

M.A. D E G R E E.

PSYCHOLOGY.

A COMPARATIVE STUDY OF THE MENTAL
DEVELOPMENT OF EUROPEAN AND SOUTH
INDIAN CHILDREN BETWEEN FIVE AND
TEN YEARS.

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A B S T R A C T.

A COMPARATIVE STUDY OF THE MENTAL DEVELOPMENT OF EUROPEAN
AND SOUTH INDIAN CHILDREN BETWEEN THE
AGES OF FIVE AND TEN YEARS.

The work falls into two parts. There is first of all a theoretical comparison of European children with Indian children. Although in the case of the latter, their development was studied personally, for the European child we relied on the conclusions arrived at by European Psychologists through their researches and experiments. The authorities for these being mainly, Charlottee Buhler, Susan Isaacs, William Stern and Piaget.

The development of European children was studied in three main fields with an introduction setting forth the justifications for studying childrens' development in these clear-cut divisions. These three fields are (1) Language and Thought, (2) Play. (3) Social and Emotional Development. In the light of these, the development of Indian Children was introduced tentatively. There is no claim to strictly scientific accuracy in this portion of the work with regard to Indian children, a comprehensive study being beyond the scope of a single worker within the limited period of six months.

The second portion of the work is a statistical survey of the results of the 'Francis Gaw Scale of Performance Tests.' For matters of comparison, the figures for European children are those arrived at by Francis Gaw. The Indian children tested were from a rather well represented School in Trivandrum, South India. These tests were all non-verbal, and even among these, care was taken to discard those which involved any particular culture. Ten tests were at first chosen, later three were dropped through lack of time, and one because the material met with disaster, and it was not possible to have it replaced in India.

Although the province chosen for the tests was limited, and the upper strata of society absent, yet the figures may reliably represent the achievements of South Indian Children as a whole, for that particular strata of Society.

I N D E X

PART I

MENTAL DEVELOPMENT OF CHILDREN

BETWEEN FIVE AND TEN.

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P A R T I.

MENTAL DEVELOPMENT OF CHILDREN BETWEEN
FIVE AND TEN.

I. INTRODUCTION.

Mental Development in Psychological terminology has come to stand for growth and maturation, as contrasted with change due to merely environmental influences. Such development depends upon the inherited characteristics of the individual and their mode of reacting on the environment. Figuratively it is the 'point of convergence of both the internal conditions and the external opportunities of development'. The organism meets the environment half-way and vice versa, and every individual is essentially the product of the interaction of these two factors.

In estimating such development, experimental child Psychologists have recognized the inadequacy of testing any one phase of an individual's behaviour, or any one mode of reaction, as e.g. the measurement of its intellectual ability which was most popular in the early days of mental testing. Instead, today, they aim at arriving at the total level of its development, and at studying the child's personality in all its fundamental dimensions. The intimate inter-relation of all forms of mental activity is emphasized and the impossibility of describing any one aspect of mental life except with reference to the organization of human activity as a whole. An attempt is made to keep the total child in view and to interpret all his reactions as the 'dynamic adaptations' of his entire organism - not one aspect of his

psychic life acting in isolation, but each item in proportion to the intensity or the weakness of the others. No behaviour of any kind is a manifestation of one particular aspect of the individual's mental equipment, and this is a fact of common observance. So often we find almost identical characteristics in individuals producing such contrasting effects, depending upon the difference in the combination of the temperamental traits, in producing the total personality. In most cases one aspect might play a predominating part, but the others are still there producing a halo effect. For example even if we succeeded in getting a very efficient test of intelligence, in measuring the individual's performance in such a test, we may it is true, get a fairly adequate estimate of his intelligence, but it is doubtful to what extent we have eliminated the effects of such character qualities as power of concentration, persistence, speed etc. and yet these may be so insignificant to intelligence that when a finer analysis is made, the net result may be very different from the original one.

When we get to older children, we are involved in a still further difficulty, According to Spearman, specific abilities become prominent after the age of seven, and in attempting to test a child's development we may be testing to a very great extent his specific abilities. In the case of infants and pre-school children on the other hand, there does not appear to be so much specialization, so that in their case it is easier to establish certain modes of

behaviour as symptomatic of certain stages of development. Striking performance of almost any kind in childhood, is an expression of general mental alertness and initiative, rather than of special talent in a given direction. One opinion current among child Psychologists is, that a general mental energy seeks out a material that is suited to a given age level and does very well with it. Every gifted seven and eight year old draws, and draws enthusiastically, but relatively very few fulfill the promises of their governesses and become artists as adults or adolescents. Between fourteen and seventeen these same children might compose poetry, and yet be able only to appreciate poetry when life acquires more stability for them.

So far as physical development is concerned, existing statistics enable us to claim that specially in infancy and even up till the age of eight or nine mental development goes hand in hand with the development of the bodily organism. In infancy e.g. the degree of mastery of the body is characteristically different for each month during the first year of life, and these changes have essentially a physical and psychic correlate. From the studies of the brain of infants we know today, that the cerebellum - the organ which controls bodily equilibrium grows very slowly in the first five months and then suddenly develops at a faster rate between the age of six and eighteen months. This time at which the greatest increase

is indicated is also the time when the child is learning to sit and to walk - activities requiring the effective regulation of bodily equilibrium which the cerebellum supplies. Likewise the changes which the following years bring with regard to social behaviour, emotional behaviour etc. must also be involving a very subtle inter-play between the purely physical and psychic organism - if one is justified in speaking of these ^{as} two distinct entities. In spite of development taking such varied forms, when we come to the school beginner of five we still find a good positive correlation between good school-work and physical development. This appears to be more or less fully borne out by Indian children as far as personal experience goes. But one peculiar phenomena was evident and Western Psychologists also have observed it. There definitely does exist a group where good school work or even a high intelligence quotient does not carry with it particularly good physical development. The children in this group seem to share certain common temperamental characteristics which were not so common in the normal group. Almost without exception they are already introverted, not very well adapted socially and prone towards varying degrees of neuroses. It is tempting to ask how far this temperamental maladjustment is responsible for the lack of physical development and vice versa, specially as its influence seems to be carried into adolescence. The accelerated pace of physical growth in the well developed

group seems transitory. Though they may reach their full physical development earlier, it is not necessarily greater than that of the group less developed in childhood, which catches up physically at adolescence and by which time also it acquires, perhaps through greater experience, a far more efficient and adequate social adaptation, however superficial that may be. This last generalization, namely, that the under-developed group catches up with the normal group at adolescence showing at the same time an improved social adaptation, was well confirmed by quite a few mothers with whom there was an opportunity to discuss it. The mothers were reliable, scientifically trained women whose judgments might well be taken into account. The question was brought in casually in the discussion of many other child problems, so that none of them saw any special significance in this point. In many cases they themselves mentioned the fact quite casually without being asked any direct question - provided of course the conversation led up temptingly to it.

On the whole however, the general rule that there is a positive correlation between good school work and good physical development holds good till about the age of eight, after which it is not rare to find a positive correlation between bad physical development and good school work. This most probably is as Charlotte Buhler says, because the child has reached the ability to compensate. It is here also that adequate tests of mental ability have proved impossible, for the child brings so

much specialization and interest to the fore that Psychologists are in danger of testing specific abilities and skill rather than the fundamental general ability.

In order to come to some kind of general understanding of the stages of mental development attained by children between five and ten years we will have to study some of their characteristic forms of behaviour and reactions to specific situations in many varying fields. Since we are only concerned with normal children we can have no doubt that the elements of behaviour will have been thoroughly mastered by now, such as perfect control over their own bodies, and a certain amount of skill and precision in work and play. Their language too will more or less indicate the intensity and extensity of their thought. Through the years that follow, behaviour undergoes important and characteristic changes. It is symptomatic of normal growth that all the psychological functions are subject to this transformation, though each may have its special chief period of development. When we come to the school beginner at five, we are really witnessing the last phase of a period of the greatest development which normally lies between the ages of two and a half years and six. Between six and eight, the greatest advance is in the development of the will power rather than in the intellect as will be contended in a later section.

We may now briefly consider a few of the fields in which such development is characteristically manifested. In surveying it, it is inevitable that we quote for the most part

the conclusions arrived at by European Psychologists with reference to European children. No such detailed scientific study has as yet been made of Indian children. Their development therefore can be described only on the basis of the Writer's own experience. The more one studies the children of different nations, the more one realizes how children are the same human material throughout widely separated regions of the world. One is often surprised at the almost identical mental reactions to particular situations, made by children of widely different countries, and often too their remarks appear as if they have been literally translated from one language into the other. We have every reason therefore to expect the mental and physical development to follow the same general lines. If as we will show later, the expression of such development takes a slightly different form due to circumstances and in the difference in social conditions, it is only the form that varies, the principle still remains the same.

II. LANGUAGE AND THOUGHT.

There is no doubt that speech develops most rapidly during the early years of childhood, and when we come to the ages under investigation, the child has well-nigh reached the adult mechanisms of speech.

According to Stern, speech development is considered to be nearly completed by the fifth year. But if by speech development we mean the chief period of development of this psychic function, in South Indian children development seems to be almost complete by the age of three and a half. Whether this is because they mature earlier as is frequently suggested (without any real foundation) or whether it is because they move so much among the other members of the home and almost constantly have an adult attendant, is a subject worth investigation. There is however one further possible explanation. It might be due to the criterion by which the development is judged. In the Indian languages the standard of speech development is judged chiefly through the efficient and correct use of inflections. In the South Indian languages, the form of the sentence and even its meaning can be entirely changed through the endings without the addition of any new words, whereas in English one would have to add new words to change a very simple sentence into a more elaborate form. For example, one could translate literally from English the sentences "Give it to me" and "Will you give it to me." In the Vernacular, the first sentence is expressed.

in three words, the second is expressed in the same three words, only the verb being inflected in a different way. These inflections form the basic elements of speech, and when they have been acquired, the speech development ought to be regarded as completed. What differentiates the older child from the pre-school one is its ability to use more complex forms of thought. In studying the child between five and ten therefore, we do not study his language as such, but only in so far as it manifests the depth and range of his thoughts.

Piaget, after having made an exhaustive study of childrens' spontaneous conversations and answers to deliberate questions, comes to the conclusion that till the age of six and seven, thought as manifested by the language of children remains ego-centric. It plays round himself and deals with his own immediate experience.

In accordance with the facts, this cannot be taken too literally. Any intimate knowledge of children above two will certainly point to their absorbing interest in the physical world, and if scientific proofs are necessary, Susan Isaacs records of the activities of her group of children will immensely prove how much of their time is spent in concerning themselves with material phenomena where the environment is favourable - that is, where there is scope for varied experience and where adults cater to the children's demands - social, emotional, and intellectual. Piaget discussing further the question of ego-centrism points out the autistic and unsocialized thought of the child till it is about seven. This again is a generalization

drawn on a very slender basis of fact. It is true that the social instincts which he has stressed so much do appear more marked at the seventh and eighth years, but they must not be looked upon as a direct expression of a strictly biological process. It is to such a great extent the outcome of experience, and depends so much on individual tendencies and temperaments, that the social sense must be regarded as having a psychosocial genesis. As a general rule Soliloquy is commoner in the child before seven than after this age. Due allowance must be made however for individual differences, for some soliloquise much more than others at all ages. But even in the case of these children there is plenty of social behaviour in appropriate situations. Socialization therefore is a continuous process rather than 'one of hard and fast stages of development marked by crises of change'. After all, it is not only the child that is ego-centric; adults untrained, undisciplined, ignorant and inexperienced are certainly ego-centric in varying degrees. Susan Isaacs supports the view that childish egocentrism is in large part due to ignorance, and adds "there are no doubt limiting conditions and ages, but the fullest allowance must be made for limited experience". The child is not resistant to knowledge as Piaget supposes, but suffers merely from a lack of experience.

With reference to Indian children, this view only needs to be confirmed. The vivid interest which they display in their surroundings is so much taken for granted that it has

ceased to draw comment. Every endeavour is made on their part to make their environment intelligible to themselves. They do not even manifest that selective factor which most adults do - anything new and incomprehensible must be accounted for and made clear. At the same time there is also a group of children which does not take the slightest interest in incidents with reference to which the foregoing group would have had an endless series of questions to ask. In fact they do not seem to have observed them at all - their attention seems to turn on their own play activities with such seriousness that one begins to suspect ^{that} it satisfies for them a more vital need than is evident superficially. Individual differences of this kind point all the more clearly to the hypothesis that egocentrism has a psychological genesis rather than being a purely biological process. The decisive factors appear to be the environmental and temperamental tendencies rather than the principles of pure maturation.

Piaget has also found the phenomena of juxtaposition in childrens' speech. Once again he attributes this as a form of speech characteristic of children, for it implies the failure to see the explicit relation between propositions which imply such a relation. This may hold good in many cases as may be seen from the following examples taken from Piaget. We find here the term "because" covering many kinds of relations such as casual, consecutive etc. A child of eight remarked "The man fell from his bicycle because he broke his arm." Another (6½) "I teased the dog because he bit me."

What is meant is - First "I teased the dog and then he bit me".

L (7½) "I went to the Cinema because it was pretty."

Piaget commenting on this remarks that they found out that he did not know it was pretty before going to the Cinema. He thinks the child meant "I went to the Cinema and it was pretty."

