

# A COMPARISON OF MENTAL ABILITIES OF MIXED AND FULL BLOOD INDIANS ON A BASIS OF EDUCATION<sup>1</sup>

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There are two sorts of factors involved in all studies of mental process of the type about to be considered in this paper. One is that sort of factor which is inherent in the organism, and the other is that sort which plays on the organism and brings about changes in the organism, or the environmental factor. A division may be made of these two factors. In the first we find traits due to remote ancestry and those due to chance variation in less remote ancestry. In the second we have environmental influences of an informal character and those of a more or less deliberate or formal nature. Here we have at the lower end of the scale impressions whose moulding capacities habituate in the greatest minutiae, most informally, which shade very gradually into the more pretentious processes of formal education. Under this last, noting the cause of the change, we must take cognizance of the school of the mother's breast as a source of nurture as well as the school of the mother's knee, both of which profoundly influence the developing man mentally and physiologically in all probability.

And the school of the mother's breast and of the mother's knee are not the same for all individuals. They differ from group to group and from one individual to another but more so in the former case than in the latter. Especially would this be true if the groups were racial. The school of the mother's knee cannot be the same for a Navajo papoose

<sup>1</sup> The observations on social status among Indians included in this article were made in part while the writer was doing field work in the spring of 1921, the expense of which trip was met by courtesy of the Committee on Grants of the American Association for the Advancement of Science.

living in its mother's hogan, reacting to its mother's bronze features and harsh guttural sounds as is that of the white infant, or the negro baby, in its early nest of qualitatively different stimuli. The patterns are different though they may be of the same elements, being richer in quality and more abundant in quantity in some situations than in others. The jewelled necklace, the silver bracelet with turquoise settings of the Pueblo mother, worn incessantly, and her brightness of costume generally will not give the same stimulus pattern and cannot produce the same reaction as a drab gingham dress with no beads and trinkets. We pass by the other differences in nurture which come later, but will say that teachers in some of the United States Indian schools where some boarders come in from the pueblos and the hogans at five years of age, claim that these children make better students than those who come later. It is easy to see that they have not so many Indian ways of thinking as those who linger longer in the primitive environment, which would interfere with the 'white' learning.

So when comparisons of mental performances of two races or even of social groups are made one must consider the environmental influence as a very important factor to be controlled.

We have said that individual environments differ in the same group and if they there produce differences of importance, racial environmental differences might produce them in larger degree. Here is a case, which so far as the writer knows has never been reported till now, of a white boy of eleven years with a Binet age of seven. The subject had been discovered in the typhoid ward of Bellevue Hospital of New York City and since his was an interesting case, upon his convalescence he was brought to the New York Clearing House for Mental Defectives for examination. He was given a Binet test by the writer, at that time a psychologist in the clinic, with the above-mentioned result. No pathological condition could be found by the neurologists in charge of the clinic, and until his life history was investigated no cause for the mental retardation could be made evident. But the

fact was that the boy had been reared on a coal barge which moved about in New York Harbor, never remaining for a long period of time at any one point. In this case the environmental influence had been so limited that he was retarded mentally four years, according to the Goddard Revision of Binet then in use, 1913.

Since certain of our tests presuppose certain environmental influences producing certain experience necessary to a creditable showing in the tests, to measure one by the test who has not had the opportunity to acquire the experience necessary before one can begin to meet the situation set down before him would be unfair. It is psychologically sound to say that one cannot learn something without the stimulus necessary to that learning. We cannot presuppose its presence. For that reason we cannot draw scientific conclusions as to the mentality of individuals unless those individuals have been exposed to the environment which the test presupposes. We may continually shut our eyes to this fact but the fact remains.

Negroes are compared with whites on a basis of age, likewise Indians with whites on this basis, but we do not know what the negro or the Indian could do if placed in an absolutely white environment from birth until the date of the test. This is no contention that the blacks and redskins as groups are necessarily equal to the whites, for we still leave the question open. So far tendencies appear to show that as groups they are not, where some allowance for environment is made. The value of experimental data cannot be unduly emphasized, being objective measures, but having obtained them they are only data after all. Analysis and interpretation of the most painstaking character are necessary to bring out all the facts since the distribution of the measures are merely resultants as it were of many factors.

