A STUDY
OF THE MENTAL CAPACITY
OF DEPENDENT CHILDREN

BY

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PART I

METHODS AND RESULTS OF SURVEYS MADE TO ASCERTAIN THE INTELLIGENCE OF DEPENDENT CHILDREN.

THE INTELLIGENCE TEST.

Since Binet introduced to the world the idea of a general intelligence and introduced his great creation,--the Binet-Simon Test for its measurement, there has been much research undertaken to determine the degree of intelligence possessed by particular classes or homogeneous groups of people. The soldier, the deaf, the blind, the negro, the foreign born, the delinquent, and the dependent have all been the target of these investigations. While the study of delinquent children from the very beginning has engaged the attention afid the best efforts of the leading researches, comparitively little effort has been made until very recently to solve the problem of the orphaned dependent child.

THE NATURE OF AN INTELLIGENCE TEST.

To ascertain the intellectual abilities of the many special and selected groups in our population, many tests or examinations have been employed. Any test which calls into use the higher faculties for its successful operation, can be made a fair test to ascertain the intelligence of an individual. When knowledge is possessed of the manner in which the normal unselected individual handles the test a criterion for comparison is established. The establishment of such a norm is

known as "standardizing."

It is the usual thing to standardize a test on unselected children of school age. By comparing the score of an individual with the median score of the unselected group of children a fair idea of the subject's deviation from normality can be gleamed.

Many tests have been used in surveys of orphan and children's homes. The Binet is perhaps more widely used than any other. There have been many revisions of this test; formerly Goddard's revision was the accepted form but now that of Terman of Stanford University is supreme in the field. But other tests beside these are used, among them being: the Yerkes-Bridges Point Scale, the Herring Revision, and the Proteus Maze Scale, and others. Performance scales for the manipulation of concrete objects are also used. Among the following are the Pintner-Patterson Performance Scale, the Army Performance Scale, the Stenquist Mechanical Test, and the Ferguson Form Board. Group tests are also extensively used.

DEPENDENCE.

Most of the children tested are those cared for in orphan asylums and children's homes. It is worth remembering that the term "orphan" as applied to such children is very misleading. Orphan means strictly a child both of whose parents are dead. As a matter of fact only a small percentage

of the cases in the homes are orphans in this sense. A great many have only one parent living and some both living. The presence of the children in a home indicates therefore a breakdown on the part of the family either because of some unfortunate occurrence or else because of incapacity or lack of moral stamina on the part of the parents to support a child. The very fact that so many of the children have both parents living would lead one to suspect that in frequent cases the trouble lies in intelligence or character defects on the part of one or both parents, leading to an inability to compete with others in the ordinary course of life. This would lead us to suspect, therefore, a greater amount of deficiency among such children than would be found in unselected school children.

RESULTS FOUND IN A SURVEY OF DEPENDENT CHILDREN BY STENQUIST, THORNDIKE AND TRABUE (15).

The following is a quotation from a report made on the results of the survey. "Dependent children as a group are much below ordinary children of corresponding ages in the sort of abilities tested by the Binet, Completion and Reading of the cases in the homes two persons in this sense. A great many have only one parent living and some both living. The presence of the children in a home indicates therefore a breakdown on the part of the family either because of some unfortunate occurrence or else because of incapacity or lack of moral opinion on the part of the parents to support a child. The very fact that so many of the children have both parents living would lead one to suspect that in frequent cases the trouble lies in intelligence or character defects on the part of one or both parents, leading to an inability to compete with others in the ordinary course of life. This would lead us to suspect, therefore, a greater amount of deficiency among such children than would be found in unselected school children.

RESULTS FOUND IN A SURVEY OF DEPENDENT
CHILDREN IN [illegible], THREE-
NINE AND TWELVE (15).

The following is a quotation from a report made on the results of the survey. "Dependent children as a group are much below ordinary children of corresponding ages in the sort of abilities tested by the Binet, Completion and Reading

Tests. They differ, of course, among themselves. We find one child of much promise, forty-nine of nearly average ability or better, while forty-eight are four years or more behind and the remaining three-fifths are from half a year to four years behind.

"The median underageness of the children when measured by the Mechanical Test was 1.3 for nine and ten year children; 2 for eleven and twelve year old children; and 1.6 for thirteen and fourteen year children and 1.7 for fifteen and sixteen year old children.

"It can be seen that in the Mechanical Tests the dependent children are notably inferior, though not so much as in the more abstract ability, such as in tested in the Binet Scale. On the average they are about 1¾ years behind."

DR. PINTNER'S SURVEY OF 106 DEPENDENT CHILDREN (17)

In an examination of 106 dependent children Dr. R. Pintner concluded the following: "The chief charistic of dependent children is their general backwardness."

