

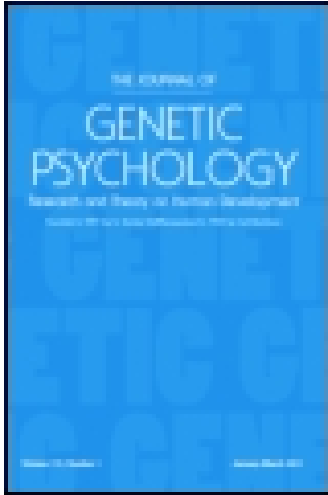
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## The Genetic versus the Logical Order in Drawing

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## THE GENETIC VERSUS THE LOGICAL ORDER IN DRAWING.

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It is now some twenty years since President G. Stanley Hall published his study upon "The contents of Children's Minds on Entering School." This publication is regarded as the first step in America of what is known as the child-study movement. During these fifteen years an immense amount of energy has been put forth and the results estimated in number of students, organized and unorganized, in the enthusiasm of interest, and even in the quantity of observations recorded, good, bad and indifferent, are something enormous. It has become a study which has appealed to a body of students of wide range of educational foundations, purposes and methods. Parents have undertaken it in the hope that through it they might be more truly parents. Teachers have undertaken it in the hope that it would help them to clearer pedagogic light. Normal schools have made it a significant part of their curricula for the purpose of interesting forth-coming teachers and children. Scarcely a university of any prominence is without a department engaged in child investigation. And in the department of philosophy, child study has pushed itself forward to be one of the main grounds of complaint in the divorce proceedings now pending between psychology and metaphysics. Methods of investigation necessarily have been as various as the purposes and life creeds of the heterogeneous classes of investigators. Necessarily there has been and is much mutual poo-hooing by the self-eyed of these divergent classes; still the work on all lines has gone merrily forward.

It has been evident from the first, that the point of view of child study was likely to prove interesting in the pedagogical field. For the movement started from a standpoint diametrically antipodal to that which has been the established basis of school practice. It has started from the standpoint of the child at his beginning, even in his remote ancestors, and has worked forward on a basis of internal development. Present school systems start from the adult, and work backward on a basis of adult thinking. It has been the interesting speculation from the first whether or not, as in the case of two gangs of workmen

starting to dig a tunnel from opposite sides of a mountain, they would meet in the middle. There is, to begin with, then, two opposite view points for regarding the education of the child; one, that his thinking power develops in the same logical order in which adults do their thinking; the other, that he develops his thinking in a different order,—an order which we may call “genetic.” It may be, it is true, that if we analyze the knowledge and training of adults according to the logical order, and then follow the child genetically and watch how he acquires knowledge, we shall find that he follows the logical order, that the genetic order is identical with the logical order as all past systems of education, without investigation, have assumed. But on the other hand, careful investigation may show that the child’s method of acquiring knowledge depends upon factors essentially different from those by which the adult thinks; the child may lack certain essential factors which the adult possesses; the logical order may be different from the genetic order and we may be attempting to teach him by an order which is not possible.

The defenders of the logical order can hardly be said to dispute the genetic standpoint. They are rather in the attitude of never having supposed it possible that there could be a genetic order different from the logical. The view of education as expressed by our present courses of study is something as follows:

The starting point of the logical method is what the adult knows in any given subject. This mass of knowledge is collected, sifted of non-essentials, and each part is tapered logically at the end so that it proceeds from what is simple in a logical sense to what is more complex. These tapered courses are then given to children in grades. Applied for example, to the course in drawing, the school has looked over the functions of drawing to adult life and has found that it is used (1) in industrial occupations, (2) in artistic representation and (3) in cultivating a “faculty” of observation. The first step in simplification is to abstract the geometric forms from objects in their practical relations. By this separation of form from practical objects, it is supposed that the work is made easier for children since the material is supposed to distract their attention. The next step is to segregate these geometric forms into an order of *mathematical simplicity*, and it is found that lines naturally are the logical simples out of which grow, by clear logical process, angles, squares, cubes, curves, circles, spheres, etc. All of this material is finally grouped in parallel columns so that if a cross section should be taken at any given level, so much preparation for industrial occupation, so much for art, so much for an observing “faculty,” would be found mixed in proportion, approx-

imating that which each of these diversities occupy in adult life. The child consequently begins these forms which are the simplest in a logical sense and proceeds gradually, step by step, through the geometric type forms and finally is supposed to reach the point where form is abstracted from nature. At this point, unfortunately, school education generally leaves him. He is supposed to cross over to nature by himself. He has learned to draw the perfect geometrical form out of which natural forms are constructed. This view of course holds that the business of the child is first to learn the "how," and then the "what" afterward. In other words, it argues for technique before execution, mechanism of formal expression before the idea expression, discipline before doing, grammar before language. It is a principle clearly of wide recognition in all forms of school education and has the advantage of being more or less regarded as axiomatic. To attack the principle of the logical order in drawing, is to attack the main column upon which rests the burden of our present educational structure.

This is a review of an issue which has probably come most distinctly to the front and in a field of instruction in which already there has been several skirmishes—instruction in drawing. Unanimity of existing systems upon essential issues is met by practical unanimity of students of those issues among the child study investigated. Moreover, the subject is an interesting one for the reason that in the matter of children's drawings studies have been made by some of the most prominent leaders of the present child-study movement as the following list of sixteen studies, upon which this review is based, will show.

#### I. MASS STUDIES.

1. A study of several hundred children's early drawings, in "Contents of Children's Minds on Entering School;" by President G. Stanley Hall, of Clark University, first published in 1882 and republished in *Pedagogical Seminary*, 1892, Vol. I, p. 165.
2. A study of 15,218 drawings of 6,313 children, ranging in age from six to sixteen years, by Professor Earl Barnes, of Stanford University; *Pedagogical Seminary*, Vol. II, p. 455, 1892.
3. A study of 1,232 drawings by children under 10 years, by Dr. H. T. Lukens; *Pedagogical Seminary*, Vol. IV, p. 79, 1896.
4. Art of Little Children, a study of 1,250 drawings by young children of the Italian school, by Corrado Ricci; translated from the Italian by Louise Maitland; *Pedagogical Seminary*, Vol. III, p. 202, 1893.
5. A Study of Drawings of Children in the Schools of Wi-

nona, Minn., by children from five to seventeen years, by M. V. O'Shea ; Proceedings of the National Educational Association, 1894, p. 1015.

6. What Children Draw to Please Themselves, by Mrs. Louise Maitland, from 1,570 drawings of California children, ranging from five to seventeen years ; Inland Educator, Sept., 1895.

7. Chapters of "Child as an Artist" and "The Young Draughtsman" in Studies of Childhood, by James Sully ; New York, 1896, p. 208.

8. Note sur les Dessins d'Enfants, by Jacques Passy, upon the drawings of Young Children, principally in rural French schools ; Revue Philosophique, Dec., 1891, p. 614.

9. Art Teaching and Child Nature, by E. Cooke ; in London Journal of Education, December, 1885, and January, 1868.

10. A Study of Motor Ability, by Supt. J. A. Hancock ; *Pedagogical Seminary*, Vol. III, p. 8.

11. The Child's Attitude toward Perspective Drawing, by A. B. Clark, of Stanford University, in Studies of Education, Number 8, 1897.

