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An investigation into educational and occupational differences in test performance on a battery of adaptability tests for Africans

De Ridder, Jacobus Celicourt

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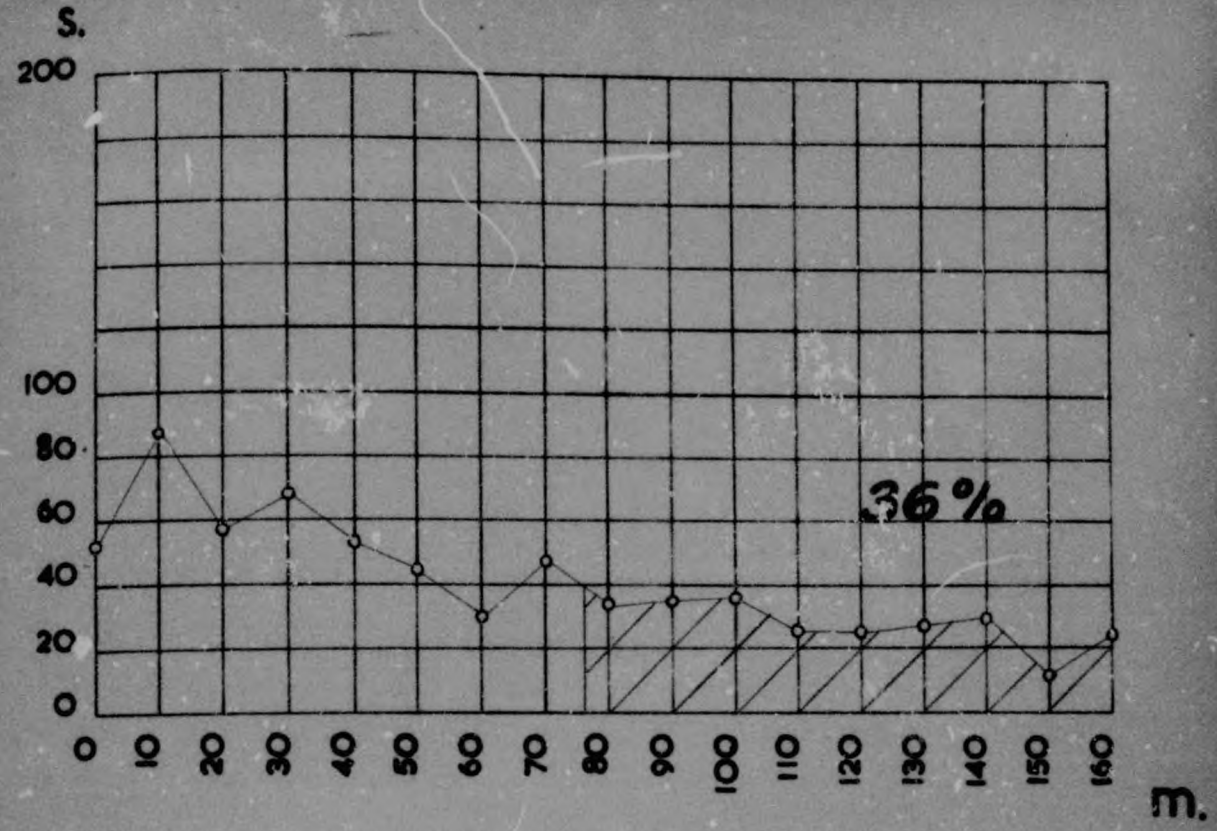

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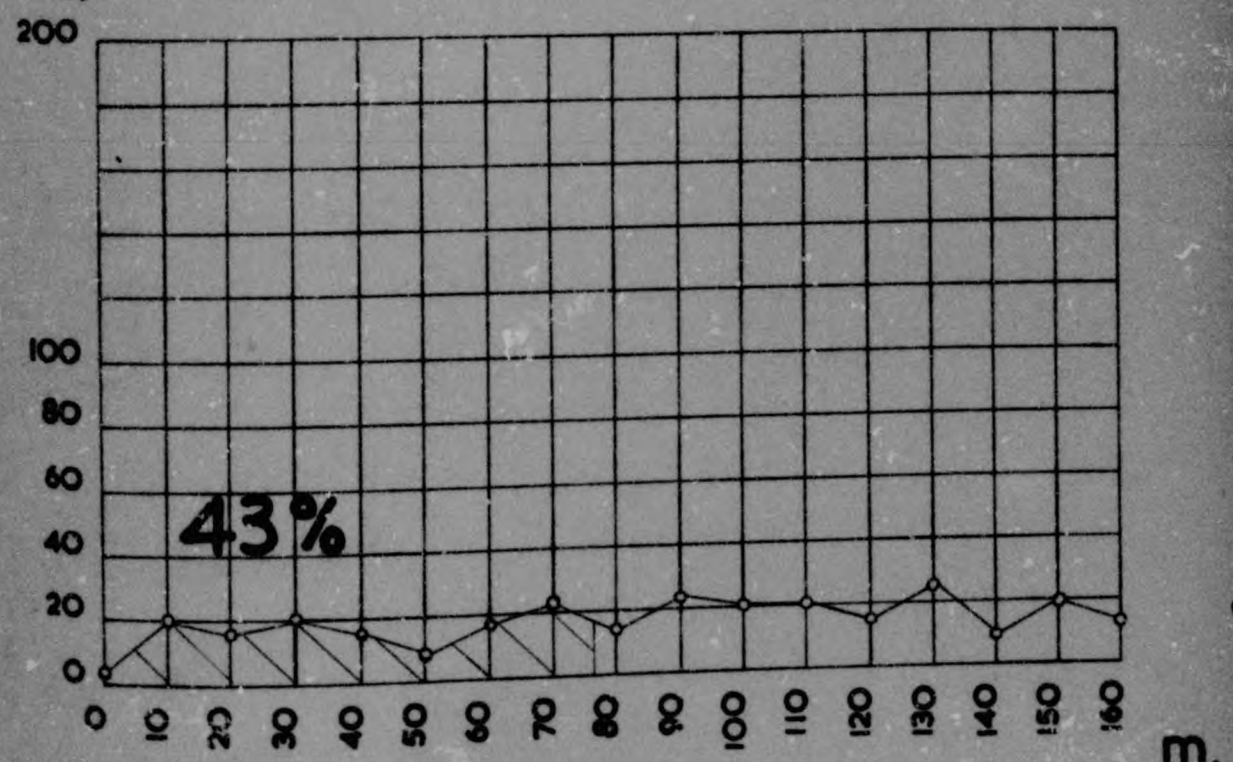
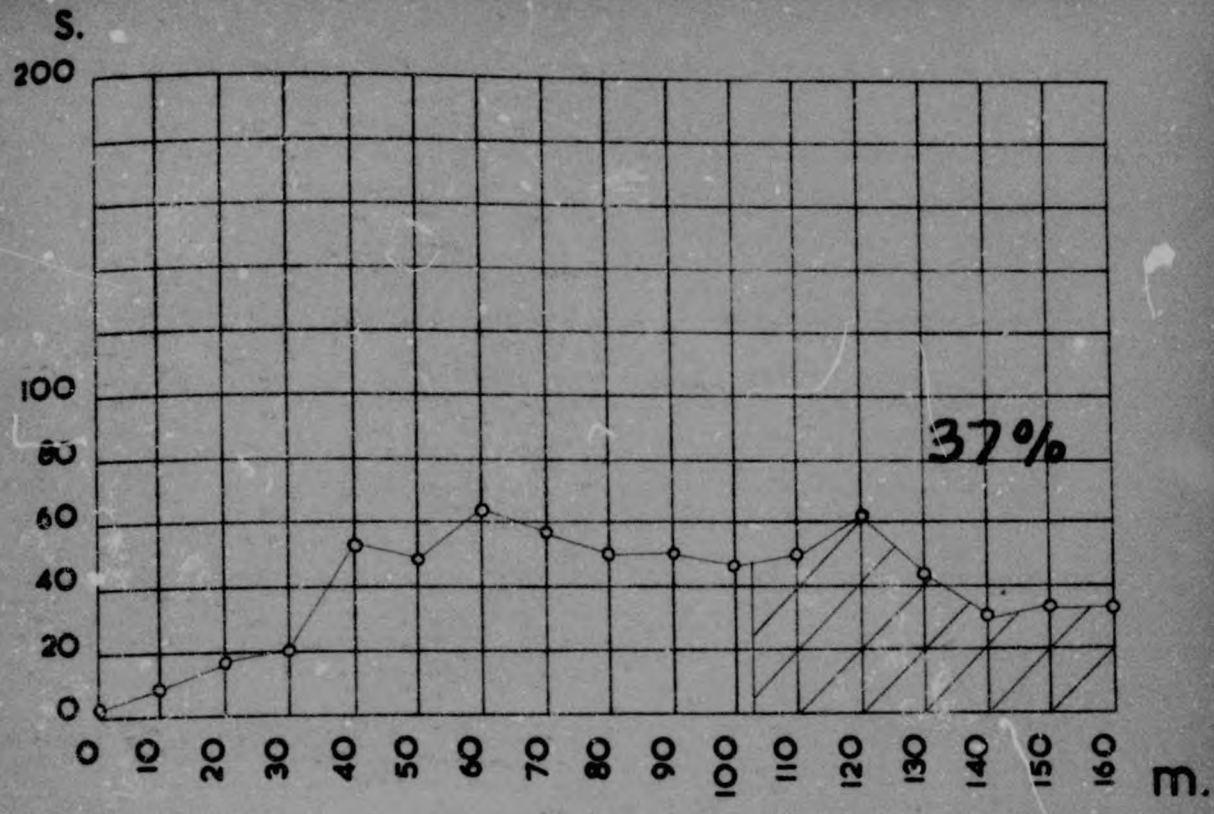


MECH.

SORTING 1:



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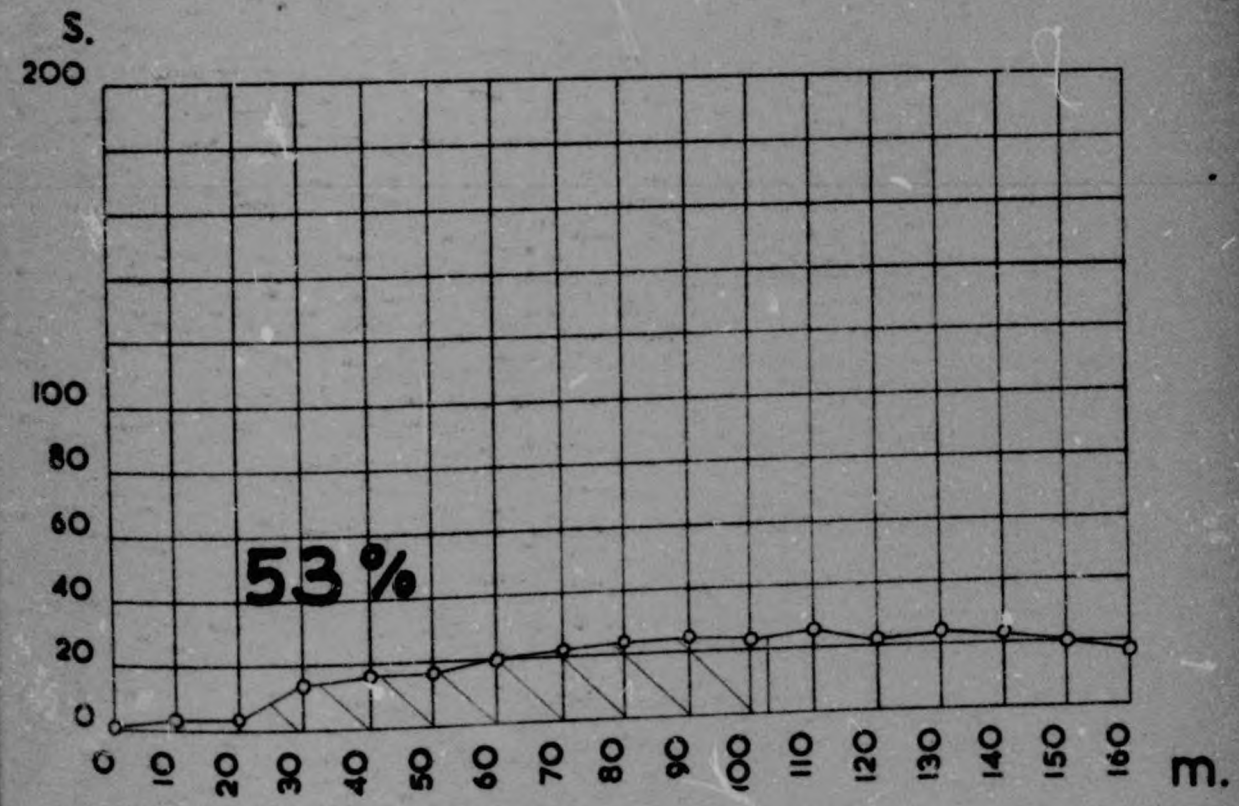

MECH.

