

# A TENTATIVE REVISION AND EXTENSION OF THE BINET-SIMON MEASURING SCALE OF INTELLIGENCE.

## PART II. SUPPLEMENTARY TESTS. 1. GENERALIZATION TEST: INTERPRETATION OF FABLES.

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Experiments made by one of the writers with this test several years ago, led him to believe that the interpretation of a series of rightly selected fables would afford a valuable indication of intelligence. After a careful search 20 fables were chosen for preliminary trial in the hope that from them 10 or a dozen might be found offering progressive degrees of difficulty and hence lending themselves to serial arrangement in the form of a scale. Most of them were taken from Aesop, and will be recognized by the following titles:

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|---|--|
| 1. The Boy and the Filberts.              | 12. The Jackdaw and the Doves.           |
| 2. The Fox and the Crow                   | 13. The Ants and the Grasshopper.        |
| 3. Mercury and the Woodman.               | 14. 'The Fish and the Pike.'             |
| 4. The Milkmaid and Her Pans.             | 15. The Ape and the Carpenter.           |
| 5. The Ass and His Shadow.                | 16. The Hermit and the Bear.             |
| 6. The Farmer and the Fox.                | 17. 'The Fox and the Boar.               |
| 7. The Stork and the Cranes.              | 18. The Husbandman and His Sons.         |
| 8. The Stag at the Pool.                  | 19. The Goatherd and the Wild Goats.     |
| 9. The Eagle and the Tortoise.            | 20. The Laborer and His Three<br>Wishes. |
| 10. Hercules and the Wagoner.             |  |
| 11. The Father, His Sons and the<br>Rods. |  |

These were given as a mass test to all the pupils of a school-room at one time. The regular period for a recitation in literature was employed. E distributed among the pupils blank sheets with numbered spaces in which the pupil's interpretations were to be written. Then taking his position in the front of the room E stated that he was going to read some fables, reminded the pupils that a fable is a little story which

<sup>1</sup>For previous use of this test see Whipple's Manual of Tests, p. 454-457.

is meant to teach a lesson, and finally instructed them to write down after the reading of each fable the lesson which they thought it was meant to teach. After giving the test to about 40 pupils it became evident that the series was of very uneven value and that some of the fables too closely resembled others in the series. The list was accordingly shortened to eight, containing the following fables presented here in the exact form in which they were used.

#### FABLES

##### I. THE MILKMAID AND HER PLANS.

A milkmaid was carrying her pail of milk on her head, and mused thus: "The money for this milk will buy 300 eggs. The eggs will produce at least 250 chickens. With the money which the chicks will bring I can buy a new gown. In this dress I will go to parties with the young fellows, who will all propose to me, but I will toss my head and refuse them everyone." At this moment she tossed her head in unison with her thoughts and dashed the pail of milk to the ground, and all her imaginary schemes perished in a moment.

##### II. MERCURY AND THE WOODMAN.

A woodman once dropped his axe into a deep pool and sat on a bank lamenting his loss. Mercury appeared, plunged into the pool and brought up a golden axe, and inquired if this were the one lost. When the man denied this, Mercury disappeared beneath the water a second time and brought up a silver axe. When the man said this was not his, Mercury dived a third time and brought up the right one. The man with joy claimed this, and Mercury was so pleased with the man that he gave him the gold and silver axes also.

##### III. HERCULES AND THE WAGONER.

A man was driving along a country road, when the wheels suddenly sank in a deep rut. He did nothing but look at the wagon and call loudly to Hercules to come and help him. Hercules came, and thus addressed him: "Put your shoulder to the wheel, my man, and goad on your oxen." He then went back and left the driver.

##### IV. THE BOY AND THE FILBERTS.

A boy put his hand into a pitcher of nuts and grasped as many as he could, but was unable to get his closed hand out of the neck of the pitcher. Unwilling to lose the nuts, he burst into tears, but still held on to the nuts.

##### V. THE EAGLE AND THE TORTOISE.

A tortoise complained to the birds that no one would teach her to fly. "I will teach you to fly, then," said the eagle, and he took her almost to the clouds, when suddenly he let her go, and she fell to earth and dashed her shell to pieces on the rocks.

