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SOME PSYCHOLOGICAL AND PHYSIOLOGICAL FACTORS IN PHYSICAL EDUCATION

Submitted by

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Some Psychological And Physiological Factors In Physical Education.

The Problem.

This thesis concerns the field of physical education of pupils in grades one to twelve inclusive. Its purpose is not to show that I am at discord with a so-called natural program of activities in physical education but to show that a natural program if not supplemented by formal physical education will take away from the science of physical education much of its evident worth. Some formal physical education must be a part of the program.

The sponsors of such a program appear to have been gathered in by the philosophy of modern educational theorists who are endeavoring to lead us out of the apparent chaos and put forth a program which apparently will go hand in hand with many new theories in education.

The natural program is too radical a step to take, especially when the physical development of children in our modern enviromment must be considered. It takes fine therapeutic value out of physical education.

However, there is a tendency to eliminate formal physical education from the program and substitute a strictly natural program.

Trends in Education and Physical Education.

Education is the field in which all Americans are deeply interested. If you look back into its history you will find many sufficient reasons why the people of this country should have the faith that they do in education. America is a land of equal opportunity and the people have taken education as a fundamental basis to give all that equal opportunity to share in the fruits that might arise.

Public education had been given to Americans in early Colonial days and its expansion has been commensurate with the civilization that has been undergone. With the beginning of the public high school and its development education has been brought closer to the people. To-day any problem in industry, human relationships, politics, etc., which cannot be solved harmoniously is taken into the schools to have educators thrash out and possibly set up courses which might tend to an adjustment of the situation.

There is much research going on in all fields of endeavor which have found themselves in the realms of education. Much investigation has also been going on in education itself by many who heretofore were not directly connected with it. Many school systems have, or are buiding up departments of research whose one business is to study the children of the city, their degrees or types of intelligence, their success in their studies, their possibilities for after school years.

Americans have great faith in the fact that many have climbed to high positions through their success in school. This expression has been featured when noting the expansion of secondary schools. In 1890 there were probably not more than three thousand boys and girls in secondary schools of the nation;to-day the number is approximately five millions. Within the last ten years, the colleges and universities have begun to grow at a corresponding rate. At great sacrifice parents struggle to give their children an education so that they may be freed from the necessity of earning their livelihood by means of physical labor.

To meet this increase in enrollment, new schools must be built. The public accepts the addition of high schools and now pays the consequent greatly increased cost of education as a matter of course. In fact it is no longer considered unusual when a city spends a million or more dollars to house one such school. Schools contain diversified curracula to meet the demands not only of numbers but on account of the different cultural backgrounds and the most varied vocational interests.

In order to meet the demands of society, there has been an influx of new theories, new emphases and new procedures in education. Some of the new theories are the child centered school, child centered curriculum, scientific curriculum making and the project method.

Along with these theories are emphases in which some educators stress

more than others, as character in education, education of the emotions, education for citizenship, education for leadership and gifted children, thrift education, safety education and health education. To put over these emphases some schools have departed from the traditional schoolroom procedures and have reorganized their classrooms and brought forth new procedures of individual instruction, ability grouping of pupils, schemes of departmentalization and work study plans. This period in education is one of great experimentation, one of feverish activity, one of promotion of any aspect of education, in the schools if it appears worth the price in effort and in money.

It is with the project method that the natural program in physical education identifies itself. Professors Thomas D. Wood and Rosalind Cassidy in their book on The New Physical Education write the following," John Dewey is the leading philosopher and teacher of the modern period. The aim of education is held to be not merely the development of the individual, but the development of this individual in relation to society. According to Dewey, education is the "process of remaking experience, by giving the individual better control over his own powers." This emphasizes the growth of the individual in relation to social factors, which is the keynote of modern education.

The belief that education is growth- Education is more than preparation for adult life; it is the living of a full, rich life by the child each day, which, it is true, will prepare him for a rich life later on. Education

then is growth and is its own end, not merely a means to a far removed end, as so many have believed it to be.

The modern philosophy, the development in the fields of science, psychology, and sociology have been discussed; all have direct bearing on educational theory and we have endeavored to show this.

Method in modern education -- The method in modern education is defined thus by Munroe: " Method is the guidance of the child in his activities by the teacher so that he may incorporate into his own experience that portion of the experience of the race which, to those who have the direction of his education, seems valuable."

