ITALIAN IMMIGRANTS - THEIR INTELLIGENCE AS RATED BY TESTS

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The U. S. immigration laws provide for the exclusion of persons with defective intelligence. In order to carry out the provisions of this law it is necessary to give prospective immigrants a mental examination and decide which among those who apply are mentally defective. The social history, in so far as it is obtainable, is given due weight in the examination, but social adequacy alone is not sufficient to prove the absence of defect. Even in a complex environment the majority of mentally defective persons live within the law and provide for themselves with more or less success outside of institutions. The proportion who can adjust satisfactorily in the simple environment from which a large proportion of our immigrants come, is of course much larger. Many who are obviously mentally defective give presumably good social histories. It is necessary, therefore, to depend on formal intelligence tests as the most reliable measure of the intelligence of prospective immigrants.

Immigrants differ from one another in age, education, language and cultural environment, and also from the Americans upon whom many valuable tests have been standardized. For these reasons some widely used tests are unsatisfactory for work with immigrants and the expected performance on all tests varies with the group examined. It is, therefore, desirable to find what tests are most useful and to determine the extent of variation in test results due to factors other than native intelligence.

The work reported here was done to determine the suitability of certain tests and to find the standard expectation of different groups of immigrants coming from Naples. It is part of a research problem

designed to measure the effect of nationality, age, sex, education, occupation and other environmental factors on test performance, the ultimate purpose being to devise more accurate methods and standards for the diagnosis of mental deficiency in immigrants.

In order to avoid inaccuracies of translation and unfairness to illiterate or near illiterate people, no test was tried that required the subject to use verbal constructions in giving the solution of it. In some of the tests, like additions and naming the days of the week, it was necessary for him to use a word or group of words, but never a sentence and the answer could not be misunderstood.

The tests were taken from various sources, but previous experience in the examination of immigrants determined the selection of them. There are 4 more or less comprehensive tests and 21 others that are less important when standing alone, but which have been combined in two groups for the purpose of expressing results in this series of cases.

The four comprehensive tests are:

The Ferguson Form Board Test
The Porteus Maze Test
The Kohs Block Design Test
The Pintner Non-language Test

The twenty-one other tests are divided as follows:

First series:

Healy Construction Test A
Healy Construction Test B
Gwyn Triangle Test
Mare and Foal Test - Pintner and Paterson modification
Cube Imitation Test - Pintner modification

Second series:

Copying square (Stanford Binet, year 4)
Mutilated pictures (Stanford Binet, year 6)
Copying diamond (Stanford Binet, year 7)

Counting 20 to 1 (Stanford Binet, year 8)

Naming days of week forward (Stanford Binet Alternate, year 7)
Naming days of week backward
Naming months of year forward (Stanford Binet Alternate, year 9)
Naming months of year backward
Arranging weights (Stanford Binet, year 9)
Drawing designs from memory (Stanford Binet, year 10)
Identifying Geometric figures (Mullans Learning Test)
Ball and field test (Stanford Binet 8 and 12 year)
Repeating digits forward
Repeating digits backward
Additions
Subtractions

All tests were given and scored by the standard methods with the following exceptions ~~except as follows:~~

Kohs Block Designs Test: Three trial designs were given in each case before the test proper was started.

Pintner Non-language Test: Explanations were given in minute detail for each of the six divisions of this test so that there could be no misunderstanding as to what was required.

Counting 20 to 1: No time limit was used.

Naming days of week: No checks required.

Naming months of year: No checks required and no time limit used.

Ball and Field Test: Pocket book and field was used instead of ball and field because it was thought that some of the subjects would not be familiar with a ball. It would, of course, have been necessary to have been walking in the field in order to lose the pocket book, and this introduced a new psychological element into the test, but this is not believed to have changed the results much one way or the other.

A lead pencil was used on all tests where pen or pencil was required.

The persons included in this study were selected from among those who applied for immigration visas at the American Consulate General in Naples between August, 1929 and September, 1931.

Were selected

Most applicants for immigration visas came to Naples a day or two before the scheduled sailing of the ship upon which they have engaged passage for the United States. They are then put through the required examinations, which are completed by the time the ship sails. Every applicant is given some sort of mental examination, which may consist of a few questions or one or more performance tests. The applicants knew this beforehand and for this reason those who were specially examined went through what to them was, at least in part, an expected routine procedure.

A total of 1131 persons were given the special examination and all except 39 of these were from Southern Italy (not Sicily). The selection of cases was made according to age and sex groups. Beyond this there was no selection except the occasional exclusion of a person with high education. It was the original intention to exclude all who had more than a public school education, but so few of these turned up that the bar against them was overlooked on five occasions. As a result, two men with some high school or college training are included in the main group, three women with such training are included in the special Porteus, Kohs test group, and three men and one woman with such training are included in the Pintner non-language test group.

The cases were selected at random and they represent a fair cross section of immigrants who come from southern Italy at present and who have come in the past.

The groups are as follows:

131 males	ages 15 - 44 - general run
154 females	" 15 - 44 - general run
85 males	" 45 - 60 - illiterate or near illiterate
91 females	" 45 - 60 - illiterate or near illiterate
100 mothers	illiterate or near illiterate with literate children
101 literate	children (male and female) of the 100 mothers
75 males	ages 15 - 24 - specially literate - for Pintner Non-language Test only
75 females	" 15 - 27 - specially literate - for Pintner Non-language Test only
188 females	" 15 - 44 - general run - for Porteus and Kohs, only, 150 had Kohs
35 females	" 45 - 60 - illiterate or near illiterate for Porteus and Kohs
57 males	" 15 - 24 - general run - for Porteus and Kohs, only 46 had Kohs
39 females	Trieste Group - general run - for Ferguson Farm Board only.
1131 Total	

The reason for and explanation of the various groups follows. The majority of adult immigrants from Naples are between 15 and 44 years of age and at present most of them are women. The general run is, therefore, better represented by this age group, and by the women. It was originally decided not to examine anyone who had been to the States before, but this was changed in order to complete the age 15 to 44 and age 45 to 60 male groups. Forty-six of the 131 cases in the former and 54 of the 85 cases in the latter had been to the States.

The reason for the inclusion of the age 45 - 60 groups was a general observation that old immigrants, especially illiterates, did very badly on intelligence tests, and it was thought advisable to find the expectation for them, as well as to measure the effect of age on test performance. It was necessary, however, to include 18 literate women and 41 literate men in order to complete the two groups. The literates in these groups represent the general run of literates of thatage.

The 100 illiterate or near illiterate mothers with 101 literate children were examined in order to get additional light on the effect of education on test performance. Thirty-eight literate mothers were included, but they were less literate than the average run of literates. There were, of course, many mothers among the other female groups, but they were not included in the special group of 100 whose children were also examined.

The 75 literate males and 75 literate females for the Pintner Non-language Test were selected in order to get a comparison with similar groups in other countries where the Pintner Test is generally applicable. These two groups were more literate than the general run of literates.

The extra cases both male and female for the Porteus Maze and the Kohs Tests were average run. They were included because test material for these two tests was not available when parts of the main groups were tested.

The Triests group of 39 women were given the Ferguson Form Board Test to get a comparison between women from this section and Southern Italy. Immigrants from Triests are at the consulate too short a time to permit a detailed special examination. They come in from Trieste to Naples on a ship bound for the United States and are brought from the dock to the consulate for the visa examination. As soon as this is finished, they are returned to the ship so that the sailing may not be delayed.

Because of the possible effect of schooling and other environmental factors on test results, data was collected on each case as follows:

Number of years schooling
Grade reached in school
Ability to sign name
Reading ability (reads well
(reads fairly well
(reads poorly
Reading habits - whether reads newspapers, books or both and how many times per week
Occupation
Residence (City - any place having more than 2500 inhabitants
(Small town - any place having between 1000 and 2500 inhabitants
(Country - any place having less than 1000 inhabitants
Size of home in which they lived with their parents
Number of brothers and sisters including those who had died.

Reading Ability

Reading ability was measured by a test devised to approximate the same results as a test used with prospective immigrants in Dublin, Cobh, and Belfast. In these places the reading test from the Stanford Scale, year 10, was used. The paragraph is given below.

"New York, September 5th. - A fire last night burned three houses near the center of the city. It took some time to put it out. The loss was fifty thousand dollars, and seventeen families lost their homes. In saving a girl who was asleep in bed a fireman was burned on the hands."

