18	25	18	12	16	4	.	3	1	.	.	.	102·02	135

Correlation ratio $\eta = 0{\cdot}23 \pm 0{\cdot}05$; Standard deviation 12·67.

Table XXV

Dr Smith's Home

STANFORD-BINET TEST

GIRLS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	101·0	1
B	.	.	.	.	.	.	2	1	4	5	2	2	2	3	1	.	.	.	.	.	.	100·86	22
C	.	.	.	.	.	1	5	3	4	7	7	6	1	1	3	.	.	.	.	.	.	98·74	38
D	.	.	.	1	1	.	4	6	5	7	3	3	.	.	.	.	.	1	.	.	.	93·45	31
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	1	1	11	10	13	19	13	11	3	4	4	.	.	1	.	.	.	97·49	92

Correlation ratio $\eta = 0{\cdot}25 \pm 0{\cdot}07$; Standard deviation 12·0.

Table XXVI

Dr Smith's Home

SIMPLEX TEST

BOYS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	1	.	.	.	1	.	.	1	1	.	.	.	.	.	.	.	100·5	4
B	.	.	.	.	.	.	.	4	3	1	1	2	1	2	2	.	.	.	.	.	.	101·94	16
C	.	.	.	.	1	1	2	6	4	8	4	6	3	2	1	2	.	.	1	.	.	100·68	41
D	.	.	.	1	.	1	1	3	4	1	8	3	1	1	.	.	.	.	.	.	.	96·25	24
E	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	105·0	1
Total...	.	.	.	1	1	3	3	13	11	11	13	12	6	6	3	2	.	.	1	.	.	99·72	86

Correlation ratio $\eta = 0{\cdot}17 \pm 0{\cdot}07$; Standard deviation 13·30.

Table XXVII

Dr Smith's Home

SIMPLEX TEST

GIRLS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	110·0	1
B	.	.	.	.	.	2	.	.	1	5	2	4	4	.	.	.	.	.	.	.	.	100·94	18
C	.	.	.	.	.	5	1	3	2	3	4	3	.	3	1	.	.	.	.	.	.	95·92	25
D	.	.	.	1	.	1	1	6	5	5	3	1	1	1	.	.	.	.	.	.	.	93·28	25
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	.	8	2	9	8	13	9	8	6	4	1	.	.	.	.	.	.	96·48	69

Correlation ratio $\eta = 0{\cdot}29 \pm 0{\cdot}07$; Standard deviation 12·07.

Table XXVIII

Dr Smith's Home

BINET-SIMPLEX AVERAGE

BOYS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	.	1	.	1	.	.	1	.	.	.	.	.	.	.	99·0	4
B	.	.	.	.	.	.	1	1	2	4	.	1	2	3	.	1	.	.	.	.	.	104·2	15
C	.	.	.	.	.	1	1	8	3	6	5	6	6	1	1	2	.	1	.	.	.	101·1	41
D	.	.	.	.	1	2	.	3	3	4	4	4	1	1	.	.	.	.	.	.	.	96·48	23
E	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	98·0	1
Total...	.	.	.	.	1	3	3	12	9	15	10	11	9	6	1	3	.	1	.	.	.	100·25	84

Correlation ratio $\eta = 0{\cdot}21 \pm 0{\cdot}07$; Standard deviation 12·76.

Table XXIX

Dr Smith's Home

BINET-SIMPLEX AVERAGE

GIRLS

Mid-parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	105·0	1
B	.	.	.	.	.	.	1	1	3	3	5	1	3	1	.	.	.	.	.	.	.	100·06	18
C	.	.	.	.	.	2	3	3	4	1	5	.	5	2	.	.	.	.	.	.	.	97·08	25
D	.	.	.	1	1	.	1	6	6	5	3	1	.	.	.	1	.	.	.	.	.	92·76	25
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	1	2	5	10	13	9	13	3	8	3	.	1	.	.	.	.	.	96·41	69

Correlation ratio $\eta = 0{\cdot}26 \pm 0{\cdot}08$; Standard deviation 11·6.

tion between the parents' class and the child's intelligence. In some instances, as, for example, the correlation of the girls' intelligence with the mothers' class (Simplex test—Table XXI), the coefficient is actually higher for those children who have always been separated from their parents, than for the elementary school children living in their own homes. It remains true, however, that nowhere is the difference between the average intelligence levels of the five classes as great in the institution as in the elementary school children.

With the exception of the one coefficient just mentioned, i.e. girls' intelligence with mothers' class, the child's intelligence shows a higher correlation with the father's than with the mother's class. This may be explained by the fact that there was on the whole a smaller range of social class among the mothers, and those classes were more difficult to disentangle accurately. It may be noted that on the whole the boys show a very slightly higher correlation with the fathers' class, and the girls with the mothers'. This difference may be quite fortuitous, but it would be interesting to see whether it recurs in the results of any other investigations.

A curiously anomalous result is the one higher correlation provided by the Simplex test marks and the mothers' class (girls) (Table XXI). These discrepancies continually crop up in work of this kind, and all we can do is to put them down to the smallness of the groups, refrain from basing any weighty conclusions on them, and hope that in the future someone will be able to find groups sufficiently large to prevent their occurrence, or several other small groups to confirm or contradict these results.

What finally emerges from this part of the work is that though a child has never lived with its parents, it is likely, other things being equal, to have a slightly higher intelligence if it comes from one of the so-called upper classes, than if it is the child of labouring people. From classes D and E, children with an I.Q. of over 120 are considerably rarer than those with one below 80, while from classes A and B exactly the opposite is true. There are, however, a large number of very bright children in the lower classes, and very dull children in the upper classes, of whom more will be said in a later section.

Tables XXX to XXXIII show the results of Simplex and Stanford-Binet tests given to the children of the British Homes. Luckily, the numbers, for the Simplex test at any rate, are here more adequate from a statistical point of view. The correlations were unexpectedly high. It is difficult to see why these children, who have spent on an average

0·38 of their lives (or 4 yr. 5 months) in the Homes and away from their parents, should yield a higher correlation than the elementary school children who have never left home. Possibly the range of classes is greater. The A class is larger in proportion, and the E's were of a very low grade—many of them N.S.P.C.C. cases, and children passed on from Guardians' Institutions[1].

Section 8. *Effect on correlation of age of leaving parents*

The second question on our list was: in the British Homes group, where the children have been admitted at different ages, do those who were admitted very young show a smaller correlation between intelligence and parents' occupations than those admitted at a later age?

Correlations were reckoned separately for those children who left home before they were 3, and those who were admitted at some age older than 3. The groups were very small. There were only 68 children in the whole group admitted under 3. As many of them were still quite young, they had to be given Stanford-Binet tests. They were compared with 107 unselected children admitted at an older age who were given the same test. The results are shown in Tables XXXIV to XXXVII. The association of intelligence and the social class of the parents is certainly greater for the children who remained longer in their homes. There is a more distinct slant in the distributions, and the correlation ratios (for what they are worth) are higher. The ratio of 0·59 for boys admitted after 3 is extremely high, and would be quite remarkable did not the smallness of the group admit of its being partly due to chance. It would be interesting if other similar groups could be tested, to see whether these results are confirmed.

Section 9. *Possible improvement of intelligence with improvement of environment*

The next question asked was whether these children, when taken from bad homes and put into fairly favourable surroundings, improve in intelligence.

[1] *Correlation of intelligence of siblings.* Among the children tested in the British Homes group 105 pairs of siblings worked the Simplex test. The correlation of their intelligences will not tell us much about the inheritance of ability, because the pairs of siblings had in practically all cases been brought up together. But the correlation was found, to ascertain whether the findings of other workers were confirmed. The correlation was $r = 0{\cdot}49 \pm 0{\cdot}05$, which is about that usually found.

The children in the British Homes are not all there because of bad home conditions. Some of them are orphans from good homes. For this particular enquiry, therefore, the children who did come from undeniably bad homes were picked out. The standard of badness was here necessarily a subjective one. The writer went through the case papers of all the children tested, and selected those whose home circumstances seemed so bad that life in any kind of institution would be preferable. N.S.P.C.C. cases, Guardians' cases, and the children of insane, drunken or criminal parents formed the bulk of them. These children were then divided into four groups, not according to the length of time they had been in the institution but according to the proportion of their life spent there. It is probable that this is a more useful measure than the crude length of time spent in the homes. The experience of 6 months, for example, has probably much greater influence on a child of 3, than on a child of 13. The children were therefore grouped according to whether they had spent a fifth, or two-fifths, or three-fifths, etc., of their lives in the homes.

If a favourable environment improves intelligence, those children who had been removed from bad surroundings, to spend the greater part of their lives in better ones, should do better than those but recently taken from unfavourable conditions. Table XXXVIII gives the average intelligence of the children in these four groups. *A* is the group which has spent the smallest proportion of its life—from 0 to 0·19—in the institution. Group *D* is of children who have spent three-fifths or more of their life there. The result does not show any improvement. The scattering of the averages seems to be quite haphazard. The numbers in each group are again small, and it is possible that if larger numbers had been obtainable some trend would have been shown. If the *A*'s and *B*'s are grouped together, and also the *C*'s and *D*'s, the result is slightly different. A slight increase in intelligence is shown for both boys and girls. The average rises from 92·5 to 94·6 for the girls, and from 92·8 to 95·9 for the boys.

Section 10. *Possible increase of correlation, with age, in children remaining with parents*

The next line of attack was to question whether children who remained in their own homes showed a higher correlation between their intelligence and their social class as they got older. If this increase were found, however, it might mean one of two things. It might be due to

Table XXX

The British Homes

STANFORD-BINET TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1	1	.	.	.	.	.	118·17	6
B	.	.	.	.	.	.	.	3	2	2	3	5	5	4	.	2	1	.	.	.	.	107·2̇	27
C	.	.	.	1	3	1	1	2	4	.	4	2	3	2	.	1	.	.	.	.	.	96·08	24
D	.	.	.	1	1	3	6	1	5	4	4	2	1	1	.	1	.	.	1	.	.	94·13	31
E	.	.	.	.	1	1	.	1	2	.	2	.	.	.	.	.	.	.	.	.	.	86·14	7
Total...	.	.	.	2	5	5	7	7	13	6	13	9	11	9	1	5	1	.	1	.	.	99·27	95

Correlation ratio $\eta = 0{\cdot}47 \pm 0{\cdot}05$; Standard deviation 15·28.

Table XXXI

The British Homes

STANFORD-BINET TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	.	.	.	3	.	1	1	.	.	.	.	.	.	.	103·0	6
B	.	.	.	.	.	1	.	1	1	3	2	4	4	.	.	.	.	.	.	.	1	104·65	17
C	1	.	.	1	1	.	1	3	3	4	6	6	3	1	2	1	.	.	1	.	.	100·26	34
D	1	.	1	1	2	3	1	1	.	3	2	1	1	1	1	.	.	.	.	.	.	88·47	19
E	.	.	.	.	.	.	.	.	.	.	3	.	1	.	.	.	.	.	.	.	.	103·75	4
Total...	2	.	1	2	3	4	3	5	4	10	16	11	10	3	3	1	.	.	1	.	1	98·78	80

Correlation ratio $\eta = 0{\cdot}35 \pm 0{\cdot}06$; Standard deviation 17·24.

