

## CHAPTER V

## PILOT STUDY OR TRYOUT OF THE TEST

## I. INTRODUCTION

As it is mentioned in the last chapter, that whatever deficiencies found <sup>in</sup> the first draft of the test were eliminated; and the final form of the test was prepared. It was essential to obtain accurate information regarding the effectiveness of each and every item in a sample of examinees that would properly represent the population about which the information was sought for. So, the revised test was administered with a view to knowing how the test would work in its actual use.

## II. THE OBJECTIVES OF PILOT TESTING

*application  
for time limit in  
subtests*

- (i) To clarify the directions for taking the test.
- (ii) To standardize the instructions to be given for the test and also for each individual subtest.
- (iii) To fix up time limit for each subtest and for the test as a whole.

(iv) To find out, if any, item needs any change in its wordings.

(v) To determine the difficulty values of the questions of each subtest.

(vi) To determine the discriminating power of each individual question.

(vii) To identify weak and defective items and to locate needed improvement.

(viii) To judge the quality of recordings.

(ix) To find out appropriate rate of delivery of the test.

(x) To prepare final forms of the test.

### III. DESCRIPTION OF PILOT TEST-BATTERY

The pilot test-battery consists of 38 subtests. <sup>ten.</sup>  
They are grouped into five main heads, viz.,

Group I - Listening to Different Situations and  
Vocabulary Tests:

(a) Listening to Different Situations  
consisting of fourteen subtests.

( $S_1$  to  $S_{11}$  and  $S_{13}$  to  $S_{14}$ ).

- (b) One Vocabulary Test consisting of four parts. ( $S_{12}(f)$ ,  $S_{12}(u)$ ,  $S_{12}(v)$ ,  $S_{12}(e)$ )

Group II - Attention Tests consisting of five subtests (  $v_1$  to  $v_4$  ).

Group III - Memory Tests consisting of seven subtests. (  $x_1$  to  $x_7$  ).

Group IV - Auditory Resistance Tests consisting of five subtests. (  $\phi_1$  to  $\phi_4$  ).

Group V - Reasoning Tests consisting of six subtests. (  $z_1$  to  $z_4$  ).

In the beginning of the test for almost 10 minutes a general talk on purpose of the test was given for warming, upon tape-recorder. It also included instructions on the task to be done and practice exercises.

The following procedures are applicable to this group of tests and so they are noted below to avoid unnecessary repetition in case of each:

1. The method of marking responses is the same in all the fifteen tests except in the test on Accuracy of Idea. In these tests, the subject is required to select the correct answers from the printed four alternatives and

to encircle the letter of a correct answer. In the test of Judging Accuracy of Ideas a subject is required to encircle any of the three letters - correct, wrong and uncertain ( 211, 212, 213 ).

2. The scoring method is also uniform. The scores on each of these tests were taken as the number of items correct. Each correct answer was given one mark.
3. After description of the test total time of the test is given, which includes the time for instruction (and the time for practice examples in other tests), the time for listening the text (passage, poem, talk etc. applicable here only) and the time for reading the printed answers and necessary time to think over and marking the response. From the pre-pilot study average time was determined and this has been taken into account while taping all these processes.
4. The 'pause'\* for response is also 'taped'.

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\* 'Pause' is the time gap between listening question and actual marking of the response. This much time is taped - that is, the tap is left for response say 7 seconds or 15 seconds.

Each test is briefly described below:

Group I - (a) Listening to Different Situations

Test 1 - The test<sup>(51)</sup> of Listening for General Significance comprises of fifteen short passages of about fifteen to forty words. After listening to a passage the subject is required to select <sup>which</sup> one of four alternatives given in answer sheets <sup>which</sup> best describe the general sense of the passage. The total time of the test has been almost <sup>about</sup> of 12 minutes.

Test 2 - The test<sup>(52)</sup> two is a story about Robinhood which comprises of sixteen questions. The questions are based on characters, the information given in the story. The total timing of the test has been almost of 14 minutes.

Test 3 - The test<sup>(53)</sup> three is on a poem. The poem ('*ମହାବିଷ୍ଣୁ*') depicts the beginning of the rainy season, its effect on the poet and natural settings. There are fifteen questions, set on the main idea, mood and details given in the poem. The total time of the test has been <sup>about</sup> almost of 8 minutes.

Test 4 - The fourth test<sup>(54)</sup> consists of General Talk on "Uses of Solar Power" ('*ସୂର୍ଯ୍ୟଶକ୍ତିର ବ୍ୟବହାର*'). The talk describes various types of uses of solar power and

how it is produced, how valuable it is to mankind etc. In all, fifteen questions are set on main idea, the uses and details of the talk. The total time of the test has been almost 11 minutes.

Test 5 - In the fifth test ( 5<sub>4</sub> ) on 'Birth date of Science' (ବିଜ୍ଞାନର ଜନ୍ମଦିନ ) was a dialogue or drama revealing on how the scientific inquiries began. A scientist explains to his three children why the 28th May is considered to be the birth date of Science. It also gives information about the beliefs and attitudes of medieval people about eclips, religion, etc. The questions are based on the theme and general information of the drama. The total time has been almost 15 minutes. *about*

Test 6 - In the sixth test ( 5<sub>5</sub> ) on Noting Details, the subject is required to listen to a short passage of about 15 to 30 words length first and then to answer questions based on the passage. The passage were based on day to day life on some events and some on individuals. There were such ten passages. The total time taken has been almost 21 minutes. *about*

Test 7 - In the seventh test ( 5<sub>6</sub> ) on Anecdote consists of fourteen questions based on main idea, information, and characters. It is an imaginative anecdote of a man who had dream. In this test, one question was of arrangement type, others were of multiple choice. The total timing of the test has been almost 8 minutes.

Test 8 - The eighth test (  $\xi_8$  ) on Follow

Directions (is based on directions given on an hypothetical rehearsal of what to do, if the school building sets on fire. It consists of thirteen questions. The total timing of the test has been almost 8 minutes.

Test 9 - The ninth test (  $\xi_9$  ) of Listening for

Inference comprises of fifteen small 'stories' told in 15 to 35 words. The subject is required to listen to each story, and then to answer a question selecting which one of four alternative sentences states what is most likely to happen next in the story. The total time of the test has been 12 minutes.

Test 10 - The tenth test (  $\xi_{10}$  ) is an experience

of an antique shipkeeper narrated by him. The test consists of fifteen questions. One question is an arrangement type and others were of multiple choice type. Total time of the test has been almost 9 minutes.

Test 11 - The eleventh test (  $\xi_{11}$  ) on Judging

Accuracy of Ideas consists of twentyfour statements. The students are required to judge the idea of a statement as true, false or neither of them and mark them accordingly. The total time of the test has been almost 11 minutes.

(b) Vocabulary Tests

Test 12 - The twelfth test (  $\xi_{12}$  ) is a

Vocabulary test with four parts with 69 items in all. The part S<sub>12</sub>(f) and S<sub>12</sub>(h) were tests on synonyms and antonyms; it consists of 20 words in each. After listening to a word on the tape, the subject is required to select from four words (alternatives) the one which was either most nearby the same or opposite meaning. The other two parts S<sub>12</sub>(j) and S<sub>12</sub>(u) are tests on idioms and proverbs. After listening to idioms and proverbs respectively, the subject is required to select and encircle the correct answer from the four alternatives. The total timing of each of the four parts of the test has been almost 6 minutes, 6 minutes, 6 minutes, and 6 minutes respectively.

Test 13 - The thirteenth test (S<sub>13</sub>) is on Boys' Talk pertains to be of boys' interest and is on the Beginning of Cricket in India (ଓଡ଼ିଶାରେ କ୍ରିକେଟର ଆରମ୍ଭ). It consists of fifteen questions based on the information given in the talk. The subject is required to select a correct answer out of four alternatives. The total time of the test has been almost 5 minutes.

Test 14 - The fourteenth test (S<sub>14</sub>) on Girls' Talk is about 'Decoration of a House' ('ଘରର ସଜ୍ଜା') pertains to girls' interest. The test consists of fourteen questions based on the informations given in the talk. The subject is required to select a correct answer out of four alternatives. The total time of the test has been almost



5 minutes.

Test 15 - The fifteenth test ( 514 ) consists of sixteen questions based on a story of 'fox and a goat'. The questions were based on main idea, on character and information given in the story. Students are required to select a correct answer out of four alternatives for fifteen questions. The one question was an ordering of events. Total time of the test has been almost 10 minutes.

Group II - Attention Tests

There are five sub-sets of different material in this group of tests, from 16 to 20 ( 511 21 514 ). They are described one by one below.

Test 16 - In the sixteenth test ( 511 ) sets of three digits is presented to subjects on tape-recorder. The subject is required to mark either a tick ( / ) or a cross (X). The subject is required to make a tick when the first digit is the largest and the last is smallest or when the first is smallest and the last is largest. If these conditions are not fulfilled, the subject is required to make a cross. The test consists of fifteen such sets of three digits. The digits were presented with a pause of five seconds. The total time of the test has been almost about 7 minutes.

Test 17 - In this test ( 512 ) a series of

letters, vowel and consonants are mixed up. They were presented on a tape-recorder one by one. The student is to respond by marking a tick (✓) if consonant follows a vowel, or marking zero when vowel follows a consonant, and marking cross (X) when vowel was followed by a vowel and consonant is followed by a consonant. Three lists of the ten letters in each are presented for testing. The total time has been almost 10 minutes.

Test 18 - In this test (U<sub>3</sub>) the sequence of five letters - C, L, E, S, A is presented to pupils. The subject is not allowed to write the sequence. The subject is required to interchange mentally two of the five letters according to the instruction given. Fifteen such sequences are asked to write down. The score on the test consisted of the number of sequences completely correct. The total time of the test has been almost 9 minutes.

Test 19 - In this test (U<sub>7</sub>) the sequence of five digits 1, 2, 3, 4, 5 is presented to subject. The task required to be done was exactly the same as that of test number 18 (U<sub>3</sub>). There are eleven sequences in all. The total time taken has been almost 7 minutes.

Test 20 - In this test (U<sub>4</sub>) first of all a word is presented to the subject. Immediately afterwards two sentences are presented on tape-recorder to the subject. The subject is required to find out which sentence contains the word which has been presented to

them on tape-recorder. The pair of sentences contained nearly similar in pronunciation, like  $\text{ਓਨਾਨ}$  or  $\text{ਓਨਾਨ}$  or with wide or narrow pronunciation like  $\text{ਯੋਨੀ}$  or  $\text{ਯੋਨੀ}$ . After deciding which sentence contains presented word, the subject is required to encircle the letter against the correct answer. Twenty such words and pairs of sentences are presented. The score of the test was number of items correct. The total time taken has been almost 11 minutes.

### Group III - Memory Tests

There are in all seven subtests in this group.

*memory span*

Test 21 - In this test (  $\text{ਏ੧}$  ) the subjects' immediate memory is tested. The subject was required to write down whole sentence immediately after listening to the sentence on the tape-recorder. Minimum length of the sentence was of six words. Fifteen such sentences are given. The score of the test is equal to the number of sentences correct. No word should be missed or wrong word be included. The total time taken has been almost 8 minutes.

Test 22 - In this test (  $\text{ਏ੨}$  ) the subject listens to several pairs of sentences presented on tape-recorder. The first sentence in each pair states a condition and the second sentence of the pair of states a consequence of that condition. When the first sentence of

any pair (presented in different order) is listened again the subject must write down the second sentence or correctly reproduce the meaning of the second sentence in his own words. The sets of such pairs of sentences in increasing number to three, five, seven and ten sentences are presented one by one. The score and the test is number of ideas correct. Grammatical mistakes (which did not change the meaning) were not taken into consideration while scoring. The total time has been almost 23 minutes.

Test 23 - In the sentence completion test ( $\mathcal{E}_3$ ) the subject is required to listen to fifteen unrelated sentences so that when he is presented with a sentence with one word omitted, he can reproduce the missing word. While studying the sentence, the subject does not know which word will be omitted. The subject recorded the responses immediately after listening to the sentences. The score on the test is the number of words correctly reproduced. The total time has been almost 6 minutes.

Test 24 - In the test ( $\mathcal{E}_7$ ) same type of task as in ( $\mathcal{E}_3$ ) is to be performed but with little change. In this test delayed memory is to be tested. Thus, first of all 15 sentences are presented and immediately the subject is to attempt an another test ( $\mathcal{O}_1$ ) and after completing that task, he is to fill up the gap of listened sentences for test ( $\mathcal{E}_3$ ). The scoring method is also like that of ( $\mathcal{E}_7$ ). The total time has been almost 5 minutes.

Tests 25-26 - In these two tests (  $\mathcal{U}_4$   $\mathcal{U}_5$  ) the subject is required to listen to fortyfive pairs of word and word in (  $\mathcal{U}_4$  ) and word and number in (  $\mathcal{U}_5$  ) divided into three pairs in each, one by one. In the test 25th (  $\mathcal{U}_4$  ) the subject is required to listen the pairs of unrelated, meaningful words and in 26th (  $\mathcal{U}_5$  ) he is required to listen the pairs of word and number. In both the tests the subject is required to recall the word or number according-ly when a word is presented on tape. The words in both the tests are not always reproduced in the same order. The pairs are presented only once and the subject is required to recall the related response immediately. The total time required for each test (25th and 26th) has been almost 18 minutes and 19 minutes respectively.