Piaget seems to have ignored altogether the question of rationalization. That children make these unconscious rationalizations as much as adults is evident. Moreover when they answer these direct questions of adults, they have not the slightest intention or interest in giving us their real beliefs about the point. The question may be one they have never thought about, but they give the answer on the spur of the moment just as if it were to satisfy the adult. Many of their theories therefore have no relation to their mode of practically reacting to any given particular situation. To what extent this juxtaposition occurs with reference to the equivalent malayalam term is an open question, but in no case was this phenomenon met with in the personal experience of children of four and five. Susan Isaacs gives many examples to show in how many cases those conjunctives which Piaget considers the danger points, are correctly implied. She specially quotes a remark of one little boy aged three years nine months showing the correct use of conjunctives even on the ideal plane of thinking - "The bread is already buttered isn't it? So if we want it without butter we can't can we, unless we scrape it off with a knife? And if we want it without butter and will not scrape

it off with a knife, we will have to eat it with butter, don't we?" "What limits the child" she says, "is not an inability to apprehend logical relations but inability to deal with ideational systems of more than a low degree of complexity." It is not therefore characteristic of childish though to be unconsciously directed - it merely depends on the mood of the moment. The mood is sometimes one in which they are unable to make the simplest of presuppositions. J.C. (5½ years Indian) was asked a simple sum in addition, "If there are six mango trees in your house, and three in A's and two in B's, how many are there altogether?" J.C. would not proceed with the sum because he insisted that there were only four mango trees in his house. He would not presuppose the greater number, and yet in school he does sums on similar lines everyday without throwing any doubt on the premises. On another occasion J.C.'s parents were talking of shifting to a new house which happened to be far away from the school, while the present one was within two minutes walking distance. J.C. began to wonder how he would go to school everyday, and was told that in the future he would have to go in the car. He immediately began a string of presuppositions. "Supposing the car is being repaired" (M)" Then we will get a taxi for you. (J.C.) You will never send me alone in a taxi and supposing T is ill and K is very busy, I still won't be able to go to school". Nor is J.C. wanting in improvising imaginative games on a most lavish scale.

It is not therefore that children between five and ten cannot deal logically with arguments; they can do so very well at certain levels of thought provided they are in the mood for it.

It is the lack of experience also that accounts for the child's inability to utilize formal reasoning. Eurt's study of the development of reasoning in school children led him to conclude that all elementary mechanisms are present before the mental age of seven if not before. Development consists primarily in an increase in the precision and elaboration with which those mechanisms can operate. Many psychologists go even further and claim that from about the age of four the reasoning ability is evident. Many observers will bear witness to this fact gathered from their childrens' conversations; and Susan Isaac's book "Intellectual Growth in Young Children" abounds with such instances. Her subjects however it must be remembered are very highly selected, so that their development will be a few months or a year ahead of the average child of the same age. In claiming that the reasoning ability is here at so early an age we still claim only that the raw mechanisms are there - it is found in its more concrete expressions now, it appears in its more abstract forms only about the age of twelve. The important point to recognize is the 'fundamental unity of all processes of knowing, whether they take the perceptual, the imaginative, the conceptual or the deductive forms'. The simplest form of reasoning and the perception of relations are the base on which the finer shades of

reasoning are built, and these broad levels of development no doubt over-lap at all stages.

We may in conclusion enumerate a few more forms of thought that occur in childhood, bearing in mind that these forms do not follow any strict biological sequence, but occur in the speech of children and gradually disappear as they mature and gain in experience.

Until about the age of ten most children consider thought to have material form - "it is made of air, of blood, etc." But it seems hardly fair to ask children such questions. Scientifically trained men, and even psychologists would hesitate before they presumed to give a definition of this concept. Children however do not exercise such self-criticism and would dismiss the question with the first means that occurred to them. That they do give it a material form may mean that ^{they} are able to deal with concrete forms only. J.C. (Indian) believes that when he speaks or thinks of anything the actual words come down from his head to the tip of his tongue. At the same time children are not quite lost in grappling with abstract concepts. For instance the remark of one of Susan Isaac's subjects at the age of six years, on hearing a companion remark on "getting up early and late and things like that"- "Early and late aren't things. They are not things like tables and chairs and cups - things you can model."

Another phenomena which usually appears in childhood is that commonly known as Nominal Realism - when the names as

such have every importance for the child. "If there weren't any names, you couldn't make anything" remarked a child to Piaget. At the earliest stage till about five or six, names are regarded as belonging to things, as being in the very nature of the things. From this stage they pass on to believing that the names were invented by the makers of the things, most often God is given the responsibility. J.C. ($5\frac{1}{2}$) was quite definite about God having given us our names; when asked if they could be changed he said "Oh no, we would have to ask God before we did that". Although he held this theory, it did not in the least prevent him from occasionally creating new names which he thought more appropriate for himself and his friends. By the age of nine and ten they completely pass this stage to where even in theory the name is no longer identified with the idea of creation. "Names could have been changed and nobody would have known" is the attitude towards this phenomena. Incidental with this stage is that of artificialism as may be seen from an examination of the responses to the 'Definitions Test' of Binet. The child of seven and eight defines a thing according to its use - a chair as a thing to sit on, a mountain 'to be climbed' and so on. Everything appears to the child mind to be made for a purpose. This stage itself is the outcome of childish animism which attributes life and consciousness to inanimate things. As we know, every child passes through a stage when he talks of the moon following him or leaves being hurt when they fall from

the trees. The question however, is whether it is the child alone that has such impressions - on the contrary, ignorant adults entertain very similar ideas, pointing to us the important part played by experience in the story of maturation.

These stages of thought, therefore, over-lapping as they do at every period, wherever we may choose to take a cross section of the child's mind, must not be looked upon solely as the result of some mysterious process of maturation - biological growth is but half the tale - the World of experience the other half, and maturation must be essentially looked upon as a psychological concept.

III. PLAY

To a keen observer, the play life of a child must surely throw much light on the transition from one stage of development to another. No activity is taken more for granted and yet perhaps no other field is able to yield so adequate an all round picture of the level of maturation attained. The play life of the child is one of those situations in which he brings to a meeting point, almost vividly as it appears to a trained observer, his own innate development and his experiences - his total environment. The child's intellectual, emotional and social maturity is inevitably manifested here - if we but knew how to interpret it richly enough, for with Karl Groos we must agree that, "Play is the free expression of the soul."

After the period of function-training is over - the period when the infant is merely concerned with action and manipulation, there appears a gradual transition towards the application of skill. They are no longer interested in the action only, but more so in the result of their activity, and here begins the application of skill. They aim at making things that have come under their experience, and though want of skill or dexterity will prevent the representation from being correct from the artistic or technical point of view, taking into consideration the intention of the child

this stage is known as that of symbolic representation. This is more or less well established in three and four year olds. Before this the child rarely has any intention of representing an object. If asked to name the object he has produced he usually invents one on the spur of the moment, which in all probability bears no relation to the construction; and many if asked to name in the course of construction say "I won't know till it is finished" or something to that effect. A year or two later, the child before he begins his construction says to himself or to the on-lookers that he is going to make a car, or a boat or whatever his intention may be.

After the age of symbolic representation they are interested in making things out of materials not for the pure pleasure of representing objects, but in order to use them for a further play activity, e.g. making paper boats to sail them in water - specially in the Monsoon time in India, making stilts etc. This is technically known as the stage of realistic production, and Charlotte Buhler considers this mode of planned attack as contrasted with the wilful unplanned attack of the younger child as a developmental step that all normal children reach by the age of six. "Failure to reach it" she suggests, "as being an indication of the extent of psychical unbalance or intellectual retardation".

The material chosen for play is also partly

determined by the child's development. Building materials alone remain in favour from infancy throughout the years of childhood, but all mechanical toys which lend themselves only to one type of manipulation are quickly discarded. J.C. (5.8) sometimes unconsciously displayed these attitudes most clearly standing before his toys deciding how best to occupy himself. He would as it were review the ones he had discarded long ago, takes out his toy elephant to see that it still moves on its wheels, makes an elaborate display of trains, or any other mechanical toys which still happen to exist, finally puts them all back and chooses materials for construction, or carpenter's tools, drawing materials etc. At intervals there used to be an epidemic for aeroplane construction, and after that for making bows and arrows.

In the manipulation of material the infant shows little or no discrimination, and whereas he performs certain characteristic movements regardless of the material, the older child manipulates each object according to its nature and makes on the whole a happier adaption of the material to the purpose in view. He may e.g. use clothes pegs as horses - unlike in nature though they be, but it will be noticed that he constructs many such pegs so as to bear some kind of resemblance to the horse and hardly ever gives the pegs the fictitious role of horse.

From the age of two onwards, an important sex difference is noticed. While all infants prefer

building materials, at this age boys are much more enthusiastic about it, and will construct not only with bricks but anything handy, e.g., rods, boxes, etc. Girls on the other hand, do not on the whole display any extremes of like and dislike. They tend to tolerate everything.

While we may seek for the maturation factor in the child's purposeful construction - the attempt to achieve a self-imposed goal, we find individuality and experience expressed in the choice of their objects of construction, Charlotte Buhler gives us a very striking example of two brothers aged three and a half and seven, both playing with clothes pegs. The older child was occupied in constructing a horse, a motor car and an aeroplane with them, while the younger put some into two card-board boxes, attached them to his waggon and went round the room saying he was the baker and selling rolls to his brother. The difference in motivation is significant. While the younger plays a game of pretence and gives the pegs a fictitious character, the older is engaged in a task which for him appears quite serious, and which must be achieved before he can be satisfied for the time being. Having reached this stage does not mean that children never go back to an earlier one. A great deal depends on the mood of the moment. J.C. (5.8) (Indian) had reached the stage of realistic production and by the age of five years ten months had acquired quite a number of collecting interests. Yet there were times when

he would revert to the most childish levels in the inventions of fiction games. He would put his cousin's doll into it's pram pretending he were the nurse and receiving instructions about the time he was to come back etc. Of course this happened very infrequently, but that it does occur only shows that too clear-cut demarcations cannot be made. The realistic production and arriving at practical goals is symptomatic of a certain level of maturity and is the expression of an 'innate developmental trend' that is characteristic of the normal child as Charlotte Buhler concludes from her statistics.

Judging the play of Indian children with these standards present some difficulty because some social conditions are so different from a psychological point of view. One can only make tentative suggestions. In the present inquiry there was really no opportunity to observe their free play, and questions referring to it, both parents and children found difficult to answer. Activities which would be included under play in the psychological sense of the term were not regarded as such by either of these parties. For example, by more detailed questions it was obvious that children of six had definitely reached the stage of realistic production, but the children themselves looked upon the production of these objects as a means to their play. It is significant that they always imply by 'play' what in the English language would strictly be called 'games'. In fact we have only one term in the

vernacular for both these English terms, and the same word is used as the noun and verb. Judging from the available data, Indian children pass through these same stages but they all over-lap so much and the children themselves are directly influenced by adults to a greater extent in their play that it is difficult to find the exact levels for each age group. Besides, being initiated into activities by adults, we must be careful not to call an earlier maturation what is really imitation. Having almost constantly an adult to play with them, it is natural to have ideas suggested to them in the course of their play - e.g. "We'll make such and such a thing with this" etc. The child having thus been taught the relationship between an idea and its representation imitates the adult automatically in theory, although it cannot do so exactly, technically. For example, Indian children are given ample opportunity to draw and model, and they appear to reach the stage of symbolic representation by the age of three, whereas English children do not reach this stage by their third year. Instead of denoting an acceleration it may on the contrary be pointing to the results of curbing their imagination so early. The same point seems to be clear by their attitude to group games. Indian children are initiated so early into group games, that this is by far the chief form that their play takes. But to judge their maturation by this would certainly give a wrong impression. For at the ages from four to seven, their

attitude to this form of play is very different from the spirit which group games imply. They are usually interested in carrying out their own individual ambitions, and use the others in the group as 'pawns'. After the age of eight or nine, the attitude is entirely changed, due as we shall see in the next section to a greater degree of socialization and emotional development. Only now can we be really justified in saying that the child has reached the maturation level implied in a happy partnership of group games.

IV. SOCIAL AND EMOTIONAL DEVELOPMENT.

If it is legitimate at all to mark off by boundaries the gradual passage from one phase of development to another, we may be justified to a certain extent in maintaining that it is in this field that a very marked difference is shown between the pre-school child and the child of five and above.

It is perhaps now for the first time that the child sees himself as a member of a group - sharing ideas, hearing opinions etc. His own psychic development partly accounts for this, for now he is better able to communicate with others and make himself understood through his developed forms of speech. In addition the environment must no doubt contribute its share towards this transition by demanding a certain amount of modification of behaviour, for it is about the age of five that most children enter school, and is for the majority of them the first opportunity of meeting so many of their own ages. The first year or two must be difficult years of adjustment. Till now they were the centres of attraction for their mothers or nurses, now they find themselves one among so many, all equally demanding care and attention, and each child no doubt finds himself thwarted in his freedom of speech and movement. This forces on him a sense of reality, and gradually he learns to fit in with the

others, for he is not long in discovering that no other kind of behaviour pays. The child of five though more socialized than his junior still does not play with others in a co-operative sense. It might well be said that he plays in the presence of others or uses them as 'pawns in his own game'. They usually plan their games in the following strains - "You stand under that tree, and when I shoot, you must fall down" or "I am the shopkeeper and you must come and ask me for sugar, tea" etc. and so on. Obviously the other individual's part in the game is but to obey every such behest. If there is any suggestion as to the contrary, the game is discontinued but not before a quarrel and tears.

At about the age of seven, individualistic goals and games are found more or less dull, the child begins to partake more heartily in group games. As we mentioned earlier, it appears as if Indian children also, only really welcome group games from the age of six and seven onwards, although they are initiated into it much earlier. In fact they have more interest in all their activities when they are performed by a whole group together. Children who appear to have no appetite at all give no trouble with regard to their food when it is taken in the company of other children. The same applies to many of their common everyday activities and more serious occupations. A child further, now begins to look outside his own home, and the social codes of his

group appear more important than the standards in which he has been brought up. At first he is interested only in conforming to the modes of his group, dressing like them, possessing things like theirs, etc. J. C. (5:8) had been wanting a pencil cap, so one day when he was with his mother at a shop she bought him one. Since he looked so dissatisfied they asked for another selection and in none of these could he find the kind he wanted although they looked quite satisfactory. Some more were then brought out and at last he was delighted to find exactly what he had been looking for. Now this one was not nearly as high a quality as the others, "but everyone in my class has this kind" he said, and therefore he wanted no other. Gradually these five and six year olds begin to take a part in making and enforcing rules. Sacred to them are the ceremonies of each game, and they must be piously regarded. Whereas older children seem to understand rules as mere conventions agreed upon by the players, to those under seven or eight they are absolute. Nor do children of five and six display much toleration in meting out penalties to those who have transgressed the social law. Once a friend of J. C.'s gave him a little kitten which unfortunately none of the adults welcomed; but he seemed so anxious to have it that finally he was allowed to keep it. On the evening of the second day, the kitten seemed to have disappeared, and J. C. was obviously distressed. He made all possible suggestions, "somebody must

have stolen her", "The mongoose must have caught her" etc; he only settled down when it was suggested that there was still a possibility of its being found. The next morning however it was found that it had spent the whole night in one of the wardrobes. Nobody approved of this, but J. C. by far the youngest of them all was the most intolerant, "oh drive that kitten away - don't give her any milk this morning - we'll throw her over the wall" etc. Susan Isaacs gives us very interesting examples of similar behaviour of children towards their dolls. She noticed that even children whom she knew to have been used to nothing but the greatest gentleness and mildness at home, were found at play to be scolding their dolls most vehemently. It is significant psychologically that they were most intolerant when their dolls were supposed to be guilty of the faults towards which they themselves were most prone. The older children were on the whole more reliable in their conduct, and yet it was they who were much more tender and patient towards their charges.