Table XXXII

The British Homes

SIMPLEX TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	1	2	1	2	2	2	2	3	.	1	.	.	.	.	107·64	17
B	.	.	.	1	1	1	2	4	6	7	8	8	10	7	6	1	1	.	.	.	.	103·98	63
C	.	.	.	3	4	8	7	21	9	11	20	13	11	6	5	1	1	.	.	.	.	97·23	120
D	.	.	2	3	8	5	12	22	12	8	8	6	8	5	1	1	.	.	.	.	.	91·69	101
E	.	.	.	.	.	2	1	3	2	4	.	.	.	.	.	.	.	.	.	.	.	89·33	12
Total...	.	.	2	7	13	16	23	51	31	31	38	29	31	20	15	3	3	.	.	.	.	97·07	313

Correlation ratio $\eta = 0{\cdot}32 \pm 0{\cdot}02$; Standard deviation 14·84.

Table XXXIII

The British Homes

SIMPLEX TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	2	.	3	4	2	.	2	.	1	.	.	.	.	108·42	14
B	.	.	.	.	2	.	4	7	7	7	7	8	6	2	3	2	.	.	.	.	.	99·85	55
C	.	.	.	2	3	8	13	11	16	10	12	14	9	2	1	1	1	.	.	.	.	94·68	103
D	.	.	1	4	4	5	11	17	10	15	12	6	2	.	1	1	.	.	.	.	.	90·93	89
E	.	.	.	.	1	.	1	2	1	2	1	1	.	.	.	.	.	.	.	.	.	91·56	9
Total...	.	.	1	6	10	13	29	37	36	34	35	33	19	4	7	4	2	.	.	.	.	95·12	270

Correlation ratio $\eta = 0{\cdot}34 \pm 0{\cdot}04$; Standard deviation 13·199.

Table XXXIV

The British Homes. Children admitted under 3 years

STANFORD-BINET TEST

BOYS

Parent's class	Distribution of I.Q.'s																				Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
A	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	116·5	2
B	.	.	.	.	.	.	.	1	1	.	.	3	.	.	.	1	.	.	.	.	.	104·3	6
C	.	.	.	.	2	1	1	1	1	.	3	1	.	1	.	1	.	.	.	.	.	94·9	12
D	.	.	.	1	.	1	2	1	4	.	4	1	.	1	.	.	.	.	1	.	.	95·9	16
E	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	91·5	2
Total...	.	.	.	1	2	2	3	3	8	.	7	5	.	4	.	2	.	.	1	.	.	97·76	38

Correlation ratio $\eta = 0{\cdot}34 \pm 0{\cdot}1$; Standard deviation 16·42.

Table XXXV

The British Homes. Children admitted under 3 years

STANFORD-BINET TEST

GIRLS

Parent's class	Distribution of I.Q.'s																				Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
A	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	102·0	1
B	.	.	.	.	.	.	.	1	1	.	.	2	3	.	.	.	.	.	.	.	1	110·13	8
C	.	.	.	1	.	.	.	1	2	2	2	1	2	1	2	.	.	.	1	.	.	104·2	15
D	.	.	.	.	1	.	.	1	.	1	.	.	1	.	.	.	.	.	.	.	.	93·25	4
E	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	105·5	2
Total...	.	.	.	1	1	.	.	3	3	3	4	3	7	1	2	.	.	.	1	.	1	104·3	30

Correlation ratio $\eta = 0{\cdot}297 \pm 0{\cdot}16$; Standard deviation 17·04.

Table XXXVI

The British Homes. Children admitted over 3 *years*

STANFORD-BINET TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	1	.	.	.	.	.	119·0	4
B	.	.	.	.	.	.	.	2	1	2	3	2	5	4	.	1	1	.	.	.	.	108·04	21
C	.	.	.	1	1	.	.	1	3	.	1	1	3	1	.	.	.	.	.	.	.	97·25	12
D	.	.	.	.	1	2	4	.	1	4	.	1	1	.	.	1	.	.	.	.	.	92·3	15
E	.	.	.	.	1	1	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	84·0	5
Total...	.	.	.	1	3	3	4	4	5	6	6	4	11	5	1	3	1	.	.	.	.	100·1	57

Correlation ratio $\eta = 0{\cdot}599 \pm 0{\cdot}06$; Standard deviation 15·74.

Table XXXVII

The British Homes. Children admitted over 3 *years*

STANFORD-BINET TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	1	.	.	.	2	.	1	1	.	.	.	.	.	.	.	103·2	5
B	.	.	.	.	.	1	.	.	.	3	2	2	1	.	.	.	.	.	.	.	.	99·7	9
C	1	.	.	.	1	.	1	2	1	2	4	5	1	.	.	1	.	.	.	.	.	97·2	19
D	1	.	1	1	1	3	1	.	.	2	2	1	.	1	1	.	.	.	.	.	.	87·2	15
E	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	95·4	2
Total...	2	.	1	1	2	4	3	2	1	7	12	8	3	2	1	1	.	.	.	.	.	95·44	50

Correlation ratio $\eta = 0{\cdot}35 \pm 0{\cdot}08$; Standard deviation 16·48.

Table XXXVIII

The British Homes

SIMPLEX TEST

Intelligence and proportion of life in Homes

Group	Boys		Girls	
	Mean I.Q.	No. of cases	Mean I.Q.	No. of cases
A	92·64	45	93·64	39
B	93·08	49	91·18	32
C	96·79	43	96·41	39
D	93·46	24	91·4	22

Correlation ratios: Boys $\eta = 0{\cdot}12 \pm 0{\cdot}05$; Girls $\eta = 0{\cdot}17 \pm 0{\cdot}06$.

N.B. *A* = 0 to 0·19 of life in Homes. *B* = 0·2 to 0·39 of life in Homes. *C* = 0·4 to 0·59 of life in Homes. *D* = 0·6 and over of life in Homes.

modification by the environment, but it might depend on genuinely inborn factors which ripened gradually, or only became effective in the later years of childhood. For this reason a control group is particularly necessary here. If any increase in the correlations is due to inborn factors, it should appear also among the children separated from their parents. If it depends on environment, it should appear only among the children living at home. For this enquiry the children of the London elementary school were divided into four groups—10, 11, 12 and 13-year-olds—and the correlations reckoned separately for each age group. The results are shown in Tables XXXIX to XLVI. It is unfortunate that a greater range of age could not be shown. But as the Simplex tests are of little value for children under 10, and Stanford-Binet tests would have taken more time than was available, this could not be avoided. It will be seen that the correlations do rise (with the exception of an anomalous result for the 12-year-old girls) from about 0·3 to 0·45 for the girls, and from 0·23 to 0·37 for the boys. For comparison with these results, groups were sought from among the children of Dr Smith's Home, to see whether a similar rise could be found there. It was difficult to divide the children in any way which would give groups large enough to be of any use. It was therefore decided to divide the results of the Stanford-Binet test into two groups for boys and two for girls, the lower groups to contain those from children under 11, the upper groups those from children over 11. Even then the groups were small, and to keep them as large as possible a somewhat looser class classification was adopted. If the class of both parents was known, the mid-parent's class was taken to be that

of the child. If that of only one parent was given, the child was put into that of the known parent. These results are not strictly comparable with those from the elementary school, as they are based on Stanford-Binet tests, while the latter are based on the Simplex, also the age groupings are somewhat different; but they are good enough to show the trend. The results are given in Tables XLVII to L. It will be seen that though the correlations rise very slightly, from 0·22 to 0·28 for the boys, and from 0·21 to 0·25 for the girls, the rise is much smaller than that for the elementary school, even though the range of age, which might be expected to increase the rise, is much wider.

Section 11. *Effect of uniformity of environment*

So far, we have dealt chiefly with the average intelligence levels of various groups. Something might be learnt by a comparison of the range of intelligence within groups. If environment can affect intelligence scores, we should expect children reared in a uniform environment to be more alike than those brought up in dissimilar surroundings. The children within a single residential institution should show a smaller range of intelligence than, for instance, those living in their own homes and attending a day school. The usual way of expressing the range of intelligence is by the coefficient of variation. Comparing Dr Smith's Home and the London elementary school, as giving the extremes of uniformity and diversity within the limits of the present study, we find that the coefficients of variation are as follows:

	Boys	Girls
Dr Smith's Home	13·93	12·94
Elementary school	15·39	14·04

These increases are very small, and are statistically barely significant. They are in the direction one would expect, but are certainly smaller than might be assumed, considering the very great uniformity of environment inside Dr Smith's Home.

It might be expected, also, that with increased length of time in an institution, children might become more alike, and this coefficient of variation at successive age levels decrease. Prof. Burt[1] discovered a decrease in variability at the older ages among ordinary elementary school children, but attributed this to defective standardisation of the Binet-Simon tests for the older children. In his opinion variability is relatively constant from year to year, at any rate until the age of 10,

[1] *Mental and Scholastic Tests*, p. 158.

after which it may decrease slightly. Caradoc Jones and Carr-Saunders[1], in their survey of orphan children, found a decrease in variability with length of residence in an institution, and from this argued that three or more years' residence in a uniform environment tended to have a slightly equalising effect on the intelligence of the children. Where their material was re-sorted to provide groups of equal age, the effect was much less marked. For four out of their seven schools the coefficient of variation rose with length of residence for children under 12, and dropped only 1 per cent. for children of 12–13.