This was scored as follows:

Reads well - Time no more than 15 seconds regardless of mistakes.
Time from 16 to 20 seconds inclusive with no more than one mistake.

Reads fairly well - Time from 16 to 20 seconds inclusive and more than one mistake.
Time from 21 to 35 seconds provided there are no more than three mistakes.

Reads poorly - Time between 21 and 35 seconds inclusive with more than three mistakes.
Any time in excess of 35 seconds whether or not there are mistakes.

In Naples the reading test was a simple paragraph from an Italian book, but a stop watch was not used to record the time. The measure is, therefore, not strictly comparable with the mathematical measure given above.

Occupation

The only comparison on the basis of occupation is within the male/ 15 - 44 age group and the females who took the Perteus and Kohs tests. ~~and who were in the age group if xx tx years~~ No group of women has a sufficient number of skilled workers, to make separate tables for all the tests on the basis of occupation worth while. For the purpose of this article an unskilled worker is a farmer, common laborer, basket maker, miner, chauffer, sailor, weaver or houseworker. A skilled worker is a clerical worker or one who follows some trade or profession. Examples are tailors, butchers, barbers, blacksmiths, shoemakers, carpenters, masons, dressmakers, etc.

Most of the women gave housework as their occupation, but some gave field work and some both house ahd field work. Of the 154 women in the 15 - 44 age group, 36 worked in the fields and 26 were dressmakers. Thirty-one of the 100 mothers worked in the fields and only two were dressmakers. Dressmaking is the only skilled occupation represented in these two groups. Nineteen of the 91 women, age 45 - 60, worked in the fields and only 4 were skilled workers.

The Trieste women had no advantage in point of occupation over the Napàes 15 - 44 age group. There was a slightly smaller percentage of field workers but the proportion of skilled workers was still smaller.

As contrasted with the women, 58 of the 131 men ages 15 - 44 and 17 of the 85 men ages 45 - 60 were skilled workers.

Place of Residence

Information about the population of places of residence was secured from the applicants and the statement of many of them was, of course, a guess. It is probable that more lived in cities and more in the country than the figures show, but they are approximately accurate. With the exception of the Trieste group a large majority of all persons examined were from small towns. The percentages are given in the table below:

Residence	Small town	Country	City
Naples group	82.6	12.6	5.8
Trieste group	33.3	51.3	15.4

A few of the applicants had lived in two places in Italy. In these cases both places were credited as his residence in calculating the percentages given above, but no account was taken of those who had been to the United States. Nearly all of these lived in cities while there. The number and ~~percentages~~ who had lived in the United States, together with the percentages of the total, are shown in the following table.

Residence in United States	Number	Per cent of total	Average number of years
Men age 15 - 44	46	35.0	8
Men age 45 - 60	54	63.5	6
Women age 45 - 60	6	6.6	4
All other groups	0	0	0

The proportion living in town, city and country is approximately the same for the various subdivisions of the Naples group comprising a total of 1092 cases, and there is an insufficient number of city people in any one group to allow of valid comparisons within the groups on the basis of residence. The comparative effect of residence on test results will be shown for a country in which the applicants are more nearly divided between city and country.

The small town people work chiefly in rural occupations and should for comparative purposes be considered rural. Most of the farm workers lived in small towns.

Whether or not residence in the United States with its city life affected the results is shown in the tables.

Size of Home

The size of the home is based on the number of rooms without the kitchen. The information was secured from each applicant but a tendency to exaggeration has to be considered. The average home of the adult had 2.8 rooms. A very large home here and there tended to run up the average. More than 10 per cent of every group except the Trieste group lived in one room homes and some of these one room homes had no kitchen. Sixty per cent of the illiterate men age 45 - 60, fifty per cent of the illiterate women age 45 - 60 and forty per cent of the illiterate women age 15 - 44 lived in one room homes. The average size home for the various groups is given in table 1 along with the average years of schooling. The home is in the main larger or smaller as the schooling is greater or less. The illiterates and old people lived in smaller houses than the other groups.

(Take in Table 1)

Page 104

TABLE 1 - SIZE OF HOME COMPARED WITH SCHOOLING

	Men 15 - 44 total	Women 15 - 44 total	Men 45 - 60 total	Women 45 - 60 total	Mothers 28 - 53 total	Trieste women 19-50 "	Women 15-44 literate	Men 45 - 60 literate	Women 45-60 literate	Mothers 28-53 literate	Children 7 - 14	Children 8 - 9½	Women 15-44 illiterate	Men 45 - 60 illiterate	Women 45-60 illiterate	Mothers 31-51 "	Women 15 - 24	Women 25 - 34	Women 35 - 44	Men 15 - 44 skilled	Men 15 - 44 unskilled
Ave. rooms in house	3.3	3.5	2.3	1.9	2.6	3.3	3.8	3.1	2.3	2.9	2.9	2.8	2.4	1.6	1.8	2.4	3.5	3.8	3.2	3.4	3.1
Ave. year schooling	5.3	3.5	1.7	0.9	1.2	5.6	4.3	3.5	4.0	3.1	2.8	2.3	-	-	-	-	5.8	3.7	2.4	6.9	4.6

Size of Family

The medium number of brothers and sisters of the adults was five, giving a family of eight and there was only a slight difference in the medians of the various Naples groups. The median for the Triest# group was seven. The men age 15 - 44, the women age 15 - 24 and the old men and women had a median of four. It is ~~feasible~~ possible that the old people forgot to mention some of their brothers and sisters who had died.

No significance as to test results can be attached to the slight differences in the size of families, but a family of eight insures that the subject tested has had at least some mental stimulation brought about by contact with others.

Methods

The tests were given by a well qualified assistant who spoke English and Italian fluently and who was specially trained for the work. Each subject was tested individually and special pains were taken to insure that he was at ~~east~~ ease and fully understood what was required of him, so that as far as possible his performance would be a reflection of his full mental ability.

It is to be noted, however, that some persons who apply for visas are apprehensive about the results and a few are fatigued by the trip to Naples. Others, especially among the illiterates, apparently do not put sufficient effort in the test problem. These factors tend to affect the score adversely in some cases, but the effect on the general result for any group is insignificant. This statement is made on the basis of years of experience in the examination of immigrants, many of whom were examined on different days in order to obviate the effect of fatigue, apprehension and apparent original poor effort.

The test results are expressed by the percentile method wherever the type of scoring makes this possible and the scores have been compared with the equivalent mental age where this has been worked out. For the remainder of the tests the results are expressed as percentages of success.

The sixteen miscellaneous tests in the second series are combined into one group by giving each test a point score. The total score for any case is the sum of the points made on the 16 tests and a percentile scale is made of these total scores.

The results in the tables and charts are given for the main groups and also for subdivisions of these groups in order to show the effect of certain factors or test results; for instance, the women age 15 - 44 are subdivided into three age groups and again into literate and illiterate groups without regard to age.

Where the sub-groups do not add up to the total of the main groups as with the literate and illiterate, and skilled and unskilled, the reason is that some members of the main group do not properly fall in either of the sub-groups. If a person who had not been to school could both sign his name and read, he was excluded from both literate and illiterate sub groups. If he could sign his name only he was included in the illiterate group. If he had been to school and could not sign his name he was excluded from both groups. There were very few exclusions for these causes. Ten per cent of the illiterate could sign their names.

Ferguson Form Board Test

This test, consisting of six graded form boards each containing six spaces filled by blocks, was given and scored according to the method

in use at the Judge Baker Foundation[1] (see appendix No. 1). The scoring

(1) A Manual of Individual Mental Tests and Testing, pp. 126-127. Bronner, Healy, Lowe and Shimberg.

in use there, referred to here as Shimberg scoring, is supplemented in this work by the original Ferguson scoring and by a percentile table showing the number of boards completed. The Shimberg scoring is very satisfactory for this group and is preferred to the Ferguson for general work with immigrants, but has no great advantage over it. The Shimberg scoring does not discriminate between the upper ranges of intelligence in a bright group of people, because a large percentage of them make the maximum score, 60 points. By the Ferguson scoring, the maximum score, 30 points, is practically impossible to reach and it discriminates somewhat but not sufficiently between different grades of higher intelligence. It is given because other national groups that make high scores are to be reported. These groups will be compared with one another and with the Italian groups and it is desirable to show a more accurate percentile comparison in the higher ranges of intelligence than can be shown by the Shimberg score.