However, when we study the 'comparative psychology of races,' the main factors whose influence we desire to determine are those due essentially to one given form of germplasm and another. We seek to find *race* differences and nothing else.

We call attention to at least two ways of proceeding, both of which have difficulties. One of these procedures is to compare two remote but pure racial stocks in some mental performance. The other is to compare one pure stock with a mixture of the two racial bloods, *i.e.*, mixed bloods, as in the case of comparison of the performance of negroes with mulattoes by Ferguson (1).

The first procedure has the difficulty of controlling the factors of nurture, as environment, education, and social pressure. But if this could be accomplished the racial differences, if there be any, should be comparatively large. The second procedure ought to offer less difficulty on the score of controlling the environmental factor as the mixed bloods should possess an environment more like one of the pure blood group than if the groups were both pure. This method merely assumes less of difference in the matter of nurture. If there be any racial differences, they would be less in this case presumably, because one group is an 'adulterated' form of the other. But in this second method in which we compare pure and mixed bloods, if we are to draw inferences from the principles of the science of genetics, the matter is complicated by the dominance and recessiveness of traits found in such mixed bloods. To quote East and Jones (4), 'Inbreeding and Outbreeding,' pp. 55-56: "The interaction of a pair of homologous factors in a hybrid—allelomorphs they are called—does not always result in the production of an intermediate. Often the action of one factor *dominates* the action of the other, either by masking it or by inhibiting its operation. When this occurs the dominated character recedes from sight in the  $F_1$  generation and the ratio in the  $F_2$  generation is 3 dominants, 1 recessive." By way of illustration in the merely physiological character of skin color, a mulatto father with sandy beard married to an apparently full blood negress has two sons as black as their mother in striking contrast to their paternal parent. A little girl of three to be seen running about on a certain Indian reservation has a Jewish-Indian parentage, her father being an employee in the vocational school there, presents an interesting case. Will she show

equal amounts of Jewish mental traits and of Indian mental traits or more of one than of the other? If the genetic law works in mental traits as it does in physical traits possibly we ought to get multimodal effects in one distribution of mixed blood performance in a mental test, particularly should we get at least bimodal effects in a distribution of performance of an  $F_2$  population. It would be going beyond the originally prescribed limits of this paper to follow this out further.

Beset by these foregoing difficulties in the present instance we have undertaken the comparison of full blood with mixed blood Indians in performance of some tests, taking advantage of whatever may accrue from the similarity of nurture in the two groups but recognizing that it is not a case of identity of environmental factors.

In a recent paper, 'The Results of Some Tests on Mixed and Full Blood Indians,' *Journal of Applied Psychology*, 1921, the writer of this paper gave results of a comparison of the performance of mixed and full blood Indians on a basis of age. The tests were the nine tests used by Pyle (2, 5) on whites and negroes and some of them were used by Pintner (6). The data were so handled as to attempt to supply age norms for these blood groups, but because of the small groups of age and sex, resulting from these sub-divisions of the original 153 mixed bloods and 224 full bloods, the resulting 'norms' are rather unreliable. But the comparisons of scores almost consistently favor the mixed bloods though it should be said that the school attainment and other factors of nurture were ignored.

In the present paper we so handle the same data as to place both blood groups on an equal school attainment basis, using the Course of Study of the United States Indian School issued by the government as a basis of grading, which grading had already been done by the local administration, under the supervision of Superintendent C. W. Blair of the U. S. Indian School of Chilocco, Oklahoma, in which school the subjects were students.

The problem may read thus: If groups of mixed and full blood Indians with the same school training as indicated by

grade attainment are given the same psychological tests under controlled conditions, what will be the results of a comparison of their performances of the tests?