Relation of variability of I.Q.*'s to age. Dr Smith's Home*

STANFORD-BINET TEST

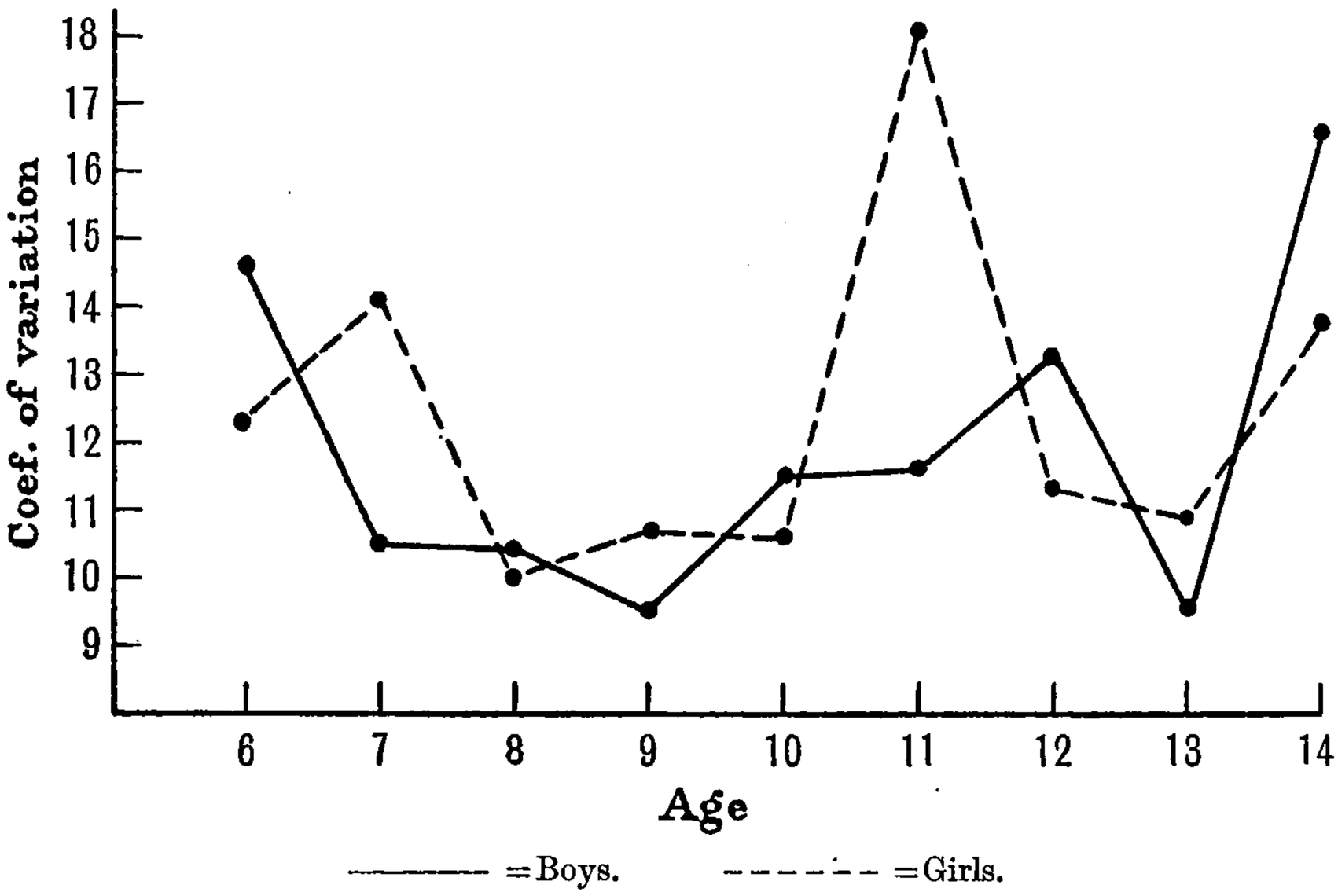


Fig. 3

In the present investigation, Dr Smith's Home provided a group which was useful in its nature, but unfortunately small in size. As the children were there from infancy, age was a direct measure of length of time in the institution. The coefficients of variation in terms of I.Q.'s were therefore worked out for each year separately, for both boys and girls. The Stanford-Binet test gave a greater range of age, and slightly larger numbers, but the curve was also ascertained for the Simplex figures. The Stanford-Binet results are given in Table LI, and the same thing is shown graphically in Fig. 3. The elementary

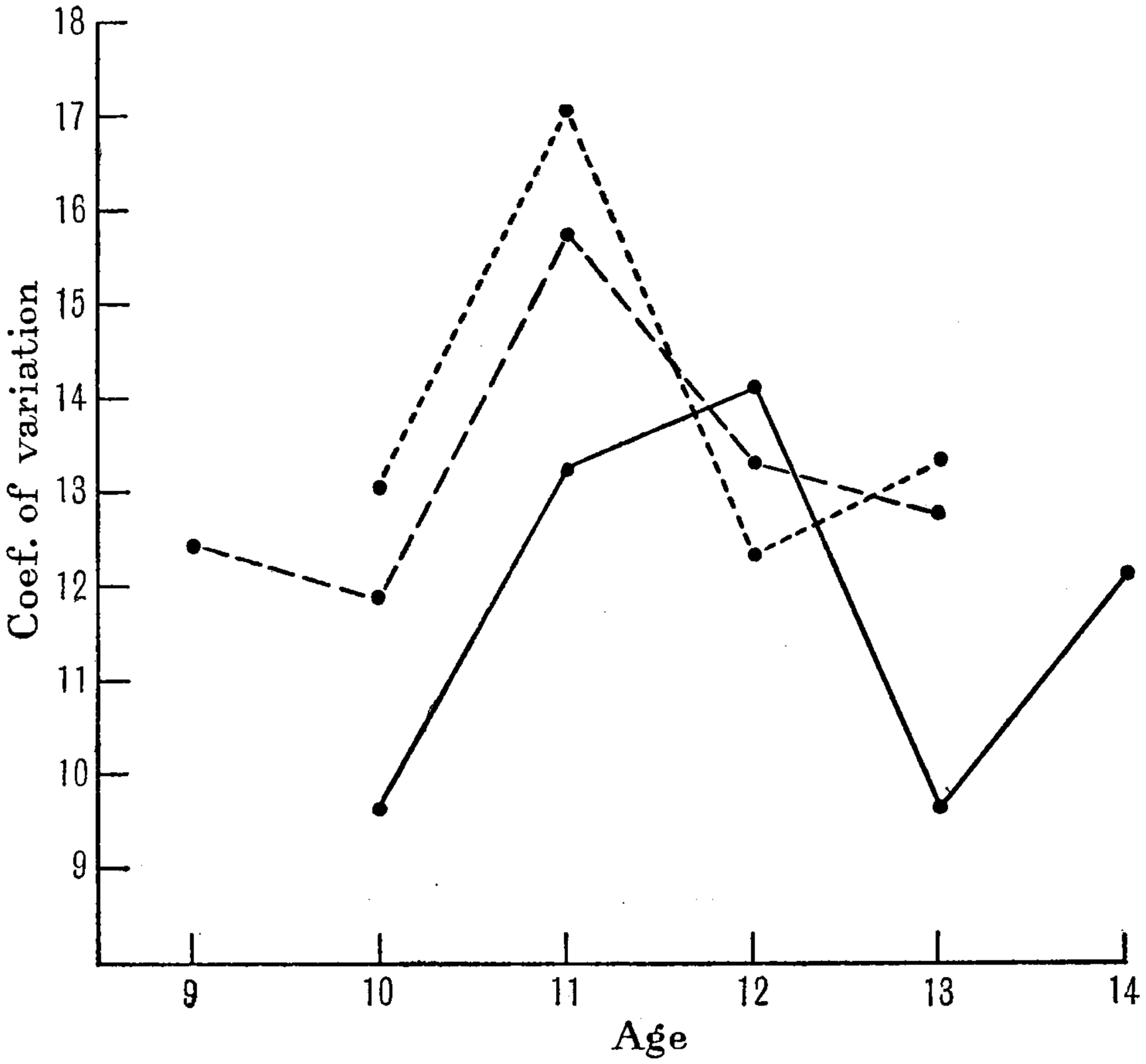
[1] *Brit. Journ. of Psych.* XVII, Pt. 4, April 1927, p. 359.

school gives a control group of children in their own homes, though not for the earlier ages. The British Homes group comes between the other two, as it is made up of children who have spent part of their time at home, part in the institution. The results are given in Tables LII and LIII, and Figs. 3, 4 and 5. Here the girls' results from the three

Relation of variability to age

SIMPLEX TEST

GIRLS



Dr Smith's Home ——— The British Homes – – – – – – Elementary School - - - - - -

Fig. 4

schools are given together, and the boys' together, because the curves for the girls show an interesting similarity of shape, while the boys' show an equally interesting dissimilarity.

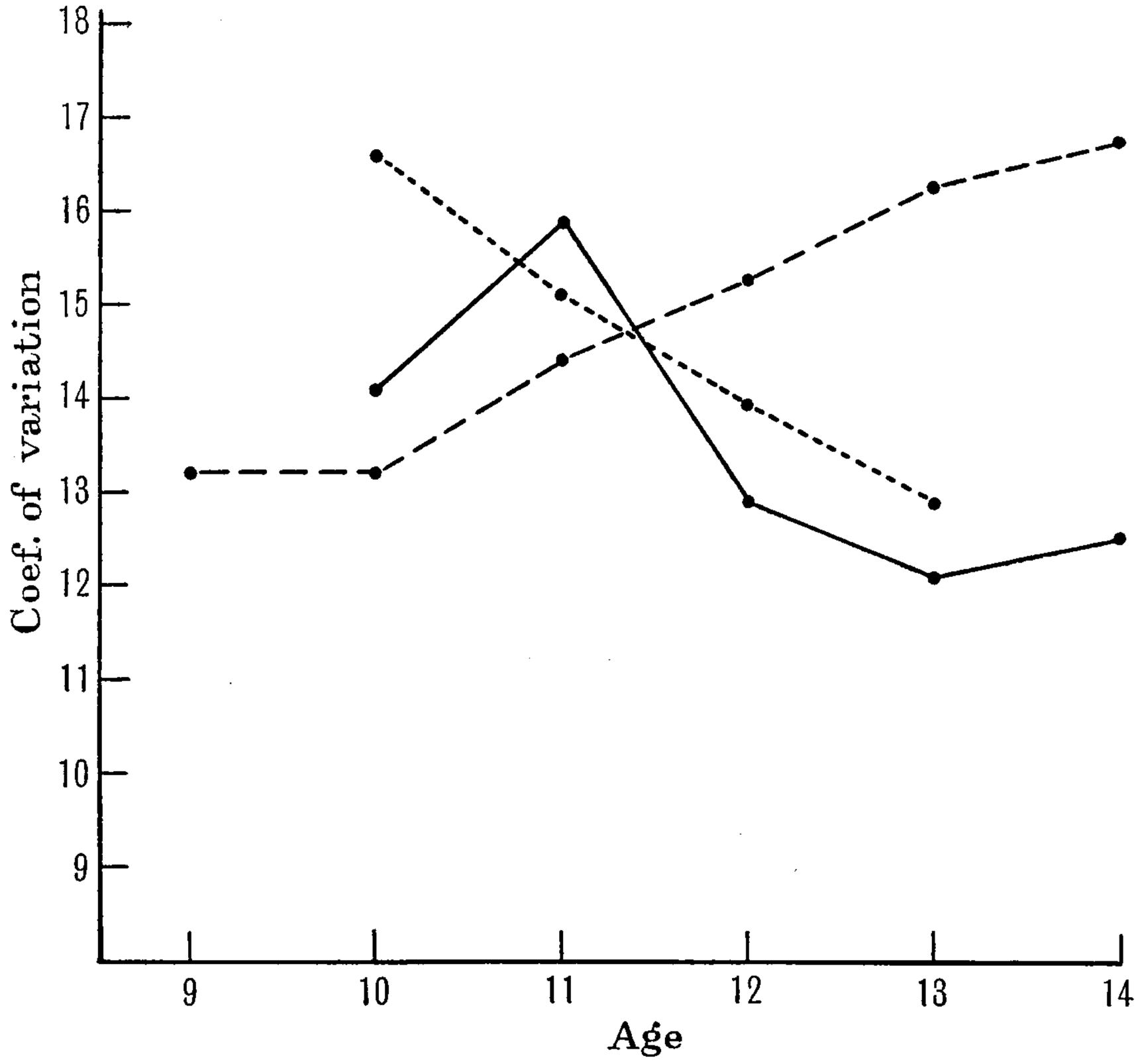
The Binet curves for the girls and boys are not unlike, and would probably have been more alike if the numbers had been larger. Both

show a drop near the beginning—presumably on settling down in a uniform environment after the slight dissimilarity of the schools and homes of their boarded-out period. Then there is a gradual rise to a peak at 11 for the girls and 12 for the boys, a drop, and another rise

Relation of variability to age

SIMPLEX TEST

Boys



Dr Smith's Home ——— The British Homes - - - - - - - Elementary School - - - - - -

Fig. 5

at 14. This is not very different from Dr Burt's estimate for elementary school children. There is no general tendency to become more alike, except from 11 or 12 to 13, which may be accounted for by test defects. The rise from 13 to 14 may be due to the approaching instability of puberty, and may be shown in spite of the tendency of the tests to

Table XXXIX

Elementary School. Age group 10

SIMPLEX TEST

BOYS

Parent's class	Distribution of I.Q.'s																				Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
A	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	120·5	2
B	.	.	.	.	.	.	.	.	.	.	5	1	.	.	2	1	1	1	.	.	.	113·64	11
C	.	.	.	.	.	3	.	1	2	4	6	1	2	3	.	2	.	1	.	1	2	107·43	28
D	.	.	.	.	.	.	1	.	.	1	.	2	1	1	.	1	.	.	.	.	.	106·71	7
E	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	93·0	1
Total...	.	.	.	.	.	3	1	1	3	5	11	4	3	5	2	5	1	2	.	1	2	108·96	49

Correlation ratio $\eta = 0{\cdot}23 \pm 0{\cdot}09$; Standard deviation 18·18.