DR. PINTNER'S RESULTS.

A Diagnostic table of the 106 subjects follows.

Very bright	7.5%
Bright	13.2
Normal	35.
Backward	27.
Feeble-minded	22.

Note. The system of rating is shown in Part II.

The Ohio Bureau of Juvenile Research.

1603 County Home children and three special children's homes were given tests by the Ohio Bureau of Juvenile Research. The diagnostic distribution of the 1603 children examined is as follows:

Feeble-minded	33.75 %
Potential feeble-minded	10.04
Deferred diagnosis	36.56
Border line	2.35
Inferior	1.68
Normal	13.85
Bright	1.67
	100.00 %

The following is a quotation from the Bulletin by the Bureau:

"The high percentage of feeble-minded in these homes seems startling. It is even more startling if the potential feeble-minded are grouped with them. Our experience in this work has made us believe without a doubt that a large percentage of these children are at least"socially feeble-minded."

"The condition found in the various homes as indicated by percentage of feeble-mindedness is highly variable. The percentage of the actually feeble-minded varies in the thirty-four homes from 4.6% to 51.6%."

THE MISSISSIPPI MENTAL DEFICIENCY SURVEY.

Two large orphangges were surveyed under the direction of Dr. T. H. Haines (19). In one of these homes there were 140 children. Fifty-eight of these children were given individual examinations. Twenty of them were diagnosed as feeble-minded. Three of these had I.Q.'s of less than .50, ten others of less than .60, the remaining from .60 to .69. Six others were classed as border line cases.

The other orphanage surveyed had a population of about 130 children. Twenty-one of these had I.Q.'s from .42 to .68. Two others were classed as border liners, I.Q. of .64 and .67. Seventeen per cent. of the children of this orphan home were feeble-minded.

SURVEY OF THE NEW YORK STATE BOARD OF CHARITIES.

Hall(17) of the New York State Board of Charities reported a test of the orphan asylums of New York and found on the whole that this class of children were somewhat inferior to the public school children had were tested with the same test.

REPORT OF THE NEW HAMPSHIRE CHILDREN'S COMMISSION.

L. C. Streeter in his report on the Children's homes of New Hampshire gives the following summary: "The Binet Test was used in getting the mental rating of 1248 children. These tests show 49% normal, 30% backward and 21% feeble-minded. There is a much larger percentage of feeble-mindedness among the delinquents than among the dependents.

PINTNER'S SUMMARY.

The following table is a summary given by Pintner of the results found by the best workers in the field, in Pintner's "Intelligence Testing."

Institution.	Author.	No Exam.	F.M.	Backward.	Normal	Above Normal.
County Home	Stenquist	256	18.5	62	19	.5
County Home	Pintner	106	5.7	46.2	34.9	13.2
23 Institutions.	Hall	21.42	6.7	0	0	0
4 Homes	Williams	150	6.0	32.5	49.5	12.0
Orphanages	Carlisle	141	7.8	....	....	....
House of Good Shepherd.	....	117	9.4	.....	....	....
Orphangge	Terman & Wagner	68	6.0	29.	53	12
Orphanage	Haines	270	17.0	....	....	....
34 County homes	Mateer	16.3	33.7	39	13.8	.6

Part II

A STUDY OF THE MENTAL CAPACITY OF DEPENDENT CHILDREN IN THE CHARLOTTESVILLE CHILDREN'S HOME, CHARLOTTESVILLE, VIRGINIA.

THE CHARLOTTESVILLE CHILDREN'S HOME.

The Charlottesville Children's Home was founded in April, 1919, for the purpose of protecting, maintaining and providing a home for the orphan and destitute children of Albemarle County and the City of Charlottesville, Virginia. It is situated on a large lot at the extreme eastern end of the city. A board of trustees and lady managers appointed from the several churches of the city govern the institution. The children are not committed by the courts but are placed therein by their unfortunate parents (or parent) or by other persons interested in the child's welfare (with, of course, the consent of the parent or parents). It is usually to be found that there is at least one surviving parent. In some few cases both survive but are not living together. It is specifically stipulated that no delinquent children be retained in the home. The official ages of eligibility is from two to twelve; though actually both limits are exceeded. There are several instances of infants being left on the doorsteps of the home by unfortunate mothers.

No child has ever been adopted from the home, though there is no law prohibing such adoption. The parents would have to be consulted if adoption were ever attempted and if the child be a complete orphan the consent of the Board would

have to be obtained.

THE SURVEY.

A mental survey of this institution was undertaken for the purpose of ascertaining the average level of intelligence attained to by children dependent on charity. The home is typical of many others scattered throughout the country and the results obtained from this one institution would be indicative to a large extent of the mentality of dependent and orphan children in other institutions.