## II. STUDIES OF INDIVIDUAL CHILDREN AND DRAWINGS.

12. Notes upon the Development of the Child, by Millicent Washburn Shinn, University of California Studies, Vol. I, Nos. 1 and 2, 1893-4.

13. Chapters upon "Infant's Movements" and "Origin of Hand-writing" in Mental Development, by Professor J. Mark Baldwin, of Princeton, New York, 1895.

14. "Pictorial Evolution of Man," a series of drawings by children, with comments by Prof. Earle Barnes, in Studies and in Education, Nos. 1 to 10, 1896-7.

15. References in "Development of the Intellect," and "Senses and Will," by W. Preyer, translated by H. W. Brown.

16. Studies of Children's Drawings, University of California Studies, Vol. II, Edited by Prof. Elmer E. Brown and comprising studies by Millicent Washburn Shinn and others, upon individual children up to five and six years of age, 1897.

17. Systems of Drawings published by leading text publishers of the United States and Courses of Study in Public Schools.

It should be understood that this review will attempt to deal with the problem only up to the tenth year or thereabouts, or in other words, with drawing in the kindergarten and primary grades ; nothing is predicated upon the problem after that age. It is also distinctly to be understood that this presents the problem merely from one standpoint to pedagogy. In framing any

course of study for practical uses, many other considerations must of course be recognized.

Without exception, all text-books of drawings put forth by the leading publishing houses of the United States for kindergartens and primary schools, and all courses of study except for a few cities and localities, scattered as occasional dots over the American map, are firmly based on this idea of commencing with abstract type forms and proceeding by the logic of mathematics to more complex, industrial and ornamental forms. All forms studied are the simple type forms and their combinations divested of all matter which would distract the attention or interest of the child from abstract form. The systems of drawing in use in the primary grades of the public schools carry this same idea. I take the following from that of the first primary year, assigned by the system which probably is most widely used in the United States and with which all others are in a substantial agreement: lines, circle, cube, hemisphere, sphere, application of these forms to apple and kite, angles, shading, quatrefoil leaf, cross. The primary work and indeed the grammar is simply a development in complexity of these abstract forms.

The first problem will be that of analyzing the factors which appear in babyhood leading up to the point where pedagogy has undertaken the problem of education.

#### THE SCRIBBLING PERIOD.

During the second year of life, possibly in the last weeks of the first year, many children are interested in scriawling or scribbling lines upon paper or slate with a pencil.<sup>1</sup> In the various studies the observations indicate that the child is well on into its third year and even older before his scribbles begin to bear even a remote resemblance to the object which he may be supposed to be drawing.<sup>2</sup>

The progress and the transition is slow and gradual to drawings in which the child makes a distinct effort to represent an object.<sup>3</sup> The child is interested in scribbling lines several

<sup>1</sup>Brown, p. 44, 30-26-18; Lukens, p. 80; Baldwin, 85; Shinn, p. 96; Sully, p. 33-5; Cooke; Ricci, p. 303; Brown, p. 63.

<sup>2</sup>Baldwin points out (p. 86) the growth from angular straight lines to curves, from movements one way exclusively to reverse movements and an increasing tendency to complex intricate figures which he thinks probably results from greatly increased ease, variety and rapidity of movement. Sully concludes, concerning this period, "With practice the child acquires by the second or third year the usual stock in trade of the juvenile draughtsman and can draw a sort of straight line, curved line, a roughish kind of circle or oval and even fits them together at angles.

<sup>3</sup>Baldwin's child began to scribble in her second year and it was af-

1. A muscular interest in the exercise of muscle.
2. An imitative interest in performing acts which the child sees others perform.
3. A visual interest in the mere seeing of the marks the hand-movements produce.

The term "interest" will be used throughout in the broad sense of meaning the impulse which incites to action, whether that impulse is construed as conscious or unconscious, physical, psychical, or both; immaterial controversies will thus be avoided.

### I. MUSCULAR INTEREST.

In the development of any muscular function, Preyer has shown, there is a certain cycle of progressive activities.<sup>1</sup> After muscle and nerve have come into anatomical existence, there is a period of impulsive activity not excited externally; the child twists and turns his body and head for months before he sits up, kicks his legs for months before he walks, babbles months before he utters a sound in the sense of speech. The interest here is, for practical consideration, wholly muscular. It is the play period in the life development of each muscular co-ordination, motiveless and an end and joy unto itself. Gradually developing out of this impulsive activity are actions requiring for their excitation some external stimulus, and still later the movement is excited only by an excitation which constitutes a motive. The child does not exercise for the sake of activity itself, but for interest in something it wishes to do or to possess. While, therefore, the muscular interest, pure and simple is a fleeting phenomenon of the preparatory stage to muscle functioning, nevertheless, since new muscles and nerve adjustments are constantly coming into functional action throughout childhood, in one form or another, muscular interest is probably ever present as an important factor and most predominantly in the early years. We may, then, recognize as a chief factor in this scribble period a muscular interest in mere exercise analogous to leg kicking before walking or babbling before talking. As the function of the muscles involved matures, the interest passes over to the subject matter for drawing.

All observers agree upon the general character of the early

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ter nine months' persistent effort, at least, before the first rough representative effect appeared. Miss Shinn's niece commenced to scribble at the end of the first year. Sully puts the normal appearance of representative features in the second or third year; Preyer and Ricci think that the end of the third year is the normal beginning of representation. Prof. Brown's study indicates the first half of the third year. These studies would all indicate a period of one, and most probably, two years for meaningless scribble.

<sup>1</sup> Senses and Will, p. 195.

stages of scribbling.<sup>1</sup> There is a "free aimless swinging of the pencil to and fro" in movement purely spontaneous (Sully). Cooke remarks that the child finds his pleasure in the free arm movement. Professor Brown neatly puts it "the child's interest at this period relates to the act rather than to the product."

II. The imitative interest, in general, develops somewhat later than the muscular interest. While Preyer finds some suggestions of imitative acts as early as the fourth month, the impulse is not as widely noticeable by most observers until the latter half of the first year. By the end of the year it is clearly the most striking feature of the child's activity, affecting the motions of the arms, legs and of the speech organs. This interest is clearly conditioned to a very large extent, at least, by the muscular interest, *i. e.*, the child attempts to imitate only those movements which he has, in the elements at least, exercised in the impulsive period. Preyer draws emphasized attention to this fact; the child in his impulsive period practices a large number of movements and adjustments and imitation comes in as a force in the selection of certain of these movements for practical use. He makes it appear extremely improbable that in learning to speak the child ever imitates the sound which has not been an element of his purposeless practice in the impulsive period. Sully also places emphasis upon this selective activity. The pedagogic method of nature is clear; it uses developed forms of activity and does not seek to build up new forms for itself.

