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## BINET AND SIMON'S SYSTEM FOR MEASURING THE INTELLIGENCE OF CHILDREN

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The present article is a condensation, with minor adaptations from Binet et Simon: "Le développement de l'intelligence chez les enfants," *L'Année Psychologique*, 1908, pp. 1-94. Accounts of the tests herein described have already been published in English by Goddard of the New Jersey Training School, in "The Training School," 1910; by Huey of the Lincoln State School and Colony, Lincoln, Illinois, in "A syllabus for the clinical examination of children," School Print, 1910; and by Whipple in his Manual of mental and physical tests," Baltimore, 1910. In these accounts, however, but few of Binet and Simon's comments on the tests have been included, undoubtedly for the sake of brevity. I have thought it advisable to publish this fuller account in which the main comments of the authors are given. The system is intended for use by persons not necessarily trained in psychology or specially informed as regards the mental development of normal children. But its very simplicity is apt to lead to misunderstandings unless those who use it can do so with some knowledge of such explanations and aims of the tests as the authors give.

The system consists essentially of a graded series of simple tasks that the child is asked to perform. The tasks are arranged in the order of increasing difficulty for the normally developing child. They are, further, grouped according to the ages at which the normal child acquires the ability to perform them. Thus, in general, the "mental age" of a child is determined by the most difficult group of tests that he is able to pass. The following are the tests with the authors' comments. General considerations for conducting the tests and the interpretation of the results are given below.

### III. CHILDREN OF THREE YEARS

1. Say to the child: (a) Show me your nose. (b) Show me your eyes. (c) Show me your mouth.

The child at first understands only our gestures, and is sensible only to the intonations of our voice. Next he understands the spoken word without the ability to express his own. This test determines whether he understands the meaning of familiar words.

2. REPETITION OF SENTENCES. Read the following sentences to the child, slowly and with expression, and ask him to "say" them:

Series A. (a) It rains. I am hungry (6 syllables).

(b) His name is Jack. Oh, what a naughty boy (10 syllables).

If the child remains silent try the following series:

Series B. (a) Papa (2).

(b) Slipper. Letter (4).

(c) It rains. I am hungry (6).

(d) I have a dog. He's a dog (8).

(e) His name is Jack. Oh, what a naughty boy (10).

No error of any sort is allowed in the repetition by the child. A normal child of three years will repeat a sentence of ten syllables, but not one of ten. The natural defect in pronunciation at this age often makes it difficult to know whether the repetition is correct or not. After the ability to understand words comes the ability to repeat them when heard, not, as one might suppose, the ability to speak one's own thought, or to name an object.

3. REPETITION OF TWO NUMERALS. Tell the child to say the following numbers after you. Pronounce them at

the rate of one per half second: 6; 8; 3. 3-7; 6-4; 8-5.

The test is passed if two numerals are repeated correctly once out of three trials.

Numerals are more difficult to repeat than words because of their lack of meaning. A child that repeats six syllables will not repeat more than two numerals.

4. DESCRIBING A PICTURE. Show the child a picture and say: "Tell me all that you see in that picture." Use at least three pictures. They should be colored, and each should contain some people and a "subject."\*

One of three different classes of responses may be obtained. (a) Simple enumeration. Of this, there are three degrees. In its simplest form the child merely names one after the other a few of the persons and objects that he recognizes. In the second, more advanced degree, he names more things. In the third he uses connectives and prepositions. The normal child will name less things than the older, defective child of the same mental age, because of the former's lesser experience and smaller vocabulary. (b) Description. In this, the use of phrases occur, in addition to the connectives, designating the characteristics of the persons and objects. (c) Interpretation. In this, the subject of the scene or the character of the person is perceived, indicated perhaps by some emotional word, remark or attitude.

This test suffices at once to determine whether the child is of a mental age of three, seven or twelve. At the age of three he simply enumerates, at seven, he describes, and at twelve he interprets. It reverses the process involved in Test '1' of this group, where the child passed from the heard word to designating the thing: here he passes from seeing the thing to naming it, a much more difficult process.

5. GIVING THE FAMILY NAME. Ask the child to give his name. If he gives only

\*[For this purpose pictures found in "Jingleman Jack," by James O'Dea, New York and Chicago, 1901, will be found satisfactory. The writer uses the following three: Scene on a lawn, in a meat market, and in a shoe repair shop.]

his first name, John, e. g., ask further: "And what is your last name? John—What?" etc.

Every child of three knows his first name. He does not always know his family name.

#### IV. CHILDREN OF FOUR YEARS

1. SEX OF CHILD. Ask; "Are you a little boy or a little girl?"—in the case of a boy, and "Are you a little girl or a little boy?"—in the case of a girl. If the child replies "yes", or "no", ask the questions separately.

At three, there may be no reply or an error. At four, a correct answer is always given.