The Shimberg score and age equivalents according to the Meehan Shimberg male norms follows:

Age	9	10	11	12	13	14	15	16
Points	12	18	24	30	36	42	48	54

It is noted that the test is not standardized below the nine and above the 16 year levels, but that two months are allowed for each point between 12 and 54. In this article the same ratio is followed in estimating equivalent mental ages for persons who make more than 54 or less than 12 points. A person who makes only 6 points is credited with 8 years of mental

(page 13a follows)

age and so on. This extension of the scheme upward and downward is not a proved accurate standardization but level, it is approximately so and is used here for convenience.

Ferguson[1] did not standardize his results with age but presented them by school grade. His medians from the first grade to the second year high school ranged from 6 to 16 points. These two extremes of grades usually correspond to ages 6 and 15 and this should be born in mind in reading the Ferguson score table given here.

(1) Ferguson, G. O. (1920), A Series of Form Boards, Journ. Exp. Psy., Vol. III, No. 1, pp. 47 - 58.

The Ferguson test was given before any of the other form board tests in order that the score of this, the most valuable of them, would not be affected by practice with the others. The six Ferguson Boards are so graded that the easier boards give practice for those that follow. No additional practice is necessary or desirable.

Table 3 shows the percentile rating of the various groups by the three types of scoring together with the schooling and reading ability of each group.

Table 2 shows the reading habits and school grade of the literate adults and the children. It, together with the caption on Table 3, applies to all the tests, except the Porteus Maze and Kohs Block Design Test, and should be read in connection with the tables for them.

(Take in Tables 2 and 3)

By all three methods of scoring the men are better than the women of equal age, the young adults better than the old adults, the literate adults better than the illiterate adults, the skilled better than the unskilled, the Trieste women better than the other women, and the adults better than the children, but the mothers are only slightly better than their children and the illiterate mothers are about equal to the children age 8 to 9½ years. An examination of all the environmental data shows, however, that the differences in scores can not be taken to prove a difference in native mental ability between the groups, or that age, sex and occupation have of themselves influenced the scores to the extent shown. The literate sub groups with higher scores have been to school longer and can read better than those with lower scores. Education seems to be an important factor. This is further indicated by the reading ability and the grades reached in school as shown in Table 2 . Those who reach higher grades and read more than others do better on the tests.

Age apparently has some influence, but the only measure of its effect that is at all reliable is the comparison of the illiterate women. This comparison eliminates the sex and education factors. By the Shimberg scoring the median score of the illiterate women ages 15 - 44 is three points more than that of the women age 45 - 60. This is equal to a difference of six months in mental age. By the Ferguson scoring the difference is slightly more favorable to the younger group but on the basis of boards completed the older women are a shade better.

Page 14A

TABLE 2 - READING HABITS AND SCHOOL GRADE OF LITERATE ADULTS AND CHILDREN.

	Men 15-44	Men skilled 15-44	Men unskilled 15-44	Women 15-44	Women 15-24	Women 25-34	Women 35-44	Men 45-60	Women 45-60	Mothers	Trieste group	Children 7-14	Children 8-9½
Number	131	58	71	124	53	49	52	41	18	38	35(1)	101	51
Reads daily	28	18	8	4	0	1	3	1	0	0	3	School	
Reads 1 or more times weekly	58	23	35	16	10	5	1	5	0	0	16	School	
Reads less than once weekly	12	4	8	1	1	0	0	1	0	1	0	School	
Never reads	33	13	20	103	42	43	48	34	18	37	16	School	
Percentage never reads	25.2	22.4	28.4	83.1	79.2	87.8	92.3	83.0	100.0	97.4	45.7	School	
Grade reached in school(average)	3.5	4.3	3.3	3.2	3.3	2.9	1.7	2.5(2)	1.9	2.3	4.0	2.5	2.2

(1) Two of the total 39 not recorded and 2 illiterate.
(2) Based on 35. Grade of 6 of the 41 not recorded.

The slight difference in favor of the younger group of illiterates may be due in part to environmental factors. The younger group lived in larger homes, 2.4 rooms against 1.8 rooms. Table 1 shows that in general the size of homes rises and falls with the amount of schooling. It is, therefore, probably an index of other factors that influence mental development.

The skilled workers are better than the unskilled, but they have more schooling and this may be in part responsible for the difference.

The Trieste women do better than any other group of women. They had more schooling than any group except the age 15-24 group, the best Naples group, but they read slightly better and more than any Naples group. They also reached a higher grade in school, but their homes were slightly smaller and a much larger proportion lived in the country. These women are probably superior to the Naples women.

The median score of the best group, the skilled workers, is lower than any American norms. Using 16 as the divisor gives this group an intelligence quotient of 83.3. A striking feature about this low score is that it was made by a group who have been working at occupations that give practice in the ~~mechanical~~ observation of forms and adjustment of things, and who would, therefore, be expected to ~~make~~ make a score higher rather than lower than normal on ~~a simple mechanical test.~~ a test in which adjustments of variously shaped blocks to one another must be made.

Chart 1 graphically shows the median score of the various groups, charted opposite the equivalent mental age according to the Meehan, Shimberg male norms. The mental age of most groups is less than 9 years. This chart and also graph 1 shows ~~how schooling apparently influenced the results.~~ the association between schooling and score

(Chart 1 near here)

Mare & Foal and Construction Tests (Healy)

The Mare and Fold, Gwyn Triangle, Healy Construction A and Healy Construction B tests were given in the order named, but not immediately following the Ferguson Form Boards. Some of the miscellaneous tests were put in between in order to avoid monotony and fatigue by varying the character of the tests and to diminish the possible effect of practice on construction tests successively given.

The Mare and Fold (Foal) test was given according to the Pintner and Paterson modification with the triangular and diamond shaped pieces already in place.

The Gwyn Triangle test was given in the usual way with all the triangles at the top pointing one way.

The Healy Construction Test A was given with the five pieces arranged irregularly at the side, and the Healy Construction Test B was given with the semilunar space pointing away from the subject and the pieces arranged irregularly at the side so that no two pieces belonging together were in juxtaposition.

On the first trial of each of these tests the pieces were removed out of sight of the subject so that the board was not seen with the pieces in place.

The second trial was given immediately after the first in the following manner: In the case of success, the pieces were turned out and the subject was told to put them in again. In the case of failure to complete the test in the alloted five minutes on the first trial the test was completed by the examiner while the subject looked on. The pieces were then turned out and he was asked to try again.

Tables 4, 5, 6 and 7 show the first and second (Trial) test percentile ratings of the different groups on the four tests and charts 2, 3 and 4 graphically show the median scores on the ~~Gwyn Triangle,~~ Healy A and Healy B tests.

(Take in Tables 4,5,6 & 7)

The Mare and Ford test appears to be rather too easy to be of value as an intelligence test for adults. One gets the impression on watching some poorly performing cases that slowness in motor reaction rather than mental dillness is responsible for the poor showing, but this can not be altogether true because the relatige standing of the various groups on this test is in general the same as on the other tests, some of which do not require any manual manipulations.

The best groups are the skilled men and their median score corresponds to a test of age of between 12 and 13 by the Pintner and Paterson norms(1). The children have a test age between 7 and 8 and none of the illiterates go above 9.

(1) Scale of Performance Tests, Pintner and Paterson, p. 100.

The Gwyn Triangle, the Healy A and the Healy B tests, have been used extensively in the examination of immigrants and have proved to be unreliable. Dull adults of apparently the same general intelligence may vary five or six years in test age according to these tests and many fail to complete them in five minutes. This range of variation does not apply to bright people and it is extremely rare for one of these to fail. In a group of 414 emmigrants examined at Oslo only one failed on the Healy B, none failed on the other two tests and very few required as much as 100 seconds to complete any of them. None of this group had more than a common school education.

The unreliability of these tests as a measure of the relative intelligence of dull individuals almost disappears in the case of groups. It would probably disappear entirely if the groups were large enough.

Leave the original sheet as it is for the

The groups here reported maintain their relative standing fairly well but there are some variations. The skilled men are the best on the Gwyn Triangle and they are the only group who do better than Pintner and Paterson's[1] 13 year olds. The median of the unskilled laborers falls

(1) Scale of Performance Tests, Pintner and Paterson, p. 116.

between 10 and 11 years and that of the total group of children falls at 7, giving them an intelligence quotient of 75.