Table XL

Elementary School. Age group 10

SIMPLEX TEST

GIRLS

Parent's class	Distribution of I.Q.'s																				Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	129·0	1
B	.	.	.	.	.	.	.	.	1	1	2	1	1	.	.	.	.	.	.	.	.	102·3	6
C	.	.	.	.	.	.	1	5	4	6	9	3	3	2	1	5	2	1	.	.	.	105·0	42
D	.	.	.	.	.	.	.	2	3	.	.	2	2	.	.	.	.	.	.	.	.	99·56	9
E	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	96·5	2
Total...	.	.	.	.	.	.	1	7	8	9	11	6	6	2	1	6	2	1	.	.	.	104·3	60

Correlation ratio $\eta = 0{\cdot}297 \pm 0{\cdot}08$; Standard deviation 13·6.

Table XLI

Elementary School. Age group 11

SIMPLEX TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	105·0	1
B	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	.	.	.	.	.	111·0	3
C	.	.	.	1	2	1	.	6	3	6	2	5	5	5	1	2	2	.	.	.	.	101·9	41
D	.	.	.	.	1	.	3	.	2	2	1	2	.	.	.	.	.	.	.	.	.	92·27	11
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	3	1	3	6	5	8	4	8	6	6	1	2	2	.	.	.	.	100·55	56

Correlation ratio $\eta = 0{\cdot}30 \pm 0{\cdot}08$; Standard deviation 15·23.

Table XLII

Elementary School. Age group 11

SIMPLEX TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	123·0	1
B	.	.	.	.	.	.	.	1	.	.	.	2	1	1	1	.	.	1	.	.	.	112·86	7
C	.	.	.	.	.	1	3	4	5	1	4	6	.	1	2	2	.	.	1	.	.	97·8	30
D	.	.	.	.	1	.	.	1	2	1	.	.	.	2	.	.	.	.	1	.	.	101·25	8
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	.	1	1	3	6	7	2	4	8	1	4	4	2	.	1	2	.	.	101·24	46

Correlation ratio $\eta = 0{\cdot}36 \pm 0{\cdot}07$; Standard deviation 17·27.

Table XLIII

Elementary School. Age group 12

SIMPLEX TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
B	.	.	.	.	.	.	1	1	.	1	1	1	3	.	1	.	.	.	.	.	.	103·1	9
C	.	.	.	1	.	2	2	2	6	3	4	5	2	2	1	1	.	.	.	.	.	98·42	31
D	.	.	.	.	1	1	2	2	.	.	1	1	1	.	.	.	.	.	.	.	.	90·2	9
E	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	112·0	1
Total...	.	.	.	1	1	3	5	5	6	4	6	7	7	2	2	1	.	.	.	.	.	98·06	50

Correlation ratio $\eta = 0{\cdot}32 \pm 0{\cdot}09$; Standard deviation 13·69.

Table XLIV

Elementary School. Age group 12

SIMPLEX TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	2	.	.	.	1	.	.	.	.	.	.	.	103·6	3
B	.	.	.	.	.	.	.	.	.	2	3	1	1	1	.	1	.	.	.	.	.	106·3	9
C	.	.	.	.	1	.	.	2	12	4	5	2	4	2	2	1	.	.	.	.	.	100·17	35
D	.	.	.	.	.	2	2	.	2	1	3	1	.	2	.	.	.	.	.	.	.	95·85	13
E	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	96·3	3
Total...	.	.	.	.	1	2	2	2	15	10	12	4	5	6	2	2	.	.	.	.	.	100·14	63

Correlation ratio $\eta = 0{\cdot}26 \pm 0{\cdot}08$; Standard deviation 12·32.

Table XLV

Elementary School. Age group 13

SIMPLEX TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	1	.	1	.	1	.	.	.	.	.	.	.	107·3	3
B	.	.	.	.	.	.	.	.	.	2	.	3	.	.	.	.	.	.	.	.	.	103·6	5
C	.	.	.	.	1	2	3	9	.	6	3	3	.	.	.	1	1	.	.	.	.	93·48	29
D	.	.	.	.	1	.	3	2	1	1	4	.	.	.	.	.	.	.	.	.	.	91·17	12
E	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	93·0	2
Total...	.	.	.	.	2	2	6	11	2	11	7	7	.	1	.	1	1	.	.	.	.	94·73	51

Correlation ratio $\eta = 0{\cdot}37 \pm 0{\cdot}08$; Standard deviation 12·25.

Table XLVI

Elementary School. Age group 13

SIMPLEX TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	105·3	3
B	.	.	.	.	.	.	.	1	1	3	.	4	2	1	1	.	.	.	.	.	.	105·97	13
C	.	.	1	.	.	1	4	5	2	3	7	3	1	2	.	.	.	.	.	.	.	95·52	29
D	.	.	.	.	.	2	1	2	2	.	.	.	1	.	.	.	.	.	.	.	.	88·0	8
E	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	87·0	1
Total...	.	.	1	.	.	3	5	9	7	6	7	7	4	3	1	1	.	.	.	.	.	97·07	54

Correlation ratio $\eta = 0{\cdot}45 \pm 0{\cdot}07$; Standard deviation 12·99.

Table XLVII

Dr Smith's Home. Children under 11

STANFORD-BINET TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	1	.	1	.	1	.	.	.	.	.	.	.	107·0	3
B	.	.	.	.	.	.	1	2	3	2	2	6	4	5	2	2	.	.	.	.	.	106·5	29
C	.	.	.	.	1	.	5	1	7	10	11	5	5	10	1	.	1	.	.	.	.	102·09	57
D	.	.	.	.	.	.	.	2	7	2	8	5	1	.	.	1	.	.	.	.	.	99·81	26
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	.	1	.	6	5	17	15	21	17	10	16	3	3	1	.	.	.	.	102·81	115

Correlation ratio $\eta = 0{\cdot}22 \pm 0{\cdot}06$; Standard deviation 11·4.

Table XLVIII

Dr Smith's Home. Children under 11

STANFORD-BINET TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	103·0	1
B	.	.	.	.	.	1	1	2	2	3	1	2	3	2	1	1	1	.	.	.	.	108·75	20
C	.	.	.	.	1	.	3	4	1	7	7	2	4	.	1	.	.	.	.	.	.	98·37	30
D	.	.	.	.	.	.	2	3	2	4	4	5	.	1	2	.	.	.	.	1	.	101·83	24
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	.	1	1	6	9	5	14	13	9	7	3	4	1	1	.	.	1	.	102·31	75

Correlation ratio $\eta = 0{\cdot}21 \pm 0{\cdot}07$; Standard deviation 13·54.

Table XLIX

Dr Smith's Home. Children over 11

STANFORD-BINET TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	1	3	1	.	2	.	.	.	.	.	.	.	.	.	95·71	7
B	.	.	.	.	.	.	1	1	.	2	6	2	3	1	1	.	.	1	.	.	.	105·2	18
C	.	.	.	.	1	1	4	4	5	5	7	8	3	4	1	.	2	.	.	.	.	100·98	45
D	.	.	.	.	.	3	3	4	4	5	6	4	2	2	.	.	.	.	.	.	.	96·06	33
E	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	92·0	1
Total...	.	.	.	.	1	4	8	10	13	13	19	16	8	7	2	.	2	1	.	.	.	99·71	104

Correlation ratio $\eta = 0{\cdot}28 \pm 0{\cdot}06$; Standard deviation 12·49.

Table L

Dr Smith's Home. Children over 11

STANFORD-BINET TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	98·0	3
B	.	.	.	.	.	.	1	2	3	4	3	1	1	2	1	.	.	.	.	.	.	99·8	18
C	.	.	.	.	1	1	3	2	5	3	4	5	.	1	2	.	.	.	.	.	.	97·37	27
D	.	.	.	1	2	.	2	5	5	5	3	1	.	.	.	.	.	1	.	.	.	92·08	25
E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
Total...	.	.	.	1	3	1	6	9	14	12	12	7	1	3	3	.	.	1	.	.	.	96·21	73

Correlation ratio $\eta = 0{\cdot}25 \pm 0{\cdot}07$; Standard deviation 12·52.

Table LI

Relation of variability of I.Q.*'s to age. Dr Smith's Home*

STANFORD-BINET TEST

BOYS

Age	Coef. of var.	No. of cases
6	14·62	15
7	10·51	20
8	10·44	38
9	9·54	35
10	11·42	19
11	11·56	21
12	13·24	34
13	9·65	35
14	16·05	14

GIRLS

Age	Coef. of var.	No. of cases
6	12·32	16
7	14·17	16
8	10·0	15
9	10·72	12
10	10·64	20
11	18·08	11
12	11·27	17
13	10·9	28
14	13·71	14

Table LII

Relation of variability to age

SIMPLEX TEST

BOYS

Dr Smith's Home

Age	Coef. of var.	No. of cases
9	—	—
10	14·07	16
11	15·93	21
12	12·94	29
13	12·15	34
14	12·51	19

The British Homes

Age	Coef. of var.	No. of cases
9	13·21	43
10	13·24	56
11	14·47	74
12	15·29	56
13	16·26	81
14	16·74	14

Elementary School

Age	Coef. of var.	No. of cases
9	—	—
10	16·68	49
11	15·14	56
12	13·96	50
13	12·93	51
14	—	—

Table LIII

Relation of variability to age

SIMPLEX TEST

GIRLS

Dr Smith's Home

Age	Coef. of var.	No. of cases
9	—	—
10	9·68	14
11	13·26	19
12	14·1	15
13	9·66	20
14	12·18	17

The British Homes

Age	Coef. of var.	No. of cases
9	12·47	33
10	11·94	57
11	15·77	57
12	13·31	67
13	12·82	65
14	—	—

Elementary School

Age	Coef. of var.	No. of cases
9	—	—
10	13·04	60
11	17·06	46
12	12·32	63
13	13·38	54
14	—	—

Table LIV

National Institute's group

GROUP TEST 34

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
B	1	1	.	1	.	3	4	3	3	7	5	2	3	.	.	.	.	.	.	.	.	91·21	33
C	2	2	5	5	7	9	15	14	9	12	21	7	5	.	.	.	.	.	.	.	.	87·87	113
D	1	1	1	1	6	3	3	6	5	5	4	4	2	.	.	.	.	.	.	.	.	87·52	42
E	.	1	.	.	.	.	1	2	.	2	.	.	.	.	.	.	.	.	.	.	.	84·6	6
Total...	4	5	6	7	13	15	23	25	17	26	30	13	10	.	.	.	.	.	.	.	.	88·28	194

Correlation ratio $\eta = 0{\cdot}09 \pm 0{\cdot}05$; Standard deviation 14·5.

Table LV

National Institute's group

GROUP TEST 34

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
B	.	.	.	1	3	1	5	2	1	5	4	3	4	.	.	.	.	.	.	.	.	93·0	29
C	.	1	4	4	10	8	9	5	6	12	10	5	1	.	.	.	.	.	.	.	.	86·19	75
D	3	5	5	6	4	7	6	3	5	2	3	2	.	.	.	.	.	.	.	.	.	74·92	51
E	.	1	.	.	2	1	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	78·0	6
Total...	3	7	9	11	19	17	20	11	12	19	18	10	5	.	.	.	.	.	.	.	.	83·08	161

Correlation ratio $\eta = 0{\cdot}47 \pm 0{\cdot}04$; Standard deviation 14·26.

