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The Survival Values of Play.

CONTENTS.

SURVIVAL VALUES OF PLAY.

I. INTRODUCTORY.

The educational value of play in the development of youth has long been tacitly recognized by the majority of observing people. While possibly unable to assign it any definite value, sympathetic adults have at least felt that time spent in plays and games has not been squandered, but on the contrary, that benefit has resulted. This phase of the subject had been emphasized by early writers, while Froebel by means of the kindergarten utilized the play activity as a distinct agency in formal education. Until the time of Spencer, however, no one attempted to investigate scientifically the philosophy of play,—its origin, nature and utility.

Spencer finds the origin of the æsthetic sentiments (1) in the play activity, an idea which he states was gathered from a forgotten German source. (2) The nature and origin of play are thus discussed as a preliminary to his main topic. Spencer, to account for the origin of play, evolved a surplus-energy theory, which may be succinctly stated as follows:—Highly evolved animals have developed many powers adjusted to many requirements which can not all act at once. Their more efficient organization, and hence better nutrition, gives a surplus of time and vigor not absorbed in providing for immediate needs. Hence many powers are inactive for considerable periods. (3) Active, healthy nerve centres during prolonged rest continually gather energy and hence in time "are brought to a state of more than ordinary instability—a state of excessive readiness to decompose and discharge," (4) which they do owing to the multitude of stimuli which are continually besieging the organism. "Hence play of all kinds—hence this tendency to superfluous and useless exercise of faculties that have been quiescent." Although he terms play activities as *superfluous and useless*, directed to proximate ends without

(1) Spencer, Principles of Psychology, Vol. II., Chap. IX. Appleton & Co., 1885.

(2) As Groos shows (The Play of Animals, Chap. I.), this source was Schiller, and the idea is again traced to Kant and Hume. Groos also maintains and is followed by Eby (The Reconstruction of the Kindergarten, Ped. Sem., July, 1900), that Spencer also derived from Schiller the conception of the nature of the play impulse. This is just possible, but by no means certain. It must be remembered that Paul, Beneke and Schiller treated the play impulse, although in a very vague and metaphysical manner, while the first scientific explanation was attempted by Spencer. In this connection see Wallaschek, Primitive Music, Note, page 232.

(3) Spencer, *op. cit.*, Vol II., p. 629, and Vol. I., Section 50. See also his Physiology of Laughter, in Illustrations of Universal Progress.

(4) Ibid, Vol. II., pp. 628-630.

ulterior benefit either individual or biological, yet he further admits that these activities "may bring the ulterior benefits of increased power in the faculties exercised" and "there results only the immediate gratification plus the maintained or increased ability," thus committing himself to the practicing or exercising utility of play. As to its psychological nature he speaks of satisfaction, gratification and pleasure, and that in play "there is a more manifest union of feeling with the action."

Karl Groos, in his two published works (1) gives to play a distinct biological importance. He finds the origin of play in instinct. To him "play is a veritable instinct." (2) Its utility is that of practice or preparation of the instinct for future service. In the ontogenetic development of animals "instincts appear before they are seriously needed," while the young are still under parental care. With phylogenetic nervous evolution comes natal weakness. Instincts are not "elaborated to their last and finest details," (3) and hence if brought into contact with a real environment would react imperfectly, subjecting their possessor to danger of extermination in the struggle for life. Play is thus an instinct-educator. Practice in play elaborates these imperfect instincts "to their last and finest details," fitting them to react perfectly to the coming environment. Thus through play natal weakness is not a disadvantage and phylogenetic nervous evolution is possible. Thus animals do not play because they are young, but "rather they have a period of youth in order to play." (4)

In discussing the instinctive origin of play, one must bear in mind that play and instinct are not entities, but are generic terms, referable to each of many individual activities. (5) The statement that play is an instinct means that each and every play activity is an instinctive activity, and to this exceptions must be taken.

A definition of instinct, (6) which Poulton believes will be generally accepted by Darwinian naturalists, gives as one element "a complex group of co-ordinated acts entirely congenital on its first occurrence." Translated into neural terms, this expression means that every instinct involves at least a discharge of nervous energy over a complex group of congenitally associated neurones. Groos himself, after a lengthy discussion, also defines instinct as embracing hereditary brain tracts. (7) Thus each and every play if instinctive, must embrace within the activity a congenital association of neurones. But in fancy, revery, day dreams, castle-building, puns, play lies, imagination, etc., we have a play in ideas involving the higher associational areas and it is difficult to conceive of any complicated congenital associations

(1) Die Spiele der Thiere, 1895, and Die Spiele der Menschen, 1899.
(2) Poulton claims that this same idea is not original with Groos, but had been developed previously by Robinson and Lloyd Morgan. See article by Poulton in Nature, Nov. 21, 1901.
(3) Groos, The Play of Animals, p. 74. Appleton & Co., 1898.
(4) Ibid, p. 75.
(5) Allin, Play, University of Colorado Studies, Vol. I., No. 1, p. 65.
(6) Poulton, Zoological Problems Studied by a Psychologist, Psychological Problems Studied by a Zoologist, Nature, Nov. 21, 1901.
(7) Groos, Play of Animals, p. 69.

in these regions. In fact they are generally conceded to be entirely plastic, free from congenital associations. Likewise may be mentioned myths, many stories and some fiction and poetry, which are largely plays among ideas, involving no congenital associations. Among neuro-muscular activities the same conditions obtain. Groos enumerates many cases dealing with the playful use of the senses and the motor apparatus. (1) He quotes Compayre: "I knew a little girl who would undertake to recite only on condition that she be allowed to use her fingers at the same time," (2) and mentions other such concomitant habitual activities usually termed automatisms. Carrying a cane, fanning for the sake of the touch stimuli, hand-clapping, banging on the table with the fist, hopping and skipping, the chewing and biting of pipe stems and pencils, and even gum-chewing are mentioned as plays and therefore from his standpoint instinctive activities. Besides there can be cited plays upon habits formed *de novo*, such as the finger movements of pianists when preoccupied. Plays in imitation of adult work activities as keeping store, keeping school, playing horse, preaching, etc., and plays based upon ancestral adult occupations handed down as a part of the social heritage, (3) such as the use of rice at weddings, Easter and Christmas rites, are also cases in point. In these last two classes of plays it is not maintained that none involve instinctive elements, nor is the wide prevalence of instinct in plays in general denied, but it is asserted that many of these plays, for instance those cases above mentioned, involve no congenital nervous associations and hence can not be properly termed instinctive.

These are extreme cases no doubt, but yet they are all true forms of play and Groos, to uphold his position, must affirm that in each and every case there is a discharge of nervous energy over a combination of neurones, a large number of which were functionally associated at birth. An exact determination of this fact in each case is extremely difficult, yet from the known facts of progressive medullation and localization of functions, as far as these cases are concerned, Groos' position is untenable, and hence his general statement that play is an instinct is also untrue.

Groos, in his first work, "The Play of Animals," in upholding the instinctive origin of all plays, commits himself to the doctrine upheld by James, Baldwin, Spencer, et. al., that imitation is an instinct, and hence imitative plays may be classed as instinctive. This argument is absolutely essential to the validity of Groos' instinct theory, as he himself would admit. There are many activities, as playing store, keeping school, etc., whose only claim to be termed instinctive is based upon the fact that they are imitative. If imitation be not an instinct, then it is doubly certain that every play reaction is not instinctive.

(1) Groos, Play of Man, Part I. Appleton & Co., 1901. Some of these plays receive their stimulus from instinctive reactions, e. g., the erotic passion, but many are pure intellectual plays and have no congenital references.
(2) Ibid, p. 10.
(3) Arthur Allin, Social Recapitulation, Educ. Rev., Nov., 1899.
Tylor, Primitive Culture, Vol. I., Chap. III. London, 1891.

In investigating this doctrine of the instinctive nature of imitation, one must bear in mind that imitation, like play, is a generic term referring to a number of individual cases of imitative activity, (1) and that if the doctrine be true, each and every imitative act must also be an instinctive act, i. e., each individual reaction must possess within itself both the characteristics of instinct and imitation, and hence an imitative act necessarily involves congenital nervous co-ordinations, if it always be instinctive. Many imitative acts certainly do possess this essential characteristic, especially those cases of imitation among lower social animals, the nursing plays of little girls, courtship plays, etc., while if we consider the wide extent of imitation in society as elucidated by Tarde, Royce, Baldwin, et. al., the greater majority of cases in highly evolved societies just as certainly do not. People imitate each other's manner of gait, of talking, of tipping the hat, etc. Children imitate abnormal peculiarities such as squinting, limping and chorea. Imitation is conscious and voluntary as well as unconscious, and one may imitate in another, relatively speaking, any activity he chooses, whether it be acquired or not. With the exception of the exciting stimulus, the two activities are identical in every respect and if the copy embraces acquired reactions only, the imitative act must also, and hence not embrace that essential characteristic of instinct, a congenital neural co-ordination. The assumption that imitative acts are also always instinctive requires a latent congenital nervous association for every reaction possible to be imitated, a requirement quite contrary to the facts.

Another weakness of the instinct theory of imitation Groos (2) himself calls attention to, viz., that if imitation be an instinct and play is a practice of instincts, then imitative play would be the means of practicing this imperfect instinct to functional maturity. A child would imitate playfully to strengthen a weak tendency whose development is essential in adult life. This assumes that imitation was once strong in the phylogenetic series, but has become weakened with the increase of plasticity, but as a matter of fact the contrary is true; imitation has increased in strength and amount as we ascend the scale in plasticity and intelligence. Again the position would assume that the tendency to imitation is weak in children and well developed in adults, a condition quite contrary to the general assumption. Groos sees the inconsistency of this position and makes an exception to his practice theory, assigning to imitative play the same biological and sociological function that is generally given to pure imitation. This position is also open to criticism. Play and imitation are each reactions with certain qualities. An imitative play consists of both characteristics united in one reaction. If imitative play has evolved and survived it must have a specific function not possessed by a pure imitative reaction. Ascribing to imitative play the same function as imitation explains the imitative part of the activity, but it has no bearing upon the play side of the reaction. What is the use of adding play to imitation when the pure imitative reaction will accomplish the necessary result? This question Groos does not meet.

(1) Arthur Allin, Play, *loc. cit.*, p. 65.
(2) Groos, Play of Man, Note, p. 289.

Summarizing, the instinctive nature of many plays and many imitative acts is not questioned. However, it is strongly asserted that many concrete plays and imitative reactions do not possess that essential quality of an instinctive reaction, viz., a complex group of neurones functionally associated by heredity, and hence Groos' fundamental proposition of the instinctive nature of every play reaction is not true.

For considerations like these, Groos in his second work abandons the instinctive nature of play and imitation and grounds both in a natural or hereditary impulse (1) without, however, abandoning the biological utility of play. Groos in his second position does not define clearly and succinctly "hereditary impulse." In fact he uses the term in a very general and loose manner, and half admits that he himself is not clear as to its meaning. (2) In his use of the term, however, he most clearly develops its meaning in discussing the nature of imitation, and as a consequence these instances have been chosen in elucidating and criticising his second position. However, the same argument is equally applicable to play.

Groos says, "I committed myself in my former work to the designation of imitation as an inborn instinct, and yet I must admit the logical inconsistency of this, since the very conception of instinct dispenses with the use of imitation. . . . . 'To assert that imitation is instinctive,' says Bain, 'is to maintain the existence of an infinity of pre-existing associations between sensations and actions' (Senses and the Intellect, p. 408). This appears to me to be the one insurmountable objection among the many which he and others have brought against the conception of imitative instinct, and it is serious enough to cause me to modify my former position." (3)

In developing his conception of hereditary impulse, Groos admits the force of ideo-motor activity in imitation, that a perception of a movement to be vivid and complete must have muscular sensations as an element of the idea, and therefore every vivid perception of a movement in others would involve a like tendency in ourselves. But granting the truth of this ideo-motor conception he says, "yet this is only a *necessary condition* of imitation and does not account for the *amazing force of the impulse.*" (4) Again, "This tendency of movement ideas must have special grounds furnished by organic needs and especially those which are instinctive; when the general idea of movement is coincident with one of these, the impulse toward discharge becomes very strong." (5) That is, if we have a number of different tendencies to imitation inherent in a number of movement perceptions, one is completed as an imitative act, while the others remain uncompleted as pure perceptions. Why is this? Groos argues that there must be a difference in the nervous centres themselves and infers that the difference is one of hereditary impulse. The inference is not entirely a happy one.

(1) Groos, Play of Man, p. 375.
(2) Ibid, pp. 2, 3 and 377.
(3) Ibid, pp. 284-5.
(4) Ibid, p. 285. Italics added by writer.
(5) Ibid, pp. 288-9. Italics added by writer.

Suppose a child sees twenty movements, each of which is a strong stimulus to imitation and yet the child reacts to one to the exclusion of the other nineteen. The reason may lie in the stimuli as well as in the centres. The reactive effect of stimuli varies according to their strength, their persistence, i. e., their cumulative effect (summation of stimuli), rivalry among induced images, and their relation to preceding or concomitant stimulations. A number of circumstances among the stimuli themselves may determine which produce a reaction and which do not. But granted that two stimuli are equal in their reactive possibilities, one may release a vigorous reaction, while the other may produce no noticeable result. In this case the difference is in the condition of the nerve centres. The one may possess an abundance of energy and be very irritable or susceptible to stimuli, while the other is in a fatigued or depleted condition. That to which Groos refers as the characteristic quality of an hereditary impulse which explains play and imitation is this relative instability or forceful reactibility of nerve cells to appropriate stimuli. All that is necessary to predicate of this "hereditary impulse" in order that it may fulfill its necessary function in imitation, i. e., explain why one movement is imitated in preference to another and why it is performed with "amazing force," are the two factors, "a surplus of stored energy," and "a relatively great susceptibility to stimuli."

This is exactly Spencer's theory of play; that certain centres store a "surplus of energy" and that this of necessity renders them exceedingly susceptible to stimuli. There is this difference, however: Groos limits these qualities to hereditary impulses; Spencer makes no definite limitations.

Groos is certainly right in ascribing these qualities of instability and forceful reactibility to hereditary impulses, but errs in not ascribing them to other centres. Surplus energy is one condition of cell instability or that state of readiness or preparedness for reaction. Fatigued or depleted cells require a strong stimulus before reacting. Fatigue and susceptibility to stimuli, generally speaking, vary inversely to each other, so wherever we find this forceful reactibility, we would also find instability.

These qualities are found in instincts as they are in a state of functional preparedness for reaction at birth. The neurones are medullated, and means for securing nutrition are at hand.

Again they are found in well-ingrained habits as the relative amount of energy taken to centres depends upon their functional activity. The stimulating effect of exercise is based upon this fact. Use a muscle and it grows in size and power. Practice initiates habits and habit is a state of functional preparedness for a certain reaction. Habits are very susceptible to stimuli and react readily and even automatically. Physiologically habits are identical with instincts. They both have the same qualities of good nutrition, instability to appropriate stimuli, and functional preparedness for reaction. The physiological properties are common to both; in instincts they are present at birth, in habits they are acquired.

The same conditions are found along lines of growth and development. Nerve centres while developing at different times in the life of the young

from the state of neuroblasts to functional maturity are the scene of great physiological activity. They increase in size and number of prolongations, means of nutrition are increased and they are at their nascent period extremely irritable to stimuli, giving rise to many of the child's spontaneous reactions, interests, tendencies and desires. These developmental characteristics are often falsely termed instinctive. They are rather innate in that they are a necessary result of life and a hereditarily prescribed order of development of the nervous system. They are no more truly instinctive than growth or even life itself. For example, take the development of the Rolandic and associational areas. Corresponding to these as a necessary result of their development, there would be an excess of motor movements, or a great activity in associated thought and the finer coordinations of movement. These are certainly congenital, but the reactions are general in nature, not definite and specific. Before any of these reactions could be termed instinctive, there must be a congenital development of the centres, *plus definite, specific and congenitally prescribed co-ordinations of neurones so that definite and specific reactions occur.*

This readiness for reaction, inasmuch as it is based upon a surplus of stored force and excellent conditions for securing nutrition, implies a forceful reactibility, is characteristic of instincts, well ingrained habits and lines of growth and development, and is also one of the physiological factors of impulse.

Impulse, like instinct and imitation, is not an entity; it is a generic term applicable to a number of individual concrete phenomena. An impulse is simply a tendency toward a particular movement, the movement, for the time, being uncompleted owing to inhibition or other causes. It may be congenital, i. e., based upon instinct, or acquired, i. e., based upon habits or have its anatomical basis in centres not yet definitely organized.

Groos recognizes that "hereditary impulse" does not cover all the facts in the explanation of play and imitation and in consequence is driven to strange admissions. He says, "In this dilemma we can only hold fast to the fact of the primal need for activity," and further speaks of a universal "impulse to activity." (1) Again he suggests a return to the faculty theory of psychology and expresses his belief in a "central instinct or central impulse," (2) although he admits that the idea can be but vaguely defined.

These general statements of Groos are very unsatisfactory. In a way we do have a "primal need for activity" or "an impulse to activity," but not in the sense that they are due to an hereditary functional combination of nerves. Activity of some sort is an essential characteristic of life. Given an organism which is continually generating energy and place it amidst continual stimulations, i. e., assume life, reactions of some sort must occur. We might say that activity is congenital or innate the same as life or growth, but not instinctive. The principle of life is sufficient and there is no necessity of assuming any hereditary functional combinations of nerves, or central instinct of activity.

(1) Groos' Play of Man, p. 3.
(2) Ibid, p. 377.

Again it is objected that many play movements of animals are peculiar to the different species, and that a peculiar functional organization of nerves—instinct—is the only possible explanation of this fact. The fact noticed is true and as emphasized by Spencer (1) instinct does explain a great number of these peculiar movements, but it is not the only explanation. As shown before there is a regular order of development of the nervous centres with corresponding peculiar movements. These movements to some extent vary in character in different species, but it is because the animals have a peculiar congenital nervous *development*—not a peculiar congenital functional nervous *organization*. Again a large percentage of these movements characteristic of the different species may be explained by a peculiar anatomical arrangement of the nervous system and musculature. Suppose all habitual and instinctive tracts in two animals of different species be eliminated and their nervous system be entirely plastic. Yet, say in the case of an elephant and a snake, if nervous energy be liberated in the higher centres and it spread to the musculature, movements characteristic of the species would occur in each animal because it possesses a specific anatomical structure. No peculiar functional association of neurones need be assumed to explain this fact, and the argument of the specific nature of play movements does not establish the instinctiveness of each and every play reaction.

In conclusion it will be noticed that if Groos limits the qualities of instability and forceful reactibility to hereditary impulses alone—those based upon instinct—his position is open to all the objections urged against the pure instinct conception of play, while the essential characteristic of his final position is really identical with Spencer's surplus energy theory which he attempts to overthrow.

The biological doctrine of evolution at present generally accepted is: that successful evolution in the animal world has been along the line of an increase in functionally unconnected nerve elements—an increase of plastic endowment, (2)—and that this of itself necessitates natal weakness; but this natal weakness would be destructive of the young and hence of progressive evolution unless this disadvantage were counterbalanced by other preservative factors. Hence natural selection has favored two necessary and essential factors, 1st, a shielding of the weak young from the incidence of natural selection,—parental care—and, 2d, neural organization of the helpless young to an adaptive maturity—education. Thus these two

(1) Spencer, *op. cit.*, p. 630-2.
(2) Fiske, Outlines of Cosmic Philosophy, Vol. II., pp. 342-369.
Butler, Anaximander on the Prolongation of Infancy in Man, Classical Studies in Honor of H. Drisler, N. Y., 1894, pp. 8-10.
Hammarberg, Studien Ueber die Idiote, Upsala, 1895.
Sutherland, Origin and Growth of the Moral Instinct, 2 Vols., 1898.
Donaldson, Growth of the Brain, pp. 74, 238, 240. Scribner's, 1898.
Chamberlain, The Child: A Study in the Evolution of Man, pp. 1-37. Scribner's, 1901.
Barker, The Nervous System. Appleton's, 1899.

factors have no value in themselves; they are but subservient means to a greater end. They have value and have come into existence only because they have aided in that ultimate goal of evolution—the progressive efficiency of the race. (1)

Thus this *whole* educational-adaptive process has a biological utility and it consists of so many adaptive organizing sensori-motor reactions. These reactions have different characteristics and accordingly may be roughly (2) classed as (1) play reactions, (2) work reactions, and (3) subsidiary, complementary or automatic reactions.

Groos asserts that play has a special exclusive utility within this educational field because of its special exclusive nature. Play reactions are instinctive in nature and their utility is that of practice, i. e., they are that part of the educative process which deals with instincts and hereditary impulses. The play reactions have exclusive province as instinct-educators. The validity of this special province of play within the educative process alleged by Groos is of course dependent upon the validity of the instinctive nature of play and this position has been shown to be untenable.