This necessarily heavily involves the teacher. She must be able to choose what is suitable to the age and interests of the child. She must be equipped with psychological, scientific, and sociological method as well as schoolroom technique, and must have a definite educational philosophy behind it all. She must start then with a knowledge of the child and, if she is true to modern belief, she will adhere to the basic idea of interest.

Dewey writes in Interest and Effort in Education, "The genuine principle of interest is the principle of the recognized identity of the fact to be learned or the action proposed with the growing self; that it lies in the direction of the agent's own growth, and is, therefore, imperiously demanded, if the agent is to be himself."

This, of course, implies the project method, which is defined by Kilpatrick as "whole-hearted, purposeful act carried on amid social surroundings."

These aspects of method show that there must necessarily be a special method in each subject, but we also know that there is a general method which serves as a guide to both teacher and pupil in the attack on problems; it is using the knowledge about getting at study which has been found useful by others. The essentials of general method, identical with the essentials of reflection, are:

1. There must be a problem.
2. Interest in it sends one in search of data.
3. These data must be evaluated.
4. The ascertained facts are to be organized around a logical center or centers toward a solution.
5. The solution results.
6. The solution is to be tried and tested by actual use.

The project method - The ideas about the curriculum are no longer those hallowed by long and unchanging traditions. In fact they are quite opposite. The curriculum grows out of the child's interests and hence is psychological, not logical. It cannot be set up in its complete form in a syllabus that tells the teacher just what to teach each day in the week and be consistent in any way with modern belief.

The teacher and child make the curriculum from day to day, the teacher having certain big aims, and the child's interests and growth characteristics as her guides.

The significant elements in modern education which have influenced

the natural movement in physical education have been set up briefly and, perhaps, incompletely. It grew up as a protest against old, unscientific, and irrational forms that were not based on child nature and development, and as an effort to formulate a program consistent with modern educational ideas and ideals. It is dynamic, not static; it is functional rather than structural; it is subject to constant growth and change." [1]

At another place in the same text the authors write," Formal gymnastics, free-hand movements (for the most part), and much of the apparatus work of the gymnasium belong to the category of artificial stunts and mechanical movements; they lack the purpose, mental content, and objective which are essential to sensible performances.

Formal gymnastics in physical education correspond to drugs in medical practice. The movement in medical treatment is away from the use of drugs. In a similar way progress in physical education must be away from all formal, artificial kinds of movement.

In the natural program all formal, mechanical, militaristic, and superimposed gymnastics are discarded along with the educational theory of formal discipline." [2]

[1] The New Physical Education - Wood and Cassidy - Macmillan - 1930.

[2] The New Physical Education - Wood and Cassidy - Macmillan - 1930.

The above necessarily implies that there is no place for formal physical education in a general program of physical education. Peters says, " Whatever the child gets through the guided activity must be worth getting, and must be got better by reason of the adult's participation, if such participation is to justify itself. If the teacher is worth anything, he must look ahead, direct the activities (covertly, of course) in harmony with a purpose, see to it that they lead to something."[1]

Formal physical education has a place in a program of physical education. The psychological factors take precedence over the physiological factors in a natural program. In later chapters I will show that any program in physical education must have a physiological basis especially when the development of children are considered. Also, a program should appeal to the interests of the child but these interests must be subordinate to the physiological factors. Formal physical education permits us to carefully supervise the activities of growing children.

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1. Foundations of Educational Sociology - Charles C. Peters - Macmillan - 1925.

Some Psychological Factors.

In this part I am going to take some purely psychological evidence concerning formal physical education, leaving the physiological data to later discussion. Throughout I will use the psychological factors without any physiological reference.

Interest - It is claimed by those who sponsor a purely natural program that pupils do not have any interest in formal physical education. All children will have an interest in anything that will affect their well-being. Miss Mabel Lee, Director of Physical Education for Women, University of Nebraska, Lincoln, Neb., writes, " When I read Wood and Cassidy on The New Physical Education I am quite persuaded that natural exercise is far superior to the formal activities but when I attend conventions and see demonstrations such as I saw last year in Boston and see a natural program following and preceding a program of formal activities, I find myself in a most uncertain frame of mind in regard to it."

John Brown, Jr., M.D., Secretary, Department of Physical Education, The National Council of the Young Mens' Christian Association, writes, " I believes there is a place for both natural and formal types of exercises in physical education. In fact, I am of the opinion that some of our present day leaders in physical education over emphasize the advantages of natural exercises and activities and under-state the values accruing from formal exercise and activities. One may even seriously question if the

highly organized team games like football and basketball do not involve many of the elements which are criticized in so-called formal activities.