Table LVI

National Institute's group

PERFORMANCE TEST

BOYS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
B	.	.	.	1	3	1	1	2	7	7	3	3	3	1	.	.	.	.	.	.	.	93·22	32
C	.	1	1	6	6	10	9	17	22	20	8	6	5	2	.	.	.	.	.	.	.	89·95	113
D	.	.	1	3	.	2	7	7	12	2	4	3	1	.	1	.	.	.	.	.	.	89·93	43
E	.	.	.	.	1	.	.	.	1	3	1	.	.	.	.	.	.	.	.	.	.	92·16	6
Total...	.	1	2	10	10	13	17	26	42	32	16	12	9	3	1	.	.	.	.	.	.	90·55	194

Correlation ratio $\eta = 0{\cdot}101 \pm 0{\cdot}05$; Standard deviation 12·34.

Table LVII

National Institute's group

PERFORMANCE TEST

GIRLS

Parent's class	Distribution of I.Q.'s																					Mean I.Q.	No. of cases
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150		
A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	—	—
B	.	1	.	.	1	2	3	1	2	10	3	4	1	.	.	.	.	.	.	.	.	93·18	28
C	.	1	.	3	6	11	8	12	10	8	9	4	3	1	.	.	.	.	.	.	.	88·6	76
D	2	.	4	4	8	6	5	6	5	6	2	2	1	.	.	.	.	.	.	.	.	81·61	51
E	.	1	.	.	.	1	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	83·0	5
Total...	2	3	4	7	15	20	16	21	17	24	15	10	5	1	.	.	.	.	.	.	.	86·99	160

Correlation ratio $\eta = 0{\cdot}31 \pm 0{\cdot}05$; Standard deviation 13·7.

produce an opposite result. With better standardised tests it might be even greater. It will be interesting to see whether any new standardisation of tests produces the same results.

All three of the curves given by the girls' Simplex results are of the same general shape for the period which they cover. That from Dr Smith's Home is shifted downwards and to the right, which means that the variation is slightly less, and its highest point is at 12 instead of 11. That from the British Homes, as might be expected, takes a middle position, except that the variation at 12 is slightly higher than that among the elementary school girls.

When we turn to the boys' results, the picture is different. The Simplex curve from Dr Smith's Home is roughly similar, but in the elementary school variability steadily drops from the age of 10 to 13, while in the British Homes it steadily rises. It is difficult to see why this is so, especially as the groups in the two latter schools are of fair size, and results from them should have some meaning. All that can be said is that if there really is a tendency for the tests to show a spurious homogeneity at the older school ages, there must have been a considerable rise in variability among the boys to account for the increase in the coefficients. Why the boys of this group should show this rise, while the girls do not, seems inexplicable.

Section 12. *Correlation with non-verbal tests*

It has frequently been argued that most of the intelligence tests in common use place so large a premium on verbal facility of various kinds that poor children, whose linguistic training in their homes is notoriously bad, are placed at a disadvantage not due to intellectual inferiority on their part. Further, that if these children were given tests of a more practical kind, where words are unnecessary for the working out of the tests, they would do as well as children in more favourable circumstances. The group of children tested by the National Institute of Industrial Psychology was given a performance test. It was therefore possible to discover whether the association of test results and social class holds good for non-linguistic tests.

This group had one advantage. The children were all school-leavers —which means that they were all about 14 years old. Any anomalies due to age scattering are therefore eliminated. On the other hand the range of social class was small. The schools were all fairly poor ones, and although the children have been sorted out according to their fathers' occupations, this was difficult. A smaller correlation might

therefore be expected than those obtained from the other groups. The results are given in Tables LVI and LVII. The results here show an interesting and quite unaccountable difference between the boys and girls. The girls show a correlation of 0·3, which is about the same as that from linguistic tests in the other schools. The boys, however, show practically no correlation, classes C and D having almost exactly the same mean score. Parallel tables were worked out for the group test (N.I.I.P. group test 34) which these children were given

Table LVIII

National Institute's group

PROSPERITY ESTIMATE AND INTELLIGENCE

PERFORMANCE TEST

BOYS

Class	Mean I.Q.	No. of cases
A	88·6	10
B	95·6	33
C	90·58	60
D	88·68	25
E	79·6	5
Total...	90·91	133

Correlation ratio $\eta = 0{\cdot}27 \pm 0{\cdot}05$.
Standard deviation 12·5.

GIRLS

Class	Mean I.Q.	No. of cases
A	91·9	10
B	86·58	26
C	86·54	39
D	77·0	17
E	89·0	4
Total...	85·58	96

Correlation ratio $\eta = 0{\cdot}33 \pm 0{\cdot}06$.
Standard deviation 12·7.

(see Tables LIV and LV). It is partly linguistic, but not entirely so. It provides a control result for the performance test, but is not exactly comparable with the linguistic tests given by the writer. The results here are even more surprising. The girls show a very high correlation—0·47—while the boys show practically none at all.

What is remarkable about these results is the extremely low level of the groups as a whole, and the striking difference in the correlations with parental class afforded by the boys and girls. The fact that a correlation was found with the performance results of the girls proves that for them, at any rate, it is not only intelligence as measured with the help of linguistic capacity which decreases from class to class.

The Institute also made an estimate of prosperity, based on their knowledge of the home, for each child. The homes were ranked on a five point scale, *A*, *B*, *C*, *D*, *E*. It was thought that this might form

an interesting alternative to the fathers' class as a measure of social standing. Correlations were therefore worked out on this basis for boys and girls separately, for both performance test and group test 34. The results are given in Tables LVIII and LIX. It is interesting to note that a correlation with the performance test now appears for the boys as well as for the girls, and the girls' is slightly raised. With group test 34 the boys' correlation is doubled, though even then it is very small. The girls' is slightly lowered. These results may possibly

Table LIX

National Institute's group

PROSPERITY ESTIMATE AND INTELLIGENCE

GROUP TEST 34

BOYS

Class	Mean I.Q.	No. of cases
A	85·4	10
B	92·79	33
C	87·54	61
D	85·28	25
E	—	—
Total...	88·09	129

Correlation ratio $\eta = 0{\cdot}19 \pm 0{\cdot}06$.
Standard deviation 14·6.

GIRLS

Class	Mean I.Q.	No. of cases
A	94·0	10
B	84·38	26
C	83·85	41
D	74·11	18
E	77·75	4
Total...	83·0	99

Correlation ratio $\eta = 0{\cdot}36 \pm 0{\cdot}06$.
Standard deviation 14·9.

lessen somewhat the anomaly of the very low correlation previously noted. But as it is impossible to assess accurately the new factors introduced by the grouping for prosperity, the explanation of that anomaly must be left an open question.

It might be noted at this point that during the visiting of the first hundred homes of this investigation, the writer and the worker who accompanied her made an estimate of the mother's intelligence, on a five point scale, after a long conversation in which the child's history and prospects, and family matters generally were discussed. These estimates were made before the child's test results were known. The groups were very small, and the results of correlation with the Binet test results as follows:

Girls	$\eta = 0{\cdot}36 \pm 0{\cdot}10$ (36 cases)
Boys	$\eta = 0{\cdot}48 \pm 0{\cdot}07$ (52 cases)

Section 13. *Intelligence and age*

Comparison of the variations of intelligence levels with age in the different groups may throw some light on the problem of whether length of residence in an institution tends to improve or hinder the development of intelligence. If any drop in intelligence with age is

Intelligence and age. Dr Smith's Home

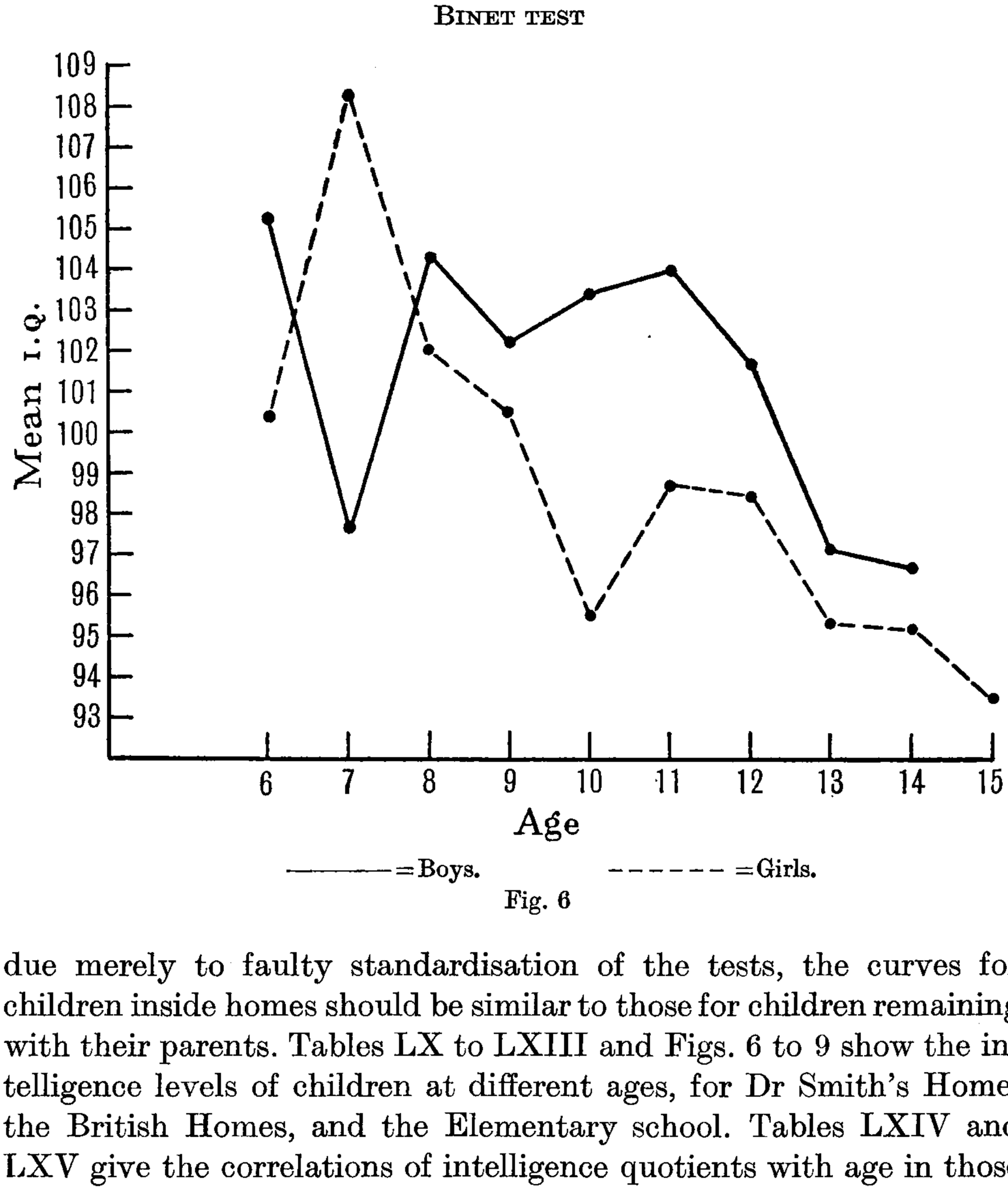


Fig. 6

due merely to faulty standardisation of the tests, the curves for children inside homes should be similar to those for children remaining with their parents. Tables LX to LXIII and Figs. 6 to 9 show the intelligence levels of children at different ages, for Dr Smith's Home, the British Homes, and the Elementary school. Tables LXIV and LXV give the correlations of intelligence quotients with age in those groups where the children were of different ages. The group from the National Institute of Industrial Psychology is not included here, as the children were all school-leavers, and therefore of a uniform age (14).