Test 27 - In this test (  $\mathcal{U}_6$  ) the subject is required to write down immediately the series of letters one by one, with increasing length immediately after listening. The series consists of minimum three letters to five letters. At the end of the test three meaningful sentences are presented with three or four words. The score is for the all number of letters written in correct order.

#### Group IV - Auditory Resistance Tests

Test 28 - In this test (  $\mathcal{U}_7$  ) the subject was

required to write down the words presented with pauses. The each letter or syllable of a word is presented with pause of about 3 to 4 seconds and such 20 words are presented. The score on the test was the number of words correctly understood. Spelling mistakes are not penalized. The total time has been almost 7 minutes. It should be noted that this test served as an interpolation activity for test (Ur) as noted earlier.

Test 29 - In this test (O<sub>1</sub>) the subject is required to write down the lines of different songs sung by a male. The lines of songs are of varying length and also are presented, with increasing complexity of composition. Such 20 lines are presented. The maximum length of the line has been of seven words and minimum was of four words. The score on the test is the reproduction of correct line. The total time of the test has been almost 10 minutes.

Test 30 - In this test (O<sub>3</sub>) the subject is required to listen to the sentence. In the sentence unnecessary repetition of the meaning of the former part of the sentence was included. After listening the subject is required to write down the sentence either as it was listened or the meaning of the sentence in his own words. The score on the test is the number of correct sentences written or the correct understanding of the meaning of the sentence. Such twenty sentences are presented. The total

time of the test has been almost 10 minutes.

Test 31 - In this test ( २१४ ) the subject is required to write down the sentence spoken with a grouping arrangement contrary to the sense of the passage; just as he writes words after listening to syllables presented with pause in ( २१५ ). Fifteen such sentences are presented to subjects. The correct sentences written or the correct understanding of the meaning of the sentence. The total time of the test has been almost 12 minutes.

( २१५ )

Test 32 - In this test ( २१५ ) the words of a correct sentence is presented in unusual order. The subject is required to write down the correct sentence or correct order of the words. The score of the test is the number of correct sentences written. No spelling mistakes were taken into consideration while scoring. The total time has been almost 12 minutes. There were 20 such items in the test.

#### Group V - Reasoning Tests

##### Inductive Reasoning

Test 33 - This test ( २१५ ) consists of 20 items. In each item there are four sets of nonsense syllabus. The task is to find out from the set of syllabus which does not relate to other three sets of syllabus. The score is the number of sets found correct. The total time has been almost 12 minutes.

Test 34 - The same type of task is required to be performed here but with set of four meaningful words rather than sets of nonsense syllabus as in (22). Such 20 items are given. The score of the test was the number of words found correct. The total time was 11 minutes and 50 seconds.

Test 35 - This test (23) consists of these types of problems which involves reasoning. Type A (24) consists of ten syllogism, e.g., A is greater than B, B is greater than C, therefore, A is greater than C. The subject is required to fill up the correct word. In type B (25) eleven reasoning problems are presented; and task is to find out the correct answer of the problem. The third type (26) consists of ten small 'stories'. The task is to find out whether the statements given about the stories were 'correct', 'false' or 'uncertain'. The score is the number of the items correct. The total time has been almost 19 minutes.

Test 36 - In this test (27) fifteen series of letters in order are presented to the subjects. The task is to find out which letter or group of letters would come next from the printed four letters or group of letters. The score on the test was number of items correct. The total time of the test has been almost 7 minutes.



Test 37 - In this test (24), the pupil is required to read the sentence printed in answer sheet with one word in bold type (may be subject, object, verb or an adjective). The student is required to recognize the word as subject, adjective, etc., and find out similar word from the sentence listened to on tape-recorder and write down the word in answer sheet. There were such 31 items in the test. The score on the test is the number of items correct. Total time for the test has been almost 21 minutes.

Test 38 - This test (25) is on arithmetical problems. The task is to find out correct answer which requires little numerical computation for solution. Twentythree arithmetical problems are presented on tape-recorder and each one is of multiple choice type. The score of the test is the number of items correct. The total time of the test has been almost about 12 minutes.

Thus, the whole test battery consisted of 38 sub-tests with 701 items in all was prepared.

all  
Most of these tests are same as shown in the final forms A & B (Appendices No. 6 & 7) after some changes as a result of item analysis. The answer sheet for this pilot form is shown in Appendices No.2 & 3. The original pilot form is not included in the Appendix due to consideration of a

bulk of a large number of pages repeated unnecessarily.

#### IV. SAMPLING

The sample used for pilot study should coincide with the total population for which the test is finally meant.

The present test is meant for whole of Gujarat State; for Gujarati speaking 8th standard students. It is not possible to have an access <sup>to</sup> the whole of the population due to lack of time and limited <sup>fund's</sup> expenses. So it was decided to choose some area of Gujarat randomly. To correspond to the different cultures of the inhabitants residing roughly in different parts of five districts of Gujarat, viz., Ahmedabad, Baroda, Bhavnagar, Kaira and Surat were selected to cover the areas situated in extreme directions as well as the central parts of Gujarat.

After selecting the areas, the question of random selection of schools from these areas was taken up. The criteria for the selection of the schools were:

- (i) The school should have enough number of boys and girls, as well as a room of such a size in which 40-44 students can be tested at a time.
- (ii) The school should be available for two successive days.

(iii) One school should be from rural and one from urban area from the same district (culture).

(iv) There should be availability of electric current to run tape-recorder.

In view of this, at least, four to five schools in each district were sorted out. Due to intervening factors such as, bi-monthly tests, or special subject tests, some special programmes of the schools, visits from inspecting authorities, etc., or natural calamities such as heavy rains etc. it was difficult to get the cooperation from some schools. Accordingly, whichever schools were ready to cooperate for the two days test programme from each district were selected. The names of such schools and number of boys and girls in each have been given in Appendix 1.

*size*  
*noted* The size of the sample was considered convenient and good enough for statistical reasons to determine discriminating values of each item.

This gave us a random, fairly large sample of <sup>about</sup> 466 pupils including both boys and girls, coming from both urban as well as rural areas, amongst which the differences in their capacity to listen or grasp were suspected. In other words, the sample was large enough to take care of accuracy of results and reduction of error; it was at the

same time random and stratified and also representative of all areas, selected to suit some physical conveniences and at the same time to study the contribution of factors such as sex and area of environment which are likely to affect the performance on the test.

#### V. ADMINISTRATION OF THE TEST

The test was thus administered to 466 students of 8th standard in thirteen high schools of five districts. The dates of administration of schools as shown in Appendix 1 reveals that the pilot was started in the IInd term of 1972 and within almost three months the data were collected.

The timings of each test and arrangement of the test have been given earlier. The test was lengthy. It was administered for two successive days. It took about 3.30 hours to finish on each day. Normally, the testing started with the first period and continued till sixth period with recess in between. Care was taken to avoid the adverse effect of fatigue with rest period at the end of two periods. The students were asked to take the test continuously from 70 to 80 minutes at one sitting.

#### VI. ANALYSIS OF DATA

##### Item Analysis

As noted in each test, the scores were obtained

on each of 38 tests for each subject. On the basis of these scores obtained, the procedure viz., item analysis for selection of items was followed. This necessitated the computation of difficulty values and discriminating values for each test item.

As Lindquist (85, p. 292) has very rightly pointed out, "ordinarily the primary goal in test construction is to maximize the number of discriminations among all the examinees or between such groups of examinees as the test administrator designates." The process of item analysis helps in finding out this discrimination. Item analysis is a process of selecting best items (which discriminates the most between the good and bad performers) from a set of tried items on a small representative sample.

The importance of the process is put forth by Garrett (51, p. 361): "The adequacy of the test - whatever its purpose - depends upon the care with which the items of the test have been chosen." It is considered to be a powerful tool for test improvement as weaker items are dropped. Item analysis again shortens the test. Both, in turn, increases its validity and reliability.

So, the procedure of item analysis in the present case following the one described by Garrett (51, pp.366-367).

First, the answer books of 466 students were

taken. Out of them some 56 were found to be incomplete. These were not scored. Remaining 410 were examined. Out of these 410, for the convenience of statistical calculations, every tenth answer book from total answer books arranged in order of scores was taken out, i.e. 40 answer books were eliminated. The scores of 370 subjects were used for item analysis for convenience of computations as prescribed by Garrett following Kelly.

#### Criterion Groups

After scoring and totalling it was necessary to determine the criterion for comparison and to prepare comparable groups. So all the 370 answer books were arranged in order of scores, from high to low.

Which percentage to choose to prepare the criterion is a debatable point amongst statisticians. Yet normally 27 per cent of the upper group and 27 per cent of the lower group are taken up. Kelley<sup>1</sup> has shown that the most accurate determination of item validities or internal consistencies can be obtained by.... "comparing approximately the upper and the lower 27 per cent of the total group."

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1. Kelley, T.L.: "The Selection of Upper and Lower Groups for the Validation of Test Item", Journal of Educational Psycho. 30-17-24 (1939) quoted by Thorndike, R.L., "Personnel Selection", John Wiley & Sons, Inc., New York, 1949, p. 345).

Garrett (51, p. 367) notes, "It has been shown that the discriminative power of an item is most accurately determined when item analysis is based on the top and bottom 27 per cent rather than some other percentage of the distribution." So in this study, item analysis is done on 27 per cent of the upper group and 27 per cent of the lower group. That is, 100 answer books were taken up in area of upper and lower 27 per cent groups. These were analysed for every item distractorwise. Then each question, distractorwise was totalled which gave the whole picture of distractors chosen by the pupils. The totals give percentages as they were out of 100. The next step was to correct these scores for chance success.

#### Correction of Scores for Chance Success

Many a times researches do not find it necessary to apply the formula for success, since usually sufficient time to answer the question is given in tryout. That means they have taken care of the problem of omission, and not for guessing. From the point of view of Garrett (51,p.365), "it is important to try to estimate the number of examinees who get the right answer through correct knowledge or correct reasoning and rule out answers which are based upon guess work." Thus, he favours to apply the formula. Lindquist(85, p. 278) is also in favour of applying the formula. He notes in detail the views in

favour of and against the formula. He concludes that, "the writer values the gain in meaning fullness of the discrimination indices so much more than slight amount of reliability lost that he is inclined to favour correcting the item analysis data for chance success as well as the examinees scores on the tryout test."

Those, who do not think fit to apply the correction for chance success formula, usually try to avoid it by (1) warning pupils not to guess blindly, (2) providing sufficient time for every examinee to try every item, (3) constructing items in such a way that the distractors will be plausible as far as possible. These authorities overlook the fact that few examinees may deliberately ignore the warning and one cannot change such attitudes or idiosyncrasies. Again, it is not possible to construct distractors with equal attractive values. (It is assumed when formula for chance success is applied that all answers are equally attractive). In standardization procedure the process of item analysis gives the picture of choices of pupils distractorwise. The distractors with zero or too low value are changed and retested to make them equally attractive. So, here it was thought fit to apply the formula for lessening the chances for guessing as well as correcting the scores for omissions if any.

The formula used is like this:



$$S = R_p - \frac{W_p}{K - 1}$$

$G$  = No of items

$W$  = No of items wrong

Where  $S$  = Corrected score

$R_p$  = percentage of correct answers

$W_p$  = percentage of pupils who answered wrongly

$K$  = number of choices in the item.

Any explanation for the formula?

✓ This formula was not applied to all test items.

The scores on tests of Listening to Different Situations from 1 to 15 ( $S_1$  to  $S_{15}$ ) which include Vocabulary Tests also and the scores of all Reasoning Tests from 33 to 38 ( $2_1$  to  $2_6$  respectively) were corrected for chance success by this formula. In the group of Attention Tests the scores on tests 16, 17 and 20 ( $u_1$ ,  $u_2$  and  $u_4$ ) were also corrected by this formula. Where, either two or three cues are provided. The scores on tests number 18 and 19 ( $u_3$  and  $u_5$ ) were not corrected as (1) they are not objective type questions that is, the subject has 30 chance for guessing from the alternatives as there is no provision of definite cues or distractors, (2) even if a subject may guess, (due to forgetfulness or inattentiveness or such other factors), he may guess from large number of words or situations that is say infinity. That means  $K$  becomes so large as to make correction negligible. In group of Memory Tests, the tests 21, 23, 24 and 25 ( $a_1$ ,  $a_3$ ,  $a_4$  and  $a_5$ ) respectively) the formula was not applied due to the same

mentioned reasons. Reasoning Tests were matching tests. Many authorities think, it is not advisable to apply the formula for matching test, as it tends to penalize the more cautious examinees as in multiple choice item. No correction formula can compensate for differences among pupils due to guessing. Lindquist ( 85 ) notes formula given by Shen and Chen based on number of omissions. The formula is:

*Any explanation?*

$$S' = R + \frac{O}{n} \quad ?$$

Where:  $S'$  = Corrected scores.

$R$  = Number of right answers.

$O$  = Number of omissions.

$n$  = The number of suggested responses to each item.

*how? Explain* But from the point of view of Lindquist, "both the formulas are functionally interchangeable". So the same formula was applied for correction in test numbers 22, 25 and 26 (  $E_2, E_5$  &  $E_6$  respectively). The formula was not applied to all Auditory Resistance Tests for the reasons mentioned earlier.