Granted that there is far greater opportunity for exercises and development of personal initiative, judgement and choice in unpredictable situations in natural activities, something may be said for the benefits accruing to the individuals for participating in activities in which unison and uniformity of action is called forth. Both types develop different but essential qualities of judgement, rhythm and skill.

In my opinion, a well-balanced curriculum of physical activities would include both types, not so much of the formal as is characterized in the Swedish and German movements in the past, but certainly not going to the other extreme of eliminating them entirely."

Pupils will show an interest in formal gymnastics if they are taught that such exercises are for their physical development, and it may be added that a whole lot depends upon the teacher to be able to make himself young and take part in the activities. Concerning this James Edward Rogers, Director National Physical Education Service says," However it all depends how all these things are taught. If they are taught happily, joyously, enthusiastically , by a teacher with personality and a smile, they will all be enjoyed and therefore it will all be play and not work. If any of these subjects are taught according to rote, in monotonous drill style by a sad teach-

er with a cracked voice, then it becomes work."

The teacher must aim to develop the proper attitude in pupils and endeavor to have them react enthusiastically.

Dr. J.F.Williams who also is a prominent leader for the natural program says, " It notes that a child may be put through a set of exercises, but claims that there is no assurance that cooperation is present, because there may be the nearly perfect outward performance, and at the same time definite rebellion." [1]

Any pupil in American schools who is giving all he has that makes for nearly perfect outward appearance certainly has not the time to react anti-psychical. Many tasks are undertaken with interest because they are worth while. They are done with a will because they are worth while.

In The New Physical Education Wood and Cassidy write regarding interest in the natural program, " In the field of method the natural movement has been strongly influenced by modern education. The doctrine of interest is basic; no activity is included in a natural program that has not this element and approach. It has determined the material used and the method of teaching. The material can readily be adapted to the project method presentation, which is quite impossible with a formal technique and content.

The general method, the thought process, finds application in this field even though it may seem quite improbable and impossible to

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1. Principles of Physical Education - J.F.Williams - Saunders - 1927.

many. This general method and the application of the project method to physical education are discussed at length in later chapters. Actual problem solving is involved in the natural program The whole idea of natural gymnastics is based on this idea. The child is interested in baseball, but realizes that he cannot catch as well as he wishes to. He has a definite problem,and thus drill is motivated for its solution. He works with enthusiasm on the exercise which will improve his skill. He, the group, or the teacher, may devise relay games with the necessary elements in them,and thus make the solution of the problem more interesting and enjoyable. This discussion shows the way in which the curriculum grows out of the child's interests and so, like that in general education, cannot be highly organized, set up in advance, and given to each teacher,who must then take up the task of teaching it, irrespective of its application to the child. The curriculum in natural physical education is made by the teacher and child to-gether, growing out of the needs and interests of the child.This again, shows the need in this field for the highly trained, imaginative, and resourceful type of teacher.

Modern educational thought has given like aims to general education and natural physical education."[1]

The interest of the individual and of society are consequently best served by the ideal combination of education as life and education as preparation for life. Such a combination respects the

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[1] The New Physical Education-Wood and Cassidy-Macmillan-1930.

present equipment of the child, his needs, capacities, interest and experience; but it maintains that these are to be directed and guided in the light of the truths and principles made known to us through a vision of the ideal of life.

Chapman and Counts uphold the place of child interest but make it subordinate to the acquistion of " habits, skills, knowledges, procedures, and ideals, powers which will, with a high degree of probability, be employed by the individual in the important activities of his life. Interest as the major criterion for the selection of subject-matter is a pernicious guide,and any system of education which sets up child or student interest as its guiding star is doomed to failure."[1]

To the direct question, "Do the pupils show interest toward formal gymnastics ?", the Directors of Physical Education in Indianapolis, Buffalo and Denver answer respectively;

" They do in Indianapolis."

" Yes, absolutely, providing the teacher selects the kind of gymnastics which are not too artificial."

" Yes but they are interested in all physical education activities."