2. NAMING OF FAMILIAR OBJECTS. Show successively a key, a closed knife, a penny, and ask: "What do you call this?"

This is more difficult than naming the things seen in a picture, as required in Test III.4. There the child could choose what he wished and was able to name. Here he must name the particular things shown him—apparently a small, but in reality a big difference.

3. REPETITION OF THREE NUMERALS. Proceed as in III. 3. Use the following: 6-4-1; 7-9-3; 8-2-5.

4. COMPARISON OF TWO LINES. Prepare a cardboard with two parallel horizontal lines, one five and the other six centimeters long, and three centimeters apart. Show it to the child and say: "See these lines. Which is the longer?" Give three trials, turning the card about each time so as to change

the relative positions of the two lines, or, better, use three cards.

A correct response without hesitation must be given two times out of the three trials.

A child of three, fails; one of four, passes. Failure may be due to inability to comprehend the words rather than to an inability to perceive the inequality of the lines.

#### V. CHILDREN OF FIVE YEARS

1. COMPARISON OF TWO WEIGHTS. Prepare two pairs of weights, identical in size and appearance, the first pair weighing three and twelve grams, and the second pair six and fifteen grams. Place a pair before the child and say: "See these two weights. Which is the heavier?" If, after all explanation, the child fails to comprehend the task the weights may be placed in the child's hands, one in each, and the question asked again.

The child at five barely passes this test. The comprehension of the task is much more difficult than the perception of the difference in the weights. Various wrong responses result.

2. COPYING A SQUARE. Prepare a card with a square on it, four centimeters on a side. Place this before the child and have him draw it with pen and ink. Drawings similar to specimens 1, 2 and 3, Plate I., are regarded as satisfactory. Specimens 4, 5 and 6 are failures.

3. GAME OF PATIENCE WITH TWO PIECES. Prepare two 2x3 inch cards, cutting one

into two triangles along one of its diagonals. Place the uncut card before the child, and the two pieces of the other nearer him with the two hypotenuses away from each other, and so that they can be combined into a rectangle without turning over one piece. Say: "Put these two pieces together so they will make one like that," pointing to the uncut card.

At four, about two-thirds fail. At five, scarcely one in twelve fails. Some precautions are to be noted. (a) Some children are too indolent to try; they should be encouraged. (b) The child may accidentally turn over one piece. In this case begin over again. (c) At the moment of making the successful combination the child may look up inquiringly for an opinion as to its correctness. No suggestion should be given.

4. COUNTING FOUR PENNIES. Place four pennies in a row before the child. Say: "See these pennies. Count them. Tell me how many there are." Have the child point at each as he counts.

The child of three fails. At four, half pass. At five, all pass. No error is allowed.

The process of counting involves (a) the ability to recite the numbers in correct succession; (b) the ability to apply each number to a different object. It may be objected that success here depends upon training. But only a low grade intelligence would prevent learning to do this.

## VI. CHILDREN OF SIX YEARS

1. SHOWING RIGHT HAND AND LEFT EAR. Say: "Show me your right hand." Then, "Show me your left ear." If, for the first, the response is such as to leave it uncertain as to which hand is meant, tell

the child to raise the right hand up high.

At four, all err by showing the right ear. At five, half fail. At six, none fail.

There are three classes of responses. (a) Responses showing that the child does not know right from left at all; he shows the right in both cases because of the natural tendency to show it. (b) Responses showing that he knows, but is not quite certain. He shows the right ear but corrects himself. (c) Responses showing that he knows with certainty, being made correctly without hesitation. 'b' and 'c' are accepted as satisfactory.

## 2. REPETITION OF SENTENCES OF SIXTEEN WORDS.

Proceed as in III. 2. Read the following to the child: "Let's all go for a walk to-day. Please give me that big hat to wear."

At five, half the children fail. At six, none fail.

## 3. AESTHETIC COMPARISON.

Cut out the pictures given in Plate II. and mount them in pairs on three cardboards of convenient size, keeping the arrangement for each pair as given in the plate. Show one at a time to the child and say: "Which is the prettier of these two"

At five, half fail. At six, none fail. There is a strong tendency to choose the one on the right or left each time.

## 4. DEFINITION OF KNOWN OBJECTS. Ask the following:

- (a) What is a fork?
- (b) What is a table?
- (c) What is a chair?
- (d) What is a horse?
- (e) What is a pencil?

The responses obtained may be grouped into three classes. (a) silence, or simple repetition, as "A fork is a fork," or designating the object by gesture. (b) Definitions in terms of use alone, as "A table is to eat," "A horse is to pull wagons." (c) Defini-

tions better than in terms of use, as, "A horse is an animal that pulls wagons." The child is attributed the class to which the majority of his definitions belong.

At four, half define in terms of use alone. At five, a little more than half define this way, and at six, nearly all do. At nine, the majority define better than in terms of use. The first class of responses is, of course, the most childish of all.