The skilled men are decidedly better than any other group on the Healy A. Their median gives them a test age between 9 and 10 by Pintner and Paterson's Norms[2], and between 15 and 17 by the norms of Lowe,

(2) Scale of Performance Tests, Pintner and Paterson, p. 125.

Shimberg and Wood[3] established in Boston on persons of different races

(3) Further Standardization of Construction Tests A and B. Journal of Applied Psychology, 1924. pp. 324 - 338.

and nationalities, the majority of whom were recruited from the ranks of juvenile delinquents. By this same standard the unskilled men have a test age between 11 and 12. The children have a test age between 6 and 7 by the Pintner and Paterson Norms. Lowe, Shimberg and Wood do not report norms for children below nine years of age probably because too few of such children come to the attention of the authorities as delinquents.

The skilled men do not have the best median with the Healy B test, but they have a smaller percentage of failures than any other group and on the second trial their position at the top is regained. The literate old men do better than any other group on the first trial of this test, but they fall back into their regular place on the second trial.

By the norms of Lowe, Shimberg and Wood[1] some of the groups reported here test at normal age or better on the Healy B test. This, and to a less extent the Healy A, are the only two tests on which these groups test near any published American norms. It is concluded, therefore, that these norms, based as they are on persons of different races and nationalities, the majority of whom were delinquent are unsuitable as standards for comparison.

(1) Further Standardization of Construction Tests A and B. Journal of Applied Psychology, 1924. 3 24-338

Because of the divergent results of different workers with the Healy A and B tests, Table 8[2] is published here in order to throw more light on the subject. The groups reported were applicants for immigration visas examined in the cities named. Persons with more than a common school education were excluded.

(2) ~~Unpublished reports by author.~~ Unpublished data collected by author

(Take in Table 8)

Charts 2 and 3 graphically show the first and second trial results on the Healy A and B tests. More schooling within comparable groups is associated with higher scores and the differences between the groups are reduced or entirely eliminated on the second trial. This applies also to the Gwyn Triangle Test.

For the examination of ~~a~~ dull individuals the second trial is more satisfactory than the first with these three tests. The more intelligent who make only a fair showing or fail at first do the tests will after being shown the solution, while duller ones may improve very little or even do worse on the second trial. This is usually a significant difference and it is rather surprising that so many individuals in these groups failed on the second trial.

Moral: Give Individual

(Take in Charts 2 and 3 near here)

The Cube Test (Pintner Modification)

The Binet black cubes for the arranging weights test were used. The examiner sat opposite the subject and gave the 12 movements devised by Pintner (see appendix No. 2). The Pintner method was followed, but more definite instructions were given. After the subject was told to "watch carefully and do what I do" he was also told to"touch the block first that I touch first, touch the block second that I touch second" and so on. If failure on the first line appeared to be a failure to understand the problem, it was counted a failure, but the line was given over again after the instructions were repeated. The test was continued until five or six lines were failed and it was obfious that there would be no more successes.

Table 9 shows the cube test results.

(Take in Table 9)

The best group here was the group of skilled men and their median of six correct lines corresponds to a test age of 10 according to Pintner and Paterson's[1] norms. It is noted that the children with a median of five

(1) Scale of Performance Tests, Pintner and Paterson. p 137

corresponding to a test age of seven do better than most of the adults on the cube test.

The median of other adult immigrant groups[2] shown in Table 10 forms a better basis

(2) Unpublished reports by author.

for comparison than the Pintner and Paterson Norms.

(Take in Table 10)

Page 20 A

Table 10

CUBE TEST, PINTNER MODIFICATION

	Males					Females					Children	
	Oslo	South-ampton	Cologne	Dublin	Naples 15-44	Oslo	South-ampton	Cologne	Dublin	Naples 15-44	Cologne	Naples
Number of cases	170		133	112	131	218		152	100	152	18	101
Lines correct median	8		7	6	5	8		7	6	4	7	5

Repeating Digits Forward and Backward.

The series of digits given below were used and the rate of ~~repetition~~ pronouncing them was approximately seven ~~digits~~ in five seconds. Success with one line in a series of three was counted as success for the number of figures in that line and the next higher series was immediately given. The test was stopped when four lines in succession were failed.

When a subject failed ~~to~~ to repeat two digits backwards, it was assumed that he did not get the idea because of unfamiliarity with such exercises, and a special effort was made to teach him by examples repeatedly given. If he did finally get the idea and then succeeded with two or more figures credit was given. The results are shown in Table 11.

Repeating Digits

Forward		Backward	
641	374859	92	471952
352	521746	387	583294
837	273859	529	752638
4739	9285164	6528	4162593
2854	7231895	4837	3826475
7261	3857291	8629	9452837
31759	72534896	31879	
42837	49853762	69482	
96176	82795482	52961	

(Take in Table 11)

The median for most groups is five digits forward and two digits backward. Five digits forward and three digits backward are placed by Terman at the seven year level. The very poor showing of these groups on this test is apparently not altogether if at all due to the fact that some of the Italian digits have two syllables. The children maintain their position at about the seven year level, and it is noted that the various groups rate about the same as they did with the Pintner Cube Test.

A table of the median scores of other non-English speaking immigrant groups on this test is given as being more reliable for comparative purposes than the Stanford Binet standards.

TABLE 12
Repeating Digits, Median Score

	Males			Females			Children	
	Oslo	Cologne	Naples 15-44 group	Oslo	Cologne	Naples 15-44 group	Cologne	Naples
Number of cases	103	134	131	164	153	154	26	101
Repeating digits forward	7	6	5	7	6	5	5	5
Repeating digits backward	5	5	3	6	4	3	4	3

Computation Tests - Additions and Subtractions

The computations listed below were given in regular order beginning with the easiest addition. For the additions the form of the question was "how many are 3 and 4", or "if you add 3 and 4 together how many does it make"? For the subtractions the form was "if you take 2 away from 4 how many are left"? In the case of the two problems 10-(2 + 4) and 20-(3 + 4) the form was, "if you have 10 lira and spend 4 for bread and 2

for butter, how many lira would you have left"? One trial was given and spontaneous corrections were allowed. The results are shown in Table 13.

Additions	Subtractions
3 + 4	4 - 2
6 + 7	6 - 2
8 + 6	10 - 4
12 + 13	15 - 12
15 + 16	25 - 4
2 + 3 + 4	20 - 7
12 + 13 + 10	50 - 11
2 + 4 + 6 + 8	10-(2 + 4)
17 + 13 + 9 + 4	20-(3 + 4)

(Take in Table13)

The superiority of the old men to the old women on this test is largely due to environment, while the superiority of the children to their illiterate mothers is attributed to schooling.

There are no American norms that the results in this test can be compared with, but it contains the nine year level Stanford Binet test for making change (10 - 4, 15 - 12 and 25 - 4). Seventy per cent or more of each group except the illiterate old women got two or more of these three problems correct. Practice with the others may have favorably influenced the result, but it appears that these people do simple additions and subtractions better than any other test.

Geometric Figures Test (Mullan's Learning Test)[1]

(1) The Mentality of the Arriving Alien. Public Health Bulletin 90, 1917. pp. 46 - 49.

The material for this test consisted of a card with 20 geometric figures on one side and 3 on the other (see appendix No. 3). The subject was allowed to look at the 20 figures momentarily, the 3 figures were then

exposed and the examiner said "look at these three figures carefully, they are among those on the other side, when I turn the card over you must find them there". The card was turned over in 10 seconds and the examiner said "point out the three figures". If the subject succeeded the test was discontinued, if he failed, a second and, if necessary, a third trial was given with exposure of the three figures for ten seconds on each trial. The problem was to find all three figures on the same trial and the card was turned for the next trial as soon as a mistake was made. The results are given in Table 14 along with the results for other tests.

The skilled men do better than any other group on the Geometric Figures Test. The children do better than any of the illiterate adult groups and almost as well as their literate mothers.

Ball and Field Test

The results for the Ball and Field Test are given in Table 14. The unskilled men do much better with this test than any other group, and the children do better than any illiterate group of adults except the old men. With the exception of a slight superiority on the first trial of the Healy B test, the Ball and Field Test is the only one in the series in which the unskilled are better than the skilled. Their superiority in thistest is probably due to their occupational environment. They worked in the fields and their field work gave them mental associations that enabled them to grasp better than shop workers a problem having to do with a field. The relative good standing of the old illiterate men is probably due to the same cause. All groups do the test rather poorly, only 50.7 per cent of the best group succeeded at the 12 year level. Fifty-five per cent of the

children succeeded at the eight year level, but their average age is 9 1/3 years. Two-thirds of Terman's eight year olds succeeded at the eight year level.