As in the case of the muscular interest, so with the imitative interest, there is first a period when it acts for itself, but later, this interest passes over into the object imitated. Young Preyer at fifteen months, long before he could speak or understand the significance of reading, would amuse himself by holding a newspaper before his face babbling aloud, in simple imitation of an action he had observed in his elders. Baldwin observed his child, during the earlier period, looking not so much at the picture drawn, as at the movements of his hand and arm. He says the first attempts were "simply the vaguest and most general imitation of the teacher's movements, not the tracing of the mental picture, and the attempt was no better when a copy was made by myself on the paper." Dr. Lukens, writing

<sup>1</sup>Ricci finds a network of lines running in all directions without displaying the least intention of representing anything. (p. 303.) Baldwin describes the movement in his child from her 18th to 27th month: "At first she made only sweeping arm movements, then began to flex the wrist somewhat and toward the end of the series, with no teaching, manipulated the pencil with her fingers considerably." (p. 83.) He finds at the ages up to the 27th month, no connection apparent between a mental picture in consciousness and the movements made by the hand and fingers.



of this period, says: "The most that can be said is that the child imitates in a general way the outward movements that he sees older persons make in drawing. He has not yet gotten the inside view of the process but only its outward, mechanical movement."

III. Another interest which probably to some slight extent impels the child to scribble is that of sight. But in its simple, unassociated state, this is extremely transitory and the interest in mere seeing soon passes over into interest in the objects which are seen. There is reason to infer, both on anatomical and objective grounds, that the main muscular adjustments of the eye mature early in babyhood. Preyer considers co-ordination complete at the end of the second month.<sup>1</sup> Miss Shinn's niece was able, at fourteen months, to pick out from bourgeois type, lower case, the letters "o" and "s." For simple interest in seeing Miss Shinn's notes show interesting facts.<sup>2</sup> But early in the second year, the child's interest in seeing is evidently that of the associated interest which the objects call up. The child will be most interested in those objects which he has seen definitely and has had most firmly and repeatedly associated with feelings of pleasure and pain. On this ground, the face of the child's mother is likelier to be an earlier and stronger interest and more capable of gaining control of his motor apparatus than objects forced casually upon his attention.

The child's ability to see and interpret pictures in some crude way, comes in probably in the second year.<sup>3</sup>

The next step of significance is, when out of this scribble, there appear formations vaguely and distantly resembling the model. Professor Baldwin (p. 90) explains the psychology of this transition somewhat elaborately. Briefly, his explanation is that in the scribble period the child's drawing movements are merely muscular, uncontrolled by the visual centers which correspond to the visual image of the object to be drawn; that gradually these visual centers gain control of the muscles of arm, wrist and hand in drawing and the child begins to make drawings in crude resemblance of the mental image. One is prone to gain the notion from the emphasis Baldwin places

<sup>1</sup> Senses and Will, p. 38. Donaldson: Growth of the Brain, p. 165.

<sup>2</sup> Shinn, p. 85.

<sup>3</sup> Miss Shinn thinks Ruth closely associated a pictured cat with real cat at the tenth month; but certainly at the 14th month she picked out her father's photograph from a group picture of eight figures and shortly later, would call by name photographs of other members of the family. Pollock (Mind, Vol. III, p. 393) says his child understood the general significance of pictures in the 13th month. Sully (p. 309) has a case of recognition of pictured animals at 10 months, but he thinks this early form of recognition is probably on a level with Romanes's animal "recepts."

upon the details of the psychological explanation that there is sudden and complete transition. But, as the studies yet to be presented will show, it is of essential importance that this process of transition from muscular to visual control is an extremely gradual one, persisting in all probability throughout the kindergarten and primary periods. The tendency to regard this transition as something sudden and complete has led to most of the serious errors in the present systems of drawing instructions. It has been concluded that from the moment the child shows crude tendencies towards representation, he is ready to set up in business as a draughtsman, artist and observer. Pedagogy has at this point seized him upon the assumption that he is matured, anatomically and functionally, to perform any requirements made of him. On the contrary, these studies will show that the early post-scribble period is a mixture of muscular and visual attempts to control his arm and hand movements and that we must for years regard muscular control as dominant.

There are several peculiarities of the drawings of children emerging from the scribble period and persisting for a longer or shorter period. Many have bearings upon the pedagogy of the problem. We might consider the chief ones in the following order :

I. The child is inaccurate in a physiological sense.

(a) Traces of the aimless and purposeless scribble persist for months and even years after the child's drawing, in many respects, has representative features.

(b) The control of the child's arm and hand movements by his visual centers receives interference from muscular association and motor images and thus tends to break away from visual control interspersing the drawing with things felt and known as well as things seen.

(c) The child is inaccurate in the use of typical, geometrical forms, does not draw straight lines, lacks ability to see and arrange figures geometrically and logically. This tendency persists throughout the period under consideration.

II. The child shows generic interests in method and in the choice of subject matter for drawing.

(a) He shows tendencies which are probably due to the mixture of muscular and visual control expressed by his confidence in ability to draw.

(b) He shows a distinct preference for drawing objects which are connected with the human personality and activity.

III. The child is inaccurate in a psychological sense.

(a) He misplaces parts of a whole figure, *e. g.*, he puts eyes sometimes outside the head, legs detached from the body, leaves out neck, etc.

- (b) He draws what he knows, not exclusively what his eye sees at any given moment.
- (c) He is inaccurate in perspective effect and technique.
- (d) After a child has learned to draw some object or some feature of an object in a certain way, this scheme or diagram tends to persist in later drawings regardless of differences of position of the model, either in visual sight or in the memory of the young draughtsman.

#### I. PHYSIOLOGICAL INACCURACIES.

(a) The scribble impulse, the uncontrolled and probably uncontrollable exercise of muscle generally continues in parts of the drawing of certain figures after the child is able to draw other parts of the same figure with some degree of representation; in the human figure, face, features and legs will generally be represented while other parts will be omitted or scribbled. This fact is very clearly shown in the progressive series of drawings to be found in those published by Professors Lukens, Brown, Sully and Cooke. The visual centers gain and hold control upon certain parts but are not able to maintain them in others. In a large percentage, this scribble tendency is to be observed in the drawings of kindergarten age and even of the primary school.

(b) There is every reason to believe that in early childhood, motor images derived from joint and muscle sensations of movement, form a larger proportion in the make-up of child ideas than in the adult mind, as compared with visual and auditory images. Drawing, in an artistic and industrial sense, requires the segregation of visual control, and its complete influence over the movements of drawing. To obtain this control has been the chief battle of the drawing teachers under the present systems; and genetic psychology is inclined to protest that methods of forcing are employed. The child frequently mixes up with his drawing movements those not directly under control of the visual centers. Froebel (*Education of Man*) observes "Here comes a bird flying, and thereupon the child draws a line symbolizing the direction of the supposed flight of the bird." Children will draw the wind and other invisible things. Barnes tells of a small child who drew a line from a boy's eye to the sky explaining that he could not make the boy look up and the line was to show he was looking at the clouds. Brown (p. 65) describes a little girl drawing a picture of her papa dancing and drew a zig-zag line which she explained represented the dancing part. "The movement of papa's dancing," comments Brown, "was as much a part of the image as was any one of his visible features."