After correcting the raw scores for chance success/ guessing the discriminative values of all the items by various methods and difficulty of value were calculated on raw as well as corrected scores. All the values of

both the types are given in Table No. 1. Each method of calculations discriminative value is stated below, as suggested by different authors.

#### Discriminative Values by Various Methods

1. The percentage of correct responses to an item from upper and lower groups were subtracted and divided by 100. Formula is  $\frac{UR - LR}{100}$ . The formula

was applied to both the scores - raw scores as well as corrected scores. Values obtained are given in Table 4.

2. Biserial <sup>between?</sup>  $r$  was read from the Flanagan's Table for both types of scores.

3. Chi-value was calculated to know the significance of difference between two groups for the item.

It is a usual practice to use the Chi-square as a measure of item discrimination, proposed by Guilford and others. But Lindquist favours the use of Chi-test suggested by Cureton (-----) to circumvent the limitation of critical ratio and Chi-square tests, which are applicable only to large samples and to item choices that are in the middle of range of attractiveness to examinees. Lindquist points out, "The Chi-test proposed for use by Cureton is designated to determine, at designated levels of confidence, whether a sample drawn at random from the population in

TABLE 1

TABLE OF VALUES OF THE PILOT SAMPLE

Sub test	Raw Scores		Corrected Scores		Difficulty Value		Discriminative Value		Bis 'r'		Chi-value (Corrected Scores)	Remarks
	27% Upper group	27% Lower group	27% Upper	27% Lower	Raw Scores	Corrected Scores	(U-L/100) Raw Scores	Corrected Scores	Raw Scores	Corrected Scores		
1	2	3	4	5	6	7	8	9	10	11	12	13
I 1	43	32	24	9.34	.38	.17	.11	.15	.12	.26	2.60	
Σ 2	75	38	66.66	17.33	.57	.42	.37	.49	.38	.52	5.57	Selected
3	49	16	32.00	-12.00	.33	.16	.33	.32	.38	.00	6.20	
4	64	31	52.00	8.00	.48	.30	.33	.44	.34	.53	6.61	Selected
5	43	33	24.00	10.66	.38	.17	.10	.13	.12	.23	3.14	
6	69	51	58.00	34.66	.60	.46	.19	.23	.19	.25	3.14	Selected
7	38	35	17.33	13.33	.37	.15	.03	.04	.01	.07	5.88	Selected
8	37	18	16.00	- 9.00	.28	.08	.19	.16	.24	.00	4.05	
9	85	58	80.00	44.00	.72	.62	.27	.36	.32	.39	5.08	Selected
10	78	42	70.66	22.66	.60	.47	.36	.48	.36	.49	7.12	Selected
11	59	46	45.33	28.00	.53	.37	.13	.17	.15	.17	2.46	210
12	65	40	53.33	20.00	.53	.37	.25	.23	.26	.37	4.63	Selected
13	55	31	40.00	8.00	.43	.24	.24	.32	.24	.44	5.16	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
14	41	36	21.33	14.66	.39	.18	.05	.06	.04	.06	1.10	
15	68	42	57.33	22.66	.55	.40	.26	.34	.27	.37	4.78	Selected
II 1	75	76	66.66	65.33	.76	.66	-.01	.01	0	.02	0	
2	78	43	70.66	24.00	.61	.47	.35	.47	.37	.46	7.07	Selected
3	70	47	60.00	29.33	.59	.45	.23	.31	.24	.33	4.28	Selected
4	39	23	18.67	- 2.66	.31	.09	.16	.19	.05	.00	4.86	
5	45	26	26.66	1.34	.36	.14	.19	.25	.21	.59	5.10	
6	77	57	69.33	42.66	.67	.56	.20	.26	.22	.25	3.57	
7	61	54	48.00	38.66	.63	.43	.07	.09	.07	.11	1.19	
8	73	38	64.00	17.33	.56	.41	.35	.47	.36	.50	6.57	Selected
9	56	33	41.33	10.66	.45	.26	.23	.30	.24	.40	4.75	Selected
10	85	50	80.00	33.33	.68	.57	.35	.47	.41	.49	6.57	Selected
11	88	39	84.00	18.66	.64	.51	.49	.66	.53	.65	9.14	Selected
12	82	38	76.00	17.33	.60	.47	.44	.59	.47	.49	8.28	Selected
13	70	33	60.00	10.66	.52	.35	.37	.49	.44	.56	7.16	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
14	50	42	33.33	22.86	.46	.28	.08	.10	.08	.13	1.42	
15	45	16	26.66	-12.00	.31	.14	.29	.27	.34	.00	5.53	
16	36	26	14.66	1.33	.31	.08	.10	.13	.12	.46	3.33	
III 1	52	38	36.00	17.33	.45	.27	.14	.19	.15	.26	2.95	
2	52	36	36.00	14.07	.44	.25	.16	.22	.17	.29	3.28	
3	75	43	66.66	24.00	.59	.45	.32	.43	.34	.43	6.00	Selected
4	58	35	44.00	13.33	.47	.29	.23	.31	.24	.38	4.41	Selected
5	67	43	56.00	24.00	.55	.40	.24	.32	.23	.34	4.10	Selected
6	27	18	2.67	- 9.33	.22	-.03	.09	.12	.12	.00	2.35	
7	80	50	73.33	33.33	.65	.54	.30	.40	.33	.41	5.65	Selected
8	77	50	69.33	33.33	.63	.52	.27	.33	.29	.36	4.85	Selected
9	30	28	6.66	4.00	.29	.05	.02	.11	.09	.08	0.84	
10	74	44	65.33	25.33	.59	.46	.33	.40	.32	.42	7.07	Selected
11	17	5	-10.66	26.66	.11	-.19	.12	.16	.25	.00	0.00	2
12	26	10	1.34	-20.00	.18	.09	.16	.21	.26	.00	0.00	12

83

1	2	3	4	5	6	7	8	9	10	11	12	13
13	31	23	8.00	- 2.66	.27	.03	.08	.11	.09	.25	4.54	
14	44	26	25.34	1.34	.35	.14	.18	.24	.20	.57	5.00	Selected
15	86	52	81.34	36.00	.69	.59	.34	.45	.40	.47	6.47	Selected
IV 1	19	25	- 8.00	0.00	.22	-.04	-.06	-.04	-.10	.00	-3.84	
2	11	12	18.66	-17.33	.12	.09	-.01	.19	.17	.00	.00	
3	90	41	86.66	21.33	.66	.54	.49	.45	.52	.64	6.44	Selected
4	42	20	22.66	- 6.66	.31	.15	.22	.18	.26	.00	5.00	
5	73	34	64.66	12.00	.54	.38	.39	.53	.40	.55	8.34	Selected
6	70	42	60.00	22.66	.56	.42	.28	.37	.29	.40	6.66	Selected
7	22	29	- 4.00	5.34	.26	.25	-.07	-.05	-.06	.00	-2.00	
8	71	50	61.33	33.33	.60	.48	.21	.27	.22	.28	3.85	Selected
9	63	27	50.66	2.66	.45	.27	.36	.48	.36	.68	7.61	Selected
10	64	39	52.00	18.66	.52	.35	.25	.44	.26	.38	4.39	Selected
11	58	46	44.00	28.00	.52	.36	.12	.16	.12	.17	2.38	Selected
12	35	28	13.33	4.00	.32	.09	.17	.09	.09	.24	2.10	213

	1	2	3	4	5	6	7	8	9	10	11	12	13
	13	36	19	14.66	- 8.00	.28	.07	.17	.15	.21	.00	3.78	
	14	92	71	89.33	61.33	.82	.75	.21	.28	.34	.36	4.50	Selected
	15	34	12	12.00	-27.34	.23	-.06	.22	.12	.30	.00	2.90	
V 1 34	61	26		48.00	1.33	.44	.25	.35	.46	.36	.72	6.67	Selected
	45	15		26.66	13.33	.30	.07	.30	.40	.34	.19	10.83	
	68	40		57.34	20.00	.54	.39	.28	.34	.29	.39	5.27	Selected
	65	31		53.33	8.00	.48	.31	.34	.45	.36	.53	6.87	Selected
	58	48		44.00	30.66	.53	.38	.10	.14	.10	.15	2.13	
	33	22		10.66	- 4.00	.28	.06	.11	.11	.11	.00	2.90	
	56	33		41.33	10.66	.45	.26	.23	.30	.35	.40	5.26	Selected
	75	44		66.66	25.33	.60	.46	.31	.41	.33	.42	8.88	Selected
	56	26		41.33	1.33	.41	.22	.30	.40	.32	.68	6.86	Selected
	45	36		26.66	14.66	.41	.21	.09	.12	.10	.18	1.17	
	46	32		28.00	9.34	.39	-.19	.14	.18	.15	.30	3.13	



1	2	3	4	5	6	7	8	9	10	11	12	13
12	52	23	36.00	- 2.66	.38	.18	.29	.36	.32	-.00	6.48	
13	64	35	52.00	13.33	.50	.33	.29	.39	.30	.45	5.90	Selected
14	92	58	89.33	44.00	.75	.67	.34	.45	.45	.49	6.61	Selected
15	55	23	40.00	- 2.66	.49	.20	.32	.40	.33	.00	6.53	
VI 1	84	39	52.00	18.67	.62	.35	.45	.33	.49	.37	5.00	Selected
2	72	54	62.66	38.66	.63	.51	.18	.24	.19	.25	2.00	Selected
3	43	36	24.00	14.07	.40	.19	.07	.10	.07	.15	3.10	Selected
4	50	57	33.33	42.66	.54	.38	-.07	-.09	.07	-.11	-1.66	
5	85	46	80.00	28.00	.66	.54	.39	.52	.43	.52	7.28	Selected
6	46	30	28.00	66.00	.38	.17	.16	.21	.17	.38	3.84	Selected
7	75	51	66.66	35.00	.63	.51	.24	.32	.26	.33	8.57	Selected
8	62	57	49.00	42.00	.60	.46	.05	.07	.03	.07	0.71	
9	82	54	76.00	38.00	.68	.57	.28	.37	.32	.39	5.43	Selected
10	64	38	52.00	17.00	.51	.35	.26	.35	.27	.39	5.20	Selected

65

1	2	3	4	5	6	7	8	9	10	11	12	13
VII 1	97	67	96.00	56.00	.82	.76	.30	.40	.48	.57	6.50	Selected
2	51	37	34.66	16.00	.44	.25	.14	.18	.16	.24	3.00	
3	84	69	78.66	58.66	.77	.68	.15	.20	.20	.23	4.02	Selected
4	48	27	30.66	2.66	.38	.19	.21	.28	.23	.55	5.28	
5	56	39	41.33	18.66	.48	.20	.17	.23	.17	.27	3.47	
6	74	35	65.33	13.33	.55	.39	.39	.52	.40	.56	7.39	Selected
7	36	18	14.66	- 9.00	.27	.07	.18	.15	.23	-.00	3.78	
8	72	38	62.66	17.33	.50	.40	.34	.45	.35	.48	6.52	Selected
9	85	53	80.00	37.33	.69	.59	.32	.43	.38	.45	5.80	Selected
10	80	40	73.33	20.00	.60	.47	.40	.53	.42	.53	7.42	Selected
11	76	37	68.00	14.66	.57	.41	.39	.53	.40	.56	7.64	Selected
12	23	20	38.66	- 6.66	.22	.20	.03	.38	.15	.00	6.88	
13	38	20	17.33	- 6.66	.29	.09	.18	.17	.22	.00	4.60	
14	66	27	52.00	2.67	.46	.27	.39	.49	.36	.67	7.12	Selected
VIII 1	92	58	89.33	44.00	.75	.67	.34	.45	.45	.51	6.56	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
2	86	51	81.33	34.66	.68	.58	.35	.47	.41	.48	6.81	Selected
3	61	29	48.00	5.33	.45	.27	.32	.43	.32	.58	6.88	Selected
4	56	39	41.33	18.66	.47	.30	.17	.23	.17	.27	3.43	Selected
5	79	46	72.00	28.00	.67	.50	.33	.44	.35	.44	4.88	Selected
6	77	64	69.33	52.00	.70	.61	.13	.17	.15	.18	2.54	
7	84	46	78.66	28.00	.65	.53	.38	.50	.42	.50	4.14	Selected
8	54	49	38.66	32.00	.51	.35	.05	.06	.06	.47	.85	
9	69	31	58.66	8.00	.50	.33	.38	.50	.38	.58	7.43	Selected
10	81	40	74.66	20.00	.61	.47	.41	.55	.43	.54	8.40	Selected
11	18	25	- 8.00	00.00	.23	.04	-.07	-.08	-.11	.00	-3.46	
12	89	71	85.34	61.33	.80	.73	.18	.24	.25	.29	3.70	
13	69	60	58.66	46.66	.65	.52	.09	.12	.10	.12	1.64	
IX 1	85	51	80.00	34.66	.68	.57	.34	.46	.38	.47	6.30	Selected
4C 2	79	50	72.00	33.33	.65	.53	.29	.39	.39	.48	5.40	Selected
3	97	71	96.00	61.33	.84	.79	.26	.35	.54	.58	4.90	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
4	55	52	40.00	36.00	.54	.38	.03	.04	.03	.04	1.30	
5	43	47	24.00	29.34	.45	.27	-.04	-.05	-.05	-.06	-.66	
6	76	36	68.00	14.67	.56	.41	.40	.53	.43	.56	7.53	Selected
7	84	70	78.67	60.00	.77	.69	.14	.19	.19	.21	3.17	Selected
8	40	28	20.00	4.00	.34	.12	.12	.16	.13	.36	-0.37	
9	28	18	4.00	- 9.33	.23	-.03	.10	.13	.13	-.17	5.45	
10	76	66	68.00	54.66	.66	.61	.10	.13	.70	.15	1.94	Selected
11	27	35	2.66	13.33	.31	.08	-.08	-.10	-.12	-.35	-2.43	
12	81	61	74.67	48.00	.71	.66	.20	.26	.24	.28	2.30	Selected
13	90	76	86.66	68.00	.83	.77	.14	.28	.23	.25	2.80	Selected
14	17	25	-10.66	0.00	.21	-.05	-.08	-.10	-.16	.00	4.33	
15	8	7	-22.66	-23.00	.07	-.23	.10	-.04	+.00	.00	0.00	
X-1 9	79	59	72.00	45.34	.69	.59	.20	.27	.20	.28	3.71	
	2	65	53.33	5.33	.47	.29	.36	.48	.36	.58	7.50	Selected
	3	35	13.33	14.66	.25	.14	.21	-.02	.28	.00	-2.07	218
	4	87	82.66	38.66	.71	.61	.33	.44	.39	.47	4.78	Selected