The advantage that work in fields apparently gave the farmers on this test disappears in the case of groups with good native ability and better education. This is illustrated in the table below.

Ball and Field Test, Males

	Norway skilled	Norway farmers	Italy, skilled	Italy unskilled mostly farmers
Number of cases	49	92	58	71
Percentage succeeding at 12 year level	83.7	79.3	39.7	50.7

(Take in Table 14)

Table 14 gives the percentage of persons who succeed on ten tests in addition to the two just described. It is noted that some fail the four year level copying square test and that a large proportion of some groups fail the six year level mutilated pictures test. Fewer fail the eight and nine year level counting twenty to one and arranging weights tests.

Less than 40 per cent of the best group succeeded with the ten year level drawing designs from memory, and less than 21 per cent of the worst group succeeded with the seven year level copying diamond test. These latter were illiterates, but a rather large proportion of the literates also failed. The children do relatively well with these two tests. Graph 4 shows how the results are ~~affected by~~ associated with education.

Point Scale for 16 Miscellaneous Tests

The 16 tests last discussed, beginning with repeating digits and comprising those listed as the second series, have been brought together in a point scale in order to express their combined value concisely and increase their usefulness in the examination of immigrants.

Each test is given a weighted score in accordance with the percentage of success of a given standard group (see appendix No. 4). The weighting of the scores is necessary in order to get into the scale such useful tests as additions, subtractions and repeating digits without unduly stressing the value of these tests as would be done if each of the additions was given a value of one and so on with the other tests.

The standard group used for giving a score value to each test is the group of 152 women age 15 - 44. This group comes nearer representing the average than any other. A larger proportion of immigrants of the present day fall into it than into any other group and they occupy a position in test performance between the men of similar age and the old people.

A score based on any group or on the entire series of cases would give satisfactory comparative results, but where so many factors influence the test performance, no unit of measure can accurately express the intelligence of any group or individual. A measure to be at all just must be comparative, or in other words note must be taken of the fact that a score of 22 in one group means the same as 14 in another (combined scores, literate and illiterate women).

The percentile ratings of the various groups according to the combined score of the 16 miscellaneous tests are given in Table 15 and the relation of the scores to education is shown in Graph 8.

(Take in Table 15)

The children have a relatively high score. It is only one point lower than that of the best group of literate women. These tests obviously give school children an advantage over adults whose occupation, environment and interests or poor education keep them from indulging in practices such as reading that are associated with education and schooling.

It is noted that in arranging weights, a purely practical test, and in naming the months and the days of the week, tests that involve every day experience, the illiterate adults do as well or better than the children.

The Porteus Maze and Kohs Block Design Tests

The type of person taking the Porteus Maze and Kohs tests was the same as those taking the other tests, but additional cases were included to make up the desired numbers for these two tests. Two hundred and thirty-one additional cases took both the Porteus and Kohs and 31 took the Porteus alone; most of the Porteus and all of the Kohs cases were additional.

The slight differences in age and education of the Porteus group from the main groups are recorded in the caption of Table 16 . The same figures with only slight variations hold for the Kohs.

(Take in Table 16)

The Porteus Maze test was given and scored by standard methods and the six year Maze was demonstrated to the illiterates who failed. These were allowed to try it again. The adult mazes were not used

The Porteus test is supposed to be a test of temperament as well as of intelligence but temperament apparently had nothing to do with the poor results of so many persons in some of these groups. They could not find their way through the Mazes. There was no question of the poor performers running into closed roads because they did not take time. On the contrary, their work was often very slow.

The question of lack of effort through a defeatist attitude has to be considered but is probably of little importance. This is based on a general observation that most of the subjects do appear to try hard, and experience has shown that some of the dull individuals fail to get through the six year maze in four or five trials in spite of a demonstration after each failure. Unfamiliarity with pencil and paper is not solely responsible for the poor performance of any of these people. Most of them have been to school and can read and write and 10 per cent of the illiterates can sign their names. I have seen immigrant women who never before have had a pencil in their hands do the 11, 12, 13 and 14 year level mazes.

The median mental age of the various groups is in general slightly better on the Porteus than on the Ferguson test, but the tables show that, except in the case of the young men, the lower percentiles do worse on the Porteus. Graph 2 illustrates the relation of schooling to the Porteus test scores.

The children do better on the Porteus than on any other test. The median test age for the main group corresponds with the median chronological age, which is nine. The average age of this group is 9.5 years. The old men do better on this test than the women, age 15-24. The reverse is true of the Ferguson

This suggests that the male environment influences the score at least as much as it does the Ferguson score.

In the Kohs Block Design Test[1] sixteen colored cubes one inch in

(1) Intelligence Measurement, by S. C. Kohs, 1912. The MacMillan Co.

diameter and all painted alike are used. The subject makes colored designs with these cubes similar to 17 graded paterns that are presented to him on cardboard cards (see appendix No. 5).

The test was given according to Kohs' method with the exception that all subjects were allowed to do three practice designs. This naturally made the test easier. The results are shown in Table 17.

The supposed greater familiarity with and interest of women in colors did not give them an advantage with this test. Turning over the blocks to get the correct colors, arranging them and bringing them together was too much of a problem for them. Very few got beyond the ninth design, up to which point only four of the cubes were used. Eighteen, the median score of the literate women, gives them a test age of nine, while the illiterates, with a score of four, have a test age of 6.5. The men with an average of 6.0 years schooling have a score of 4.6, test age 11.6. 11.5

The children did not have this test, but it was given to ten children of immigrants at Cologne. These children, age 7 to 12, median age 9½, had a median score of 31, test age 10.6 years.

There were 13 dressmakers and 5 embroiderers among the 114 literate women age 15 - 44 who took this test. Their median score was 28, test age 10.25; this is better than the general group, but their average schooling, 4.1 years, is better than the general group. The 5 embroiderers with average schooling of 4.6 years had scores ranging from 33 to 56, test

age 10⅔ to 12 2/3 years. This group of 5 is too small to draw conclusions from, but the fact that their scores on the Porteus ranged from 6½ to 10½ years, which is no better than the scores of the entire group of literates, suggests that their higher Kohs scores ~~were due~~ bear some relation to their occupation.

There were 27 literate women age 15 - 44 who were dressmakers or embroiderers; the median Porteus score for this group was 10½ years, only ½ year more than the general group. This type of skilled occupation apparently had little if any effect on the Porteus results.

(Take in Table 17)

The Pintner Non-Language Test

The Pintner Non-language Test requires the use of a pencil, but the writing of the digits is the only part of it that directly involves schooling. The test is obviously unsuitable for people who can not write the digits and experience had suggested that near illiterates suffered from an educational handicap in attempting to solve some of its problems. The test was, therefore, not given to the general group, but a group of 75 men and 75 women selected because of literacy was given the test for the purpose of comparison with other adult literate groups.

The men had one more year of schooling and reached 0.9 year higher grade than the general group of men age 15 - 44, all of whom were also literate. The women had one-half year more schooling and reached 0.7 year higher grade than the general group of literate women age 15 - 44. Three of the men and one of the women had more than a common school education; 40 per cent of the men and 20 per cent of the women were skilled workers. The results are shown in Table 18 . The highest score possible is 601 points.

(Take in Table 18)

TABLE 18

PINTNER NON-LANGUAGE TEST - ITALY

	Males	Females
Median age	17	22
Average years schooling	6.3	4.8
Average grade reached	4.4	3.9
Number of cases	75	75
Percentile	Points	
100	420	424
90	323	282
80	282	246
70	257	213
60	249	202
Median 50	230	184
40	214	174
30	185	153
20	167	144
10	142	123
0	87	61

The median score, 230 for the men and 184 for the women, gives them a test age of 9 years, 7 months, and 8 years, 7 months reppectively. These are poorer scores than the literate groups made on any of the other three comprehensive tests, but on tests like the cube, repeating digits, drawing designs from memory and ball and field, etc. the scores were as bad or worse.

The relatively poor showing of this selected group on the Pintner non-language test as compared with similar but slightly less educated groups on the Ferguson, Porteus and Kohs suggests a different ~~form~~ kind of standardization, but other groups of immigrants with only a common school education only do as well or better on the Pintner as on the other three tests, showing that it is not standardized too high. Table 19 gives the median scores of other groups together with their education.