The principle of which these illustrations are typical is that

the visual centers are yet in a period of very immature development and are constantly interrupted by other impulses. Passy (p. 661) tells of a little girl under his observation who in drawing from a model made a very gross error, which she later saw and attempted to correct by drawing the object over again; in four successive attempts, the error was repeated showing that the force of muscular association was greater than the visual centers could overcome.<sup>1</sup>

(c) The conflict of the genetic and the logical order at this point is that the logical order takes no account of these conditions. Still more conflicting is the view requiring accuracy in the seeing and drawing of geometric form with mathematical precision. Froebel, as is well known, placed the mathematical sense the first in order, as it is logically, and the systems have adopted this theory. Accuracy and precision are essential prerequisites from the logical standpoint that technique precedes execution, clearly justifying the endless fine work and insistence upon accuracy in the kindergarten and primary school. But the genetic view sharply contends on the grounds of health and preservation, against injury to immature forms of development. A few studies have been made quantitatively by psycho-physicists in this field, those of Hancock, Bryan and others.

## II. GENERIC INTERESTS IN MATERIAL AND METHODS OF DRAWING.

It would seem from the genetic standpoint, that we are brought to a standstill, that all drawing must be prohibited until the child is nine or ten years of age perhaps. Yet, it is admitted by all, that exercise is essential as a function of growth in the period of immaturity. It would seem that the genetic claims have forced the problem between Charybdis and Scylla.

But, at this point, the genetic argument introduces a new

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<sup>1</sup>This feature of motor control is capable of immense enlargement but it would lead deeper into psychology than the limits of this review would permit. Briefly, there is evidence of phylogenetic influence as well as ontogenetic grounds that the visual centers are less of a central office through which the ideas of the adult are adjusted than in childhood; that ideas expressed in visual terms have more of a sub-conscious muscular basis than introspection commonly reveals. Dr. S. Stricker in his interesting monograph (*Bewegungsvorstellungen*) elaborates from careful, personal introspection a most suggestive line of thought. He contends that to imagine clearly any moving object, he feels distinctly a sensation in his own muscles which would be employed were he to make this movement; for example, in imagining a man walking he feels the sensation in his thigh muscles; in imagining a horse pulling a load he feels sensations in the breast. If he forcibly suppresses the sensation strictly declares himself unable to imagine the movements from which he concludes that these sensations are essential to the imagination of movement.

factor and claims for it the absolute authority of pilot. This is the principle of natural interest viewed as an organic expression of physiological states. In this form, this is a principle which has not been recognized by the adherents of the logical order; to do so would be to introduce a factor likely to come in conflict with that of the logical order itself. Interest, as it has been treated by the upholders of the logical order, is an ephemeral state, of no real or organic significance, to be used as a convenient expedient or excited by temporary devices; but in the sense in which the word is now being put forward, in genetic psychology, its recognition urges a principle with roots as deep as logic and of more mandatory significance for the period of childhood. If interest is the principle of the importance claimed for it, the struggle for life or death of education by the logical order in young children must take place at this point. For it cannot be denied that much of the school work under the method of the logical order is and can only be accomplished directly in the teeth of interest shown to be generic and deeply rooted in hereditary tendencies in all probability. Pedagogy has been forced to decide between the logical order and interest so many times, and so axiomatic to adult minds does the argument for the former appeal, that the child's interest has been whipped into submission, branded as an untrustworthy will-o'-the-wisp until the whole process has been established as a fundamental pedagogic virtue. In recent years, metaphysicians have unloaded upon the subject a lot of offal from their decaying structures and created about it a necessary but unfortunate prejudice. But interest as put forward from the biological standpoint is something different from the brand heretofore sold in metaphysical and pedagogical markets. It claims an origin as deep and a sway as important in many lines as heredity itself. Hunger and thirst are forms of this interest; they are the voice of certain physiological needs. So, also, are the desires for fresh air, for warmth, for athletic exercises in a hundred different ways. We all recognize these interests and have no doubt of their authoritative right of command from complex physiological conditions. There are, it is true, in disease, hungers and interests which are false, though I believe that physicians are now generally laying it down as a principle that while the hungers and wants of the invalid sometimes deceive, still in the absence of any better criterion these are the safest guide for determining what the patient should do. But pedagogy deals not with the sick and abnormal but as a rule with the normal. The principle appeals in an even more stable form than in medicine. But when we admit the feeling of hunger and other bodily impulses as reliable indicators of delicate physiological state, we cannot logically stop with these. Dispositions,

tempers, traits of character, instincts, emotions, love, music, art, faith, and even the religious impulses, whose roots perhaps reach back into countless ranks of ancestry are none the less indications of physiological states of the organism at a given moment. The impulse of these forces are the individual's interests and indicate, in a delicate degree, fine adjustments within the organism beyond all power of any other kind. Moreover, as has already been briefly outlined, these interests pass through stages of development from impulse of muscular through reflex to interest in objects; a child's interest in certain forms of activity or even in certain objects is conditioned by the physiological stages through which this interest has been developed.

The attempt to apply the principle of interests to pedagogy must be attended with more care and critical inspection than has been applied in many of its applications. The evidence goes to show that children's interests have a wide arc in individuals; but, nevertheless, such mass studies as those of President Hall, Prof. Barnes and others, have undertaken with several thousand of children show beyond question that in certain lines at least, there exist generic interests, common to children of a given period of genetic development. The limits of this review are upon the generic side of interests, although it must be clearly borne in mind that there are included within the large generic arcs variable individual arcs, which must be considered by any teacher in the modification of any general course of study. While this principal interest may be attended with difficulties in application, while it may be shown that important exceptions under the rule must be made, nevertheless, viewed from this genetic standpoint, the principle of interest appeals as the safest general guide of what children should do with muscle and nerve adjustment in a nascent process of growth. Prof. Barnes thus clearly puts the issue: "We may say that the natural tendency in a child's development are right and to be encouraged; or we may hold that the natural promptings of human nature are wrong; that the aim of education is to divert the human soul from its natural course along some line determined by philosophy or theology. In either case, to act intelligently, we must know what the natural line of development is."

At this point the question which necessarily arises in the minds of those who have been trained to look upon the logical order as axiomatic in its declaration that a child must learn how to do a thing before doing it, is: How is the child going to draw if he is not taught by gradated steps of elementary simplicity? To the adult mind, steeped in this traditional dogma, this rises as an incomprehensible problem. It is the natural

view of the adult mind. But there is seemingly nothing incomprehensible about it to the child. The remarkable feature about children drawing is their absolute and unflinching courage and naïve self complacency, both with their ability to draw anything and everything they wish to draw and with what they have drawn. Passy (p. 615)<sup>1</sup> most vividly describes the attitude of a young child in drawing: "He does not hesitate but seizes his pencil and draws rapidly in an automatic manner. It is impossible to make him look at his model with any attention; if any one commands him to look at it, he hurriedly casts upon it a distracted and disdainful glance and continues without concerning himself with that which he sees. The moment he has finished, he shows it to you with a triumphant air."

Prof. Barnes in his study of 15,218 drawings by 6,303 children from 6 to 16 years, who were requested to illustrate the story of Hanns-Guck-In-die-Luft, finds that at 6 years of age, the children drew on an average 1.6 scenes; this average increased steadily until the boy, at 14, and girl, at 13, the average was a little more than 3 scenes each; from this time on, the average decreases and at 17 years was 2.4. Prof. Barnes comments: "This would seem to indicate that girls at 13 and boys at 14 become less daring in expression. The children who refuse to draw at all were over 13 years. Other studies in this line would seem to indicate that at 13, or the period of puberty, the children experience a change in ideals, and it may be that after this, they realize more fully, their inability to execute what they see."