1	2	3	4	5	6	7	8	9	10	11	12	13
5	45	37	18.50	5.50	.41	.17	-.08	.12	.07	.03	2.40	
6	60	31	40.00	-43.50	-.46	.19	.29	.44	.30	.68	8.50	Selected
7	72	57	58.00	36.50	.65	.47	.15	.23	.16	.22	3.50	Selected
8	58	58	37.00	37.00	.58	.37	.00	.00	.00	.00	0.00	
9	79	73	68.50	59.50	.76	.64	.06	.09	.08	.12	1.19	
10	24	31	-14.00	-4.50	.28	-.09	-.07	-.11	-.09	.00	0.00	
11	34	28	1.00	-8.00	.31	.35	.06	.09	.07	.00	0.00	
12	44	22	16.00	-17.00	.33	-.60	.22	.33	.25	.49	-1.53	
13	48	42	22.00	13.00	.45	.18	.06	.09	.06	.14	1.76	
14	81	76	72.50	64.00	.79	.68	.05	.09	.07	.09	1.00	
15	58	29	37.00	7.50	.43	.11	.29	.44	.30	.67	7.40	Selected
16	88	51	82.00	26.50	.69	.54	.38	.56	.45	.52	7.78	Selected
17	58	51	37.00	26.50	.54	.25	.08	.11	.08	.11	1.04	
18	26	17	-11.00	-25.50	.22	.18	.09	.14	.13	.00	0.00	
19	12	18	-32.00	-23.00	.15	-.28	-.06	-.09	-.11	.00	0.00	
20	48	45	22.00	-18.00	.47	.19	.03	0.05	.03	.06	0.01	

	1	2	3	4	5	6	7	8	9	10	11	12	13
21	52	51	28.00	27.00	.51	.27	.02	.02	.02	.02	.02	0.08	
22	64	31	46.00	- 4.00	.48	.25	.33	.05	.34	.71	8.50	Selected	
23	52	45	28.00	18.00	.49	.23	.07	.11	.07	.13	1.50		
24	49	33	24.50	- 1.50	.41	.12	.16	.23	.17	.57	5.21	Selected	
XII 1	66	29	54.66	5.33	.48	.30	.37	.49	.38	.61	7.65	Selected	
2	85	55	80.00	40.00	.70	.60	.30	.40	.33	.43	5.77		
3	80	32	73.33	9.33	.56	.41	.48	.64	.49	.66	9.69	Selected	
4	72	53	62.66	37.33	.63	.49	.19	.26	.20	.81	3.57		
5	80	53	73.33	37.33	.67	.55	.27	.36	.30	.37	5.00		
6	86	55	81.34	40.00	.70	.61	.31	.41	.37	.42	5.92		
7	81	35	74.66	17.33	.58	.46	.46	.58	.50	.60	8.28	Selected	
8	80	46	73.33	28.00	.63	.51	.34	.45	.30	.35	5.00		
9	68	37	57.33	16.00	.53	.37	.31	.41	.37	.54	7.01	Selected	22
10	45	38	26.66	17.33	.42	.22	.07	.10	.14	.43	6.36		21
11	78	43	70.67	24.00	.60	.47	.35	.47	.37	.46	6.57	Selected	

Σ 12(8)

1	2	3	4	5	6	7	8	9	10	11	12	13
12	7	4	-23.00	-28.00	.00	-.00	.00	.00	.00	.00	-0.00	
13	50	20	33.33	- 6.66	.35	.17	.30	.33	.33	.00	6.15	
14	62	40	49.33	20.00	.51	.35	.22	.29	.22	.32	4.18	
15	80	34	73.33	12.00	.57	.42	.46	.61	.47	.62	9.51	Selected
16	64	26	52.00	1.33	.45	.27	.38	.51	.40	.69	8.36	Selected
17	63	27	50.66	2.66	.45	.27	.36	.48	.40	.68	8.07	Selected
18	29	22	5.33	- 4.00	.25	.025	+.07	.05	.09	.00	0.08	
19	79.	49	72.00	32.00	.64	.52	.30	.40	.33	.40	5.57	
20	80	46	73.33	28.00	.63	.51	.34	.45	.36	.45	6.28	
g <sub>12</sub> (u)												
77	61	61	69.34	48.00	.69	.59	.16	.21	.16	.22	2.94	
2	84	59	78.66	45.33	.71	.61	.25	.33	.30	.33	4.84	
3	45	29	26.67	5.34	.37	.16	.16	.21	.16	.39	4.20	
4	79	26	72.00	1.33	.53	.37	.53	.71	.53	.82	10.30	Selected
5	85	48	81.34	30.67	.66	.56	.37	.50	.42	.52	7.00	22



1	2	3	4	5	6	7	8	9	10	11	12	13
6	39	13	18.66	-16.00	.26	.10	.26	.19	.34	.00	4.50	
7	81	35	74.66	17.33	.58	.46	.46	.57	.47	.61	8.67	Selected
8	80	46	73.33	28.00	.63	.51	.34	.45	.37	.45	6.28	Selected
9	68	37	57.34	16.00	.53	.37	.31	.41	.32	.44	6.97	Selected
10	45	38	26.66	17.34	.42	.22	.07	.09	.07	.13	1.57	
11	89	62	85.34	49.34	.75	.67	.27	.36	.36	.41	5.33	
12	16	23	-12.00	- 2.66	.00	-.00	-.00	-.00	.00	.00	-0.00	
13	94	71	92.00	61.34	.83	.77	.23	.31	.39	.43	5.30	
14	90	60	86.66	46.66	.75	.66	.30	.40	.40	.45	5.90	Selected
15	73	26	64.00	1.33	.47	.29	.47	.63	.47	+.78	15.50	Selected
16	77	44	69.00	25.33	.66	.47	.33	.44	.34	.43	6.28	Selected
17	78	64	70.66	52.00	.71	.61	.14	.18	.17	.19	2.58	
18	83	74	77.33	65.33	.78	.71	.09	.12	.11	.02	1.71	
19	79	40	72.00	20.00	.60	.46	.39	.52	.41	.52	7.28	Selected
20	91	70	88.00	60.00	.81	.74	.21	.28	.32	.36	4.42	22 23 33

1	2	3	4	5	6	7	8	9	10	11	12	13
592(51)												
90	54	86.66	38.66	.72	.62	.36	.48	.45	.51	6.95	Selected	
2 90	51	86.66	34.66	.71	.60	.39	.52	.48	.54	7.39	Selected	
3 83	51	77.33	34.66	.67	.55	.32	.43	.37	.44	5.85	Selected	
4 84	56	78.66	41.33	.70	.60	.28	.37	.33	.39	6.13	Selected	
5 72	34	62.66	12.00	.53	.37	.38	.51	.39	.54	7.35	Selected	
6 74	52	65.34	36.00	.63	.50	.22	.29	.24	.30	4.00	Selected	
7 25	32	0.00	9.34	.29	.05	.07	+.09	.07	.00	0.00		
8 43	32	24.00	8.00	.38	.16	.11	.16	.14	.28	3.00		
9 64	31	52.00	8.00	.48	.30	.33	.44	.34	.53	6.72	Selected	
10 56	45	41.34	26.66	.51	.33	.11	.14	.11	.17	2.03		
11 69	31	58.66	8.00	.50	.33	.38	.51	.39	.58	6.71	Selected	
12 44	20	25.33	- 6.60	.32	.13	.24	.25	.24	.00	5.50		
13 28	29	4.00	5.34	.29	.05	-.01	-.01	-.01	.00	-2.00		
592(51)												
76	68	68.00	57.33	.72	.63	.08	.11	.10	.12	1.42	22	
2 37	26	16.00	1.33	.32	.08	.11	.15	.13	.49	3.45	24	

1	2	3	4	5	6	7	8	9	10	11	12	13
3	64	28	52.00	4.00	.46	.28	.36	.48	.34	.62	7.46	Selected
4	63	43	50.66	24.00	.53	.37	.20	.27	.21	.28	3.82	Selected
5	66	42	54.66	22.66	.54	.38	.24	.32	.25	.34	4.55	Selected
6	80	41	73.33	21.33	.61	.47	.39	.52	.41	.57	7.28	Selected
7	39	33	18.66	10.66	.36	.14	.06	.08	.07	.15	1.45	
8	60	26	46.66	1.33	.43	.24	.34	.45				Selected
9	43	16	24.00	16.00	.30	.20	.27	.08	.32	-.12	1.13	
10	70	36	60.00	14.66	.53	.37	.34	.45	.35	.50	6.40	Selected
11	71	26	61.33	+ 1.33	.47	.32	.45	.60	.45	.78	8.93	Selected
12	51	39	34.66	18.66	.45	.27	.12	.16	.14	.20	2.41	
13	50	36	33.34	13.34	.43	.23	.14	.20	.15	.29	3.16	
14	52	38	36.00	14.66	.45	.25	.14	.21	.15	.24	2.90	Selected
15	17	24	-10.66	- 1.33	-.21	.00	.07	-.00	-.10	.00	-0.00	
16	42	34	20.67	12.00	.38	.16	.08	.09	.09	.13	1.56	
XIII												225
823												
75		69	66.66	58.66	.72	.63	.06	.08	.07	.09	1.03	

1	2	3	4	5	6	7	8	9	10	11	12	13
2	56	42	41.34	22.66	.49	.32	.14	.18	.14	.22	2.76	
3	43	35	24.00	13.33	.39	.18	.08	.11	.06	.17	1.86	
4	72	39	62.66	18.66	.56	.40	.33	.44	.34	.47	6.23	Selected
5	72	43	62.66	24.00	.58	.43	.29	.39	.30	.39	5.42	Selected
6	28	25	14.00	0.00	.27	.07	.03	.14	.05	.00	1.50	
7	68	34	57.33	12.00	.51	.35	.34	.45	.35	.51	6.56	Selected
8	77	52	69.33	36.00	.65	.53	.25	.33	.26	.34	4.56	Selected
9	72	26	64.00	1.33	.49	.33	.46	.63	.25	.78	8.85	Selected
10	56	36	41.33	14.66	.46	.28	.20	.26	.21	.32	3.96	Selected
11	18	14	- 9.33	-14.67	.16	+ .00	.04	.00	.03	+ .00	+0.00	
12	19	11	- 8.00	-18.66	.15	+ .00	.08	.00	.14	- .00	-0.00	
13	88	67	84.00	56.00	.78	.70	.21	.28	.29	.33	4.21	Selected
14	76	60	68.00	48.66	.68	.58	.16	.19	.18	.23	2.85	
15	71	.46	.61.33	28.00	.59	.44	.25	.33	.26	.34	4.57	Selected
XIV												2
50	75	59	66.67	45.34	.67	.56	.16	.21	.19	.22	3.00	2
2	61	35	48.00	13.33	.48	.31	.26	.35	.27	.42	5.31	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
3	72	59	62.66	45.33	.66	.54	.13	.17	.14	.20	2.42	Selected
4	64	34	52.00	12.00	.49	.32	.30	.40	.31	.46	8.86	Selected
5	72	44	62.66	20.00	.58	.41	.28	.43	.29	.44	6.03	Selected
6	38	30	17.34	6.67	.34	.12	.08	.10	.09	.25	2.14	
7	81	36	74.66	14.66	.59	.45	.45	.60	.47	.60	8.42	Selected
8	59	31	45.33	8.00	.45	.27	.28	.37	.29	.48	6.02	Selected
9	82	50	76.00	33.33	.66	.55	.32	.43	.36	.44	5.42	Selected
10	52	16	36.00	-12.00	.34	.18	.36	.36	.40	.00	12.40	
11	59	31	45.33	8.00	.45	.27	.28	.37	.29	.48	5.68	Selected
12	38	29	11.34	5.34	.34	.11	.09	.12	.10	.30	2.50	
13	30	33	6.67	10.67	.32	.08	.03	-.04	-.02	-.11	-1.05	
14	37	26	16.00	1.34	.32	.09	.11	.15	.13	.49	3.59	
XV 592												
XVII 62		43	49.33	24.00	.53	.37	.19	.25	.19	.27	3.63	
2	72	60	62.67	46.67	.66	.55	.12	.16	.13	.16	2.14	227
3	85	58	80.00	44.00	.72	.62	.27	.36	.31	.39	5.14	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
4	64	26	52.00	1.33	.45	.27	.38	.51	.39	.73	7.09	Selected
5	82	44	76.00	25.33	.63	.51	.38	.51	.41	.51	7.09	Selected
6	94	71	92.00	61.33	.83	.77	.23	.31	.39	.41	5.08	Selected
7	58	29	44.00	5.33	.44	.25	.29	.39	.30	.36	6.27	Selected
8	59	37	44.33	16.00	.48	.30	.22	.28	.22	.29	4.27	Selected
9	83	63	77.33	50.66	.73	.64	.20	.26	.22	.30	3.66	
10	83	62	77.33	49.33	.73	.63	.21	.28	.22	.32	3.06	
11	77	69	69.34	58.67	.73	.64	.08	.10	.04	.12	1.44	
12	95	70	93.33	60.00	.83	.77	.25	.33	.50	.46	5.39	Selected
13	98	88	97.33	81.00	.93	.90	.10	.16	.34	.31	2.93	
14	42	35	22.67	13.34	.34	.18	.07	.10	.08	.14	1.57	
15	83	54	77.33	38.66	.69	.58	.29	.38	.33	.40	4.28	Selected
16	31	29	8.00	5.34	.30	.07	.02	.03	.02	.07	0.42	
XVI 642												
17	84	54	68.00	8.00	.69	.57	.30	.22	.35	.23	7.57	Selected
2	94	85	88.00	70.00	.90	.79	.09	.18	.21	.26	3.00	