Nevertheless, play still has a biological function, not because it is a special form of reaction, but because it is a part of the educative process. But the same is equally true of the work reaction. Groos' aphorism that we do not play because we are young, but are young in order to play, is but a part of the truth. The same may also be asserted of the work reaction, while the entire truth is rather that we are not *educated* because we are young, *but are young in order to be educated.*

The whole question as to the relative province of play and work in the educative process is thus open to investigation. It is evident that the work and play reactions have many utilities in common; these have been termed the "general utilities of play." However the play reactions have certain peculiar qualities by reason of which, they are better adapted for service within this general field than any other reaction. These are termed the "special utilities of play" and they are such as would lead to the selection of those reactions within the general utility field. The "Survival Values of Play"—the subject of this thesis—includes both the general and special utilities. Since these special utilities depend upon the peculiar and essential qualities of the play reaction, the nature of play and work must first be determined.

(1) Arthur Allin, The Law of Future Specific and Social Efficiency (unpublished).

(2) This represents no accurate classification. It represents rather three general groups of activities, sufficient for the purposes of this discussion.

II. NATURE OF PLAY AND WORK.

As indicated above a strict analysis of Groos' final position as to the nature of play demonstrates its probable identity with the surplus-energy theory enunciated by Spencer. (1) As shown before the instability of a cell, barring variations in the nature and strength of the stimulus, depends upon the strength of the cell relative to the amount of energy within. Those centres which possess means for readily securing and storing nervous energy would be extremely sensitive to stimuli, extremely ready to react. These centres were found to be those involved in (1) instincts and congenital impulses, (2) well ingrained habits, and (3) those at their nascent period of growth and development.

The nervous system is continually besieged by thousands of stimuli. Besides the many conscious sensations of light, heat, pressure and the more definite stimuli received through our special senses, we are subject to variations in the weather, thermometric and barometric conditions, conditions of moisture, sunlight and winds, (2) the many tropisms, (3) and the varying condition of the viscera. These, although unperceived, nevertheless affect us profoundly, giving rise to many of our moods, day dreams and idle thoughts, (4) our random spontaneous muscular movements, mental and physical automatisms, (5) and our play reactions. As Spencer says, these stimuli are continually "reverberating" (6) through our nervous system, and unless inhibited or directed, would cause reactions in centres of least resistance to stimuli, centres most susceptible or sensitive. Hence we would find random spontaneous activities and play reactions involving (7) *a*, instincts and congenital impulses, *b*, well ingrained habits, and *c*, centres at their nascent period in growth and development, which last group embraces the non-instinctive plays described by Groos under the heads, "Play-

(1) Also accepted by Wallaschek, Primitive Music, p. 232. He also suggests (p. 272), on excellent grounds, the use of the term "unapplied energy" for "surplus energy."

(2) Dexter, Weather and Conduct, Psych. Rev.
Dexter, Weather and Suicide, Psych. Rev.

(3) Loeb, Physiology of the Brain, Chap. XIII. Putnam's, 1900.

(4) Waldstein, Subconscious Self. Scribner's, 1897.

(5) C. E. Partridge, Reveries, Ped. Sem., Vol. V., No. 4.
Partridge and Lindley, Some Mental Automatisms, Ped. Sem., Vol. V., No. 1.

(6) Barker in his chapter on the Irritability of the Neurones (Nervous System, Chap. XXI.) very strikingly describes the unremittant character of nervous activity due to continual stimulation.

(7) The usual opinion concerning the views of Spencer and Groos is that both theories represent truth, but that neither by itself is a complete explanation of the play phenomena. Attention is here called definitely to the fact that the surplus-energy theory as developed above would embrace and include that of Groos as a constituent element. As noted before, Spencer distinctly and repeatedly states that play would involve racial and congenital reactions, and in fact he devoted most of his space to elaborating this idea and stating facts in support. It is strange that with his critical attitude toward Spencer's position, Groos should overlook such an obvious fact.

ful Use of the Sensory Organs," (1) and "Playful Use of the Motor Apparatus." (2) Roughly then the physiological criterion separating play and random activities from work would be a discharge of energy in centres of least resistance to stimuli—centres with an abundance of stored force—while the psychological criterion would be a lack of the feeling of strain and effort.

Any definite distinction between play and spontaneous random activities is difficult to make. As in the case of plant and animal life, so here the two classes merge into each other and the distinction must necessarily be general and relative. The difference may best be seen in the case of a baby. Movements of the limbs with a more or less quiet condition of the body we at once term spontaneous, yet exactly the same reaction performed with more vigour and accompanied by sparkling eyes and a general excitation of the rest of the body, we invariably call play. A certain brightness of the eyes is an invariable accompaniment of a pronounced play reaction and Darwin explains this brightness of the eyes during pleasurable states as due to distension by arterial blood and a consequent contraction of the orbicular muscles to prevent a possibly harmful engorgement. (3) It is generally assumed that there is a rush of blood to functioning centres, the amount being proportionate to the intensity of the reaction. (4) Mosso has shown by the plethysmograph that the slightest thought or act of attention causes a vaso-motor reaction. (5) Dr. Anderson has followed the same line of investigation, devising what is termed a "muscle bed." The subject is placed prostrate upon the apparatus and perfectly balanced so that the least change in the centre of gravity can be recorded. Even the thought of a movement in the leg would cause such a determination of blood to that organ as to effect a change in the equilibrium, while an idea of a movement which is habitually attended by pleasure and delight, that is of the play nature, caused a quicker and more decided vaso-motor reaction. (6) Thus the chief characteristics serving to differentiate play from random activities would be the intensity of the reaction, coupled with a general excitement of the body and an exhilarating vaso-motor reaction. (7)

Most writers, including Groos and Spencer, agree probably from introspective grounds in ascribing pleasure to play as one of its chief and distinctive psychological accompaniments. The question as to the physiological accompaniments of pleasure is one of the old and mooted questions of psychology. A critical analysis of the widely prevalent theories is here impossible. Henry Rutgers Marshall, in his Pain, Pleasure and Aesthetics, after a critical review of all the facts comes to the conclusion that a dis-

(1) Groos, Play of Man, Part I., Chap. 1.
(2) Ibid, Chap. 2.
(3) Darwin, Expression of the Emotions, pp. 148 and 206.
(4) Hartwell, Report of the Physical Training Conference, Boston, 1889. p. 10.
(5) Mosso, The Mechanism of the Emotions. Clark University Decennial Celebration Publication, 1899.
(6) Public Opinion, Jan. 23, 1902, p. 114.
(7) The great emotional reaction in games of chance is well described by France, The Gambling Impulse, Amer. J. of Psych. XIII. 3.

charge of surplus nervous force, wherever the energy involved in the reaction to a stimulus is greater in amount than the energy which the stimulus habitually calls forth, (1) is the only invariable accompaniment of pleasure and hence is the physical stimulus arousing the pleasure state in consciousness. This hypothesis would make the pleasurable state a result of a reaction in centres possessing surplus energy. These stimuli, like all others, would not affect consciousness unless possessing volume and persistence, that is where there was a general and intense reaction. This theory of Marshall's as to the physiological basis of pleasure seems to be the best explanation at present, and as will be noticed the physical accompaniments of pleasure are almost identical with those given to play. If pleasure is an invariable characteristic of play this coincidence was to be expected.

Such physiological conditions as described above as the basis of the play reactions do not exist in such simplicity in one activity. Play activities, sports, games and work reactions are complex in nature, each embracing many reacting centres in various parts of the body. Each activity is a combination of many elements—muscular, neural, vaso-motor and glandular reactions—a combination varying from moment to moment. In the many reacting centres forming the one complex activity, there may be all variations from surplus energy to fatigue, from unregulated discharge to inhibition and rigid regulation. The whole does not consist entirely of play elements, but of other elements as well, the relative number of which may vary from moment to moment. Each element would tend to affect consciousness through the afferent nerves. Consciousness does not discriminate between elemental sensations. The entire activity is regarded as a whole and is either work or play, according to the predominant state of consciousness. Nor do these innumerable sensations necessarily fuse into a whole. It is rather a case of domination by some and exclusion of others, just as we consciously attend to but a few of the thousands of stimuli which are continually striking our organs of sense. The strength and persistence of stimuli and inhibition by other conscious states are determining factors in attention. Thus football is characterized by strain, intense effort, almost exhaustion, inhibition and rigid regulation of many of the elemental activities, and yet they do not dominate in consciousness during the game. Persons thoroughly enthused in a boxing contest rarely notice even the pain of a severe blow, owing to the concentrated state of the attention.

Groos' criticism of the surplus energy theory may be easily met in this connection. Children will play when exhausted and tired from work. So a kitten although exhausted by play will again spring after a rolling ball, or dogs who have raced about the garden until they are obliged to stop from sheer fatigue and lie on the ground panting, with tongues hanging out, will again resume their chase on the slightest provocation. (2) Groos argues that if there be fatigue and exhaustion and still play, the theory of surplus energy fails to meet the facts, and hence these cases must be regarded as instinctive. But in the case of the dog the question is equally pertinent why

(1) Marshall, Pain, Pleasure and Aesthetics, p. 204. MacMillans, 1894.
(2) Groos, The Play of Animals, pp. 19-20.

did the dog stop at all if the activity was instinctive. Groos answers that of course energy is a *sine qua non* to the reactions of instincts, that even they will not act continuously without rest. The inference is that it was necessary for the dog to rest a few moments in order for the instinctive centres to recuperate their store of energy. This is undoubtedly true and yet Groos denies the same explanation in the case of the surplus energy theory. In either case the reacting centres, whether instinctive or in a condition of irritability due to an abundance of force, have a few moments of rest in order to recuperate to their former state of irritability. The only difference between the two is in the necessary amount of recuperation and the time employed, and it is extremely doubtful if it is necessary to assume a longer time in the latter case. "Stored force" is rather an unfortunate term, for it is doubtful if nerve cells store any great amount of nervous energy; the term means rather conditions for securing an abundance of energy readily and quickly; it refers to an abundance of supply rather than to an abundance actually stored within the cell. Any cell is quickly exhausted if continuous demands be made upon it, while a rest of a few seconds is sufficient for recuperation. (1) The heart muscles have but a few moments for rest. Rhythmical exercises find their great value in this fact and tetanized movements are consequently condemned. (2) This proves that the process of relief occupies but a short time, Mosso proving that a few seconds are sufficient for neural cells, so quickly do they recuperate. Groos' objection in the case of the dogs is no more valid than may be urged against the instinct theory on the same grounds, and we must add to this the fact that in play there is a quickened vaso-motor reaction and the centres in question are bathed with a greater blood supply, ensuring more nutrition immediately and a readier relief from the toxic conditions of fatigue. (3) There is no reason why in play there should not be an immediate recuperation to a state of forceful reactibility demanded by the surplus energy theory. Again in the case of the children who will gladly answer the summons to play when tired out and exhausted by work, the composite nature of our reactions must be remembered. The fatigue may be limited to some centres while there is an abundance of vigour in others. The play reaction may dominate in consciousness and the fatigue be entirely forgotten or unnoticed for the moment. Further the consequent quickened general circulation of the blood may be the very best means for relieving the fatigued centres. (4)

Summarizing we see that a pure play activity consists of a discharge of a relatively great amount of nervous force involving exhilarating vaso-motor reactions and a more or less excited condition of other parts of the body, giving rise in consciousness to a state of comparative pleasure, exhilaration and power, with a lack of the feeling of strain, effort or fatigue; that our activities as wholes are complexes involving such a variety of elements within the single activity that they can be characterized by no distinct physiological criteria; that the single activity must be regarded as either work or

(1) Mosso, Psychic Processes and Muscular Exercise, *op. cit.*, pp. 338-390.
(2) Sargent, Report of the Physical Training Conference, p. 75.
(3) Donaldson, Growth of the Brain, p. 312. Scribners', 1898.
(4) Ibid.

play according to which of these elemental reactions dominate in consciousness and hence the only possible criterion of the whole activity must be subjective; and that play refers to those activities which are accompanied by a state of comparative pleasure, exhilaration, power, and the feeling of self-initiative.

In pure play, the particular reaction is determined mainly from within, that is, it involves centres with the greatest susceptibility for reaction; pure work on the other hand is a particular reaction imposed from without; it is an adaptation to external needs and necessities; it may or may not coincide with the individual's tendencies, interests and desires. These are not considered. Something must be done, and the reaction is adapted primarily to this rather than to internal conditions of the reacting centres. A boy left to himself may run, jump, throw, or indulge in flights of fancy and imagination, the particular centres reacting in each case, the continuance or change to another reacting centre, the inclusion or exclusion of certain co-ordinations, are adapted to the boy and have no direct reference to external factors. In work, sawing wood for instance, a definite, particular and continued reaction is demanded. The tendency may be for the boy to use his legs at this particular time, but this factor is ignored. Change in the functioning centres—the element of whim and caprice—is reduced to a minimum. A particular and continued movement of the arms and none other is here demanded. Again in pure free play no attempt at precision and accuracy of movement is essential. Liberated surplus energy in the higher centres instead of taking a definite channel to the periphery may "overflow" and introduce non-essential concomitant movements. This is a general result of intensity of reaction seen in rage and strong emotions, involving a general diffusion of energy. In work precision and accuracy are largely demanded. The liberated energy must be confined to definite channels. In piano practice, the movements must be precise and accurate, other concomitant movements being detrimental and hence inhibited. In scientific work the teacher must see that definite and precise associations are made and that speculation and fancy are inhibited. Facts must be associated in a prescribed way. The opposite of pure play would be regular, definite, precise and continued reactions imposed by external conditions; it would be the machine-like activity—hard, cheerless toil. (1) Our common work activities, like play, are complex in nature, embracing many reactive elements. Again there is no absolute and definite criteria between the two activities. It is almost impossible to distinguish any real and vital difference in the activities of solving some puzzles, and many of the "puzzle problems" found in the older arithmetical text books. Work in its purest form exists in the drudgery and routine of menial positions, while occupations involving change, variety, excitement and self-initiative approach the play reaction. Since these elemental reactions vary within the whole activity but affect consciousness as a whole, the only criterion is the subjective, and work would refer to those activities accompanied by a predominant sense of strain, effort, inhibition, constraint and rigid regulation.

(1) Allin, Play, p. 73.

III. GENERAL UTILITIES OF PLAY.

The general utilities ascribed to play may be roughly classed as follows:

1. Diversional.
2. Kathartic.
3. Alleviating.
4. Recuperative.
5. Practising.
6. Educative.
   - A. Exercising.
   - B. Organizing of
     - a. Instincts.
     - b. Instinct-habits.
     - c. *De Novo* habits.
   - C. Transmission of the Social Heritage.
7. Sociological.

1. A pure diversional play is one whose sole object is to "pass away the time" where the customary work activities are not sufficient to engross all of the individual's time and energy. A pure diversional play is but rarely seen. Playing solitaire, reading novels, many of the amusements of the idle classes and old people are instances in point. They are characterized by a minimum of energetic activity and definiteness of reaction, and easily pass from the province of play into idle random movements. The value of play in this connection is in the fact that it serves the purpose with a minimum of exertion on the part of the individual.

2. Aristotle first applied the term "katharsis" to the effect of the tragedy upon the emotions of pity and fear (1) and, whatever meaning he attached to the term, there is no doubt that it represents an important psychological truth. The tragedy is a stimulus exciting certain intellectual and emotional states in the observer similar to those of the actor. The emotional reactions are instinctive, once extremely useful, but of less utility at present, and under certain conditions positively anti-social. These reactive centres are nevertheless prepared for function, i. e., they continually gather energy and become susceptible to stimuli, and are liable to react at inopportune moments. Uncontrollable outbursts of passion to trifling stimuli are instances frequently occurring. The tragedy, by inducing these emotional reactions in the observer in a weakened form and under fictitious circumstances, would drain away this potently harmful energy into harmless channels. The individual would be "purged" or relieved of this possibly anti-social energy. The same argument is equally applicable to all emotions and hence to all the aesthetic arts. (2) The similarity with play is also apparent. The play reaction involving centres of surplus energy would drain them of this extra force. Katharsis, however, implies the idea of purging or a draining of that energy which has *anti-social possibilities*, and hence the kathartic value may

(1) Butcher, Aristotle's Theory of Poetry and Fine Arts, pp. 238-268. McMillan, 1898.

(2) Hirn, The Origins of Art, Chap. VIII. McMillan, 1900.

be predicated of only certain play reactions. The value of football, boxing and other physical contests in relieving the pugnacious tendencies of boys is readily apparent as examples. Without the numberless well organized set forms of play possessed by society which give a harmless outlet to the mischievous and unapplied energy of the young, the task of the teacher and parent would be appalling.

In all cases, the purging is effected by the *reaction* and it matters little whether it be play or work. Regular and continued labor as a rule is very effectual in this respect. It is generally those people of comparative leisure, or who have extremely specialized forms of vocation, that have the most need for the kathartic value of play and art.

While this function has a wide field among the young and even among adults, yet, as shown later (1), one task of education is to organize as much as possible these anachronistic instincts, emotions and impulses into a larger system of habits which have social utility. If this were done, these centres would still secure a purging in adult life, but not one wherein the energy is lost, but one wherein it would be utilized for social service.

3. In reactions marked by intensity and enthusiasm, there results a certain concentration and fixation of the attention and hence distracting and disturbing stimuli have no reactive effect upon consciousness. For instance, a lecturer may suffer from a severe toothache or other painful sensations, but during the intense excitement and concentration of thought and effort in an enthusiastic address, the pain ceases, but only to return shortly after the lecture. The pain stimuli were present throughout but did not affect consciousness. The speaker had been temporarily anaesthetized, and the probable explanation is that in a state of intense concentration of attention there is a flux of blood to the reacting centres and a state of comparative anaemia or non-reactibility to stimuli in surrounding centres. The same stimuli storm the body as before, but they have no reactive effect. Other reactions are suppressed and the hyperaemic centres hold full sway. This explains the use of drink in depression, sorrow and trouble, and the many amusements and hilarious carousals of adults seeking to temporarily forget the cares and worries of the world. Owing to the intense emotional conviction or emotional monoideism of the mediæval martyrs, they were known to be consumed by the flames with a smile of ecstacy upon their features. Savages use the vasomotor effect of music during childbirth, circumcision and other painful rites (2), and probably for this reason. Engage a child in an intensive play and its sorrow or anger quickly vanishes. Even hard, steady and intensive work is one of the best of antidotes for a state of sorrow. This alleviating effect is due to the fact that the other centres are drained of their energy and hence are not affected by disturbing and distracting stimuli.

4. The recuperative value of play has long been recognized. When a certain set of centres have been continually used, time for rest and recuperation is needed. At the same time, other centres have been in a condition of enforced idleness and owing to the accumulation of energy have need for

(1) See below the section on the organization of instinct-habits.
(2) Wallaschek, *op. cit.* p. 169.

movement. Play involving these idle centres has not only value for their relief, but also gives opportunity for rest and recuperation to the fatigued ones. But a change in the work activity could also subserve the same end. Other things being equal, play, the activity with the less strain and effort, would be selected. In this case a second reason may be adduced for the greater utility of play. Suppose a case of mental work involving comparative exhaustion and fatigue. There has been a more or less hyperæmic condition of the reacting centres with, probably, comparative stagnation in other parts of the body. A change of work involving muscular reactions of normal discharge and regularity could be undertaken, allowing of rest in the fatigued parts. There would be a determination of the blood supply to the new reacting centres with a comparative stagnation in others. The toxic condition of the blood due to mental fatigue would engender fatigue in the new reacting centres. (1) What is needed is a thorough vaso-motor reaction, involving the excretory organs, so as to rid the blood of its toxic conditions, with a determination of fresh arterial blood to the fatigued centres. This would best be secured by a true play activity with its general vaso-motor reaction.

5. The practising value of play as here used refers to the necessity of keeping in constant practice habits already formed but rarely used. "We get out of practice so easily," is the common saying in regard to activities which entail definiteness, precision and nicety of organization. The pianist must practice incessantly. Wallaschek emphasizes this point in his descriptions of primitive dramatic plays. Many of the hunting and war dances are a crude representation of the real activities of the hunt and war, and one of their values is to keep the participants in practice in all the necessary movements of those activities. (2) The jousts, tourneys and knightly combats in feudal times had this value. Professional and business men keep up their social habits, interest in literature, art and music as indirect aids to their all-round development and professional success. If play serves this purpose with a minimum of effort, it will be chosen. However, in the case of piano practice, where precision and intricacy are demanded, play with its irregularity and variability is detrimental. The precision and definiteness in the amount of the discharge and the inhibition of superfluous movements mean strain, effort and attention; it is the work reaction and is better adapted for this purpose.

6. The term educative refers to (a) the growth and development of the body during youth—exercising, (b) the organization of the neurones in various associations—organizing, and (c) the transmission of certain ideas.