If the reader will examine the accompanying tables he will note the character of the tests administered to these subjects. It has been said (8) that if there are racial differences in mental traits they ought to be indicated by tests of the higher mental processes. We have here (1) association tests, controlled and uncontrolled which investigate, quoting Whipple (10), "the nature and efficiency of those association connections—that the subject has already established"; (2) memory tests which inquire into "the retentive capacity or ability to reproduce an arbitrary series of symbols" and "a series of related ideas"; (3) word-building tests, being tests "of invention—ingenuity and active attention—ability to combine isolated fragments into a whole."

The full blood subjects were nearly all of the Plains and Forest Indian racial stocks. Only two or three were Plateau Indians. The mixed bloods were mixtures of these stocks with whites, though a few appeared, by darkness of skin color, to have some negro blood; however, the experimenter could not establish this fact. Fortunately there were only three or four of these.

The size of the school-attainment groups which we shall call educational sub-groups makes the data fairly reliable with the exception of the eighth, ninth, and tenth grade sub-group of the full bloods. The writer has called attention elsewhere (9) to the fact that the degree of Indian blood decreases with school grade at least in this school—the higher the grade the smaller, on the average, is the amount of Indian blood.

The educational sub-groups are three in number and were gotten by combining the numbers in the fourth and fifth grades, the sixth and seventh grades, and the eighth, ninth and tenth grades respectively. In order to approach an even distribution of the number of cases these combinations were necessary and even then, in the case of the full blood sub-group mentioned above, the desired number could be brought

up to only forty-one as compared with ninety-four and eighty in the lower sub-groups, and in some of the tests the number was even smaller than this for this sub-group. We give herewith (Table I) the composition of the sub-groups in respect to the actual number taken from each grade as supplied from the data of the Opposites Test:

TABLE I

COMPOSITION OF SUB-GROUPS			
<i>Mixed Bloods</i>		<i>Full Bloods</i>	
Sub-Group I	Number of Cases	Sub-Group I	Number of Cases
4th Grade.....	14	4th Grade.....	37
5th Grade.....	41	5th Grade.....	57
Total.....	55	Total.....	94
Sub-Group II		Sub-Group II	
6th Grade.....	25	6th Grade.....	49
7th Grade.....	28	7th Grade.....	31
Total.....	53	Total.....	80
Sub-Group III		Sub-Group III	
8th Grade.....	16	8th Grade.....	17
9th Grade.....	26	9th Grade.....	17
10th Grade.....	15	10th Grade.....	7
Total.....	57	Total.....	41
Grand Total...	165	Grand Total...	215

The numbers for the different tests are not the same, since the giving of the tests lasted over several days and sometimes subjects were absent from class. Sex differences are not measured here since the groups are all too small and will not stand further division and besides if such differences exist in the data they would probably be balanced by their equal distribution. As to age, grade for grade the average age is greater for the full bloods than for the mixed bloods by a median difference of 1.6 years or a difference on the average of 1.7 years with a range of 1.3 years in the fourth grade to 2.5 years in the ninth grade. If anything age should favor the full bloods in the results of the experiment for they are thus shown to be older, the difference between the averages being that of 11 per cent with the mixed group as a base.