2200

1	2	3	4	5	6	7	8	9	10	11	12	13
3	71	51	0.42	2.00	.54	.22	.30	.40	.21	.63	6.72	Selected
4	86	68	.72	36.00	.77	.54	.18	.36	.25	.37	4.73	
5	86	70	0.72	40.00	.78	.38	.16	.32	.22	.33	4.36	
6	78	75	00.56	50.00	.77	.30	.03	.06	.05	.06	0.71	
7	73	58	.46	16.00	.66	.31	.15	.30	.21	.32	4.46	
8	78	51	0.56	2.00	.65	.29	.27	.54	.31	.71	8.28	Selected
9	89	67	0.78	11.00	.78	.40	.22	.67	.31	.67	10.47	Selected
10	76	51	52.00	+ 2.00	.69		.25	.50	.27	.69	10.42	Selected
11	88	71	76.00	42.00	.79	.59	.17	.34	.25	.36	4.71	
12	84	54	68.00	8.00	.69	.38	.30	.60	.35	.23	8.43	Selected
13	89	70	78.00	40.00	.80	.59	.19	.38	.29	.40	6.66	
14	91	64	82.00	28.00	.77	.55	.27	.54	.38	.54	7.57	Selected
15	88	62	76.00	24.00	.75	.50	.26	.52	.34	.52	7.28	Selected
XVII 12												
1	34	17	1.00	-24.50	.26	.05	.26	.01	.22	.00	0.00	22
2	46	38	19.00	7.00	.42	.13	.42	.12	.08	.39	2.20	29

1	2	3	4	5	6	7	8	9	10	11	12	13
3	48	25	22.00	-12.50	.37	.11	.37	.22	.24	.00	4.66	
4	60	49	41.50	23.50	.55	.24	.55	.18	.12	.20	2.83	
5	64	34	46.00	1.00	.46	.24	.48	.45	.31	.71	7.33	Selected
6	67	33	50.50	- 0.50	.50	.25	.50	.50	.33	.00	8.33	
7	50	28	25.00	- 8.00	.36	.13	.39	.25	.23	.00	8.00	
8	63	42	44.50	13.00	.26	.29	.53	.32	.21	.33	5.08	Selected
9	62	28	43.00	- 8.00	.45	.23	.45	.43	.35	.00	7.00	
1	50	27	25.00	- 9.50	.39	.13	.23	.13	.25	.00	5.80	
2	59	37	38.50	5.50	.48	.22	.22	.33	.22	.48	10.66	Selected
3	60	36	40.00	4.00	.48	.22	.24	.36	.25	.54	11.66	Selected
4	61	31	41.50	- 3.50	.46	.21	.30	.41	.31	.00	6.86	
5	50	42	25.00	13.00	.46	.24	.01	.12	.08	.33	2.00	
6	63	51	44.50	26.50	.57	.36	.12	.18	.13	.20	2.53	Selected
7	55	31	32.50	- 3.50	.43	.17	.24	.32	.25	.00	5.88	230
8	53	32	29.50	- 2.00	.43	.15	.21	.29	.22	.00	4.46	



	1	2	3	4	5	6	7	8	9	10	11	12	13
9	37	30	5.50	-	5.00	.34	.02	.07	.05	.08	.00	0.06	
1	57	31	35.50	-	3.50	.44	.18	.26	.36	.27	.00	6.18	
2	55	34	32.50	1.00	1.00	.44	.17	.21	.31	.22	.64	5.84	Selected
3	47	21	20.50	-18.50	-18.50	.34	.11	.26	.20	.29	.00	0.33	
4	57	42	35.50	13.00	13.00	.45.50	.24	.15	.23	.15	.31	6.11	Selected
5	45	31	17.50	-	3.50	.38	.09	.14	.18	.15	.00	5.55	
6	49	44	23.50	16.00	16.00	.46.50	.25	.05	.08	.05	.12	1.16	
7	63	31	44.50	-	3.50	.47	.23	.32	.45	.33	.00	8.38	
8	42	28	13.00	-	8.00	.35	.07	.14	.13	.15	.00	5.00	
9	60	43	40.00	14.50	14.50	.51	.27	.17	.26	.17	.32	4.00	Selected

(Chi-  
Value  
Row Scores)

XVIII 23

1	62	22	-	-	.42	.40	.42	.42	.42	.42	.42	5.59	231
2	40	06	-	-	.23	.34	.34	.34	.34	.34	.34	5.40	

1	2	3	4	5	6	7	8	9	10	11	12	13
3	44	06	-	-	.25	-	.38	-	.52	-	6.16	The whole
4	53	05	-	-	.29	-	.48	-	.62	-	7.34	test is
5	48	08	-	-	.28	-	.40	-	.51	-	6.50	dropped
6	49	03	-	-	.26	-	.46	-	.64	-	7.50	
7	51	07	-	-	.29	-	.44	-	.55	-	6.16	
8	54	04	-	-	.29	-	.50	-	.63	-	6.33	
9	43	04	-	-	.23	-	.39	-	.56	-	7.26	
10	10	01	-	-	.06	-	.09	-	.40	-	2.66	
11	41	05	-	-	.23	-	.36	-	.56	-	5.83	
12	52	08	-	-	.30	-	.44	-	.53	-	6.14	
13	56	05	-	-	.31	-	.51	-	.62	-	8.33	
14	13	01	-	-	.07	-	.12	-	.44	-	3.66	
XIX												
XII	79	31	-	-	.55	-	.48	-	.49	-	6-71	Selected
2	31	36	-	-	.58	-	.45	-	.47	-	5.85	Selected
3	73	28	-	-	.51	-	.45	-	.45	-	6.28	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
41	80	30	-	-	.55	-	.50	-	.51	-	7.00	Selected
5	83	33	-	-	.58	-	.50	-	.49	-	7.00	Selected
6	61	13	-	-	.37	-	.48	-	.51	-	6.71	Selected
7	77	43	-	-	.60	-	.34	-	.37	-	4.71	Selected
8	78	27	-	-	.53	-	.51	-	.51	-	7.14	Selected
9	61	26	-	-	.44	-	.35	-	.37	-	4.85	Selected
10	27	2	-	-	.15	-	.25	-	.60	-	5.80	
Chi-value Corrected Scores												
XXII	69	61	38.00	22.00	.65	.30	.08	.16	.09	.19	3.00	
2	61	40	22.00	-20.00	.51	.11	.21	.22	.21	.00	4.20	
3	63	35	26.00	-30.00	.49	.13	.28	.26	.29	.00	5.00	
4	72	49	44.00	- 2.00	.61	.22	.23	.44	.24	.00	7.16	
5	72	58	44.00	16.00	.65	.30	.14	.28	.15	.33	4.23	Selected
6	81	70	62.00	40.00	.76	.51	.11	.22	.15	.22	3.00	Selected
7	69	51	38.00	2.00	.60	.20	.18	.36	.19	.61	5.83	Selected
8	82	54	64.00	8.00	.68	.36	.28	.56	.32	.61	8.14	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
9	69	58	38.00	16.00	.64	.27	.11	.22	.12	.28	3.50	Selected
10	86	69	72.00	38.00	.78	.55	.17	.34	.24	.35	4.71	Selected
11	76	56	52.00	12.00	.66	.32	.20	.40	.22	.46	5.50	Selected
12	70	56	40.00	12.00	.63	.26	.14	.28	.13	.36	4.50	Selected
13	62	56	24.00	12.00	.59	.18	.06	.12	.06	.19	2.20	
14	57	38	14.00	-14.00	.48	.07	.19	.14	.19	.00	3.25	
15	44	30	-12.00	-40.00	.37	.00	.14	.00	.15	.00	0.00	
16	78	57	22.00	-14.00	.68	.11	.21	.08	.24	.12	1.16	
17	51	47	2.00	- 6.00	.49	.01	.04	.02	.05	.00	1.00	
18	51	32	2.00	-36.00	.42	.01	.19	.02	.20	.00	1.00	
19	54	40	8.00	-20.00	.47	.04	.14	.08	.14	.00	0.08	
20	50	34	0.00	-32.00	.42	-.16	.16	.00	.17	.00	0.00	

Chi-value  
Raw Scores

234

XXI 1 34 9  
2 52 44

.38 - 4.00  
.08 - 1.00

1	2	3	4	5	6	7	8	9	10	11	12	13
3	68	41	-	-	.54	-	.27	-	.27	-	3.71	Selected
4	59	19	-	-	.39	-	.40	-	.43	-	5.57	
5	68	23	-	-	.46	-	.45	-	.46	-	6.28	
6	77	32	-	-	.54	-	.45	-	.46	-	6.28	Selected
7	63	22	-	-	.43	-	.41	-	.42	-	5.71	Selected
8	77	29	-	-	.53	-	.48	-	.47	-	6.71	Selected
9	79	63	-	-	.71	-	.16	-	.06	-	2.50	
10	89	56	-	-	.72	-	.33	-	.39	-	5.25	
11	77	27	-	-	.52	-	.50	-	.49	-	7.00	Selected
12	82	50	-	-	.66	-	.32	-	.36	-	4.42	Selected
13	72	13	-	-	.43	-	.59	-	.60	-	8.28	Selected
14	52	11	-	-	.31	-	.41	-	.48	-	6.15	
15	73	40	-	-	.56	-	.33	-	.30	-	4.57	Selected
XXII 22												
11	64	18	-	-	.41	-	.46	-	.48	-	6.42	23
2	63	15	-	-	.39	-	.48	-	.50	-	6.71	51

1	2	3	4	5	6	7	8	9	10	11	12	13
3	49	6	-	-	.28	-	.43	-	.55	-	9.16	
4	71	17	-	-	.44	-	.54	-	.54	-	7.57	Selected
5	70	24	-	-	.47	-	.46	-	.46	-	15.66	Selected
1	85	30	-	-	.58	-	.55	-	.56	-	7.71	Selected
2	68	19	-	-	.44	-	.49	-	.50	-	6.85	Selected
3	79	22	-	-	.61	-	.57	-	.56	-	8.00	Selected
4	81	39	-	-	.60	-	.42	-	.43	-	6.71	
5	45	11	-	-	.28	-	.34	-	.40	-	5.50	
6	64	14	-	-	.39	-	.50	-	+.50	-	7.00	
7	44	11	-	-	.28	-	.33	-	.41	-	5.33	
1	78	33	-	-	.56	-	.45	--	.46	-	6.28	
2	70	21	-	-	.46	-	.49	-	.50	-	6.85	Selected
3	56	17	--	-	.37	-	.39	-	.42	-	5.42	236
4	71	27	-	-	.49	-	.44	-	.44	-	6.14	6