Coincident with the child's interest in group play is the dawn of the 'social consciousness' as Florence Goodenough denotes it. Because of his desire to win the approval or avoid the disapproval of his group, the child learns to inhibit his impulses to a certain extent. He identifies himself more and more with the group and looks at himself through the eyes of his associates. This we may

regard as but the foreshadowing of the power of self-criticism which is still rudimentary even at the age of ten.

Very interesting studies of the primary tendencies of self-praise and criticism of others have been made by Decroly. Of these two tendencies, from about four to five, there exists for the most part self-praise only, they are to all appearances still so oblivious of others and their work. They exclaim with pride at their own achievements and will call the attention of others to it. e.g. exclamations such as "none of the others can do this, I am the only one who knows how to do it" etc. are quite commonly heard among children. The tendency to depreciate other children or the problem itself when it appears insoluble comes a little later - to quote in this instance an example from Decroly - J. Y. 10-6 is criticized for his poor handwriting and answers - "Oh well, a nice handwriting is dumb anyway."

On the whole, Charlotte Buhler finds that children show an appreciative attitude towards other children from about the age of eight. Pearl Greenberg, from her studies made on Viennese children came to the conclusion that two to five year olds rarely express spontaneous opinions about their work, if expressed at all they are positive for their own, negative for the work of other children. 70% of six to seven year olds however, were found to make spontaneous

criticisms of self-praise. At the same time it is usual for two to five year olds to make positive criticisms of others, however little objective value they may have, if they are people whom they like. On this account it would be dogmatic to state any hard and fast rule; due allowance must be made for individual variations which are numerous. J. C. at the age of five years nine months was often noticed to make appreciative remarks amounting to positive objective criticism about the activities of his class-mates, "M to-day found his desk with his eyes shut". (C) can't you do that? (J.C.) "No, I don't think I can do that" - after a few seconds, "really M. is a very clever boy." And many of J.C.'s friends whose ages ranged from six to eight took a pleasure in calling him the sports champion of their class. More enlightening is the work of Emmons who finds a positive correlation between self-criticism and the degree of intelligence - the more intelligent child is capable of self-criticism at an earlier age.

Objective criticism as we may expect, occurs before self-criticism. From about seven, when the child is less dependent on adults and more so on companions of the same age, he regards his elders from a critical point of view. No longer is he blindly willing to allow them to maintain their prestige by mere virtue of being grown up. 'In the movement of their minds away from phantasy and towards

reality, they demand an authority that is genuine though mild and understanding.' Nine and ten year olds are unanimous in wanting a teacher who is perfectly fair in evaluating their work. They begin to want real achievement, real skill in every direction. Fairy tale days are over by the age of eight, animal life awakens their interest and these are in turn replaced by tales of adventure - the girl following the same cycle but a little later.

On the whole however, though smiles and tears and moments of sheer desperation are but the normal events of every child's life, psychologists have agreed that children from five to ten present relatively far fewer difficulties than the younger age groups or the early adolescents. It is significant that this period coincides with the culmination in the development of physical strength and vitality. This fact is also borne out by Medical statistics which show that the mortality rate is lowest between the ages of eight and twelve. Not only is good physical development maintained but it is also a source of pride to the child. His friends hero-worship him and the leaders of these age groups are always selected because of their strength or skill in some kind of sport.

This wave of physical development is counterbalanced by an equally strong mental acceleration - the forward spurt being usually in the direction of logical, abstract and

critical thinking. The ten year old is ambitious and anxious to discover things for himself. His interests are above all practical, his readiness therefore to help with repairs etc. are more of a necessity than a pure desire to oblige. With ten to fourteen year old boys in the house, non-mechanical minded adults rarely have an opportunity to gauge the disadvantages of their handicap. The lights, the radio, the typewriter are all in working order if he is at home. It is quite possible that girls from nine to eleven are as obliging in their own sphere. When the present tests were being conducted many of the girls, at least thirty five per cent of them spontaneously helped the experimenter in putting back the material in their boxes etc. but only three out of a total of two hundred boys made the effort!

V. GENERAL COMPARISON OF EUROPEAN
AND INDIAN CHILDREN.

The foregoing survey of the main fields of development in European and Indian children, tends to point to the fact that individual differences are certainly greater than communal or racial differences. From infancy, though average height and weight are expected to be less in Indian children, the stages of their maturation coincide almost exactly with those of European children. (Speech development is the only direction in which there appears to be a marked acceleration on the part of Indian children. This is very likely, as we had occasion to mention before, due to the greater amount of adult influence. It is not so much that there is a physiological limit to the amount or variety of articulation on the part of the child, as the absence or the presence of opportunities. Hearing more adult forms of speech, and a vocabulary wider than would be applied to things under their own direct experience, it is natural that they should acquire a better standard of speech earlier than children who see much less of adults.) There is no doubt that progress in language is largely due to pure imitation. Children often appear to use words in the same sense as adults without meaning the same thing at all. It is only gradually through experience that they

come to learn what exactly those terms stand for. For example, E. C. (3:3 Indian) had been asking for some time to be taken to church and one Sunday evening her parents promised to take her. Before they set out, her father asked her what she was going to do in church. Immediately, without a moment's hesitation she replied, "You must run and I will catch you." She had so often used the word in what appeared to be its correct context, that one would never have suspected her to have such a different conception of the term. Since so much of speech is mechanical imitation, in judging maturation by its standard, one has to take into consideration the many influencing agents at work. It can only be a safe measure of maturation when applied within the limits of environmental differences. Likewise, egocentricity and soliloquy are not peculiar to the ages below seven or to different nations. It is largely a question of environment - in the sense that no environment can be perfectly uniform for any two children, one has to take into account each one's peculiar reaction to it.

It was not possible to find the exact age levels for the different forms of play, but there is every reason to expect the European and Indian levels to coincide more or less. (There does at any rate exist identical activities. All Indian children, like European children take great

pleasure in building, and will build with any available material. Modelling is also popular till about the age of eight or nine. While the children of the higher classes who are kept indoors more, would model on a modest scale with plasticine, the children of the labouring classes, living chiefly out of doors make most elaborate representations with real soil, the Cocconut and the Palmyra palm. Initiated into group games earlier, the Indian child does not really enter into its spirit before the ages of five or six. After this age there is a real pleasure in partnership as in the case of European children. But at all ages they are more interested in all their activities, if there are other children to share in them, and compete with them.)

In the sphere of social and emotional development, the European child may have to make a greater adjustment than the Indian child when he enters school. Under the circumstances, the latter most probably finds it necessary to make these adjustments all along. Pearl Greenberg found, that where two to five year olds do express spontaneous opinions, it is always positive for their own, negative for the work of others. As far as personal experience goes, Indian children between two and five are not wanting in making positive remarks about the work of others as long as they concern people whom they like. These positive criticisms

are not however spontaneous, they are really answers to direct questions. One cannot be too dogmatic about the point of self-criticism, positive and negative criticism; individual differences are so great, and these stages overlap even in adults.

The racial temperamental differences themselves are not as great as is usually supposed. Social traditions, ideals and customs play so important a part, that many differences which are considered fundamental, are to a great extent superficial only. The same mechanisms are at work everywhere, but unconscious imitation begins to operate so early in life, that an adaptation acquired within any geographical unit, tends to persist in the Communities within those limits. It is significant that the less easily accessible a region, the more orthodox and conservative it remains, almost impervious to new ideas; showing a greater bond of sympathy to its own Community, and a greater suspicion of the foreigner.

PART II

MENTAL DEVELOPMENT OF SOUTH INDIAN CHILDREN
AS INDICATED BY PERFORMANCE TESTS.

I. THE APPLICATION OF MENTAL TESTS.

To diagnose normality, retardation and acceleration in these broad and general terms may appear to the layman not so very remarkable a feat; but to state with scientific precision the degree of departure from the normal, and what is still more important, to establish the grounds on which we grade individuals in the order of their mental ability, is a problem which even now is not completely solved.

The measurement of Mental abilities at one time meant comparatively nothing more than sensorial measurement; and since this showed no relation to activities which obviously required intelligence for its performance, they were not long in being replaced by such psycho-physical measurements as reaction time etc. These studies were followed later by others relating to the purely psychical activities as memory, learning, judgment, and reasoning. To some 'intelligence' came to stand for the ability to carry on abstract thinking; accordingly tests were framed and individuals graded in intelligence according to their ability to carry on this form of activity. Meanwhile, other gradings were being made by testing the reasoning ability - abstract and concrete, adaptability to new situations and the ability to make use of past experience.

Though psychical measurement of this kind marked a step forward towards the goal, it is still open to doubt how far any of the above mentioned abilities may be relied upon as an index to general mental ability, which is really the central purpose of all mental measurement. While some psychologists claimed that one such activity was adequate to estimate general mental ability, there were other schools best represented by Thorndike who conceived the mind to be 'a host of highly particularized and independent faculties;' implying thereby that intelligence is no common multiple of many mental abilities, and that therefore, one could get a separate evaluation of traits but no index to the general ability. Nor is it possible to speak of a 'general ability' as in Thorndike's terminology. The greatest opponent to this school of thought is Spearman, who is now widely followed in his theory that mental traits are not absolutely independent, that there is a single common factor in all our cognitive abilities, and this he terms the 'general factor'. Spearman does not assert that this is general intelligence, but merely proves mathematically that his 'g' is but a component of all such operations as 'adaptation', 'abstraction', 'attention' etc. This theory surely must be a source of comfort to any mental tester because it claims

so little. Apply what tests we may, from the simplest sensory to the most highly involved, Spearman assures us that they will all involve 'g' which we may with confidence call 'general intelligence' though he does not commit himself to saying so much. His criterion is that all branches of intellectual ability have a common factor 'g' and that different mental activities have specific factors which are independent of one another and of 'g'.

The outcome of the many studies along these lines has been the creation of a vast number of tests all claiming to measure or estimate mental ability, by far the most popular being the Binet tests in their Stanford revision form and Burt's revision of the same. The results of these have been very promising in the hands of specialists applying them to children, but unfortunately it has not always been so in every case. Glaring discrepancies in certain cases opened the eyes of testers to the fact that in spite of their best intentions and theories, General Intelligence alone was not the only factor being evaluated in these above mentioned tests. Being Verbal and requiring such responses they were calling into play Verbal ability, which is a relatively 'special' ability and need not have any great correlation with general intelligence. In many cases this specific ability is developed out of all

proportion to 'general ability' and other specific abilities. Nor was it possible to apply these tests to deaf children, those with speech defects, and those so emotionally disturbed that they could not be expected to do themselves justice when face to face with an examiner. There was therefore, a demand for a revision of mental tests so as to make them applicable to all the types of children mentioned. From this need there developed Performance tests which almost completely rule out the factor of Verbal ability, but it is doubtful whether it has not introduced at the same time another difficulty, the introduction of a specific practical ability, which like the Verbal ability need not have any correlation with General Intelligence. The wide application of these two types of tests gave results which were not always consistent with the estimate of intelligence in daily life.

(Further analysis has suggested that it may be impossible to divorce intelligence entirely from the emotional and temperamental factors. To assess the mental ability of an individual it may be necessary to study that individual as a whole. Nevertheless, for purposes of analysis to separate intelligence from emotion, emotion from character, and character from will is unavoidable; but to obtain a completely adequate survey of the individual's

ability these factors must be allowed to interact. One type of examinee for example, though they fail in life, may do fairly well in intelligence tests which need only a few minutes concentration at a time. Such individuals may be incapable of sustained attention, and may lack qualities like persistence etc. Their ability or rather capacity must therefore be rated in the light of all these facts if they are to yield a complete picture. It was mainly to meet this demand that tests of emotional and temperamental traits were constructed. These however are not yet wholly reliable.)

Later tests appear to have taken all these facts into account. The Rorschach^{ach} tests and the Mosaic tests are both intended to measure individuals as entire wholes and not as a body of loosely integrated faculties. These however are still awaiting the conversion of educationists and psychologists, but we may hope that since the facts have been faced, many pre-existing flaws have been remedied and they will in their own time contribute their share in this attempt at estimating Mental Development.

II. GAW'S SCALE OF PERFORMANCE TESTS.

Performance tests which are now adopted primarily for mental testing, were first developed as an outcome of the successful researches of Itard and Sequin on the method of educating mental defectives. From this successful issue emerged also the Montessori method of educating normal children. The natural interest of children in handling such material, and their being such as could be manipulated by all grades to a certain extent, contributed a great deal towards their being the pattern on which tests could be moulded in estimating mental development when the need arose which necessitated a measurement without making demands on the subject's ability to use language. We are warned not to confuse these with those tests of manual dexterity, where success depends primarily on skill and deftness with the fingers, or with tests on mechanical ability in which recognition of mechanical relations is a necessary condition for a correct solution. Francis Gaw claims that the tests in her series are essentially measurements in which the manual response is but a means to an end, analogous to the written response required in numerous linguistic tests.

The existence of a special Verbal factor is now an established fact; similar evidence with regard to a practical ability in performance tests is still forthcoming.

The reasons for this are not far to seek. The use of Performance tests in educational guidance is only a recent development; consequently an attempt to establish a factor in them falls to a still later date. Moreover it is important to notice that it is only recently that statistical methods for the solution of this problem have become available, till that time therefore any analysis of the factors involved in different activities was little more than speculation. Among the most recent and important works in this line are those researches of Alexander undertaken to discover the relationships between the so-called different abilities of an individual. Employing a novel statistical technique he claims to have proved the existence of a practical factor as well as the Verbal factor. In addition to these two he finds corroboration of the existence of 'g'. Alexander defines practical ability as "that ability or combination of abilities which can be measured by Performance Tests of intelligence in which there is a practical task to be done which involves and stresses thinking rather than mere manual dexterity." As far as possible such tests should be measuring the same type of thinking that is measured in Verbal tests as e.g. education of relations, education of correlates, rather than reproduction in any form. The purpose being to use a practical medium for measuring intelligence.