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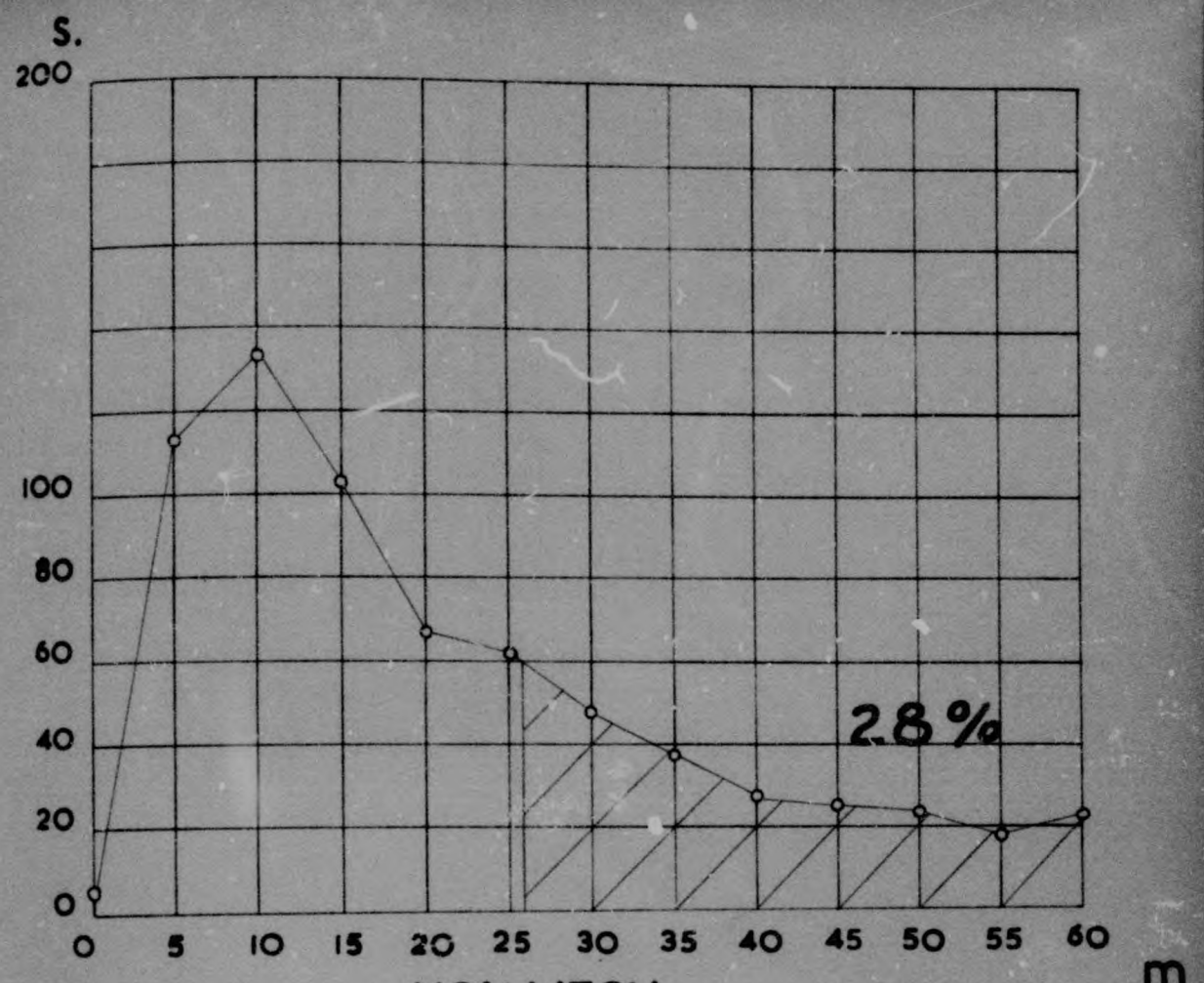

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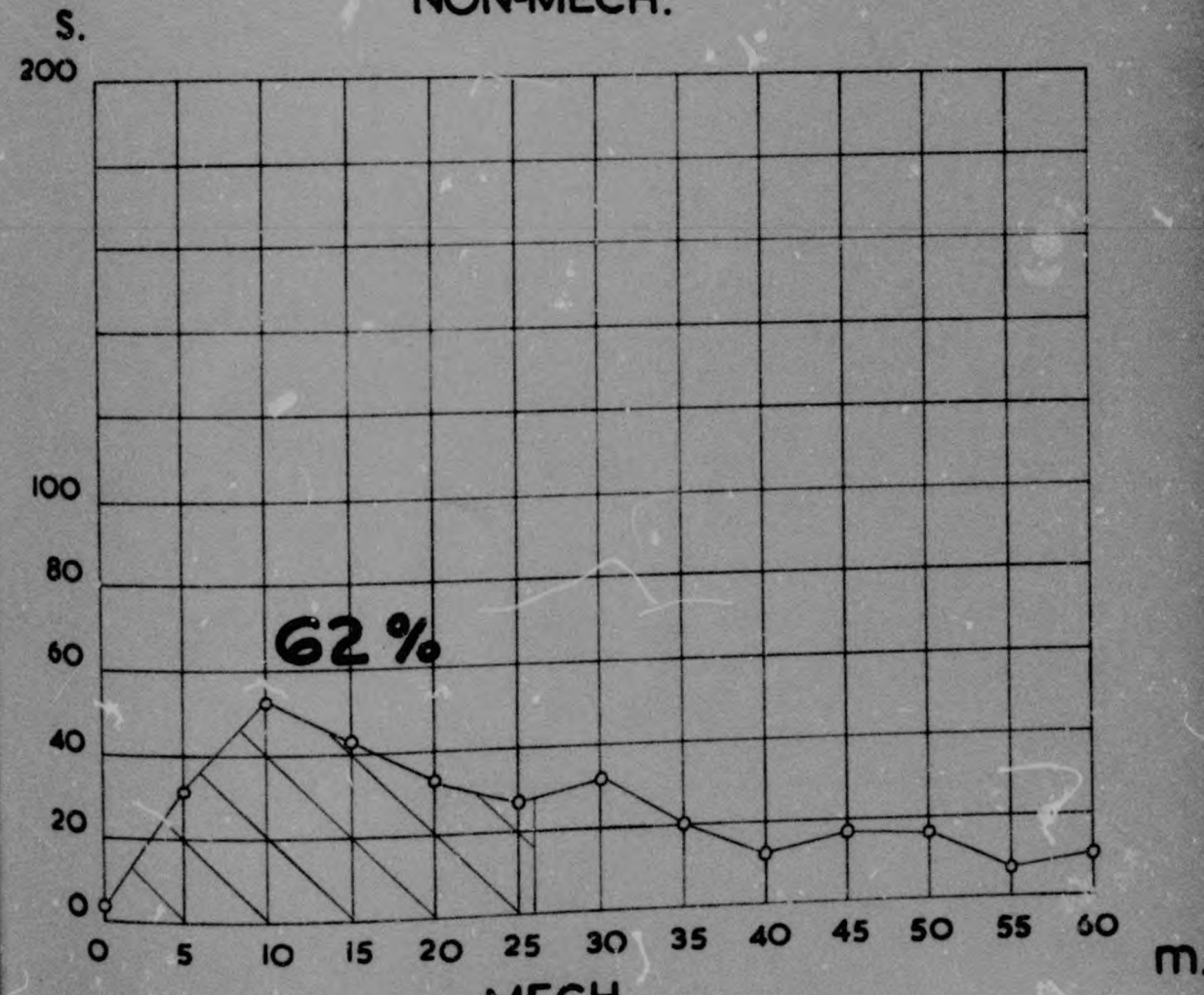
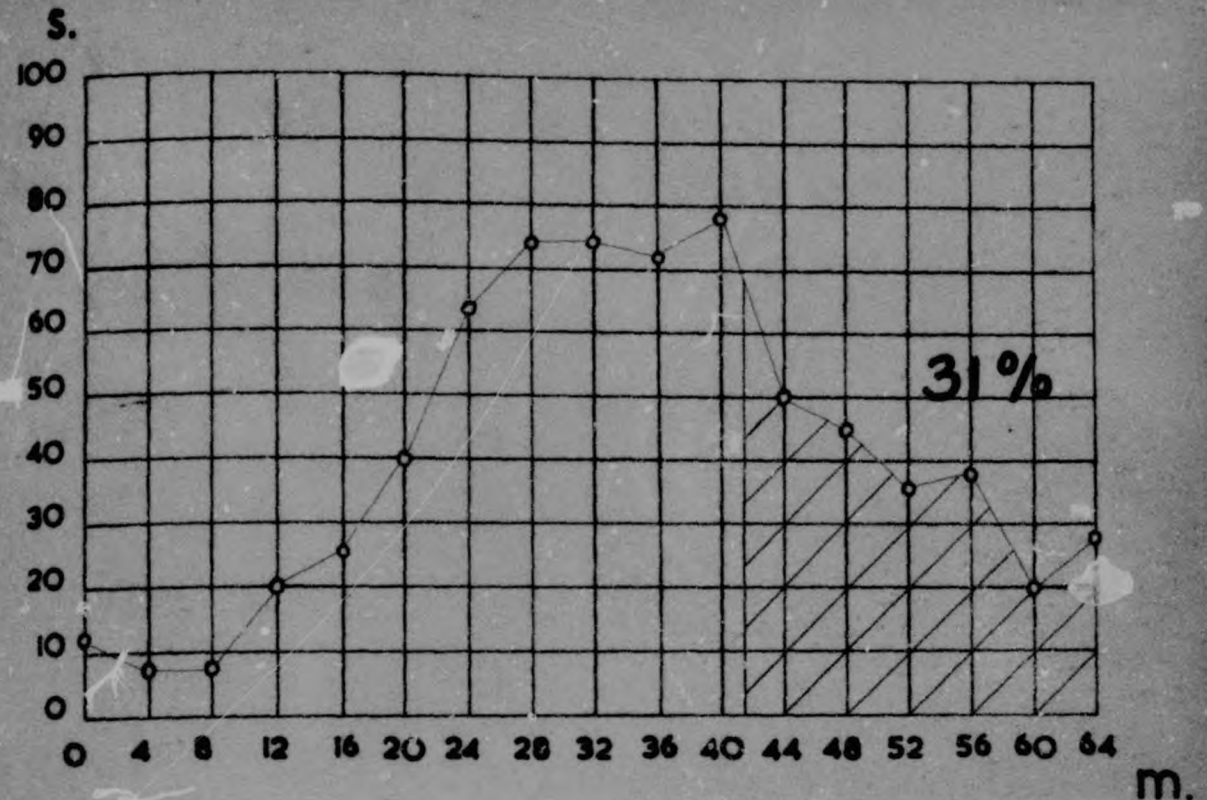


MECH.

CUBE CONSTR. :



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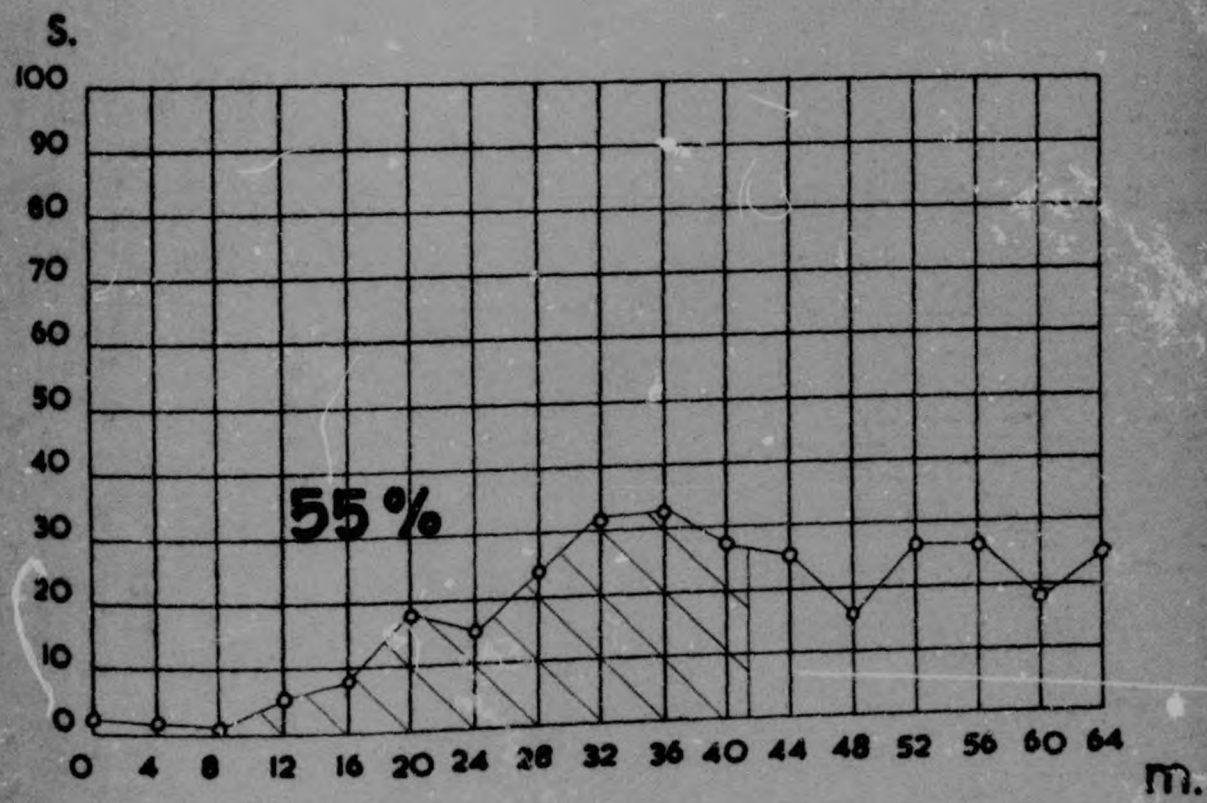
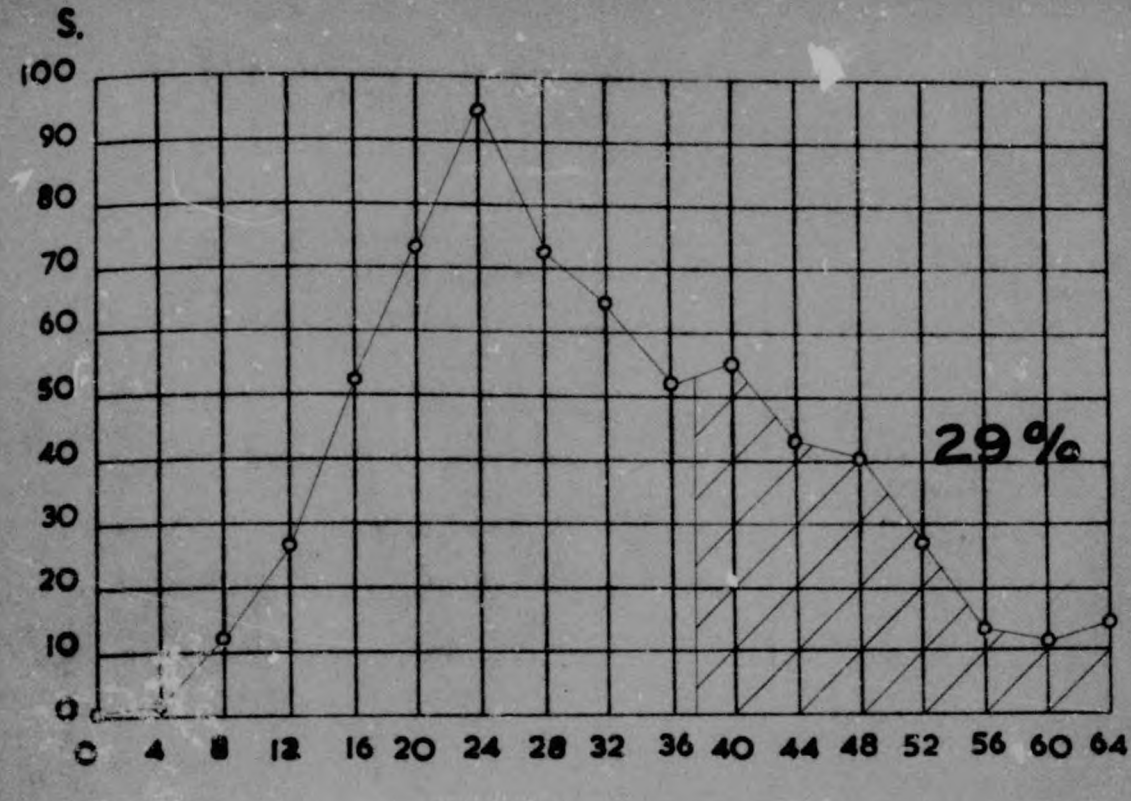


MECH.