We now look to the results of the performance of the two

TABLE II

Sub-groups Grade	Opposites Test			Genus-Species Test		
	I 4-5	II 6-7	III 8, 9-10	I 4-5	II 6-7	III 8, 9-10
Full Bloods: No. Cases.....	96	83	40	114	85	38
Ave. Score.....	6.7	9.7	13.5	7.1	9.5	13.2
A.D.....	3.0	2.9	3.0	2.0	2.2	3.5
P.E.....	2.5	2.5	2.5	1.7	1.9	3.1
Median.....	6.4	9.5	14.1	6.1	8.9	12.7
Range.....	0-17	1-16	3-19	0-18	1-19	4-20
Mixed Bloods: No. Cases.....	48	53	46	46	43	57
Ave. Score.....	8.1	12.0	18	7.6	10.9	14.5
A.D.....	2.8	2.7	3.7	2.9	3.2	3.4
P.E.....	2.4	2.1	3.2	2.5	2.8	2.9
Median.....	8.0	11.8	14.8	6.7	10.0	14.3
Range.....	0-17	2-20	6-20	2-17	3-20	6-20
Per cent attaining median of Full Bloods.....	69	73	75	56	72	65
	Part-Whole Test			Free Association Test		
	I 4-5	II 6-7	III 8, 9-10	I 4-5	II 6-7	III 8, 9-10
Full Bloods: No. Cases.....	85	77	39	105	81	38
Ave. Score.....	5.1	8.4	10.3	39	44.2	53.3
A.D.....	.1	2.9	2.5	12.3	8.7	8.0
P.E.....	.1	2.5	2.1	10.3	7.2	6.7
Median.....	4.9	8.1	10.1	40	45.3	51.1
Range.....	0-13	2-20	2-19	0-75	5-68	39-74
Mixed Bloods: No. Cases.....	49	56	58	47	51	54
Ave. Score.....	6.0	10.5	11.7	41.3	46.8	57.1
A.D.....	2.4	3.4	1.3	8.8	10.0	6.3
P.E.....	2.0	2.8	1.1	7.4	8.5	5.3
Median.....	5.4	9.8	11.2	40	47.3	59.8
Range.....	0-13	2-20	1-20	8-63	16-68	35-78
Per cent attaining median of Full Bloods.....	73	69	72	49	59	74
	Logical Memory Test			Rote Memory- Concrete Test		
	I 4-5	II 6-7	III 8, 9-10	I 4-5	II 6-7	III 8, 9-10
Full Bloods: No. Cases.....	92	81	37	106	83	38
Ave. Score.....	14.7	25.6	28.2	37.5	39.9	43.1
A.D.....	9.7	9.9	10.0	4.8	4.3	2.3
P.E.....	8.2	8.3	8.5	3.9	3.6	1.9
Median.....	12.8	26.0	29.5	37.6	39.3	41.3
Range.....	0-36	4-46	8-51	22-58	26-54	32-56
Mixed Bloods: No. Cases.....	54	52	50	46	50	57
Ave. Score.....	22.5	29.7	35.3	37.7	41.3	45.4
A.D.....	9.5	9.6	6.3	4.8	2.4	4.0
P.E.....	8.1	8.1	5.4	3.9	2.0	3.4
Median.....	22.3	30.5	35.6	37.1	42.2	45.0
Range.....	0-50	9-55	13-50	20-51	26-54	33-59
Per cent attaining median of Full Bloods.....	79	67	86	50	66	82



TABLE II. — *Continued*

Sub-groups	Rote Memory- Abstract Test			Word-Building (cairlp) Test		
	I 4-5	II 6-7	III 8, 9-10	I 4-5	II 6-7	III 8, 9-10
Full Bloods: No. Cases.....	106	83	38	101	80	35
Ave. Score.....	27.1	32.2	38.8	10.1	12.9	15.9
A.D.....	6.6	5.3	4.3	4.0	3.5	7.1
P.E.....	5.6	4.4	3.5	3.3	2.9	6.1
Median.....	25.9	31.8	38.5	9.5	13.0	14.5
Range.....	6-51	17-47	24-51	0-21	0-22	0-22
Mixed Bloods: No. Cases.....	46	50	57	51	51	56
Ave. Score.....	28.9	35.2	41.9	10.4	13.3	16.5
A.D.....	3.4	1.9	3.8	4.4	3.7	1.8
P.E.....	2.8	1.5	3.1	3.7	3.2	1.4
Median.....	30.3	37.0	41.7	9.5	13.0	17.5
Range.....	19-48	22-49	27-54	0-20	1-21	0-22
Per cent attaining median of Full Bloods.....	80	82	75	57	51	71