### 5. EXECUTION OF THREE SIMULTANEOUS COMMANDS.

The authors use the following, saying to the child: "Do you see this key? Go put it on that chair there. Then close the door. Near the door you see a box on the chair. Bring the box to me. First the key on the chair; then close the door; then bring me the box. Do you understand? Very well, go ahead." These may be varied if circumstances require it.

The child should execute them promptly without further direction.

At four, nearly all fail; at five, half fail; at six, all or nearly all succeed.

### 6. GIVING AGE. Ask: "How old are you?"

Many remain silent, others give an age much too small, never too high. At six, the majority give their age correctly.

### 7. DISTINCTION BETWEEN MORNING AND AFTERNOON.

Ask: "Is it morning or afternoon?"\*

Before six, the child does not respond correctly readily.

## VII. CHILDREN OF SEVEN YEARS

1. Cut out the four pictures from Plate III. and mount

\*[I have found it very advisable to state the question this way if it is morning, and to ask, "Is it afternoon or morning?", if it is afternoon, because of the strong tendency to always repeat the last word of the question.]

each on a cardboard of suitable size. Show one at a time to the child and ask: "What is gone in that picture?"

The test is passed if three of the four are answered correctly. Various irrelevant replies may be given. At five, the replies are inadequate. At six, two-thirds are still wrong. At seven, the majority are correct.

### 2. TELLING NUMBER OF FINGERS.

Ask: "How many fingers on your right hand?" "How many on your left hand?" "How many in all on the two hands?"

The correct answers should be given without counting or hesitation. At six, half pass. At seven, all pass.

### 3. COPYING A WRITTEN PHRASE.

Use "The little Paul" for a copy, and have the child write it with pen and ink.

The test is passed if one ignorant of the copy can read the child's writing. Some make only zigzag lines, other certain letters only so as to be legible. The test might be regarded as a test of training. But inability to pass indicates at the same time a retarded intelligence.

### 4. COPYING A DIAMOND

On a cardboard draw a diamond of about the size of the square used in V. 2. Have the child draw it with pen and ink.

Drawings equal to samples 1, 2 and 3. Plate IV. are satisfactory. Drawings no better than samples 4, 5 and 6 are unsatisfactory. At five, a child can draw a square. But at six, half fail in drawing a diamond. At seven, fifth still fail.

### 5. REPETITION OF FIVE NUMERALS.

Proceed as directed in III. 3. Use the following: 6-5-2-8-1; 4-9-3-7-5; 2-8-6-1-9.

One repetition without error in three trials is sufficient for passing the test. At seven, only three-fourth pass.

### 6 DESCRIBING A PICTURE

Proceed as in III. 4.

From three to five, the child merely enumerates. At seven, description is the rule with but few exceptions.

**7. COUNTING THIRTEEN PENNIES.** Proceed as in V. 4.

The child must count and touch each penny with his finger as he counts it, without an error of any sort. At six, two-thirds still fail. At seven, none fail.

**8. NAMING FOUR COMMON PIECES OF MONEY.** Show the child a nickel, a penny, a quarter, and a dime in the order given, and ask: "How much is this?" for each.

At six, hardly any French children know the four common French coins. At seven, the great majority do.

**VIII. CHILDREN OF EIGHT YEARS**

**1. READING FOR TWO MEMORIES.** Give the child the passage given in Plate V., and say: "Let me see how well you can read this."

Note the character of his reading, and take the time it takes him to read the passage. Immediately after he has read it have him recall it, saying: "Now tell me what you read." To determine the number of 'memories' divide the passage as follows:

Three—houses—on fire—St. Paul—Sept. 5—A big fire—in St. Paul last night—destroyed three houses in the centre of the city—Seventeen families—without shelter—The loss exceeds thirty thousand dollars—In rescuing—a child—in his cradle—a barber's boy—has had his hands—seriously—burned.

The following is the rate at which normal children read the passage.

At 8 years .....	45 seconds
At 9 years .....	40 seconds
At 10 years .....	30 seconds
At 11 years .....	25 seconds

The character of the child's reading may be as follows: (a) Spelling; (b) Reading by syllables; (c) Hesitant reading with frequent pauses between words and phrases; (d) Fluent reading—without pauses; (e) Expressive reading.

The test is rarely passed at seven, but nearly always at eight.

The test shows the dividing line between imbeciles and morons. If the test is passed it shows the child's intelligence. If a child from eight to ten years fails we must suspend judgment until we are certain that his inability to read is not due to lack of schooling. If an adult of thirty cannot read we may, without great chance of error, conclude that he lacks intelligence.

**2. COUNTING THE VALUE OF STAMPS.** Prepare a cardboard with a horizontal row of three one cent stamps, and under them a row of three two cent stamps. Show this to the child and ask: "How much will it cost to buy all these?\*"

The correct answer must be given in less than fifteen seconds. At seven, the great majority pass. At eight, all pass.