O'Shea had a number of children draw from some object or person present and then from memory of some object or person well known to them. He reports: "While not one of the children up to nine years made any objection whatever I had to encourage those beyond that age to do the best they could and many of them seemed quite overpowered at first, especially in representing a boy or girl whom they could see. I noticed, also, that younger children rarely hesitated in drawing from memory, but go straight to work with their lines and dots to make man, woman, child, or other object, while the older children seem to be absorbed in meditation and do not draw so readily." In another experiment Prof. O'Shea had a number of children, from four to eleven years, illustrate stories which had been read to them, and they were given perfect freedom to express any difficulties which they met with. They were closely observed while the story was being read and during the making of the drawing. "From the records of five hundred cases

<sup>1</sup> Colonel Parker in "Talks on Pedagogics," p. 302, has a similar pen picture of child courage in drawing.

studied in this way about one per cent. indicated that they could not represent certain objects, among these being a bridge, a horse and carriage, and a fairy." At the same time, there was "no hesitancy in representing the wind, Jack Frost and other invisible things. It seems that with children of this age there are few objects ever seen or heard of that are too difficult for speedy and confident representation." Prof. O'Shea concludes: "It would seem, then, that children from four to nine years or thereabout, represent the object involved in drawing a story as readily and with as much pleasure as they would in repeating the story orally or even in listening to it. After the age of eight or nine, it seems that the difficulty of representing begins to be readily appreciated and there is less confidence and satisfaction in the work."

Dr. Lukens, in the course of his article, offers a number of individual illustrations of this principle of early courage of execution. A noteworthy one will be found on p. 92, *Pedagogical Seminary*, Vol. IV, in the case of five-year-old Tom, who, in the course of a year, struck off several hundred drawings, a partial list of the topics of which Dr. Lukens gives; they range over the whole field of child thought, from scenes of Jack the Giant Killer to the picture of a house on fire; no trace of a problem of ease or difficulty of mechanism is to be found.

In Prof. Brown's study there is offered some interesting data from children under five years showing that they did manifest lack of courage when called upon to draw from models before them, but this feature does not seem to appear in memory or pictorial drawings.

Certainly, nothing is more clearly evident than this, that children during the kindergarten and primary grades, allowed to choose their times and objects for drawing are not spontaneously worried about the problem of how to draw. The evidence is equally clear that there does later come a time when the child does become self-critical of his work, does hesitate, does need help and will seek it in the mechanism of expression. The criticism which genetic psychology would attach to the present system is not that it has taught mechanism too much but it has taught it at the wrong time; that the school curriculums have attempted to answer the child's question of how to draw several years before he has asked it or wants to know.

This subject of courage and confidence in the ability to draw bears upon the important problem of accuracy. Accuracy is the core and radiating center of the systems determined by the logical order. Text and teacher's hand books are sprinkled page by page with hints, rules and regulations for teaching and insisting upon accuracy—accuracy in line drawing, accuracy in perspective, accuracy in seeing, accuracy in representation of



the model—all of which go to show that the problem at best is a persistent one throughout the kindergarten and primary school. The child's pertinacity in carelessness as to accuracy, has only been equalled by the pedagogue's pertinacity in his attempt to force the child to be accurate. The physiological side of the problem has already been touched upon indicating that there is a strong basis and justification for this pertinacity on the child's side of the matter, and vital danger in the pedagogue's pertinacity. Probably the best objective corroboration of this physiological view lies in the evidence of the continual and monstrous effort to enforce it; further, after all, with the best of texts, devices and entreaties, punishment even to the rod, with the most conscientiously unmerciful teachers in the enforcement of this logical requirement and with the most obedient pupils, the drawings of young children who have lived through all this merciless drill until the drawing lesson has been associated in the minds of teachers and pupils with all that is disagreeable in school life, show little gain in the point of accuracy. Mrs. Maitland comments upon the drawings of several hundred children who had attempted geometric figures which they had learned to draw in school as follows: "In the conventionalized design where the aims to be attained are very definite, it is to be deplored that in this class of drawing where accuracy is a supreme virtue, inaccuracy and slovenliness are the conspicuous elements. The lines are often ruled, they are too long or too short, the angles are not true, the squares, circles, triangles, and sections are not true."

The spirit of texts and school curriculum under the logical order is typically illustrated by the view of Mr. Sparks, of South Kensington, quoted by Mr. Cooke: "The main thing (in the teaching of drawing) is to make children accurate; that is the moral of the whole thing. Some sentimental objections have been made to a hard and fast and repulsive method, but it is necessary to be very matter-of-fact in training artisans to be accurate in understanding any drawing that may come before them."

It is but too clearly evident that there is no ground of compromise between the logical order and the genetic view in the point of accuracy. Accuracy is a fundamental essential to the entire system and the fact that a child is inaccurate by nature becomes to the minds of system and curriculum makers the most mandatory reason in the world for the need of drill. The genetic conclusion is diametrically opposed; the fact that children are inaccurate and are not interested in accuracy is the very best evidence that they should not be forced in drills of accuracy; it indicates to the supporters of this view physiological causes; the child's hour for accuracy has not yet come. Until

it does come the pedagogue will be wise to lie abed and wait for the child to grow.

Probably the study most directly bearing upon the subjects for drawing best adapted from the standpoint of children's interest is that of Mrs. Louise Maitland. It comprises 1,050 drawings from public school children from six to seventeen years, 350 from eighteen children in the Stanford Experimental School, of five years and upward, besides a hundred or so more. It will be observed in the tables that in almost all of the rubrics a significant change of interest takes place about the 10th year. At five to seven years, 55 per cent., and at eight to ten years, 62 per cent. draw separate objects, and at eleven to thirteen years the percentage jumps to 91 per cent. and at fourteen to seventeen years, to 98 per cent. Picture stories are preferred by 32 per cent. of children five to seven years, at eight to ten years by 33 per cent., but at eleven to thirteen years this ratio falls to 6 per cent., and at fourteen to seventeen years to 1 per cent. The same change at this period is to be noticed in their preferences for objects. The following table shows what children drew when asked to draw anything they pleased:

	5-7 yrs.	8-10 yrs.	11-13 yrs.	14-17 yrs.
Human figure	45%	40%	8%	5%
Animals	23	21	11	10
Plants	35	30	17	11
Houses	32	30	13	4
Mechanical inventions	8	13	11	8
Still life	40	47	39	31
Geometric design	5	12	28	37
Ornament	3	3	4	8

Significant facts to be observed in relation to the logical order are that the human figure, which comes last in the scheme of the logical order, comes first in the order of genetic interest, and that interest in animals, plants and houses, which the logical order also would put last, are shown to have their larger ends of spontaneous interest in childhood, tapering with increase of age. On the other hand, geometric design and ornament, which are exclusively the warp and woof under existing systems, show an almost inappreciable interest in children under 10 years, but become important after that period. It must be remembered in this connection that probably the larger number of these children receive instruction in geometric design in the public schools.

Dr. Lukens's study of twelve hundred and thirty-two spontaneous drawings of children under ten years, corroborates Mrs. Maitland's figures. He finds that 44 per cent. of the whole number are drawings of the human figure, and if he should

base the estimate upon drawings which contain the human figure (which would include pictorial drawings) the percentage would be 75. Geometric figures and ornament combined were significantly represented by only 2 per cent. He concludes that {the thing par excellence for all lower grades and kindergartens is the human figure and from the date of his investigation forcibly condemns the prevalent use of geometric form.