1	2	3	4	5	6	7	8	9	10	11	12	13
5	46	05	-	-	.26	-	.41	-	.55	-	6.66	
6	84	26	-	-	.55	-	.58	-	.58	-	8.14	Selected
7	61	13	-	-	.37	-	.48	-	.64	-	6.71	
8	74	31	-	-	.53	-	.43	-	.57	-	6.00	Selected
9	49	05	-	-	.27	-	.44	-	.58	-	7.14	
10	54	08	-	-	.31	-	.46	-	.58	-	7.50	
XXIII 203												
X17	67	26	-	-	.46	-	.41	-	.55	-	5.71	Selected
2	67	45	-	-	.56	-	.22	-	.29	-	3.00	Selected
3	74	45	-	-	.59	-	.29	-	.39	-	4.00	Selected
4	61	20	-	-	.40	-	.41	-	.55	-	5.71	Selected
5	54	20	-	-	.37	-	.34	-	.45	-	4.71	
6	61	34	-	-	.47	-	.27	-	.36	-	3.71	Selected
7	34	10	-	-	.22	-	.24	-	.32	-	3.71	231
8	54	04	-	-	.29	-	.50	-	.62	-	8.16	
9	78	36	-	-	.57	-	.42	-	.56	-	5.85	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
10	35	09	-	-	.22	-	.26	-	.35	-	3.98	
11	53	26	-	-	.40	-	.27	-	.36	-	3.71	
12	81	45	-	-	.63	-	.36	-	.08	-	5.00	
13	76	52	-	-	.64	-	.24	-	.32	-	3.28	Selected
14	74	47	-	-	.60	-	.27	-	.36	-	3.71	Selected
15	32	10	-	-	.21	-	.22	-	.29	-	3.50	
XXIV 218												
1	80	37	-	-	.58	-	.43	-	.57	-	6.00	Selected
2	91	53	-	-	.72	-	.38	-	.51	-	5.28	Selected
3	77	50	-	-	.63	-	.27	-	.36	-	3.85	Selected
4	22	12	-	-	.17	-	.10	-	.22	-	1.80	
5	31	14	-	-	.22	-	.17	-	.23	-	2.66	
6	71	33	-	-	.52	-	.38	-	.51	-	5.28	Selected
7	58	28	-	-	.43	-	.30	-	.40	-	4.14	Selected
8	38	10	-	-	.24	-	.28	-	.37	-	4.50	

22  
23  
28



1	2	3	4	5	6	7	8	9	10	11	12	13
9	72	51	-	-	.61	-	.21	-	.28	-	2.85	Selected
10	65	36	-	-	.51	-	.29	-	.38	-	4.00	Selected
11	35	12	-	-	.24	-	.23	-	.31	-	3.66	
12	62	20	-	-	.41	-	.42	-	.44	-	5.85	
13	38	11	-	-	.24	-	.27	-	.36	-	5.20	
14	46	21	-	-	.33	-	.25	-	.28	-	3.42	
15	63	39	-	-	.49	-	.24	-	.25	-	3.28	Selected
XXV ୧୧୧												
1	51	39	-	-	.45	-	.12	-	.14	-	1.57	
2	46	23	-	-	.35	-	.23	-	.26	-	3.14	Selected
3	27	01	-	-	.18	-	.18	-	.60	-	5.00	
4	33	17	-	-	.25	-	.16	-	.15	-	2.50	
5	62	26	-	-	.44	-	.36	-	.37	-	5.00	Selected
6	60	26	-	-	.33	-	.34	-	.35	-	4.71	Selected
7	58	26	-	-	.42	-	.32	-	.33	-	4.42	Selected
8	44	28	-	-	.36	-	.16	-	.17	-	2.14	

1	2	3	4	5	6	7	8	9	10	11	12	13
9	57	27	-	-	.42	-	.30	-	.30	-	4.14	Selected
10	54	18	-	-	.36	-	.36	-	.39	-	5.00	Selected
11	44	18	-	-	.31	-	.26	-	.30	-	3.57	
12	52	26	-	-	.39	-	.26	-	.28	-	3.57	Selected
13	66	61	-	-	.64	-	.05	-	.05	-	0.57	
14	60	31	-	-	.46	-	.29	-	.30	-	4.00	
15	38	18	-	-	.28	-	.20	-	.25	-	3.16	
XXVI. 1	83	55	-	-	.64	-	.28	-	.32	-	3.85	Selected
25 2	31	44	-	-	.38	-	.13	-	-.14	-	-2.00	
3	66	31	-	-	.49	-	.35	-	.36	-	4.85	Selected
4	64	39	-	-	.52	-	.25	-	.26	-	3.42	Selected
5	68	44	-	-	.56	-	.24	-	.25	-	3.28	Selected
6	73	48	-	-	.61	-	.25	-	.27	-	3.42	Selected
7	69	48	-	-	.59	-	.21	-	.22	-	2.85	Selected
8	51	36	-	-	.44	-	.15	-	.16	-	2.00	

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13
8	41	08	-	-	.24	-	.33	-	.51	-	5.33	Selected
9	51	18	-	-	.34	-	.33	-	.37	-	4.57	Selected
10	52	12	-	-	.32	-	.40	-	.46	-	5.57	Selected
11	41	04	-	-	.22	-	.37	-	.55	-	6.33	Selected
12	22	02	-	-	.12	-	.20	-	.48	-	3.80	
13	14	02	-	-	.08	-	.12	-	.37	-	2.75	
14	59	28	-	-	.43	-	.31	-	.32	-	4.28	
15	80	54	-	-	.67	-	.26	-	.29	-	3.57	
16	68	32	-	-	.50	-	.36	-	.37	-	5.00	
XXVIII 212												
XIX	61	20	-	-	.40	-	.41	-	.43	-	5.71	
2	57	22	-	-	.39	-	.35	-	.37	-	4.85	
3	59	31	-	-	.45	-	.28	-	.29	-	3.85	
4	81	38	-	-	.64	-	.33	-	.35	-	4.57	Selected
5	79	59	-	-	.69	-	.20	-	.24	-	2.71	
6	44	05	-	-	.29	-	.39	-	.55	-	6.33	

2  
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2  
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2

1	2	3	4	5	6	7	8	9	10	11	12	13
7	68	35	-	-	.51	-	.33	-	.32	-	4.57	Selected
8	85	50	-	-	.67	-	.35	-	.41	-	4.85	Selected
9	73	30	-	-	.51	-	.43	-	.43	-	6.00	Selected
10	68	49	-	-	.58	-	.19	-	.20	-	2.57	
11	43	16	-	-	.29	-	.27	-	.32	-	3.71	
12	81	46	-	-	.63	-	.35	-	.38	-	4.85	Selected
13	69	42	-	-	.55	-	.27	-	.28	-	3.71	
14	56	24	-	-	.40	-	.32	-	.34	-	4.42	
15	59	27	-	-	.43	-	.32	-	.33	-	4.42	
16	82	50	-	-	.66	-	.32	-	.36	-	4.42	Selected
17	75	71	-	-	.73	-	.04	-	.07	-	0.50	
18	68	46	-	-	.57	-	.22	-	.23	-	3.00	
19	36	09	-	-	.27	-	.27	-	.38	-	4.33	
20	63	21	-	-	.42	-	.42	-	.42	-	5.85	

1	2	3	4	5	6	7	8	9	10	11	12	13
XXIX 212												
1	38	11	--	-	.25	-	.27	-	.36	-	4.50	
2	40	08	-	-	.24	-	.32	-	.44	-	5.16	
3	51	23	-	-	.38	-	.28	-	.32	-	5.27	
4	41	03	-	-	.22	-	.38	-	.60	-	6.16	
5	28	03	-	-	.16	-	.25	-	.48	-	5.80	
6	52	23	-	-	.37	-	.29	-	.32	-	4.00	
7	42	14	-	-	.28	-	.28	-	.34	-	4.50	
8	47	05	-	-	.26	-	.42	-	.63	-	6.83	
9	54	15	-	-	.35	-	.39	-	.44	-	7.60	
10	32	07	-	-	.20	-	.25	-	.35	-	4.00	
11	20	03	-	-	.12	-	.17	-	.41	-	3.20	
12	15	01	-	-	.08	-	.14	-	.45	-	3.25	
13	25	05	-	-	.15	-	.20	-	.37	-	2.71	244
14	35	04	-	-	.20	-	.31	-	.50	-	5.00	
15	09	03	-	-	.06	-	.06	-	.19	-	1.25	

1	2	3	4	5	6	7	8	9	10	11	12	13
16	11	10	-	-	.10	-	.01	-	.09	-	0.00	
17	13	01	-	-	.07	-	.12	-	.42	-	2.75	
18	07	01	-	-	.04	-	.06	-	.33	-	1.66	
19	00	00	-	-	.00	-	.00	-	.00	-	0.00	
20	07	00	-	-	.04	-	.07	-	.00	-	2.00	
XXX1 1	36	15	-	-	.26	-	.21	-	.27	-	3.33	
2	82	47	-	-	.65	-	.35	-	.49	-	4.85	
3	32	21	-	-	.26	-	.11	-	.14	-	1.66	
4	89	46	-	-	.62	-	.43	-	.49	-	6.00	Selected
5	53	18	-	-	.35	-	.35	-	.38	-	4.85	
6	73	19	-	-	.46	-	.54	-	.58	-	7.57	Selected
7	67	20	-	-	.43	-	.47	-	.48	-	6.57	Selected
8	82	42	-	-	.62	-	.40	-	.43	-	6.42	Selected
9	61	32	-	-	.46	-	.29	-	.30	-	4.00	
10	81	38	-	-	.54	-	.43	-	.46	-	6.00	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
11	69	28	-	-	.48	-	.41	-	.41	-	5.71	Selected
12	71	30	-	-	.50	-	.41	-	.41	-	5.71	Selected
13	77	42	-	-	.59	-	.35	-	.37	-	4.85	
14	55	22	-	-	.38	-	.33	-	.35	-	4.57	
15	80	44	-	-	.62	-	.36	-	.39	-	5.00	Selected
16	72	54	-	-	.63	-	.18	-	.19	-	2.41	
XXXI 1	31	06	-	-	.18	-	.25	-	.41	-	4.90	
2	72	31	-	-	.51	-	.41	-	.41	-	5.71	Selected
3	75	23	-	-	.49	-	.52	-	.52	-	7.28	Selected
4	41	05	-	-	.23	-	.36	-	.54	-	5.83	
5	30	09	-	-	.19	-	.21	-	.33	-	3.33	Selected
6	56	21	-	-	.38	-	.35	-	.38	-	4.85	Selected
7	25	08	-	-	.16	-	.17	-	.29	-	3.20	
8	64	27	-	-	.45	-	.37	-	.38	-	5.14	Selected

245



1	2	3	4	5	6	7	8	9	10	11	12	13
9	60	15	-	-	.37	-	.45	-	.49	-	6.28	Selected
10	78	75	-	-	.76	-	.03	-	.04	-	0.33	
11	42	08	-	-	.25	-	.34	-	.45	-	5.50	
12	46	09	-	-	.28	-	.37	<sup>47</sup> -	.47	-	6.00	
13	30	09	-	-	.20	-	.21	-	.33	-	3.33	
14	69	27	-	-	.48	-	.42	-	.39	-	5.86	Selected
15	26	05	-	-	.15	-	.21	-	.40	-	4.00	
XXXII: 1	66	15	-	-	.41	-	.41	-	.53	-	7.14	Selected
2	68	23	-	-	.46	-	.45	-	.46	-	6.28	Selected
3	84	53	-	-	.68	-	.31	-	.36	-	4.28	Selected
4	77	21	-	-	.49	-	.56	-	.56	-	7.85	Selected
5	50	08	-	-	.29	-	.42	-	.52	-	6.83	
6	49	09	-	-	.28	-	.40	-	.49	-	6.50	
7	29	08	-	-	.19	-	.21	-	.33	-	3.33	

247

1	2	3	4	5	6	7	8	9	10	11	12	13
8	54	26	-	-	.40	-	.28	-	.30	-	3.85	Selected
9	45	12	-	-	.28	-	.33	-	.40	-	5.33	
10	48	16	-	-	.32	-	.32	-	.34	-	4.42	
11	52	18	-	-	.35	-	.34	-	.38	-	4.71	Selected
12	59	34	-	-	.46	-	.25	-	.24	-	3.42	Selected
13	22	04	-	-	.13	-	.18	-	.38	-	3.40	
14	66	39	-	-	.52	-	.27	-	.28	-	3.71	Selected
15	47	13	-	-	.30	-	.34	-	.40	-	4.71	
XXXXIII 22												
1	48	35	-	-	.42	-	.13	-	.14	-	2.78	
2	52	26	-	-	.39	-	.26	-	.28	-	7.00	Selected
3	60	27	-	-	.42	-	.37	-	.34	-	6.83	Selected
4	37	20	-	-	.29	-	.17	-	.21	-	3.75	
5	53	26	-	-	.38	-	.29	-	.31	-	5.83	Selected
6	84	63	-	-	.73	-	.21	-	.27	-	4.02	Selected
7	50	28	-	-	.35	-	.31	-	.23	-	4.66	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
8	35	04	-	-	.26	-	.31	-	.50	-	3.00	
9	30	07	-	-	.18	-	.23	-	.38	-	1.66	
10	13	03	-	-	.08	-	.10	-	.35	-	0.00	
11	40	13	-	-	.26	-	.27	-	.35	-	5.00	
12	56	-26	-	-	.39	-	.34	-	.32	-	6.50	Selected
13	32	19	-	-	.25	-	.13	-	.17	-	2.66	
14	11	14	-	-	.12	-	-.03	-	-.06	-	0.00	
15	71	44	-	-	.57	-	.27	-	.28	-	5.30	Selected
16	30	10	-	-	.20	-	.20	-	.30	-	-2.00	
17	58	44	-	-	.51	-	.14	-	.14	-	2.75	
18	26	24	-	-	.25	-	.02	-	.03	-	0.00	
19	62	26	-	-	.44	-	.36	-	.38	-	7.70	Selected
20	43	07	-	-	.25	-	.36	-	.54	-	4.60	