TRIPOD :



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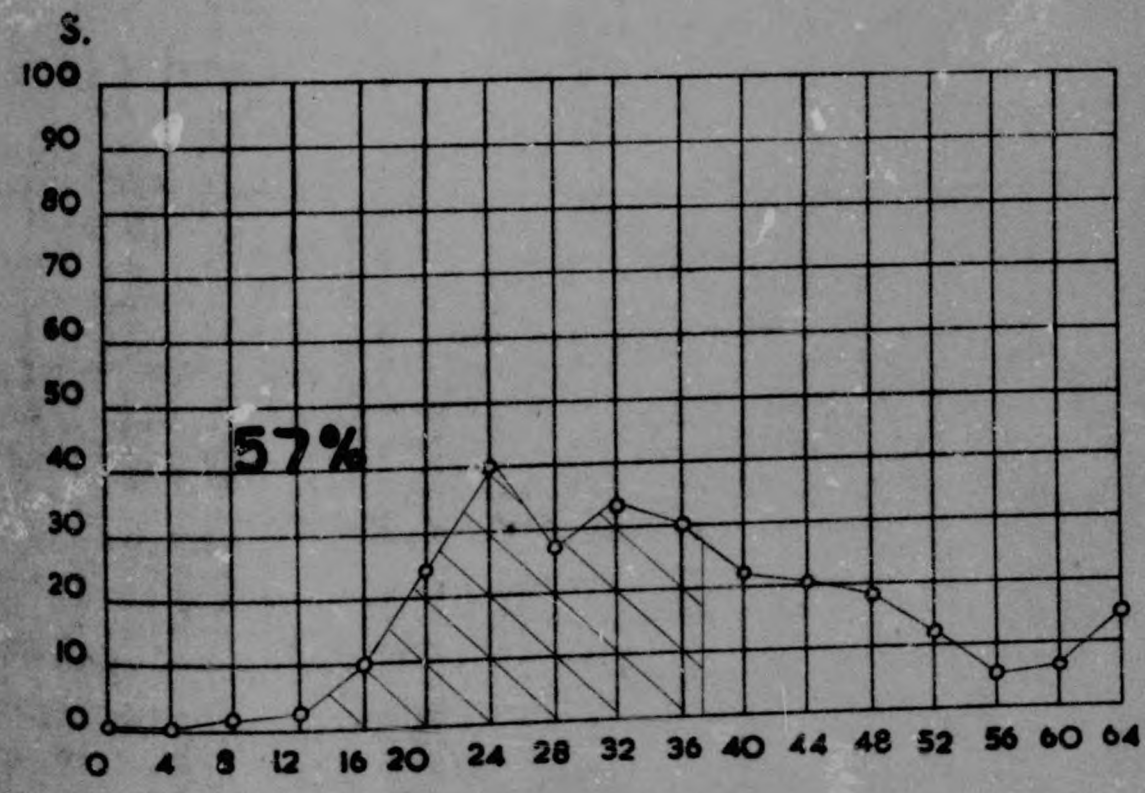
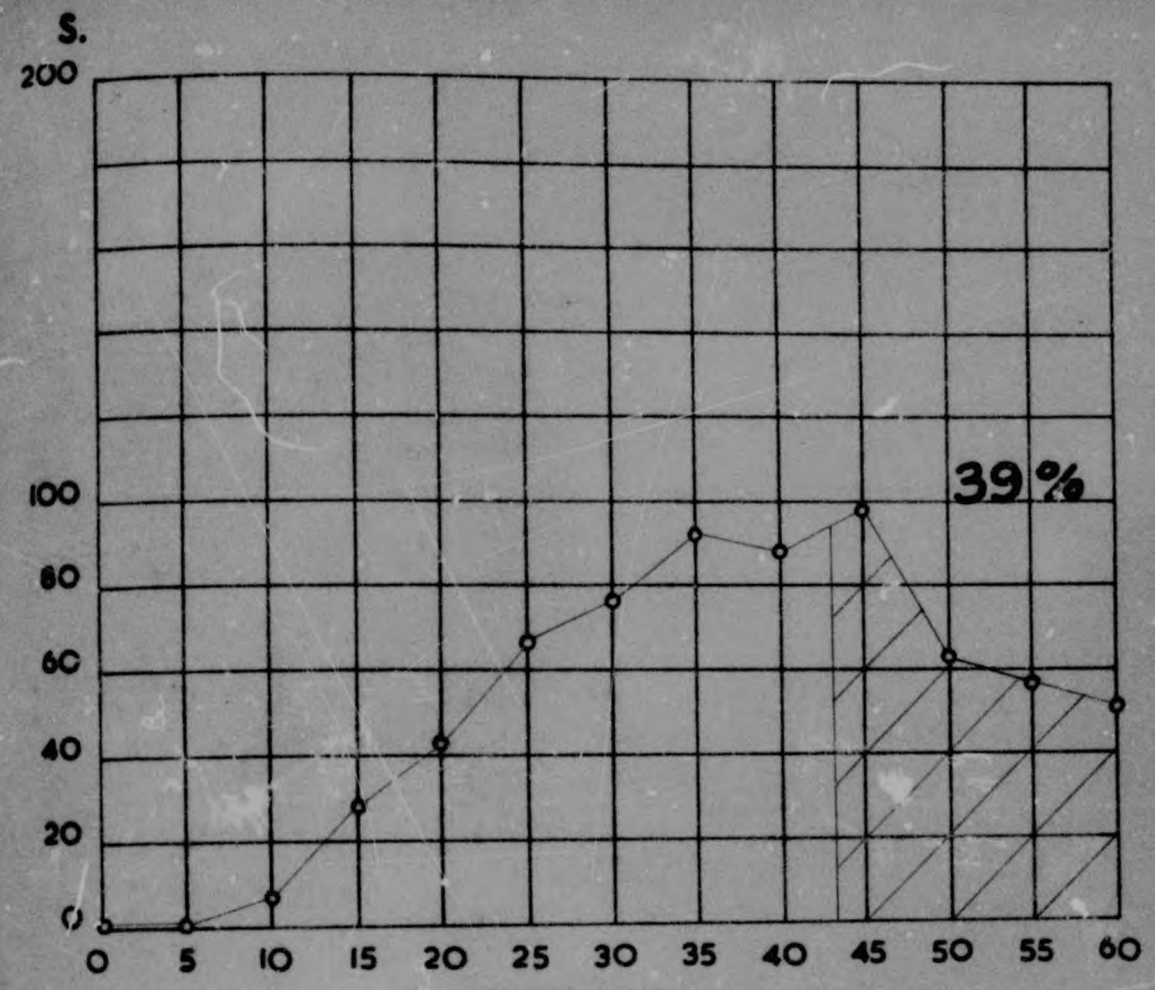


MECH.

FORMBOARDS :

Kuch



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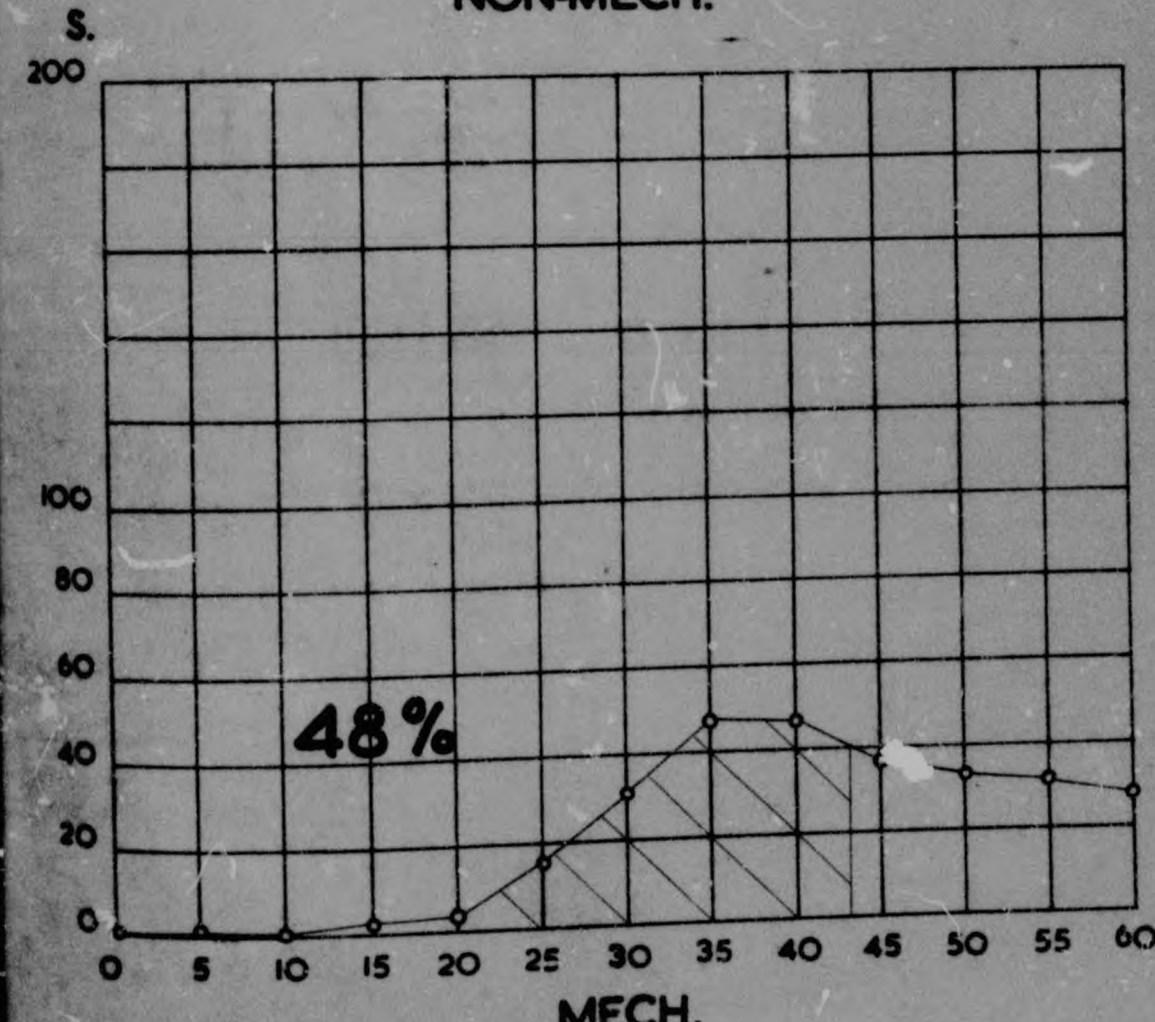
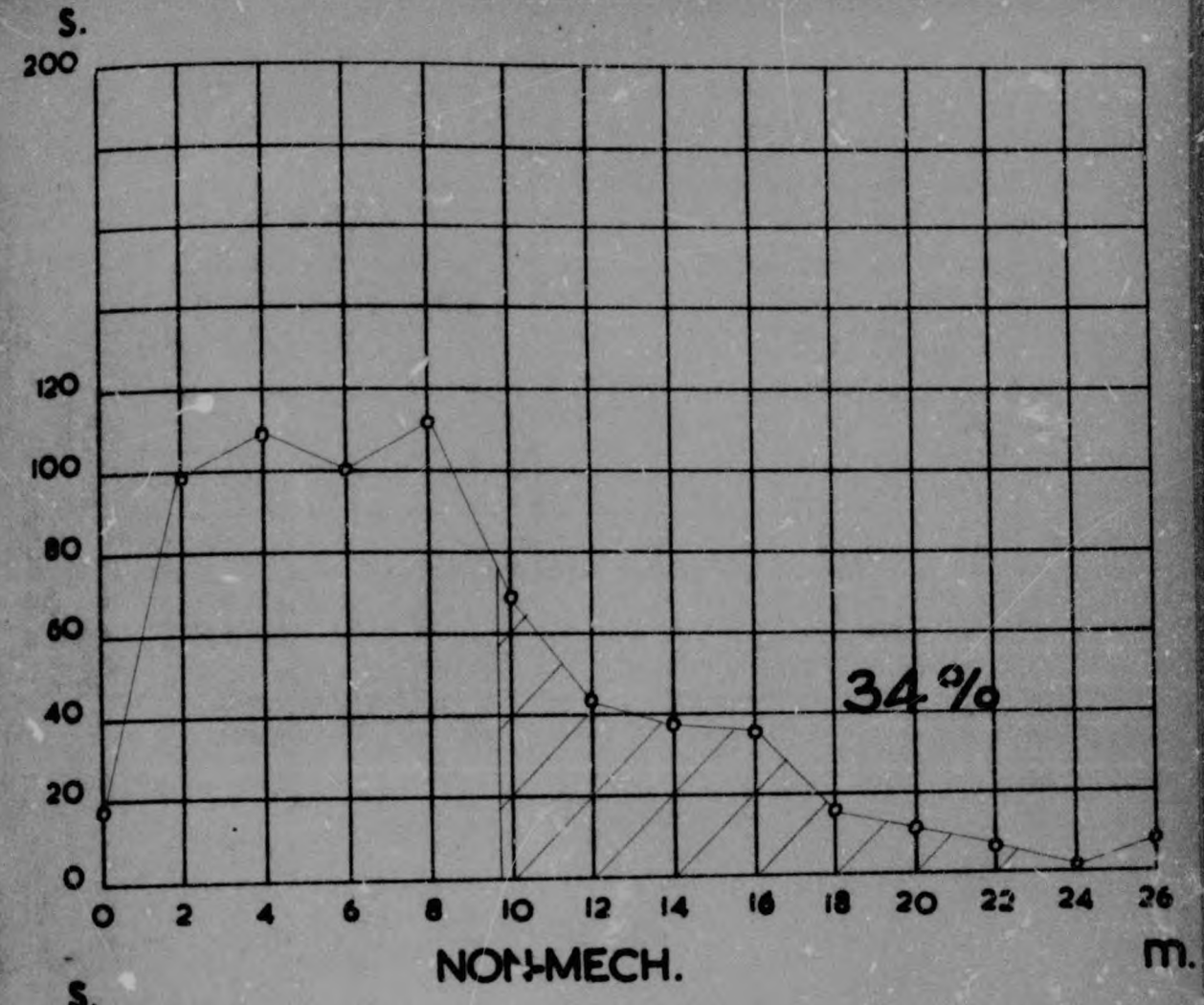
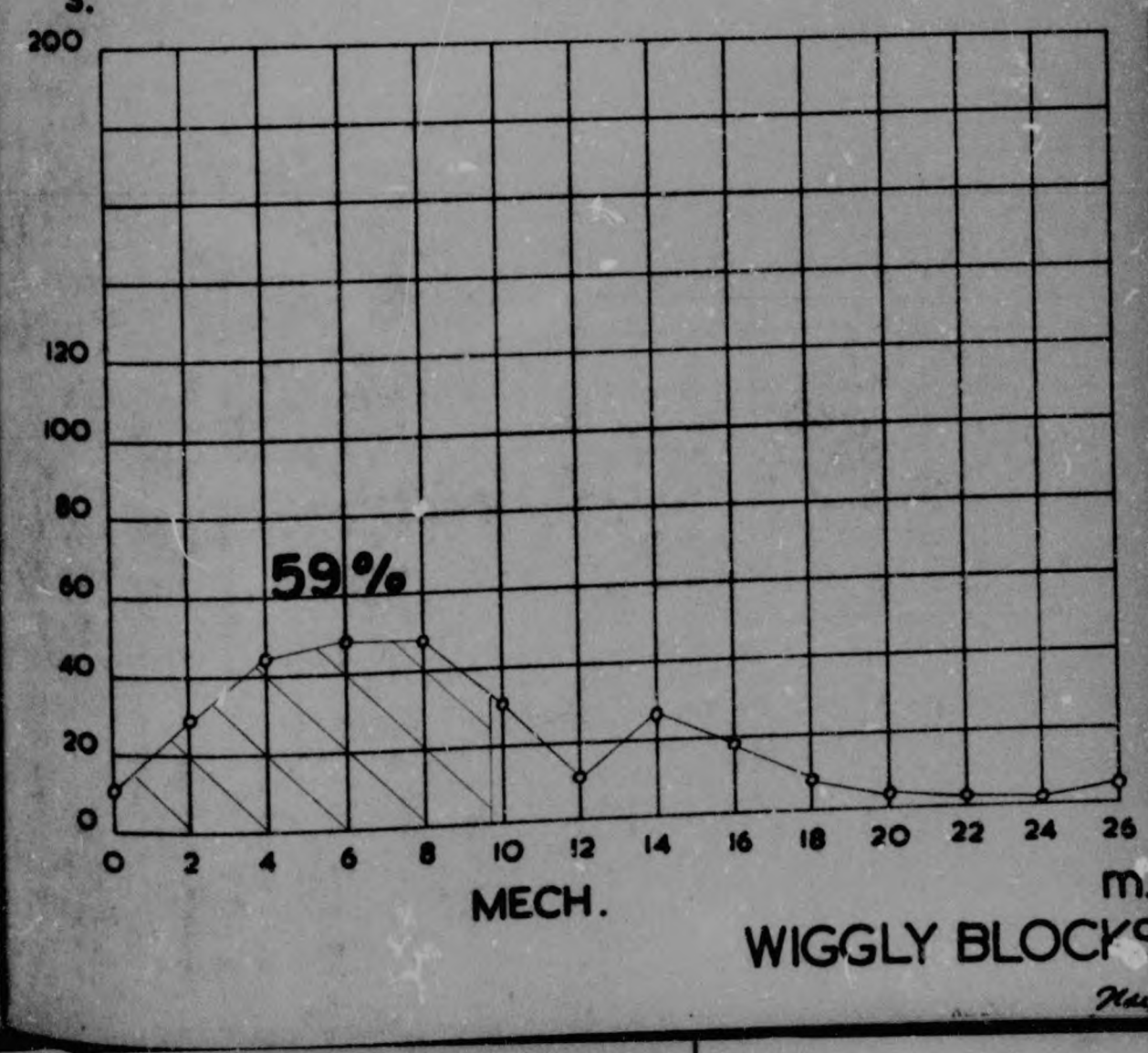