Word-Building (aeobmt) Test.\*

Sub-groups Grades	I 4-5	II 6-7	III 8, 9-10
Full Bloods: No. Cases.....	98	85	38
Ave. Score.....	11.1	13.2	15.2
A.D.....	3.8	2.4	2.3
P.E.....	3.1	1.9	1.1
Median.....	10.8	12.8	15.2
Range.....	0-20	2-23	5-23
Mixed Bloods: No. Cases.....	50	49	58
Ave. Score.....	10.0	13.2	15.8
A.D.....	1.6	1.9	1.5
P.E.....	1.3	1.5	1.3
Median.....	10.1	14.0	15.3
Range.....	1-17	2-21	1-22
Per cent attaining median of Full Bloods	52	67	58

blood groups as given in the Table II. In doing so let us have in mind several questions which we may ask:

1. Do they differ in their performance and how much if they do?
2. Do they profit by education and which group profits most? In this we take the sub-groups as representative.
3. Are any peculiar abilities possessed by either group?
4. In which test do they differ most?
5. Which test proved most difficult for a group?
6. Is there any evidence of superior mentality in either group as compared with the other?

In order to answer the first question as to differences in the performances in the several tests by the groups, we have to consider the central tendencies of the sub-group performances, and the overlapping of the two distributions of the measures in each sub-group.

We first take into consideration the average scores. For instance in the opposites in the fourth and fifth grade sub-group these are for mixed bloods 8.1 and for full bloods 6.7. The per cent of the former to the latter is 120. In the sixth and seventh grade sub-group this per cent of the average score is 123 and in the eighth, ninth and tenth grade sub-group it is 133. The average of these per cents for the three sub-groups is 125. In the genus species test these per cents. are 107, 115 and 109, and the average 109. Table III gives these per cents for the several tests. In only one test did the full bloods excel the mixed bloods in a single sub-group. (See the second word-building test, fourth and fifth grade sub-group.) The averages of the per cents for a single test, reading across, may be taken as comparative measures of the group performances. Since the average of these is 111 per cent, we may say that the mixed blood Indians excelled the full blood Indians by 11 per cent of their performance.

But we wish to know something of the overlapping in the several sub-groups for the several tests before putting our trust in this measure of a difference between mixed and full blood Indians on a basis of education. A table of the overlapping has been prepared. [See Table IV.] On the average the overlapping for the fourth and fifth grade subjects is 52.8 per cent, median 57 per cent; for the next sub-group or the sixth and seventh grade sub-group, it was 67 per cent, median 67 per cent; and for the last sub-group it was 73 per cent, medium 74 per cent. The trustworthiness of this measure of difference obtained above must be judged by these measures of overlapping, those for the last sub-group being more reliable than those of the first two and the first of all being the least reliable.

TABLE III

SHOWING PER CENT OBTAINED BY DIVIDING MIXED BLOOD AVERAGE SCORE BY  
FULL BLOOD AVERAGE SCORE

Test	Sub-Group 4-5	Sub-Group 6-7	Sub-Group 8, 9, 10	Total	Ave.	Rank
Opposites.....	120	123	133	376	125	8
Genus Species.....	107	115	109	326	109	6
Part-Whole.....	117	125	115	357	119	7
Free Ass'n.....	106	106	107	319	106	4
Logical Memory.....	150	116	126	392	131	9
Rote Mem. Con.....	100	103	104	307	102	2
Rote Mem. Abs.....	106	108	108	322	107	5
Word Bld. 1.....	102	103	105	310	103	3
Word Bld. 2.....	90	100	103	293	98	1
Average Per Cent.....	111	111	112		111	

TABLE IV

SHOWING OVERLAPPING—PER CENT OF MIXED BLOODS ATTAINING AND EXCEEDING  
MEDIAN OF FULL BLOODS

Opposites.....	69	73	75
Genus Species.....	56	72	65
Part-Whole.....	73	69	72
Free Ass'n.....	49	59	74
Logical Mem.....	79	67	86
Rote Mem. Con.....	50	66	82
Rote Mem. Abs.....	80	82	75
Word Bld. 1.....	57	51	71
Word Bld. 2.....	52	67	58
Average.....	62.8	67	73
Median.....	57	67	74