1	2	3	4	5	6	7	8	9	10	11	12	13
<div> <div>XXXIV</div> <div>222</div> </div> <div>Chi-value (Corrected Scores)</div>												
1	73	32	64.00	9.34	.52	.36	.41	.55	.41	.60	8.06	Selected
2	41	09	21.34	-21.34	.25	.11	.32	.21	.42	.00	5.00	
3	80	39	73.34	18.66	.59	.45	.41	.55	.41	.55	7.50	Selected
4	94	62	92.00	47.34	.78	.70	.32	.45	.47	.54	3.18	
5	47	23	29.34	- 2.66	.35	.15	.24	.20	.26	.00	5.60	
6	67	27	56.00	2.66	.47	.29	.40	.53	.42	.71	8.66	
7	56	15	41.00	-13.33	.35	.21	.41	.41	.45	.00	6.66	
8	96	75	94.67	66.67	.85	.86	.21	.28	.41	.44	6.60	
9	60	46	46.67	28.00	.53	.37	.14	.19	.14	.17	2.64	
10	67	35	56.00	13.33	.51	.34	.32	.43	.21	.48	6.36	Selected
11	36	27	14.67	2.67	.31	.08	.09	.12	.08	.37	3.15	
12	90	68	86.67	57.34	.79	.71	.22	.30	.32	.35	4.64	250
13	77	32	69.33	9.34	.54	.39	.45	.60	.44	.61	8.55	Selected
14	55	22	40.00	-40.00	.38	.20	.33	.40	.35	.00	6.50	

1	2	3	4	5	6	7	8	9	10	11	12	13
15	86	56	81.33	41.34	.71	.61	.30	.40	.36	.41	5.70	Selected
16	72	26	62.66	1.33	.49	.32	.46	.62	.46	.75	9.38	Selected
17	36	34	14.66	12.00	.35	.13	.02	.03	.02	.04	0.08	
18	80	52	73.33	36.00	.66	.54	.28	.37	.31	.37	5.34	Selected
19	51	19	34.66	- 8.00	.35	.18	.32	.35	.34	.00	6.80	
20	83	75	77.33	66.66	.79	.71	.08	.10	.11	.12	1.91	
XXXV 1	69	51	38.00	2.00	.60	.20	.18	.36	.19	.61	5.83	Selected
2	52	10	4.00	-80.00	.31	.02	.42	.04	.50	.00	1.50	
3	62	21	24.00	-58.00	.41	.12	.41	.24	.43	.00	4.60	
4	70	53	40.00	6.00	.62	.23	.17	.36	.42	.48	5.16	Selected
5	62	54	24.00	8.00	.58	.16	.08	.12	.08	.33	3.00	
6	56	32	12.00	-36.00	.44	-.06	.24	.48	.25	.00	3.66	
7	31	21	-38.00	-58.00	.00	.00	.00	.00	.12	.00	0.00	
8	70	30	40.00	-40.00	.50	.20	.40	.40	.40	.00	6.50	
9	41	09	18.00	-32.00	.25	-.09	.32	.18	.42	.00	4.25	

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	1	2	3	4	5	6	7	8	9	10	11	12	13
10	76		54	52.00	8.00	.65	.30	.22	.44	.36	.53	7.16	Selected
1	53	26		44.00	1.00	.42	.23	.34	.43	.33	.70	7.33	Selected
2	69	45		58.66	26.66	.57	.43	.24	.32	.25	.33	4.42	Selected
3	63	58		50.66	44.00	.60	.47	.05	.07	.05	.06	0.85	
4	51	37		34.66	16.00	.44	.25	.14	.19	.15	.24	3.00	
5	18	30		- 9.33	6.66	.24	+.04	-.12	.07	-.16	.00	-2.66	
6	12	08		-17.33	-22.66	.10	-.00	.04	.00	.00	.00	0.00	
7	34	17		12.00	-10.66	.26	.06	.17	.12	.22	.00	3.66	
8	62	48		49.33	30.66	.55	.40	.14	.18	.15	.20	2.70	
9	47	34		29.33	12.00	.40	.20	.13	.17	.14	.25	2.77	
10	31	09		8.00	-22.66	.20	.04	.22	.08	.34	.00	2.33	
11	72	69		62.66	58.66	.70	.60	.03	.04	.03	.04	0.42	
252													
1	48	32		22.00	- 2.60	.40	.11	.16	.24	.17	.00	5.20	
2	61	34		41.60	1.00	.48	.22	.27	.40	.28	.69	6.66	Selected

1	2	3	4	5	6	7	8	9	10	11	12	13
3	37	30	5.60	- 5.00	.34	.03	.07	.11	.08	.00	1.66	
4	39	15	8.00	-27.50	.27	.04	.24	.35	.30	.00	2.33	
5	67	45	50.50	17.50	.56	.34	.22	.33	.23	.38	4.58	
6	66	44	49.00	16.00	.55	.33	.22	.33	.23	.38	5.33	Selected
7	82	69	73.00	53.50	.76	.68	.13	.19	.17	.21	2.55	
8	38	45	7.00	17.50	.42	.13	-.07	-.11	-.07	.00	-2.00	
9	73	34	59.50	1.00	.54	.31	.39	.59	.40	.77	6.66	Selected
10	52	26	28.00	-11.00	.39	.14	.26	.39	.28	.00	9.50	
XXXVI and												
4	64	47	52.00	29.74	.56	.40	.17	.23	.18	.25	3.40	The whole test is dropped.
5	37	28	16.00	4.00	.33	.10	.09	.12	.10	.30	2.90	
6	20	11	- 6.66	-18.66	.15	-.12	.09	.12	.17	.26	-2.76	
7	53	39	37.34	18.67	.46	-.22	.14	.18	.15	-.23	2.89	
8	15	8	-13.34	-22.66	.12	-.17	.07	.09	.15	-.34	-2.04	
9	38	25	17.34	0.00	.32	.08	.13	.17	.15	.00	4.21	
10	38	24	17.34	- 1.33	.31	.08	.14	.18	.16	-.49	4.72	

1	2	3	4	5	6	7	8	9	10	11	12	13
11	19	25	- 8.00	0.0	.22	-.04	-.06	-.08	-.08	.25	-3.21	
12	43	26	24.00	1.34	.35	.12	.17	.23	.16	-.57	4.78	
13	39	42	18.67	22.67	.41	.20	-.03	-.04	-.03	.06	-1.15	
14	22	19	- 4.00	- 8.00	.21	-.06	.03	.04	.05	.14	-1.51	
15	30	18	0.67	- 9.33	.24	-.01	.12	.10	.16	.08	-12.12	
16	41	34	21.34	12.00	-.38	-.16	.07	.09	.08	-.13	1.56	
17	32	17	9.34	-10.66	.25	-.10	.15	.20	.20	.05	-12.35	
XXXVII 22												
1	85	63	80.00	50.66	.74	.66	.22	.29	.28	.33	4.17	
2	71	44	61.34	25.33	.58	.43	.27	.36	.28	.36	5.00	
3	60	57	37.34	42.66	.68	.57	.03	-.05	.03	.32	5.68	
4	33	25	10.66	0.00	.29	.06	.08	.10	.09	.00	3.22	
5	78	35	70.66	13.33	.57	.41	.43	.58	.44	.58	8.38	Selected
6	86	50	81.33	33.33	.68	.57	.36	.48	.42	.48	6.71	Selected
7	13	11	-16.00	-18.66	.00	.00	.00	.00	.00	.00	0.00	

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1	2	3	4	5	6	7	8	9	10	11	12	13
8	87	61	82.86	48.00	.74	.65	.26	.35	.33	.38	5.07	
9	65	30	53.33	6.66	.48	.30	.35	.46	.36	.58	7.02	Selected
10	68	35	57.33	13.33	.52	.35	.33	.44	.34	.48	6.41	
11	39	22	18.66	- 4.00	.31	.10	.17	.19	.20	.00	4.50	
12	61	30	48.00	6.66	.46	.27	.31	.41	.32	.55	6.31	Selected
13	82	55	76.00	40.00	.68	.58	.27	.36	.31	.37	5.00	
14	37	10	16.00	-20.00	.23	.08	.27	.16	.37	.00	3.75	
15	78	28	70.66	4.00	.53	.37	.50	.67	.50	.72	8.33	Selected
16	17	19	-10.66	- 8.00	.18	-.00	.00	.00	-.00	.00	-0.00	
17	22	16	- 4.00	-12.00	.19	.00	.06	.00	.09	.00	-0.00	
18	67	40	56.00	20.00	.53	.38	.27	.36	.28	.39	5.14	
19	45	24	26.67	- 1.33	.34	.14	.21	.27	.23	-.00	5.20	
20	46	23	28.00	- 2.66	.34	.14	.23	.28	.26	.00	5.40	
21	66	39	54.66	18.66	.52	.36	.27	.36	.28	.43	5.14	Selected
22	69	27	58.67	2.67	.48	.30	.42	.56	.42	.72	8.59	
23	75	46	66.67	28.00	.60	.47	.29	.39	.31	.39	5.42	

1	2	3	4	5	6	7	8	9	10	11	12	13
24	63	43	50.67	24.00	.53	.37	.20	.27	.23	.28	3.82	
25	55	21	40.00	- 5.33	.38	.20	.34	.40	.36	.00	6.50	
26	67	42	56.00	22.67	.54	.39	.25	.33	.26	.36	4.63	
27	60	22	46.67	- 4.00	.41	.24	.38	.47	.40	.00	7.66	
28	41	17	21.37	-10.66	.29	.11	.24	.21	.26	.00	5.00	
29	72	42	62.66	22.66	.57	.42	.30	.40	.31	.42	5.59	Selected
30	74	33	65.33	10.66	.53	.37	.31	.54	.41	.59	7.79	Selected
31	49	28	32.00	4.00	.38	.18	.21	.28	.22	.48	5.09	
XXXVIII 245												
1	74	76	65.34	68.00	.75	.66	-.02	-.03	-.03	.02	+0.03	
2	61	26	48.00	+ 1.33	.44	.25	.35	.47	.36	.72	7.66	Selected
3	72	50	62.68	33.33	.61	.47	.22	.29	.23	.30	4.00	Selected
4	64	31	52.00	8.00	.47	.30	.33	.44	.31	.53	7.53	Selected
5	46	24	28.00	- 1.33	.35	.14	.22	.28	.24	.00	5.40	
6	41	24	21.33	- 1.33	.32	.11	.17	.21	.19	.00	5.00	

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1	2	3	4	5	6	7	8	9	10	11	12	13
7	71	35	61.33	13.33	.53	.37	.36	.48	.35	.51	6.91	Selected
8	51	34	34.67	12.00	.42	.23	.17	.23	.18	.30	3.66	
9	83	54	77.33	38.33	.68	.57	.29	.39	.33	.40	5.42	Selected
10	77	35	69.33	13.33	.56	.41	.42	.56	.46	.57	7.97	Selected
11	85	81	80.00	74.67	.83	.77	.04	.05	.06	.08	0.67	
12	13	18	-16.00	- 9.33	.00	- .00	.00	- .00	- .00	.00	0.00	
13	12	19	-17.33	- 8.00	.00	- .00	.00	- .00	- .00	.00	0.00	
14	30	22	6.67	-26.00	.26	-.04	.08	.07	.10	.00	2.00	
15	44	30	25.34	6.67	.37	.15	.14	.18	.15	.32	5.40	
16	10	12	-20.00	-17.33	.00	- .00	.00	- .00	- .00	.00	0.00	
17	51	24	34.67	- 1.33	.37	.18	.27	.35	.29	.00	6.80	
18	59	37	45.34	16.00	.48	.30	.22	.29	.22	.34	4.11	
19	39	10	18.67	-20.00	.24	.10	.29	.18	.39	.00	4.50	
20	80	50	73.33	33.33	.65	.53	.30	.40	.33	.46	5.55	Selected

	1	2	3	4	5	6	7	8	9	10	11	12	13
21	59	23	23	45.33	4.00	.43	.24	.31	.41	.32	.57	5.71	Selected
22	37	10	10	16.00	-20.00	.23	.08	.27	.16	.39	.00	3.75	
23	58	45	45	44.00	26.67	.51	.35	.13	.17	.13	.20	2.35	

Note: The corrected scores having minus (-) signs in columns three and four have been considered as one score zero.

which the correct answer to the item is marked by equal proportions of the two criterion groups will have the proportion of the high scoring criterion group marking the correct answer.

In this study, Chi is computed with the following two formulas:

$$\text{Chi} = \frac{RH - RL - 1}{R_T \left( 1 - \frac{RT}{NT - NRT} \right)}$$

(in case number of examinees in high scoring group is greater than the lower group)

and

$$\text{Chi} = \frac{RH - RL + 1}{R_T \left( 1 - \frac{RT}{NT - NRT} \right)}$$

(in case the number of examinees in the high scoring group who mark the item correctly is smaller).

Where: RH = the number of examinees in the high scoring group who mark the item correctly.

RL = the number of examinees in the low scoring group who mark the item correctly.

$$R_T = R_H + R_L$$

NT = the number of examinees in the high scoring and low scoring groups.

NRT = the number of examinees in the high scoring and low scoring groups who do not reach the item in the time limit. (In this study it is taken up as those who do not answered. Because instruction was given to answer all items as far as possible).

The Chi is applied to only corrected scores. Here, higher the numerical value of Chi, the higher index of discrimination is indicated. In this study items with higher discriminative powers are selected. As Ebel (40,364) puts, "It goes without saying that no special effort should be made to secure a spread of item discrimination indices. The higher the better."