TABLE 19

PINTNER NON-LANGUAGE TEST

	Males				Females			
	Oslo	Stuttgart	Dublin	Naples	Oslo	Stuttgart	Dublin	Naples
Median age	21	23	27	17	23	25	26	22
Average years schooling	7.4	7.7	7.7	6.3	7.2	7.3	8.6	4.8
Grade reached	7.3	7.6	4.0	4.4	7.2	7.3	4.2	3.9
Number of cases	155	157	159	75	208	194	122	75
Median score	422	365	230	230	424	346	196	184
Median test age (years)	15.74	14.83	9.65	9.65	15.88	13.25	8.75	8.65

The Pintner Non-language Test has many features in common with the Army Beta tests and some of the Stanford tests. A good showing means good native ability and some schooling, a poor showing means poor native ability or very poor schooling or both.

The material in the Pintner and Army Beta tests is non verbal and not essentially scholastic yet school experience affects the ability to perform them

In this group of tests as a whole and in nearly every individual test, maleness, youth, skilled occupations and more schooling have been associated with higher scores than femaleness, age, unskilled occupations and less schooling. An explanation of the causes of these differences is necessary to an understanding of the significance of the generally low scores in terms of native intelligence which is of more importance than the actual scores.

Sex and Environment

As to sex, the men have consistently done better than the women but a large proportion of them have been to the United States where they lived in cities. This raises several questions in connection with their superior performance.

Does the fact that these men made and saved enough money to visit their homes in Italy, and were sufficiently interested to do it, indicate that their native intelligence was better than that of the average male immigrant?

Did travel and city life increase their store of knowledge and mental associations or in some other way stimulate their minds, so that they have an advantage over their countrymen who have never left home?

In order to provide an answer to these questions the men were classified according to age and residence as shown in Table 20 . The results are given for the Ferguson Farm Boards only, but the relative position of the groups will hold good for practically all of the tests.

(Take in Table 20)

Table 20

FERGUSON FORM BOARDS - MALES

	Age comparison			Residence comparison			
	Age 15-24	Age 25-34	Age 35-44	Age 25-44 lived in the United States	Age 25-44 always lived in Italy	Age 45-60 lived in the United States	Age 45-60 always lived in Italy
Median age	17	28	39	36	27	56	55
Average size of home (rooms)	3.6	3.3	2.6	2.9	3.2	2.3	2.4
Average years in school	5.5	5.5	4.7	4.7	5.9	1.7	1.9
Average grade	4.0	4.1	3.1	3.4	4.1	1.0	1.1
Percentage that reads well	44.8	62.7	41.9	45.6	66.6	7.4	12.9
Per cent that were skilled	53.1	35.3	45.2	41.3	36.1	24.1	45.2
Percentage in United States	0	33.3	93.5	100.0	0	100.0	0
Number of cases	49	51	31	46	36	54	31
Median Shimberg score	33	31	25	24	31	11	11
Median Ferguson score	13	13	12	12	13	8	9
Median Boards complete	5	5	5	5	5	4	4

Page 324

Superior performance is associated with education, youth, skilled occupation and continued residence in Italy. None of the 15 - 24 age group have been out of Italy and this group is superior to the other two groups. Also the two sub groups who lived in the United States are inferior to the corresponding sub groups who always lived in Italy.

The table shows that neither travel, city life nor residence in the United States gave some of these men an advantage over the others. It also rules out the selection of men better than the average male immigrant as an explanation of the superiority of the men over the women.

Male immigrants are the husbands and brothers of female immigrants and they come from the same environment. There is, therefore, no reason for supposing that their native intelligence is superior to that of the women unless there is a natural sex difference in favor of males. If there is an appreciable difference it must arise after puberty as the two sexes are about equal in test performance during school years. Pointing to a sex difference is the fact that in all but one of six countries in which the test ability of prospective adult immigrants was surveyed in the course of this work, the males tested considerably higher than the females, but education and environment have to be considered as causative factors.

The average difference in test age of the literate Naples men and women ages 15 - 44 on the Ferguson, Porteus and Kohs tests is 33 months in favor of the men. An equality of native ability would mean that one year more of schooling plus a more favorable environment ~~has~~ have produced 2⅜ years superiority in test ability.

The literate old men and women have practically the same amount of schooling and the average difference in test age between them on the Ferguson and Porteus is 2.16 years. The average difference between the illiterate old men and women on these two tests is 1.5 years. These differences in favor of the old men must be due either to sex or environment.

The superiority of the males that is not due to more schooling is in all probability due to a more stimulating environment which includes occupation. The skilled men are consistently superior to the unskilled men in this series of tests. They have 1.3 years more schooling than the unskilled, which is doubtless in part responsible for their better showing leaving an undetermined amount due to occupation.

The difference between the males and females on the basis of environment is more important than the difference between the males on the basis of occupation alone. The males, whether they are skilled or unskilled, have more contact than the women with the outside world and with each other. This increases their mental associations and gives them an advantage in test performance.

Education

Education is shown to be an important factor in test performance. It has influenced the results in all kinds of tests including simple construction tests that in no way involve the ability to read or write. More schooling is invariably associated with higher scores in groups of the same sex and age.

It is appreciated that, in general, persons more favored by schooling and occupation owe their favorable position to superior native ability. This is especially true of university graduates and the professions, but in an environment in which the maximum amount of schooling of any group is only 5½ years and the people are common laborers, farmers, carpenters and the like, native ability is probably unimportant in determining whether the amount of schooling a person gets is 2, 3 or 4 years or whether he becomes a common laborer or carpenter.

Graphs 1, 2, 3 & 4 graphically illustrate the relation between test performance and schooling on 20 of the tests. This relation is also illustrated in Charts 1, 2, & 3. In each graph the curve of education directly follows the curve of test performance within given age and sex groups. In graphs 1 and 2, which gives the Ferguson and Porteus scores, sex is seen to affect markedly the height of the curves, but it does not change their relation to education. In Graph 2, which gives the combined scores for 16 tests, the curves follow the line of education and are influenced very little by sex. The illiterates of the two sexes and adult groups with the same schooling have almost equal scores.

(Graphs 1, 2, 3 and 4 near here)

Graph 4 shows most strikingly how slight differences in education may be reflected in test performance. The two tests here illustrated require the use of a pencil, but not the ability to write, but the greater amount of writing that some had done evidently created mental associations in connection with simple designs and the relation of lines to each other that enabled them better to perform these tests. The higher scores of the children on these two tests are probably due to their recent preoccupation with pencil and paper.

The effect of education on test performance is well illustrated by the performance of the children in comparison with their poorly educated or illiterate mothers. The mothers as before stated were selected in order to get a comparison between illiterate mothers and their literate children, but some mothers with schooling were included. Unless 3.5 years of schooling is accepted as evidence of superior native ability, the illiterate mothers probably had about as much native ability as the general group of women, for they tested as well as the illiterate women age 15 - 44. If the mothers are equal to the other women, there is no reason to suppose that they are inferior to their own children because of qualities the children derived from their fathers.

The children (median age 9 1/3 years) perform better than their illiterate mothers on nearly all of the tests, and better than their literate mothers on many of them. They are also better than other groups of women on many of the tests. Their combined score on the 16 miscellaneous tests is only slightly lower than that of the best group of women. The probable explanation is that the children are fresh from school, and have exercised and developed up to near the maximum for their age those faculties that are required in the performance of certain tests, whereas such faculties have lain dormant and undeveloped in the women since they left school for the monotonous drugery of

home life devoid of stimulating factors. It has been shown (Table 2) that they do not read.

Age

As to the difference in test performance of adults on the basis of age, the only groups on which the results are not seriously complicated by differences in education and environment is furnished by comparing the women age 15 - 44 with the women age 45 - 60.

The difference in age between the illiterate women of these two groups for all the tests except the Porteus and Kohs is 14 years, where the difference is 20 years. Combining the results for all the tests except the Porteus, the difference in performance between the two groups is practically nothing. The younger group tests one year higher on the Porteus.

The schooling of the younger and older groups of literates for all tests except the Porteus is 4.3 and 4.0 years respectively, a relatively unimportant difference, but the difference in age is 27 years and there is considerable difference in test ability in favor of the younger groups. Part of this is doubtless due to the age factor.