Ricci's study of 1,250 drawings is wholly upon the human figure.

Studies under the direction of Prof. Brown deal almost exclusively with the human figure, broadening to objects with which the child is brought in contact in his natural experience, mainly animals, houses and actions. Prof. Brown says: "It seems clear that the first drawings of all these children was pictorial rather than decorative in character. The idea of making symmetrical figures for the mere sake of beauty was a later development if it appeared at all."

By Prof. Barnes's table of 15,218 drawings, it would be indicated that the human figure in different attitudes occur in every drawing; but here his subject, the story of Hanns-Guck-in-die-Luft, will of course encourage such a result.

Sully's elaborate study reaches the same conclusion. He says, the human figure comes first in the child's interest in drawing and animals closely follow.

The second class of material which the systems give largely after geometric figures, is decoration and design, which grow with clear logic from the arrangement of geometric figures. It forms a large part of the form and drawing lesson in the kindergarten and primary school. It is supposed to cultivate an artistic taste and appreciation. The results in this field are as unanimous as in the former case. Mrs. Maitland, as stated, finds that from five to seven years 5 per cent. draw designs and 3 per cent. ornaments and this ratio increases to the ages of fourteen to seventeen when 37 per cent. prefer conventional designs and 8 per cent. ornament. Dr. Lukens finds that under ten years of age 2 per cent. covers geometric design and ornament combined. Prof. Barnes remarks that out of the 15,218 drawings not more than ten or twelve papers are decorated in any way with borders or ornamental lines or fancy flourishes. Prof. O'Shea placed before groups of children, five to seventeen years, a chair or table which was ornamented. He says: "With children of five, the ornamentation was never represented; with children of eight, exactly 50 per cent. of the drawings showed evidence that their authors had tried to reproduce the ornamentation, while with persons of sixteen, 87 per cent. represented the objects ornamented." Ricci sums up his study of the question with the sentence, "Art as art to children is unknown."

He finds that drawing is merely a language to young children and their zeal is put forth in symbolizing all there is in their minds. Sully says (p. 382), "At no stage in this child art can we find what we regard as elements of artistic value." However, in these statements, it is but just to state that nearly all explain that by concluding that children have no art in their drawings they do not mean to imply that the child has no art in his nature. Sully, for example, emphasizes the art impulse in the child nature. "We are quite justified," he says, "in speaking of the art impulse as a common characteristic of childhood." But in the early stages of these drawings under consideration, art does not seem to have reached a stage ready for expression in form.<sup>1</sup>

The only observations throwing light in any sense of exception to what has preceded are those of Miss Shinn,<sup>2</sup> chronicled in her Notes. The child was given the Froebellian gifts in the second year and a careful effort made to educate the child with them. At times, as the notes show, the child took a warm in-

<sup>1</sup>Other investigations of child nature which have no place in this review are strongly pointing to the suggestion that we are acquiring altogether too much expression from the child in certain lines. Much of his nature and much that is strongest lies as yet in the form of vague instincts and below the threshold of consciousness. To this class of feelings, as it were, the art instinct properly belongs; while the child may be said to be strongly animated by instincts which will develop into artistic powers, it's an altogether different matter to assert that he is ready to stand and deliver these in the form of language, in form acceptable to the schoolmaster. Heim, in his *Zeichnen und Schen* (p. 16), strongly inveighs against the emphasis placed upon ornamentation in early education. He points out on utilitarian grounds that it is only a very small part even of æsthetic appreciation among adults that depends upon ornamentation. A true sense of art, he says, only comes from the irregular forms of nature and these tend strongly to excite the child and should be the material for educating his artistic impulse.

<sup>2</sup>In a letter to the writer, discussing this point, Miss Shinn says, "the interest in type form did not last after the identification of them had lost its novelty. Ruth is now six years and a quarter. She uses her knowledge of the plane forms as she does that of any ordinary fact—as we do; that is, she would refer to a square tile or an elliptical garden plot merely to describe them as she would a tall tree or a white flower. The form is not a feature that interests her especially, and unless she found it necessary to bring it in, she would not be apt to mention it in a description. Solid form she never mentioned of her own accord, though she knows whether a thing is a sphere, a cube or cylinder. . . . I made a good deal of effort in the third year to follow the Froebellian method—with signal ill success. The child utterly declined to be the child of Froebel and detested all that Froebellianism assures us the child loves and found easy all that it tells us is hard. This was also the observation of the other college women in our seminary. . . . On the whole, I found better adapted to the child's nature and entry into education by the door of literature rather than mathematics."

terest in them; her first drawings were of the geometric forms though at so early a period (under two years of age) as to suggest the probability that the interest was merely muscular. Later observations go far to vitiate the significance of the earlier observations.

The principle of a generic order in the selection of features first drawn in the representation of the human form, which has received some attention from Dr. Hall and Professors Barnes and Sully,<sup>1</sup> indicate that the child tends first to draw the face and ends with the body and neck. The cause of this fact is, doubtless, that babies first distinguish as objects the human face and its expression by the eyes and mouth, as Preyer has shown. It indicates that the visual centers gain control of the arm movements in drawing the human figure in the order of the parts most often seen and which are, for practical purposes, most interesting. The human face, its eyes and mouth are early matters of interest to the child, while the body and neck come after the arms and legs in point of practical interest. The pedagogical conclusion would reinforce that already suggested, that the first objects in drawing should be those with which the child has been most intensely interested in his daily experiences and in a practical way. Abstract geometric forms the child can, of course, be made to look at, but this is altogether another thing from making him see them with such intensity under the complex physiological conditions which build up visual centers in the nervous system capable of control of intricate arm and hand muscles.

The force of these foregoing studies upon what subjects are most interesting to children for drawing purposes, made upon thousands of children of America, England, and as well in sunny Italy where art has had its abiding place for centuries, is clearly in conflict with the dogma of the logical order which would reverse the steps in learning to draw which these studies suggest. They indicate that the interest in the human figure and human affairs, irradiating to the things with which the child deals in his daily experience, is generic. The human figure, which in the logical order comes last, and in the adolescent period comes in the genetic order with the babe in his crib, and, so far as this data would suggest, interest proceeds toward and not from the logical geometric simples. The pedagogical inference, in the language of Dr. Hall, is that the present system should be stood on its head. It is probably misleading to say the child is interested in drawing the human figure. That im-

<sup>1</sup>G. Stanley Hall: *Pedagogical Seminary*, I, p. 166. Earl Barnes: *Pedagogical Seminary*, II, p. 460. Sully: *Studies in Childhood*, p. 337, *et seq.*

plies an art interest, for art's sake, which is clearly not the case. The child is a human egoist and his interest naturally centers around himself, man and what man does or can do in daily child experience of sight and action. Ricci succinctly expresses the point when he says: "Children by drawing describe man and things instead of rendering them artistically. The child tries to reproduce man in his literal completeness and not according to visual impression. They make, in short, just such a description by drawing as they would make in words." In the child's sphere of ideas the beginning and center is man's activity and this interest irradiates. Drawing as an expression of these irradiating ideas—just as speech, and later, writing are—must in consequence follow along the lines of this diffusing interest.