##### VI. THE ANTS AND THE GRASSHOPPER.

A grasshopper which had sung merrily all summer was almost perishing with hunger in the winter. So she went to some ants that lived near, and asked them to lend her a little food which they had put by. "What did you do all summer?" they asked. "Why, all day long and all night long, too, I sang, if you please," answered the grasshopper. "Oh, you sang, did you?" said the ants. "Now, then, you can dance."

##### VII. THE FOX AND THE CROW.

A crow, having stolen a bit of meat, perched in a tree, and held it in her

beak. A fox, seeing her, wished to secure the meat, and thus addressed her: "How handsome you are! And I have heard that the beauty of your voice is equal to that of your form and feathers. Will you not sing for me that I may judge if this be true?" The crow was so pleased that she opened her mouth to sing, and dropped the meat, which the fox immediately ate.

#### VIII. THE STORK AND THE CRANES.

A farmer set some traps to catch cranes who were eating his seed. With them he caught a stork. The stork begged the farmer to spare his life, saying the farmer should have pity on his broken leg, that he was a bird of excellent character, and that he was not at all like the cranes.

The farmer laughed and said, "I caught you with these robbers, the cranes, and you must die with them."

To secure norms of performance for these eight fables they were presented in the above described manner to about 350 pupils from the fourth to the eighth grade, inclusive, in 14 rooms of the Palo Alto and Mayfield schools. The data obtained from these 350 cases may be considered thoroughly representative up to 13 years.

*Scoring.*—The difficulty of finding a method of scoring which does not give too large play to the personal equation is a serious criticism of the fables test. After experimenting with a number of methods the following system was adopted as the one best suited to bring out objective differences and to call attention to certain types of answers significant for clinical purposes:

(a) A completely generalized and entirely relevant reply—5 units.

(b) A generalization, quite plausible but slightly differing from the correct one, or else a correct statement mostly generalized but not perfectly free from the concrete—4 units.

(c) Correct idea stated in purely concrete terms—3 units.

(d) An irrelevant generalization—2 units.

(e) A reply in concrete terms with just a trace of relevancy—1 unit.

(f) No response, or an entirely irrelevant concrete statement—0.

The following samples of responses together with the scores assigned them will make this clearer.

#### *Fable I. The Maid and the Eggs.*

Score 0. "She wanted to be dressed nice and be praised."

Score 2. "Not to carry things on the head." "Not to be selfish." "Not to boast."

Score 3. "If the maid had not planned so far ahead she would not have dropped her milk." "Don't make schemes for the future while you are carrying milk."

Score 5. "Don't count your chickens before they are hatched." "Not to build air-castles." "Don't plan too far ahead."

*Fable III. Hercules and the Wagoner.*

Score 0. "Hercules was not kind." "Hercules was selfish."

Score 2. "Teaches politeness." "Teaches not to be mean." "To do as you are told."

Score 3. "The lazy man should get out and try to push the wagon out himself." "When you get stuck in the mud, don't call for help, but try to get out yourself."

Score 5. "God helps them who help themselves." "Teaches us to help ourselves before we ask others to help us." "Don't depend upon others."

*Fable VII. The Fox and the Crow.*

Score 0. "The fox wanted the piece of meat." "The crow ought not to have tried to sing till she had swallowed it."

Score 2. "Not to be stingy." "Not to steal." "Think before you act."

Score 3. "The crow was flattered by this speech." "The crow was too proud of her voice." "If the crow had not been so flattered she would not have lost her meat."

Score 5. "Do not let people flatter you." "Don't listen to praise."

*Fable VIII. The Farmer and the Stork.*

Score 0. "The farmer ought to have let the stork go." "The farmer was a bad-tempered man."

Score 2. "To be merciful." "Do not kill animals." "Don't blame the other fellow." "Never go into traps." "Not to tell lies." "Take what you get without squealing."