In his own investigation, the Performance tests used were (1) The Pass-along Test. (2) The Block design Test and (3) The Cube Construction Test. Other Performance, Verbal and Mechanical tests were used for comparison.

He foresaw that if the practical tests were measuring the same ability or factor as the Verbal tests, then the correlation between these two would be somewhere between the correlation between the Performance tests and that between the Verbal tests themselves. This criterion did not occur in his results. He found that there was more in common between the practical tests themselves, than between them and the Verbal tests. He concluded thereby that the practical tests were not measuring the same thing as Verbal tests and that only. The same phenomena appeared with regard to the correlation between the mechanical tests and the above mentioned. It was obvious to him that these were not measuring the same common factor to any great extent. The presence of a group factor or group factors being established, he proceeded to investigate the significance of these 'factorial loadings.' By the method of 'multiple factor analysis' he found that the smallest number of independent factors necessary to account for the correlations is three. One of these, called by him Factor I is common to all the tests and is more important to the whole test situation than any other. He calls this the common factor and admits

it to be 'g'. Apart from that, practical ability is distinct from Verbal ability, these two have more in diversity than in common. He found that all Performance tests function together, there is a common item working through all of them. They have a factor in addition to 'g' - independent of it and the Verbal ability. Score on a Performance Test is the result of 'g' and the practical ability which is called F. This must not lead us into thinking that the F ability and the V ability are mutually exclusive. They are definitely related to one another and in Alexander's tests had a correlation of .5 which is quite significant. Success in an F test may be due to the relative magnitude of 'G' or the 'F' ability, and likewise in the case of Verbal tests. It is for this reason that we are recommended to use tests including a variety of abilities if the estimation of 'G' is our aim. While 'F' ability has 'G' in common with V ability, we are not justified in regarding these two abilities at different levels of 'G' as is so commonly supposed.

Concluding from Alexander's results we may have some faith in Performance tests yielding some measurement of general mental development, for his tests gave a correlation of .5 with Verbal Tests - the more common of which are widely acknowledged as being a fairly reliable measure of such

development. On the other hand we may expect to find extreme cases where one or the other of the special abilities outruns the general intelligence, but these cases are comparatively rare and function only within certain limits. Too much reliance however must not be placed on Alexander's results in interpreting our investigations. The Performance tests he used were those he had himself constructed or tested as to their efficiency. Gaw's tests have gone through no such statistical analysis and her correlations with other well known tests of intelligence are remarkably low. However, mental development of some kind they do measure, and for the time being we will refrain from giving it a specific and definite name. For the present investigation we have selected the Performance tests of Intelligence assembled by her, not because they can justify their claim to evaluate mental development as a whole more accurately than other tests, but because at the present time they appear to be the only non-linguistic tests adequately enough standardized for children of the age and nationality with which we are concerned. Their chief merit lies in their suitability for application to young children in whom a knowledge of the English language cannot be assumed.

III. APPLICATION OF THE TESTS TO
INDIAN CHILDREN.

That the modern method of studying the developmental profile of children in real life situations is the most satisfactory one there is no doubt. But such intensive work means studying them over a comparatively long period, and is far beyond the scope of a single worker. In the absence of such opportunities it was necessary to resort to some specific tests which called for immediate adaptations although not life situations.

The School selected was the "Model School" Trivandrum, South India. The children attending this school were fairly representative of the whole state. Apart from the question of ease of access there is no preference for parents sending their children to one school rather than to another. The schools being under the direct control of the state, fees, syllabuses, text books etc. are the same everywhere so that in this respect the subjects might well claim to be representative of the typical or norm for Travancore, and as we have every reason to believe for the whole of South India.

It is quite possible that although the distribution will correspond to a certain extent to that of any normal population, there is a conspicuous absence in the lower age

groups, of those members of society which would usually represent the highest intelligence. To begin with, among the subjects tested, there was only a comparatively small minority from the professional classes. The only explanation that could be put forward and that too tentatively is, that the professional classes would form such a small part of the state, that having selected one town only, in this case the Capital, Trivandrum, there must be very few such children of each age group in any one school. Further it is a matter of common knowledge, that many of the top-most Travancoreans below the age of fifty five are usually found outside their own province, in states bigger than their own, or in the service of the British Government. An explanation for this might be attempted.

Travancore is about the smallest of all the states in India. It has a population of five million, the greater portion of which earns its livelihood by Agriculture. Though in literacy it is second only to Mysore in an All-India ranking, it has been till quite recently so self-supporting that it had little or no political or economic relations with other territories. With the inauguration of Western rule in India and the extensive use of Science and Machinery, she found herself left behind. It was not difficult for her to preserve her Ancient Philosophy and Culture in a life of such seclusion and simple wants. Nor

was her country of mountain and river easily penetrated by the foreigner. She still remains the most orthodox of the Indian States, with all the good and weak points which this term implies, and to the rest of India her modes and customs remain unique. When however she was fascinated by the glamour of the complex machinery outside, the more adventurous section of her population began to migrate to other provinces gradually. Where modern forms of Government and Scientific inventions are concerned, Travancore is just finding her ground. Those of her people therefore who have outgrown these simple wants prefer to play their part in a more complex world if they are able to compete successfully there. It is clear then, that this uppermost section of Society serve all their years either in the British Government or in a bigger and more important State than their own, returning to their provinces only on retirement. Obviously by that time even their youngest child is well beyond the junior school age, so that even if they form a part of the College population, they are rarely found in schools, specially in the first few classes. There are many exceptional cases, but on the whole this rule applies. It must be mentioned that there is a tendency against this kind of migration among the younger generation, but their children are not old enough to fall under the age groups investigated here.

A total of two hundred and fifty subjects, their ages ranging from five to ten, were tested, out of which thirty-three only were girls. Even with reference to the boys much larger numbers are required before the figures can strictly claim to represent true averages, but Francis Gaw herself had only twenty in each age group, these numbers therefore can well stand with hers. In fact, in this investigation there are more than twenty in each age group except in age five where there are only eleven. Francis Gaw unfortunately had not tested five to seven year old children. She begins from age eight and tests twenty elementary school children who are known to be of average ability. In the present case, after the age of eight, we have much larger numbers, there were forty in this age group, fifty five nine year olds and fifty nine ten year olds. But whereas she had only the normal, average children, the children tested in this investigation were much more representative of the total population.

There is only one Government in India which recognizes sub-normality and makes provision for it. As for Travancore, it is possible that there are a few educational authorities who recognize this feature, and most probably the fact is inevitably forced on many of the teachers, but there is not one who really sees the significance of it, who realizes the wastage in education in accommodating these children with

the normal population. Consequently we see super-normal children sitting beside sub-normal children and border-line cases. This happens however generally in the lower classes only - mostly below eight; we do not find these extremes after this age. In this investigation, there were one or two abnormal cases and quite a few with serious temperamental and emotional difficulties.

Where the test atmosphere is concerned there is every reason to believe that the child was under the most favourable conditions that ^{were} possible. We proceeded class by class, starting from the primary school, each child sending another as soon as his turn was over. The children were given the impression that the tests were little games, and none of them suspected anything to the contrary, and they always referred to it in these terms - "Will you have me to play this too?" some of them asked when a few had been called from their class. After two or three had already come from a particular class, most of the others came much more enthusiastically, hearing most probably the favourable reports. "Miss V's games were such fun - they were so easy, I did them all" such were the reports some of them took home, even those who had not done particularly well. But no child was ever given the impression that he had failed, or that his standard was comparatively low. Every opportunity was taken to encourage the child, and where the tests were such

that in the case of a failure it was self-evident, e.g. tests like the Diagonal, Triangle etc., it was passed over so casually and treated with so little consideration that the child himself thought it was of no significance whatever.

There was one disadvantage which might have influenced the results. There being no room free in the School, we worked in the same room as the Headmaster. Sometimes the distractions were quite serious, but the children seemed almost abnormal in their power of concentration. They were able to eliminate these extraneous activities and give their attention to the tests. In no case were they seriously distracted at all, some of them were apt to be diverted a little, and needed to be reminded about their work. It must be mentioned that the instructions were given in Malayalam. They were so simple that it was possible to translate them from the English exactly without changing their sense and form.

IV. RESULTS.

Tables II. to XII. represent the average scores of English and Indian children on the various tests. Francis Gaw's norms are based on the scores of twenty average Elementary School children in each age group, except in the Porteus Maze Test where she had a hundred subjects at each age. Table I. represents the number of Indian subjects at each age, except for the Diagonal and the Healy Construction A Tests, which will be treated separately. While Francis Gaw tested eight to thirteen year olds, the present investigation is only concerned with five to ten year olds, for matters of comparison therefore, only the three age groups from eight to ten will over-lap. Figures I to XII show in graph the average scores of both English and Indian subjects.

From Table II and Figure I it will be seen that the Indian scores in the Porteus Maze Test are slightly higher than the English scores, but both English and Indian scores rise gradually with increasing age.

Table III represents the scores for the Cube Imitation Test. The Indian scores are appreciably lower at ages eight and nine but are equal to the English score at age ten. Taking the Indian scores by themselves, Figure II shows a gradual increase in the score from the lower ages

TABLE IV

ADAPTATION BOARD

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|-----|-----|-----|-----|-----|-----|----|----|----|
| English | - | - | - | 4 | 4 | 4 | 5 | 5 | 5 |
| Indian | 3.3 | 3.3 | 3.8 | 4.1 | 4.4 | 5.2 | - | - | - |

TABLE V

MANIKIN

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|---|-----|-----|-----|-----|-----|----|----|----|
| English | - | - | - | 4.5 | 5.2 | 4.5 | 5 | 5 | 5 |
| Indian | 2 | 1.8 | 2.9 | 3.6 | 3.6 | - | - | - | - |

to the higher, except from age five to six. This gradual increase might suggest that the Indian scores more or less accurately represent the averages of Indian children, while Francis Gaw's scores may not do so for English children. Her norms appear to be statistically inconsistent. They stand stationery between eight and ten years, make a good spurt forward at eleven, goes back to the eight year level at age twelve and shows only a slight increase at thirteen.

The scores for the Adaptation Board, Table IV also show an increase from year to year in the case of the Indian scores, and they are slightly higher than the English scores at the ages common to both. At age ten in the Indian scores, the improvement is much greater than that shown at any other age, as will be seen from Figure III.

In the Manikin Test, Table V the Indian scores are again lower than the English scores. Moreover, the Indian scores do not show the gradual increase which was typical of the other tests (Figure IV). There is, as in the other tests, a drop from age five to six, but here in addition, the score is identical for ages eight and nine. In the case of the English scores, they are identical at ages eight and ten, but higher at age nine. From age eleven to thirteen, they have obtained their maximum score, which is quite possible, because the test is too simple for the higher ages.

TABLE VI

GODDARD FORMBOARD.

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|-----|-------|-------|-------|-------|-----|-----|-----|-----|
| English | - | - | - | 23" | 19.5" | 19" | 17" | 16" | 12" |
| Indian | 34" | 30.7" | 26.4" | 22.4" | 20.2" | 19" | - | - | - |

TABLE VII

CUBE CONSTRUCTION.

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|---|-----|-----|-----|-----|------|----|------|----|
| English | - | - | - | 9 | 6.5 | 10 | 11 | 12.5 | 11 |
| Indian | 8 | 8.6 | 8.8 | 8.3 | 9 | 10.2 | - | - | - |

TABLE VIII

DEARBORN FORMBOARD

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|-----|-----|------|------|------|------|----|----|----|
| English | - | - | - | 10.3 | 14 | 12.3 | 12 | 11 | 15 |
| Indian | 7.6 | 7.1 | 10.1 | 10.8 | 12.4 | 14.5 | - | - | - |

Table VI represents the scores on the Goddard Formboard. The time taken by Indian children is slightly less than that taken by English children at ages eight and nine, but the same time was required at age ten. Figure V shows the gradual improvement with increasing age, in both cases. Incidentally, this is one of the very few tests in which the English scores do show this consistent improvement.

The Cube Construction Test, Table VII shows the Indian subjects to have scored higher than the English children at ages nine and ten, but lower at age eight. Figure VI shows a slight discrepancy in the Indian scores, and a much greater one in the English scores. In the former case, there is a gradual increase in the score from age to age, except from age seven to eight where there is a small decrease. In the English scores, there is a serious decrease from age eight to nine, and a very rapid increase from nine to ten; after this age the scores tend to rise gradually till age twelve, and then drop at age thirteen to the eleven year old level.

In the Dearborn Formboard Test (Table VIII), the Indian scores are higher at ages eight and ten but lower at age nine. The accuracy of the English score at age nine and the succeeding years, is doubtful. From Figure VII it will be seen that from age eight to nine there is a very great

TABLE IX

TRIANGLE.

| Ages | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|------|-------|-------|-------|-------|-------|-------|-----|-----|
| English | - | - | - | 59" | 69.5" | 36 | 43.5" | 23" | 27" |
| Indian | 128" | 75.5" | 68.4" | 72.2" | 69.1" | 54.3" | - | - | - |

TABLE X

DIAGONAL.

| | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------------------------|-----------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------|----------------------------------|
| No. Subjects | 11 | 24 | 26 | 40 | 55 | 59 |
| No. Passing | 4 | 10 | 13 | 22 | 41 | 48 |
| Total Time of those Passing | 257.6" | 680" | 1014" | 1078" | 3321" | 3936" |
| No. Failing | 7 | 14 | 13 | 18 | 14 | 11 |
| Assessed Time of those Failing | 7x480 = 3360 = 56 ms. | 14x480 = 6720 = 112 ms. | 13x480 = 6240 = 104 ms. | 18x480 = 8640 = 144 ms. | 14x480 = 6720 = 112 mins. | 11 x 480 = 5280 = 88 mins. |
| Total time | 60 mins. | 123 ms. | 121 ms. | 162 ms. | 167 ms. | 154 mins. |
| Average Time | 329" | 308" | 279" | 243" | 183" | 105" |
| Average English Time | - | - | - | 54" | 54" | 49" |

| | | |
|-----|-----|-----|
| 11 | 12 | 13 |
| 34" | 45" | 27" |

increase in the English score. After this, there is a gradual decrease till age twelve, and at age thirteen there is again a great spurt forward. The Indian scores on the other hand rise with increasing age for all the groups except from five to six, which exception occurs almost in all the tests and will be commented upon later.