**3. NAMING FOUR COLORS.** Mount two by six centimeter strips of the four primary colors, red, yellow, green and blue, on four small cardboards. Show each to the child and ask: "What color is this?"

No error is allowed.

**4. COUNTING BACKWARDS FROM TWENTY TO ONE.** Say: "Let me see how well you can count backwards from twenty to one." If the child does not at once understand, say "Count like this: 20, 19, 18, and so on."

\*[Stamps are substituted by Goddard for the French coins, three simple and three double sous, used by the authors.]

The count must be made within twenty seconds, with not more than one error. Training affects this test.

5. WRITING FROM DICTATION. Say: "Let me see how well you can write what I read to you?" Then dictate: "The pretty little girls."

The test is passed if the words are not joined, and if one not knowing the dictation can read the writing. At eight, all pass.

6. COMPARING TWO OBJECTS FROM MEMORY. Ask: "What is the difference between:

- (a) a butterfly and a fly?
- (b) wood and glass?
- (c) paper and cardboard?"

If the child does not understand what is wanted say: "You know the butterflies, you have seen them? And the fly, you know it also? Are they alike? Why are they not alike?"

To pass the test the three comparisons must be made within three minutes, and two must be exact. At six, a third pass; at seven, nearly all pass, and at eight, all do. This is a valuable test in that training in no way affects it.

## IX. CHILDREN OF NINE YEARS

1. GIVING THE DATE. Ask successively: "What day of the week is it to-day? What month? What day of the month? What year?"

An error of three days is allowed for the day of the month. But it is a curious fact that the children are ignorant of the year. They probably have no idea of so great a lapse of time.

2. NAMING THE DAYS OF THE WEEK. Say: "Name the days of the week."

They must be named in correct order without hesitation, and in less than ten seconds.

3. MAKING CHANGE—NINE CENTS OUT OF TWENTY-FIVE. This test is best given in the form of a game, adding the necessary instructions. Play store. Give the child twenty-five pennies, five nickels, and two dimes. Let him be the storekeeper and the examiner the purchaser buying something for nine cents.\*

The child must actually return sixteen cents change as well as say so. At seven, hardly any pass; at eight, a good third pass, and at nine, all do.

4. DEFINITION BETTER THAN ACCORDING TO US. The procedure is given in VIII. 4, above.

At seven and eight, half pass; at nine, all do.

5. SIX 'MEMORIES' FROM READING. The procedure is given in VIII. 1 above.

At eight, all can read the passage, but few retain six memories. At nine, nearly all pass.

6. ARRANGEMENT OF COINS BY WEIGHTS. Prepare five boxes, identical in size and appearance, and weighing 3, 6, 9, 12, and 15 grams, or 6, 9, 12, 15, and 18 grams respectively. Place them mixed up before the child and say: "These boxes do not all weigh the same. Some are heavy and some are light. Place the heaviest box here and next to it the one next heaviest, and here the next heaviest, and here the last heaviest."

\*[This is Goddard's adaptation of the French, substituting American coins.]

the lightest," pointing out with the finger the place where each is to be put. Give three trials.

The three trials together must not take over three minutes, and the arrangement must be without error twice out of the three trials.

Many children do not understand the explanation, and do not try. Others place them at haphazard without weighing them. Others understand the explanation and can discriminate the weights, but fail to arrange them correctly because they cannot get the idea of a decreasing order. Still others do not fall in any of these things, but make an error because of lack of attention and care. It is an excellent test because it is not affected by training, and reveals natural intelligence, although of a special, sensorial sort.

## X. CHILDREN OF TEN YEARS

### YEARS

1. NAMING THE MONTHS OF THE YEAR. Say: "Name the months of the year."

They must be recited within fifteen seconds, and with not more than one error.

2. NAMING NINE PIECES OF MONEY. Show the following pieces of money in the following order: Quarter, nickel, dollar, penny, dime, half dollar, two dollar bill, five dollar gold piece, ten dollar gold piece, and ask: "How much is this?" The question needs to be stated usually only for the first coin shown.

Correct answers must be given for all pieces without the child touching any of them, and the whole test must not take over fifty seconds. If it is suspected that an error made is due to a wandering of the attention the test may be repeated.

USING THREE WORDS IN SENTENCE. Say: "Here are three words: money, river, Paul," repeating them once. Then say: "Make a sentence in

which you use these three words?"\*

One minute is allowed for making the sentence. The kinds of sentences obtained may be divided into three classes. (a) Three separate ideas expressed in virtually three separate sentences. (b) Two separate ideas expressed in virtually two separate sentences with use of a conjunction. (c) One sentence expressing a single idea.

Sentences of the first class are not accepted as satisfactory. At seven, the child cannot yet write well enough for the test. At eight, hardly any pass. At nine, a third pass, and at ten, half do.

4. QUESTIONS OF COMPREHENSION. Ask the following questions one at a time:

First series. "What should one do:

(a) when he has missed the train?