It is important to point out here that no senile person was included in this series of cases. The time when deterioration in test ability begins probably depends as much on education and intellectual habits as on actual loss of mental acuity due to senile changes.

During the course of this work in two other countries, groups of people up to age 45 who read regularly and had an equal amount of schooling were examined and an appreciable difference in test ability was found. This supports the view that the definite differences shown here between the groups of women ages 15 - 24, 25 - 34 and 35 - 44 are not due to actual deterioration of the older groups but to less schooling and the fact that they are farther away from the little schooling that they had.

If women are equal to men and the illiterates in this series of cases equal the literates in native mental ability, the difference in test ability caused by education and environment is expressed by the difference between the literate men and the illiterate women. The average difference in test age between the literate men age 15 - 44 and the illiterate women age 15 - 44 on the Kohs, Ferguson and Porteus tests is 5.3 years. This is a large difference for simple non-verbal tests that do not directly involve school knowledge, but the fact that the children of illiterate mothers, no better than this group of women, test as well or better for their age than the men, strongly suggests that the 5.3 years difference between the men and women must be accounted for on some other basis than difference in native intelligence. The men are younger by 13 years, but the women with a median age of 39 have not yet reached the age where appreciable deterioration in test ability is to be expected.

The difference in test age between the literate old men and illiterate old women is not so great, but is considerable. The test results suggest that between dull groups fine shades of difference in education and environment produce definite differences in test ability and a test age of seven may mean the same in terms of native mental ability as a test age of 12. Extraneous factors surely do not affect test results to any such degree among more favored people and there is no reason to suppose that on such tests as the Ferguson, Porteus and Kohs the superior education of the college graduate gives him any advantage over the man who has gone through our public schools and has lived in a fairly stimulating environment. On the contrary, it would seem that on the Ferguson Form Board test, persons engaged in certain skilled trades should have an occupational advantage over college graduates who enter business or a profession.

The Criterion of Defect

For practical purposes it is important to know what the scores mean in terms of native mental ability. This can be approximated by comparing other groups with the groups reported here.

The median test age of the men, age 15 - 44, obtained by averaging their median scores on the Ferguson, Porteus and Kohs, is 12.25. The median test age of the white draft Army was 13.15 years[1], but neither the tests used

(1) Memoirs National Academy of Science, Vol. 15, p. 790.

in the Army nor the manner of giving them were the same as the tests and methods used here, and the difference is all in favor of the present group. The Army recruits were given more complicated tests by a method which would have left most of this group with zero or near zero scores.

The Pintner Non-language test is similar in its general features to the Army Beta tests. It was given individually to a selected group of these people and every possible effort was made to get them to understand it. Their median test age on it was 9.6 years (Table 18).

The very poor showing that these people make on such tests as the Ball and Field, repeating digits, and drawing designs from memory must be considered in comparing them with the Army draft, for these tests were used in the Army.

The Pintner test apparently does not express the full native ability of this group and it follows that the Army tests did not express the full native ability of the Army group, as the Army tests were as unfair to a very large proportion of the Army recruits as the Pintner test was to many of these immigrants. The difference between 9.6 years and 12.25 years more

nearly expresses the difference between this group and the Army, than the difference between 12.25 and 13.15. On the basis of the tests and methods used here, the mental age of the Army would be boosted by 2.65 years which would give them a mental age of 15.8. After all, it is self evident that the children of a country must have as much and no more native ability than the young adults and any difference in favor of one or the other expressed by intelligence tests must be the fault of the tests.

The skilled men should not be handicapped more than other immigrants in performing the Ferguson Farm Board test. Their median test age as compared with the median test age of others is given in the table below. The Oslo and Stuttgart groups were made up of applicants for immigration visas, from whom about 12 per cent of the total number applying had been excluded because they had more than the common school education.

Ferguson Farm Board Test - Males

	Oslo skilled and unskilled	Stuttgard skilled and unskilled	Dublin mostly unskilled	Naples skilled
Average years schooling	7.4	7.7	7.5	5.3
Average grade	7.3	7.6	3.9	3.5
Number of cases	123	157	279	58
Median test age	16.9	15.5	13.0	12.33

The Naples children score four points (Shimberg) against a score of 23 points for a group of immigrant children of the same age that were examined in Cologne. This group of children had less schooling than the best group of Naples women, but got the same score. Their intelligence quotient was 120.

These comparisons as well as the comparison with the Trieste women indicate that the very poor showing of the Naples group is not due altogether to educational and environmental factors.

Using the test most favorable to them, the best Naples group has a median intelligence quotient of 83.3 and it is a reasonable assumption that their actual native ability is no higher than this. It is significant in this connection that several investigators working in American schools have found the intelligence quotient of the children of Italian immigrants to range from 83 to 85.

That the Naples immigrants are inferior is evident, but it is difficult to decide who among them should be classified as mentally defective. The unselected illiterate women, age 15-44, have a median intelligence quotient of 51 on the Ferguson and of 43.8 on the combined score of the Porteus and Kohs.

By the classification in common use these scores throw the median of the illiterate women in the imbecile class, which is, of course, absurd. It is assumed that they have approximately the same native intelligence as the unselected group of men age 15-44. This means that for them a Shimberg score of 7 on the Ferguson should be accepted as equal to a score of 32, that a test age of 7½ on the Porteus should be accepted to mean the same as a test age of 15; that a score of 4 (test age 6.6 years) on the Kohs should be accepted as meaning the same as a score of 41 (test age 11.41 years) and so on for all the tests.

Standard Group and Standard Test

It follows from the foregoing that no standard value can be given to any test and applied to all of these people with accuracy or justice, but this difficulty is easily surmounted by adopting a standard group of people and assuming that all groups at least equal this group in native mental ability. The tests are then given a sliding scale of

values depending on the group to which the person examined belongs, and his real native ability is found from the tables by locating his score in the correct percentile of his own group and then giving it a value equal to the value of the score in the same percentile of the group of men. There is a question whether in judging the women the general group of men age 15 - 44 or the skilled men age 15 - 44 should be used as the standard group. The general group age 15 - 44 is tentatively selected as the standard group.

As an example of the use of the rating method outlined above, a 30 year old woman who can not read, but who may or may not sign her name, falls in the group of illiterate women age 15 - 44. She makes 12 points (Shimberg scoring) on the Berguson test. An examination of the table shows that 12 points gives her a 60 percentile rating and that the 60 percentile rating for the standard group of men is 36 points. Her native ability is, therefore, not expressed by the score of 12, which is equivalent to a mental age of 9, but by 36, which is equivalent to a mental age of 13. This latter is the corrected mental age in contradistinction to 9, which is simply the test age.

The same procedure is adopted for all the tests; equal percentiles mean equal native ability, and the native ability is expressed by the score of the group of men, but for purposes of expressing the results as mental age or intelligent quotient it is necessary to have a standard test that is fair. It would obviously be misleading to use as the standard a test of such limited scope as repeating digits upon which the men test at the 7 year level.

The test that more nearly expresses the intelligence of the men than any other is the Ferguson Form Board test, and this is accepted as the standard. They do slightly better on the Porteus Maze test, but it is doubtful whether these men really have as high a mental age as the Porteus test gives them.

In examining a South Italian Immigrant whose mentality is in doubt, all of the tests except the Pintner Non-language should be used. The score of the 16 miscellaneous tests comprising the second series should be expressed as one percentile rating. If the immigrant is an illiterate woman age 35 and she makes a score of 8, her percentile rating is 20 and this when expressed in terms of the 20 percentile men's Ferguson test score (Shimberg) gives her a score of 15 or a mental age of 9.5.

The value of the five performance tests comprising the second series should be expressed as one percentile rating as follows: If this woman does the second trial of the Mare and Foal, Gwyn Triangle, Healy A and Healy B in 45 seconds, 85 seconds, 235 seconds, and 274 seconds respectively and succeeds on one line of the Pintner cube test her percentile ratings on the five tests are 20 - 30 - 0, - 30, - 10 and the median percentile of this is again 20.

The Ferguson, Porteus, and Kohs test may be treated in the same way and two values given to the Ferguson, one for the actual score and one for the number of boards completed, but these three tests may be treated individually and for dull persons it is better to do so because with the Ferguson test (boards completed) as with the Porteus and Kohs the same score may fall into two or more percentiles and it is next to impossible to formulate an accurate rule for the proper location of the scores.