Score 3. "The stork should not be caught with bad people like cranes." "The stork was caught in bad company and had to be treated the same."

Score 5. "Keep out of bad company." "You are judged by the company you keep."

Scoring is made somewhat easier if we do not try to distinguished quite so many grades. It would be convenient, and not unreasonable, to combine the two groups here scored 0 and 1, and also the two groups scored 4 and 5. This leaves four types of interpretation, which usually are not hard to identify: The irrelevant (or almost irrelevant) concrete answer, the incorrect generalization, the relevant concrete

statement (*i.e.*, statement of the main point in non-generalized terms), and the perfectly relevant (or at least very plausible) generalization. These could be scored 1, 2, 3 and 4, respectively, or 0, 1, 2, and 3, or 0, 2, 3, and 5. Until we know more about the significance of these different types of answers and their relative frequency at different ages we can not be certain as to the best quantitative expression for them. Reverting to the method of scoring fables employed in this study, it may be said that the six-grade scale is not as difficult as it looks, and in actual use, after a little experience on the part of the scorer, constitutes but a slight modification of the four-grade scale. This is seen in the tendency which develops with practice, to keep in mind the above described four chief types of performance and to make sparing use of scores 1 and 4, reserving 1 for a few replies which should be spared from score 0, and 4 for a few which, though pertinent and generalized, are not quite what is wanted. Elegance, grammatical correctness, spelling, etc., should have no weight in the scoring. On the other hand it is necessary to be discriminating as to essential thought in the response. The tendency of the inexperienced scorer is to give too much credit. For example, the response "teaches to be industrious" (Fable III) hardly deserves a perfect score since the idea involved is that of self help, a slightly different thing. Similarly with the response "teaches not to depend on others" (Fable VII), a reply which is fairly plausible and partly justified by the facts, yet does not express the essential point, which is that we should "lay up for a rainy day," "look out for tomorrow," etc.

More serious is the question of the quantitative values which should be assigned to the types, based as they are on qualitative differences. For illustration, opinion may differ as to whether the type of reply given under (d) should be scored above or below that given under (c). Which is the better performance; to generalize the fable situation incorrectly, or to see the main point of the concrete situation involved without generalizing its meaning? Judging from the distribution of scores as shown in Fable V the latter seems to be a better indication of normal intelligence. Though believing that the above method of scoring fables is the most serviceable that

has thus far been devised, we are ready to discard it when a better is suggested.

As to the personal equation in scoring, only a comparison of the scores given by several persons to the same performances will determine its range and therefore the reliability of grades assigned by one individual. This the writers hope to do later. Our experience in scoring fables convinces us, however, that any study of individual differences of judgment in assigning marks must take great precaution to secure scorers who thoroughly understand the system employed and have had some training in its use. As far as our experience goes we do not believe that competent scorers will often differ more than 5 units (or 12½%) in grading by this method a set of eight well chosen fables.

Much depends on the choice of fables. Some are objectionable because they tend to provoke equivocal answers, others because they permit several plausible interpretations. A desirable fable is further characterized by the following points: (a) It should give with increasing years a rapidly decreasing number of the scores of 0 and 1. (b) Scores 4 or 5, or 4 and 5 taken together, should steadily increase. (c) Score 3 should probably not be very frequent in the upper years. (d) The per cent. of incorrect generalizations, that is the ratio expressed by the number of 2's divided by the total number of 2's and 4's and 5's added together, should gradually decrease. By reference to Table V it will be seen that Fables I, III, and VIII meet fairly well all these requirements. Fable II is decidedly objectionable as regards (a) and (d), and not above suspicion on point (b). Fables IV and V are objectionable as to (d) and (a), while Fable V also fails in requirement (c). Fable VI is excellent except for a rather large number of 1's in the upper years. This sort of analysis has led to the inclusion of Fables I, III, VII and VIII for use in the revised and enlarged measuring scale.