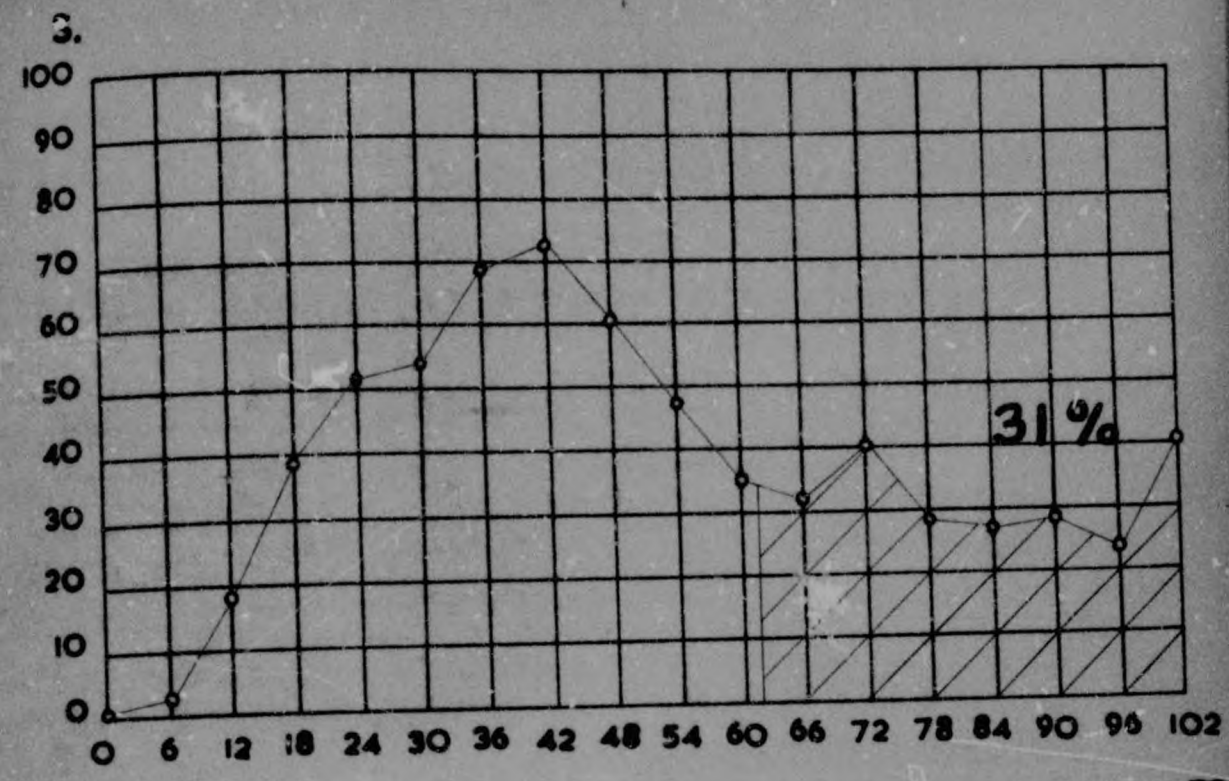
MECH.

PEGBOARD :





WIGGLY BLOCKS



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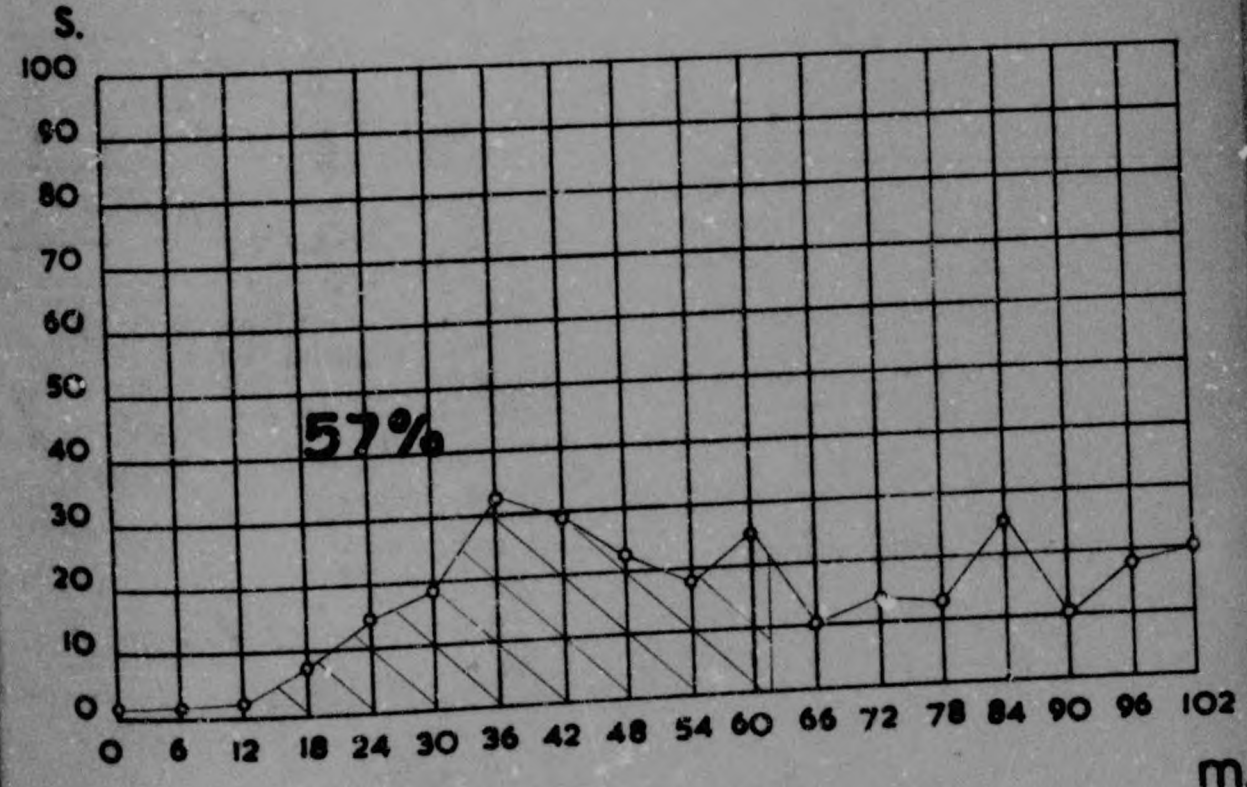
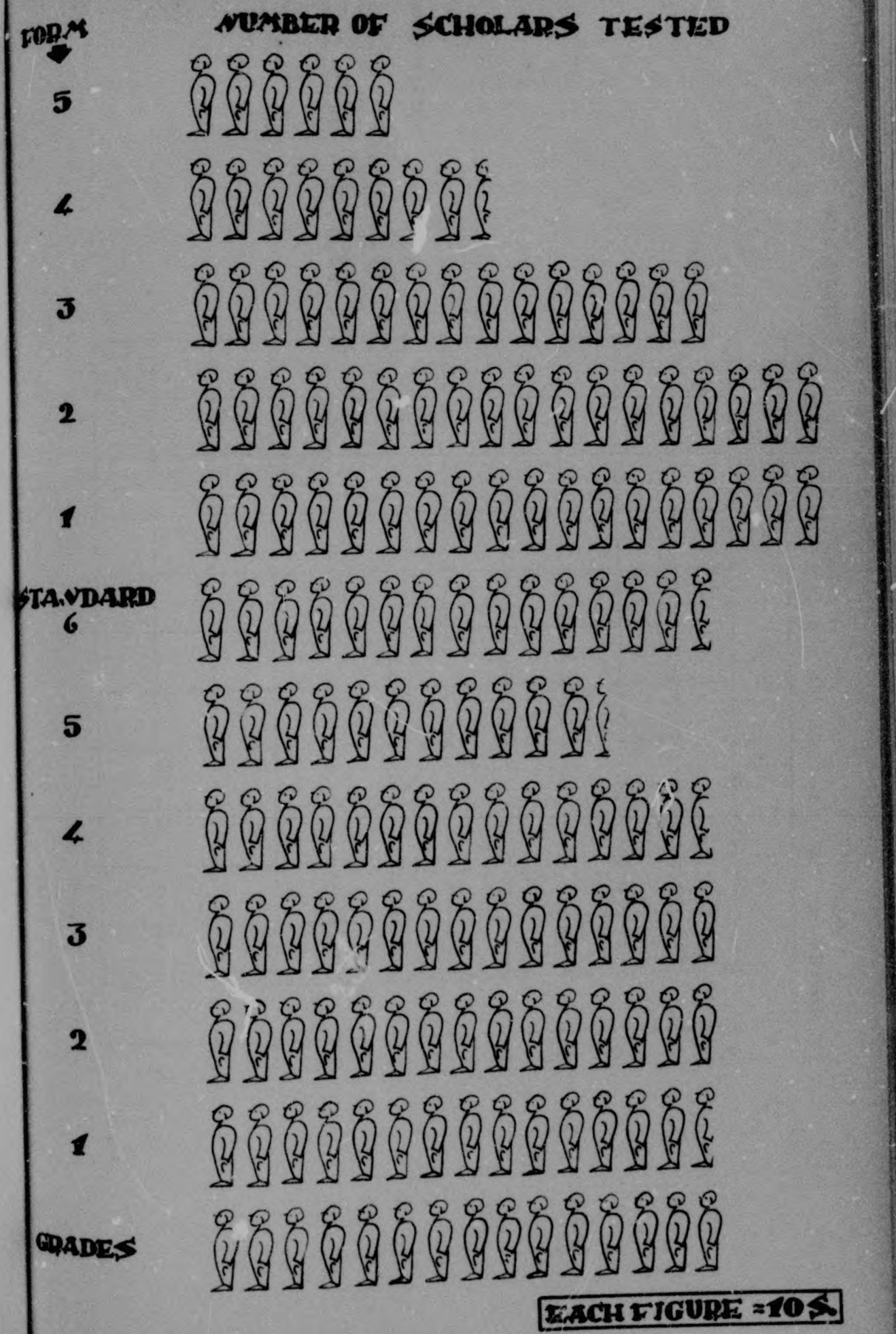


MECH.