Table IX shows the Indian subjects to have scored lower than the English subjects at age eight and nine, but slightly higher at age nine. (In those tests where the score is in terms of time, i.e., in seconds, the longer the time, the lower the score.) This seeming advantage at age nine may be solely due to the discrepancy in Francis Gaw's scores. From figure eight it will be seen that the average time taken by her subjects, rises and falls at every alternate age, and this phenomenon should not occur in an accurate statistical survey of a normal population. The Indian scores show an improvement from the lower age groups to the higher, except from the seventh to the eighth year, where the older children appear to have taken longer than the younger.

Tables X and XII represent the scores for the Diagonal and the Healy Construction A Tests, which are treated differently from the others. In the case of the two tests mentioned above, the number of successful subjects

TABLE XI

PERCENTAGE OF SUCCESSFUL SUBJECTS AT
EACH AGE IN THE DIAGONAL TEST.

| Ages | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------|----|----|----|----|----|----|
| Percentage of Passes | 36 | 42 | 50 | 55 | 75 | 81 |

TABLE XII

HEALY CONSTRUCTION A.

| | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|---------------------------------|--------------------------------|-------------------------------|---------------------------------|--------------------------------|------|
| No. of Subjects | 11 | 24 | 22 | 23 | 11 | 59 |
| No. Passing | 1 | 4 | 8 | 4 | 6 | |
| Total Time of those Passing | 40" | 300" | 596" | 273" | 516" | |
| No. Failing | 10 | 20 | 14 | 19 | 5 | |
| Assessed Time of those Failing. | 10x300 = 3000" = 50 mins. | 20x300 = 6000" = 100 ms. | 14x300 = 4200" = 70 ms. | 19x300 = 5700" = 95 mins. | 5x300 = 1500" = 25 mins. | |
| Total Time | 50.6 ms. | 105 ms. | 80 ms. | 99 ms. | 34 mins. | |
| Average Time | 276" | 163" | 218" | 259" | 183" | |
| Average English scores. | | | | 106" | 70.5 | 62.5 |

| | | |
|----|------|----|
| 11 | 12 | 13 |
| 62 | 42.5 | 41 |

were so few that their average time alone would not be statistically correct to be representative of the total population. It was therefore necessary to make an arbitrary assessment of the time in which they might have completed the test. In each of these two cases the assessed time was eight minutes, that is roughly double the time allowed in the instructions. Computing the scores from this scheme, Table X shows the average time taken by Indian children. There appears to be no comparison between the English and the Indian scores. Besides, it would be of little value to compare them since they have been treated differently. Taking the Indian scores by themselves, there is an improvement from year to year, each age group taking less time than the preceding age group. Figure IX shows this gradual improvement. There is also a greater percentage of passes with the succeeding years as will be seen from Table XI.

Figure X shows that the gradual improvement in the Indian scores is not present in the English scores. The average time taken is identical at ages eight and nine, decreases at ages ten and eleven, then rises again at age twelve and decreases at thirteen.

Table XII represents the average time taken for the Healy Construction A Test, computed according to the method

TABLE XIII

PERCENTAGE OF SUCCESSFUL SUBJECTS
IN HEALY CONSTRUCTION A TEST.

| Ages | 5 | 6 | 7 | 8 | 9 |
|--------------------------|---|----|----|----|----|
| Percentage of successes. | 9 | 17 | 36 | 17 | 55 |

TABLE XIV

Age 8 Indian scores higher than English scores in 5 out of 10 tests
" " lower " " " " 5 " " 10 "

Age 9 Indian scores higher than English scores in 4 out of 10 tests
" " lower " " " " 6 " " 10 tests

Age 10 Indian scores higher than English scores in 4 out of 8 tests
" " equal to " " " 2 tests.
lower than " " " 2 "

followed in the Diagonal Test. Want of time prevented the tests from being given to all the subjects, specially in the higher age groups. Age ten was not given the test at all. As might well be expected with such small numbers, the Indian scores show a considerable amount of discrepancy. Figure XI shows the score at age six to be a great improvement on age five; ages seven and eight take more time than their preceding years respectively, and age nine appears to take more time than age six. These statistical errors must be entirely due to the very few subjects given the test, and to the still fewer numbers succeeding in it. The percentage of successful subjects in each group is indicated in Table XIII.

Here also it would not be worth while to compare the English and Indian scores because they have been treated differently. The English scores in this last test appear to be more statistically correct than in any of the others, except the Goddard Formboard and the Porteus Maze tests. Although the improvement indicated in Figure XII is not very gradual, it is significant that there is one.

Taking the tests as a whole Table XIV expresses the total number of cases in which the Indian subjects have scored higher or lower than the English children.

V. GENERAL ANALYSIS OF RESULTS.

The most noticeable point about the results is, that in almost all the tests, the Indian scores are appreciably and uniformly better or worse than the English scores, in the three age groups which are common to both. In the Porteus Maze Test for example (Table II) the Indian subjects in all the three age groups score higher; in the Cube Imitation (Table III) they obtain lower scores at ages eight and nine, but obtain equal scores at ten. Similarly there is a uniform success and failure in the Adaptation Board and Mainkin tests respectively.

Figures I to IX show that there is a general tendency on the part of the Indian scores to improve from year to year. Age nine scores higher than age eight, and age ten higher than age nine - there is thus a gradual increase. For the Mainkin Test (Table V) the scores remain the same for ages eight and nine, though there is an increase from ages five to eight, excepting age six. The Healy Construction A Test, (Figure XI) shows, as we mentioned before a grave discrepancy due solely to the small numbers given the test. With the exception of these two cases, there is a gradual improvement from year to year, whereas Francis Gaw's tests show no such improvement. The scores for some of her tests remain identical for three or four age levels; and in most of the other tests, some of the lower age groups are better than the higher age groups.

The only tests which do not show this discrepancy are the Porteus Maze, the Goddard Formboard and the Healy Construction Tests (Figures I, V and XII). However, allowance must be made for scores remaining identical at the higher age groups in tests like the Adaptation Board and Manikin. These tests are so simple that they are not capable of differentiating between the higher age levels.

This gradual improvement in the Indian scores might suggest that they are more truly representative than the English scores, due to the small number in each group in the latter case. For ages eight, nine and ten, the Indian children tested were twice the number of English subjects, and even at ages six and seven, they are slightly more than Francis Gaw's numbers. The importance of having sufficient subjects in order to produce a true average cannot be over emphasized. This seems to be the only explanation for the seeming discrepancy at age five in the present investigation. For this age there were only eleven subjects. Figures II, IV & VII will show that whereas in all the other tests there is an improvement in the score from the lower ages to the higher, in these three cases out of the ten tests, age five obtains a better score than age six, but from the age of six onwards there continues to be a positive improvement. In the Adaptation Board Test (Fig. III) the score is identical at ages five and six.

Nowhere is there such complete failure on the part of the Indian subjects as in the Diagonal, the Triangle and the Manikin Test. It is quite possible that Gaw's averages are too high because her subjects were so few, and besides, she selected twenty who were considered to be average, and it is doubtful how far this will correspond to the average of the total population. However, since all the other tests have an equal chance to show this discrepancy, we must accept the scores as they are. Nor are her figures consistent in themselves. Figure VIII shows clearly her grave discrepancies. Her scores in the Triangle Test tend to rise and fall at every alternate age. In the Diagonal Test (Fig.X) the scores appear to be far more consistent.

It is interesting that no two tests are more alike than the Diagonal and Triangle. They involve exactly the same principle - what might specifically be a faculty for perceiving the mechanical relations between things. In the Triangle test the difficulty always lay in not turning the insets to the correct position, perhaps this is the only difficulty that exists. In the Diagonal test the chief difficulty lies in not observing that of the three triangles, one is slightly smaller than the other two. (There are five insets, three triangles, one square, and one other shape). In fact the difference is so small that it is rarely seen without training,

but some subjects guess at it when they find that the only vacant space remaining is the exact shape of the inset left but only a little smaller or bigger. Very few indeed however really work this out intelligently. The trial and error method is mostly employed, but a considerable number arrive at the solution purely by chance, as was evident from the fact that they were unable to do it a second time. The other test most like these two, and where failure is recorded is the Manikin (Table V). The successful solution of this depends partly on the child recognizing that it is a man taken to pieces, and partly on his being able to see mechanically from the shapes at the sockets which part ought to fit. Where the Indian children succeeded, they had always first seen that it was a man. If they saw this, then they solved it correctly - except in one case, but if they did not know what it was when the pieces lay apart, then they were never successful with it. There is no doubt that these three tests imply more or less the same ability, but whether it is one that can exhibit so much racial difference is difficult to judge from the limited data available.

Another test in which the Indian scores fall below the English scores is the Cube Imitation test. Taking the reactions of the Indian subjects to this test, it must be said on their behalf that they had observed the experimenter's movements carefully, were interested in them, and appeared to

reach quite a good standard. There were very few who could not grasp the pattern at all, most of them came very near to the correct solution. There was a psychologically significant feature here. Their patterns in tapping the cubes follow more or less a logical sequence. Those children who appeared to grasp the principle found the test easier than those who did not preconceive any particular sequence but observed each row separately, as it were. When however, at certain stages the pattern broke entirely new ground, some subjects adjusted themselves to it quickly, whereas the others mechanically continued the previous principle till it reached a stage when they discovered it was not possible for that sequence to continue. Taking the Indian scores by themselves, there is an improvement from year to year, except from age five to six which shows the discrepancy due to too small a group (Fig.II). Francis Gaw's figures do not show this consistent rise. From the same figure it will be seen that her scores stand stationery between eight and ten years, rise at eleven, fall to the eight year level at age twelve and then rise again at thirteen. The forward spurt at eleven might have borne out the theory that there is such an acceleration in memory between ten and twelve, if the fall at twelve did not deny it. In the Indian scores there is a good improvement between eight and nine, but it is not as much as that from six to seven. It is unfortunate that eleven and

and twelve year olds were not included in this investigation.

Observation, concentration and perseverance seems to account mainly for their success in the Adaptation Board and Porteus Maze Tests. In the latter case specially, favourable temperamental traits had a distinct advantage over the intellectual ability. Likewise in many other cases the attitudes of the subjects towards their work in general seemed significantly to affect the results on the tests.

Most of the children obviously responded to encouragement and made every effort to speed up etc, where the instructions permitted this. There were some on whom encouragement produced no effect; they looked as if they were so inhibited or so uninterested or unenthusiastic about achievement that it mattered nothing to them what they did with the tests; they gave up a test without any regret when the time for each one was over. Unlike these, the former type of children took a really intelligent interest in the solution of the problem, and most often asked if they might continue with it till they solved it. Although it meant a waste of time from the examiner's point of view, it was best to allow them to do this in order to avoid disappointment and discouragement. Also, many of them showed a keen sense of humour when it was pointed out to them how close to the solution they had been. There was still a very minor group of children who seemed quite

conscious of their powers. Most of these were intelligent and self-confident, to all appearances getting neither elated with success nor disconcerted with failure, with whom it was best not to be lavish with praise because most probably they would ignore it. The calm composure with which they entered the room, took their seats and answered any questions put to them gave one the impression that they were masters of themselves. One seemed to find that they were at the end exactly where they were at the beginning. The first group of children on the contrary did not appear very self-confident as they entered and were a little suspicious of the examiner. They gradually over-came this after some friendly conversation and towards the end of the tests were in their element. Two or three in this group were quite disappointed when the tests were over - "Is that all, are there no more?" they would ask. Almost all the girls belonged to this group, although curiously enough they never asked for any more tests. As for the second group we mentioned, no rapport could be gained with them at the end of one hour, though it meant all the mental strain of going more than three-fourths of the way. Among the girls only one came under this group, and she made a very poor performance, her teacher also gave her very little credit for her work in school.

The influence of these temperamental traits on the

Porteus Maze tests was distinctly evident although its connection with general intelligence is not obvious. The first type of children - that is, the enthusiastic, co-operating ones, on the whole made more errors from carelessness than from lack of ability. These children of headstrong and impulsive temperaments generally do not attempt any preliminary survey of the design, but rush through the Maze usually falling into the first trap that presents itself. Often when they had found the correct path visually, they would trace it in pencil at such a rate that they found themselves in a blind alley unawares. The fact that they were at once in a position to correct the error shows that it was not beyond their ability to find the path. Since even such spontaneous corrections at and after the second trial are not permissible according to the instructions, the score had to be marked against them. Many of these in this test did not justify their scores on most of the others. Also these, more often than the other types would find themselves handicapped in certain situations in the Cube Construction test. It happened sometimes that in building the cubes one or two of the blocks might have been misplaced. While some of the errors were undetected, due to the subject forgetting to look underneath or behind, the more obvious ones were spontaneously corrected by those who really understood the

principle and who did not particularly hurry but were more concerned about accuracy. The child seemed so enthusiastic and interested in his task that seeing an error he would make an exclamation of regret, knock down the whole cube, and start building it all over again. Even if he now rebuilt it within the time limit, it would mean that he had unnecessarily made twice the number of moves, which would diminish his score considerably. The more cautious ones on the contrary would move only the necessary ones. Taking the total number of cases, the subjects were penalized for time rather than for errors.

The latter type of children we mentioned also did remarkably well on the Porteus Maze tests. Caution above everything was the key-note of their policy, and their forethought and patience carried them very far. With the passive group it was sometimes found impossible to continue with the Porteus Maze tests. They did not definitely commit so many errors as stagnate at certain points. There were times when they would not proceed, whether they found it impossible to find the path, or whether they could not make the mental effort was not clear. Since there is no time limit for these tests they were given ample opportunity to satisfy individual requirements, but when children refused to proceed even at the end of a considerable period, one had to just remove the test.