Effort - In J.F.William's Principles of Physical Education you will find the following, " An observer of physical education in America will find two distinct and opposing types of programs. If he goes to certain schools he will see activities of play, games, sports, dances,and natural gymnastics;if he questions concerning this type

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1.Prin. of Education-Chapman and Counts-Houghton,Mifflin,Co.-1924.

he will learn that the program is organized and administered with reference to the child's biologic needs, instincts, and capacities, and the child's relation to a growing activity. In short, he will see exemplified what may be called the theory of interest.

If he goes to certain other schools he will see artificial exercises of calisthenic type, conducted in the classroom or gymnasium, taught usually by the response-command method. If he questions concerning this type he will learn that in addition to exercise values that are supposed to be good for the child, there are other outcomes, such as obedience, discipline, concentration, accuracy, and posture. In short, he will see exemplified what may be called the theory of effort."[1]

This infers that formal physical education is the one of effort because it contains those activities mentioned. E.R.Smith in Education Moves Ahead, has this to say, " If a pupil becomes accustomed to effort, takes pleasure in achieving, and does it all with a happy, interested, cooperative spirit, he will be having the kind of experience that leads to mental and moral development, and character formation will unquestionably come from it."[2]

Repeated effort strengthens the will and increases the power of determination; it develops self-control, self-restraint, mastery over oneself; it gives to the will the power to resist natural impulses and inclinations, and to carry out what has been resolved.

1. Principles of Physical Education-J.F.Williams-Saunders-1927.

2. Education Moves Ahead - E.R.Smith - Atlantic Press - 1924.

Satisfaction - Much satisfaction is derived from formal physical education;one only needs to take into account the number who partake of the exercise periods over the radio.J.H.McCurdy, A.M., M.D., M.P.E., of Springfield College writes, "I have had this year twenty-five men from eighteen different colleges in graduate work. A number of these men have elected as one of their choices,heavy apparatus exercises. They tell me they were forced in college to play games, and because they were of varsity caliber they were excluded from all of the gymnastic stunts. A number of these men are electing this sort of work because of the real joy and kick they get out of it. They have had free choice to elect the other types but they have chosen this as a part of their practice work."

Competition - There is some competitive value in formal physical education, just as much as in academic subjects, but they can be used as a relaxation agent or as a preliminary agent to competitive games; then the games will be more beneficial to the participants. The Indianapolis Director of Physical Education answers to the question,"Do you think boys and girls get better results from their games after a period of formal gymnastics?" " If games are for recreation, yes."

There are many times when pupils are over-stimulated;then they either need complete relaxation, or their condition can be taken care of through formal physical education.

Also, there is danger of over-stimulation in the lower grades. Some formal work at this time and response to commands, stimulates a so-

cial consciousness in group cooperation.

Pupil activity needs the costant assistance and direction of the competent teacher, simply because the pupils' judgement is not sufficiently ripened to be able to extract the invaluable elements of the social heritage.

Guidance - In Wood and Cassidy's The New Physical Education you will find, " Mental life is no longer considered a passive matter, it is an active process. Activity brings experience; lack of it leaves the mental life inexperienced. The child must feel a ball, throw it, catch it, bounce it and use it actively in different ways if he is to know what a ball is. He cannot know by merely seeing it and being told what it is.

Experience becomes an affair primarily of doing; the organism acts in accordance with its own structure, and as a consequence the change produced in the environment reacts on the organism and its activities."[1]

This would seem to imply that action for the sake of response in the individual is the goal. Nevertheless, there are some actions which should not be freed; and an individual can check them by self-control. O'Hara says, " Direction is necessary to prevent freedom from becoming capricious, even destructive of what has been established."[2] And to add from Leighton, " The young self needs guidance, needs to have presented to him the stimuli and patterns of thought and conduct which the experience of the race

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1. The New Physical Education - Wood and Cassidy - Macmillan - 1930.
2. The Limitations of the Educational Theory of John Dewey by James H. O'Hara - Washington, D.C. -1929.

shows to be the best to fit him to live as a social individual."[1] You are aware that I have brought the case of formal physical education to the fore from its psychological values, but I do not want to be misconstrued that I think that the natural program has less worth from its psychological elements. I am here contending that there is a place for formal physical education; also that a program of natural activities will not suffice unless supplemented by formal physical education. To say that pupils are interested and satisfied in only a natural program of activities is uttering a statement that we know should be questioned, because certain exercises appeal to different pupils in different ways.