TABLE V

	Mixed Bloods			Full Bloods		
	Sub-Group 4-5	Sub-Group 6-7	Sub-Group 8, 9, 10	Sub-Group 4-5	Sub-Group 6-7	Sub-Group 8, 9, 10
Opposites.....	100	149	222	100	145	201
Genus Species.....	"	143	191	"	134	186
Part-Whole.....	"	175	195	"	164	202
Free Ass'n.....	"	113	138	"	113	136
Log. Memory.....	"	132	157	"	174	192
Rote Mem. Con.....	"	110	120	"	106	115
Rote Mem. Abs.....	"	121	145	"	116	140
Word Bld. 1.....	"	128	158	"	127	157
Word Bld. 2.....	"	132	158	"	119	137
Average.....	100	134	143	100	108	126

The next observation we make is that in both blood groups the average score increases as we proceed from the lower educational sub-groups to the higher. For, to illustrate with the average score of the full bloods in any test, as the Logical Memory test, if we take the average score of the fourth and fifth grade sub-group as a base, we have, taking the next two educational group averages in the test in relation to it, the following proportion: 100, 174, and 192. The second sub-group stands 74 per cent better and the third sub-group 92 per cent better than the first. A table (Table V) showing these proportions with the average score of the first sub-group as a base are given herewith. The averages of these numbers in all tests for each sub-group is also given. These read thus, 100, 134 and 143 for mixed bloods and 100, 122, and 141 for the full bloods. It can be seen here that though both blood groups show an increase of score the per cent of increase is more regular with the full bloods and that the second sub-group of mixed bloods shows a higher gain over the first than does that of the same full blood sub-group at this point, but in this particular instance only.

The third question, as to whether the full bloods possess any abilities in higher degree than the mixed bloods and vice versa, is worth considering and while endeavoring to answer this question we shall attempt to find answers for questions four and five along with it.

If we refer once more to Table III showing the per cent of mixed blood score on a basis of full blood, we will note again, but in this connection, that the fourth and fifth grade sub-group of the latter excelled the former in the second word-building test. This may have been due to practice for this test followed the first word-building test in its administration. But even so the full bloods profited more by the practice than the mixed bloods in this sub-group. Still observing the per cents in this sub-group we note that here the most difficult test for the full bloods must have been the logical memory test and that the easiest, barring the test where practice entered, was the concrete rote memory test. The first word-building test supposed to investigate ability in

invention was rather easy for them, but none of the numbers with the exception mentioned indicate any special abilities for this blood group as compared with the other one.

If we arrange the tests in ranking order according to these numbers just used we have this series, putting the easiest first:

For Full Bloods, Fourth and Fifth Grades.

Rank.	Test.
1.	Second Word-Building Test.
2.	Rote Memory-Concrete Test.
3.	First Word-Building Test.
4.5	Rote Memory-Abstract Test.
4.5	Free Association Test.
6.	Genus Species Test.
7.	Part-whole Test.
8.	Opposites Test.
9.	Logical Memory Test.

It would seem to be indicated here that tasks of an inventive sort are performed more easily than some others by full bloods along with those of retention of isolated symbols and that abilities of these sorts are closely followed by the free play of associations. However, there is little difference between the last named and the ability to control the association process in the part-whole test, though the other controlled association performances worked more slowly. Concrete rote memory, as may be expected, is easier for them than that of abstract rote memory. The logical memory test offers an interesting situation, however, being the most difficult one of the tests. Language difficulty was probably the handicap. All this has been said for the fourth and fifth grade sub-group. But how do the other sub-groups correspond to this ranking? We have measured this by obtaining correlations between this sub-group and the others and find a positive correlation of .88 for the sixth and seventh grade sub-group and likewise a positive correlation of .94 for the eight, ninth and tenth grade sub-group, the correspondence being slightly better for the last one.