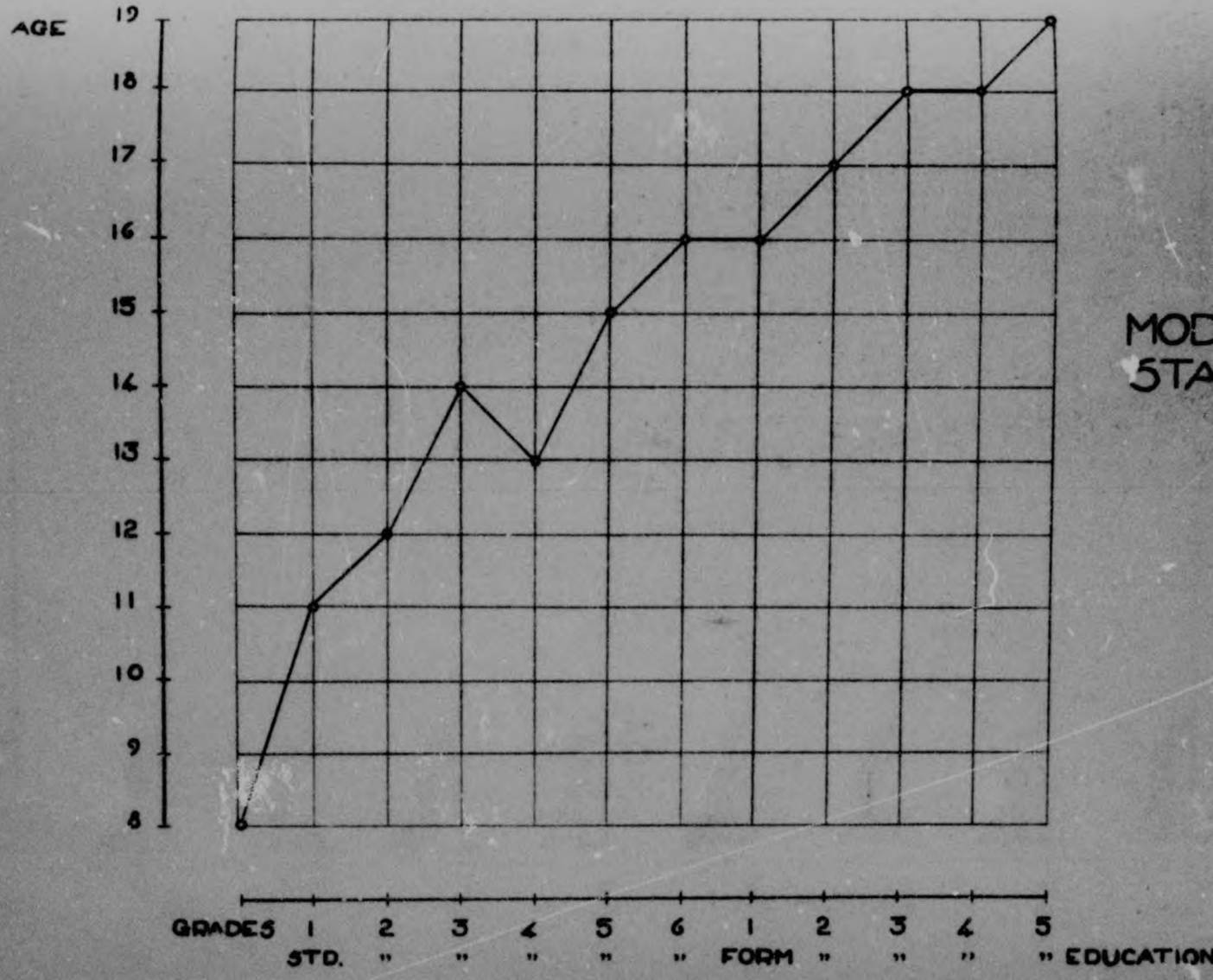
KOHS BLOCKS :

APPENDIX : F

1. Trend of Education/Age progression graphs.

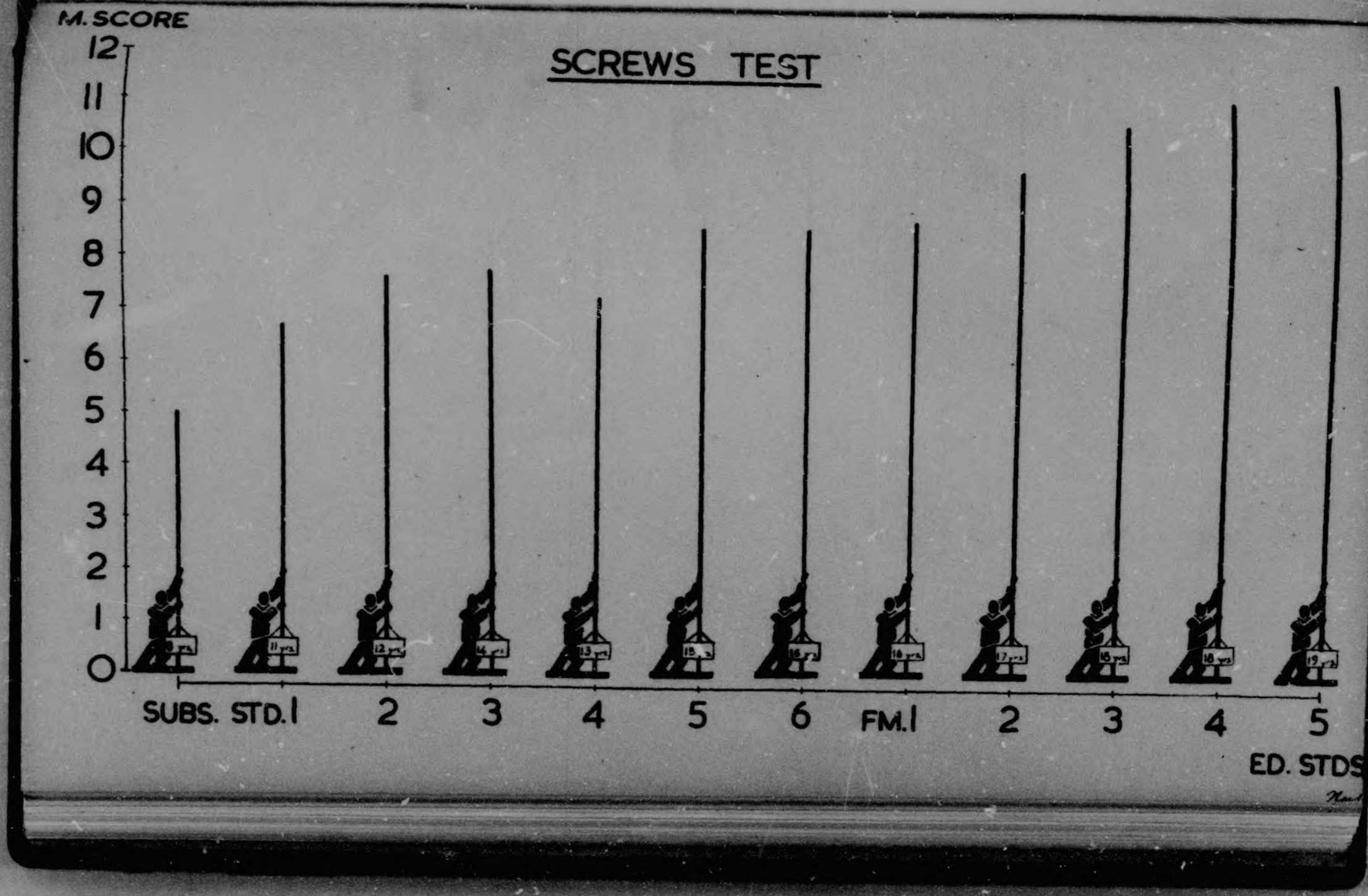


NUMBER OF PUPILS PER CLASS

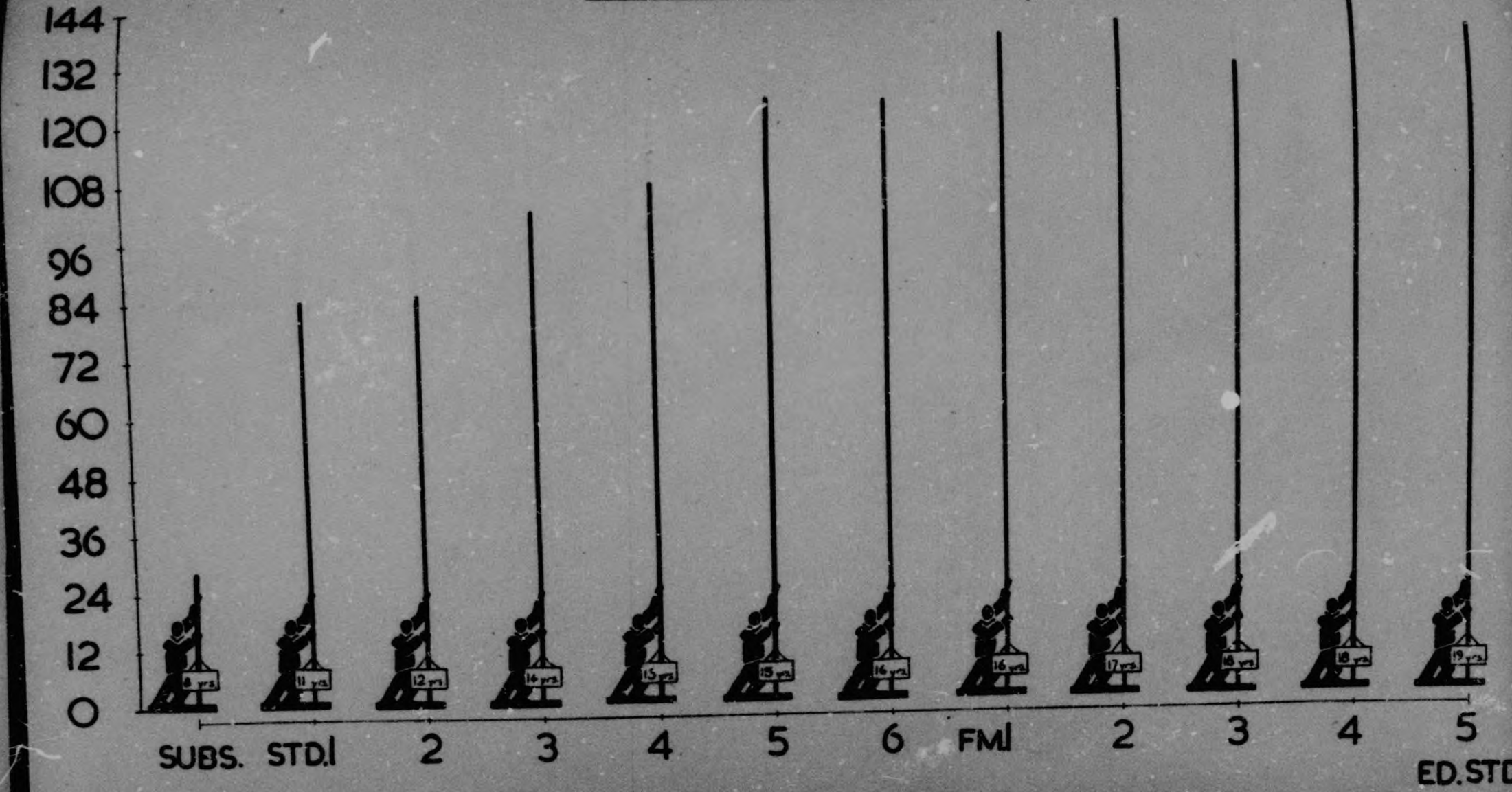


MODAL AGE PER STANDARD ——

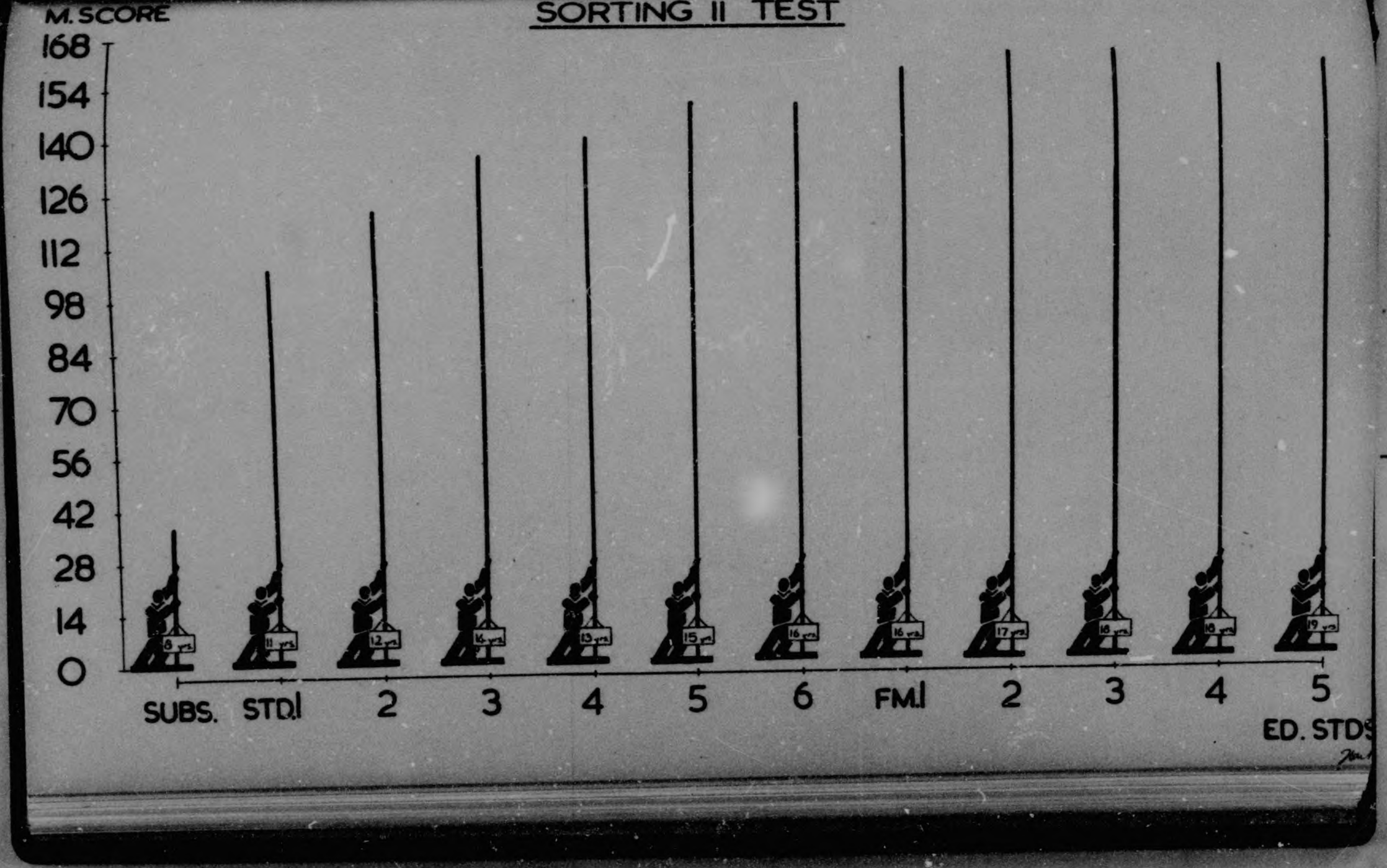
(BOTH SEXES)