All the figures show a very big drop in intelligence level with age. It can hardly be doubted that this is largely due to the tests, though Mr Richardson considers the standardisation of his tests satisfactory, and Terman's correction of the standardisation for the later ages makes no difference to these figures. The decline in intelligence from

Intelligence and age. Dr Smith's Home

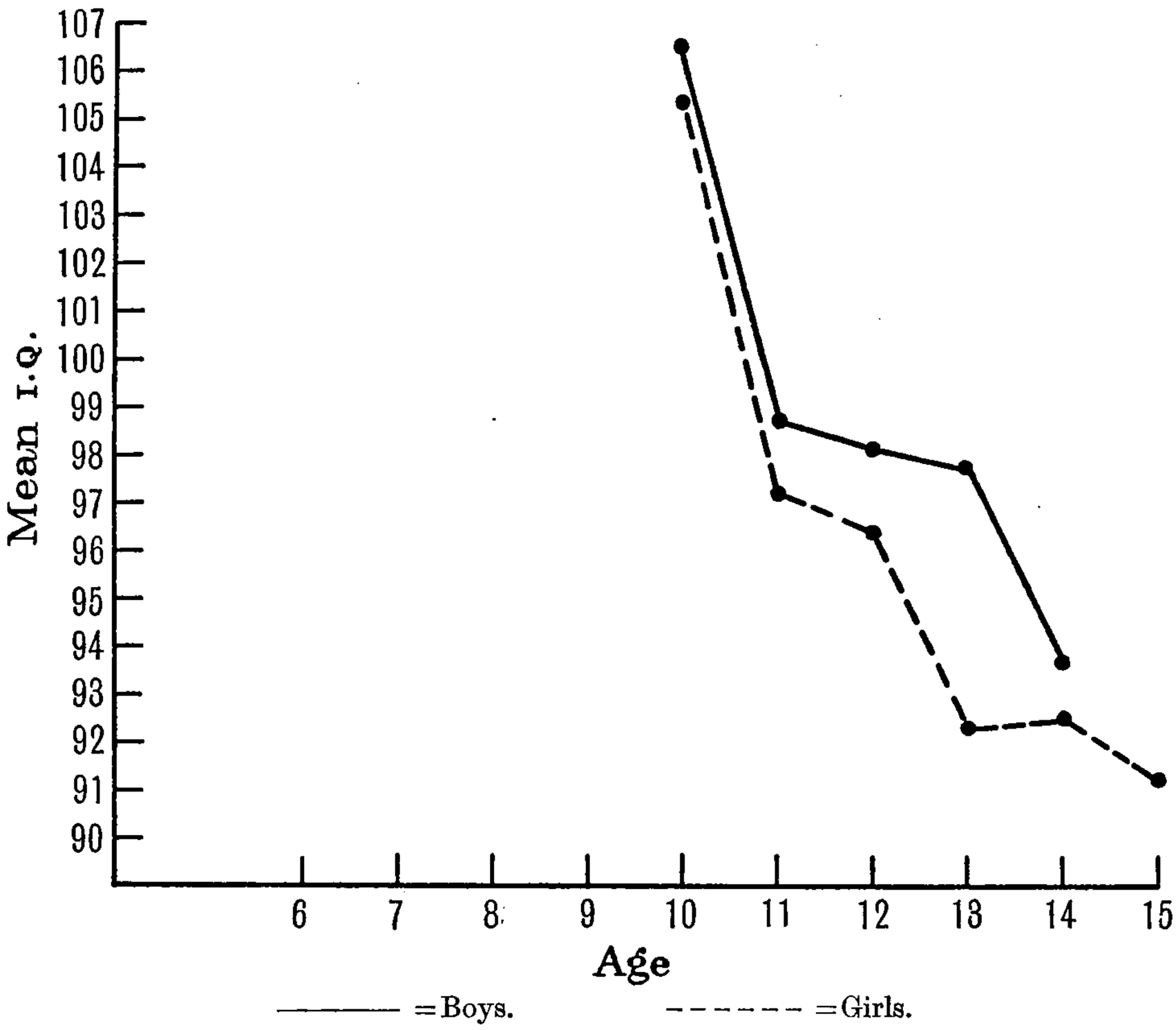


Fig. 7

10 to 14 is very little different, for the elementary school and for the Institution children. The elementary school shows a drop of 15 points from the highest figure to the lowest for the boys, and 12 points for the girls. The corresponding figures for Dr Smith's Home are 13 points for the boys, and 13 for the girls. For the British Homes the decline for these years is only 7 points, and for the girls 9. The correlation coefficients show no significant difference between the Institution children and those in their own homes. It does not therefore appear from these figures that these Institutions are having a deleterious

effect on the intelligence of their pupils, as compared with an ordinary home and school. This conclusion is in contrast to that of Prof. Carr-Saunders and Mr Caradoc Jones, who, in the absence of a control group of non-institution children, assumed that the drop in score was due to institutional life.

Intelligence and age. The British Homes

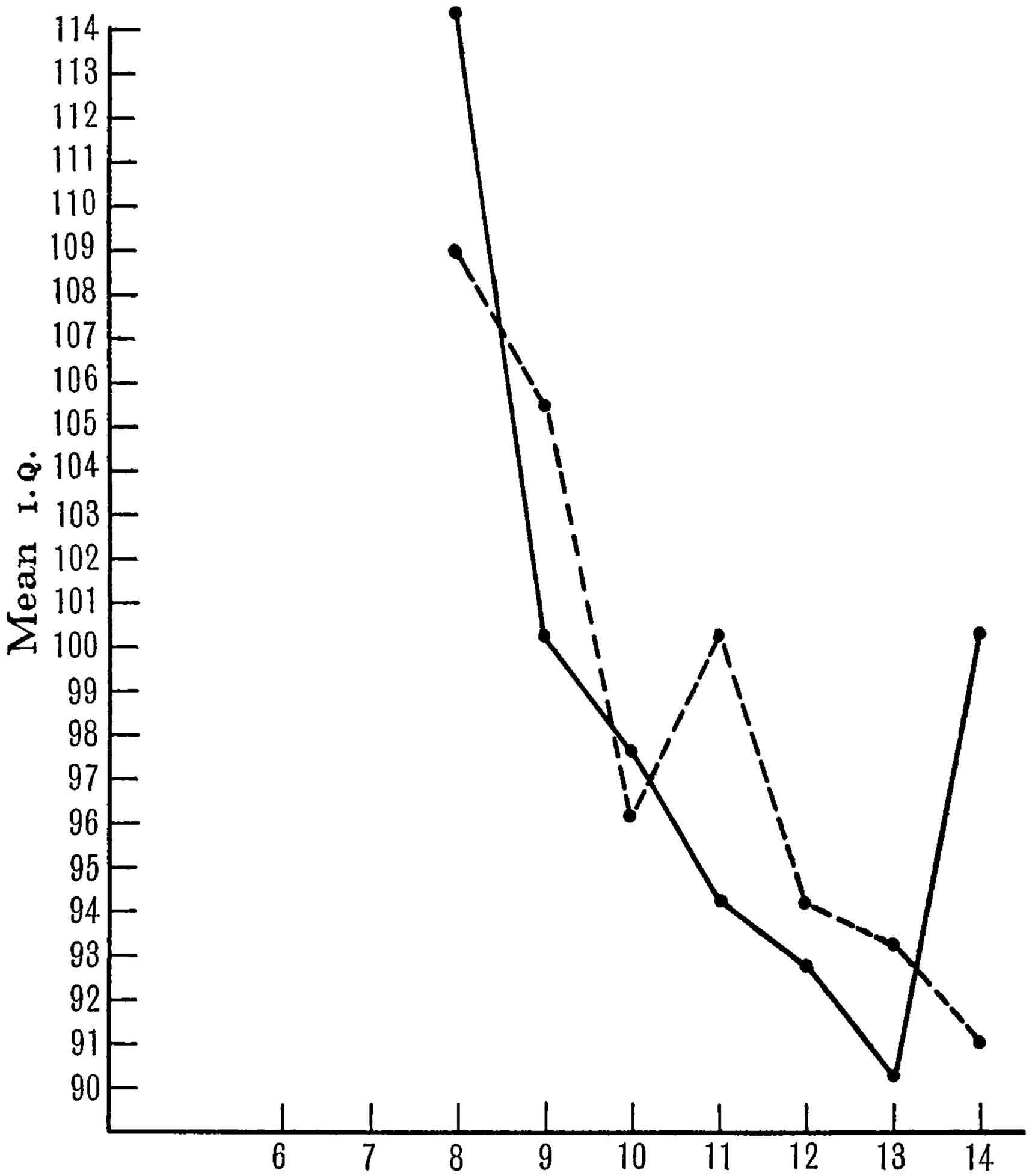


Fig. 8

The correlations shown in Tables LXIV and LXV are clear evidence of an urgent need for re-standardisation of these tests. A flaw of this kind lowers the value of all work done by means of the tests, and makes