METHODS EMPLOYED.

A stanford-Binet examination was given to each of the thirty children of the Charlottesville Children's Home. To insure perfect alertness and sustained interest on the part of the examiner only three tests were given each day.

The room in which all testing was done was a small reception hall comfortably but barely furnished. All other details prescribed by Dr. Terman in "The Measurement of Intelligence" were carefully followed.

After becoming acquainted with the children and atmosphere of the school, a very complete "rapport" was established. All the subjects were eager for the experience of being tested and singularly interested in the proceedings when examined. This was, of course, conducive to their best efforts and re-

moved all possibility of misjudgment due to a child's timidity and reticence in responding; two things most detrimental to successful results with the Binet examination.

FERGUSON FORM BOARD.

After completing the Binet test and having determined the Mental Ages of the children by this, a language or literary type test having been thought insufficient it was thought advisable to check the Binet test by another of a different type, one that involved manual rather than verbal manipulations. For this purpose the Ferguson Form Board was chosen.

A DESCRIPTION OF THE FERGUSON FORM BOARD.

The Ferguson Form Board consists of a series of six boards which increase in difficulty of manipulation from Board No. 1 to Board No. 6. The object of the test is to replace the blocks (six in the first board and twelve in each of the other five) in their proper places in the board as quickly as possible. Each board has in it six holes of different shapes and designs into which can be placed only the proper blocks. Instructions are given the subjects and the blocks are removed from the board, but remain covered with a sheet

of pasteboard until the signal ready is given. Time is recorded when subject starts and again when last block has been replaced. The interval is the time taken for the board's manipulation and determines the subject's score on that board. When No. 1 is completed No. 2 -- a more difficult board than the former -- is given and the procedure is carried through as before. Then No. 3 and on until time for all six boards has been recorded. The increase in difficulty is accomplished by the very ingenious method of combining intricate form, tongues and grooves, and beveled edges in an ever increasing complexity. A maximum of five minutes is allowed for each board. The number of seconds taken for each is transmuted into scores ranging from one to five. The total of these separate board scores constitutes the final form board score, from which the mental age of the subject may be computed. This mental age has been found by Dr. Ferguson to be roughly the same as the total score made on the six boards. A score of six, for example, indicates the subject is roughly six years old mentally.

RESULTS OF THE STANFORD-BINET TEST.

The results of the Binet test are shown in Table No. 1.

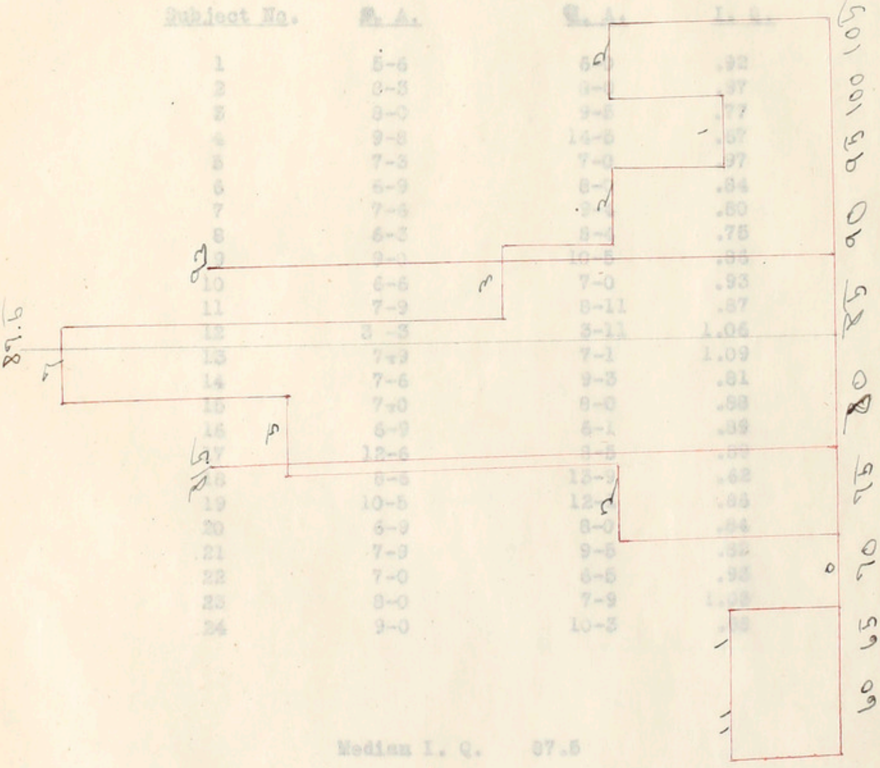
No 24
Median 87.5
P.E. of Group 5.5
P.E. of CT 1.1

Table No. 1.