Matthias in his Deeper Meaning of Physical Education says, " How the individual man experiences the various forms of physical activities psychically can hardly be described, since, as was mentioned before, the experiencing differs from man to man. These purely psychical experience forms will never be fully and accurately explained, neither physiologically nor psychologically. Instinctively every man seeks for those forms, the participation in which nets him the best diversion, the greatest pleasure, joy, and finally inner satisfaction. The psychic element comes into play so varyingly because the physical or bodily soul varies so. In one man a certain type of exercise gives rise to the greatest of joys, and fullest satisfaction, whereas it may result in utter disgust in the other. Thus there are those who gain from the bold circles around the horizontal bar the keenest

[1] Individuality and Education-Joseph A. Leighton-D.Appleton & Co.1928.

thrill and total satisfaction, whereas others shudder at the mere thought of it. Again there are those who experience their greatest joy and feelings of complete satisfaction in the rhythm of the dance, whereas others remain always strangers to this experience. Others again find their greatest soul experiences in battle with man or wind and wave, on the steep snowy precipice or on the heavenward mountain peaks. These facts must be laid down here very definitely, for it is an exaggeration when proponents of certain systems claim that the psychic experience is purest only in the swinging, the rhythmic systems.There are people with whom that is true. They should, yes, must, in this case perform rhythmically. No one has the right to deny them or belittle their particular taste for physical and psychical experience and expression. Then there are ever so many people who find their greatest satisfaction in outwardly directed experiences, the surmounting obstacles, in the depths of a winter's snow, the jagged mountain peaks, the high wave, or the conquering of an approaching opponent in a game.

Later on we will have to bring up the question, whether after all in every case these body-soul experiences are the last form of psychic experiences. For the present may this be set down as a fact ,that physical activities only then reach their highest body-sense, when the psychic experience is directed toward a joy-awakening, humanly satisfying, yes, soul-liberating goal. The form

in which this experience is found differs from man to man. After this review we are enabled to grasp the physical as well as the psychic sense of physical education, and surmise the endless possibilities in which they may manifest themselves."[1]

Activities to one individual may be satisfying and expressive and to another stultifying. Any method, any type of exercise, which results in the desired objective has justified itself. A natural or formal exercise is only a means to an end; either is valuable, if it accomplishes the desired end.

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1. The Deeper Meaning of Physical Education - Eugen Matthias -
A.S.Barnes & Co.,- New York - 1929.

Some Physiological Factors.

From what has been written up to this point, there is no doubt regardless of the form of exercise, it must have some effect upon the psychical components that are a part of the human body in order to be a part in the all-round development of that living whole. But also one must not err that bodily exercise to have a good all-round effect must be based on some physiological laws which govern the movements of the body.

Physical Education Must Be Taught in Accordance With Physiological Laws.

When muscles are used, there is found in those muscles a more active and increased supply of blood; also the component parts and tissues have an increased supply. These active muscles do not act of themselves but messages are sent out to have the muscles perform their task.These active muscles can only move the body through the aid of the bones and tendons. Regardless of the type of exercise this process in muscle,bones,and tendons is always taking place in the active muscle.The manner in which the muscle is called upon to act determines the effect that that exercise has upon the body.

But on the other hand if we are to teach physical education we must delve deeper because there must be some sort of machine which supplies these muscles with the necessary blood supply. It is essential also to know how the inner organs of the body are affected by exercise. Bainbridge says,"It is essential that the clinician, who is called upon almost daily to decide whether,and to what extent,his patients should take exercise, should be acquainted with the effects which muscular activity produces upon the various organs of the body, and particularly with the significance of the

patients should take exercise, should be acquainted with the effects, which muscular activity produces upon the various organs of the body, and particularly with the significance of the circulatory and respiratory changes associated with it."[1] We in physical education must know that body, its structure and its functions. In order that exercise may be efficiently carried out, it is necessary that the activities of the skeletal muscles, the nervous system, the heart, and the lungs should be co-ordinated and linked to-gether in such a way that the resources of the body may be utilized to the best advantage and the body may act as a physiological unit.

Physical Education Problems During The Years of Development.