Intelligence and age. London Elementary School

SIMPLEX TEST

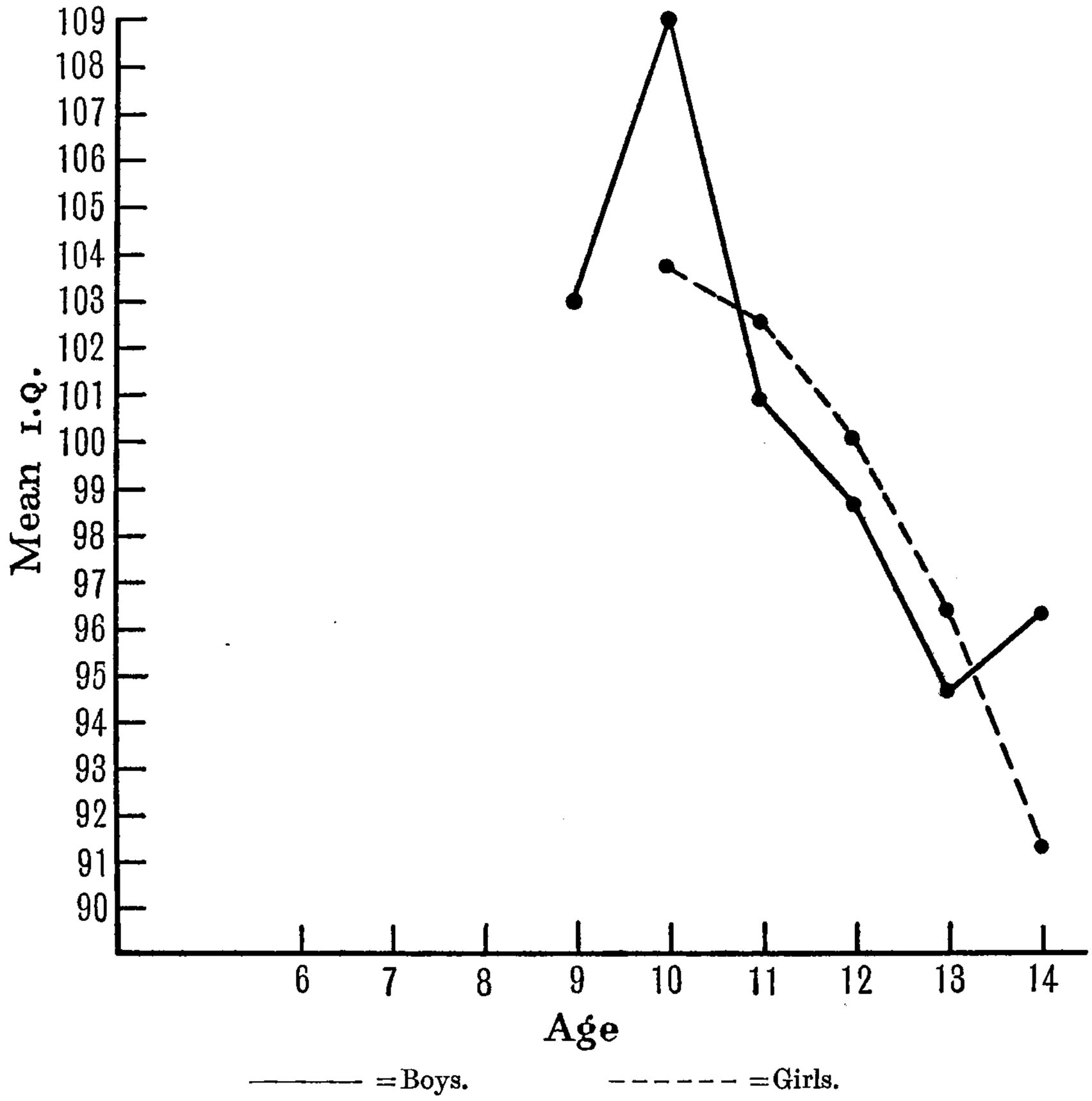


Fig. 9

interpretation of results more difficult. In these groups, however, there is no systematic error introduced, as would have been present if the older children tended to come from a different social class than that of the younger. The classes are equally mixed at each age level. It can therefore be assumed that the effect of the faulty standardisation is merely that of an inaccuracy in measurement, having the effect of lowering correlations based on these tests.

Section 14. *Intelligence and legitimacy*

In the British Homes group, it was possible to separate the legitimate from the illegitimate children. From time to time one hears generalisations about illegitimates—such as, that they are more intelligent, more stupid, more unstable, than other children. It seems not impossible, that the intangible psychological disadvantages of unwantedness, the probable state of fear of the mother during pregnancy, possible attempts at abortion, or the more concrete factors due to the mother's concealment of her condition and the consequent lack of special ante-natal care, might have some deleterious effect on the child. There is little doubt that the percentage of feeble-minded women among the mothers of illegitimate children is greater than among the general population.

Environmental conditions also tend to be less favourable for illegitimates. They are less likely to find a settled home, kindly treatment, and financial stability, than those whose parents are married.

It was therefore decided to compare two parallel groups of children, differing only in the matter of legitimacy, from the British Homes.

The children in Dr Smith's Home could not be used, as they were all illegitimate, and there was no group of legitimate children with the same environment. In the British Homes, however, among the 620 children to whom the Simplex test was given, there were 56 girls and 51 boys who were illegitimate. These two groups could be usefully compared with legitimate children from the same Institution. To compare the small illegitimate group with the large legitimate one was not considered advisable, as the proportion of children in each of the five social classes varied between the two sets. The illegitimate children, probably because of the nature of the Institution, tended to be drawn more largely from the higher social classes, than did the membership of the Institution as a whole. It was therefore decided to select at random from among the legitimate children groups of boys and girls equal in number and with the five social classes represented in similar proportions to the groups of illegitimates. Illegitimates of whom the social class was not known had to be omitted. Two parallel groups each of 50 boys, two others, each of 54 girls, were finally obtained. These were compared in respect of the average height of their I.Q.'s (Simplex), their standard deviations, and their coefficients of variability. The results are shown in Table LXVI.

From this table it will be seen that the means of the two groups

Table LX

Intelligence and age. Dr Smith's Home

BINET TEST

BOYS

Age	Mean I.Q.	No. of cases
6	105·2	15
7	97·65	20
8	104·37	38
9	102·2	35
10	103·42	19
11	104·0	21
12	101·77	34
13	97·03	35
14	96·71	14
15	—	—

GIRLS

Age	Mean I.Q.	No. of cases
6	100·3	16
7	108·31	16
8	102·06	15
9	100·5	12
10	95·5	20
11	98·73	11
12	98·41	17
13	95·32	28
14	95·21	14
15	93·5	4

Table LXI

Intelligence and age. Dr Smith's Home

SIMPLEX TEST

BOYS

Age	Mean I.Q.	No. of cases
10	106·5	16
11	98·76	21
12	98·1	29
13	97·76	34
14	93·68	19
15	—	—

GIRLS

Age	Mean I.Q.	No. of cases
10	105·4	14
11	97·26	19
12	96·4	15
13	92·3	20
14	92·59	17
15	91·25	4

Table LXII

Intelligence and age. The British Homes

SIMPLEX TEST

BOYS

Age	Mean I.Q.	No. of cases
8	114·4	7
9	100·24	33
10	97·68	57
11	94·28	57
12	92·79	67
13	90·30	65
14	100·3	3

GIRLS

Age	Mean I.Q.	No. of cases
8	109·0	5
9	105·44	43
10	96·16	56
11	100·25	74
12	94·21	56
13	93·26	81
14	91·06	15

Table LXIII

Intelligence and age. London Elementary School

SIMPLEX TEST

BOYS

Age	Mean I.Q.	No. of cases
9	103·0	1
10	109·0	52
11	100·91	59
12	98·67	60
13	94·65	54
14	96·31	13

GIRLS

Age	Mean I.Q.	No. of cases
9	—	—
10	103·72	61
11	102·54	50
12	100·07	68
13	96·33	57
14	91·33	6

Table LXIV

Correlations of age with I.Q.

SIMPLEX TEST

Institution	Age and I.Q., r	No. of cases
Dr Smith's Home	Boys $-\cdot24 \pm \cdot05$	119
	Girls $-\cdot33 \pm \cdot06$	92
British Homes	Boys $-\cdot25 \pm \cdot03$	331
	Girls $-\cdot28 \pm \cdot04$	289
London elementary school	Boys $-\cdot30 \pm \cdot04$	239
	Girls $-\cdot23 \pm \cdot04$	242
Poor Law school (O)	Boys $-\cdot07 \pm \cdot07$	101
	Girls $-\cdot28 \pm \cdot07$	75
Poor Law school (B)	Boys $-\cdot31 \pm \cdot04$	137
	Girls $-\cdot14 \pm \cdot06$	102

Table LXV

Correlations of age with I.Q.

STANFORD-BINET TEST

Institution	Age and I.Q., r	No. of cases
Dr Smith's Home	Boys $-\cdot13 \pm \cdot04$	231
	Girls $-\cdot21 \pm \cdot04$	153
British Homes	Boys $-\cdot15 \pm \cdot07$	99
	Girls $-\cdot45^{*} \pm \cdot06$	85

* The high correlation of $-\cdot45$ found among the girls in the British Homes with the Stanford-Binet test can be largely accounted for by the fact that in this small group (85) there happened to be one or two very young children with very high I.Q.'s, and also several border-line defective girls of 15 or 16 who had been kept after the usual leaving age in one of the Homes.

show no significant difference. In neither case is the difference three times the probable error. The legitimate boys are slightly more intelligent than the illegitimate, but when we turn to the girls the position is reversed, and the illegitimate have a slight advantage.

Section 15. *Intelligence and health*

The only group of children in this investigation affording material for a study of the effect of health on intelligence was that of the elementary school children tested by the N.I.I.P. A systematic medical examination was regarded as necessary before vocational guidance could be given. For the sake of uniformity this work was done by one doctor only. Because of lack of time, and by reason of the inextinguishable tendency of the elementary school child to absent himself, or more particularly herself, when a medical examination is in the wind, a number of pupils escaped this very necessary part of the routine. Sufficiently large groups were obtained, however, both of boys and girls, to make statistical comparison worth while. Much of the material obtained by the doctor was, for obvious reasons, neglected in this enquiry. In the first place, cases of serious disease are practically never to be found among the population of an ordinary elementary school. Children suffering from the grosser forms of bodily complaint are removed to special schools or hospitals before they reach the school-leaving age. A few cases of incipient heart, lung, or nerve trouble are discovered, but these are too infrequent and too heterogeneous to be used statistically. Secondly, it was considered that to correlate with intelligence certain of the health factors of which we had knowledge would be merely a waste of time. Such things, for instance, as pulse or respiration rate, lung capacity, strength of grip, are significant only when considered in connection with many underlying conditions, which are probably different for all cases, and much too complicated to be summed up in a single figure.

Three measures, however, we had, which were considered sufficiently indicative of general health to be worth using. The first of these was a general health rating. The doctor was asked to assign to each child a letter, *A*, *B*, *C*, *D* or *E*, according to his opinion of the state of that child's health as a whole. *C* was to indicate average healthiness, a condition which might include minor ailments, but nothing which would be expected seriously to hinder the child's efficiency. This should be the largest class in any ordinary school, and might include perhaps 40 per cent. of the cases. Only the very few

perfectly robust children were to be given the mark *A*, while *E* was to be reserved for the equally few whose health was so poor as to make them practically unfit for normal school life. Classes *B* and *D* were to be intermediate between *A* and *C*, and *C* and *E* respectively, and should, assuming a normal distribution of health, each number about 25 per cent. of all the children.

The second measurement, which would, it was felt, afford some indication of the child's state of general health, was an index figure found by dividing his height by his weight. There is no necessary connection between health and height, or health and weight, but the ratio of weight to height is a fair measure of the nutritional condition, and also, therefore, to some extent, of general health. Though possibly of less value than a rating of general health, it has the advantage of being a perfectly objective measure, in no way dependent on the personal opinion of the investigator. As the child's height was in each case taken as the numerator, and his weight as the denominator of the fraction, the smaller the resultant figure, the better the level of nutrition indicated. If good nutrition has a favourable effect on intelligence, therefore, we should expect the correlation between the mental level and the height-weight index to be a negative one.

In addition to this measurement of nutrition, the doctor rated all the subjects on a three point scale for nutrition, according to his opinion of their condition. Class *B* was a large one of averagely nourished children, class *A* a small one of the extremely well-nourished, while class *C* was an equally small group of extremely ill-nourished subjects. Such a rating as this might give a more correct idea of a child's condition than the height-weight index, in cases such as those of overfatness, where that index would probably be at fault.

These three sets of measurements then, the rating for general health, the height-weight index, and the nutrition rating, were correlated with the mental ratios of both boys and girls, as found by the two measures of intelligence given to these children, the performance tests and group test 34. To correlate the two sets of ratings with intelligence, the η method was used, and to correlate intelligence with height-weight index, the product-moment method.

The results are shown in Tables LXVII to LXIX.

In addition to the group of children dealt with above, a preliminary group of 100 boys and girls was tested in connection with the same experiment. They were given a similar medical examination, but the intelligence tests used were slightly different. In addition to

group test 34 and the battery of performance tests, each child was given the Stanford-Binet test, and another of the N.I.I.P.'s group tests—group test 33.