Subject No.	M. A.	C. A.	I. Q.
1	5-6	6-0	.92
2	8-3	8-[illegible]	.97
3	8-0	9-5	.77
4	9-8	14-6	.67
5	7-3	7-[illegible]	.97
6	6-9	8-[illegible]	.84
7	7-6	9-[illegible]	.80
8	6-3	8-[illegible]	.75
9	9-0	10-5	.86
10	6-6	7-0	.93
11	7-9	8-11	.87
12	3-3	3-11	1.06
13	7-9	7-1	1.09
14	7-6	9-3	.81
15	7-0	8-0	.88
16	6-9	8-1	.83
17	12-6	[illegible]	.89
18	8-5	13-9	.62
19	10-5	12-[illegible]	.84
20	6-9	8-0	.84
21	7-9	9-5	.82
22	7-0	8-5	.83
23	8-0	7-9	1.03
24	9-0	10-3	.88

Medium I. Q. 87.5

Distribution of I Q's in Binet Examination



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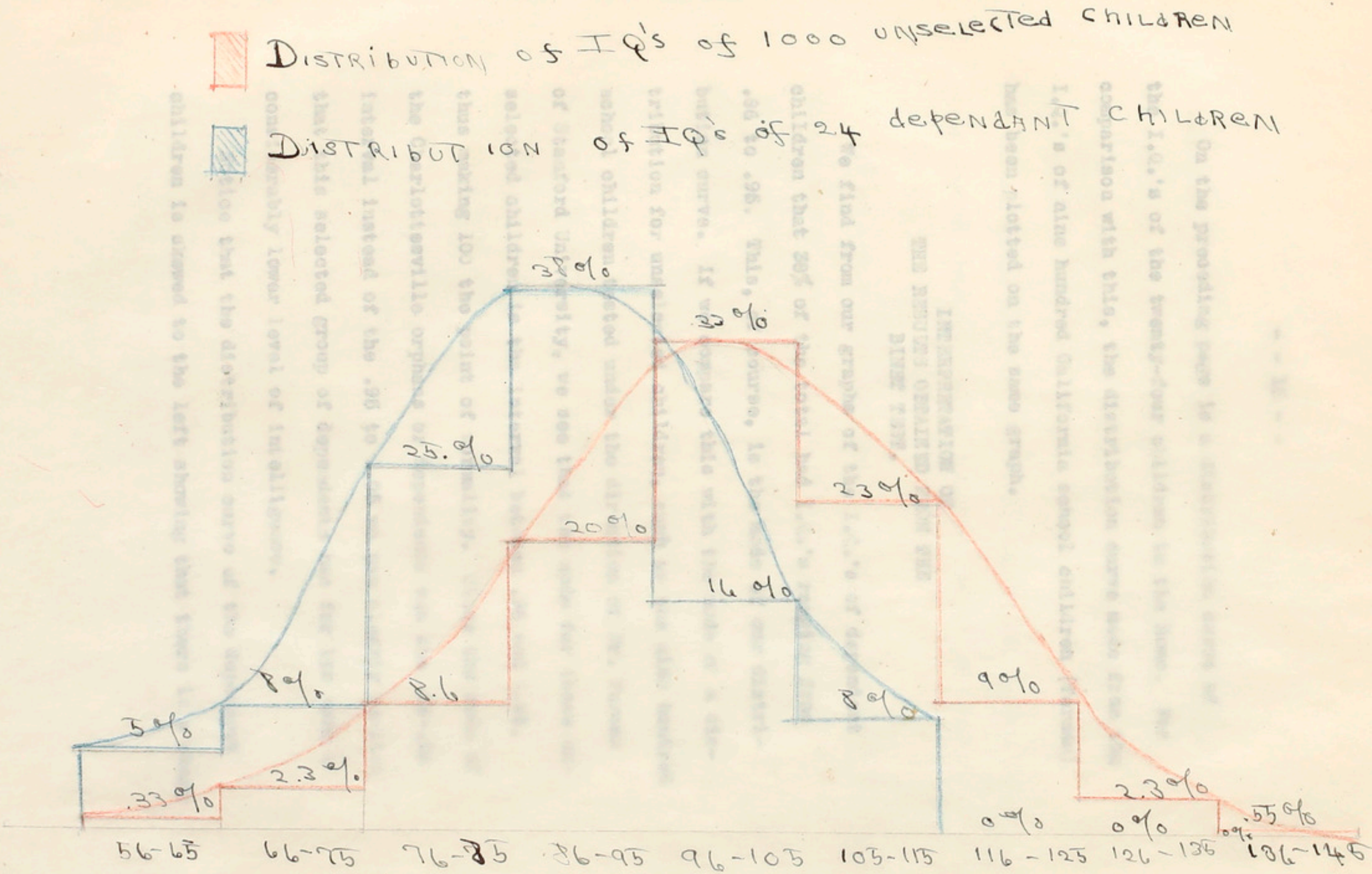
1	5-6	6-0	.92
2	8-3	8-0	.97
3	8-0	9-5	.77
4	9-8	14-5	.67
5	7-3	7-0	.97
6	6-9	8-0	.84
7	7-6	9-4	.80
8	6-3	8-4	.75
9	9-0	10-5	.86
10	6-6	7-0	.93
11	7-9	8-11	.87
12	3 -3	3-11	1.06
13	7-9	7-1	1.09
14	7-6	9-3	.81
15	7-0	8-0	.88
16	6-9	6-1	.89
17	12-6	8-5	.89
18	8-6	13-9	.62
19	10-5	12-1	.86
20	6-9	8-0	.84
21	7-9	9-5	.82
22	7-0	6-5	.93
23	8-0	7-9	1.03
24	9-0	10-3	.88