The child's first business is to grow and develop. There are those periods in life in which the physical development shows marked changes and real physical education must be adapted to meet the problems that arise if the most favorable results are to be achieved. Only when the selection corresponds to the development need, only then is physical education able to give its worth in the realm for which it is intended. Matthias writes," The child must grow. Consequently metabolism in the young body is most active. Instinctively the child seeks to stimulate this; it craves to move, it wants to romp, it wants to experience life. Man, however, incarcerates the child for hours at a time in a room and forces it into the school bench, particularly from the sixth year on. Thus the otherwise increased metabolism is checked, growth goes back-

1. Bainbridge, F.A.-Physiology of Muscular Exercise-London-1919.

ward.One may observe the diminshed trend of curves of growth in hheight and weight during the first school year.The retardation of matabolism has a second reason:The strength-distributing center of the body is the nervous system.If it,through concentration,that,is, demend upon abstract thinking,is overtaxed,then the nerve center needs for its own maintenance large amounts of strength, thus depriving the organs that support the body of their share of circulation,respiration and metabolism.Furthermore, is it likely that this retardation of growth, mainly in weight, in these first school years may be traced to neurosis. By the school with its exacting hour plan, and mass instruction, the weakly, forcibly restrained child is psychically burdened,particularly if the teacher is a stern taskmaster.

Physical education must here furnish the adjustment. It must be its problem to stimulate the retarded metabolism,to adjust the organic weaknesses such as back muscles and postural weaknesses, faulty respiration, etc."

Further on Matthias states concerning the adolescent,"Let us restate once more the physical peculiarities of this period which are of greatest importance to Physical Education. This period is the time of marked growth in height followed by a corresponding broadening of the chest.At no age, neither before nor after, is the relative chest circumference, that is, compared with the height, so low. The danger of a flat,depressed chest resulting, if no suitable physical counter

measures are resorted to, is great. This is still more important when, because of the extensive body stretching, the back muscles, which support the trunk, are weakened. Posture becomes impaired, the body pushing forward. The weakening of the back muscle is the cause for the conspicuous ibcrease in spinal deviations during this period. With the girls this increase is still more marked than with the boys. The reason for this again is found to be in the more rapid growth for girls.

The marked depression of the thorax may have serious consequences. Aside from other causes, the flexibility of the thorax may play a part. For the function of the lungs it matters greatly whether the thorax is wide, deep and flexible or whether it is flat, narrow and compressed. In this latter condition the upper rib oval through which the points of the lungs appear, is narrow, the edges of the ribs press inward and thus upon the lungs, which in turn suffer because of impaired blood supply, and consequently also from impaired exchange of gases. If the bacillus should lodge here it may not be rendered impotent as is possible in other regions where the blood circulates freely. The heart experiences a crisis. Yet it needs stimulation, but this stimulation must be rendered in proper doses. Hexheimer has proven that training experiments on oarsmen of different ages give quite varied results. In the adult the desired result, the so-called bradycardia sets in. This is a strong, slow, even and deep heart action, from which results a slow, quiet and

even pulse.

In the youth, that is, between 16 and 18, the result was exactly opposite. This is the best proof that the heart during this period, thanks to the above described growth condition, has not grown to full power." [1]

J.F.Williams in his book Principles of Physical Education writes concerning the child from six to ten years of age, "The child in this period is rapidly gaining in strength, but it must be remembered that he still retains his infant characters. The heart is still small. His weight is less than one-fourth his adult weight, and yet he has to pump blood to a body that has two-thirds of its adult weight. There is at the same time a great increase in the desire for physical activity and this, too makes great demands on the heart. For these reasons there is imperative necessity that his activity be carefully guided and that undue demands in the form of vigorous competitive contests be avoided. Simple team games may be used but kept free from the stimulation to unusual activity occasioned by championship or other social pressures from a group. Some authorities call the later years of this period the fatigue years and they may well be so regarded because of the slow development of the heart." [2]

Boys and girls need stimulation but they should not be spurred on

[1] Matthias,Eugen-The Deeper Meaning of Physical Education-Barnes-1929

[2] Williams,J.F.- Principles of Physical Education-Saunders-1928

to their extreme peak. Many times it would be wiser to supervise a lesson throughout rather than allowing them to enter into competitive games of even the simple type. Activity must fit the pupils and special care is often needed that boys and girls do not over-tax themselves.

Many physical educators will say that there are certain periods during the lives of boys and girls that vigorous activities are needed in order to throw off an excess of energy that they might have, without thinking of the large share that the boys and girls need for themselves. The growing boy and girl need not only enough energy for wear and tear but also enough to make for physical growth.

Periods of the Greatest Growth Mean Periods of the Greatest Inner Demands.