Table LXVI

Intelligence and legitimacy

	Boys			Girls		
	Mean I.Q.	S.D.	C. of V.	Mean I.Q.	S.D.	C. of V.
Leg.	97·32 ±1·29	13·52 ±0·91	13·89	94·39 ±1·19	12·93 ±0·84	13·69
Illeg.	94·26 ±1·44	15·15 ±1·02	16·07	95·2 ±1·27	13·83 ±0·9	14·52

Table LXVII

Health rating and intelligence

	Boys		Girls	
	No. of cases	η	No. of cases	η
Performance and health rating ...	148	0·12 ±0·05	129	0·13 ±0·06
Group test 34 and health rating ...	147	0·22 ±0·05	129	0·21 ±0·06

Table LXVIII

Height-weight index and intelligence

	Boys		Girls	
	No. of cases	r	No. of cases	r
Performance and height-weight index	148	−0·11 ±0·05	129	−0·095 ±0·06
Group test 34 and height-weight index	146	−0·07 ±0·06	129	−0·13 ±0·06

Table LXIX

Nutrition rating and intelligence

	Boys		Girls	
	No. of cases	η	No. of cases	η
Performance and nutrition rating ...	149	0·16 ±0·05	130	0·0005 ±0·06
Group test 34 and nutrition rating ...	147	0·06 ±0·06	130	−0·07 ±0·06

As none of the tests were used in exactly the same form, this group is not comparable with the larger one. When the boys' results are separated from those of the girls, the two groups formed are too small to be very significant statistically, especially as some children were absent from nearly every test. The various scores have, however, been correlated, and are included for what they are worth. The results are shown in Tables LXX to LXXII.

Table LXX

Health rating and intelligence

	Boys		Girls	
	No. of cases	η	No. of cases	η
Binet and health rating	54	$0{\cdot}11 \pm 0{\cdot}09$	34	$0{\cdot}11 \pm 0{\cdot}11$
Performance and health rating ...	54	$0{\cdot}23 \pm 0{\cdot}09$	35	$0{\cdot}36 \pm 0{\cdot}1$
Group test 33 and health rating ...	53	$0{\cdot}27 \pm 0{\cdot}09$	32	$0{\cdot}04 \pm 0{\cdot}12$

Table LXXI

Height-weight index and intelligence

	Boys		Girls	
	No. of cases	r	No. of cases	r
Binet and height-weight index ...	55	$-0{\cdot}06 \pm 0{\cdot}09$	35	$-0{\cdot}21 \pm 0{\cdot}11$
Performance and height-weight index	55	$-0{\cdot}15 \pm 0{\cdot}09$	35	$-0{\cdot}54 \pm 0{\cdot}08$
Group test 33 and height-weight index	54	$-0{\cdot}18 \pm 0{\cdot}09$	32	$-0{\cdot}09 \pm 1{\cdot}18$

Table LXXII

Nutrition and intelligence

	Boys		Girls	
	No. of cases	η	No. of cases	η
Binet and nutrition	55	$-0{\cdot}08 \pm 0{\cdot}09$	35	$0{\cdot}14 \pm 0{\cdot}12$
Performance and nutrition	55	$0{\cdot}14 \pm 0{\cdot}09$	35	$0{\cdot}42 \pm 0{\cdot}09$
Group test 33 and nutrition	54	$0{\cdot}13 \pm 0{\cdot}09$	32	$0{\cdot}22 \pm 0{\cdot}11$

The correlations of η ·22 and ·21 between Group Test 34 and health rating (Table LXVII) are possibly misleading. Although for both boys and girls Class A has a considerably higher health rating than Class D, in both groups Class C has a slightly higher rating than Class B. The National Institute of Industrial Psychology has since worked on the same data and slightly readjusted the health ratings, taking a larger number of factors into account. Using the product-moment formula, and with 50 more cases in each group, they find no significant correlation between test results and health ratings.[1]

Section 16. *Some special groups*

It was considered worth while to select for special attention several groups of children formed by combining the results of the whole investigation.

(a) *Class A children.*

To begin with, class A, in each of the three main groups, had shown itself anomalous. All the class A results were therefore put together,

Class A children with I.Q. *above* 115

Parents' occupations

Journalists 3
Commercial travellers 3
Civil servants 2
Lieutenants 2
Managing director 1 (2 sons)
Wesleyan minister 1
Assistant publisher 1
Civil engineer 1
Designer 1
Farmer's son 1
Surveyor 1
Merchant 1
Dentist 1 (mother's class D)
Unknown 1

Class A children with I.Q. *below* 100

I.Q. 90 to 100	I.Q. 80 to 90	I.Q. 70 to 80
Commercial travellers 5— (1 mother's class D) Farmers 4 Teachers 2— (1 mother's class D) Mining engineer— (mother's class C) Cadet Naval commander Actor Independent Assistant publisher Civil servant Architect Portuguese student Unknown	Chemist Burmese barrister Chartered accountant— (mother's class D) Variety artist Artist Stage manager Student	Pathologist Indian law student

[1] *Methods of Choosing a Career.* F. M. Earle, 1931.

and an examination made of the actual occupations of the parents of children in this class. It was thought that the low levels of intelligence in some of the A groups might be due to the fact that the occupations there were badly classified: that the cases were mostly border-line ones which should rightly have been in class B. The A children with an I.Q. above 115 in the Elementary school, Dr Smith's Home, and the British Homes were picked out, and also those with an I.Q. below 100. The occupations of their parents are given above. The mothers, where no note is made, are class A or B.

It will be seen that many of the occupations within the low-intelligence group are well within the A class, though two of the border-line occupations—commercial travellers and farmers—account for nine of the cases. There are three commercial travellers, however, in the high-intelligence class.

(b) *Children with very high and very low* I.Q.

The groups of children with very high and very low intelligence quotients were also picked out for examination. An I.Q. above 135 was considered very high, and one below 70 very low. The occupations of the parents in these two classes are set out in the following lists:

Children with I.Q. *above* 135

I.Q. above 150	I.Q. 140 to 150	I.Q. 135 to 140
Motor salesman and shop assistant	Servant and soldier	Labourer and general servant
Waiter	Hammerman at docks	Policeman
Policeman	Chauffeur and cook	Shop keeper
	Prison warder and stewardess	Tailor
	Policeman	
	Hub turner	
	Warehouseman	

The most interesting fact about this list is the complete absence of any member of the A class. There are even only two, or possibly three, from class B. All the rest are from classes C and D.

The number of children found with a very low mental ratio is surprisingly large. In the three groups there were 28 children who were below the border-line of mental deficiency. Their fathers' occupations were as follows:

Labourers 6
Porters (various) 3
Painters, bricklayers, etc. 3
Farm labourers 3
Chauffeur 1
Sand blaster 1
Hydraulic press worker 1
Carman 1
Baker's assistant 1
Bus conductor 1
Engineer 1
Printer's warehouseman 1
Ostler 1
Scavenger 1
Unknown 1
Servants (mothers) 2

These occupations also all come within the C or D group.

(c) *Children of very young mothers.*

In Dr Smith's Home there were 20 children whose mothers were under 17 years of age. It was thought possible that these children might differ in some way from the group as a whole. Their mean I.Q. was therefore calculated, and found to be 102·1. There were, among the 20, four children who came from incestuous unions. Their I.Q.'s were 105, 80, 99, and 74. If they are taken out of the group the mean rises to 105·1. Even with one very high I.Q. (148) removed, it is still 102·3. The distribution of the 20 I.Q.'s is as follows:

Table LXXIII

Children of very young mothers

I.Q.	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
No. of cases	1	.	2	.	3	3	5	3	1	.	1	.	.	.	.	1

It might be imagined that the children of such very young mothers would be at a disadvantage as compared with the rest. On the contrary, they are more intelligent than the general level of their class. The class composition of the group was as follows: Class B, 1 case; B −, 2 cases; C, 7 cases; D, 8 cases. Seeing that nearly all the children are from classes C and D, we should expect the mean I.Q. to be below the 100 level.

PART III

CONCLUSIONS

It is now possible to summarise the general conclusions to which the enquiry seems to lead. The discovery of a correlation between the intelligence of children and the social class of their parents, when they have never seen those parents, is fairly conclusive evidence that the correlation so generally found for children in their own homes is not mainly due to the direct social influence of the home, but is a genuinely biological fact. The association is on the whole rather smaller, however, in the case of institution children, and there is little doubt that environmental conditions have some weight in influencing the response to tests.

The answers to the questions bearing directly on environmental changes bring rather conflicting evidence. The decrease in correlation between the child's intelligence and its social class among children taken away from home at an early age, as compared with those in the same Institutions who left home later, and the increasing correlation between intelligence and class with increase in age, for children remaining at home, both suggest that environment has to some extent influenced the test results. On the other hand, the children taken from bad homes into the British Homes showed practically no increase of intelligence with the improvement of their surroundings. There was also little difference in variability between the children in the uniform environment of Dr Smith's Home, and those in their own diverse homes. As regards the relation between variability and age the data are so indecisive that no conclusions can be drawn from them. The small correlations between health and intelligence are interesting, but difficult to interpret. In exactly what way the two are interrelated it is impossible to say in the present state of our knowledge.

The main feeling produced after consideration of the evidence gathered together in this study is that though the opinion widely held that intelligence is hereditary and is more abundant in the upper classes, is on the whole supported, very material qualifications must be attached to this view. In the first place, the difference between the classes, under circumstances of equal environmental opportunity, does not appear to be very great, the overlap being substantial.

Secondly, the large number of low intelligences from the A class, and the even more striking list of brilliant children from classes C and D, shows the hazardousness of generalisations about social classes as such. It becomes clear that for any definite plans for social reform based upon the differential inheritance of intelligence, social class is not a satisfactory grouping. Either some basis of classification resulting in more homogeneous and more widely differentiated groups needs to be found, or we must realise that the only safe unit by which to assess intelligence is the individual, or at most the family.

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THE literature concerned with the subject of the inheritance of intelligence has grown enormously during the last few years. *The Twenty-seventh Year Book of the National Society for the Study of Education* (1928) contains a valuable bibliography of 239 items, compiled by Miss B. S. Burks, with a critical summary of each. This, however, does not go beyond the year 1927. It has not been thought necessary to duplicate this material here, but as the volume is not easily accessible in England, the references starred as most important in that list, and which have most bearing on the present study, are given in Section I of this bibliography. The headings under which they are here quoted are those of Miss Burks.

Section II contains an alphabetical list of material which has appeared since 1927. It has not all been seen by the writer, much of it being inaccessible in London, and the studies examined are of very varying value. It may, however, be of use to those interested in the subject. The whole field of the nature-nurture problem is not covered, but only that part of it most directly related to the present study. Material on the important questions of racial differences in intelligence, and of the inheritance of pathological mental states, though part of the same wide subject, would have made the present list too bulky, and have been omitted, with one or two exceptions.

The studies with which the material presented in the present monograph has most in common are the two studies of foster children described in the *Twenty-seventh Year Book*[1, 2]. It differs from them by the fact of dealing with English data, and in the nature of the groups studied, especially in the distinctive character of the group in Dr Smith's Home.

Addendum. During the printing of this monograph, a new survey of the literature on the subject of inheritance and intelligence has come to the writer's notice. This is B. Schieffelin and J. C. Schwesinger, *Mental Tests and Heredity*, Galton Publishing Co., New York, 1930, pp. 297.

[1] F. N. Freeman, K. S. Holzinger and B. C. Mitchell, Univ. of Chicago. "The influence of environment on the intelligence, school achievement, and conduct of foster children," *Twenty-seventh Year Book of the Nat. Soc. for the Study of Education.*

[2] B. S. Burks, Stanford University. "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 Year Book of the Nat. Soc. for the Study of Education.*

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