A. It is well known that stimulation is necessary to growth and development to functional maturity. The experiments of Ambronn and Held upon a cat show that without stimulation the sensory neurones in the optic tract do not easily medullate or reach functional maturity. (3) Hence stimulation and activity, i. e., use and exercise, of any centre is a necessary condition to its rapid development, probably because of the increased blood supply. Ex-

(1) Donaldson. *op. cit.* p. 313.
(2) Wallaschek, Primitive Music, p. 274. Longmans, 1893.
(3) Mosso. Clark Decennial Celebration Publication, p. 384.

ercise of muscles increases the size of the cells, their irritability and motoric capacity. (1) Neural centres are subject to the same conditions. The neurones develop in size and elaboration of parts, there is a better regulation of irritability and a greater capacity in power due to their increased facilities for a storage of energy and a fresh supply of nutriment. (2) But muscular and neural reactions are interdependent. The activity of a neurone precedes that of a muscle. The whole is neuro-muscular involving two parts. Use and exercise of a muscle necessitates exercise of nerve centres. Hence motor education is both muscular and nervous, and is absolutely necessary not only for muscular development, but also for the development of a part of the nervous system including the Rolandic area in the encephalon. "Observations made upon the brains of persons born with an arm or hand lacking, taken in connection with those made upon the brains of persons who had had an arm or hand amputated, go to prove that the suppression or considerable diminution or certain movements brings about a condition of atrophy, or arrested development, as the case may be, in those centres which would normally represent such movements." (3) Inactive motor nerves grow weaker, become fattily degenerated, and finally lose all irritability, so that it becomes impossible even to think in the direction of movements to which those movements should give the impulse. (4) The afferent motor sensations form a part of our concepts, our mental resources. Few ideas are purely of special sense origin; they are associated with motor elements and these motor elements are an essential and integral part. That is, the development of the motor centres is essential to complete psychic life. Manual training, the kindergarten, laboratory methods, the dramatic sentence method in reading and other forms of motor activity have this common justification in educational practice. The education of idiots and imbeciles, of certain classes, in the Elmira Reformatory is begun and successfully prosecuted along these lines. (5)

Facts of this character emphasize the absolute necessity of activity in the growth and development of the young, and they are made a basis of the arguments of those who advocate the introduction of gymnastics in the schools. But is is the reaction rather than any special form that has value for this purpose, for any form of activity—whether the random spontaneous movements of a baby, play, games, gymnastics or work—has this same utility. The question is really not the importance of activity but the superiority of one form over the others for the purpose.

The young, either animal or human, if left to themselves, secure their development by spontaneous movements and play naturally. Activity of

(1) Jaeger, Problems of Nature, p. 112.
Hartwell, *op. cit.* p. 9.
(2) Ibid.
(3) Hartwell, *op. cit.* p. 13.
(4) Baron Nils Posse, The Special Kinesiology of Educational Gymnastics, p. 326.
J. Crichton Browne, Education and the Nervous System, in Book of Health, edited by Malcolm Morris, p. 327. Cassell & Co., 1884.
(5) See writings of Dr. Edward Seguin, Dr. H. D. Wey, Elmira Reformatory Reports, etc.

some sort is an essential characteristic of life, but why it should naturally take the free form of play rather than that of the effort and constraint of gymnastics is another question. One reason is that it involves centres with the greatest susceptibility to stimuli; that it secures the result with a minimum of effort, and so long as it secures its ultimate purpose there is no reason for the introduction of another activity. This would suggest that, other things being equal, there should be an extension of free play in the schools rather than the introduction of set forms of gymnastics; that regular courses in gymnastics, costly gymnasiums and appliances should give way for more extensive play grounds. Sargent recognizes this factor by saying that physical training may be a success with older men in the universities and turnvereins, but it is less adapted to the lower grades. It is impossible to secure enough activity by these means for the purposes of growth and development. Children must have the play element, (1) and even the play element has been introduced into the gymnasium at Amherst (2) in order to secure a greater amount of activity.

Another superiority of play in this connection depends upon its exhilarating vaso-motor effect. A spontaneous or a work activity would bring blood to the centres in question and further their growth and development, but would not necessarily stimulate other tissues in any marked degree. Sargent claims that vigour and rapidity involving a number of muscles at the same time are essential qualities of valuable muscular exercise. (3) Donaldson also says: "From the physiological side, that which rouses an interest tends to quicken the pulse and determine a full blood supply to the entire central system." (4) Anderson's experiments at Yale, quoted above, are conclusive on this point. Sargent gives interest in the activity as one of the ten cardinal principles of good exercise. (5) The best exercise must stimulate all parts of the body—the growth of the bones and other supporting tissues, and the healthy functioning of the visceral organs. (6) An activity which fails to arouse a vigorous vaso-motor reaction in all parts of the body fails in this respect. Dr. Jaeger argues in favor of English sports for this reason. He mentions the healthy physiological effect of pleasureable, joyful emotion, and the fact that prolonged depression (visceral stagnation of blood) is capable of inducing serious bodily disorders: "To this we must add the physiological influence of pleasurable excitement, which, together with the invigorating effect of bodily exercise, fresh air and so on, enhances the exchange of matter, and thus has a healthy and hardening effect upon the body. It is no exaggeration when I say that the high qualities to which the English owe their position as the principal colonizing, commercial and industrial nation of the globe are largely due to the high development of sports in the United Kingdom, as well as in the British colonies. There is a great difference between the train-

(1) Sargent, *op. cit.* p. 53.
(2) Ibid, p. 58.
(3) Ibid, p. 74.
(4) Donaldson, *op. cit.*, p. 356.
(5) Sargent, *op. cit.*, p. 74.
(6) Hartwell, *op. cit.*, p. 8.
Jaeger, *op. cit.*, p. 113.

ing derived from sport and that which is supplied from military drill." (1) Dr. J. Crichton Browne emphasizes the same fact: "Gymnastics are excellent in their way, and are particularly valuable in the correction of round shoulders, a slouching gait, and various local abnormalities, but they can never be a substitute for play. Such formal muscular movements are less varied than those employed in juvenile games, and sooner induce fatigue. Then the quantity of exercise taken in gymnastics is likely to be deficient, not only because of the lack of sustaining interest, but also because some muscles remain unexercised. Even when not made repulsive by being converted into appointed tasks, gymnastics often become distasteful from the absence of amusement in them, and hence the inferiority of such artificial exercises to the natural exercises that are spontaneously indulged in. An agreeable mental excitement has a highly invigorating effect, and happiness is one of the best of tonics; and thus mere frolic is more conducive to bodily and mental well-being than formal gymnastics. That gymnastics are useful in education cannot be denied, but that the benefits derived from them are inferior to those which flow from sports and pastimes may well be argued." (2)

No attempt is here made to disparage gymnastics nor to deny them an important place in education. Emphasis is merely put upon two essential characteristics of play which would naturally lead to the selection of those reactions for the purpose of the stimulation of growth and development.

B. The organizing utility of play is that part of the educational process viewed from the physiological and psychological standpoints which deal with the organization of the body through associations of plastic neurones. It embraces the development of weakened instincts (instincts, emotions, hereditary impulses and all congenital functional associations of neurones), the formation of instinct-habits, as well as of *de novo* habits.. It includes all associations of vaso-motor, glandular, muscular and cortical reactions.

The development of weakened instincts is the main utility ascribed to play by Groos in his first work. Organic evolution has proceeded along the lines of an increase in our plastic endowment allowing of acquired adaptations to surrounding conditions. This has embraced a weakening of the instinct arcs. But in the lower animals acquired adaptations are not sufficient; these weakened instincts must be developed to their original form. The bloodthirstiness and ferocity of a young panther in pursuit of prey cannot be compared with that of its parents. All the actions and emotions necessary to this activity must be developed to their original form to ensure successful survival. Hence play with living and mock prey. Groos' position in reference to lower animals is correct, but with man, especially, the case is different.

Man possesses many of these old congenital, animal-like instincts and emotions, weakened of course and plastic, but yet certain to undergo some sort of development. They were reactions which were originally developed and adapted to an animal-like environment. Our fighting impulses, our emotions of hate and rage, our revengeful dispositions, are some of our ancestral

(1) Gustav Jaeger, *op. cit.*, p. 155. Written in 1878, but collected and published in 1897.
(2) J. Crichton Browne, *op. cit.*, p. 332.

inheritances, once extremely useful, but no longer so in their primitive form. (1) The biblical phrase of "an eye for an eye, and a tooth for a tooth," was based upon an actuality and not a theory. The environment has since changed. Man is now social. Habits of co-operation and subordination, instead of those of extreme mutual antagonism, have become increasingly necessary. Our ancestral reactions are no longer useful in their primitive form; they are now anti-social and anachronistic, nor can they be ignored in the educative process, for they are susceptible to development and elaboration, and in fact will develop in some way, be it social or anti-social. Society, consciously or unconsciously, must see to it that these springs of action are harnessed to social ends. They must be developed but at the same time "hedged round about" with acquired adaptations—habits of a social nature. It is a question not so much of their development as of their proper regulation and control. These plastic impulses through the grafting on of other reactions become the core of a larger system of reactions with a social reference. Instead of a development through practice to their original form, they are rather developed into instinct-habits adapting them to the new conditions.

Whether Groos recognizes this position is difficult to state. Certain it is that in his first work, he holds to the first view, that of practice and preparation. In his second work he gives examples involving the second position, and at times uses language which may be interpreted in this direction, (2) but at no time does he distinctly state the difference, and the criticism may justly be made that throughout he emphasizes the practice or development of the instinct, when he should rather have given emphasis to the "grafting on" of other reactions which will give to the whole a social nature.

An instance of this value of play may be seen in group games, e. g., football, which involves the fighting impulse to a great extent. The incentive is to vanquish the foe in certain prescribed ways. To the successful prosecution of this end, habits of emotional control, of co-operation, subordination and obedience to authority are necessary. (3) The direct fighting impulse is not developed; it is changed to healthy competition so regulated as to be social. Group games are a training *par excellence* in social habits of order, obedience, subordination and self sacrifice. According to Gulick, "These group games are played by Anglo-Saxon children, but by none others." (4) Whether this fact bears any relation to the democratic habits of order, social and political stability of the Anglo-Saxon people, is an inference worth considering. M. de Coubertin connects the reform in athletic sports by Arnold at Rugby with the Victorian era of political, social and moral progress. (5) At

(1) Hall, A Study of Fears. Amer. J. of Psych., Vol. VIII., No. 2.
Hall, A Study of Anger. Amer. J. of Psych.
Burk, Teasing and Bullying. Ped. Sem., Vol. IV., No. 3.

(2) Groos, Play of Man, pp. 2, 375.

(3) In games habits of subordination are seen which will put parental authority to shame. In football it is customary to see players accepting submissively, from the coach or captain, treatment which otherwise would not be tolerated for a moment.

(4) Gulick, Psychological, Pedagogical and Religious Aspects of Games. Ped. Sem., Vol. VI., No. 2, p. 142.

(5) Coubertin, Report of Phys. Training Conf., Boston, 1889, p. 114.

least it may be truthfully said that English sports and games are essentially democratic, while the German gymnastics are monarchistic in tendency.

As the Indian through torture, the war dance, blood-curdling stories of war and revenge, develops this fighting impulse to suit his peculiar social needs, and the Norseman by sagas, legends, epics, etc., inculcated habits of endurance and fierce reckless courage in war, so every society has evolved peculiar ways of controlling these impulses to their own peculiar needs. Nor is play the only means used. To-day this strongly aggressive and individualistic impulse seen in teasing and bullying, hazing and fighting is regulated by slaps, punishments, commands, inhibitions, the socializing effect of the play ground, education, etc., and directed to social lines of healthy competition, seen in the contests of business, the political platform, and the judicial arena. Play has no exclusive utility for this purpose.

Play also, as it involves developing centres and habits, is a means of organizing habits unassociated with instincts and hereditary impulses. Chess and mental puzzles organize neural associations. Myths, fairy stories, day dreams, etc., are plays among ideas, plays of the imagination, which physiologically are nothing but reactions involving new associations. Reveries to some extent are the play periods of the intellect; they stimulate growth and new associations and lay out lines for voluntary thought. (1) Non-instinctive movement plays and those involving the developing special senses perform this service in neuro-muscular activities.

But again play has no exclusive function. Even spontaneous reactions serve the same purpose to a limited extent, as for instance, the spontaneous movements of a baby's limbs and the unconscious formation of a large number of concepts in early life. Work performs the major part of this service, as seen in gymnastics, muscular work and the mental training of our schools and universities.

C. The transmission of ideas is a part of the educative function which is closely related to the organization of neural habits; in fact the two are interdependent. Legends, sagas, myths, poetry, songs and dances have among primitive people been their means of impressing upon the young their traditions, customs, history, ideals, religion, etc. No permanent means of record at that time existed. (2) Past ideas were transmitted through tradition. Interest, easy means for memorizing, and vivid impression were essential to preservation and were best secured through the song, the myth and the dance. All these means—this school for the transmission of past ideas—involved the play reaction. The same is being used to-day. Arithmetic is being taught under cover of the play reaction. The dramatic method in reading aims to secure a more vivid and lasting association between the idea and symbol. Signe Rink (3) describes her childhood in Greenland, where in play she dra-

(1) Partridge, Revery. Ped. Sem., Vol. V., No. 4, p. 462.

(2) It is an interesting fact noted by Major Powell that those Indian tribes whose religious rites are connected with dancing, say of the uninitiated: "He does not understand it, because he has not danced it out."

(3) Quoted by Groos, Play of Man, pp. 304-5.

matized the daily life of the Eskimos and thus secured a vivid, lasting and thorough idea of the habits, customs and life of these people. Miss Scott carries out the same idea in the Detroit Normal Training School, (1) and as a means of teaching elementary descriptive sociology the plan is invaluable. A maximum of result is secured with a minimum of effort.

Also among primitive people where, as in the case of war and hunting, the environment is absent, the young are instructed in these necessary activities through the dance. (2) The dance is a dramatic performance involving the whole hunting or war scene. The start, the journey, the hunt for the animal, the concerted action in the band, the movements and habits of the animal, all are faithfully depicted. The youth sees and finally participates, thus learning in the very best way the ideas and habits absolutely necessary for the social activities of his after life.

Imitative plays are also used naturally by children, thus learning easily and well many things in their present environment more easily and perfectly than otherwise. The street Arabs of East End in London were once accustomed to play constable, magistrate, and criminal. These plays were finally condemned by the London dailies because it familiarized the children with the ingenuity of the police, court proceedings, the tricks of criminals, and was intensifying vicious anti-social habits. (3) Ratzel mentions that where head hunting is a common occupation, the children have games founded upon it, having a cocoanut as the coveted trophy. Children's parties among the Indians are common, where little tots of four and five years of age are dressed up in paint and feathers, thus being early initiated into the customs and habits of the tribe. (4)

7. The sociological (5) value of play has been hitherto imperfectly recognized. It is true that group play and the school play ground have been of inestimable value in inculcating in the growing young social habits and feelings of immense value. The social effect of holidays, church festivals, fairs, etc., has been recognized in community life. But this has also been true in social development and has aided materially in the organization and growth of larger and larger aggregates. Individualism, more or less ex-

(1) Scott, Organic Education. Sheehan, Ann Arbor, Mich., 1897.
(2) Wallaschek, Primitive Music, p. 274. Longmans, 1893.
Grosse, The Beginnings of Art, Chap. VIII. Appleton & Co., 1897.
(3) Wallaschek, *op. cit.*, p. 275.
(4) Groos, Play of Man, p. 304.
(5) This classification is not intended to be strictly accurate. The educational, biological and sociological utilities all overlap. Any educative value from the standpoint of the individual child is also biological from a phylogenetic view, since education in its broader aspects is one of the essential conditions of biological evolution. Again there is no marked division between the biological and the sociological as the latter is a continuation of the former. The formation of many of the instinct-habits, and the transmission of the social heritage are also essentially sociological as well as educative. The utilities described in this section belong to that part of the sociological phase not already treated in the section on the educative value of play. This section refers, not to the education of the young into the existing social fabric, but to those means for securing a further social advance among adult societies.

treme, was once the predominant state. In the struggle for life the individual acted more or less as a unit, co-operated with and depended upon no one. Social development has proceeded along the line of increasing aggregations, each aggregate acting more or less as a unit in many matters of survival. The greater aggregation and the greater unity brought success. Individualistic habits must thus be supplanted by co-operation, dependence, subordination and unity of action within the group; egoism must give way to increasing altruism. In this process of socialization, play has served a function entirely equal, if not superior, to its biological utility described by Groos. The prevalence and importance of feasts, songs, dances, festivals and general merry-makings among primitive peoples can hardly be exaggerated. (1) One festival is reported as lasting for six entire weeks. (2) Irrespective of general antipathies, tribes for miles around are invited to participate on all important occasions. These large and general gatherings are the scenes of hilarity. Sympathy, good feeling and comradeship are engendered, making possible larger aggregations and a greater cohesion within the group. The same may be seen to-day in the songs and banquets of fraternities, national holidays, etc.

In the dramatic dances representing scenes of hunting and war there is a training in co-operation toward united action. Wallaschek comes to the conclusion that primitive music in connection with the dance and pantomime "is an organizing power for the masses, the tie which enables the tribe to act as one body. It facilitates association in acting. Tribes which know how to keep time, which are accustomed to play at war and hunting, associate more easily, act better in case of need, and, since association counts for something in the struggle for life, such tribes are better prepared for it." (3) *"The social significance of the primitive dance lies precisely in this effect of social unification.* It brings and accustoms a number of men who, in their loose and precarious conditions of life, are driven irregularly hither and thither by different individual needs and desires to act under one impulse with one feeling for one object. It introduces order and connection, at least occasionally, into the rambling, fluctuating life of the hunting tribes. It is, besides wars, perhaps the only factor that makes their solidarity vitally perceptible to the adherents of a primitive tribe, and it is at the same time one of the best preparations for war, for the gymnastic dances correspond in more than one respect to our military exercises. It would be hard to overestimate the importance of the primitive dance in the culture development of mankind." (4) Buecher (5) also shows the effect of the song and dance in securing habits of co-operation in work activities among

(1) Wallaschek, Primitive Music, Chaps. V.-X.
Grosse, The Beginnings of Art, Chap. VIII. Appletons, 1897.
Smith, The Religion of the Semites, pp. 252 ff.
Gummere, The Beginnings of Poetry. 1901.
(2) Grosse, *op. cit.*, p. 230.
(3) Wallaschek, *op. cit.*, p. 295.
(4) Grosse, *op. cit.*, p. 229.
(5) Buecher, Arbeit und Rhythmus. Fuenfter Theil. Teubner, 1899.

unorganized masses of men. But yet play can not be said to be evolved for this socializing function any more than it has an exclusive biological utility. Play is but one of the many agencies which have been used in social evolution.

In this chapter on the general utilities of play, it has been shown that those reactions have not had any exclusive function in biological, sociological or educational fields, and that any peculiar and exclusive utility of play for these purposes that would lead to its selection in competition with other forms of activity would be such as would depend upon its special physiological and psychological nature. These special utilities have been indicated in a general manner and yet remain to be discussed more fully.

IV. SPECIAL UTILITIES OF PLAY.

1. Ease of the reaction. Play involves centres possessing the greatest irritability to stimuli; centres with the greatest preparedness for activity. Unless there be outside direction, inhibition or regulation, it is the easiest or natural reaction They are the reactions we would naturally tend to perform if left to ourselves and freed from external necessity. Now so long as these activities would secure the diversional, recuperative, or educational ends as well as work, they would naturally be selected for that purpose; other things being equal play would tend to survive.

2. Play means a greater amount of activity. The general vaso-motor reaction involving a heightened circulation of the blood secures a continued and better food supply to the active centres and makes possible an earlier and more complete excretion of fatigue products (1) and thus the activity can be continued for a longer time. Sargent gives increased activity of the heart and lungs as one of the essential qualities of good exercise for this reason. (2) Wallaschek, after dwelling upon the exciting and stimulating effect of stirring music upon savages, mentions that a traveler observed that his rowers always began to sing when he compelled them to overcome their natural laziness and to continue their exertions. (3) The same writer says that savages are aware of the emotional (vaso-motor) effect of music and use it with good success in disease, (4) and probably it may possess its therapeutic value for this very reason. This is one of the reasons for the use of music in gymnastics. As before stated, interest and pleasure involve a quicker and more decided vaso-motor reaction to the active centres, and it is an accepted doctrine that where interest and pleasure can be suffused over an activity, it can be continued for a longer time and with less fatigue. Writers recognize that gymnastics fail in this respect. Because of the lack of a sustaining interest the

(1) Donaldson, *op. cit.*, p. 312.
Foster, Weariness, Nineteenth Century, Sept., 1893, p. 340.
(2) Sargent, *op. cit.*, p. 75.
(3) Wallaschek, *op. cit.*, pp. 165-6.
(4) Ibid, pp. 167-9. Certain tribes of Indians were accustomed also to take their sick into a room occupied by gambling parties. The intense excitement affected a high state of metabolism with beneficial results. France, The Gambling Impulse, Amer. J. of Psych., XIII:3, p. 405.

exercises are not continued until benefit is derived. In America the play element has been introduced into the gymnasium in a few places for this purpose, and Sargent mentions interest and pleasure as one of the ten prime requisites of good exercises. (1)

In play there is a greater variety of centres involved allowing of some alternation and rest. In work there is precision and definiteness of certain continually recurring reactions. Whim and caprice—change in the reacting centres—is reduced to a minimum; all is constraint and drear monotony. Thus fatigue is easily engendered and rest is a necessity. Play with its change and continual variability in reacting centres allows time for rest and recuperation and thus tends to a more continued activity.