(b) when he has been struck by a playmate who did not mean to do it?

(c) when he has broken something that does not belong to him?"

Two of the three questions must be answered satisfactorily. At six, a satisfactory answer is rarely given. At seven and eight, half pass; at nine, three-fourth, and at ten, all pass.

These three questions are easily understood and do not present a verbal difficulty. The following are more subtle and do present some verbal difficulty.

Second series. "What should one do:

(d) when he is detained so that he will be late for school?

(e) before taking part in an important affair?

\*[The authors require the child to write the sentence he forms. Goddard does not specify whether he requires it to be written or oral. In the writer's experience the test is too difficult for the time allowed if the sentence has to be written.]



(f) Why does one forgive a wrong act committed in anger more readily than a wrong act committed without anger?

(g) when one asks for your opinion of someone whom you know only a little?

(h) Why ought one to judge a person more by his acts than by his words?"

Allow at least twenty seconds for each question of both series. Three of the five in the second series must be answered satisfactorily. At seven and eight, the second series is never passed. At ten, hardly half pass. This, then, is a test on the transition from ten to eleven. It is, further, one that corresponds more with the popular idea of intelligence. Not to know the day of the week, date and year, or be able to recite the months are excusable faults, possibly due to distraction or lack of training. But this test should remove these doubts.

## XI. CHILDREN OF ELEVEN YEARS

1. CRITICISM OF SENTENCES. Say: "I am going to read you some sentences in which there is some nonsense. Listen very carefully and tell me what the nonsense is." Then read the following very slowly one at a time and ask: "What is the nonsense?"

(a) An unfortunate bicycle rider has had his head broken and is dead from the fall. They have taken him to the hospital, and they do not believe that he will recover.

(b) I have three brothers, Paul, Ernest and myself.

(c) Yesterday they found on the fortifications the body of an unfortunate young girl cut into eighteen pieces. They be-

lieve that she killed herself.

(d) Yesterday there was an accident on the railroad. But it was not very bad. There were only forty-eight killed.

(e) Someone said: "If in a moment of despair I should commit suicide, I should not choose Friday. For Friday is an unlucky day, and that would bring me bad luck."\*

Three of the five must receive good answers. At nine, hardly any pass, at ten, hardly a fourth pass, at eleven, half pass.

These sentences test the critical sense. But the child may feel the absurdity of the statement without being able to give his reason. To determine this is often difficult.

2. USING THREE WORDS IN A SENTENCE. The procedure is given in X. 3.

At eleven all pass.

3. SIXTY WORDS IN THREE MINUTES. Say: "I am going to see how many words you can say in three minutes. Say them out loud as fast as you can and I will count them."

Sixty words are required to pass the test. All pass at eleven. The nature of the words given is also instructive. Some give only detached words, some only names of objects, some a series of related words, while still others give abstract qualities. The latter are good signs of intelligence.

4. GIVING DEFINITIONS OF ABSTRACT WORDS. Ask:

\*[Whipple substitutes other sentences on the grounds that the present series is too 'blood-curdling.' I have found no objection to the series, except that the last allows of interpretation that do away with the nonsense, and that the children very often give this interpretation.]

[The authors, in addition, tell me a child that some get as many as 100. But I have found that the child's consciousness of gross failure to pass many often creates a depressive effect and decreased effort on his part.]

"What is Charity? (b) Justice?  
(c) Goodness?"

Good definitions must be given for two of the three.

At eight to nine, the child rarely passes. At ten, a third do, and at eleven, the majority pass.

5. WORDS TO PUT IN ORDER. Show the child the groups of words, one at a time, given in Plate VI. and say: "Put these words in order and find the sentence that they make."\*

Sixty seconds are allowed for a group and the words of two must be correctly combined in order to pass the test.

## XII. CHILDREN OF TWELVE YEARS

1. REPETITION OF SEVEN NUMERALS. Proceed as in VII. 5. Use the following groups:

(a) 6-4-1-3-7-9-5

(b) 8-2-5-7-3-6-9

(c) 3-7-2-5-8-4-6

One correct repetition out of the three trials is sufficient for passing the test.

2. RHYMING WORDS. Explain with an illustration to the child what rhyming means. Then say: "I am going to give you a word and see how many other words you can find that rhyme with it. The word is 'day.' Find all the words you can that rhyme with 'day.'" Proceed in like manner with the words 'spring' and 'mill.' †

The exact arrangements of the words as they are shown to the child are undoubtedly of considerable importance. But it would be difficult to get an arrangement in the translation which one could regard with certainty as identical with the French in difficulty for French children.]

Allow one minute for each word. To pass the test three words that rhyme with the given word must be found in two out of the three trials.

3. REPETITION OF ONE OR MORE SENTENCES WITH TWENTY-SIX SYLLABLES IN ALL. Use the following series of sentences and proceed as in III. 2.