VI. CONCLUSION.

The analysis of the results (Tables II to XIV) have helped us to make clear and definite statistical comparisons between the performance of English and Indian children in the various tests. One cannot state dogmatically what abilities are measured by the tests selected for the present investigation. Francis Gaw claims that they do specifically measure intelligence; but whether in reality some of them are not more efficient tests of temperament and character must for the present remain a controversial point. Whatever abilities they do estimate, taking them as a whole, they have shown the European and Indian children to be fairly equal in their final results, as was seen from Table XIV.

It is at the same time significant that there is a general tendency for all the age groups to score higher or lower in the same particular test, as will e.g. be seen from Fig. I, III and IV. The Indian scores in the Porteus Maze and Adaptation Board Tests, (Figs. I & III) are higher than the English scores. The success in these two tests, as we suggested before, appeared to depend on character traits such as observation, concentration and perseverance, much more than on the intellectual ability specifically.

Similarly in the Diagonal the Triangle and the Manikin Tests - which all three imply the Mechanical ability,

the Indian scores are appreciably and uniformly lower than the English scores. The Dearborn and the Cube Construction Tests do not show this uniform superiority or inferiority; but this is solely due to the grave discrepancies in the English scores as is evident from Figs. VI and VII. If the graphs representing the English scores had followed a normal course, then there is every reason to believe that the Indian scores would be uniformly higher in both these tests. The ability tested by these two tests is not even as easily analysed as in the case of the foregoing tests, but Alexander, after his intensive work on tests of mental ability considered the Cube Construction Test as being a fairly reliable measure of intelligence.

In spite of the scores being higher or lower in such clear-cut fields, we are still not in a position to assert that one race tends to be fundamentally superior to another in any particular direction. The same mechanisms seem to be at work everywhere, and apart from superficial manifestations, we have as yet no real justification for presupposing that these mechanisms operate in varying degrees in the different races. It is for the future to prove the maxim, that given adequate tests of intelligence, the distribution for the different races ought to be perfectly even. The principles of maturation as we saw in Part I, are identical. They follow the same sequence,

and as far as we have observed, the different stages of development are attained at the same age levels. Individual differences there are, and these tend to be greater than national or racial differences. These principles of pure maturation are really the decisive factors of mental development, for they function irrespectively of culture, and also of the environment to a certain extent. The younger the child therefore, the more successfully are we able to eliminate the extraneous influences, and measure the fundamental ability, establishing certain modes of behaviour as symptomatic of certain levels of growth. The fact that external influences are able to impress the child from its earliest days, must not be lost sight of. The environment in the widest sense of the term - implying training, traditions, and ideals, must be given its due value. American tests of Intelligence applied to Japanese children found the latter inferior in mental ability; when the Japanese administered their tests to American children, the scales were duly reversed. In the present investigation, in the Porteus Maze Test for example, the ability to control action till thought has had full play may not be very difficult for a race whose prime ideal is self-effacement, and in which case therefore it would be necessary to practice self-control from the very earliest days. There seems to be some truth in the popular opinion, that the East thinks, while

the West acts, but since very few existing tests can claim to completely eliminate environmental influences, one must avoid making dogmatic statements.

Nor can the scores be regarded as being measures of pure intelligence only. Considering the reactions of the subjects to the tests in the present investigation, it was evident that the intellectual ability was not the only factor that always decided the score. As we had occasion to mention in section V, there were many occasions when the scores of children with good ability, were considerably lowered through impulsiveness or over-enthusiasm. The possibility of any test of Intelligence being able to completely eliminate the effects of temperament is doubtful. These two phenomena interact to such a great extent, and merge into each other so imperceptibly that it is difficult to tell where the influence of one ends and the other begins. On that score it would be impossible to consider these Performance Tests as essentially measuring Intelligence or temperament and character. It would be far safer to call them tests of Mental Development, for this term makes provision for the total personality, and recognises Man's development as homogenous in spite of a seeming heterogeneity. In studying such development therefore every effort was made to interpret the cases in the light of their total personality, though it is inevitable that in analysis the specific intellectual manifestations of the individuals appear to have received greater

precise scientific evaluation and consideration than the temperamental qualities.

FIGURE I
PORTEUS MAZE.

FIGURE I
PORTEUS MAZE

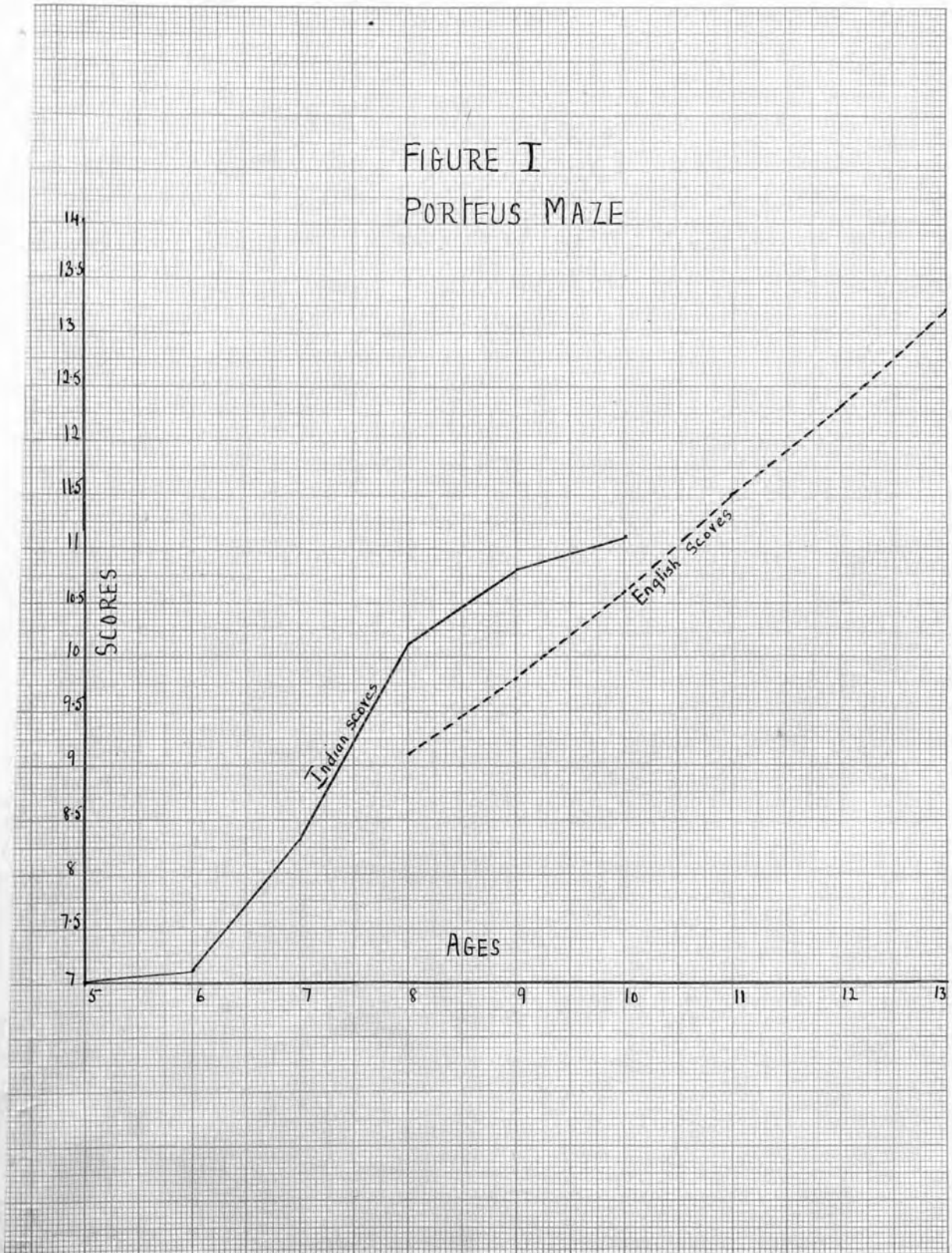


FIGURE II
CUBE IMITATION.

FIGURE II

Cube Imitation.