The composite physiological nature of plays and games must be remembered in this connection, the whole being regarded according to those elements dominating in consciousness. When as in play, the pleasure and mental exhilaration dominate, there may be other sensations of work, strain, effort, fatigue, or even pain, which fail to affect consciousness, and hence have no inhibiting effect upon the entire activity. The individual elements are woven into a co-ordinated system which must be regarded as a unit and under the control of a single act of the will. If the fatigue or pain elements dominate in consciousness the reaction as a whole is inhibited. If the play elements dominate, the system proceeds to react as if there were no fatigue or pain elements. Children may be tired and yet if the play spirit be aroused and dominate consciousness, these fatigued centres may form a part of the play activity and have less inhibitory effect, so long as the play elements are uppermost in consciousness.

For these three reasons, play implies a more continued activity. Children will play all day when an hour of work is hardly possible. When tired out with work along certain lines and seemingly exhausted, they will energetically answer the summons to a game of ball. Thus for any educational purpose, other things being equal, more can be accomplished by means of the play activity than in any other way.

3. Greater intensity of reaction. Emotions—instinctive vaso-motor reactions—have evolved because of their service in the struggle for existence. At times it is necessary for a surplus of energy to be directed to the periphery to meet a crisis, at other times the opposite reaction is the most serviceable. (2) Play involves similar vaso-motor reactions and likewise secures an intensity of effort. (3) Through the vaso-motor reactions there is a concentration of energy in the reacting centres with a comparative drain of blood from other areas. As shown in the section on the alleviating value of play, because of the comparative anaemic condition of the drained areas, other disturbing and distracting stimuli have no reactive effect. The reactive centres reign supreme. There is a concentration and fixation of attention. The effect of music upon the rowers before mentioned has thus a partial explana-

(1) Sargent, *op. cit.*, p. 74.
(2) Sutherland, Origin and Growth of the Moral Instinct, Vol. II., Chap. X, 1898.
(3) Wallaschek's use of the term "unapplied energy," instead of "surplus energy" is in point here.

tion in that the stimuli of sight and sound coming from objects on the river bank have no effect. The attention is not divided; no other interfering or subsidiary reactions are stimulated; there is no interference or loss of energy; the whole energy of the rowers is concentrated in the regular rhythmical sweep of the oars. The attentiveness and self-absorption of children in many plays is remarkable. Players in games involving a decided vaso-motor reaction are characterized by an energetic whole-souled attitude. They enter into the spirit of the game and play for all they are worth. The college grind in later life often lacks this whole-souled enthusiasm and energy of the athlete which has been imbibed in a healthy atmosphere of college sport. Concentration of energy and attention in a greater or less degree is a characteristic of the pure play reaction and by proper means these habits of energetic intensity and enthusiasm formed upon the play ground and football grid-iron should be attached to the more serious objects of life. They are often formed in childhood only to be rarely utilized in after life.

4. Greater stimulation to growth and development. Mention was made of the fact that an activity of cells, either muscular or neural, brought to them a blood supply proportionate to the activity, and that this resulted in an increase of their size and power; also that muscular activity is really neuro-muscular and hence any muscular exercise would develop the muscular and neural centres involved, but that play with its general rather than local vaso-motor reaction and consequent nutritive supply would cause a general rather than local development. The bones and supporting tissues would grow and the visceral organs kept in a healthy state of functioning. The relation of this factor to the growth and development of the nervous system remains to be discussed.

The development of different parts of the cerebro-spinal system and of the different cells in the same part occurs at different times during fœtal and child life. This development of the neuroblasts consists (1) of an increase in size, in the formation of abundant cytoplasm and outgrowths and in chemical modifications. These outgrowths consist of many dendrons and dendrites and an axone with its collaterals, which are the means of establishing functional connections with the end organs and various central cells. It is probable that no functional activity occurs until there has been quite a development. The generally accepted law is that functional activity is coincident with medullation of the axone. Progressive medullation has been traced. It begins in the fifth week of fœtal life and continues to the thirty-fifth and fortieth year. The first to mature are those which are fundamental and racially the oldest, and the order of development proceeds from these to those of more recent evolution. This order seems to be of hereditary necessity and has been termed the law of "Fundamental and Accessory Development." Ross (2) in his Diseases of the Nervous System, and Hughlings Jackson in his "Three Level Theory," (3) developed the basis of the law, and the pedagog-

(1) Donaldson, op. cit., p. 163.
(2) Ross, Diseases of the Nervous System, pp. 83-89. Lea Bros., 1885.
(3) Hughlings Jackson, Some Remarks on the Evolution and Dissolution of the Nervous System, Journal of Mental Science, April, 1887.

ical application has been made by Burk (1) that education must follow this nervous development, while Hartwell first applied the law to the pedagogy of physical training. Burk and Hartwell both well describe the bad results following the non-observance of this law. "The result of this inverted and unnatural order of teaching is seen in myriad forms of nervous disease, which find expression in St. Vitus dance, grimaces, spasms, convulsions and other forms of disordered muscular action, as well as in protean forms of headache, nervous exhaustion and mental derangement so common nowadays amongst sedentary people and brain workers." (2) After these neurones have become medullated and functionally active their development does not stop. The process continues, they becoming larger, more powerful, and with more numerous connections. This is the nascent period, the period of plastic growth and of education. (3) But this upward sweep of progressive medullation does not embrace all neuroblasts as it goes. Many are not included even in the spinal cord and may develop later, while a large number in the form of granules never develop at all.

In considering the effect of use and exercise upon this nervous development three sets of facts must be kept in mind.

a. There is a regular order of development of a number of neurones up to birth and possibly later, which at least includes the process of medullation, and which seems to depend upon hereditary necessity and is therefore relatively independent of use and exercise. These are the fundamental centres and they form a sort of skeleton around and from which further growth occurs.

b. After birth each medullated neurone has a nascent period of growth and development in size, strength and complexity, and it is upon the quality of this that the development of higher centres is dependent. This development of the fundamental centres during their nascent period depends upon use or exercise and consequent amount and quality of nutrition. Hence the argument is valid that education must proceed from the fundamental to the accessory or higher centres. Free play, if founded upon the surplus energy theory, would follow these lines of growth and development, and hence obey this law, while work would not of necessity do so.

c. The development of the neuroblasts around this frame work of fundamental centres is continually occurring. These represent the accessory movements; they are the so-called higher centres whose full and complete development is dependent upon that of the more fundamental ones.

Kaiser found that the number of developed neurones in the cervical enlargement in man more than doubled from birth to the fifteenth year (4)—accessory centres. The causes and the order of their development are not definitely known though, as in all growth, nutrition or blood supply is a large factor. (5) But their blood supply can hardly depend upon exercise because

(1) Burk, Ped Sem., Vol. VI., No. 1. 1898.
(2) Hartwell, *op. cit.*, p. 21.
(3) Burk, Ped. Sem., Vol. VI., No. 1, p. 21.
(4) Donaldson, *op. cit.*, p. 164.
(5) Burk, Ped. Sem., Vol. VI., No. 1, p. 9. Quoted from Vulpius.

they are not yet supposed to function. The experiments of Ambronn and Held (1) demonstrated that in the optic nerve of a kitten rapid medullation depended upon the stimulation of light, though it is probable that here the increased blood supply was the important factor. But in this case undoubtedly the neuroblast had already attained a considerable development, the axone extending to the end organ and hence being subject to stimuli. But with neuroblasts and granules the case is different; they have not developed their connections as to be in functional contiguity to stimuli, although there is some doubt on the question. (2) Yet their growth does seem to bear a relation to exercise of the organs concerned.

The number of axones running to the arm for instance increases with age and varies with individuals. Flechsig found the number running to the right hand 50 per cent. greater than to the left hand. (3) These represent the finer and more delicate movements of the right member. Hartwell states that exercise increases the number of neurones as well as their size and elaboration of parts. (4) The education of imbeciles and idiots through exercise proceeds upon this assumption. Large parts of their nervous system are yet undeveloped, the elements being in their granular state and upon which sensory stimuli seem to make no impression. Yet they are successfully reached through muscular exercise as is evidenced by the success of this mode of treatment in the past twenty years. (5) Mosso argues at length that muscular reactions of the finer and more delicate sort develop the centres for higher psychic life, that mobility of the extremities and intelligence are coincident throughout the animal world. (6) Cunningham from studies of the brain of man has reached the conclusion that recent evolution has been in the frontal-parietal operculum of the left Rolandic area covering the Island of Reil. This region governs the finer and more delicate movements of the right arm and hand, facial expression and speech, and Cunningham attributes this evolution especially to the acquirement of speech. (7) An objection to this might be offered that there has first been variations in size of the brain centre and that this has allowed of the acquisition of these finer muscular coordinations, but when we remember that the possibility of development in any brain centre has never been realized, Cunningham's explanation seems the more probable.

Thus it seems plausible that the granules are not susceptible to direct stimulation, but that they are developed into functional activity at least by reactions in adjacent neurones, and that this is accomplished through a decisive and somewhat diffused blood supply due to local reactions embracing adjacent granules. This is borne out by a statement of Donald-

(1) Mosso, Clark University Decennial Celebration Publication, p. 384.
(2) Donaldson, *op. cit.*, p. 231. From His.
(3) Hartwell, *op. cit.*, p. 12.
(4) Ibid, p. 9.
(5) See Elmira Reports, Writings of Seguin, Wey, et al.
(6) Mosso, *op. cit.*, p. 390.
(7) Cunningham, Presidential Address Before the Anthropological Section of the British Science Association. Science, Oct. 18 and 25, 1901.

son's (1) that hyperaemia caused an increase in the size of a rabbit's ear, and by the somewhat metaphorical language of Dr. J. Crichton Browne: "Even in the full grown brain small round cells of the embryonic type are still abundant, and suggest the possibility of further educational development. Of the superficial area of every brain there is only a certain proportion that is under cultivation. Education is directed not only towards securing the best possible returns from the districts that have been brought under cultivation, but also towards encroaching on the waste territories, and compelling them to become fruitful of thought. *But the waste territories can only be approached from those that are already tilled.* Education must eat in upon their margins, and this it probably does by putting forth new branches from already cultivated cells." (2) Flechsig states that medullated paths gradually grow out from the sense centres into the non-medullated regions, (3) i. e., the course of functional development proceeds from the active functioning centres to the non-active and immature ones. Hence exercise of the fundamental centres would tend to develop the accessory, and play with its more intensive vaso-motor reactions and its tendency to variability (4) would be much more effective for this purpose. The probable conclusion would be that free play, since it obeys the law of "The Fundamental to the Accessory," involves a more vigorous and extended blood reaction, possesses a great variability of reaction, and can be either predominantly neural or muscular, would secure the fullest, most complete and symmetrical development of the nervous system possible. (5)

5. Variability of the play reaction. In work there is a definite, precise and regulated reaction adapted to a definite end. A normal amount of energy is released along definite channels and to definite centres. When work becomes habitual as it usually does, this energy is discharged along habitual associations,—along lines of least resistance. A central cell is connected by its axone, which has a number of branches and collaterals, with a number of other cells. Each of these again may have a number of connections with peripheral cells. So a discharge from a single cortical cell has many possible channels to the periphery. A habit would be a tendency

(1) Donaldson, *op. cit.*, p. 39.
(2) J. Crichton Browne, *op. cit.*, pp. 286-7.
(3) Barker, The Nervous System, p. 1073. Appleton & Co., 1899.
(4) See following section on the variability of the play reaction.
(5) Hall and Allin (Psychology of Tickling, Laughter and the Comic, Amer. J. of Psychology, Vol. IX) suggest that a complete theory of play must not only include exercise of congenital tendencies in order that they may become *useful* (theory of Groos) but also embrace exercise of faculties in order that they may become *useless*, but whose disappearance is a necessary pre-condition to the development of some higher and more useful function. It is the well known tadpole analogy. Prof. Allin suggests the term "metamorphic stimulation" for such phenomena. He also suggests that preliminary stages of development, such as "the wild oats' period," the delight in myths, legends, etc., nurse within them qualities of mind and action which are matricidal in nature, in that they are turned back, so to speak, in destructive criticism of some of the features of the early stages. The same truth applies also to political and social development. See also G. S. Hall, Some Social Aspects of Education, Ped. Sem., Vol. IX.

for this discharge to invariably follow definite channels because of the lessened resistance due to repetition. When there is a heavy discharge, it may be sufficient to overcome the resistance in other of the possible avenues, thus bringing in subordinate reactions. This is the case in epilepsy, where very unstable cells under strong stimuli discharge and, spreading down to the periphery, involve, instead of regulated, precise and coordinated movements, many unregulated, uncoordinated reactions of the musculature, glands and vaso-motor centres. Intensive and vigorous movements have this character, embracing many unregulated and subsidiary reactions, and lacking the element of precision. In intense passion with a hyperaemic condition of the brain and musculature, the individual loses control of himself and there is a raging flux of ideas and hundreds of unregulated, spasmodic movements of the muscles. Hyperæmia of the brain is accompanied by a flow of ideas, of new associations. (1) Many brilliant inventive writers have unconsciously adopted devices to secure this hyperaemia of the brain without which they are unable to do their best work. Lombroso mentions many such devices as wine, reclining prostrate with the head lower, near the fire, or covered up with pillows. (2) "From the physiological side, that which rouses an interest tends to quicken the pulse and determine a full blood supply to the entire central system, yet the narrow gymnastics of the school, in the most austere form, do not in themselves produce that condition of good nutrition favoring the best diffusion of the impulses and the formation of secondary and subconscious associations." (3) Play with its discharge of surplus energy, above the regular normal amount, and its quickened vaso-motor reaction, would tend to cause irregularity of reaction. (4) Originating in instinctive or habitual associations they would involve also new lines of discharge, new associations, variations from our instinctive or habitual reactions.

Myths, legends and fairy stories have a recognized value for young children and have been widely introduced into the elementary curriculum because they cultivate the imagination and fancy. Stories of adventure, fiction and poetry are good for the same reason. Pure speculative metaphysics has been successfully introduced into the high schools. It possesses the value of initiating habits of mental curiosity, speculation and hypothesis. There may be some useful thought content to these activities but their common as well as their psychological justification is their cultural value, initiating habits of mental reaction which later are useful. All these are really plays, plays among ideas, among neural associations. Imagination and fancy are not entities, but like speculation and hypothesis are types of mental reactions which on their neural side are associations varying from

(1) J. Crichton Browne, *op. cit.*, p. 290.
(2) Lombroso, The Man of Genius, p. 22. Scribners, 1896.
(3) Donaldson, *op. cit.*, p. 356.
(4) Compare with Baldwin's three ideas of increased vitality, pleasure and motor excess, in the explanation of adaptations. The use of this variability in securing an excess of ideas or muscular reactions and thus multiplying the chances of successful adaptation to new circumstances in life is identical with Baldwin's conception. Baldwin, Mental Development, Chap. VI.

the ordinary. Cultivating the habit of fancy and speculation is cultivating the tendency to variability in neural associations and it is this which is of cultural value. It is commonly thought that the scientist has no imagination, but on the contrary, the best scientist has the best imagination. The use of the hypothesis is absolutely essential in inductive reasoning. A few facts are discovered; what are their significance? A fertile imagination supplies hypothesis after hypothesis. These form the starting point for a deductive search for new facts. Hypotheses are rejected and altered, new facts are discovered, and a new principle is enunciated. The imaginative and speculative type of mind whose theories are convictions, rather than means or working hypotheses is a failure. But habits of imagination united with a practical turn which tests speculations by an appeal to facts, give the highest type of the scientific mind—the scientific genius. "Darwin was as productive of hypotheses as Nature is of living things" and in fact could not resist forming one on every subject, but with one exception every first-formed hypothesis had after a time to be given up or greatly modified. (1)

"There is nothing new under the sun," is an old aphorism which contains much truth. Our knowledge consists of combined sensations. Elemental facts and perceptions are for the most part the same for all. New knowledge is largely a recombination of the old, new associations of elemental facts. Darwin viewed the same world as his predecessors, but he viewed it in a new light, associated the facts in a new way. Many explanations of the genius have been offered, some comparing them with the insane and some with the child. (2) They have at least this in common that they are extremely variable, they are continually associating things in new ways, not content with accepting existing explanations. "Childhood, like greatness, is never exact." (3) The genius varies from social habits in neural associational activity, is continually forming new associations, new hypotheses, at last finding one which is better suited to existing facts and conditions. (4)

The variability of the play reaction in securing an excess of ideas and reactions has been of importance in biological and sociological evolution. Groos well says that the spirit of rivalry and opposition has been a mainspring of advance in culture and quotes Sully that the best children from a biological standpoint are those who have "most of the rebel in them," possessing not a sulky but a playful, mischievous disobedience, (5) which means that they are the amenable non-conformers to the habitual, the variable, the adaptive, the progressive individuals. At one time variations were entirely organic, fixed and definite, but when evolution took the line of an increase of nervous plasticity, accommodations became more and more habitual, a result of experience and education. With the formal education of today

(1) Cramer, The Method of Darwin, pp. 37, 40. McClurg, 1896.
(2) Lombroso, *op. cit.*
Chamberlain, *op. cit.*, Chap. 3.
(3) Eby, The Reconstruction of the Kindergarten. Ped. Sem., Vol. 9, p. 55.
(4) Baldwin, Social and Ethical Interpretations, Chap. 5. McMillans, 1897.
(5) Groos, The Play of Man, p. 187.
Baldwin, Social and Ethical Interpretations, p. 117.

definite adaptations to existing conditions can be consciously impressed upon the young, but with animals and early man such was not the case. Each individual was left to make adaptations to existing and changing conditions as best they might. This was not done consciously, but was more or less a matter of chance, of circumstances. This is well illustrated from instances of animal psychology. "I noticed that one of my seven-days-old chicks pecked repeatedly at something near the corner of the turned-up newspaper which formed the wall of the enclosure, the paper being propped against a more solid support. The speck which had caught Blackie's keen eye turned out to be the number of the page. He then transferred his attention to the corner of the paper, which he could just reach. Seizing this he pulled at it, bending the paper down, and thus formed a breach through which he escaped into the wider field of my study. I caught and put him back near the same spot. He went at once to the corner, pulled it down and escaped, but was captured, and set down on the other side of the pen. Presently, he sauntered round to the old spot, reached up to the corner of the newspaper, pulled it down, and again effected his escape. A single chance experience had sufficed to teach him, and the association held good. Morgan (1) and Thorndyke (2) give other similar instances, embracing both observation and experiment, illustrating the acquirement of new adaptations. It is the "sense-trial and error" method. Lindley in a "Study of Puzzles" demonstrated that most of a child's reactions were of this nature. (3) A great many trials are made, and finally one of a thousand perhaps *happens* to be successful, and that amount of progress is a result. This is comparable with the methods said to be used by Edison, desirous of obtaining a new chemical reaction. The substance to be analyzed is placed in a long row of test tubes and all the different chemical reagents are poured into these tubes, until one happens to be successful. In the early stages of animal evolution when adaptations were becoming acquired rather than congenital, play in youth would graft upon instincts numbers of modifications which later in life would possibly secure better adjustment to external conditions. "The more adaptive activities must be given ere they can be selected from among those which are less adaptive.

"Herein, then, lies the utility of the restlessness, the exuberant activity, the varied playfulness, the prying curiosity, the inquisitiveness, the meddlesome mischievousness, the vigorous and healthy experimentalism of the young. These afford the raw material upon which intelligence exercises its power of selection. Observers of human life have not failed to contrast this youthful expansiveness ready to try all, dare all, and to do all, with the narrower and more restricted, if more concentrated efforts of those in whom the stern lessons of experience have checked so much that is picturesquely impossible. And this exuberant expansiveness of the young is a biological and psychological fact of profound significance." (4) So with early man

(1) Lloyd Morgan, Habit and Instinct, p. 153. Arnold, 1896.
(2) Morgan, Animal Behavior, pp. 134-155. Arnold, 1900.
Thorndyke, Psychological Review, June, 1898.
(3) Lindley, A Study of Puzzles. Amer. J. of Psych., Vol. 8, No. 4.
(4) Morgan, Habit and Instinct, p. 163.

play would secure a general variability of reaction, a greater possibility of successful adaptation to existing and changing conditions. Play has thus a biological and sociological value as a means of progress in acquired adaptations.