Median I. Q. 87.5


▨ Distribution of IQ's of 1000 unselected children
▨ Distribution of IQ's of 24 dependant children
5%
.33%
8%
2.3%
25.%
8.6
38%
20%
33%
16%
23%
8%
9%
0%
2.3%
0%
0%
.55%
56-65
66-75
76-85
86-95
96-105
103-115
116-125
126-135
136-145

On the preceding page is a distribution curve of the I.Q.'s of the twenty-four children in the Home. For comparison with this, the distribution curve made from the I.Q.'s of nine hundred California school children (Terman) has been plotted on the same graph.

INTERPRETATION OF THE RESULTS OBTAINED FROM THE BINET TEST.

We find from our graphs of the I.Q.'s of dependent children that 38% of the total had I.Q.'s ranging from .86 to .95. This, of course, is the mode of our distribution curve. If we compare this with the mode of a distribution for unselected children, such as the nine hundred school children tested under the direction of Dr. Terman of Stanford University, we see that the mode for these unselected children is the interval between .96 and 1.05, thus making 100 the point of normality. Since the mode of the Charlottesville orphans or dependents was the .86-.95 interval instead of the .95 to 1.05 we can clearly realize that this selected group of dependents has for its norm a considerably lower level of intelligence.

Notice that the distribution curve of the dependent children is skewed to the left showing that there is a sharp

falling off in the percentage of high I.Q.'s. There are no superiors to be found and only two who have I.Q.'s one hundred or above, and of course none who could be classed as gifted.

On the other hand, 13% had I.Q.'s below .75. Among the nine hundred unselected school children only 2.63% fell below .75 I.Q.

Let us look at the other end of the scale. Here we are struck by the great difference between the average independent American child guarded and cared for by provident parents, and the unfortunate public charge. Terman found that among his unselected American school children 11.85% had I.Q.'s of 1.16 or above, while from the ranks of the dependent children in this survey come none with I.Q.'s even as high as 1.10.

At the beginning of this paper the number of children in the Children's Home was spoken of as thirty while from the graphs and tables a record is found for only twenty-four. This discrepancy of six is due to the presence of children of the matrons at the Home who can not be counted as orphans. Though they have no place in a paper on dependent children it is interesting to compare their mentality with that of the twenty-four dependent children, because since the environment

of all was the same any existing differences can be attributed to hereditary alone. These six matron's children presented themselves for examination with the rest of the inmates of the Home, and it was only by chance information that their identity as non-orphans was discovered, and had it not been discovered the error in the statistics would have been great.

Of the twenty-four dependents there were none with I.Q.'s of 1.15 or more, while from the 6 independent children there were 4 with I.Q.'s of 1.15 or more, 66% against 0% of dependent children. In fact, only three of the dependent children rated I.Q.'s above 1.00, the best of these being only 1.09. Only one of the 6 independent children fell below 1.00 (.97). So it can be seen that the difference between the two groups is very great, and an argument is advanced on the side of heredity.

The absence of any gifted children may be due in part to the extremely small number tested. But in a survey of children's homes in Ohio, where 1,603 children were tested, only 1.67% were diagnosed as bright. With this knowledge in mind we can hardly expect to find many gifted children out of a total of 24 subjects.

AN INQUIRY INTO THE HEREDITY OF DEPENDENT CHILDREN HAVING I.Q.S ABOVE 100.