### III. PSYCHOLOGICAL INACCURACIES.

There is a class of inaccuracies which are not clearly dependent upon the coarser and more fundamentally physiological conditions. To avoid any question of dispute, they may be classified as psychological, not, however, with the implication that they have no physiologically causal dependence.

(a) The child misplaces parts of a figure indicating that his visual centers are not in such firm control that they can continuously hold the attention to the object as a whole. Miss Shinn's niece, for example, puts in a drawing a little girl in one corner and her dress in another, both hands on one side and her mittens quite away from the hands. It is quite a frequent thing to find the eyes placed outside of the head or the arms or legs detached. All observers mention this. Sully remarks that it is astonishing what a small child can do in the way of dislocating and putting things in the wrong place. This feature is most strongly represented in the earlier period and many examples will be found in the illustrations printed in the articles of Sully, Lukens, Cooke and Brown. Passy remarks: "One might say that children exaggerate details; it would be more exact to say that they draw without consideration of the whole; in reality *l'ensemble* does not exist for them; one can best define the drawing of a child as a collection of impressions more or less disparate; each part is drawn without regard to relation." That this feature persists till late is shown by the fact that Professor Barnes who studied deals with children over six years of age places considerable emphasis upon it.

While the exact psychological import is not clear in detail it is sufficiently plain that it is a sign of an immature condition of control by visual centers.

(b) After a child has learned to draw some object or part of one, he tends to use this scheme as a conventional form, as

it were, in the drawings of all objects or parts which in any way suggest it. Professor Baldwin's little girl, after learning to draw the human figure, would put arms on a bird. We thus find tendencies to put human faces on animals' bodies or to draw an animal as a man on all fours. In the grosser forms of this feature, the child neglects to look at any special attitude, but, as Passy says, mechanically reproduces the conventional form which he has habitually associated with it; thus having learned to draw the figure of a man in one certain position, the child uses this conventional form for man in any position. Passy and O'Shea posed as model in various attitudes, both full face and profile, before classes of pupils. O'Shea's results, with which Passy is in agreement, is that in no matter what position the model stood, the same picture grew under the artist's hand, as he had made it perhaps hundreds of times before. Children who made front views would make them when the model was in profile. This refers to children under ten years of age. "But it seems different with older children," says Professor O'Shea, "I have been unable to get those above ten years to represent readily a person whom they could look at and who stood in a different position from what they had been accustomed to represent in their drawings." Another experiment to discover whether certain conventional types are carried for a long time, Professor O'Shea examined the drawings of a class throughout the period of over a year; on an average one hundred and fifty drawings were made by each child and the persistence was clear. Some children always show roots of trees, have always the feet of the human figure turned in opposite directions, always have the clothing showing buttons, etc.

The psychology of this feature indicates the law of strong muscular association that any act once performed in a certain way tends to repeat itself unless inhibited. The inhibition in this case must of course come from the eye perceptions of the model. The fact that the eye does not interfere clearly indicates the immaturity of the visual centers and further that muscular associations are powerful where this anachronism occurs.

(c) Closely allied with the foregoing is another tendency which has caused much discussion and is universally admitted. It is that children under the tenth year, at least, tend to draw what they know about an object, not merely what their eye at a given moment, in the study of a given model, sees. They draw both sides of a house, or the inside of it, from an external view, two eyes in a profile face, or will turn over a profile picture to find the other eye, make the farther leg of a man on horseback show through the sides of a horse, picture the stomachs and lungs in human figures and feet within shoes. Clearly, before anything can be done in perspective from a logical stand-

point, this error must be corrected. Consequently, in the systems, immense efforts are constantly put forth to meet this difficulty even at a very early age and writers from this standpoint, in teachers' manuals, have made the expression, "Draw what you see," the shibboleth of drawing instruction.

The most direct and valuable study upon perspective is that by Mr. Arthur B. Clark (in *Studies in Education*, No. VIII). It contains illustrations and charts showing the development by ages in the power of perspective. A most important principle which Mr. Clark urges is that there is a progressive ability to see and draw perspective effects according to age whether or not children receive special instruction; that it is a matter dependent upon age and development rather than upon instruction. Mr. Clark stuck a large hat pin through an apple and asked 408 children, ranging in age from 6 to 16 years, to draw it. "With two or three exceptions," he says, "it was drawn in but three ways; 137 drew it clear across the apple (*i. e.* drawing that which they could not see); 150 drew the pin to the edges of the apple; and 121 drew the complete, perspective effect." An accompanying chart shows that in the order of age ninety-eight per cent. of the children of six years drew the pin through the apple (*i. e.*, drew what they knew, not what they saw); the curve decreases gradually until at nine years only 40 per cent. drew it in this way, 40 per cent. drew it to the outline and 20 per cent. drew the perspective correctly. At ten years, the number who drew what they knew falls off almost perpendicularly and at 14 years, there are none who do not make some effort to draw what they see. The curve for true perspective effect begins with 2 per cent. at six years and gradually increases, reaching thirty per cent. at ten years and fifty-eight per cent. at sixteen. Books laid upon a table for these children to draw show results in chart form practically identical with the foregoing. This study taken by itself would indicate that the average child should have extremely simple perspective problems until the ninth year, if any at all, but after that age, certainly, the great majority try to draw what they see and consequently the time for special instruction has come.

Barnes collated 12,740 human faces drawn by children; at six years twice as many full faces were drawn as profiles; from six to thirteen years, full faces decreased and profiles increased and at thirteen there were twice as many profiles as full faces. The number drawn of each was equal at a point between nine and ten years. Barnes comments: "This may mean simply that after nine years the child tries to really represent the face and then the profiles are easier. If this be true, it helps us to locate the point in the child's development where he begins to represent things as they really are instead of diagrammatically,



and nine years would seem to be the age at which the grammar of drawing might be introduced."

Sully finds that the profile is the natural symbol of the human face used by children up to five years of age. Dr. Hall finds that out of 44 heads drawn by children entering school only nine are in profile. It will be remembered in the experiment of Prof. O'Shea, already quoted, that children under ten show little hesitancy in drawing anything, regardless of model or memory, while those over that age tend to hesitate and feel embarrassed.

The psychology of this feature, carrying out Baldwin's general explanation, indicates the inability of the visual center completely to control the drawing movements, and that associations muscular, and other, continually interrupt this control by the visual centers; that other ideas in association with the visual centres are really stronger than these and seize the motor apparatus so that the child draws by the control of centers, represented by ideas he has about the object. In the apt language of Ricci, the child's drawing tries to express just such a description as he would make in words. It is clear that the conventionalizing tendency and the tendency to draw all that is known offer most serious obstacles, while they continue dominant, to instruction in drawing according to the logical order. Until this difficulty is overcome, little can be done in the matter of exact and accurate form study. The studies strongly indicate that the average child does not reach this period normally until the ninth or tenth year. Effort to force the child in this matter would, from the genetic standpoint, be injurious. The upholders of this latter view are inclined to maintain that drawing up to this age is not art, is not representation, is not even form study—it is a language to express any and all ideas of child life.