The case is not different in formal education, a conscious training of the young for life conditions. The apprentice system was a specialized training for particular ends, but with changing conditions their training was of no value, and they were unfitted to compete in their new environment. The apprentice system, like the old instinctive adaptations to the environment, made no allowance for continual progress and hence was a failure. Habits can be made almost as fixed and definite and precise as instincts and such are excellent amidst a static environment, but the conditions of life are constantly changing in every department of activity. The same habits and methods of work which brought success in professional or business activities a few decades ago would now be failures. The environment is being practically revolutionized every few decades, and we see many trained to definite and fixed habits and methods a half century ago, apparently unwilling, but really unable to adapt themselves to present day conditions. Work in education tends to definiteness, precision and fixity of habitual reactions; the steady, sober, industrious, and plodding youth often lacks the power of originality and self-initiative, the quick adaptability to suddenly and successfully meet new conditions, and loses in the race of life.

Morgan (1) justly objects to the application of the term "variation" to any acquired modification, suggesting the term "adaptations." The "grafting on" of adaptations to instincts and hereditary impulses treated in the section on the formation of instinct-habits might thus be confounded with the variability of the play reaction, inasmuch as this new habit is an addition or change from the pure instinct. But the new accommodation may be almost as definite and precise as the old instinct. The essential of the play activity is not in securing a definite accommodation as such, but in securing a *tendency to general variability* in instinctive and habitual reactions.

The same is true in imitation. It can be definite and precise—"slavish imitation," rather than spontaneous and variable. Perfunctory copying may have its uses in education, but it certainly robs the child of all self-expression and originality. Baldwin well shows the utility of the variability of the imitative reaction in the development of spontaneity, self-activity, and originality. (2) Eby strongly indicts the artificiality, unnaturalness and mechanizing spirit of the kindergarten because it allows no room for variability, originality and self-expression. (3)

Definite and fixed habits and adaptations have their use and both play and work secure these, but the essence of the play spirit is its *variability of reaction*. It tends to inculcate, not a definite adaptation, but a habit of general variability, an elasticity of body and mind, a general adaptability, spontaneity, originality and inventiveness to successfully and quickly meet

(1) Morgan, Habit and Instinct, p. 233.
(2) Baldwin, Mental Development, Chap. III.
(3) Eby, *op. cit.*, p. 51.

new requirements and conditions of life. It is the cultural rather than the specializing phase of education.

V. PLAY IN EDUCATION.

With this understanding of the essential values of the play reaction, we are in a position to depict its uses and limitations in educational philosophy and practice. The first four values, the ease, amount and intensity of the reaction and its greater developmental value are qualities which are highly desirable and which would seem to lead to its almost universal adoption as an educative reaction. The fifth, its variability, is a peculiar quality of neuronal functioning which certainly possesses utility, but whose amount and province must be determined by social needs.

In assigning a province to play in educational practice the mental character of much play cannot be too strongly emphasized. There is no sharp distinction between motor and mental plays as both elements in varying degrees are found in every play activity. The motor element predominates in a large number but the mental element is increasingly marked in the imitative, dramatic and imaginative types. Even where the motor element is not noticeable there may be spontaneous mental reactions as revery, day-dreams, etc., entirely unknown to the observer which are just as truly plays as spontaneous movements. The motor plays are more obvious and their utility more unquestioned, while idleness is generally assumed in case of an extreme mental play and its physical value not understood. Play is as much a part of *formal* education as it is of physical training.

A priori we should expect from these facts that the play reaction has had a large province in education. A history of education in its largest sense tracing the development and province of the play and work reactions is a task for the future. Even a cursory review is almost out of the question, inasmuch as the difference between the two reactions is largely one of spirit rather than of objective characteristics. The following is intended to be tentative and suggestive rather than conclusive and dogmatic.

Among animals and primitive men there is but little doubt that play was the main educative factor. Imitation is always present to a large extent but it may be of either the play or work character. The reactions resulting from commands, injunctions and prohibitions possess the work characteristics and without doubt were present in primitive times. However, among early societies the spontaneous plays, play in imitation of all adult activities, in imitation of animals, the dramatic dances, the myths, stories, legends, sagas, epics, rites and ceremonies were the main means of educating the young into the social fabric, and undoubtedly these activities were of the play nature. Play was certainly the natural and primary educational reaction.

The work spirit in the education of the young, which is so prevalent in present day formal instruction, was an artificial and secondary reaction which was introduced in response to new ideals and social needs. In considering the matter from a theoretical and historical standpoint, it would

seem that it is rather the work reaction which needs to be justified in educational practice.

Among the oriental theocratic nations which had acquired some degree of cohesion and solidarity, formal instruction appears and it is of a work nature. The Chinese, Hindoo, Persian and Egyptian instruction is formal, dogmatic and rigid in spirit to a great extent. It is dull, dry and monotonous with little appeal to the imagination, interest and spontaneity of the child. The attempt is made to force and fit the child into rigid social molds. The needs and demands of society occupy the educational consciousness; the needs and demands of the child are not considered.

The same spirit largely dominated the formal and conscious education among the Greeks and Romans and it was greatly accentuated in mediæval and modern times by the spirit of asceticism, monasticism and puritanism.

The play spirit was not crushed out entirely; it was largely eliminated from mental reactions but in bodily training the play reaction was largely retained. Where definite and precise motor reactions were required the work spirit has been introduced, e. g., in the apprentice system, training for trades and occupations, and to some extent in the military training of the Spartan youth. But for general cultural value the physical training of the young has been accomplished by the natural spontaneous reactions, until the attempt was made on the continent during the last century to subject the youth to the rigid formalistic exercises of the various systems of gymnastics. (1)

Thus the entire education of the child has been differentiated into two parts: 1st, a period of formal instruction from which the play reaction has been eliminated, and 2nd, a period given up to the child for its natural and spontaneous educational reactions. This system is yet retained and we have our resulting maxim "there is a time for work and a time for play."

As a result of this division we have our popular conceptions of play and work. To the adult mind formal instruction has its recognized utility and it is regarded as a real serious business-like affair. There is no pretence, sham or self-illusion in it; it is one of the serious things of life. The other period of play, of spontaneous activity, has not been seriously regarded by the popular mind. Its real utility in education has not been truly comprehended. It is regarded as a sort of idle pastime, a recreation which is probably necessary, but which has no real value in preparing the child for active adult life. It is not regarded in a real, serious, business-like way. This popular social judgment is impressed upon children as their own, and is used (or rather misused) in adult interpretations of a child's psychic experience during play. As a result we have the opposing theories as to the self-illusion or reality of play as a subjective phenomenon in children. (2)

Psychologically those conscious states are real and serious which persist and are fixed in consciousness. Illusions possess a transitory nature. An adult's daily activities are thus real and serious to him. A modern business

(1) Physical Training, Chap. XIII., Rep. Comm. Ed., 1891-2.
(2) Groos, Play of Man.

man would look upon the elaborate rites, ceremonials and dances of a primitive community much as he regards the traditional games of a civilized youth. To the primitive man his rites and ceremonials are real and serious things, while the activities of a business man, the Episcopalian ritual or the drills and ceremonies of a fraternal order, must seem nonsensical, full of pretence and sham. We give value to those things which engross our time and attention. So with children, their plays are real and earnest matters, but as they grow older in life and experience and their interests and activities keep changing, they continually view the activities of preceding stages with amusement, wondering how they ever regarded them as of serious moment. Women fully engrossed in the routine of making calls, many clubs and societies, regard the doll play of little girls with sympathetic amusement, but from the standpoint of real utility the little tots are hardly at a disadvantage. Did not society impose upon children their own distinction between tasks demanded and the activities spontaneously undertaken, children would still notice the difference between them but probably regard their own as the ones of serious moment.

As society recognizes that these activities are of real and serious moment to the children and that they have as great an educational value as the tasks of formal education, the popular distinction between work and play must vanish. As Fenelon pointed out, the common way of placing everything that is disagreeable on one side, and everything that is pleasant on the other, connecting the former with industry and regarding the latter as idleness and waste of time, can hardly be commended to call out the very best in a child's nature.

In later times the trend of educational practice has been away from this sharpcut two-fold division. The play spirit is being introduced into formal education, while direction, encouragement and supervision are extended over the old time play period. We are tending to combination and integration rather than to separation and differentiation.

Fenelon in the latter part of the 17th century was one of the first to recoil against the rigid formalistic education and to advocate the introduction of the play element by appealing to the interests and inclinations of the pupils. He saw no reason why education should not become a pastime as enjoyable and spontaneous as the child's own dramatic activities. Rosseau, Pestalozzi and Froebel emphasized the same idea in varying ways and degrees. The movement has been checked at times, but on the whole has steadily grown in force and volume. The kindergarten is the outgrowth of this idea and at present the play spirit is very prevalent in the lower grades. The movement has been further accentuated by the growth of child study, the new psychology, and the efforts of a host of educational specialists in the universities. The extension of the play spirit into the upper grades and the high schools is earnestly advocated and just as earnestly resisted by a large number of conservative educators. The play and work reactions in

formal education are in the main represented by two opposing schools of educational philosophy and practice—the psychological and the logical. (1)

The child is the keynote of the former system carried to its far extreme. Educational reactions are adapted to the child, its interests, tendencies, whims and desires. The child is the master and the educational system is his servant. The word work is banished from his vocabulary. Everything is made interesting, his spontaneity and self-initiative are encouraged and he travels the educational path freely, spontaneously and of his own accord.

The sociological school in its extreme typifies the work reaction. The social end of education stands out preeminent in consciousness. The child is to be adapted to a definite, precise and complex order of social relationships. Here reign order and stability entailing regularity and precision of conduct. Here are rules of conduct in social relationship, in business, in public and private morality, and in the industrial regime which must not be violated. Here are customs, ideals, beliefs, modes of thinking and systematized bodies of thought which are prescribed. The child is formed and straight-jacketed to fit an existing and prescribed standard, no matter what his interests and tastes may be. In the former case the educational reactions are adapted to the child, but in the latter they are adapted to an objective standard—the social demands of the age. They are the play and the work reactions.

These ideas represent the theories of the two schools carried to a logical extreme while in fact there is little difference between them in actual practice. They merely call attention to and overemphasize their own standpoint, taking for granted or overlooking the obvious truths on the other side.

The claims of the sociological school are certainly reasonable and sensible, and no one can dispute them. An accountant must be trained with mechanical habits of accuracy, regularity and precision in many business details. Mistakes impair his usefulness. Precise and accurate habits of speech are demanded of all. Society demands certain definite, regular and unerring habits in private and public life and social intercourse. Unquestioned obedience to many social and moral laws is demanded. Our penal institutions are designed to take care of those with too erratic habits. The industrial regime demands certainty and regularity of action. In fact the cohesion and organization of society into a great social, political and industrial machine has depended upon the inculcation of certain definite, regular and unerring habits of reaction. Without them specialization and division of labor would be impossible. The individual is a unit in a great interacting, interdependent aggregation and his success is dependent upon the unerring regularity and precision with which the tasks of others are performed. Each must depend upon the other units reacting regularly in certain definite and prescribed ways. The efficiency of the whole depends upon the mechanical behavior of the parts.

The machine-like qualities of the work reaction has thus been and will continue to be a necessary and integral part of education. From it are born

(1) Allin, A Criterion in Educational Processes. School and Home Education, Jan., 1900.

law, order, efficiency, organization and responsibility—the stable and conservative qualities of society. These are necessary, but are also detrimental when carried to an extreme. No allowance is made for variability of reaction, for growth and progress. (1) It is the old story of instinct and variation, of definite unerring habits and an irregularity of reaction which admits of accommodation. The qualities of the play and work reactions are *both* demanded as ends of education but the *amount* (2) of each element will be determined as heretofore by social selection.

If these two qualities of regularity and variability in varying amount are demanded as ends, what valid reason is there for the present tendency of mixing the two types of reaction promiscuously in the educational process rather than the old two-fold division with a period of work and a period of play? A due proportion of the two might be secured by either method. The answer must be sought in the first four special utilities of play (3) and in the composite nature of a work or play activity.

Any activity is a composite of many reactions either of a work or play nature. Psychologically the activity is a unit and is either work or play, according to the predominant state of consciousness. Hence we may have an educational activity which possesses the four special utilities of play and yet which might secure to a large degree the educational results of a work reaction.

It must not be thought that the resulting conscious state varies directly to the ratio between the number of play and work reactions in the activity. For instance, if an activity is composed of twelve work reactions and ten play reactions, the work elements do not necessarily dominate in consciousness. The matter is complicated by the strength of the resulting afferent stimuli of each reaction, by suggestion, imagination and attention. Theoretically the activity may be largely composed of work reactions and still be regarded as play. Mark Twain's story of Tom Sawyer and the fence is a case in point and instances may be multiplied. Herein lies the absurdity of our present concepts of work and play with their associated emotional reactions. It would be better to make the child believe his school tasks were play than to have them regarded as work and drudgery.

The large percentage of work reactions entering into a spontaneous play activity may be seen in group games, dramatic, imitative and traditional forms of play. Precision and definiteness are largely demanded. It is said that on certain occasions among the Kwahiutl Indians of British Columbia the dancer who makes a mistake is killed. (4) Play does not necessarily mean anarchy; there may be rigid, monarchistic organization and still play. Buecher (5) shows that primitive man gradually acquired habits of work,

(1) Chap. IV., Sec. 5, *supra.*
(2) The amount of each element cannot be fixed in any definite ratio, since it will vary not only with changing conditions of society, but for the different occupations of life. A poet and a scientist would demand a different proportion.
(3) Chap. IV., secs. 1-4, *supra.*
(4) Wallaschek, *op. cit.*, p. 276.
(5) Buecher, *op. cit.*

industry, culture and morality through rhythmic movements, dancing, singing and muscular exercise. Even in spontaneous plays we find subordination and obedience to authority unparalleled in home or school life. Attention, persistency and subordination of self to the dominance of an idea is likewise remarkable in games. By suggestion and the power of personality in directing the pupil's attention, this definiteness of reaction, this monarchistic organization of the play activities can be increased.

Granted this fact we have a sound reason for the combination of the play and work reactions in one composite play activity. The activity will be easier, and can be pursued for a longer time. More can be accomplished in a day. The activity will be more intensive and as the impression of a reaction upon the nervous system (memory in its broader sense) is increased by the intensity or vividness of the reaction, things are learned quicker and remembered better. That is, the educational results of both the work and play reactions demanded by society are secured with a minimum of time and energy, a very practical consideration. The last two special utilities of play, viz, its variability and its greater stimulation to growth and development, are *ends* of education and the first three, the ease, the amount and intensity of the reaction are but *means* of reaching an educational goal in a minimum of time.

The introduction of plays and games, the cultivation of spontaneity and self-initiative, i. e., the suffusion of the play spirit over formal education without sacrificing the amount of precision and regularity of reaction prescribed by society is the province of the future teacher, and it is one wherein the very best powers of tact, forceful direction and supervision, suggestion, and a winning and sympathetic personality will be taxed to the utmost. (1)

As the educational utility of play has been recognized and as the sentiment that play is but a mere idle pastime or at the most a helpful recreation has vanished, the old play period has been brought more and more under supervision and restriction. The question has been to introduce the work element, to secure greater educational results, without a sacrifice of spontaneity, joyousness and self-initiative. A wise direction and stimulation toward the educational goal, rather than a monarchistic system of gymnastics is the proper ideal. What we are now attempting consciously, has long been done by unconscious selection.

The forms of play have been continually undergoing change and evolution in response to changing conditions. A mere suggestive sketch of the process is alone possible at this time:

(1) President Hall advocates the use of mechanical toys to teach many principles and laws of physics. See Physics and Manual Training. Ped. Sem. Vol. IX., No. 2. A collection and description of all the games and devices for securing the play reaction in formal instruction actually in use in our public schools, with suggestions for further extension, is a task for the future. In this connection see Johnson, Education by Plays and Games, Ped. Sem., Vol. III.

1. Anti-social forms tend to become eliminated. All games of gambling are condemned. Destructive plays such as tearing up paper, kicking things to pieces, throwing and smashing objects, mischievous pranks and playful vandalism are repressed and kept within proper bounds by parents and teacher. Fighting plays are freed from their recklessness and maliciousness and are later systematized by rules and regulations. Forms of play involving teasing and bullying such as sticking pins, pulling hair, hazing at college, rough practical jokes, the tortures of children and primitive people, playful acts of revenge, the extreme spirit of mimicry, satire, scorn, bandinage and banter fail of public approval and are greatly restricted or eliminated. Various forms of hunting plays, as robbing birds' nests, acts of cruelty, etc., some forms of play on the sensations of contact, taste and smell are eliminated. Random playful activities are apt to take any form and society is continually selecting, modifying and eliminating objectionable forms, and evolving regular rules and restrictions without destroying the play spirit. The random activities have been ordered and systematized into set forms, e. g., the rules of boxing, football, or in fact any game.

2. Play forms which have evolved and been adapted to a definite purpose are later lost and forgotten, because of the changing social environment. They were useful at one stage of social environment but now no longer so. The dramatic representative dances of war and hunting, the voluptuous love dances, the Teutonic jousts and tourneys may be mentioned.

3. Evolution of plays in form and spirit is noticeable. The plays in preparation of war have changed in accordance with prevalent methods of war. We have war dances, jousts, tourneys, knightly combats, fencing, broadswords, marches and drills, playing soldier, cadet companies, etc. Traditional games founded on real activities of former times exist at present with the old meaning lost, changed beyond recognition, but still doing service in the education of the young.

So far the supervision of society over plays, play grounds, and the community life of high schools and colleges has been largely of a negative and prohibitive character. Whatever organization and systematization of the plays and the social life of the young has been accomplished, has been secured through the unconscious evolution of set forms of activity and their traditional inheritance. The question for the future is a positive direction and stimulation of effort within this field toward educational and social ends.

The establishment of vacation schools and public play grounds where there is a wide range for spontaneity in action, but where there is more or less conscious direction of plays and indirect instruction in nature study,

sewing, constructive work, etc. (1), the introduction of various systems of self-government (2), or gymnastics, military training, rigid supervision and encouragement of football, baseball and track athletics is evidence of the fact that the authorities are becoming aware of this phase of education in its positive aspects, and that in the future the proper organization and direction of the pupils' outside activities towards educational and social ends will demand an equal share of the authorities' time, energy and attention. (3)

Much remains to be accomplished, but there is no doubt that the tendency is away from the two fold division, and toward an integration of the pupil's entire activities as a whole; an introduction of the play spirit into formal education and much of the work spirit into the play period. How far this process shall continue and still subserve educational ends, whether our present distinction between work and play shall vanish, whether all the child's activities shall be systematized as one whole where everything is real and serious without destroying the ratio of variability and definiteness of reaction prescribed by society, is a question to be worked out in the future by patient trial and effort.

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(1) Vacation schools or public play grounds under the supervision of the school authorities have been established in Boston, New York, Chicago, Cambridge, Cleveland, Brooklyn, Philadelphia, Indianapolis, New Haven, and in various continental cities. The idea has been mainly to direct the spontaneous activities of the children of the crowded tenement quarters, which were liable to develop into vicious and mischievous anti-social tendencies, into healthful social and educational lines. For a more detailed account the reader is referred to the following references:
Public Play Grounds and Vacation Schools, Chap. XV., Rep. of U. S. Com. of Educ., 1899-00.
Chicago Vacation Schools, Amer. J. of Soc., Vol. IV.
Movement for Small Play Grounds, Amer. J. of Soc., Vol. IV.
Movement for Vacation Schools, Amer. J. of Soc., Vol. IV.

(2) Johnson, Rudimentary Society Among Boys, John Hopkins' Univ. Studies, Nov. 1884.
Austin Lewis, School Discipline, School Review, Oct., 1895.
McAndrews, High School Self-Government. Sch. Rev., Sept., 1897.
Thurber, High School Self-Government. Sch. Rev., Jan., 1897.
French, School Government, Chicago Teacher, Mar., 1899.
Commons, The Junior Republic, Amer. J. Soc., Nov. '97 and Jan., 1898.
Shaw, The School City—A Method of Self-Government. Rev. Rev., Dec., 1899.

(3) As an instance of what may be done in this positive direction the reader is referred to the excellent article "An Educational Object Lesson," by Sanford Bell in the Ped. Sem., Vol. IX., No. 2. The article describes the work carried on in one of the ward schools of Washington, D. C.

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A Statistical Study of Education in the West.

CONTENTS.

A STATISTICAL STUDY OF EDUCATION IN THE WEST.

The preeminence of the East in matters educational is one of the popular conceptions of the day; culture and higher education have generally been assigned to her exclusive possession. Indeed this assumption is but natural when we recall the density of population and the wealth of this section with a school system long and firmly established. The West, on the other hand, is but newly and sparsely settled and both opportunity for and interest in educational advance would naturally be regarded at a minimum. However. the average visitor to this western section is often astonished at the relative position of the West in educational matters, but even he as well as those reared and educated within her boundaries and who are intimately acquainted with her educational progress fail to thoroughly appreciate her remarkable position, so firmly does current thought dominate one's judgment. The West still continues to send a relatively large proportion of her youth to Eastern schools because of her supposed lack of educational facilities.