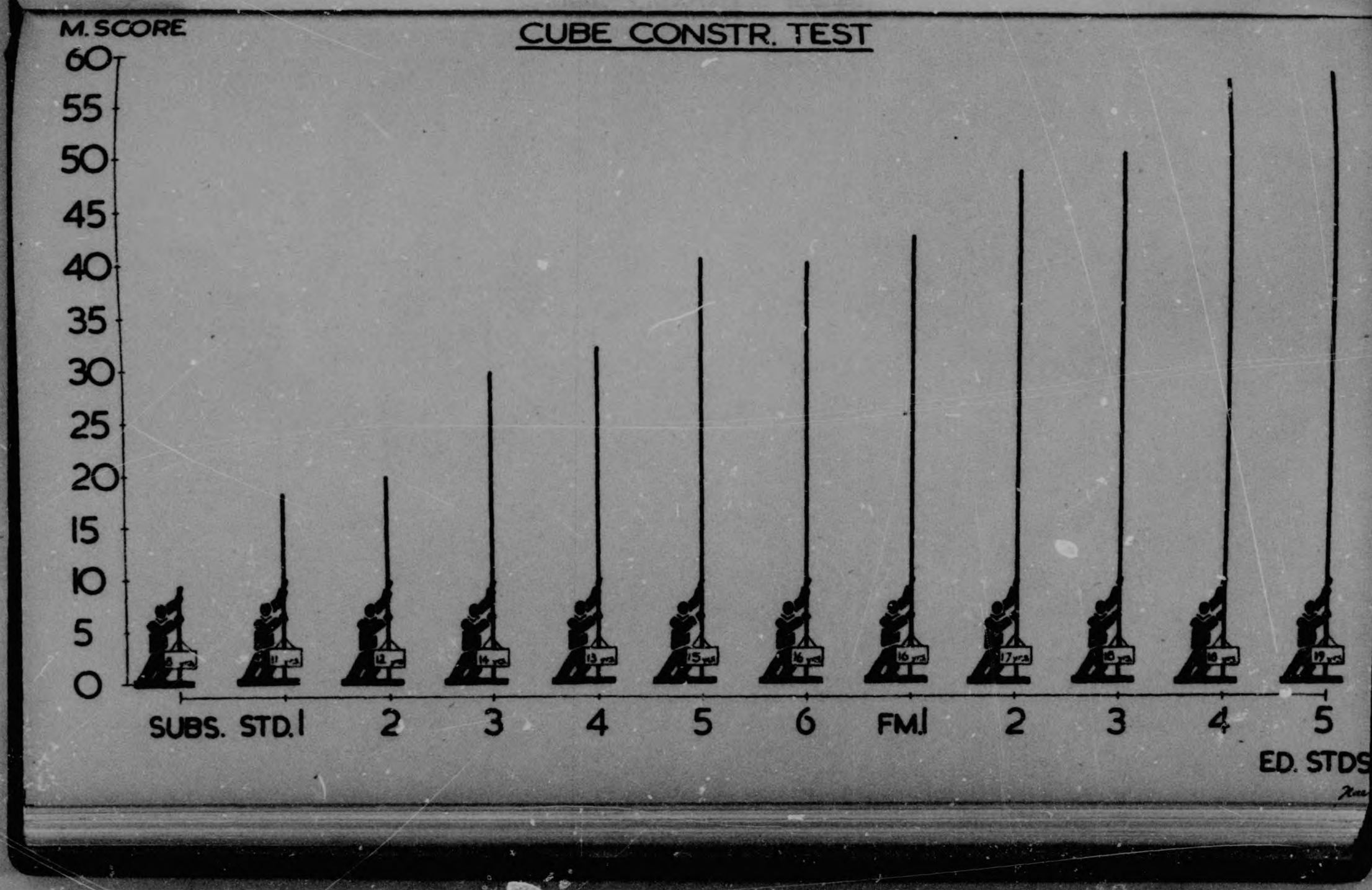

M. SCORE
12
11
10
9
8
7
6
5
4
3
2
1
0
SCREWS TEST
SUBS. STD. 1
2
3
4
5
6
FM. 1
2
3
4
5
ED. STDS

SORTING 1 TEST

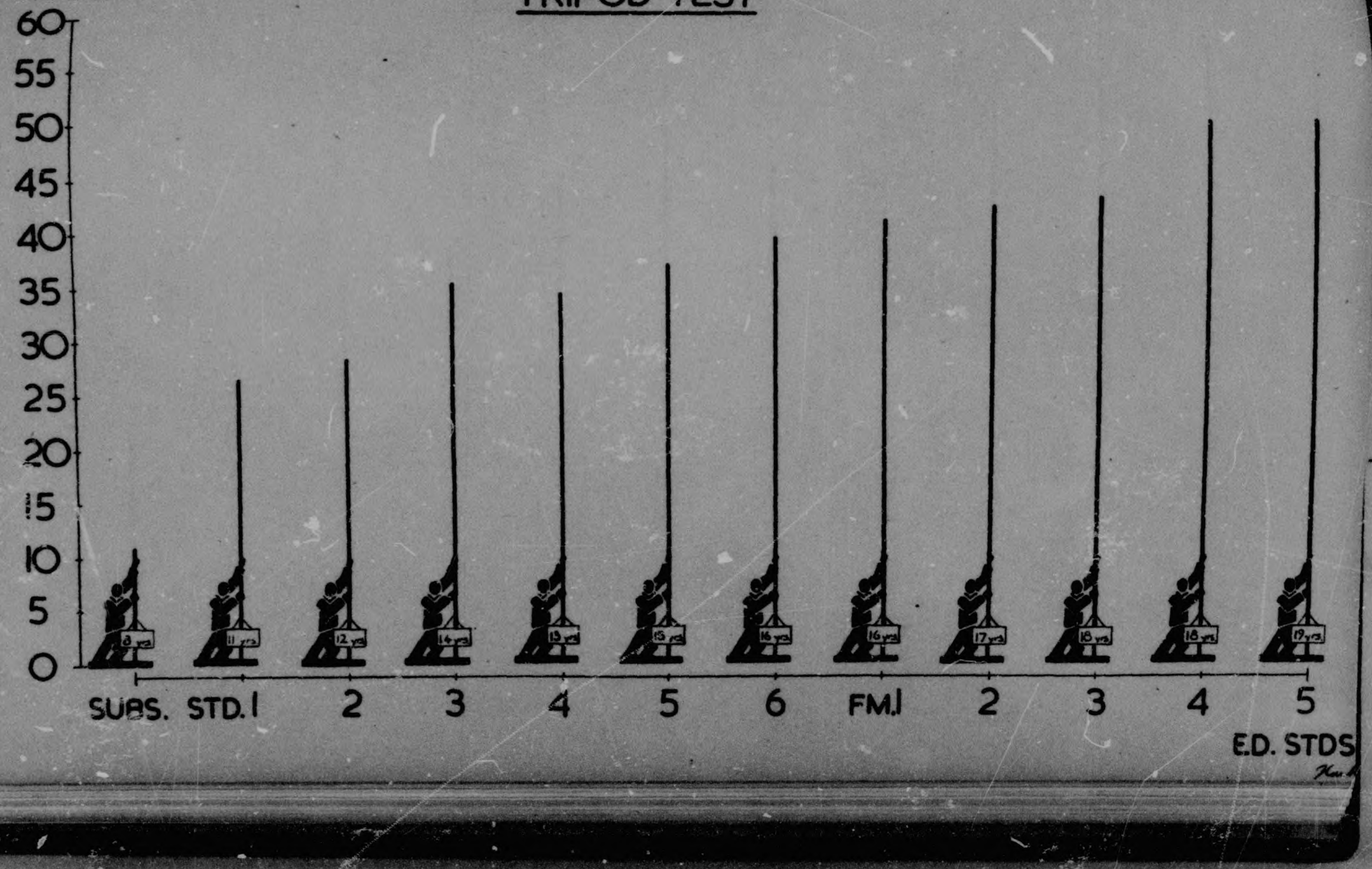


SORTING II TEST

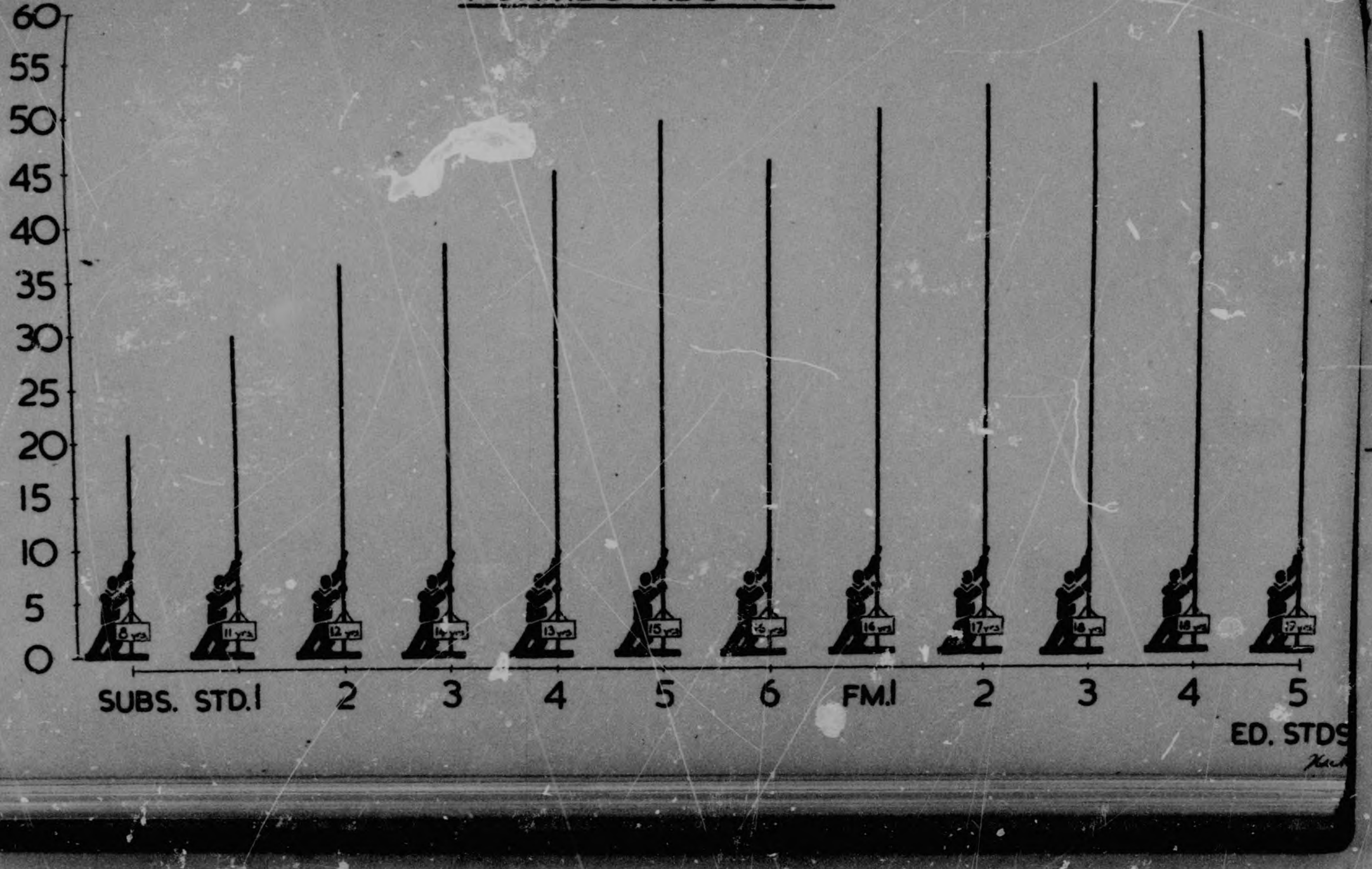


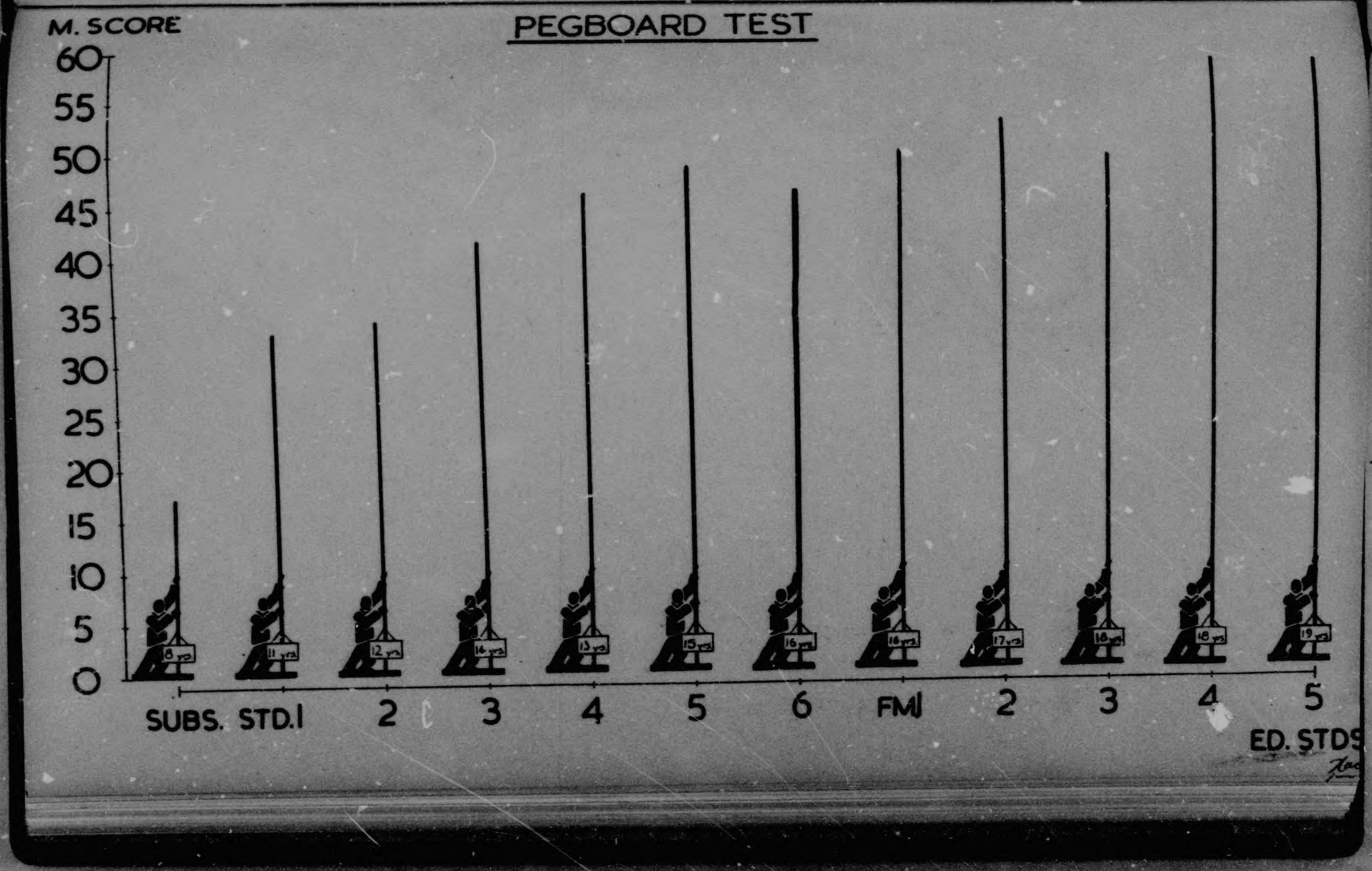

M. SCORE
CUBE CONSTR. TEST
60
55
50
45
40
35
30
25
20
15
10
5
0
SUBS. STD. 1
2
3
4
5
6
FM. 1
2
3
4
5
ED. STDS

TRIPOD TEST

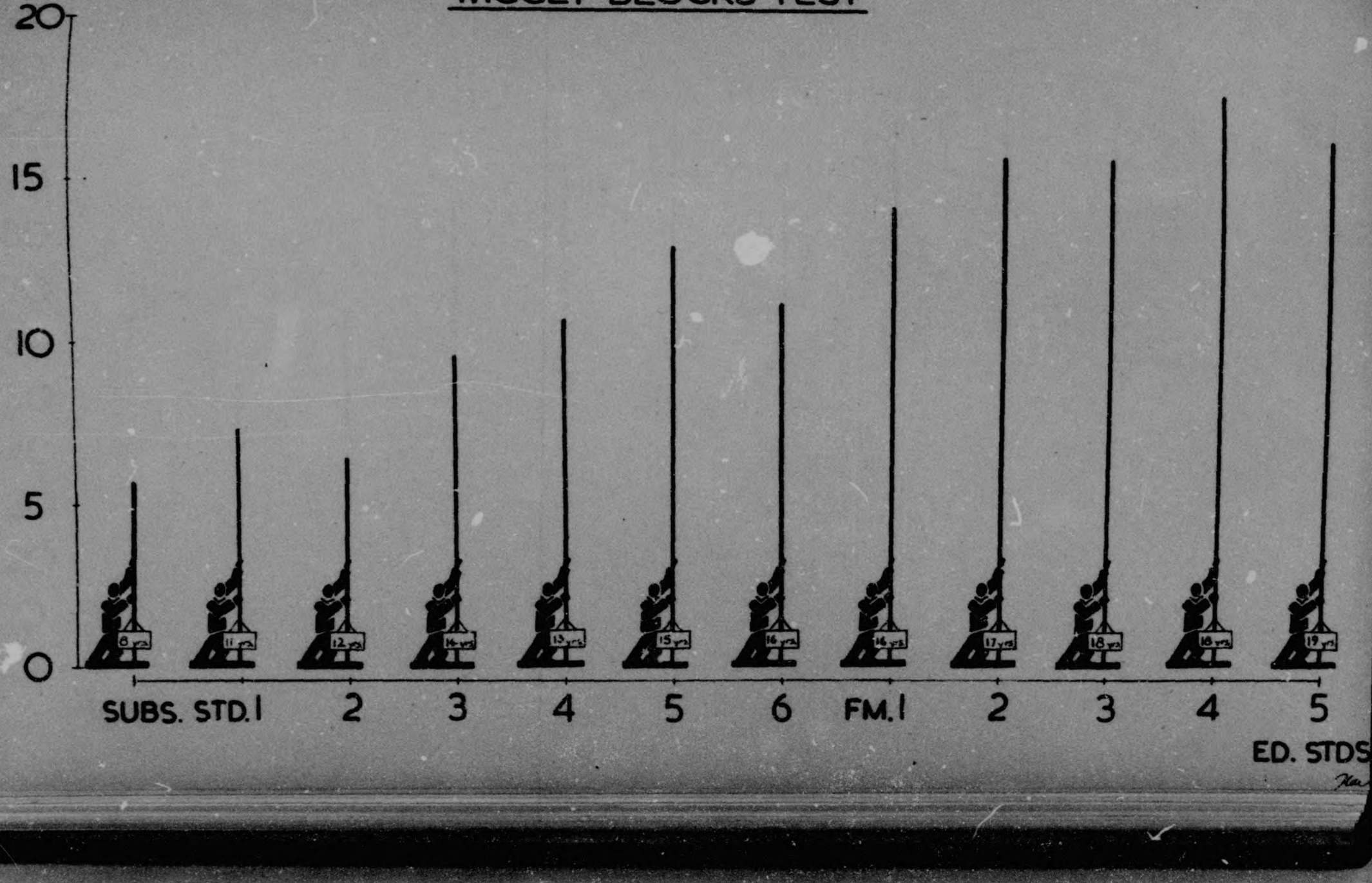

M. SCORE
60
55
50
45
40
35
30
25
20
15
10
5
0
8 yrs
11 yrs
12 yrs
14 yrs
13 yrs
15 yrs
16 yrs
16 yrs
17 yrs
15 yrs
18 yrs
17 yrs
SUBS. STD. 1
2
3
4
5
6
FM. 1
2
3
4
5
E.D. STDS

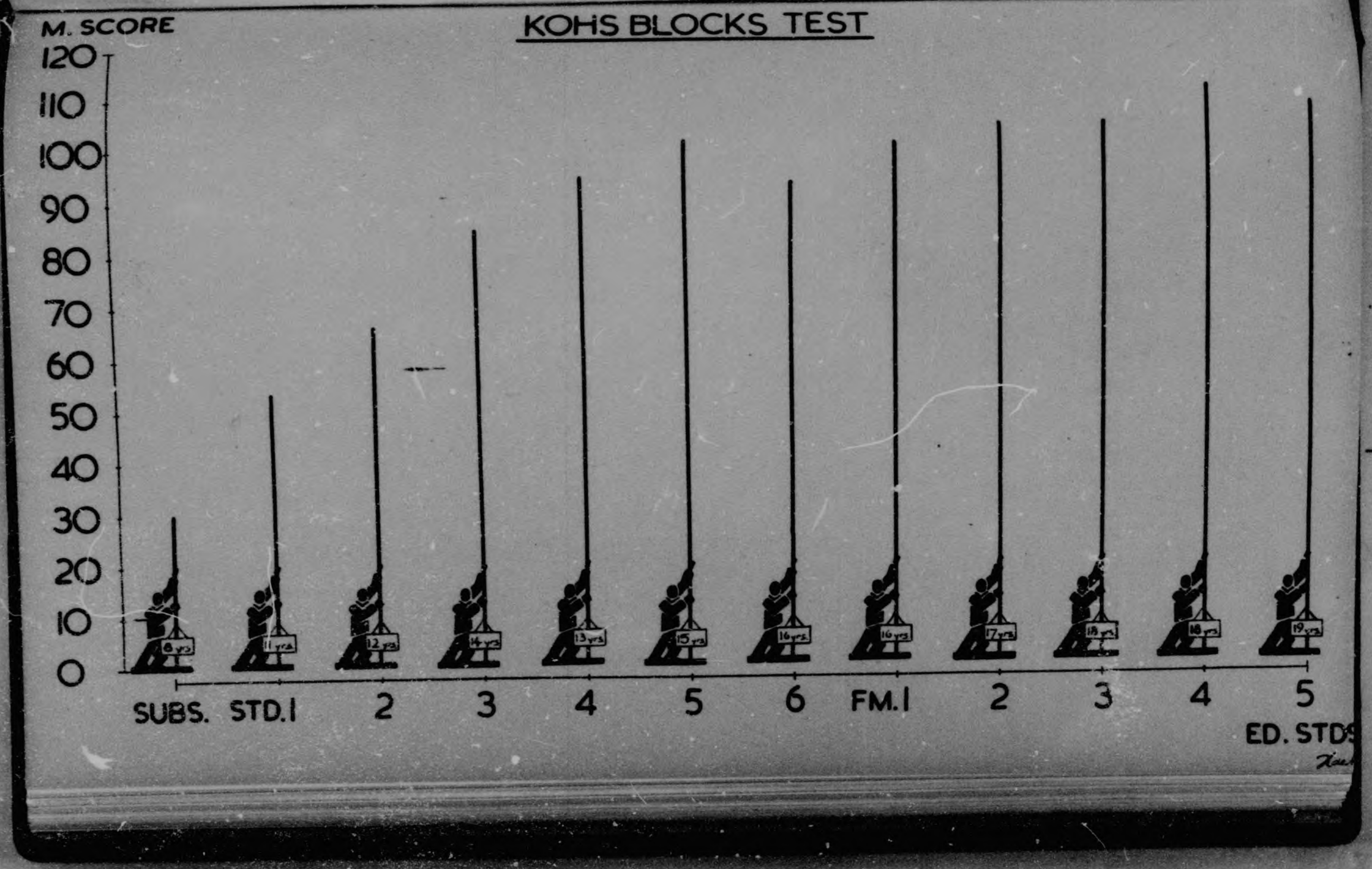
FORMBOARDS TEST




PEGBOARD TEST
M. SCORE
60
55
50
45
40
35
30
25
20
15
10
5
0
8 yrs
11 yrs
12 yrs
14 yrs
13 yrs
15 yrs
16 yrs
16 yrs
17 yrs
18 yrs
18 yrs
19 yrs
SUBS. STD.1
2
3
4
5
6
FM1
2
3
4
5
ED. STDS

WIGGLY BLOCKS TEST




KOHS BLOCKS TEST
M. SCORE
120
110
100
90
80
70
60
50
40
30
20
10
0
8 yrs
11 yrs
12 yrs
14 yrs
13 yrs
15 yrs
16 yrs
16 yrs
17 yrs
18 yrs
18 yrs
19 yrs
SUBS. STD.1 2 3 4 5 6 FM.1 2 3 4 5
ED. STDS

APPENDIX : G

1. Intercorrelation Tables of the Various School Standards.

TEST INTERCORRELATIONS (SCHOOL SAMPLE):

TEST INTERCORRELATIONS OF SUB-STANDARDS AND STD. 1 PUPILS COMBINED.

		1.	2.	3.	4.	5.	6.	7.	8.
1.	SCREWS.	.							
2.	SORTING 1.	.36957							
3.	SORTING 2.	.37226	.76370						
4.	CUB CONSTR.	.27805	.47459	.47774					