Skeletal growth and inner organic power do not harmonize. There are periods in which there is a great growth in height, others in which there is a great increase in weight; also the inner organs have their periods in which there is great increase in size and power. For example, during the four years from three to seven years of age, the volume of the heart increases from one to one and one-fourth, height from one to one and one-third, and weight one to one and one-sixth; during the thirteenth and fourteenth year the volume of the heart increases from one to two, the area of the pulmonary artery grows from one to one and one-sixth, an increase in weight from one to one and one-twenty second and an increase in height from one to one and

one-twentieth. The above proportions were taken from statistics of Baldwin, Hall and Wood.[1]

To quote from J.M.Tyler's Growth and Education, "The human body is composed of many distinct systems and organs, all indissolubly united in one organism, where every part is at once means and end to every other part. The health and life of the whole organism may be disturbed and destroyed by the weakness of any one of these numerous parts. What we often call the lower organs, the viscera, are absolutely essential to life, and hence by far the most important. They are fundamental as well as essential. Anything which disturbs our digestion or the removal of waste equally disturbs the clearness and vigor of our thought. If there is to be no schism in the body the organs must be properly balanced in weight and power. Otherwise the overgrown part robs some other organ of its fair share of nutriment, and throws upon it burdens whichiit cannot bear. If any part, for any reason, to be exposed to excessive strain, that part must be fortified and strengthened during its period of growth in early life. But every other part should be correspondingly strengthened to back it up in its emergency period."[2]

1. Baldwin, B.T.-The Physical Growth of Children from Birth to Maturity
Univ. of Iowa Studies.

Hall, G.S.-Adolescence-D. Appleton & Co.-New York-1911.

Wood, Thomas D.-Child Health Organization Pamphlet.

2. Tyler, J.M.-Growth and Education-Houghton, Mifflin Co.-Boston-1907

From the foregoing it would seem that the wisest policy physical educators could take is to give exercises that would tend to develop those parts which are not growing during the periods of cessation. Skeletal growth and internal organs have their growth periods as well as their cessation periods and there is a time when exercises should be given for those parts of the body during the periods when they need it and when it is most opportune.

Activities in Relation to Physiology.

Formal gymnastics can better take care of the physiological needs of the body in some individuals than natural activities. Exercise must be regulated to individual fitness, must be approached gradually and increased only with increasing strength, for exercise that scarcely amounts to exertion in one person will be injurious and dangerous to another. You will find in Matthias's Deeper Meaning of Physical Education the following, "The body carriage of man is determined by position, shape and structure of the skeleton, particularly of the spine and thorax. These again, as also the relative position of the joints of extremities to the trunk and its parts, are dependent upon the strength and condition of body extensors and contractors. If one of these two groups, for example, as is usually the case, the contractors, are overdeveloped, then the corresponding extensors are overstretched. The limb or the back is then thrown into a one-sided and prolonged condition of contraction. One should visualize, for example, the decided effect

of the pectoral muscles as against the backward-pulling shoulder-blade muscles. If the pectoral muscles are over-developed, then the shoulders are pulled forward, and the blades stand off wing-like.

The more powerful muscles and tendons exert then, because of greater inner tension-power(tonus), a greater pull.

On the other hand, it must not be overlooked that it is possible, that through one-sided extravagant stretching exercises of muscle and tendon, the inner tension power may be lessened, and muscles and tendons overstretched."[1]

It is here reasonable to state that physical educators have as one of their problems to keep in place or put in place the relative positions of the bones and the form and carriage of the body as a whole. Good posture is the best adjustment;first, of the various body parts to each other;and second, of the body as a whole to its environment, task,or work. It is posture that signifies vitality; the high, elevated position of the various body parts that indicates strength and vigor.

It might be of interest here to insert a natural program of activities taken from Wood and Cassidy's The New Physical Education:

First Grade.

1.Walking, running, skipping,to music.

2.Elephants.

3.Ducks.

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[1] Matthias, Eugen-The Deeper Meaning of Physical Education-Barnes-1929

4. Squirrels in trees (new game taught).
5. Mulberry bush (choice of the children).
6. Playing soldiers - march back to classroom.

Second Grade.

1. Galloping horses.
2. Going to the wood to pick apples.
3. Fox and geese (new game taught).
4. Slap Jack (choice of the children).
5. I see you.

Third Grade.

1. Birds flying (running around room with arms out).
2. Automobile race (new game taught).
3. Ball tag (choice of the children).
4. Stunt - wheelbarrow.
5. Wheelbarrow race.

Fourth Grade.