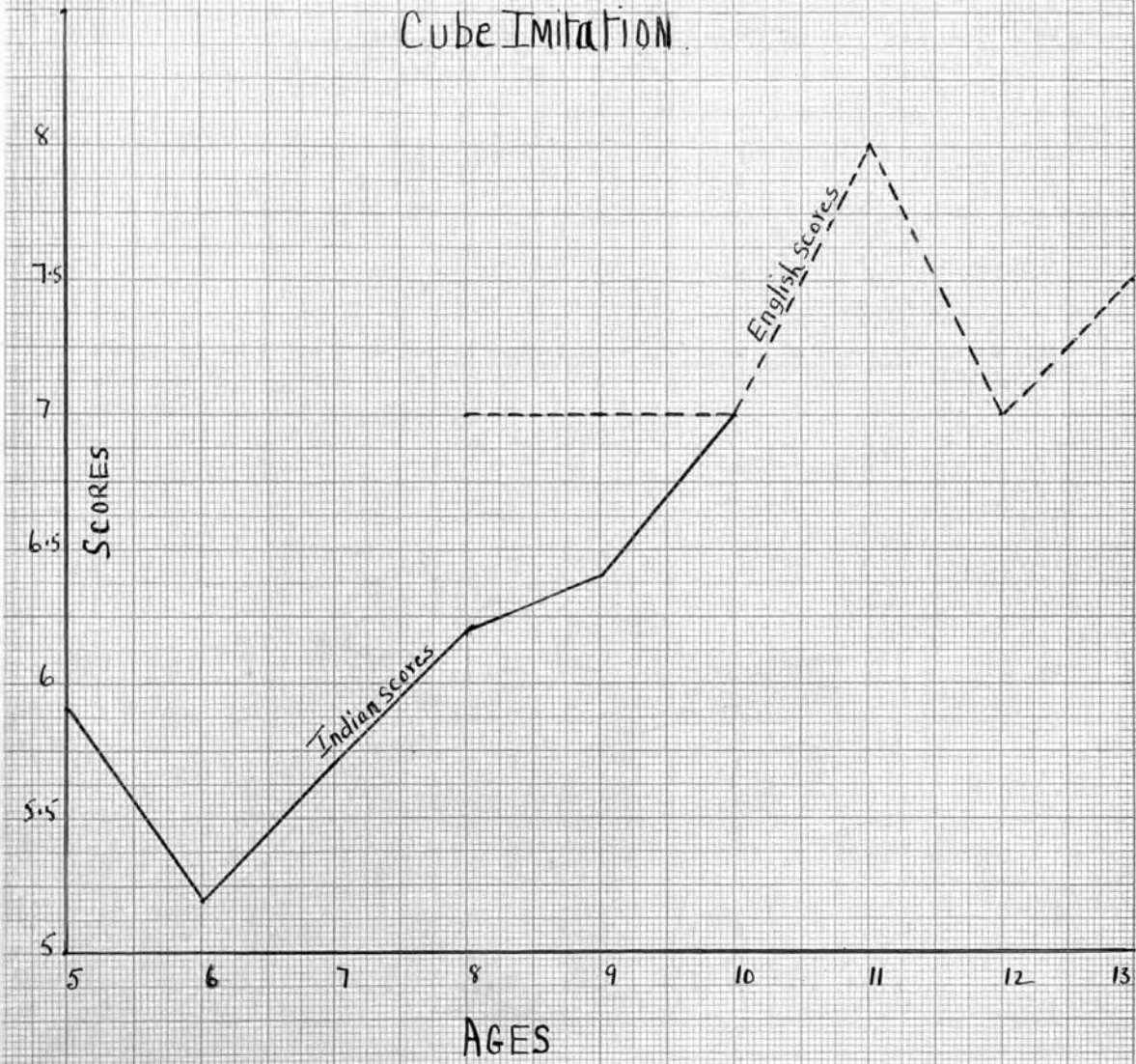


FIGURE III
ADAPTATION BOARD

FIGURE IV
MANIKIN

FIGURE III
Adaptation Board

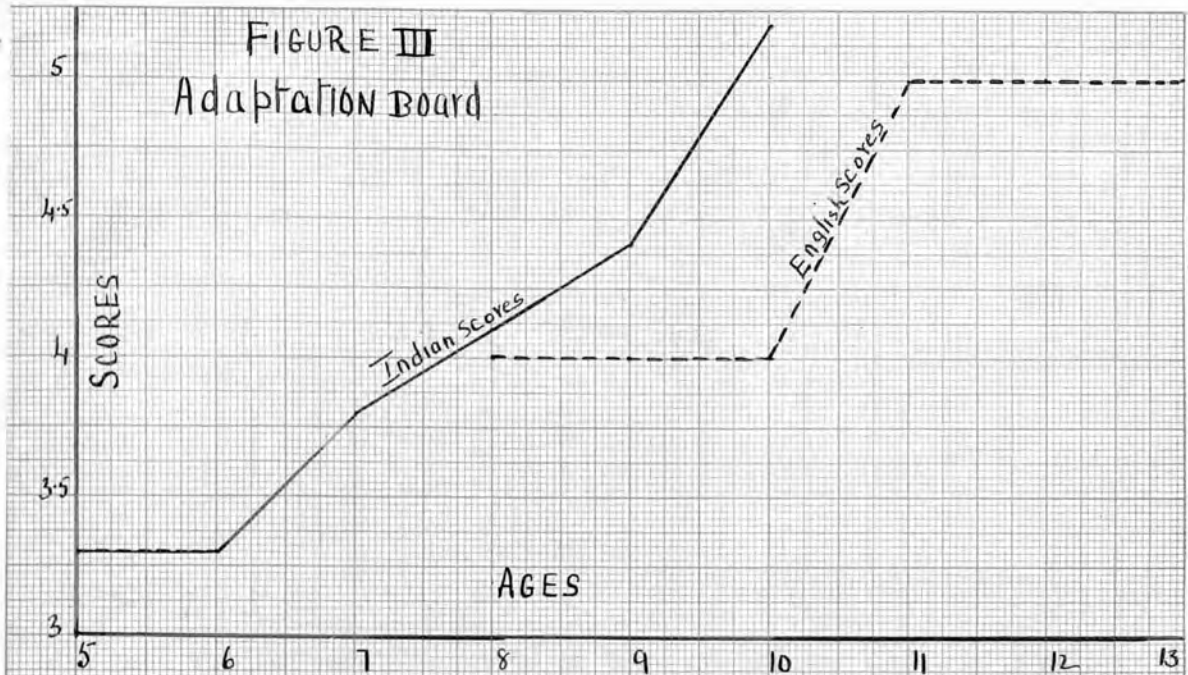


FIGURE IV
MANIKIN

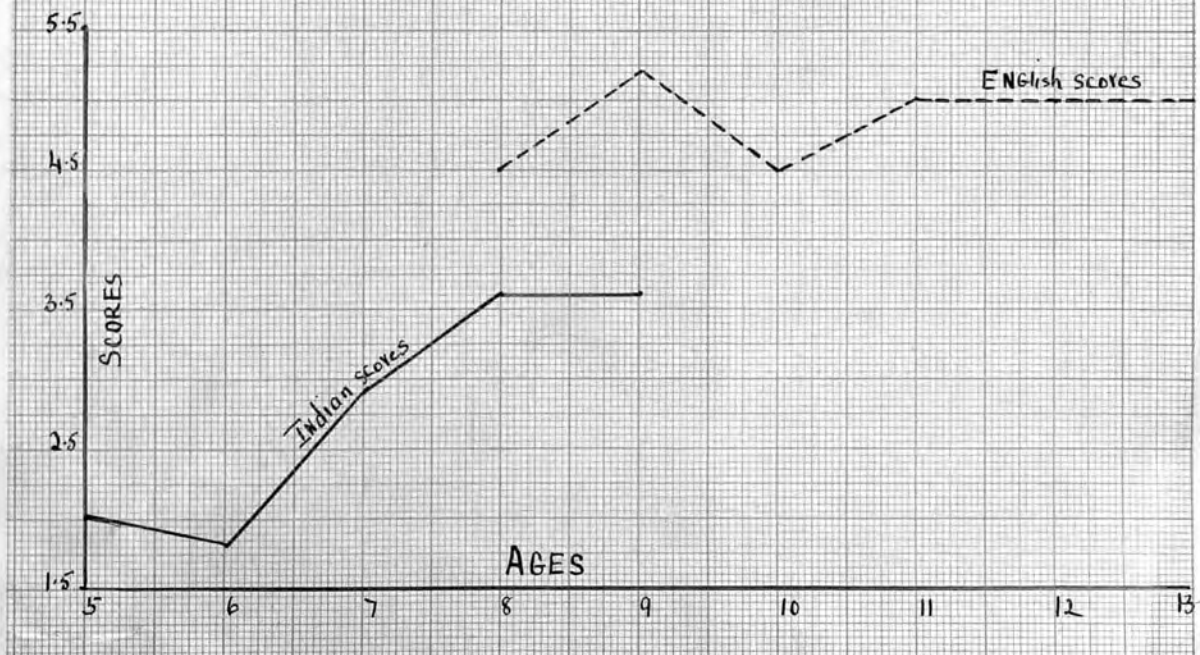


FIGURE V

GODDARD FORMBOARD

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FIGURE V

Goddard Formboard

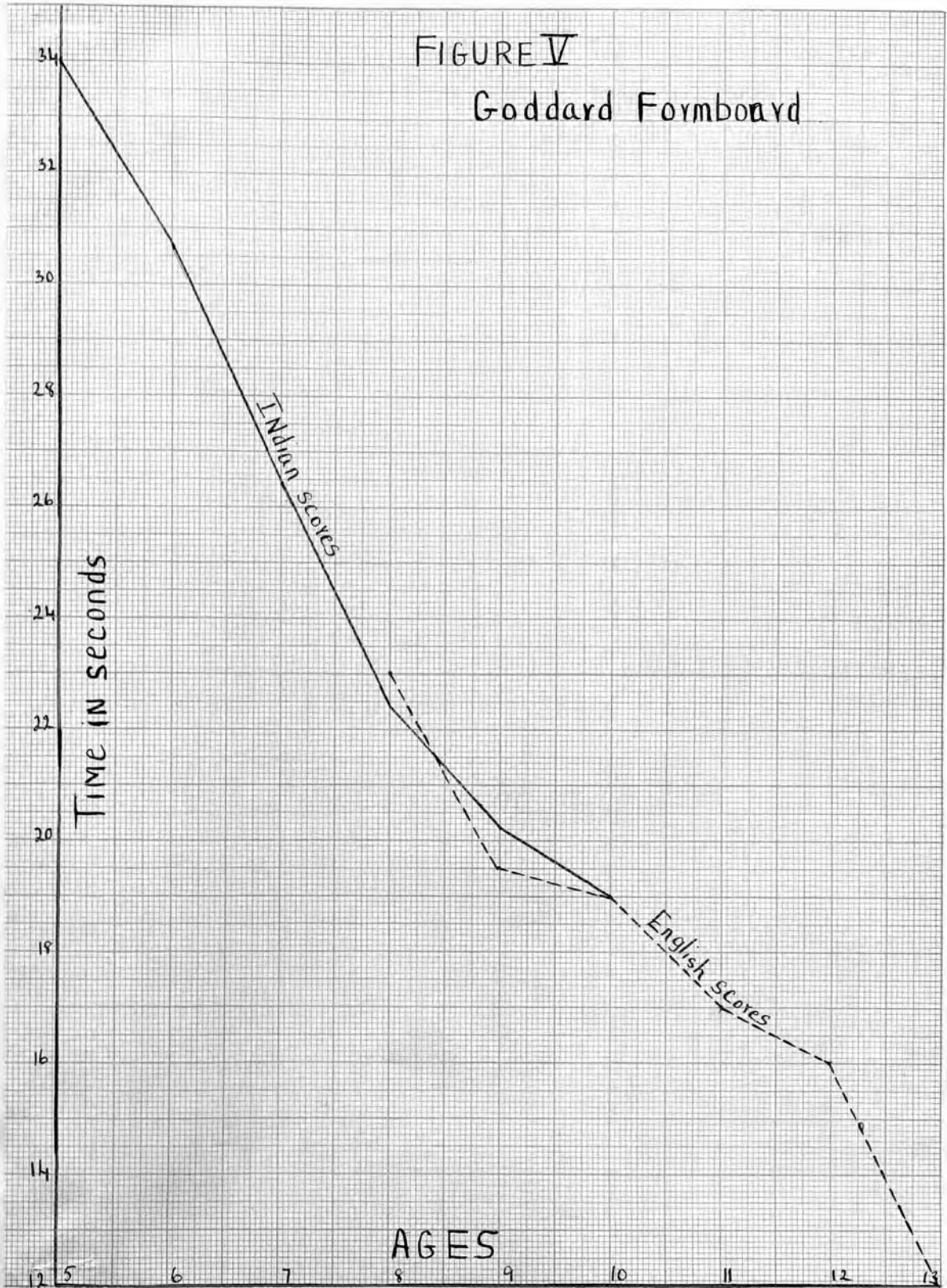


FIGURE VI

CUBE CONSTRUCTION.

FIGURE VI
CUBE CONSTRUCTION

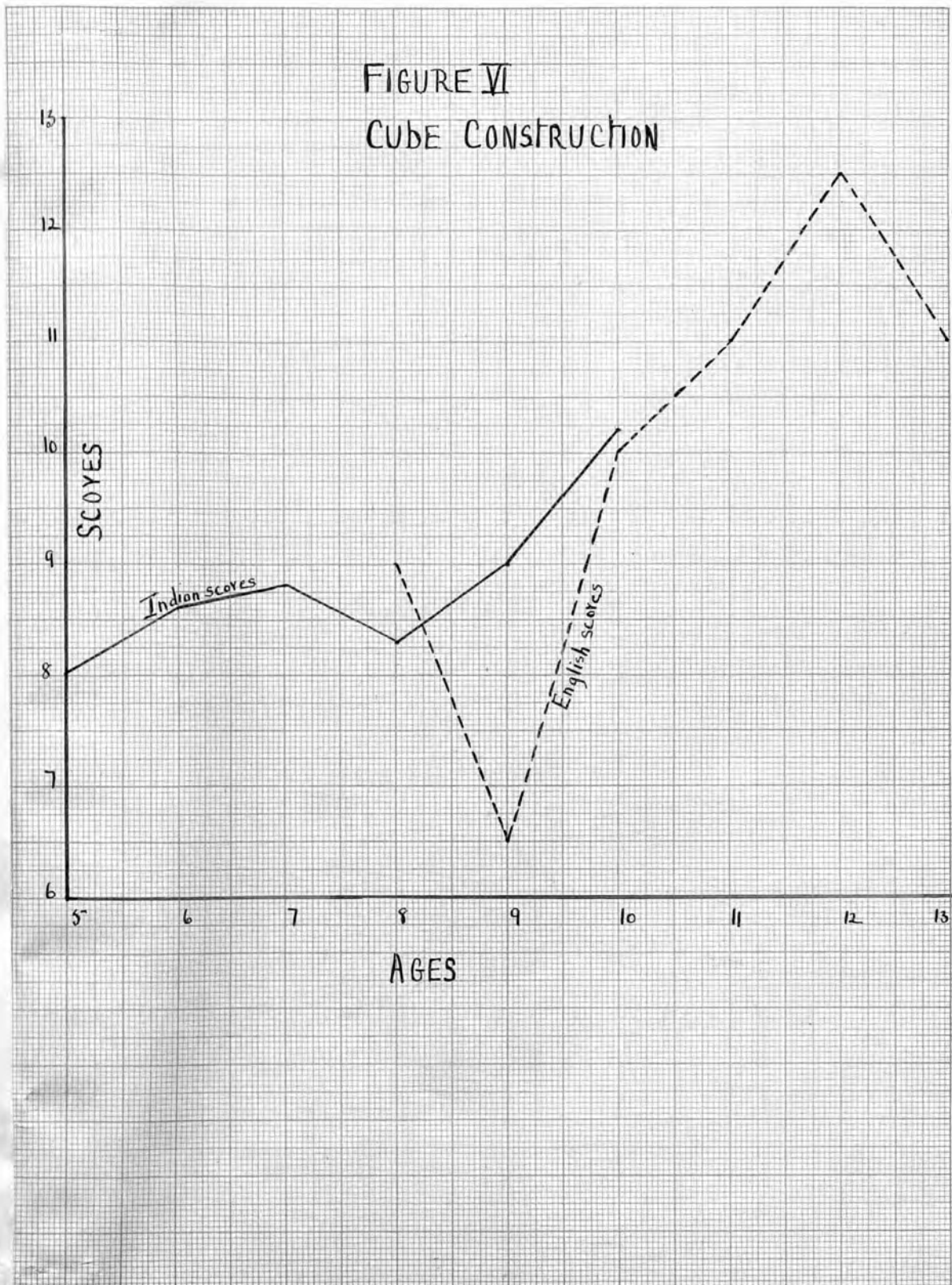


FIGURE VII

DIARBORN FOREBOARD.