As mentioned above there were only three of the 24 children in the Home who had I.Q.'s of 100 or above. An inquiry into the heredity of the children revealed the following: No. 23 who had an I.Q. of 1.03 has a father living who is paying his entire expenses and upkeep while in the Home. Nos. 13 and 14 with I.Q.'s of 1.09 and 1.06, respectively, were first cousins. The father of the former pays his daughter's entire expenses and the latter's parents, though not paying at present, has declared his intention of doing so in the near future.

These are the only instances in the Home of parents defraying their children's expenses, and it is noteworthy that the children of these parents are the only ones in the entire institution who are gifted with I.Q.'s of 1.00 or above.

COMPARISON WITH PINTNER'S RESULTS.

The following table compares the results found herein with those obtained by Pintner in his examination of 106 dependent children:

Classification.	I.Q.Range.	Wise. %	Pintner. %
Very bright	1.25 -above	0	7.5
Bright	1.10 -1.25	0	13.2
Normal	0.90 -1.10	33.3	35.1
Backward	.75 - .90	54.2	27.2
Feeble-minded	.75-below	12.5	22.0

RESULTS OF THE FERGUSON FORM BOARD TEST.

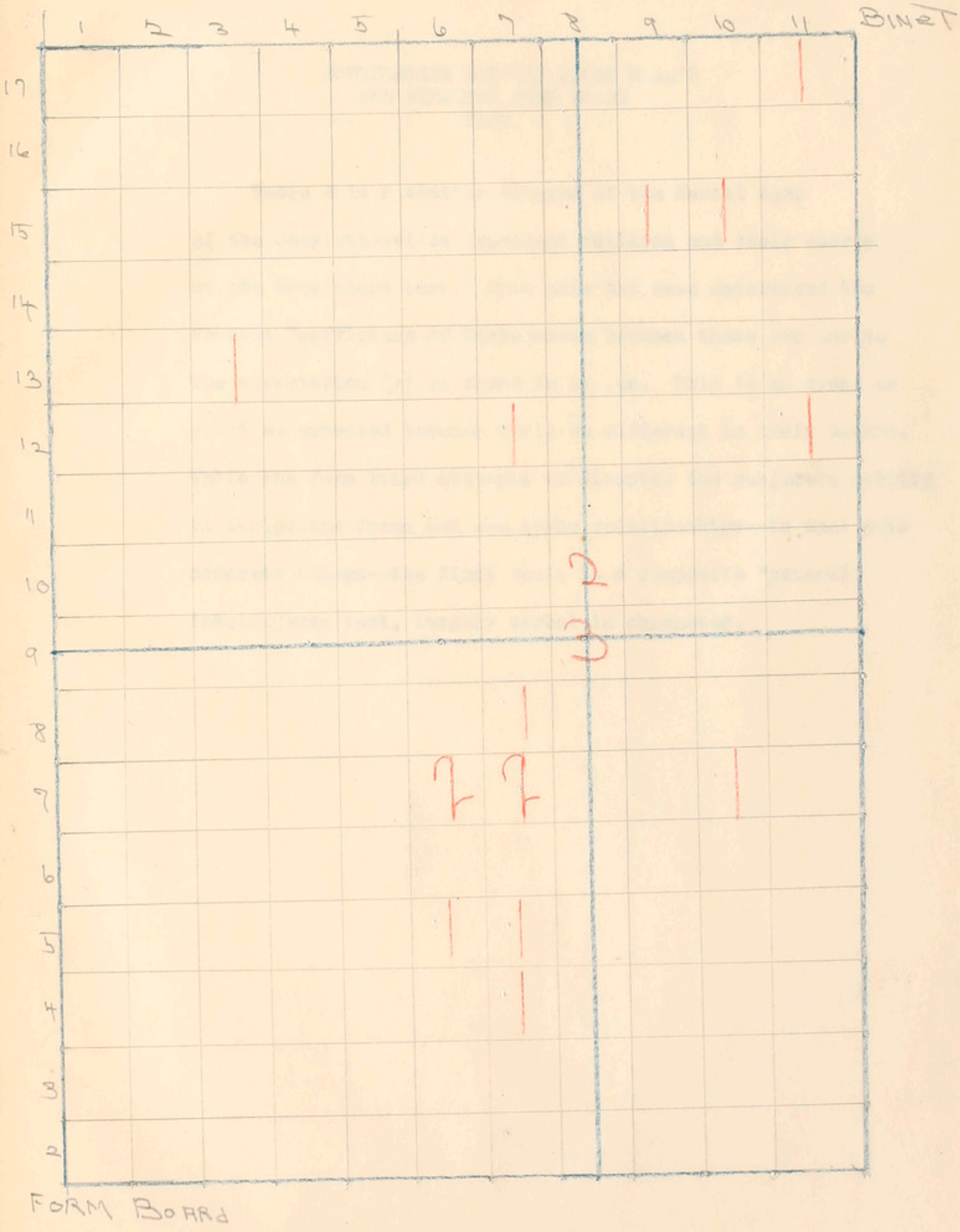
Table 2 gives the subject No., form board score, and chronological ages of each of the 24 dependent children at the Charlottesville Children's Home.