(a) Children, it is necessary to work for a living. You must go to your school every morning. (24)

(b) The other day I saw a pretty young dog in the street. Little Maurice has some spots in his new apron. (26)

(c) Ernest is punished very often for his bad conduct. I bought a beautiful doll at the store for my sister. (28)

(d) There was a frightful tempest with lightning that night. My comrade has taken cold. He has a fever and coughs very much. (30)

No error of any sort is allowed. With a series of sentences increasing in length a point is soon reached where minor errors appear, such as the change in position of a word, or the use of a synonym, or the omission of an unimportant one. With still longer sentences essential parts will be modified or entirely forgotten.

4. PROBLEMS OF DIVERSE FACTS. (a) Say: "I am going to read you a sentence, but will stop just before coming to the end. Listen carefully and see if you can finish it as it should be." Then read the following:

† [The authors give only one trial, and with a much more difficult word, viz., 'obedience.' This seems to make the test too difficult. The above is Goddard's adaptation.]

"A person out walking in the woods suddenly stopped, much frightened, and ran to the nearest police to report that he had seen hanging from the limb of a tree.....(after a pause) a what?"

(b) Read the following slowly:

"My neighbor has been having strange visitors. He has received one after the other a doctor, a lawyer, and a minister. What has happened at my neighbor's?"

Both must be answered correctly.

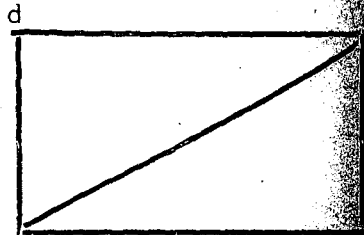
### XIII. CHILDREN OF THIRTEEN YEARS

1. DRAWING A CUT IN A TWICE FOLDED PIECE OF PAPER. Take about a six inch square of paper and say: "Watch me fold this piece of paper and how I cut it. I am going to ask you in a moment to draw the way it would look if I unfolded it again." Then proceed as follows: In plain view of the child fold the square twice in the middle and in directions at right angles to each other. Then cut an equilateral triangle of about a centimeter from the middle of the closed side—the side showing only one fold. Then give the child another square of paper of the same size and repeat: "Draw the way this piece of paper would look if I unfolded it again." He may keep the folded paper and piece cut out in view but must not touch

either, nor attempt to fold another.

It is a difficult test. If the child succeeds readily, ask if he has tried it before.

2. DRAWING THE FIGURE OF TWO JUXTAPOSED TRIANGLES. Use the two triangles cut for V. 3. Place them on a piece of paper before the child with triangle abc nearest him thus:



Say: "Suppose I turned over this piece (abc) so that side (bc) will be next to side (ab) of this piece (abd) and so that this corner (c) will be at this one (b). What will be the shape of the two together then? I will take away one (abc). Now draw on this piece of paper. Begin by drawing a line around the one you have left." After he has drawn one triangle both should be moved from his sight.

The test is difficult. It is passed if the child draws a right angle at the second triangle, and makes side 'bc' next to 'ac' shorter than

3. DISTINGUISHING BETWEEN ABSTRACT IDEAS. Ask the following: "What is the difference between:  
(a) pleasure and hope"

- (b) evolution and revolution? (d) poverty and misery?  
 (c) event and advent? (e) pride and pretension?"

This concludes the list of tests as the authors have outlined them. In the necessary adaptations for American children and conditions I have in most cases followed Goddard, and in a few instances, Whipple, as noted in the foot-notes. Whether these adaptations make the revised tests the exact equivalents of the original for French children would be difficult to say without some experimentation on this point itself. But it is important that we maintain a uniformity of procedure if results obtained by different examiners are to be at all combined or compared.

For the sake of further maintaining this uniformity of procedure I have also included more specific directions in many cases for the individual tests than the authors give. These may seem trivial and unnecessary in some cases on merely reading the tests, but will, I believe, justify themselves to those who are fitting the tests to any extensive use. Unfortunately it will be found, especially with abnormal children, that the details in the procedure must often be varied to meet the variety of individual peculiarities that we find in the children. No variation should be made without a clear reason, but this given, good judgment would be sufficient to guide the procedure correctly. This is one of the points where the system of testing is not so mechanical as appears on the surface. The following is a brief summary of the authors' general discussion of the tests.

**GENERAL CONSIDERATIONS FOR CONDUCTING THE TESTS.**  
 Work in a quiet, isolated room. Have no other person present except, when possible, a stenographer to take down the child's responses, *verbatim*. Always treat the child kindly. If he seems timid, reassure him at once, not only in tone of voice, but also by giving some test that is most of the nature of a game. Always encourage and never criticize or make corrections. The object is to determine the child's intellectual level, not to teach.  
 Never help the child with additional explanations. The tests are of such a nature that he ought to understand. Only

make sure first that you have his attention in every case, then proceed according to the directions given. Begin with tests that are not too easy nor too difficult for the child, with some that fit his age. If one begins with too difficult tests the child may be discouraged. If the first are too easy, they will excite his scorn, and he may make no effort. Do not let information obtained from other sources about the child influence your judgment. Regard him as an X, an unknown quantity which is to be determined by the present method alone.