FIGURE VII
Dearborn Formboard

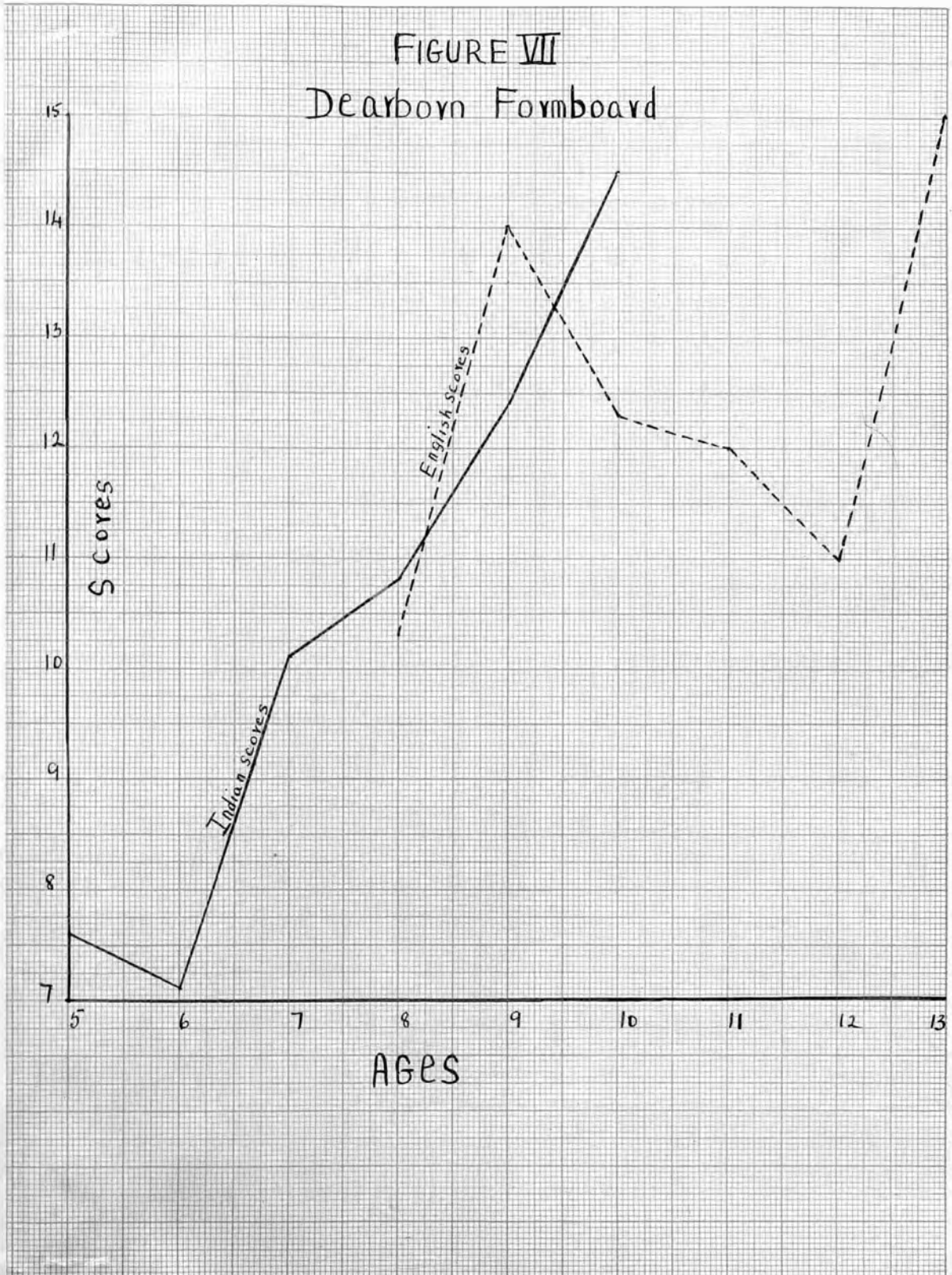


FIGURE VIII

TRIANGLE

FIGURE VIII

TRIANGLE

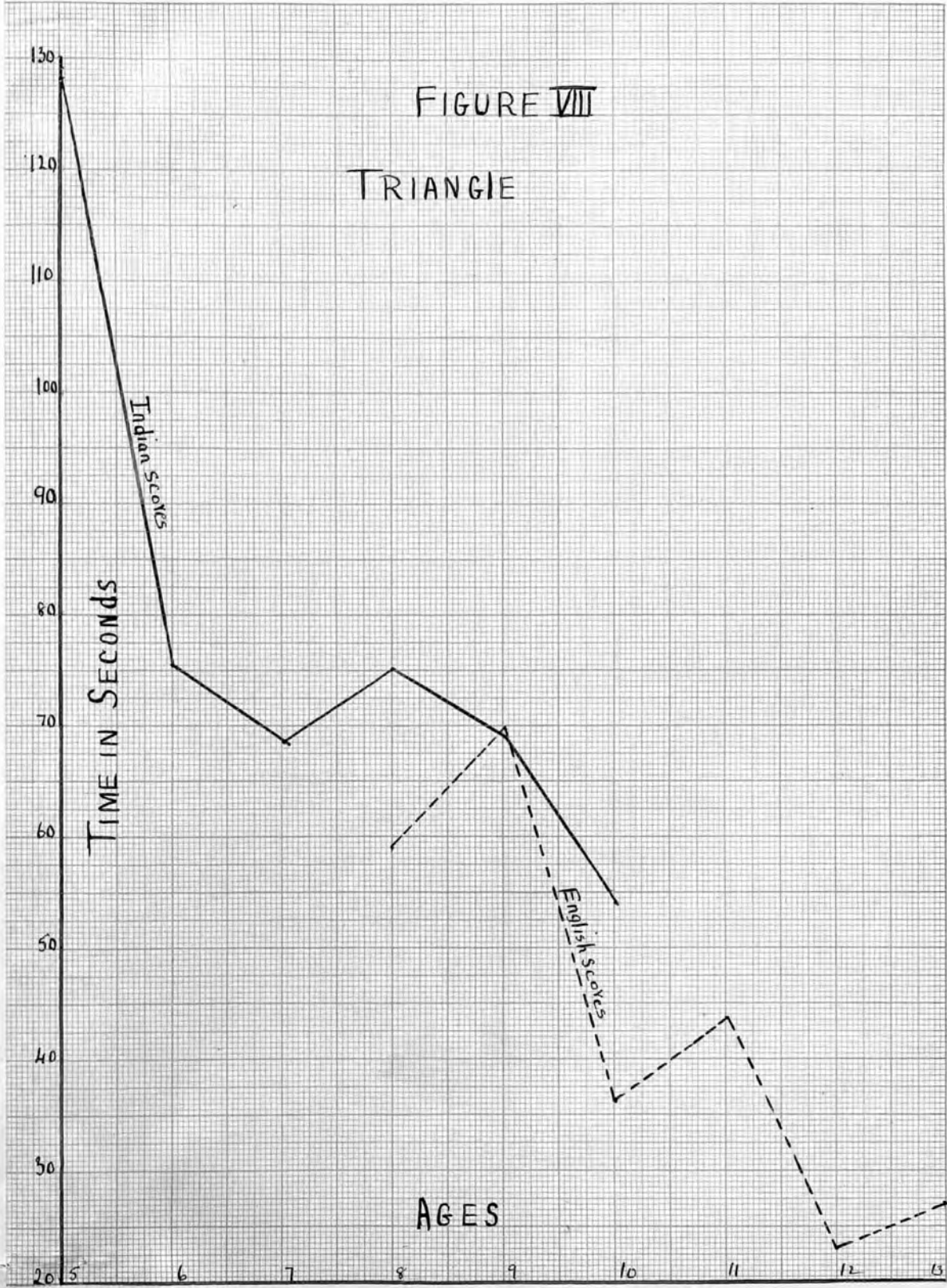


FIGURE IX

DIAGONAL

FIGURE IX
DIAGONAL

INDIAN SCORES

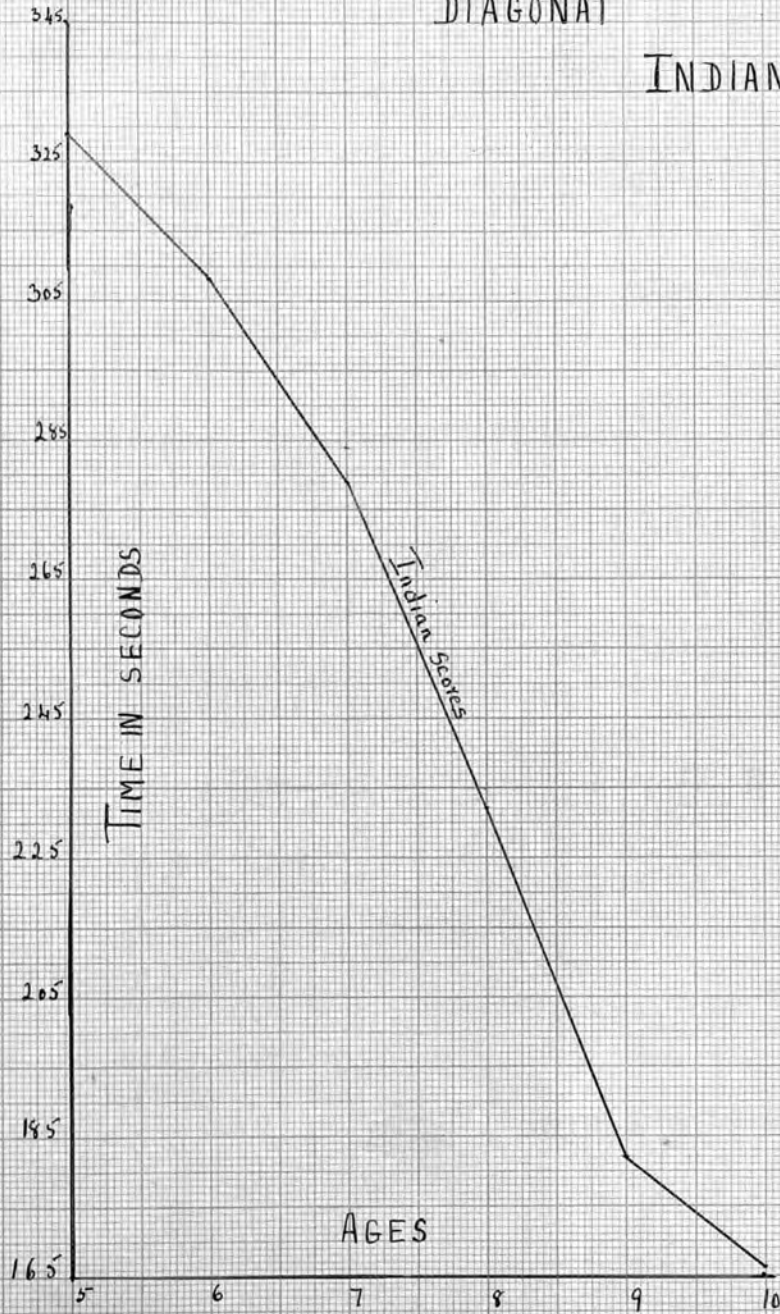


FIGURE X

DIAGONAL

FIGURE X
DIAGONAL

ENGLISH SCORES

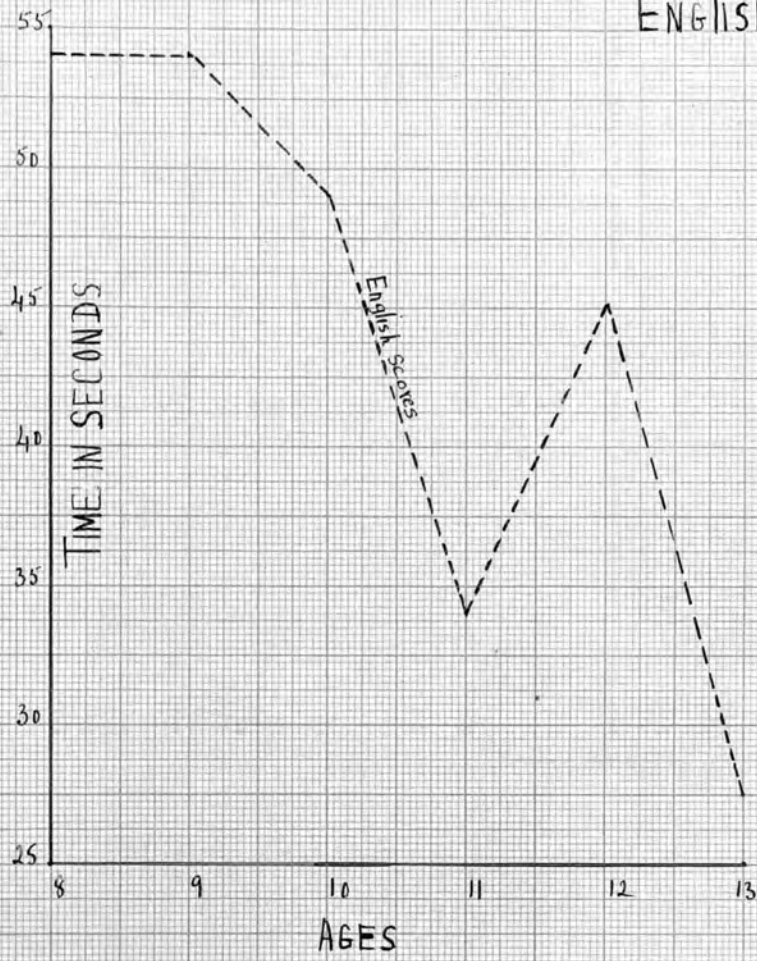


FIGURE XI

HEALY CONSTRUCTION A

FIGURE XI
HEAVY CONSTRUCTION A
INDIAN SCORES

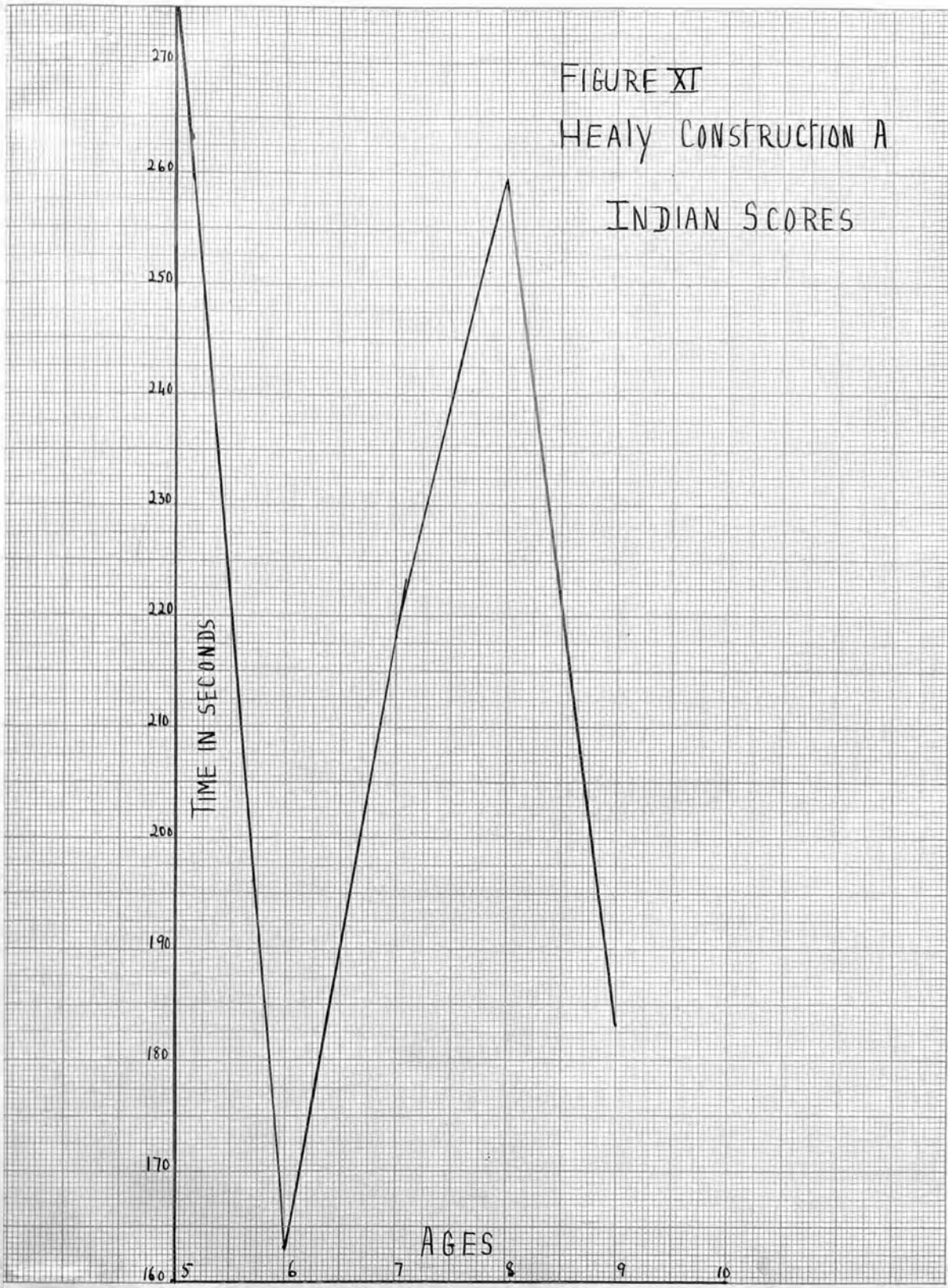


FIGURE XII
HEAVY CONSTRUCTION A.

FIGURE XII
HEAVY CONSTRUCTION A

ENGLISH SCORES