Sully, Hall and Passy draw a very close parallel between the figures of children's development in drawing with the development of similar instincts in the race, to which the reader is referred for details. All of the chief fallacies and anachronisms of children's drawings are found in the drawings of primitive man and primitive man for centuries used grotesque symbols barely representative as a means of writing, of expressing ideas. This view of such a period in the development of art is in full accordance with Hegel's theory in his *Philosophy of Æsthetics* though from an entirely different philosophical basis. He divides art development historically into symbolic, classic and Christian. The symbolic period was that of savagery when man did not conceive the idea of representation and his drawings were vague and bizarre; he expressed power by great size or multiplicity of limbs, heads, etc., without much

evidence of representative attempt. In the classic age of Greece, the expression was fully adequate to the idea and representation reached its height. The analogy of these children's drawings with this symbolic period is clear.

The significant feature for pedagogy, illustrated by these cases is, that drawing of children up to nine or ten years stands on the level of writing; by it he expresses any ideas that he might express by words; while not exactly symbolic in the strict sense of the word, it is more symbolic than representative<sup>1</sup>. It is only later that the child tends to limit drawing to the expression of ideas of accurate form. The genetic view does not dispute the logical view as to the necessity for drawing what is visually seen, but asserts that in the present systems this work has been put several years too early and protests against the forced methods which have necessarily been used to compel the child to do that which he is not ready to do.

A serious objection arises necessarily, upon the suggestion that the systematic instruction by the logical order be postponed at least until after the ninth or tenth year, that there will not be then time to teach the subject in the remaining school course. This objection in its naked form is certainly a forcible one, and one that the upholders of the genetic view are not yet prepared to meet with a definite plan; it has not yet been tried. The answer, however, would probably be along some such line as follows. The replacing of the systems of drawings upon the logical order by a system based on the genetic order does not mean that there would be no drawing instruction in the kindergarten and primary grades. In the reorganization of matter, methods, and system, the child's interest probably would require more attention to the subject than at present. So far as the mastery of accuracy and ideas of geometric form are concerned, there is every reason to feel confident that these would be more quickly and readily acquired at a period when the child has a strong, instinctive interest in them than at a period when he has not. We are all ready to grant that nothing would be gained and much lost should we attempt to teach babes to walk before their natural period for walking; stunting and permanent

<sup>1</sup> As Professor Brown and Miss Shinn point out, the word "symbol" is hardly the best word to use in this connection. It is clear that the child himself does not as a rule consider his drawings merely as "standing for" the object. It is ever, more or less, a representation from the child's standpoint. But in the sense in which Hegel used the term, the savages were equally confident that their rude drawings were not like the object. So probably the term "symbolic" in its Hegelian significance will do as well as any as an expression to denote drawings from general ideas not limited merely to those referring to exactly what the child sees, but including, as well, what he knows.

injury probably would be the only result and no time would be gained.

To recapitulate, the progress of a child learning to draw is roughly divisible into three genetic periods, although it must, of course, be kept in mind that there is no definite point of change.

1. A period in which the movements are wholly muscular and are unguided by the visual centers in any degree; roughly, this period is that of the second and third years.

2. A period roughly between the fourth year and the ninth or tenth, characterized by the first beginning of crude representation and slowly proceeding toward an interest to accurate drawing of objects as they are really seen. During this period, the visual centers show evidences of extreme instability to control the delicate muscles of the arm, hand and fingers which must be presumed to be coming into functional existence throughout this period.

3. A period beginning with an interest in accurate representation of what the eye sees to the exclusion of associated ideas.

This review has dealt only with the first two periods.

To sum up and place the problem of education involved in the clear light of contrast from the standpoints of the logical and genetic views, the use of parallel columns may be suggestive. It is to be understood the term "child" is not used beyond the ninth or tenth year.

#### THE LOGICAL ORDER.

The child's mind is a *tabula rasa* upon which anything considered by the educator desirable may be written at the will of the educator. It is the business of the educator to select and write the knowledge most desirable and in an order determined by a logical analysis of the subject.

Childhood should be shortened to its lowest possible limits and as rapidly as possible the child should be induced to put away childish things.

The child is a little adult. If we take cross sections of the human mind at various

#### THE GENETIC ORDER.

The mind of a child shows, in some fields at least, which have been investigated, distinct generic tendencies to select certain material and methods for its education and reject other material and methods. It is the business of the educator to make use of these generic tendencies as interests and to subordinate instruction to them.

Investigations point to the probability that the child who is most the child, as a child, will be most the man, as a man; therefore let childhood ripen in children.

The child is not a little adult. Investigation indicates that he grows in spots. Cross

levels from birth to adult life we shall find that the ways of thinking are identical in kind and character.

The steps by which a child learns a body of knowledge or training, as, for example, accurately to represent in drawing, are identical with the processes by which a full grown man logically thinks them.

The determining principle in forming a course of study in drawing should be that of the synthetic combination of the parts obtained by analysis of the subject matter concerned, in a logical way, according to inherent relations existing between these parts.

These parts thus obtained by analysis will be the abstract geometrical simples of form divorced from all matter or distracting ideas and these the child should be taught to recombine and finally he may be led to natural objects in which both matter and form appear.

The child should be taught fully and completely the mechanism of how to draw before he is allowed to draw from his own ideas.

The first essential step in

sections show changes, in kind, in the ways of thinking though these successive layers show causal relations, one with another, just as, while the bud is not a leaf, yet there is a causal relation between the two, and healthy and mature functioning of the bud is essential to the best activity of the leaf.

In certain essential respects, at least, there is evidence to show that the steps by which a child learns to represent in drawing are radically different from the processes by which a full grown adult thinks them.

The determining principle in forming a course of study in drawing must be that of the child's generic tendencies or interests, modified by individual interests. Investigation indicates that these interests require an order of instruction more nearly the reverse of the logical order than identical with it.

The child's generic interest shows that he should commence drawing with man and the things that men do or have about them—the human figure, the house he lives in, animals he sees or fears. Matter and form are therefore inseparable in childhood and the progress is toward a separation; hence, abstract geometric forms will come last, not first.

The child should be allowed to draw from ideas and in doing so, and under the influence of the interested excited mechanism should appear as a subordinate factor.

Accuracy is a power depend-

drawing is that of accuracy, for this is the prime requisite of mechanism. All success will depend upon forcing the child into habits of accuracy of sight and movement.

Drawing should originate and cultivate artistic instincts.

The material best suited for originating art instinct consists of the dislocated parts of conventional designs and the typical geometrical forms divested of all that would interest the child and thereby distract his attention.

Drawing to the child should be made to deal with form exclusively.

ent upon physiological maturity; the first consideration should be prevention of physiological injury; the time for drill and accuracy is indicated by the time interest develops in it. By reversing the relative order of mechanics and drawing from ideas, the essential place of accuracy is also reversed.

Instincts cannot be originated. They are probably determined for us by ancestral tendencies and have a genetic order of development in the individual. The child shows practically little of what is ordinarily meant by artistic instinct and it is not ready for formal expression.

The child has practically no interest in conventional designs nor in abstract geometrical forms; such instruction should at least be postponed.

Drawing to the child is language for the expression of his ideas; and form, pure and simple, constitutes a very small modicum in his interest. It is not possible to segregate form in the child's mind in an intelligent manner to him.