5.	TRIPOD.	.39168	.57050	.54652	.56397				
6.	FORMBOARDS.	.33270	.56191	.62141	.59517	.62275			
7.	PEGBOARDS.	.28255	.54902	.54794	.52096	.59535	.64006		
8.	WIGGLY BLKS.	.22276	.35784	.35000	.37637	.37082	.41752	.45283	
9.	KOHS BLKS.	.27312	.50534	.55595	.68094	.62438	.70389	.58822	.46190

TEST INTERCORRELATIONS (SCHOOL SAMPLE):

TEST INTERCORRELATIONS OF STD.4 PUPILS.

		1.	2.	3.	4.	5.	6.	7.	8.
1.	SCREWS.								
2.	SORTING 1.	.18032							
3.	SORTING 2.	.02906	.34780						
4.	CUB CONSTR.	.19335	.29694	.02237					
5.	TRIPOD.	.45000	.20471	.02419	.39357				
6.	FORMBOARDS.	.22950	.23084	.11960	.50022	.32579			
7.	PEGBOARD.	.21245	.17639	.03009	.33343	.42274	.48849		
8.	WIGGLY BLKS.	.29733	.17201	.13367	.39308	.40502	.44311	.39908	
9.	KOHS BLKS.	.15033	.10362	-.00131	.50159	.31024	.57623	.53614	.47166

TEST INTERCORRELATIONS (SCHOOL SAMPLE):

TEST INTERCORRELATIONS OF FORM 2 PUPILS.

		1.	2.	3.	4.	5.	6.	7.	8.
1.	SCREWS.								
2.	SORTING 1.	.14962							
3.	SORTING 2.	-.08284	.21189						
4.	CUB CONSTR.	.04237	.21788	.15717					
5.	TRIPOD.	.19720	.35860	.07235	.45986				
6.	FORMBOARDS.	.17761	.28173	.11285	.43440	.48088			
7.	PEGBOARD.	.03206	.37722	.24550	.39577	.57622	.49390		
8.	WIGGLY BLKS.	.05489	.13908	.13684	.33455	.35457	.35786	.34430	
9.	KOHS BLKS.	-.01429	.11649	.07701	.41822	.36421	.49466	.38382	.34688

TEST INTERCORRELATIONS (SCHOOL SAMPLE):

TEST INTERCORRELATIONS OF FORM 4 AND FORM 5 PUPILS COMBINED.