The following is a study of the relative condition of education in the different sections of the United States based upon the statistics published in the Reports of the U. S. Commissioner of Education. The sections referred to are the divisions used by the U. S. Census Bureau and adopted by the Commissioner of Education: 1. North Atlantic Division, embracing the six New England States, New York, Pennsylvania and New Jersey; 2, South Atlantic Division, consisting of the eight states of Delaware, Maryland, Virginia, West Virginia, the Carolinas, Georgia and Florida, and the District of Columbia; 3, South Central Division, embracing the seven states of Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Arkansas and the territory of Oklahoma; 4, North Central Division, embracing the twelve states of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, the Dakotas, Nebraska and Kansas; and 5, the Western Division, of the nine states of Montana, Wyoming, Colorado, Utah, Nevada, Idaho, Washington, Oregon, California, and the two territories of New Mexico and Arizona.

This last division is the largest in point of size, being somewhat over 1,000,000 square miles in area and embracing the semi-arid plains of Montana, Wyoming, Colorado, New Mexico and Arizona, and the rugged mountainous country of the Rockies. In density of population it is far below the average as may be seen from the following table:

Table I. Approximate Population Per Square Mile.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	73. —1	21.8—2	11.1—4	17.5—3	.9—5
1880.....	89. —1	28.4—2	15.4—4	23.4—3	1.7—5
1890.....	107. —1	33. —2	19. —4	30. —3	3.0—5
1900.....	130. —1	40. —2	23.6—4	35.2—3	3.5—5

While the West has made the largest percentage of gain, yet a country of 1,000,000 square miles which boasts of but 3½ people per square mile can not be expected to compare favorably with a section containing six times as many people settled on one-sixth the area.

Nor can it be said that the population in the West is centred in the fertile spots, for with a few exceptions there are no great centres of population, it being fairly well distributed throughout the mountains and on the plains. The distribution of people many miles from a railroad where visible means of support are scant is a fact that forcibly strikes the attention of the observing visitor. But 35 per cent. of the total population of the West is gathered in centres of 4,000 or more, while 55 is the corresponding per cent. for the North Atlantic Division, as may be seen from Table II. This leaves 65 per cent. and 45 per cent. respectively of the population which is scattered in places of less than 4,000 people.

Table II. Percentage of Population (1890) in Cities of

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
8,000 or more	51.81—1	16.03—4	10.45—5	25.91—3	29.99—2
4,000 or more	55.14—1	17.55—4	12.20—5	30.19—3	34.44—2

Table III. Percentage of Children (5-18 yrs.) to Total Population.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870	28.30—4	33.02—2	33.92—1	32.40—3	25.57—5
1880	26.87—4	32.24—2	33.13—1	30.63—3	25.13—5
1890	25.39—4	34.04—2	34.76—1	29.33—3	24.33—5
Averages	26.85—4	33.10—2	33.93—1	30.78—3	25.01—5

Table IV. Percentage of Adult Males to Children (5-18 yrs.).

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890	114.4—2	66.8—4	65.9—5	94.6—3	156.7—1

Table V. Percentage of Population of Foreign Birth.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890	22.34—2	2.35—5	2.93—4	18.16—3	25.46—1

From the foregoing tables it will be seen that the proportion of children of school age to the total population is lower in the West than in any other division, there being three adult males for every two children. This means also undoubtedly a large per cent. of unmarried males. Inasmuch as the children occupy a relatively small place in the total population, it would naturally be inferred that their education would likewise tend to occupy a similar position in public interest, yet granted an interest in education equal to that of the East, this preponderance of taxpayers would of course be an item of material benefit. The percentage of foreigners is the largest in the West; this includes the Mexican element in the southern part, the Chinese, and the lower class of Europeans who are attracted to the mines, and it forms an element distinctly unfavorable to any high degree of interest in educational progress.

With this preliminary review of the unfavorable conditions in the West, one is in a position to better appreciate in their true significance the following series of facts bearing upon the enviable position of the West in education. The statistics dealing with the "common schools" refer to both the grades and secondary work of the public schools, (1) and cover the years in the life of a child from five to eighteen.

COMMON SCHOOL STATISTICS.

The table (VI) giving the percentage of the total population who are actually enrolled in the common schools, shows a remarkable increase since 1870 in the two southern divisions, a fair increase in the West, and a marked decrease in the East and North. The North Central, the South Central and

Table VI. Percentage of Total Population Actually Enrolled.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	22.09—2	6.26—5	7.49—4	24.41—1	13.82—3
1880.....	20.20—2	16.36—4	15.38—3	23.23—1	16.32—5
1890.....	17.89—4	19.72—3	21.02—2	22.43—1	17.03—5
1900.....	17.32—5	20.91—3	21.46—2	22.16—1	19.70—4
Averages.	19.38—2	13.31—5	16.34—4	23.06—1	16.72—3

the South Atlantic Divisions at present (1900) lead in the percentages, but their significance is negatived by the fact that the proportion of the children to the population is also greater in these sections, as may be seen from Table III. If a section has a relatively large number of children, a relatively large percentage of attendance would naturally be expected.

Table VII eliminates this factor; it gives the ratio of those actually enrolled in the public schools to those who ought to attend, and thus furnishes safe and interesting data to compare the interest taken in education in the different sections. As will be seen, there is a remarkable increase in the

Table VII. Percentage of the Total Number of Children (5-18) Actually Enrolled in the Public Schools.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	77.95—1	30.51—5	34.17—4	78.87—2	54.77—3
1880.....	75.17—2	50.74—4	46.43—5	75.84—1	64.96—3
1890.....	70.45—2	59.22—5	60.14—4	76.46—1	70.01—3
1900.....	68.09—3	61.37—5	61.90—4	75.68—2	81.13—1
Averages.	72.91—2	50.46—5	50.66—4	76.21—1	67.72—3

South and West and a decrease in the North and East. The West jumps from third place in 1870 to first in 1900, and at present out of every 100 chil-

(1) This leaves out of account the private schools. As they are probably more numerous in the East, this puts that division at a disadvantage in the following comparison. However, these private schools are included in all the statistics on secondary education in the succeeding chapter.

dren who ought to be in school, the uncultured West can boast of 81 who are enrolled, six more to the hundred than the North Central States, its nearest competitor, *and thirteen more to the hundred* than in the North Atlantic States, where there is supposed to be every incentive and opportunity for securing an education. The remarkable increase in the West in 1890-00 is also of note in spite of the hard times which materially decreased the revenue (see Table XVII). On the general average for the thirty years, the North, East and West stand in order, although this covers a period when there were but nine inhabitants to the ten square miles in the Western Division. It will be noticed also that, with the exception of the North Central Division, there is no fluctuation, but that present conditions in each section seem to be the result of a marked general tendency.

Table VIII. Average Number in Daily Attendance for Each 100 Enrolled.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	58.7—4	59.4—3	67.7—1	58.4—5	65.8—2
1880.....	62.3—4	62.5—3	65.8—1	60.8—5	65.5—2
1890.....	65.5—1	63.9—3	63.8—4	63.6—5	64.5—2
1900.....	72.4—1	61.0—5	66.8—4	69.8—2	68.1—3
Averages.	64.7—3	61.7—5	66.0—1	63.1—4	65.9—2

Table VIII is likewise of value for comparison of the interest taken in school work, by showing the comparative daily regularity of attendance of those enrolled and attending school. The North and East show a steady and regular increase in regularity of attendance, while the other three are fluctuating. The North Atlantic Division has made the greatest gain and at present stands first in point of attendance, with the North Central Division and the West close followers. The West stood second in this respect for 1870, 1880 and 1890, but dropped to third place in 1900. The positions for an average of the thirty years is, S. C., West, N. A., N. C. and S. A., a record very favorable to the West, considering that it covers a period when the country was very sparsely and newly settled. While Table VII indicates the interest in education in the community at large, this table should fairly indicate the interest of the enrolled pupils. Again attendance would be governed to some extent by the accessibility of the schools, which would naturally be expected of a low degree in a lately and sparsely settled community. The above table (VIII) should also be compared with No. VII. In the North Central Division there is a large per cent. of the children enrolled, bringing in many of desultory attendance. This would account for its relative low position in the present table. Likewise in the East the enrollment is steadily decreasing, thus coming to include those who would be most regular in attendance. Regularity of attendance and enrollment would tend to vary inversely. This is markedly so in the East, and to a certain degree in the North and South Central Divisions. In the South Atlantic and Western Divisions, in spite of a marked increase of the enrollment, the attendance has not decreased, but shown a slight increase in regularity, a fact which speaks well for the status of education.

Table IX. Average Number of Days of School Per Year.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	152.0—1	97.4—4	91.6—5	133.9—2	119.2—3
1880.....	159.2—1	92.4—4	79.2—5	139.8—2	129.2—3
1890.....	166.6—1	99.9—4	88.2—5	148.0—2	135.0—3
1900.....	177.1—1	112.0—4	99.7—5	155.6—2	145.7—3
Averages.	163.7—1	100.4—4	89.7—5	144.3—2	132.3—3

Table IX gives the average length of the school year in the different divisions. Each keeps its relative position for the period as well as for the average, the North Atlantic, the North Central and the West coming in order, with nineteen days more school per year on an average to the credit of the East. All divisions show a steady and regular gain, though in this respect the West has the advantage. It has made the largest actual gain in the thirty years, beating the East by 1.4 days and the North Central Division by 5 days, while if given in per cent. the results would appear greater.

Table X. Average Number of Days Attended for Each Enrolled Pupil.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	109.0—1	62.2—4	56.2—5	94.1—2	87.2—3
1895.....	119.0—1	66.2—4	63.6—5	101.9—2	98.0—3
1900.....	128.3—1	68.3—4	66.6—5	108.7—2	99.2—3
Averages.	118.8—1	65.6—4	62.1—5	101.6—2	94.8—3

Table X is really a combination of Tables VIII and IX, but for three different years. It can be readily seen that the average number of days in attendance would depend upon the regularity and the length of the school year. However, owing to a wider divergence, the length of the school year dominates the results of this table, and as can be seen, they are really identical with those of Table IX.

Table XI. Average Number of Days Schooling Given for Every Child.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	70.2—1	18.1—5	21.8—4	59.6—2	45.9—3
1880.....	74.5—1	29.3—4	24.2—5	64.4—2	54.9—3
1890.....	76.8—1	37.3—4	33.9—5	71.9—2	61.2—3
1900.....	87.5—1	41.9—4	41.2—5	82.2—2	80.5—3
Averages.	77.1—1	31.6—4	30.3—5	70.0—2	60.6—3

The above table in presenting the length of the school year in relation to the actual number of children who should be in school again presents nothing new, it being a combination of Tables IX and III. The large percentage of children in relation to the population and the relatively short terms unite in making extremely low percentages for the South. The North Central Division suffers some in this respect, while the West, having the

least percentage of children, suffers least, making a somewhat better showing than in Table IX. On the whole, the figures with slight modifications duplicate former results. The same may also be affirmed of Table XII, which compounds the length of the school term with the total population.

Table XII. Average Number of Year's (200 Days) Schooling Given to Every Individual.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	4.43—1	0.80—4	0.78—5	3.71—2	2.77—3
1880.....	4.84—1	1.90—4	1.57—5	4.19—2	3.57—3
1890.....	4.99—1	2.42—4	2.20—5	4.67—2	3.98—3
1900.....	5.60—1	2.72—4	2.68—5	5.34—2	5.23—3
Averages.	4.96—1	1.96—4	1.81—5	4.48—2	3.89—3

Table XIII. Teachers Compared With Pupils, Buildings and Population.

1. Number of Teachers per Building—

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	1.9—1	1.2—4	1.2—5	1.7—2	1.6—3
1900.....	2.4—1	1.4—4	1.2—5	1.7—3	1.8—2

2. Enrolled Pupils per Teacher—

1890.....	33.9—2	43.9—4	46.6—5	29.2—1	34.3—3
1895.....	34.7—3	43.1—4	47.1—5	31.0—1	33.3—2
1900.....	35.7—3	43.9—4	46.7—5	32.0—1	32.9—2

3. Population per Teacher—

1890.....	190.2—2	223.0—5	221.7—4	132.9—1	201.7—3
1900.....	202.3—3	212.2—4	217.5—5	144.3—1	166.9—2

The number of teachers to a building is not a sure criterion by which to judge the excellence of a school system inasmuch as it may prove rather a certain localization of population, allowing of a number of grades in a building. However, this makes possible a greater amount of grading, and thus secures more efficient instruction. The low number proves the present existence of a great many of the district schools with but one teacher. It will be noticed that the North Atlantic, the South Atlantic and the West have made some progress in centralization, while the South and North Central States have remained stationary. A comparison of the 1900 figures with the localization percentages of Table II shows an exact parallel, though not to such a marked degree relatively to each other. With the marked localization of population in the East we should expect to find relatively a greater number of teachers per building than given in the table, though it must be confessed that the number 4,000 in Table II is entirely too large for any accurate comparison.

The enrollment to the teacher is a much more accurate means of comparison and it furnishes results highly gratifying to the West. While not a sure criterion, yet as a rule the fewer the children to a teacher, the better is

the resulting instruction. The number of pupils per teacher is increasing in the East and the North, is remaining practically constant in the Southern Divisions, and has made a marked decrease only in the West, and, as will be shown later, this is due to an increase in the number of teachers rather than to any falling off in the number of children. At present the North Central States stand first in this respect, with the West a close second, and the East third, although if present tendencies continue the West should be soon in a pre-eminent position.

The number of the total population per teacher corroborates the above results for the East, West and North. The number has slowly increased for the East and North, while a very marked decrease is shown for the West. These facts, taken in connection with Table III, showing the relation of children to the total population, prove conclusively that the teaching force in relation to the children is being rapidly improved in the West, that it is not being maintained in the East, and that if present tendencies continue, in a few years the West will stand pre-eminent in this feature. That these facts speak strongly for the excellence of instruction and the efficient organization of our common schools can not be denied.

The above inference is strongly supported by a comparison of school taxation and expenditure. As mentioned before, the large proportion of taxpayers to school children is a condition favorable to the West. This is also true of the greater amount of wealth per capita, as may be seen from Table XIV. In the Western Division there are three taxpayers for every two chil-

Table XIV. Property Per Capita and Taxpayers Per 100 Children in 1890.

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
Property	$1,232—2	$579—4	$569—5	$1,129—3	$2,250—1
Taxpayers ..	114.4—2	66.8—4	65.9—5	94.6—3	156.7—1

dren between the ages of five and eighteen years, while the ratio would be larger compared with those who actually attend. The West is easily in first place. The East has more taxpayers than children, but her position relative to the West is bettered by the fact that her percentage of enrollment is relatively small. However, eliminating this difference, the West has more taxpayers compared to the children enrolled. This can be seen by a comparison of Tables XIV and VII. The total amount of property per capita is also extremely large in the West, being nearly double that of the East, its nearest competitor. Again, it must be remembered that the percentage of enrollment is high in the West (VII), but yet the above relations are but slightly changed. With this very high percentage of property and taxpayers to the number of school children, no financial reasons can be adduced for poor schools in the Western Division.

Table XV. School Property Per Capita and Per Enrolled Child.

1. Per Capita—

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	7.62—2	1.62—4	1.29—5	7.01—3	8.27—1
1900.....	10.37—1	2.24—4	1.85—5	8.77—3	10.35—2
Averages.	9.00—2	1.93—4	1.57—5	7.89—3	9.31—1

2. Per Enrolled Child—

1890.....	65.12—2	12.82—4	9.64—5	49.16—3	75.23—1
1900.....	59.90—1	10.74—4	8.67—5	39.56—3	52.57—2
Averages.	62.51—2	11.78—4	9.15—5	44.36—3	63.90—1

It will be seen from the above table that in point of school property, both in relation to the population and the enrollment, the West occupies the first position easily in 1890, and for the average for the two years while the place is usurped by the East in both cases in 1900. It will be shown by data following (XVI-XX) that there has been a decided decrease in the West in both expenditure and taxation since the early 90's, and which was probably due to the "hard times" which was so severely felt and from which she is just recovering. In all probability this fact has been the cause for the East securing the first position in the above table for 1900. The high position of the West in this regard is somewhat phenomenal, considering the fact that it is a new country, and is even now in the process of development. Yet it must be remembered that all values are relatively high in the Western States, but even making allowance for this factor, the West in spite of its newness, is a strong candidate for first honors.

The tables (XVI-XX) of school revenue and expenditure give much better data for comparison and show well the falling off in the West, due to the protracted hard times. They also prove beyond doubt the pre-eminence of this section in the amount expended in support of the common schools, although again the relatively higher values enter as a disturbing factor.

Table XVI. Total School Revenue Per Taxpayer.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	9.73—2	4.48—5	4.62—4	10.42—1	9.66—3
1895.....	11.80—1	4.93—4	4.64—5	11.41—2	8.28—3
1900.....	14.33—1	5.50—4	4.71—5	11.69—2	11.32—3
Averages.	11.95—1	4.97—4	4.66—5	11.17—2	9.75—3

Table XVI gives the total school revenue in comparison to the taxpayers. The rankings are well defined among the divisions. However the comparative results are rendered valueless because of the large percentage in the West of taxpayers to the total population, as is well shown in Table IV. The percentage of taxpayers is 50 per cent. larger in the West than in any other division, and hence the above value is correspondingly decreased. The table taken in connection with succeeding ones shows that the schools can be maintained at a high degree of financial efficiency at a less burden on the taxpayers than in any other division.

Table XVII. School Revenue Per School Child (5-18 Years).

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	11.13—2	3.00—5	3.04—4	9.86—3	15.17—1
1895.....	13.48—1	3.30—4	3.08—5	10.80—3	13.05—2
1900.....	16.39—2	3.67—4	3.14—5	11.07—3	17.86—1
Averages.	13.66—2	3.32—4	3.08—5	10.58—3	15.36—1

The school revenue compared with the number of school children of five to eighteen years of age (Table XVII) needs to be compared with Table III. The low position of the two southern divisions and the North Central States is explained to some extent by their relatively high percentage of children, although this factor is not enough to disturb their relative ranks in this table. Likewise this same factor is favorable to the West in comparison with the East, but again it is not sufficient to affect their ranking. It will be noticed that there has been a steady and regular gain in every section except in the West, where there was a marked diminution in 1895, which was more than regained in 1900. This is undoubtedly due to the financial conditions of the West at that time. With this exception the West holds first rank throughout in the amount of revenue available for the education of her young. Should the same comparison be made with the children enrolled and actually attending (Table VII), it will be found that the pre-eminence of the West will be materially decreased, owing to the small percentage of children enrolled in the Eastern States.

Table XVIII. Expenditure Per Capita of Population.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	2.38—1	.63—5	.73—4	2.14—3	2.15—2
1880.....	1.97—3	.68—4	.55—5	2.03—2	2.41—1
1890.....	2.76—3	.99—4	.97—5	2.81—2	3.37—1
1900.....	3.98—2	1.36—4	1.05—5	3.23—3	4.08—1
Averages.	2.77—2	.91—4	.82—5	2.55—3	3.00—1

In the expenditure of moneys for the common schools in relation to the total population (Table XVIII), the West will be seen to occupy the first position, with the exception of the year 1870. The East, the North Central, the South Atlantic, and the South Central follow in order. The large proportion of children (III) in the Southern and North Central Divisions explains their low position, but does not change their rank. Likewise the West has the advantage over the East, but not enough to modify results. A detailed comparison of the same values for each year from 1870 to the present, shows the remarkable fact that the school expenditure per capita of population has been greater in the West than in any other division since 1875—a period of twenty-five years. Before that time the East occupied first rank.

Table XIX. Expenditure Per Capita of Average Attendance.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1870.....	18.31—2	10.27—4	9.06—5	14.87—3	21.87—1
1880.....	15.64—2	6.60—4	5.40—5	14.39—3	22.59—1
1890.....	23.58—2	7.78—4	7.28—5	19.70—3	30.57—1
1900.....	31.72—1	10.68—4	7.34—5	20.85—3	30.44—2
Averages.	22.31—2	8.83—4	7.27—5	17.45—3	26.37—1

The expenditure in proportion to the average attendance (XIX) is likewise of interest and furnishes proof positive of the high position of the West. A slight decrease is noticeable in this section from 1890-1900, which is not present in the other divisions. In fact they all show marked gains. This decrease is undoubtedly due to the economic conditions before mentioned. With the exception of this year the West stands pre-eminent, with the East and North following in order. The same table given for each year from 1870 to 1900 would show that the annual expenditure per capita of the average attendance in the West exceeded by as high as $5 to $7 its nearest competitor for a period of twenty-five years—from 1870 to 1895. During this year the amount sank below that of the Eastern States, but increased rapidly in the latter 90's, promising to again outstrip that of the East in the near future. Here it must be remembered that the school term is much longer in the East, and that $30 per pupil for the year means much less than in the West, where there are thirty-one days less school per year. With this correction the above values for the West will be increased by nearly 20%, giving the West the first rank for 1900, as well as for the other years, although the difference in values must be borne in mind.