Table 2.

Subject No.	Form Board Score.	C.A.
1	7	6-0
2	13	8-0
3	10	10-5
4	7	14-5
5	2	7-0
6	4	8-0
7	9	9-4
8	7	8-4
9	9	10-5
10	5	7-0
11	10	8-11
12	0	0-0
13	9	7-1
14	7	9-3
15	8	8-0
16	0	0-0
17	8	8-5
18	12	13-9
19	15	12-1
20	5	8-0
21	13	9-5
22	12	7-0
23	15	7-9
24	15	9-3

Table - 2 -

Diagram Showing Correlation between Binet and Form Board Mental Ages



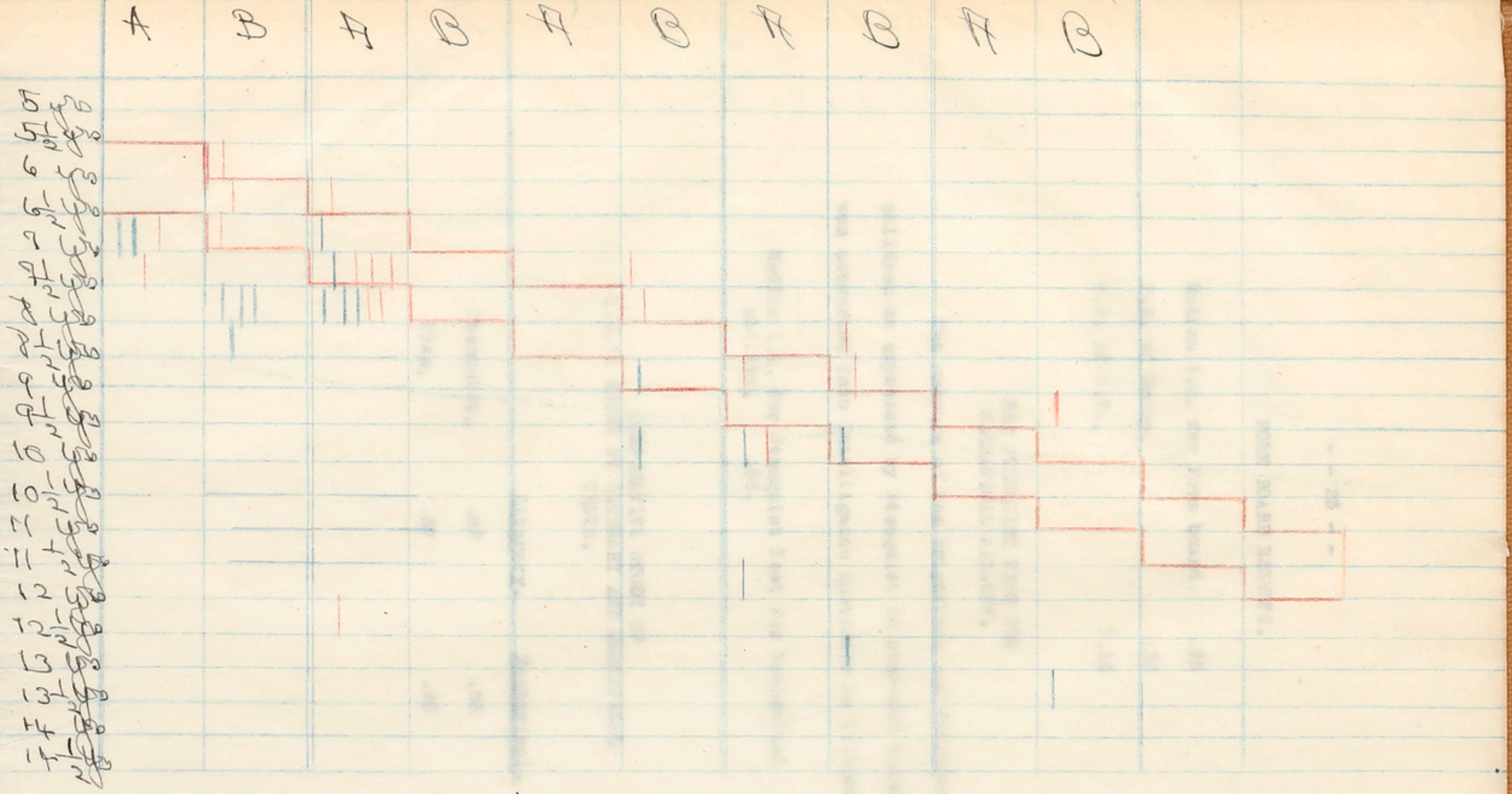
CORRELATION BETWEEN BINET M.A.'S AND FERGUSON FORM BOARD TEST.