It is important to bear in mind that 40 per cent of the illiterate women do only 2 Ferguson Boards, that 40 per cent of them make 5 years or less on the Porteus test and that 20 per cent of them score 0 on the Kohs test, giving them only an allowed test age of 5.25 years and that with little variation these scores hold good for all the simple tests that are tabulated on the percentile basis.

It is almost unbelievable that such imbecile score ratings, made on simple tests given with the utmost care and scored liberally, can mean anything except mental defect, but these women and the mothers can not be inferior to their husbands, and brothers and children.

On the standard test 10 per cent of the husbands and brothers made between 8 and 9 years mental age or less. If the selected group of skilled men is used as the standard, the mental age of 10 per cent is 9.5 or less. Even with this group a considerable number have scores that are exceeded by some inmates in institutions for the feebleminded.

There is, however, a social angle to be cohsidered in connection with whether or not people get into institutions, and it is generally recognized that there are many more defectives outside of institutions than there are in them. If it were possible to exclude any adults who on approved non-language tests have a corrected mental age below ten or any person who had a corrected intelligence quotient below 63.5 most defectives along with some who are not defective by social standards would be excluded and much would be done to prevent a reduction in the general intelligence level of the countyy.

For the convenient location of low scores the percentile rating from 10 to 0 of the two groups of men on the Ferguson and Porteus tests are given ~~below.~~ in Table 21.

TABLE 21

Percentile Ratings from 10 to 0 of Men on Ferguson Form Boards and Porteus Maze Test

	Men general group	Men skilled	Men general group	Men skilled
	Ferguson test (Shimberg score) Points		Porteus Maze test Mental age	
Percentiles				
10	8	15	10	11
8	7	15	10	11
6	6	14	9½	11
4	5	11	8	11
2	3	7	7½	11
0	1	4	5½	8½

Using the Ferguson as the standard test, the score of 11 by the 4 percentile of the skilled group gives a test age of 8.83 years and the score of 5 by the 4 percentile of the general group gives a mental age of 7.83 years. The score of 7 and 3 by the 2 percentiles of the groups gives a mental age of 8.17 and 7.5 years. By the Porteus test the test age of the 2 percentiles of the skilled group is 11 years, but the Ferguson test is believed to be a more reliable measure especially in the lower percentiles. In any event a person whose median on all of these tests falls to the 2 percentile has a very low intelligence and many who make the 10 percentile on some of them are defective.

A more detailed discussion of who should be certified as mentally defective will be given after data on immigrants from other countries are published.

SUMMARY AND CONCLUSIONS

1092 South Italian emigrants were examined in Naples with non-verbal intelligence tests and 39 emigrants from Trieste were examined with the Ferguson Form Board test.

Men scored higher than women, skilled workers higher than unskilled workers, younger adults higher than older adults, literate adults higher than illiterate adults, and literate children with a median age of 9 1/3 years as high or higher than their illiterate mothers.

The higher scores of the men were due mostly, if not solely, to more schooling and more stimulating environment.

The higher scores of the younger adults were due mostly to more schooling, but aside from this a slight but definite deterioration in test ability was shown for groups more than 45 years of age.

The Trieste group was superior.

Slight differences in the amount of schooling caused definite differences in test ability and the performance of all tests was greatly affected by schooling and environment.

No schooling and a very poor environment, as compared with five or six years schooling and a better environment caused a difference of from four to five and one-half years in test age ability between groups that are presumed to have the same native mental ability.

The approximate range of the median intelligence quotient of the groups of illiterate women on simple performance tests was between 40 and 50. It is definitely shown by the children that this can not be an accurate expression of their native ability.

The best group, the skilled men, has a median intelligence quotient of 83.3 on a test, the Ferguson Form Boards, that is fair to them and it is believed that their true native ability can not be higher than this.

All the tests proved to be good, but some were more easily performed than others because they presented problems that were more within the range of experience of the persons tested.

The divergent results produced by differences in education and environment indicate that no test can be devised that measures the native ability alone.

The greatest inaccuracy in intelligence test results occurs in dull unlettered people where for the practical purpose of diagnosing mental deficiency the greatest accuracy is needed.

In judging people by tests, as much attention must be paid to their environment as to the tests.

A scheme is devised for eliminating factors other than native ability in expressing test results, by adopting a standard group and a standard test shown to be fair to that group, and referring all scores back to the score of the standard group on the standard test. By this means the corrected mental age is found and this is in most cases considerably higher than the test age.

Appendix 1

Ferguson Form Board Test

Method and scoring in use at the Judge Baker Foundation.

Give boards in order I to VI, or until S has failed two consecutive boards. Present pieces outside the board in such a way that no two blocks belonging together are in juxtaposition. Turn over pieces as below:

Board I Turn over the middle block in the upper row and the two side blocks on the lower row.

Board II No turning over is necessary.

Board III Turn over one of each pair so that the larger part of each block is uppermost, the bevels thus being hidden.

Board IV Turn over one of each pair.

Board V Turn over the smaller of each pair.

Board VI Turn over one of each pair so that the larger part of the block is uppermost.

The removal and the turning of the pieces is always done out of sight of S. Say to S, "Put these pieces in as quickly as you can."

Scoring: Record time for each board. Time limit for each board is five minutes. Convert seconds into values according to table below. Final score is sum of all the values.

(Take in Table 2-2)

Norms: (tentative) 308 males, 171 females. (Meehan, Shimberg).

Smoothed Scores by Sex and Age

Sex	Age	9	10	11	12	13	14	15	16
M		12	18	24	30	36	42	48	54
F		-	-	-	-	-	34	38	41

Ferguson Type of Scoring

Each board scored alike, Score based on number of seconds required to complete as follows:

Seconds	Points
0 - 29	5
30 - 59	4
60 - 99	3
100 - 149	2
150 - 300	1

In giving the test Ferguson did not turn the pieces or arrange them in any definite way.

Appendix 2

Cube Test (Pintner Modification)

1st move - 1234	7th move - 13243
2nd " - 12343	8th " - 14324
3rd " - 12342	9th " - 13124
4th " - 1324	10th " - 143124
5th " - 1432	11th " - 132413
6th " - 1423	12th " - 142341

(Take in photostats here)

Appendix 4

Point Score Value of 16 Miscellaneous Tests

The score values, based on the performance of the 152 women, age 15-44, were worked out as follows:

If 100 per cent succeeded	Score 0
If between 75 and 99 per cent succeeded	" 1
If between 50 and 75 per cent succeeded	" 2
If between 25 and 45 per cent succeeded	" 3
If between 1 and 24 per cent succeeded	" 4

Point Score Value of 16 Miscellaneous Tests

	Points
Copying square	1
Mutilated pictures	1
Copying diamond	1
Counting 20 to 1	1
Naming days of week forward	1
" " " " backward	1
" months of year forward	1
" " " " backward	1
Arranging weights	1
Drawing designs from memory	4
Geometric figures	
1st trial success	3
2nd " "	2
3rd " "	1
Ball and field	
12 year level success	4
8 " " "	3
Repeating digits forward	
6 or more	4
5	2
4	1
less than 3	0
Repeating digits backward	
4 or 5	4
3	2
2	1
Additions	
8 or 9 correct	4
7 "	3
5 or 6 "	2
1 to 4 "	1
Subtractions	
9 correct	3
7 or 8 "	2
1 to 6 "	1
Total points possible	35

Table 22

TABLE

Values		10	9	8	7	6	5	4	3	2	1	0
Board I		0 to 16	17 to 19	20 to 21	22 to 24	25 to 27	28 to 29	30 to 36	37 to 51	52 to 66	67 to 300	F
Board II		0 to 68	69 to 72	73 to 76	77 to 81	82 to 86	87 to 89	90 to 92	93 to 97	98 to 104	105 to 300	F
Board III	Time in seconds	0 to 79	80 to 88	89 to 95	96 to 102	103 to 112	113 to 127	128 to 144	145 to 163	164 to 186	187 to 300	F
Board IV		0 to 117	118 to 130	131 to 140	141 to 155	156 to 178	179 to 197	198 to 205	206 to 208	209 to 212	213 to 300	F
Board V		0 to 167	168 to 181	182 to 197	198 to 216	217 to 232	233 to 242	243 to 253	254 to 264	265 to 271	272 to 300	F
Board VI		0 to 223	224 to 248	249 to 262	263 to 267	268 to 269	270 to 272	273 to 277	278 to 285	286 to 294	295 to 300	F