The result of this correction is strikingly evident from Table XX, giving the *daily* expenditure per pupil for the last decade. This eliminates the variable—the length of the school year. There is a steady and regular diminution in the South Central Division, as well as decrease in the West for 1895, thus confirming the effect of the financial stress. However, in spite of this diminution and the regular increase in the East, the West continues to easily hold its rank. Even during this period of low expenditure in the West, it can be seen that each pupil in this section throughout his elementary and high school course has had on an average for the three years 5⅔ cents more per

Table XX. Daily Expenditure Per Pupil.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	.141—2	.078—5	.083—4	.133—3	.225—1
1895.....	.155—2	.081—4	.077—5	.141—3	.203—1
1900.....	.179—2	.095—4	.074—5	.134—3	.209—1
Averages.	.158—2	.085—4	.078—5	.136—3	.212—1

day expended upon his education than a pupil in the East. The amount on the average is 2½ times greater than that in the South. The West ranks

easily first, with the East, the North and the Southern sections following in order.

Whether this relative expenditure represents a corresponding efficiency is difficult to answer, because of the difference of values. Table XX may be further differentiated as in Table XXI and by taking the values representing salaries (Table XXI, 1) and comparing them with the average monthly salaries of teachers which are approximately $52.25, $44.50 and $42.50 for the West, East and North respectively, so as to eliminate this difference in value,

Table XXI. Average Daily Expenditure Per Pupil.

1. Salaries—					
Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	.085—3	.061—5	.068—4	.087—2	.144—1
1895.....	.090—2	.063—5	.064—4	.089—3	.131—1
1900.....	.103—2	.066—4	.063—5	.087—3	.142—1
Averages.	.093—2	.063—5	.065—4	.088—3	.139—1
2. Other Expenses—					
1890.....	.056—2	.017—4	.015—5	.046—3	.081—1
1895.....	.065—2	.018—4	.013—5	.052—3	.072—1
1900.....	.076—1	.029—4	.011—5	.047—3	.067—2
Averages.	.066—2	.021—4	.013—5	.048—3	.073—1

we find that the relative positions of the three divisions do not change for the average of the three years. Section 2 of the same table giving the daily expenses other than for salaries shows a marked and steady decline in the Western and South Central Divisions, but still the sections keep the same relative rank on the average.

These expenses other than salaries are again differentiated in Table XXII, into (2) Sites, Buildings and Equipment, and (3) Maintenance, but on the basis of the school year. Here it will be noticed the money devoted to maintenance has increased rapidly in every division, but the West easily maintains her lead with the other divisions following in their regular order. This predominance of the West would be still further accentuated if the comparison were made on a basis of daily expenditure. Section (2) dealing with Sites, Buildings and Equipments, exhibits a marked decrease in the West.

Table XXII. Average Annual Expenditure Per Pupil.

1. Salaries—					
Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	14.16—2	5.92—5	5.98—4	12.85—3	19.46—1
1895.....	15.54—2	6.68—4	6.35—5	13.66—3	18.67—1
1900.....	18.16—2	7.38—4	6.23—5	13.56—3	20.62—1
Averages.	15.95—2	6.66—4	6.19—5	13.36—3	19.58—1

2. Sites, Buildings and Equipments—

1890.....	5.33—2	.95—4	.76—5	3.42—3	7.10—1
1895.....	5.94—1	.87—4	.80—5	3.70—3	4.66—2
1900.....	7.38—1	1.06—4	.45—5	3.60—2	3.22—3
Averages.	6.21—1	.96—4	.67—5	3.57—3	4.99—2

3. Maintenance—

1890.....	4.09—1	.76—4	.60—5	3.43—3	3.89—2
1895.....	5.36—2	1.04—4	.54—5	4.24—3	5.58—1
1900.....	6.18—2	2.24—4	.66—5	3.69—3	6.60—1
Averages.	5.21—2	1.35—4	.60—5	3.79—3	5.36—1

The amount has fallen from $7.10 to $3.22 in ten years, it being in 1900 less than one-half of the amount in 1890. The South Central states have also decreased but in less a degree. The other divisions have maintained a steady increase. The West occupied first position in 1890 but fell to second in 1895 and third in 1900. In maintenance the West still retains its increase and position. It is evident that the decrease noticed in the daily expenditure per pupil (Table XX) in the West and the South Central Division is in the amount devoted to the items, Sites, Buildings, and Equipment of Section 2, Table XXII. An attempt was made to determine whether this decrease was in the expenditure devoted to Sites and Buildings, or in that devoted to Equipment. However, no further differentiation of these expenditures could be furnished by the Commissioner of Education. The forced economy of the schools at this time due to the severe financial conditions seems to have cut off merely an extension of building and equipment in the West without any marked effect upon the salaries and maintenance. But in spite of this decrease the West stands second for the average of the three years in this item. While it was found that in the matter of salaries, an elimination of the variable caused by a difference of value, did not affect the respective ranks of the divisions, yet in these other regards no means of accurate comparison are available, and it must remain a matter of conjecture and opinion whether these rankings in expenditure would also indicate the relative efficency of the schools.

Summarizing we see that the tables which have value for our comparison are those dealing with, 1st, the percentage of enrollment (VII); 2nd, the regularity of attendance (VIII); 3rd, the amount of schooling (IX); 4th, the enrollment per teacher (XIII); and 5th, the financial support and equipment (XIV-XXII).

The last three items are conclusive in every respect and show without doubt the relative standing of the divisions; these may be tabulated as follows:

Item.	1.	2.	3.	4.	5.
Length of School Year.....	N. A.	N. C.	W.	S. A.	S. C.
Enrollment per Teacher.....	N. C.	W.	N. A.	S. A.	S. C.
Financial Support	W.	N. A.	N. C.	S. A.	S. C.

Thus the position of the Southern sections seems to be well determined; the others each occupy a first, second, and third place, making them on a par, if each of the items have equal value. If we should assume that the enrollment per teacher and the financial support indicate the relative efficiency of the schools, then the West, the North and the East would be ranked in order, and the above tabulation would be combined as follows:

Item.	1.	2.	3.	4.	5.
Amount of School	N. A.	N. C.	W.	S. A.	S. C.
Efficiency	W.	N. C.	N. A.	S. A.	S. C.

The first and second of the above items (enrollment and regularity of attendance) are not at all conclusive as to the ranking of the divisions, because of the element of fluctuation of position during the thirty years' period, and as a consequence it is much more difficult to make any just estimate. However, in the percentage of enrollment (VII) it will be noticed that there is a marked and steady decrease in the East and North since 1870, while the West has made a steady increase. Present conditions (1900) therefore are not due to a sudden fluctuation, but represent the sum of 30 years' tendencies. Thus the figures of 1900 should fairly represent the real status of enrollment at the present time, and hence they have been taken as a basis of comparison.

The table of regularity (VIII) is very unsatisfactory. The East shows a steady increase, but the others fluctuate in a very marked manner. A detailed comparison of each year since 1870 give the same results: The East steadily increases from year to year, but the others vary widely on successive years. Hence an average for the last 10 years was computed and taken as a basis of comparison. These results are given in Table XXIII below:

Table XXIII. Daily Attendance Per 100 Enrolled.

Year.	N. A.	S. A.	S. C.	N. C.	West.
90-91	66.00	62.00	63.20	64.50	63.50
91-92	66.36	60.81	63.31	65.70	65.39
92-93	66.68	61.17	62.86	67.60	67.10
93-94	67.80	62.14	64.17	66.82	68.14
94-95	68.61	62.44	63.84	66.65	68.73
95-96	69.10	62.56	66.74	69.12	69.58
96-97	71.33	61.57	67.52	70.32	71.37
97-98	71.60	61.59	65.07	70.50	69.38
98-99	72.29	60.42	67.52	69.60	71.50
99-00	72.43	61.02	66.80	69.84	68.08
Ave	69.22—1	61.57—5	65.10—4	68.06—3	68.27—2

If this be accepted then the positions for the four items would be:

Item.	1.	2.	3.	4.	5.
Amount	N. A.	N. C.	W.	S. A.	S. C.
Efficiency	W.	N. C.	N. A.	S. A.	S. C.
Enrollment	W.	N. C.	N. A.	S. C.	S. A.
Regularity	N. A.	W.	N. C.	S. C.	S. A.

The last two items might be combined as fairly indicative of the interest taken in education, and the results would then stand:

Amount	N. A.	N. C.	W.	S. A.	S. C.
Efficiency	W.	N. C.	N. A.	S. A.	S. C.
Interest	W.	N. A.	N. C.	S. C.	S. A.

If these items be considered of equal value, then the educational status of the five divisions in the matter of public education would be:

1, West; 2, North Atlantic; 3, North Central; 4, South Atlantic, and 5, South Central, although it must be confessed that some of the methods of comparison are very faulty.

From Table II it will be recalled that the percentages of the total population living in cities of 8,000 or more for 1890 were:

N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
51.81—1	16.03—4	10.45—5	25.91—3	29.99—2

A good school system would naturally be inferred in these places of high localization of population, but what effect this has upon the ranking of the total division is very difficult to determine, in any accurate manner. Table XXIV was prepared for the four items. The percentages for the four years following 1890 were averaged for the cities of 8,000 or more, and then for the total divisions.

Table XXIV. Average for the Four Years ('90-'94) for Cities of 8,000 and Over, and for Total Division, for:

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.R.
1. Regularity—					
Cities	71.7—3	71.7—4	71.8—2	74.4—1	71.2—5
Total	67.2—2	61.6—5	62.8—4	66.7—3	67.3—1
2. Amount—					
Cities	194.5—1	187.6—4	182.7—5	188.1—3	190.6—2
Total	171.2—1	106.0—4	97.2—5	148.4—2	139.7—3
3. Pupils per teacher—					
Cities	35.4—1	36.0—2	37.6—5	36.4—3	36.4—4
Total	34.8—3	43.7—4	46.8—5	30.7—1	33.5—2
4. Daily expenditure—					
Cities	.163—2	.120—5	.122—4	.167—3	.219—1
Total	.152—2	.081—4	.080—5	.140—3	.222—1

It will be noticed that the regularity of attendance is decreased by the country districts, and that it is practically uniform in the cities for all divisions. The low positions of the Southern sections in regularity is thus accounted for by her larger percentage of rural population. Eliminating this

difference, the ranking of the divisions for regularity in the country districts would be:

1.	2.	3.	4.	5.
W.	N. C.	S. A.	S. C.	N. A.

whereas for the general summary the positions were:

N. A.	W.	N. C.	S. C.	S. A.

This difference of localization thus advances the West, North Central and the South Atlantic in rank, while the East is reduced from the first to the last position.

In the length of the school year, the rankings for the total division and for the cities are identical, except that the West is advanced to second place. The percentage of country population reduces the length of the year in each division as follows:

	N. A.	S. A.	S. C.	N. C.	W.
Percentage	48.19	84.00	89.55	74.00	70.00
Days decrease	23.5	81.6	85.6	39.7	51.

By finding the fraction of a day which 1 per cent. of country population would reduce the length of the school year, a fair standing of the divisions in regard to this item for the rural and suburban districts should result. These are:

1.	2.	3.	4.	5.
N. A.	N. C.	W.	S. C.	S. A.

whereas the general summary was:

N. A.	N. C.	W.	S. A.	S. C.

the only change being in the relative positions of the two southern sections.

It will be noticed that the number of pupils per teacher is lowered because of the rural districts in the East, North and West, while it is markedly increased in the two Southern sections. Furthermore it is evident that for the cities there is but little difference between the divisions. Probable these values represent a norm, and hence the rural schools in the three Northern sections have small numbers because of the lack of children per district, while the contrary is true of the South. This is detrimental to the South, but no evidence of superiority of organization in the North. However in proportion to the people the decrease is relatively greater in the North Central Division with the West and East following in order.

In daily expenditure in the cities the divisions have the same rank as for the total. The rural districts do not modify results. The expenditure is decreased in all divisions with the exception of the West. Here, strange to say, the daily expenditure per pupil is increased by bringing in the rural districts.

Because of the difference of localization the East is greatly benefited in regularity at the expense of the other sections, the North and West are benefited slightly at the expense of the East in the matter of enrollment per

teacher, and the two Southern sections are each benefited once at the expense of the other. Hence it is obvious that the difference of localization does not materially affect the results as given in the general summary.

SECONDARY EDUCATION.

While the former section dealt with both public elementary and secondary work, the following statistics deal only with secondary education and includes both public and private schools of every description which give work corresponding to secondary instruction.

Table XXV. Average Percentage of Secondary Students in '95, '97, and '99 Pursuing

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
Latin	46.93—4	58.14—1	47.94—3	45.43—5	48.08—2
Greek	8.24—1	4.63—2	3.60—4	2.08—5	3.83—3
French	20.00—1	13.26—2	6.10—4	3.28—5	7.43—3
German	18.24—1	10.63—4	5.46—5	13.05—2	12.99—3
Algebra	50.29—5	61.81—2	62.20—1	53.49—4	58.44—3
Geometry	26.54—4	26.88—3	27.56—2	24.33—5	32.70—1
Trigonom	2.50—4	5.37—2	6.65—1	1.86—5	4.04—3
Astronomy	5.54—1	4.68—3	5.53—2	4.02—4	3.64—5
Physics	19.68—5	23.05—3	26.45—1	20.18—4	23.03—2
Chemistry	10.08—2	8.47—4	8.65—3	7.95—5	13.35—1
Phys. Geog.	19.19—4	25.60—3	29.27—1	25.82—2	18.85—5
Geology	6.11—2	3.25—5	7.39—1	3.81—4	5.06—3
Physiology	26.54—4	27.81—3	38.77—1	29.93—2	17.57—5
Psychology	2.37—5	3.59—2	7.15—1	3.42—3	3.24—4
Rhetoric	31.28—5	33.79—4	36.47—2	34.11—3	43.60—1
History	38.02—4	45.87—2	38.11—3	31.37—5	49.56—1
Eng. Lit.	43.69—2	41.23—3	33.63—5	35.38—4	61.08—1
Civics	16.73—4	12.64—5	25.88—1	25.02—2	19.16—3
Preparing for College.	18.55—2	18.10—3	19.30—1	12.00—5	17.60—4
Graduates prepared for College.	30.02—5	34.31—3	38.30—2	31.74—4	41.73—1

Table XXV gives the percentage of the entire number of secondary students pursuing the different branches averaged for the years 1895, 1897, and 1899. The values for English Literature and Civics embrace the years '98 and '99 only. By noticing the relative positions of the sections in each subject, it will be seen that the North Central Division occupies first rank in no case, but as in the former tables it tends to occupy a medium position. In the number of first positions, the South Central leads with the West, East, South Atlantic and North following in order. Grouping these studies, the positions

may be roughly indicated as follows, as at least indicative of the predominant interests in the divisions:

	1.	2.	3.	4.	5.
Classics	S. A.	N. A.	W.	S. C.	N. C.
Modern Languages	N. A.	S. A.	W.	N. C.	S. C.
Mathematics	S. C.	S. A.	W.	N. C.	N. A.
Sciences	S. C.	S. A.	W.	N. C.	N. A.
Humanities	W.	S. C.	S. A.	N. A.	N. C.

Whatever interpretation may be put on the above, the fact remains that the West and the South Atlantic Divisions stand high in all the above groups, never sinking below third place. The East stands high in the languages, but is low in the other three. The South Central is high in mathematics, science and the humanities, but is low in the languages, while the North Central is low in every respect. This would indicate a high degree of general interest throughout the curriculum in the South Atlantic and Western Divisions, a low degree in the North Central, and a specialization of interest in the North Atlantic and South Central Divisions with a consequent low degree in other lines. A noteworthy fact quite contrary to the general assumption is the high position of the West in the study of English, history and literature, and the first rank of the South Central states in science and mathematics.

Lack of laboratory equipments in the poorer schools and a consequent specialization in the "text-book courses" might be adduced to explain the above. With this explanation the best equipped schools would be found in the Southern sections and in the West, with a low degree of equipment in the North and East, which is quite contrary to the general assumption.

Again a concentration of interest in certain branches, with a low degree of interest might be argued and we find this to some extent in the East and South Central section, but this would still leave the West and the South Atlantic Division in the lead in a general interest almost equal to the special interests of the former two, while the South Central Division would have a more general specialization than the East.

An abundance of other subjects not classified above could be offered as an explanation of the low position of the North and East, but this is hardly probable.

Again the explanation could be offered that the West and South Atlantic Division have higher standards, that the different subjects are required for three or four years and for a less time in the other sections, and hence the percentage of students in these branches is increased by that ratio.

A last explanation may be offered that in certain sections there are a large number of high schools with poor equipment and a short course of study, while in the other sections there are a fewer number of schools but all of high standards. For instance the high schools in the South might be few in number but located in the larger cities and consequently first-class in equipment and requirements, while in the North we might find as large or even larger number as finely equipped, but also a large per cent. of the total number

located in the smaller towns and villages and consequently comparatively poor in grade. This condition would explain the above facts and it meets with some confirmation from the following statistics:

Table XXVI. Percentage of Total Students Averaged for '95, '97, and '99 Pursuing

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
Scientific C..	6.71—3	4.57—5	7.20—2	6.40—4	10.32—1
Classical C..	11.51—3	13.52—1	12.10—2	5.60—5	7.28—4

The above table is somewhat anomalous considered in reference to the percentages for each study. The South Central section stood first in mathematics and the natural sciences while here the West ranks first in the scientific course. The South also stood fourth in the two classic languages and here it occupies second position, even ahead of the East, which occupied the first rank in the former tabulation. It will be noticed that in the East and Southern sections the percentage is greater in the classical course than in the scientific, while the reverse is true in the North and West. Varying requirements in the different divisions as to what constitutes the two courses is the only explanation that can be offered.

Table XXVII. Percentage of Total Population in High Schools.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	.72—2	.39—4	.35—5	.65—3	.76—1
1900.....	1.08—2	.55—5	.58—4	1.20—1	1.05—3
Averages.	.90—3	.47—4	.47—5	.92—1	.91—2

Table XXVII shows that the three Northern sections are almost on a par in regard to the high school enrollment and have about double the number in proportion to the population as in the two Southern sections. However, Table III, dealing with the proportion of children in the population, must be kept in mind. The West has by far the smallest proportion of children and consequently would have the largest percentage of the children attending the high schools. The East and North would follow, while the Southern sections, with their large proportion of children in the population, would be decreased in rank still more. This table would tend to prove a localization of the high schools in the Southern sections in the larger centres of population.

Table XXVIII. Percentage of the Elementary Students Pursuing Secondary Education.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	3.49—2	1.85—4	1.52—5	2.66—3	4.17—1
1895.....	4.36—1	2.41—4	2.35—5	4.09—3	4.25—2
1900.....	5.70—1	2.53—5	2.60—4	5.25—2	5.21—3
Averages.	4.52—2	2.26—4	2.14—5	4.00—3	4.54—1

The above table deals with the percentage of those who go into secondary work from the grades. The results are much more indicative of the status of secondary education than those of the former table. The West again leads and the Southern sections occupy a low position, the percentage being but a half of that of the West. Here again the large percentage of children who are enrolled in the grades in the Western Division (VII) would give that section a rank above that indicated above, while the position of the Southern sections would be lowered. The figures are of significance in showing the general comparative interest in secondary education.

Table XXIX. Percentage of Secondary Students Pursuing Higher Education.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1890.....	36.66—3	48.92—1	47.02—2	34.52—4	18.32—5
1895.....	39.94—2	49.52—1	37.59—3	34.75—4	35.24—5
1900.....	31.32—4	48.36—1	36.26—2	30.95—5	33.26—3
Averages .	35.97—3	48.93—1	40.29—2	33.41—4	29.27—5

The above table giving the percentage of the secondary students who enter college has no significance on the comparative status of higher education in the divisions, because of the varying conditions of secondary education itself. The number of secondary students is comparatively small in the South, and a large percentage of their number who enter college might still be small in relation to the total number of pupils, or in relation to the total population. The table is, however, significant of the status of the high schools themselves. The relative positions of the divisions are almost in inverse order to what they are in the former tables on secondary education. In the South the very low per cent. of the elementary pupils who enter the high schools and the very large per cent. of these who go on into higher education prove conclusively that the high schools are strongly localized in the larger towns and cities among the better classes, that they are consequently few in number and have good equipments and standards. This is especially marked in the South Atlantic Division and would explain her high rank in all the five groups of studies tabulated above. The same is also true of the South Central Division and her low position in the languages must be explained on the grounds of local interest and specialization. This assumption is also borne out by the fact that in these two sections less than 20 per cent. of the population is found in cities of 4,000 and over.