When we come to a consideration of high scores as indicators of superior performers, we may say that in the lowest educational sub-groups a full blood Indian obtained the highest score in all the tests but the logical memory and part-whole tests. In the opposites test the honors were even. The situation was not quite so good for them, *i.e.*, the full bloods, in the results for the second sub-group, for here the highest score was obtained by some members of their groups in the two word-building tests only; however, members of their sub-group equalled the best performers of the mixed group in free association and concrete rote memory. The highest score for all performers in the third sub-groups and in what proved the most difficult test for the full bloods, the logical memory test, was obtained by a member of that blood group. In this sub-group the full bloods excelled the mixed bloods again in the part-whole and second word-building tests and equalled them in the first word-building test. In the other five tests they fell below the highest score of the mixed bloods. That is, the highest scores in all the nine tests in all the sub-groups making twenty-seven instances were obtained twelve times by mixed bloods and eleven times by full bloods. In the four remaining cases they tied.

On the other hand the lowest scores were obtained by full bloods twenty-five times out of twenty-seven.

While it was impossible to measure the influence of social status on the results given here because the subjects, or students participating in the experiment, are gathered from points at great distances from the school, some of them more than 1,000 miles away, we feel that this factor was probably very large for the reasons given above in connection with our discussion of the influence of environment. It is likely that a home in which there is one white parent will supply a pressure toward civilized beliefs and behavior not to be found in a pure blood Indian home. In many cases the 'old folks' deprecate the departure of the pure blood youth from his home to the government school. Naturally they cannot view the disintegration of their primitive culture in a disinterested manner. Those children who do not go to school when the

opportunity is offered stay at home and perpetuate the traditions of their fathers, being unable to withstand that social pressure. The frequent return of school graduates 'to the blanket' on the reservations is another evidence of the negative effect of the primitive social pressure. Tenacity of these old traditions among Indians is great. For instance, in a certain pueblo there is an adobe mission of some proportions which was built three hundred years ago and where the inhabitants throng to attend the service, yet the 'keevah,' a secret place for native religious ceremonials, is also kept intact in the midst of that pueblo and the sound of the tom-tom is dear to their hearts. Even though we find in the homes the kitchen cabinet and cookstoves, nevertheless the Indian mother, to the delight of her children, still makes Indian bread and other delicacies.

In general we wish to say:

While the results show that the mixed blood group is 11 per cent better than the full blood group in performance in spite of the fact that the latter are older generally than the former, the difference may not be racial after all but only nurtural. The pure blood carries habits of mind running more or less at cross purposes with each other, *i.e.*, habits of civilized thinking and attitude and of Indian thinking and attitude. The mixed blood processes do not suffer as much from these interferences, we believe, but they run more smoothly. Placing blood beside blood we find a full-blood scoring as well as or better than the mixed blood in about half the instances in spite of this possible conflict between the two ways of thinking. And before consigning the full blood Plains and Forest Indian germplasm to the abyss of hopeless inferiority we must consider duly what it can do as here indicated by the performance of these trustees of that germplasm. When it, Indian germplasm, can run the gamut of these psychological scales under such adventitious circumstances, the question remains, what could it do under more favorable conditions of culture?

In conclusion, our results show that under these conditions of uncontrolled social status but controlled school training:

1. The mixed blood Indians excel the full bloods by about 11 per cent in performing tests of higher mental processes.
2. Increased education produces an increase in score in these tests for both blood groups.
3. The average score of the mixed bloods is always above that of the full bloods excepting in a single instance which may be attributed to practice showing up in the latter group.
4. The easiest tests for the full bloods in terms of mixed blood performance were tests of inventiveness and of immediate memory, the concrete variety being slightly easier than the abstract.
5. Probably on account of language difficulty the logical memory test proved the most difficult test for the full bloods.
6. The other tests found particularly difficult for them were those of controlled association.
7. The best scores were about equally divided between the mixed and full blood Indians.

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