**RECORDING RESULTS.**— Besides the *verbatim* record of the child's responses, make note of all incidental observations that may be of value in interpreting the results. But do not keep the child waiting between tests. This may cause the child to lose interest in the procedure and the examiner to lose hold of the child's attention. The variety of performances called for is well adapted to sustain the child's efforts continuously for a prolonged period. It will be helpful to prepare blanks on which the tests are arranged in vertical columns, or in horizontal lines, by number only. They may then be marked with plus or minus signs accordingly as the child passes or fails in them. These signs will then indicate at a glance where the child stands in his total performance.

**INTERPRETATION OF RESULTS AND DETERMINATION OF THE MENTAL AGE.**— It happens but rarely that a child will pass all the tests up to a certain point and then abruptly begin to fail in all the following tests belonging to higher age groups. The typical case is one in which he will pass all up to a certain point and then fail in one or two tests of the next age group, several more in the next, and perhaps in all after that. To determine the mental age from such results the authors give the following rules.

(1) A child has the intellectual development of the age at which he passes all the tests, allowing one failure in one test for that age. If a child passes all the tests except one for the age of nine, and also all the tests except one for the age of ten, he is still attributed the intellectual development of ten years.

(2) Further, once the intellectual development of the child is thus fixed, he is advanced one year for every five tests that he passes beyond that development, and two years for every ten tests that he passes beyond that point. This much is simple and quite mechanical. But to judge, in the first place, whether the child passes or fails in the case of each individual test is not always easy. The variety of responses is very great and they do not always come clearly under the general classes described above. Special factors frequently appear causing results to deviate from the average and influencing them in other ways than through the intelligence. The results must be interpreted and the procedure here again guided by one's judgment. This must be done with the aid of the *verbatim* record and the notes on the incidental observations, helped by such general knowledge of psychology and special information about the nature of the child mind as the examiner may have at his command.

#### CONSIDERATIONS IN REGARD TO A DEFINITION OF INTELLIGENCE AND THEIR RELATION TO ITS MEASUREMENT.

Since these tests are intended to measure intelligence it is necessary that we have a clear idea of what intelligence implies. Only thus can we determine how well the tests fulfill their purpose. The meaning of intelligence may be made clearer by distinguishing several things that until now have been confused. First, and most obviously, intelligence does not mean degree of instruction or training. Very intelligent children may, from various causes, be deprived of this. Secondly, intelligence is independent of school ability, the ability to learn, to assimilate in school, with the methods used in the schools. Success in school work requires attention, will, character, docility, regularity of habits, and especially continuous effort. Without these the very intelligent child would learn but few things in school, and with them the child of average intelligence may do well. Further, we must distinguish between different kinds of intelligence itself. Distinction is to be made between what we may call (1) *stability of intelligence*, and (2) *correctness of intelligence*. The former refers to the increase of intelligence with age, precocity

being the maturation of intelligence in advance of its real age. Both the immature, childish intelligence, and precocity are so best when manifested in character. Everyone has seen intelligent men, for example, who yet remain childish. The maturing intelligence consists probably of (a) an increase in the faculty of comprehending and judging. A child comprehends less and judges with less penetration than the adult. It consists also of the increase of acquisitions of all sorts. The child has less experience and knows less.

There may be maturity of intelligence without correctness of intelligence, which goes to show that what we have distinguished here are really two different and independent things. A boy of twelve, for example, may use the three words in the sentence of Test X.3, but his sentence may have no sense. An adult may give his interpretations of the pictures, but they may be remarkably at fault. Here we have maturity without correctness of intelligence.

Now, of these several things that have been distinguished, what do the tests measure? We may expect that no simple answer can be given. The tests themselves fall into several classes with reference to what and how they measure. In the first place, some of the tests can be passed easily by children much younger than the age for the group to which they belong. The tests on naming four colors, the days of the week, and the months of the year, belong to this class. This shows that certain things may be known in advance of the ordinary age of acquisition through special efforts on the part of parents or teachers to teach the child these particular things. This must be taken into account. A second class of tests may be passed through practice at an earlier age than the age for the group to which they belong. This depends uniquely upon intelligence, and not upon training or any special acquisition. The tests on the arrangement of weights, the definitions better than according to the pictures, and the definitions of abstract terms belong here. A third class is generally passed at the proper age, at the age corresponding to that for the group to which the tests belong. These tests reflect a knowledge that is always acquired at a certain age, and

passed through the combined influence of intelligence and acquired knowledge. Counting backwards from twenty to one, retaining a certain number of 'memories' after one reading, words to put in order to make a sentence are tests of this class. Thus the authors' answer to the above question is that the tests do not measure intelligence considered as separate from a number of concrete factors. They measure a complex, and the result of the measurement depends on (1) intelligence, pure and simple; (2) acquisition due to special training and teaching; (3) school acquisitions that appear at a certain age only; (4) acquisitions relative to language and vocabulary, due possibly both school and home training.