Table XXX. Number of Population to One High School (1900).

N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
10,491—2	13,337—4	25,964—5	4,165—1	11,325—3

This supposition is confirmed by the above table for 1900, showing the large percentage of the population to one high school. If this were given in terms of children of school age the positions of the Southern sections would be lowered and that of the West increased to the second rank. Thus in re-

gard to the South it is safe to say that the high schools are few in number, that they are limited to the better classes, that the standards and equipment are first-class in what schools there are, that there is a general diffusion of interest throughout the curriculum in the South Atlantic, and a specialization of interest in mathematics, science, and the humanities in the South Central Division.

In regard to the North Central Division it will be remembered that it has the lowest position in percentage of students in the various branches of the curriculum, that the number of students compared with the population is of first rank, that there is a relatively high percentage of the elementary students who enter the high school, but a relatively low number of these entering higher education, that the number of high schools in proportion to the population is over twice as great as any other section, and that over 70 per cent. of the population is located in places of less than 4,000 inhabitants. This would indicate a general diffusion of interest in the curriculum, a very wide extension of the high school system among all classes of the people, but at the expense of a high standard of equipment and efficiency, i. e., there is a very large number of small high schools in the smaller towns and villages poor in equipment and requirements. The South and the North exhibit exactly opposite tendencies.

In the East we find a high position in the modern languages and the classics and a low one in the humanities and especially in mathematics and the sciences, and medium positions in regard to the distribution of the high schools among the people, the number of elementary students entering secondary work and the percentage of these entering higher education. Forty-five per cent. of the people only are found in centres of less than 4,000, a percentage lower than in any other division. With this fact in mind, the distribution in regard to means of support is not greater than in the South. If we have a medium distribution but an extremely large number of places of over 4,000 inhabitants, a medium number of students, and a rather low ranking in the general interest of the curriculum, not very high standards of equipment and requirement in relation to what ought to be reasonably expected can be assumed. The specialization of interest noted would indicate a high standard in the languages but poor standards and requirements in science, mathematics, and the humanities.

In the West 65 per cent. of the population are outside of towns of over 4,000 people, it being second in point of localization, while the distribution of the high schools among the people is a trifle lower than in the East. Eliminating the factor of localization, and considering the distribution of the high schools in relation to the places where they can be reasonably expected, the East and the West are practically on a par. However, the proportionate percentage of students in secondary work is greater in the West, i. e., eliminating the difference of localization, the enrollment is much greater. The high rank of the West in all branches of the curriculum would show a general interest and a high standard of equipment and requirement which is very general throughout the secondary schools. The number of those with low standards is reduced to a minimum.

Considering the facts that there is a high enrollment and that relatively the smallest per cent. enter higher education, it might be argued that the West possesses many high schools of but a two or three year course. This is disproved from the following table:

Table XXXI. Percentage of Secondary Students.

1. Preparing for college ('95, '97, '99)—

N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
18.55—2	18.10—3	19.30—1	12.00—5	17.60—4

2. Graduates prepared for college ('95, '97, '99)—

30.02—5	34.31—3	38.30—2	31.74—4	41.73—1

3. Pursuing higher education ('90, '95, '00)—

35.97—3	48.93—1	40.29—2	33.41—4	29.27—5

Here it may be noted incidentally that throughout the divisions nearly twice as many students actually go on into higher education as expected to during their high school course. The West stands very low in those who expect to go to college and also those who do, but stands first in the number of her graduates who are prepared to do so. This means that a large per cent. of her high schools are of a high grade. The percentage of students who actually graduate might be given and it would show the West of high rank, but this fact would prove nothing as to the length and quality of the course.

These various facts may be grouped and tabulated under three heads: The distribution of the high schools in relation to the population, the interest in secondary education, and the efficiency of the schools in relation to the students.

Table XXXII. Distribution of High Schools to Population.

	N. A.	S. A.	S. C.	N. C.	W.
Localization of Population	1	4	5	3	2
Number of H. S. to Population	2	4	5	1	3
Enrollment to Population	3	4	5	1	2
Resulting Rank	3	4	5	1	2

The first heading indicates in a way what should naturally be expected in the number of high schools and the enrollment compared to the total population, or a norm to which the other two should conform. The two Southern sections occupy fourth and fifth positions in distribution and conform to the localization of the people. The conclusion is that secondary education is largely confined to the larger towns and cities. The North is third in localization of population but nevertheless stands first in the number of high schools and the enrollment compared to the total population. This shows the widest distribution of secondary education among the people. The West is second to the East in the matter of localization, but is on a par in the number

of high schools and the enrollment to the population. This should put the West second in regard to distribution.

Table XXXIII. Interest in Secondary Work Among the Pupils.

	N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
Distribution.	3.	4.	5.	1.	2.
Per ct. of Ele. in H. Schools.	4.52—2	2.26—4	2.14—5	4.00—3	4.54—1
Per ct. of students graduat'g.	12.78—1	9.44—4	8.16—5	12.31—2	12.09—3
Graduates prepared for Coll..	30.02—5	34.31—3	38.30—2	31.74—4	41.73—1
Students in higher work.....	35.97—3	48.93—1	40.29—2	33.41—4	29.27—5

In the matter of interest any definite ranking is utterly impossible, yet the above table indicates roughly a few conclusions. The West stands second in the distribution of the high schools among the people, but yet is first in the percentage of all the elementary students who are pursuing secondary work, i. e., in the West there is a less opportunity for every elementary student to attend the high schools, yet more of them actually do than in the North Central Division. The attendance is thus above the norm. If the distribution of high schools were large, the percentage of attendance should be large, i. e., the distribution may be taken as a norm, and any deviation from this in attendance be considered as an indication of interest. Thus the Southern sections would conform to the norm, a lack of interest would be found in the North, while a prevailing interest would characterize the West and East. The fact that in the West a large per cent. of the students graduate, a very large per cent. of these are prepared for college, while a very small percentage actually attend, shows a very high interest in secondary work. The tentative conclusion would be that in the West there is a high interest widely distributed, a high interest less widely distributed in the East, a normal interest confined to a small portion of the population in the two Southern sections, and in the North an intensive interest lowered because of the wide distribution among all classes of the people. In other words, the interest among those who have an opportunity to attend is high in the East and West, normal in the South and low in the North.

Table XXXIV.

	N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
Children to total population..	26.85—4	33.10—2	33.93—1	30.78—3	25.01—5
Per ct. of children enrolled..	68.09—3	61.37—5	61.90—4	75.68—2	81.13—1
Per cent. of attendance.....	69.22—1	61.57—5	65.10—4	68.06—3	68.27—2
Per cent. in High School.....	4.52—2	2.26—4	2.14—5	4.00—3	4.54—1
Per cent. of these graduating.	12.78—1	9.44—4	8.16—5	12.31—2	12.09—3
Grad. prepared for college...	30.02—5	34.31—3	38.30—2	31.74—4	41.73—1
Per cent. in college.....	35.97—3	48.93—1	40.29—2	33.41—4	29.27—5

The course of the students on entering the grades till they enter some form of higher education may be shown by the above. In the South there is

a large percentage of children, but few are enrolled, the attendance is small, but few go on into secondary work, a small per cent. of these graduate, but a large percentage of these are prepared for and enter college. Relatively the largest number keep dropping out until the end of the High School course, where relatively the smallest number drop out. The opposite is true for the West, as is also for the East with the exception that the number first entering is small. The North as usual occupies a medium position.

Table XXXV. Standard of Work in Secondary Schools.

	N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
Per ct. of Ele. in H. Schools.	4.52—2	2.26—4	2.14—5	4.00—3	4.54—1
Per ct. of students graduat'g.	12.78—1	9.44—4	8.16—5	12.31—2	12.09—3
Graduates prepared for Coll..	30.02—5	34.41—3	38.30—2	31.74—4	41.73—1

The percentage of the secondary students who graduate has no bearing upon the length of the course, but taken in connection with the number of elementary students entering the high schools and the great percentage of elementary students enrolled in the West, it will be seen that there is but little difference in the proportionate number of high school graduates in relation to the total number of children or to the population. If the relative number of graduates in the three northern divisions are practically identical, then the percentage of these who are prepared for college irrespective of whether they have intended to or whether they have actually entered college, must bear some relation to the average length of the high school courses throughout the divisions.

This would put the Western and the Southern Sections in the lead, but this cannot be taken as an absolute criterion. The high position of these sections in all branches of the curriculum (XXV) also bears out the assumption to some extent. From what we know of distribution and localization we should expect a large number of high schools with but a few years' course especially in the North Central Division. Of course a high average length of course of study does not necessitate a high internal efficiency. The ranking of the divisions in the percentage of students prepared for college taken as a criterion for the average length of the course is only a probable conclusion, but yet it is the only statistical evidence we have.

Summarizing the two Southern sections would have a normal interest and a high standard of work confined to a small part of the population; the North would possess opposite characteristics, the interest and high grade of work suffering at the expense of distribution; in the East the distribution is medium, interest high, but length of courses low on the average; while the West would have a high interest and a high standard of work well distributed.

Table XXXVI. Financial Support. 1899-'00.

	N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
Income per school.....	3561.—1	1820.—3	1489.—4	1223.—5	3037.—2
Income per pupil.....	36.54—1	32.90—3	26.73—4	15.50—5	35.98—2

Table XXXVII.

Students per school.....	94.7 —1	55.4 —5	55.7 —4	79.0 —3	84.2 —2
Teachers per school.....	5.1 —1	3.2 —4	2.9 —5	3.3 —3	4.4 —2
Students per teacher.....	18.6 —2	17.3 —1	18.9 —3	24.0 —5	19.0 —4

Matters are still further complicated by the above tables. In financial support the East is slightly in advance of the West, with the other sections far in the rear. This should indicate general efficiency to quite an extent. Table XXXVII may be interpreted in different ways, but the real significant item is the relation of the teaching force to the number of scholars, but here the rankings correspond largely to the distribution of the schools and the enrollment.

On the whole it is impossible to assign any ranks on the general status of secondary education in the divisions, but at the very least it may be said that the West is on a par with any other division, notwithstanding the fact that all forms of secondary education are here considered.

HIGHER EDUCATION. (1)

It will be remembered that in the percentage of secondary students pursuing advanced work, the two Southern sections led with the East third, while the West was very low. This cannot be taken as an accurate indication of comparative attendance in higher education, inasmuch as secondary attendance itself differs widely among the divisions. This may be seen from Table XXXVIII below. If but a small percentage of the children attend the grades, a

Table XXXVIII.

1. Percentage of children of school age enrolled.
2. Percentage of elementary enrolled in secondary education.
3. Percentage of secondary students enrolled in higher education.

	N. A.-R.	S. A.-R.	S. C.-R.	N. C.-R.	West.-R.
1. Elementary	68.09—3	61.37—5	61.90—4	75.68—2	81.13—1
2. Secondary	4.52—2	2.26—4	2.14—5	4.00—3	4.54—1
3. Higher	35.97—3	48.93—1	40.29—2	33.41—4	29.27—5

small percentage of these enter secondary work, as in the South, a large per cent. of these might enter college, and yet the number in comparison with the number of children or total population be relatively small. In the West a

(1) Higher education embraces the work of colleges and universities for men and both sexes, colleges for women, all schools of technology, the professional schools of law, theology, medicine, pharmacy, etc. The term is rather broad inasmuch as all schools here included do not necessarily presuppose a high school equipment for entrance. Especially is this true of many of the lower class schools of law, theology and pharmacy. However, it is impossible to eliminate this factor so as to include only those who are graduates of high schools. The statistics for higher education do not admit of the same degree of systematization as those relating to elementary education and hence any detailed comparison of the divisions is impossible.

large per cent. of the children are in the grades, a large percentage of these are in the high schools, so that a small per cent. of these pursuing higher education might still be comparatively large.

A direct comparison is much more satisfactory. Table XXXIX gives the percentage of the total population who are pursuing advanced work in the five divisions. There has been a steady and marked gain in the West and North, with fluctuations in the remaining divisions. On the average for the five years the North Central, the East and the West stand in order, though there

Table XXXIX. Percentage of Total Population in Higher Education.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1895-6.....	0.34	0.26	0.20	0.33	0.32
1896-7.....	0.34	0.26	0.21	0.34	0.32
1897-8.....	0.35	0.27	0.20	0.34	0.34
1898-9.....	0.34	0.26	0.20	0.34	0.34
1899-00.....	0.33	0.27	0.21	0.37	0.35
Averages.	.034—2	0.26—4	0.20—5	0.34—1	0.34—3

is but a very small fraction of one per cent. difference between them. Practically they are on a par with the Southern sections in a low position. However, it must be remembered that in the West there is a large percentage of adult males (Table IV) and a small percentage of children to the total population (Table III), which facts put that section at a serious disadvantage in the above comparison.

The figures of Table XL indicate the percentage of the total number of students enrolled and receiving formal instruction who are in some phase of higher education. The percentages vary slightly from year to year, showing no general tendency. The average results for the five years should fairly indicate the real status of the divisions in this respect. These results cannot be taken as an absolute criterion of attendance, as they are open to a serious objection. In the West the attendance in the grades and secondary schools

Table XL. Percentage of All Pupils in Higher Education.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1895-6.....	1.62	1.20	0.88	1.33	1.55
1896-7.....	1.62	1.16	0.91	1.38	1.53
1897-8.....	1.66	1.17	0.86	1.36	1.67
1898-9.....	1.64	1.15	0.88	1.43	1.70
1899-00.....	1.66	1.18	0.91	1.52	1.62
Averages...	1.64—1	1.17—4	0.89—5	1.40—3	1.61—2

was very high and consequently the attendance in higher education might be high absolutely and yet low in comparison. In the East the opposite is true; elementary attendance is relatively low, and hence in comparison the percentage of attendance in higher education is increased.

Table XLI. Percentage of the Children of School Age in Higher Education.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1895-6....	1.36—1	0.78—4	0.58—5	1.12—3	1.31—2
1897-8....	1.37—2	0.79—4	0.59—5	1.14—3	1.38—1
1899-00...	1.33—2	0.77—4	0.60—5	1.26—3	1.43—1
Averages.	1.35—2	0.78—4	0.59—5	1.17—3	1.37—1

The attendance may be compared also with the total number of children of school age (5-18 years) irrespective of whether they attend or not. Here the positions of the East and West are reversed from that of the former table. In this comparison the West is at an advantage, since the number of children in proportion to the total population is relatively small.

In the question of comparative attendance all three of the above tables must be considered. In relation to the total population the East, North and West are on a par, in relation to attending pupils, the East, West and North are in order, and in relation to the number of children the West has first rank, with the East and North second and third respectively. No one represents a norm. Taking the three items together, there is but little difference between the East and West, with the North Central division a shade lower.

The above tables deal with the attendance in every branch of higher education, including medicine, theology, pharmacy, etc. The East has more schools of this character and hence her attendance is correspondingly increased. Table XLII below deals only with college students, the more distinctive part of higher education. In comparison with the total population, the college attendance in the West is very high, that division easily holding first rank, while if the comparison were made in relation to the number of enrolled students or the total number of children, the lead of the West would be still further increased.

Table XLII. Percentage of College Students to the Total Population.

Year.	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
1896-7....	0.135—2	0.093—4	0.080—5	0.131—3	0.172—1
1897-8....	0.140—2	0.097—4	0.081—5	0.139—3	0.181—1
Averages.	0.137—2	0.095—4	0.080—5	0.135—3	0.176—1

Table XLIII shows the distribution of the students in each division among the different branches of higher work. Remembering that the total attendance in higher education comparatively is practically the same in the East and West, it will be seen that the West has the largest attendance in collegiate and technical education, while the superiority of the East in attendance is confined to colleges for women and schools for medicine, law, theology, pharmacy, etc.

Table XLIII. Percentage of Students (1898) in

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
College	54.—3	36.—5	46.—4	56.—2	68.—1
Technology ...	6.—4	9.—2	5.—5	7.—3	13.—1
Medicine, Law and Theology	29.—2	28.—3	26.—4	34.—1	17.—5

The above statistics deal with the attendance *in* the division irrespective of the place of residence. A division might lose a large part of its students to increase the attendance of another division. The interest in higher education is more nearly indicated by the number of students *from* a division who attend irrespective of the place, rather than by the number who attend in the division irrespective of the division where they live. The following table gives the percentage of college students each division loses or gains by attending college in some other division other than that in which they reside. Each both gains and loses some students, but the percentages refer to the net loss or gain. The table deals with college attendance alone; the percentages would probably be materially increased for all phases of higher education.

Table XLIV. Percentage of College Students from the Division Lost or Gained.

Year.	N. A.	S. A.	S. C.	N. C.	West.
1896-7....	11.2 gain	1.7 lost	3.5 lost	3.5 lost	3.8 lost
1897-8....	10.3 gain	0.0 lost	5.5 lost	3.6 lost	3.1 lost

The East gains over 10 per cent., while all the others lose in a lesser degree. The relative college attendance was much greater in the West than in the East (XLII), and if we make allowance for a 10 per cent. gain by the East and a 3 per cent. loss by the West, it is easy to see that the relative attendance of college students *from* the West is much greater than from any other section. Since the attendance in all phases of higher education in the division is practically the same for the East and West, the West must stand first in relative attendance *from* the division after making allowance for loss and gain.

Summarizing the matter of attendance, first, in all phases of higher education the West is on a par with any other division in the relative number of students who attend *within* the division, and ranks first in the relative number *from* the division who attend somewhere; second, in collegiate and technical work the West ranks easily first in the relative number who attend both *in* and *from* the division; third, the East has the greater attendance in colleges for women, and in schools of law, theology and medicine.

Table XLV. Value Per Student (1898-9) Attending Colleges and Universities for Men and Women, and Schools of Technology.

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
Library .....$	65.—1	45.—3	27.—5	35.—4	49.—2
Scientific Appa's	123.—1	45.—4	39.—5	56.—3	99.—2
Grnds and Bldgs.	978.—1	711.—3	480.—4	473.—5	783.—2
Total income..$	156.—2	142.—3	86.—4	82.—5	160.—1

In the value of the library, scientific apparatus, grounds and buildings per student attending, the East easily leads, with the West second. This, of course, was to be expected where the colleges and universities have been long established; it is the high rank of the West in these respects that is a matter of surprise. A comparison of benefactions has been omitted since the amount has varied from year to year, and it would be very difficult to strike a fair average and also because the money is largely expended in apparatus, buildings and endowment. In the matter of income, the West, however, is first in rank by a small margin.

In regard to the quality of work done no definite statistics are available. However, in the East the students are localized more in a few great universities, so that the same income per student would mean more than in the West, where the students are scattered. The localization of the students in colleges and universities is shown as follows:

Table XLVI. Localization of Students.

	N. A.-Rank.	S. A.-Rank.	S. C.-Rank.	N. C.-Rank.	West.-Rank.
Students per College	382—1	214—5	265—4	335—2	284—3

Although the West has the greatest income per student, yet without doubt the efficiency of this amount per student is nevertheless greater in the East. The same is true regarding the efficiency of the library and scientific apparatus. It is doubtful if the equipment and income bear much relation to the number of students. Almost as much is demanded for a few students as for a comparatively large number. Certainly efficiency is increased by a localization of students and equipment and income in a larger institution, and possibly efficiency is much more nearly indicated by the localization of the students than by the values of equipment and income per student. The significance of the last two tables in regard to efficiency is thus largely a matter of conjecture, though without doubt they are to be construed in favor of the East, with the North and West more nearly on a par.

SUMMARY.

In conclusion the status of the West in education as derived from available statistics may be summarized as follows:

I. Common schools, embracing public elementary and secondary education.
   1. First in attendance proportionate to the number of children of school age.
   2. First in financial equipment and support proportionate to either population, enrollment or average annual or daily attendance.
   3. Second in regularity of attendance.
   4. Second in regard to the least enrollment per teacher.
   5. Third in length of the school year and the amount of education proportionate to the population, children and enrollment.

II. Secondary education, embracing all phases of secondary work, no matter where done.
   1. First in interest manifested.
   2. First in the requirements in English and History.
   3. First in the average length of the high school course and the standard of work (probable).
   4. Second in the distribution of secondary work among the people.
   5. Second in financial support and equipment.

III. Higher education, embracing collegiate, university, technical and professional work of all kinds.
   1. First in attendance of students *residing* in the division, proportionate to the population, children or total number of students.
   2. First in the number *attending* in the division proportionate to the children of school age, although a number attend in the East.
   3. First in proportionate number of *collegiate and technical* students attending within the division, irrespective of the fact that over 3 per cent. attend in some other division.
   4. Second in financial equipment and support.

Without doubt, the educational status of the West is, at the least, on a par with that of any other section, notwithstanding the fact that it is comparatively a newly settled and developed region, that it stands fifth in density of population, fifth in proportionate number of children, second in localization of population in towns of 4,000 and over, fifth in proportionate number of foreigners, but first in wealth per capita.