By allowing 5 credits for each unit in the score an S's performance may be conveniently stated in per cent. On the basis of four fables, an S who scores 20 points earns 100%, the score 13 points means 65%, etc. For most purposes it is perhaps sufficient to judge an S's performance by his total score, however expressed, although in clinical diagnosis it will be found

very suggestive to note what individual scores have entered into the total. For illustration, 40% earned by scoring 2 (or 10%) on each fable does not indicate the same mentality as 40% earned by scoring 3 (or 15%) on each of two fables, and 1 (or 5%) on each of the other two. The former indicates a decided tendency to generalize incorrectly, probably a sign of rather mature stupidity. The second 40% indicates a tendency to think in terms of the concrete, possibly a sign of immaturity rather than stupidity. Only extended use of the fables, however, with all grades of normal, retarded and advanced S's will determine the exact significance of these and other types of performance. For purposes of a scale the total per cent. earned may provisionally be taken as the most significant.

*Results.*—Table V shows the distribution of the various scores for pupils of each age and for the four fables selected for use in the revised scale. Table VI summarizes the data for the different years.

TABLE V.

	Age.	Num- ber.	Scores.					Total of 4 and 5.	Percentage of Generalizations Incorrect. <sup>2</sup>	
			0	1	2	3	4			5
FABLE I. The Maid and the Eggs.	9	41	14	31	24	4	4	19	23	51
	10	53	13	22	20	4	9	30	39	34
	11	61	8	6	31	10	16	28	44	41
	12	80	7	10	22	5	16	39	55	28
	13	73	5	4	18	8	15	47	62	22
	14	43	5	9	20	5	16	38	54	27
FABLE II. The Wagoner and Hercules.	9	41	14	7	19	29	12	16	28	40
	10	53	9	9	13	19	17	32	39	25
	11	61	5	6	15	13	20	41	61	22
	12	80	3	12	12	11	21	39	60	17
	13	73	0	5	15	12	18	47	65	18
	14	43	5	0	9	2	36	45	81	10
FABLE III. The Fox and the Crow.	9	41	19	27	34	14	2	2	4	90
	10	53	17	26	35	2	5	13	18	66
	11	61	8	15	44	8	8	16	24	65
	12	80	11	17	32	6	15	17	32	50
	13	73	11	16	27	3	8	32	40	40
	14	43	14	7	34	5	14	25	39	46
FABLE IV. The Farmer and the Stork.	9	41	36	19	31	5	2	5	7	81
	10	53	21	24	24	2	4	24	28	46
	11	61	16	11	21	6	11	33	44	32
	12	80	15	15	22	5	7	33	40	35
	13	73	8	8	14	8	14	46	60	19
	14	43	7	5	18	5	11	52	63	22

<sup>2</sup>The per cent. of incorrect generalizations for a given age is obtained by dividing the number of scores 2 for that age by the combined number of scores 2, 4 and 5.

TABLE VI.

Year.	Number.	Median Score.	Score Reached by Two-thirds.
9	41	35-40	25-30
10	53	45	35-40
11	61	50-55	45-50
12	80	55	45-50
13	73	70	55-60
14	43	70-75	55-60

We believe the "generalization test" will prove a usable addition to the scale. It presents for interpretation situations which are closely paralleled in human social relations. It tests the power to unravel the motives underlying acts and attitudes, to look behind the deed for the idea that prompted it. It gives a clue to the status of the social consciousness. This, if correct, is tremendously important for the diagnosis of the upper range of mental defectiveness. The criterion of the subnormal's unfitness for life outside of an institution is his ability to understand and appreciate social relations and to adjust to them. Failure of a subnormal to meet this criterion may lead him to break common conventions, to misunderstand people and to be misunderstood, to be considered disrespectful, sulky, stubborn, deceitful, or in some other way queer and exceptional. He is himself misjudged because he misjudges others. The skein of human motives is too complex for his limited intelligence to untangle. Again, the rectitude of the moral life is directly dependent upon the accuracy of the social judgment. If the latter is rudimentary, true morality is impossible.