THE MEASURING SCALE OF INTELLIGENCE IN USE.— The authors' chief conclusions are that the tests really offer an instrument that enables us to measure the intellectual development of children of the ages ranging from three to twelve years; that the method is practical, convenient and rapid. They, further, discuss the use of the tests in ranking defective children under the old and familiar classes, idiots, imbeciles, and feeble-minded, terms which they retain. The idiot is a being who cannot communicate with others by language. He neither speaks nor understands. His intellectual development corresponds to that of the normal child between birth and two years. To determine the dividing line between idiocy and imbecility, tests I, and 4 should be given. The imbecile is one who cannot communicate with others in written language. He can neither read and understand what he reads, nor write from dictation or spontaneously in an intelligent manner. To determine the dividing line between imbecility and feeble-mindedness tests VIII. and 5 should be given. But since illiteracy may be due to lack of schooling several other tests are given in addition. The dividing line between feeble-mindedness and the normal is more difficult to determine. It is probably not fixed. An individual is normal when he can take care of himself, when he can get sufficiently remunerative work to meet his personal needs, and when his intelligence does not rank him below the average of



the society in which his parents live. According to this a boy may be feeble-minded in one kind of social environment while he would be normal in another. To decide upon the particular tests that show best the dividing line between feeble-mindedness and the normal, still further considerations must be taken into account. The tests outlined above were all gotten up exclusively on the basis of observations on young children. But an imbecile of forty, for example, may be able to do things that a normal child, of the same intellectual level as the imbecile, cannot do. The imbecile may be able to recite the days of the week, the months of the year, to name the four principal colors, and the pieces of money which the normal child does not learn before eight to ten years. This is because the imbecile has had longer experience. There are left five or six tests adapted to show the dividing line between feeble-mindedness and the normal for the population in Paris and surroundings. These are IX. 6, X. 3 and 4, XI. 4, and XII. 2. Thus we have the following corresponding mental ages for the three old classes of mental defectives:

Idiots. . . . . mental age of 0 to 2 years

Imbeciles. . . . . mental age of 2 to 7 years

Feeble-minded, mental age of 7 to 12 years

But this classification according to mental age is valid only for the time being. A child that is an imbecile to-day may be feeble-minded only as he grows older, or he may remain an imbecile. The prognosis is reserved.

There remains a final class of abnormals, the backward children of the public schools. They do not differ from the children in the special institutions except in the degree of the defect. The same tests may be used to determine this degree. This class may be defined as those who are backward in their school work three years without having been absent sufficiently to cause the backwardness. These tests are adapted to determine the degree as well as this degree of defect.

Finally, the tests should be found useful in determining the mental status of persons accused of crime, and of candidates for enlistment in the navy and army.

PLATE II

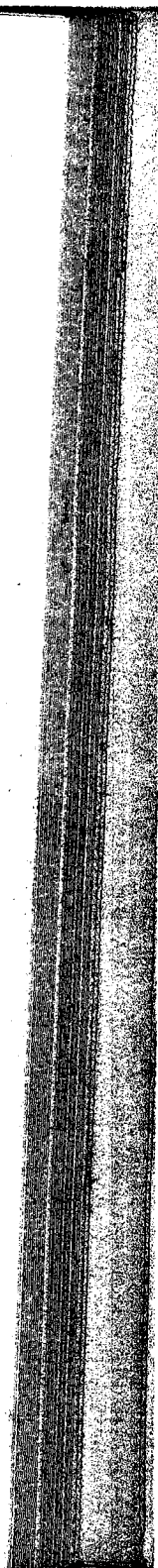
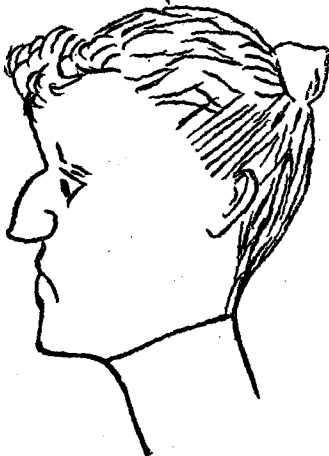


PLATE III



## PLATE V

### Three Houses on Fire.

St. Paul, September 5th. A big fire in St. Paul last night destroyed three houses in the centre of the city. Seventeen families are without shelter. The loss exceeds thirty thousand dollars. In rescuing a child in his cradle a barber's boy has had his hands seriously burned.

**PLATE VI**

**(a)**

**the for  
at a good hour  
we park started**

**(b)**

**to asked exercise  
my I have teacher  
correct my**

**(c)**

**a defends  
good dog his  
master bravely**