		1.	2.	3.	4.	5.	6.	7.	8.
1.	SCREWS.								
2.	SORTING 1.	.19787							
3.	SORTING 2.	.04538	.33632						
4.	CUBE CONSTR.	.14939	.29206	.16669					
5.	TRIPOD.	.24397	.30222	-.01130	.45735				
6.	FORMBOARDS.	.19618	.34828	.14669	.48966	.37892			
7.	PEGBOARD.	.19278	.32155	.07871	.32279	.46667	.40792		
8.	WIGGLY BLKS.	.14189	.20460	.04714	.33626	.34322	.21205	.33049	
9.	KOHS BLKS.	.05087	.27482	.05411	.48932	.30000	.37733	.27655	.22046

APPENDIX : H

1. Leaderless Group Tests:

   (a) The Scaffold Test

   (b) The Bus Route Test

THE SCAFFOLD TEST:

A. 1. Description of Test.
2. Construction of Test.
3. Aim of Test.
4. Application of Test.
5. Variations of Application.
6. Suggested alterations and improvements.

B. 1. A Consideration of the Application of the Scaffold Test to Secondary Industry.

A. 1. DESCRIPTION OF TEST:

The test consists of 60 ½ inch x 3 foot wooden dowels and 40 2 inch x 2 inch x 2 inch wooden blocks, with ½ inch holes penetrating through the blocks and cutting into each face.

Included in the test material are a number of two-dimensional plans (of the type shown on the opposite page), from which the subjects must construct a three-dimensional model.

The model is constructed by fitting the sticks or dowels into the holes in the block faces, and then positioning them to conform to the pattern shown on the plan.

A number of different yet equally difficult plans exist, each group, however, works on only one plan at a time.

In its present form, this test may be applied either in or out of doors.

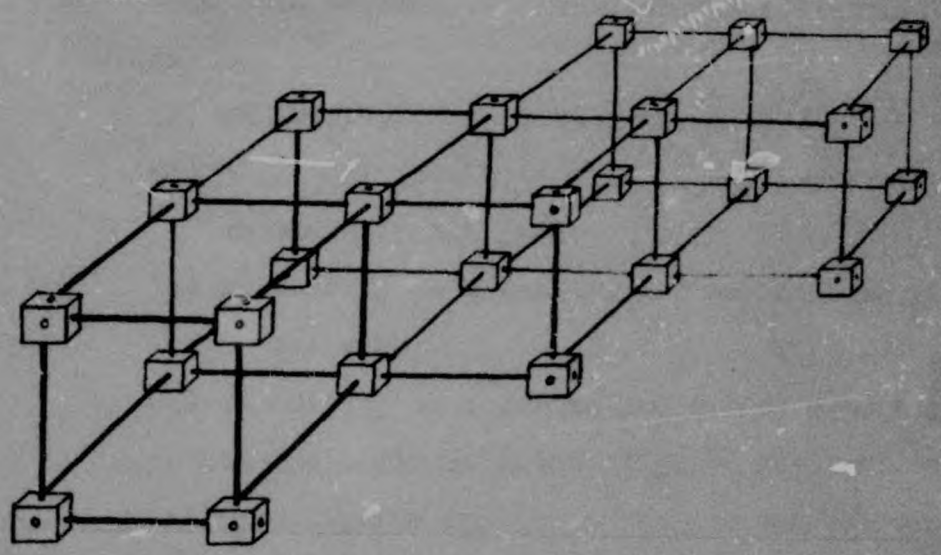
The total weight of all the test material is approximately 60 lbs.

2. CONSTRUCTION OF TEST:

Apart from the drawing involved in the plans and the cutting of the blocks, no actual test construction in needed. The wooden dowels of the type used here can be purchased from most hardware dealers.

3. AIM OF TEST:

An important function undertaken by African supervisors in secondary industry is the implementation of the instructions of the European overseer or super-intendent. Good supervision involves not simply giving



№ 1.

(PLAN FOLLOWED IN LEADERLESS GROUPS)

X-R

orders to one's subordinates, but directing, controlling and organising the work group in order to ensure that the instructions are carried out precisely and efficiently.

In this test, groups of six subjects each, following the instructions given on the plan, and employing the test material before them, are required to construct a three-dimensional model similar in all aspects to that given on the instruction sheet or plan.

Because of the nature of the problem, leadership in a task such as this will involve the following factors:

(a) an ability to work to instruction.

(b) a correct interpretation of the instructions as given on the plan.

(c) an ability to translate and expl[illegible] the plan to the group.

(d) an ability to organise and direct a work group in the implementation of given instructions.

(e) intelligence enough to realise and explain the part-whole relationsh[illegible] existing between the various segments which comprise the plan.

(f) an ability to think abstractly and to translate the phenomena of perspective as it appears on the plan, to the rest of the group.

The test is so designed that:

(i) it is virtually impossible for subjects to convey information regarding the test pattern to another group.

(ii) the complexity of the plan given will tend to evoke disagreement and argument among subjects.

(iii) an infinite number of approaches to the problem exist.

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(iii) an infinite number of approaches to the problem exist.

4. APPLICATION OF TEST:

Considered under two headings:

i. Test Situation: The subjects are numbered, the test material strewn on the floor in front of them, the plan is pinned on to the wall five feet from the floor, and the test instructions begin.

ii. Test Instructions: Men, you have come here today to do a job of work. I want you all to listen to me very carefully, because if you don't listen you will not know what to do - so all listen to me carefully.

First of all - these numbers that you each have on are to help us to recognise and know each one of you. That your number is 1, or that your number is 5, or that your number is 3, does not mean anything. These numbers are for our (tester points to himself) benefit only.

On the floor in front of you is the material you will use for this job. As you see it consists of a number of sticks and a number of wooden blocks with holes cutting through each face.

(Tester walks over the picks up one block and two sticks at random).

These sticks fit into these blocks like this (demonstrates with the material in his hand).

Now with this material and following this plan here (tester walks over to the plan and points at it) I want you men all working together as a group to make this model shown on this plan.

Don't be afraid. All work together on building this one model. Talk aloud so that everybody can hear what you are thinking.

Right - Go ahead!



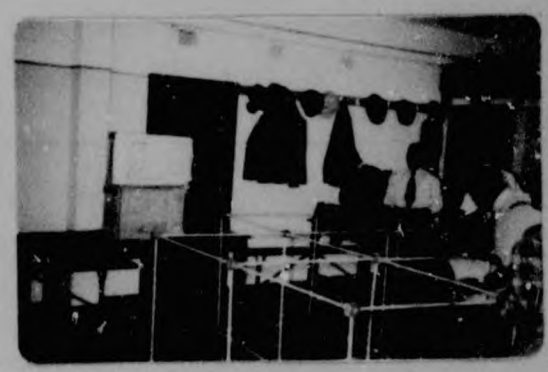
1. INSTRUCTIONS...



2. CONSULTING PLAN...



3. LEADERS EMERGING...



4. COMPLETION.

LEADERLESS GROUP TEST

5. VARIATIONS OF APPLICATION:

This test may be used either as:

(a) A Leaderless Group Test - in which the leader emerges by virtue of his capabilities and leadership qualities.

or

(b) An Assigned Leadership Test - in which the assigned leader is given a plan and told to instruct and direct the group under him in the construction of the model.

This approach is useful when one wants to select a special leader from a number of leaders who have emerged from leaderless group tests.

6. SUGGESTED ALTERATIONS AND IMPROVEMENTS:

In this experimental application of the test, the materials used were light in weight and could be easily handled by one man.

The test could be made more difficult if, instead of wooden dowels, 3 inch pipes about 4 feet long were used, fitting into metal or hardwood blocks. The fitting of each section would then, due to the weight of the connecting pipes, require greater cooperation among group members, and the total construction would consequently require a greater degree of organisation, direction and control on the part of the leader.

Construction problems may be increased if pipes of different diameters, fitting into correspondingly sized holes in the block faces, were used. Such differences in pipes would then have to be proportionately indicated on the plan.

B. 1. A CONSIDERATION OF THE APPLICATION OF THE SCAFFOLD TEST TO SECONDARY INDUSTRY:

Because of a lack of time, only a limited number of groups were tested. In all some 50 subjects undertook the test.

All groups were given a minimum of 30 minutes - none, however, completed the test.

All subjects understood the test instructions without any difficulty and no questions were asked of the tester.

In all groups the subjects became immersed in the problem. The test appeared to be meaningful enough to the subjects and to have the necessary face validity to motivate them to action. A number of violent arguments arose, and in one group a fight almost broke out among two very dominant members.

In all groups leaders emerged. They were invariably the members who constantly consulted the plan, who argued from the plan and who were able to break up the plan mentally and explain the section layout to the rest of the group.

Leadership arose more by virtue of argument and debate than by action and physical dominance.

From observation of the experimental study, this test appears to be capable of selecting the intelligent, tactful type of leader required by secondary industry. Dealing as he is with the more sophisticated urbanised African, the ideal secondary industrial African supervisor must be a man who can evoke cooperation from his subordinates, who can organise a work group efficiently, who can direct and control the men under him effectively, who can delegate duties tactfully and

intelligently, who leads by his own example, and above all a man who can carry out his superior officer's instructions in a capable, efficient, tactful and intelligent manner. By the nature of the test situation, the Scaffold Test appears to stress the above leadership qualities, and to select men with the required leadership characteristics and personality.

THE BUS-ROUTE TEST:

A. 1. Description of Test
2. Construction of Test
3. Aim of Test
4. Application of Test

B. 1. Application of the Test to P.U.T.C.O.
2. Understanding the Test instructions
3. Differences of approach to the problem
4. Intra Group Relations
5. The Tests usefulness at P.U.T.C.O.

A.

1. Description of Test:

The test consists of a coloured three-dimensional layout which includes a complicated system of roads linking 9 native townships; a built-up area or city; a couple of rivers; a railway line; level-crossings and bridges; a number of factories, schools and churches; 2 native stores; a swimming bath, a sports stadium and a station.

An assortment of traffic signs and 30 bus-stop signs, to be used by the subjects in the planning of a bus route on this layout, are housed in a compartmentalised cardboard container.

The layout is built on a 6 x 4½ feet wooden board, standing 3½ feet high. The edges of the board being protected by wooden strips projecting 2 inches above the board surface.

The layout is supported by two trestles, 3½ feet high and 4 feet broad.

For transportation purposes the surface board is made in two sections.

The total weight of the complete test is approximately 100 lbs.

2. Construction of Test:

The actual layout is moulded from modelling-clay. This substance has the advantage of:

a) being very cheap (11/9 per 100 lbs),
b) having a smooth surface and even texture,
c) being capable of "holding" a painted surface,

d) of drying very hard,

e) with a fair amount of care being easily transportable.

In order to simplify test instructions a type of standardisation of modelling was employed:

a) all factories were constructed with two chimneys, one taller than the other,

b) all schools are the same shape and colour,

c) all township houses are similar in shape, size and colour,

d) churches are constructed to the same design,

e) the native stores are identical.

The area of the layout and its height from the ground makes it possible for normal sized subjects to reach any part of the model with very little difficulty.

3. Aim of Test:

The aim of this test is to pose a problem situation to groups of six subjects at a time, in order to assess supervisory ability. The test is so designed that:

a) a solution completely satisfactory to all members of the group is seldom, if ever, achieved,

b) an unlimited number of possible approaches to the problem exist,

c) the complexity of the test layout tends to evoke disagreement and argument among the subjects,

d) due to the very complicated layout,

the passing of test information as to which roads to take, is almost impossible,

e) the nature of the problem is such that testers will have ample time to assess the subjects (at least 30 minutes). An average group can complete half the task in 30 minutes.

4. Application of Test:

Considered under two headings:

1. The Test Situation:

a) For uniformity of exposure to subjects the test material is completely covered with a black cloth,

b) The subjects enter and are given their numbers,

c) The subjects are then assembled 4 feet away from the test,

d) The Traffic and Bus-Stop signs are placed on a table 4 feet away from the model - also covered by black cloth,

e) Test Instructions begin,

f) At a given sign during the instructions and model is uncovered,

g) Test commences.

2. Test Instructions:

Men, you have come here today to do a job of work. I want you all to listen very carefully to what I am going to tell you. If you do not listen, you will not know what to do, so listen to me very carefully.

First of all - these numbers that you each have on are to help us to recognise and know each one of you.

That your number is 1, or that your number is 5, or that your number is 3, does not mean anything. These numbers are for our (tester points to himself) benefit only. (Tester then walks over to the test material and lifts off the black cloth covering it).

Can you all see this model? (pointing at the model)

Can you all see this river here? (following the course of the river with his finger).

Can you all see this railway line? (following the line with his finger).

Can you all see these roads in black? (pointing along a number of roads).

Do you all see these locations with the red roofed houses? (pointing to a number of the various locations with his finger).

Do you all see the big town here? (pointing at the city).

Do you all see these factories? (pointing at random at a number of factories). You will notice that every factory on this board has two black chimneys - see here, and here, and here (pointing at factory chimneys) - do you see that? - all factories have black chimneys.

Do you all see this building with the big red roof? This is a trading store - a shop where the people can buy things. (pointing at one of the two trading stores).

All trading stores look like this.

And these buildings here, shaped like a U, are schools (pointing at the schools).

And this is a swimming bath. (Pointing again).

Good!

Now, working on this model, I want you men to imagine that you are the owners of a bus company, who must plan a bus route which will be the best bus route for the many people living in this area - you must work out the best route for people like the factory workers, like the housewives, like the schoolchildren .....

Now, when you start your bus-route, I want you to put stops where you think they should be on the road where the bus-route runs.
(Tester now turns to the table, holding the bus-stop and traffic signs, he picks up a bus-stop sign and places it randomly on a road).

You must use these signs with BUS STOP written on them like this - and place them on the road like this, where you think a bus-stop should be.

You can also use any of these traffic-signs and ... here (pointing to the signs) to place them along the bus route, like this, where you think they will be needed. <u>But you can only start using these traffic signs when you have finished the bus route and not before.</u>

You men must plan where you will start the bus-route and where you will finish it.

Talk aloud so that everybody can know what you are thinking and do not be afraid.

You must work on this job as a group, you must not work singly, but all work together.

Now, using all these signs, I want you working together as a group to plan one bus route on this board. (pointing to the test material.)

Right, go ahead!

Author De Ridder J C
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