Recent ethnological studies, such as those of Sumner, Westermarck, and others, as well as many investigations in child psychology, give added proof of the social origin of the moral judgment. It would be interesting to know what proportion of juvenile offenders have transgressed our codes because of continued failure to grasp the essential lessons presented by human situations, the comprehension of which is a necessary basis of truly moral action. The social relations of the home, school, street, etc., present for the intellectually normal an endless succession of moral situations. That is, these are moral situations if they are comprehended, rightly generalized. For those who do not comprehend them at all they have



no moral lesson. Into the same situations other children of somewhat higher mentality than the last named read a meaning perhaps, but often the wrong meaning. Their moral development runs askew because guided by an unreliable power of generalization. We are justified in suspecting the intelligence of the so-called "moral imbecile." The small child is always a moral imbecile for lack of any understanding of social relations. If he becomes a moral man it is because of years of daily, almost hourly, experience and training in picking the moral kernel out of life-situations. The more sub-normal the child's intelligence the more insignificant his moral increment. What is meant is forcibly illustrated by such responses as the following, frequently found in our fables data:

*Fable VII.*

"Taught the crow to be wise and not to open her mouth when she had anything in it."

"The fox was slicker than the crow was."

"Not to be generous to people you don't know."

"Not to sing when you have anything in your mouth."

"To think before you sing." "Not to be forgetful."

"Where there's a will there's a way."

"To eat the meat and then sing." "How to be wise."

"Don't answer if your mouth is full."

"Look before you leap." "When you have a thing, hang on to it."  
"She should not have opened her mouth."

"Teaches us to look for tricks." "To finish one thing before we do another."

The above responses were given by pupils from 13 to 17 years of age, all of whom were retarded in school from 2 to 4 years. Similar illustrations were afforded by all the fables. It is hardly necessary to dwell further on the importance of the field here suggested for the further study of one of the most important factors in moral development.

Other points of excellence in the generalization test deserve mention. It does not need to be unduly complicated by language difficulties, as is always the case to greater or less degree in tests of ability to interpret poetry. (See for example, Bonser's Reasoning Abilities of Children in the Fourth, Fifth and Sixth Grades, p. 8). Again, fables can certainly be

found of widely varying difficulty, although it must be admitted that our own quest for an extended series was not as successful as we had hoped. It will probably be difficult to find any which will prove very serviceable below the ninth or tenth year, and it is doubtful anyway whether a test of this nature would be significant before that age. We believe that the addition to our list of a few more difficult fables would make the test especially valuable at the upper end of the scale and help a great deal in the difficult task of extending the scale beyond 13 years. Finally, it should be said that this test is one which gives little opportunity for coaching. The child who has been given a number of such fables along with 20 or 30 other tests, can not bear away much accurate testimony as to what he has been put through, and even if he related a fable to another child the latter would not as a rule profit from the acquaintance thus gained. In fact we have found that an S's previous familiarity with the fables does not necessarily increase in the least his chance of winning a high score in our test. It was learned that in the fifth grade room tested by us, all of the 35 pupils had read some of the fables of our list and 12 of the pupils all of them within a few months preceding, but a careful comparison of their papers with others written by pupils of like age and advancement who had met none of the fables, disclosed no effects whatever of such familiarity. The case might have been somewhat different had the fables been taught to the children with the conscious purpose of pointing the moral, but even this effect, we are convinced, is easily overestimated. If the fable situation is beyond the child's power of comprehension the teaching is ineffective as far as moral lessons are concerned, and may not noticeably influence the reaction to the test.

From the above it is clear that the effective use of proverbs, mottoes, fables and other snatches of literature in the moral instruction of children is absolutely dependent upon their standardization according to difficulty of comprehension. Much, if not most, of school instruction in history and literature, has in the minds of those who make the curriculum, a moral purpose; but we do not know how much of this instruction is utterly futile as far as nourishing moral growth is con-

cerned. To make it effective, norms of children's power of comprehension and generalization must be established for different ages and for different kinds of subject matter. There is reason to suspect that in this field, at present, our schools are rife with precocious attempts at generalization. The problem becomes so much the more important in those countries where this type of moral instruction in the schools is purposely and universally adopted as a national system of developing morality, as in France.

*(Continued in the April number)*