Table 2 is a scatter diagram of the Mental Ages of the Charlottesville dependent children and their scores on the form board test. From this has been determined the Pearson Coefficient of Correlation between these two tests. The correlation (r) is found to be .44. This is as close as could be expected between tests so different in their nature. While the Form Board attempts to discover the subject's ability to manipulate forms and see space relationships--to deal with concrete things--the Binet scale is a composite "general" intelligence test, largely verbal in character.

A TABLE SHOWING FOR EACH CHILD

1. C.A.
2. Binet M.A.
3. Binet I.Q.
4. Seconds required for each form board.
5. Score on each of the six form boards.
6. Total score on all six boards.

Subject No.	BINET M.A.	Binet C.A.	Binet I.Q.	Time Board. 1	2	3	4	5	6	Score Board 1	2	3	4	5	6	Total
1	5-6	6-0	.92	120	70	147	303	303	303	2	3	2	0	0	0	7
2	8-3	8-0	.97	30	55	52	280	Ex	ex	4	4	4	1	0	0	13
3	8-0	9-5	.77	41	57	135	Ex.	Ex.	Ex.	4	4	2	0	0	0	10
4	9-8	14-5	.67	60	82	228	Ex.	Ex.	Ex.	3	3	1	0	0	0	7
5	7-3	7-0	.97	Ex.	215	208	Ex.	Ex.	Ex.	0	1	1	0	0	0	2
6	6-9	8-0	.84	Ex.	102	142	Ex.	Ex.	Ex.	0	2	2	0	0	0	4
7	7-6	9-4	.80	77	66	108	170	Ex.	Ex.	3	3	2	1	0	0	9
8	6-3	8-4	.75	45	136	180	Ex.	Ex.	Ex.	4	2	1	0	0	0	7
9	9-0	10-5	.86	50	50	193	Ex.	Ex.	Ex.	4	4	1	0	0	0	9
10	6-6	7-0	.93	120	127	165	Ex.	Ex.	Ex.	2	2	1	0	0	0	5
11	7-9	8-11	.87	31	64	183	205	169	Ex.	4	3	1	1	1	0	10
12	3-3	3-11	1.06	44	Ex.	Ex.	Ex.	Ex.	Ex.	4	0	0	0	0	0	4
13	7-9	7-1	1.09	49	55	Ex.	293	Ex.	Ex.	4	4	0	1	0	0	9
14	7-6	9-3	.81	52	114	Ex.	263	Ex.	Ex.	4	2	0	1	0	0	7
15	7-0	8-0	.88	53	99	197	Ex.	Ex.	Ex.	4	3	1	0	0	0	8
16	6-9	6-1	.89	Ex.	222	Ex.	Ex.	Ex.	Ex.	0	1	0	0	0	0	1
17	12-6	8-5	.89	125	54	146	Ex.	Ex.	Ex.	2	4	2	0	0	0	8
18	8-6	13-9	.62	24	42	94	Ex.	Ex.	Ex.	5	4	3	0	0	0	12
19	10-5	12-1	.86	28	31	92	274	184	290	5	4	3	1	1	1	15
20	6-9	8-0	.84	50	165	Ex.	Ex.	Ex.	Ex.	4	1	0	0	0	0	5
21	7-9	9-5	.82	34	81	107	97	241	Ex.	4	3	2	3	1	0	13
22	7-0	6-5	.93	25	81	104	114	Ex.	Ex.	5	3	2	2	0	0	12
23	8-0	7-9	1.03	29	57	57	218	240	Ex.	5	4	4	1	1	0	15
24	9-0	10-3	.88	34	51	55	115	Ex	152	4	4	4	2	0	1	15



Location of children in School by

🟥 Mental Ages

🟦 Chronological Ages

FORM BOARD RESULTS.

Median I.Q. for Form board.	.95
P.E. of Group.	.32
P.E. of C.T.,	7.14

THE STENQUIST TEST FOR MECHANICAL ABILITY.

The measure of the brightness and dullness of children as expressed by Stenquist in over-and under-agedness was converted into Intelligence Quotients as follows:

Median I.Q. for Stenquist Test for Mechanical ability, .86.

COMPARATIVE STUDY OF I.Q.'S FOUND BY LITERARY AND MECHANICAL TESTS.

	Literary.	Mechanical.
Stenquist,	.82	.86
Wise,	.87	.95