#### Difficulty Value

The index of difficulty value of a test item reflects the property of the individual item and also the ability of the group responding to the item. So in selecting the item, difficulty values are also mentioned. From the point of view of Garrett: "An item with difficulty index of .50 brings about more individual differences than harder or easier items..... Other things being equal,

items of moderate difficulty (40 - 50 - 60 per cent) are to be preferred to those which are much easier or much harder." Usually item correlations are high in achievement tests and talent range wide the difficulty indices may range from high to low. So, the difficulty indices within narrow range may of course be taken from the normal curve. From the point of view of Lindquist, "the maximum discrimination among all the numbers of a group may be obtained when the items in a test are uncorrelated by using all items of 50 per cent difficulty, but when the items are perfectly correlated, the items should be spread over the range of difficulty. However, the items in a test are never found to be either wholly uncorrelated or perfectly correlated."

In this study, difficulty value was computed on corrected as well as with row scores. It was calculated by averaging the two percentages of the top and bottom groups. The higher numerical value of the index of difficulty, the easier the item and vice versa, as observed from the formula:

$$\frac{R_u + R_l}{N}$$

Where:  $R_u$  = number of items correct in upper group  
 $R_l$  = number of items <sup>correct</sup> in lower group  
 $N$  = total number of pupils in both the groups.

Selection of the Item

After calculating all these values, items were selected. Again there are differences about the acceptable validity (discrimination) and difficulty indices. From the point of view of Garrett (51,368), "As a general rule, items with validity indices of .20 or more are regarded as satisfactory; but items with lower indices will often serve (the purpose) if the test is long. Items having zero validity are of course useless. These items and items having negative validity must be discarded; or must be carefully examined for ambiguities, inaccuracies and other errors".

Ebel (40, p. 364) suggests the indices of item discrimination can be evaluated on these terms:

<u>Index of Discrimination</u>	<u>Item Evaluation</u>
1. .40 and up	Very good items
2. .30 to .39	Reasonably good but possibly subject to improvement.
3. .20 to .29	Marginal items usually needing and being subject to improvement.
4. Below .19	Poor items, to be rejected or improved by revision.



If we take into consideration the difficulty values calculated on the basis of raw scores many times we get low difficulty values of the same item but are with higher discriminative powers with corrected scores. So the items with equally high discriminative powers and with difficulty value nearer to .50 have been selected within the test. For example, two items of which one has .40 and .30 difficulty value calculated on raw scores and corrected scores respectively and has .34 discriminative value; and other one has .45 and .32 difficulty value calculated on raw scores and corrected scores and has .30 discriminative value; then, the second one has been chosen.

The Table 1 shows the various discrimination values and difficulty values calculated by various methods.

It will be seen from Table 1 that Chi-value of all the selected items are highly significant. If we apply only that criteria they are fit to be selected.

Again with corrected scores difficulty values are decreasing as compared with those for raw scores and discrimination values, biserial 'r' are increasing with corrected scores as compared with those for raw scores.

So, if we select the items considering difficulty

values calculated with corrected scores, we have lower difficulty values i.e. more difficult items but with better discriminative power. (With raw scores the difficulty value is higher and discrimination value lower). So items with higher discriminative powers within the test have been selected. Any item with zero validity or ~~a~~ negative validity has been discarded. On the whole items selected are those with difficulty value ranging from .19 to .84 for raw scores and from .11 to .79 for corrected scores; yet attempt has been made to choose items so as to cluster nearer to 50 per cent.

Again the items selected are those with discrimination values ranging from .10 to .63 for raw scores and .10 to .72 for corrected scores. Biserial 'r' read from the Flanagan's (130, pp. 348-351) table for raw scores ranges from .12 to .58 and for corrected scores .15 to .79. The lowest Chi-value for raw scores ranges from 2.85 to 15.66 and for corrected scores from 1.94 to 15.50. In fact, no item with minus Chi-value or non-significant value has been selected. The best items as described above has been selected within each test. Table 1 also shows all these values and the selected items.

All these selected items (questions) were again scrutinized from the point of view of appropriateness of distractors. Out of selected items (questions) any

distractor which had zero frequency in both the groups or frequency having more than the frequency of the correct answer were reframed and retested in a class of 45 pupils of Std. VIII, till they satisfied the criteria. The number of items which needed change (pilot form) with their relative placement in the final form is given below.

TABLE 2

Modified Distractors from Selected  
Questions from Piloted Test with Their  
Placement in the Final Form

Pilot Form				Final Form		
Sr. No.	Subtest No.	Question No.	Distractor No.	Form No.	Subtest No.	Question No.
1	1 ( )	15	2	B (2)	1	2
2	9 ( )	3	3	A (1)	7	1
3	9 ( )	7	all	B (2)	7	2
4	9 ( )	10	3 & 4	A (1)	7	3
5	9 ( )	12	4	A (1)	7	2
6	13 ( )	4	2	A (1)	12	1

This gives us the best items within the subtests for the final test. It will be seen from the Table No. 1 that two tests have been dropped.

✓ I. The test No. 18 ( ) have been dropped due

to two reasons:

1. Though, all the items had good discriminative values in this test (seen from Columns No. eighth and tenth) and significant Chi-values it will be seen from the Column No. sixth that the difficulty values of all the items in the test ranges from .06 to .31 which reveals that the whole test is a difficult test with comparison to other tests.

2. Secondly, while administering the test, it was observed that too difficult task to be done made most of the students inattentive and lose interest. As a result most of them stopped the work.

It will be seen from the Table No. 1 (subtest No. 18 ) that 50 per cent of the items of the test has not been attempted by even 50 per cent of the pupils.

✓ II. The test No. 36 ( ) has been dropped due to following two reasons:

1. It will be seen from the Table No. 1 (p. 209) subtest No. 36 ( ) that it was very difficult to select any satisfactory item applying all the criteria used for selecting the items of the other tests. Most of the items in this test either have negative chi-value or has negative discriminative or have very low difficulty index.

2. Secondly, while administering the test it was observed that any test items based on Gujarati alphabets

were difficult to solve by this group.

So this test is also dropped.

Thus, in the pilot study there were in all 38 subtests. Out of these 38 subtests two tests were dropped. So remaining 36 are given below in Table No. 3.

TABLE 3  
The Final Form of the Test

Index No.	Name of the Subtest	Pilot No.
1	<u>LDS Tests</u>	
1	General Significance	1
2	Story (Robinhood)	2
3	Poem	3
4	Talk - Uses of Sun Power	4
5	Drama/Dialogue	5
6	Noting - Details	6
7	Anecdote	7
8	Talk (giving directions)	8
9	Inference	9
10	Narration	10
11	Accuracy of Ideas	11
12	Vocabulary	12
13	Talk (Boys')	13
14	Talk (Girls')	14
15	Story (Fox & Goat)	15

TABLE 3 (Contd.)

Index No.	Name of the Subtest	Pilot No.
<u>Attention Tests</u>		
16	Triplet Numbers	16
17	Letter Lists	17
18	Five Digits	19
19	Phonetic Variations	20
<u>Memory Tests</u>		
20	Sentence Writing	21
21	Sentence Completion (Immediate)	22
22	Sentence Completion (Late)	23
23	Consequences	24
24	Word - Recall	25
25	Number Recall	26
26	Letter Span	27
<u>Auditory Resistance Tests</u>		
27	Delayed Spellings	28
28	Musical Lines	29
29	Haphazard Speech	30
30	Illogical Grouping	31
31	Illogical Grouping	32

TABLE 3 (Contd.)

Index No.	Name of the Subtest	Pilot No.
<u>Reasoning Tests</u>		
32	Letter Grouping (Nonsense)	33
33	Letter Grouping (Meaningful)	34
34	General Reasoning Problems	35
35	Word Finding	37
36	Arithmetical Reasoning	38

#### VII. TWO FORMS OF THE TEST

It will be seen from the foregoing Table 3 that the whole test was too lengthy. So it was thought fit to divide all the tests so as to create two parallel forms. <sup>which was otherwise not possible</sup> The final form of the whole test battery consisted of 36 tests. These tests were divided into two forms A and B, as given in Table 4, bearing following points in view:

1. Two forms will have equal number of tests.
2. Each sub-tests will have equal number of questions to be attempted by pupils.
3. Each subtest will have same form of questions.
4. Each subtest will consist of similar mental

processes to be employed.

5. Each subtest will have same directions.
6. Each subtest will be of same average difficulty level.
7. Each form will have equal timings.

TABLE NO. 4
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It will be seen from the Table 4 that each form consists of equal number of subtests, equal number of items to be attempted in each kind of subtest in each form. All the divisions of the tests have almost the same difficulty level. The maximum difference is only of .05.

Each form of the test consists of 180 items giving maximum score of 180.

After dividing the whole test into two forms, they were separately recorded on Indian tape-recorder and reproduction of the test was done on Japan-make domestic tape-recorder with A.C./D.C. currents, number RQ.1945. An independent, attachable amplifier was also used.

Both the forms of the final test took almost hr. 3 - 30 min., it included the time, for general



TABLE 4

Description of Final Form of the Test - Forms A & B  
of the Final Battery

/ Test

Sr. No.	Name of the Test	Form A			Form B		
		Total No. of the test	Total No. of the questions	Average difficulty of the whole test	Total No. of the test	Total No. of the questions	Average difficulty of the whole test
I- <u>LDS Tests</u> (9)							
1	2 - Stories (8 selected questions in each)	1	(8)	(.58)	1	(8)	(.60)
2	3 - Talks (8 selected questions in each)	2	(16)	(.59) (.59)	2	(16)	(.59) (.59)
4	Inference (8 selected questions)	1	(4)	(.72)	1	(4)	(.71)
5	Accuracy of Ideas (8 selected items)	1	(4)	(.59)	1	(4)	(.53)
6	General Significance (8 selected items)	1	(4)	(.50)	1	(4)	(.50)
7	Noting Details (8 selected items)	1	(12)	(.54)	1	(12)	(.56)
8	2- Small Stories	1	(8)	(.60)	1	(8)	(.55)
9	Poem & Drama	1	(8)	(.57)	1	(8)	(.53)
II - <u>Vocabulary Tests</u> (4)							
(8 selected items in each subtest)							
10	Synonyms	1	(4)	(.53)	1	(4)	(.53)
11	Antonyms	1	(4)	(.59)	1	(4)	(.64)
12	Idioms	1	(4)	(.61)	1	(4)	(.62)
13	Proverbs	1	(4)	(.51)	1	(4)	(.50)
III - <u>Attention Tests</u> (4)							
(8 selected items in each subtest)							
14	Trillet Numbers	1	(4)	(.68)	1	(4)	(.69)
15	Letter List	1	(4)	(.44)	1	(4)	(.44)
16	Five Letters	1	(4)	(.55)	1	(4)	(.54)
17	Phonetic Variations	1	(4)	(.54)	1	(4)	(.55)

Sr. No.	Name of the Test	Form A			Form B		
		Total No. of the test	Total No. of the questions	Average difficulty of the whole test	Total No. of the test	Total No. of the questions	Average difficulty of the whole test
IV - Memory Tests (7)							
18	Sentence Writing	1	(4)	(.56)	1	(4)	(.56)
19	Consequences	1	(4)	(.54)	1	(4)	(.53)
20	Sentence Completion	1	(4)	(.54)	1	(4)	(.54)
21	Sentence Completion (Late)	1	(4)	(.56)	1	(4)	(.56)
22	Word-Recall	1	(12)	(.40)	1	(12)	(.40)
23	Number-Recall	1	(12)	(.53)	1	(12)	(.54)
24	Letter Span	1	(4)	(.33)	1	(4)	(.32)
V - Auditory Resistance Tests(5)							
25	Delayed Spelling	1	(4)	(.54)	1	(4)	(.55)
26	Singing	1	(4)		1	(4)	
27	Haphazard Speech	1	(4)	(.54)	1	(4)	(.54)
28	Illogical Grouping	1	(4)	(.43)	1	(4)	(.43)
29	Illogical Grouping	1	(4)	(.48)	1	(4)	(.47)
VI - Reasoning Tests (5)							
30	Letter Grouping	1	(4)	(.46)	1	(4)	(.46)
31	Word Grouping	1	(4)	(.56)	1	(4)	(.56)
32	Solving Problems	1	(4)	(.52)	1	(4)	(.52)
33	Word Finding	1	(4)	(.55)	1	(4)	(.55)
34	Arithmetical Reasoning	1	(4)	(.55)	1	(4)	(.55)

instruction, for instruction of each subtest, for the 'pause' for reading and writing the answers of the items. The 'pause' ranged from five seconds to 15 seconds depending upon the task to be done. The gap of 5 to 10 seconds was also given for rest and changing page of answer sheets.

and booklet

The answer sheet (see Appendices 4&5) of the final forms were then given for printing. In answer sheets only distractors in case of multiple choice items and blanks for different types of tasks are provided.

It was observed during pilot work that the separate answer sheets and the separate booklet containing distractors took more time especially in responding to LDS test items. So to decrease the timings of the administration of the test, the distractors including correct answers were supplied in the answer sheets of the final forms of the test.

Thus, the two parallel forms with 180 questions in each were developed as described above and were administered to almost 2,000 pupils, including boys and girls in five cultures of rural and urban areas of Gujarat. After discarding incomplete answer sheets of the forms A and B, 1905 answer sheets in form A and 1943 answer sheets in form B were available for analysis. The scores on these were analysed for different types of norms. The whole procedure is described in the next chapter.