1. Airplaning (running with arms out for wings).
2. Airplane race.
3. Dodge ball (new game taught). Children feel need for practice in catching and throwing;therefore they play.
4. Teacher and class. Want better aim;therefore they play.
5. Ball tag(using bean bags or volley balls).

Fifth Grade.

1. Seven jumps.
2. Squad practice on stunts.

3. Forward ball relay.
4. Soccer (new game taught). Children feel many needs;work out natural gymnastics to gain skill.
5. Natural gymnasticspractice in soccer.
6. Soccer dribble relay.
7. Play soccer until end of period.

Sixth Grade.

1. Marching,leaping,mule-kick-march,soccer-dribble-run.
2. Demonstration of stunts by room captain - group practice.
3. Squad practice on stunts- individual help by squad leaders.
4. Circle stride ball (taught).
5. Wheelbarrow relay (children's choice).

Seventh Grade Boys.

1. March,stride,leap,run.
2. Jumping Jack jubilee.
3. Squad practice on stunts.
4. Circle relay.

Seventh Grade Girls.

1. Walk,run,leap to music.
2. Natural rhythms.
3. Natural gymnastics worked out bt the girls to improve their basketball game.
4. Corner ball.
5. Play basketball until end of period.

Eighth Grade Boys.

1. March, jump with chest-throw, run.
2. Squad practice on decathlon events.
3. Natural gymnastics, previously worked out, to meet felt needs in basketball game.
4. Basket ball.

Eighth Grade Girls.

1. Skipping and sliding to music.
2. Highland fling.
3. Demonstration of new stunts by captain - mass practice.
4. Squad practice of old and new stunts.
5. Square relay.

Ninth Grade Boys.

1. Walk, stride, leap jump, run.
2. Fence vault relay.
3. Hand tag.
4. Demonstration of stunts with group practice.
5. Squad practice.

Ninth Grade Girls.

1. Leaping to music.
2. Dal Dance.
3. Apparatus practice.
4. Hand tag.
5. Under the bar relay.

Tenth Grade Boys.

1. Marching tactics.
2. Teacher and class using various throws with basketball.
3. Basket team ball.
4. Pass and catch relay.
5. Circle race.
6. Basketball practice(assignment to bring in exercises and games to help with needed skills in basketball.

Tenth Grade Girls.

1. Run with hockey sticks in proper position. Run-step-shoot. Run-reverse-stroke.
2. Practice of natural gymnastics created by the students to help with hockey.
3. Hockey dribble relay.
4. Hockey goal-shoot relay.
5. Hockey pass-ball relay.(The game of hockey is organized for the after school athletic period.)
6. Students are assigned, For out-of-school work,the making up of games and exercises to obtain and improve hockey skill.)

Eleventh Grade Boys.

1. Squads work on track events.
2. Square relay.
3. Hurdle relay.

4. Chin the bar relay.
5. Grand chase.
6. Prison tag.

Eleventh Grade Girls.

1. Walk,run,leap to music.
2. Each student gives a child's rhythm which she has created.

   (The dancing periods are usually given once or twice a week in high school. The whole period is devoted to rhythmic activity instead of combining it with game material.)

Twelfth Grade Boys.

1. New stunts demonstrated by the captain-mass practice.
2. Squad practice.
3. Natural gymnastic practice in kicking football(without ball), catching,passing and carrying.
4. Squads tackle dummy.
5. End with tackling game,catch and throw(Staley,p.146.)

Twelfth Grade Girls.

1. Run,stride,leap,jump.
2. Tennis serve practice without ball or racquet to get swing.
3. Squad work in batting against wall.
4. Squad work om jumping for height and distance from an incline board.
5. Tag the wall relay.
6. Over the rope relay.
7. Tennis game(played in athletic period after school).

William G. Anderson, Professor and Director Yale University Gymnasium, New Haven, Conn., writes," I am a firm believer in the old time methods and am out of conceit with replacing them by play, as such, and the natural inclinations of children and youth to drop them and depend upon simian atavism. Our athletes (include four major and fourteen minor sports) are round backed, stand poorly and have little regard for correct posture."

Carl H. Burkhart, Supervisor, Board of Education, Buffalo,N.Y., writes the following," You will pardon me if I say that the word formal exercises means to me rather " a method " than specific movements. I can teach natural activities in a very formal manner and again, vice versa. If I have a large group of children in a small space, I must out of necessity resort to formal methods. A machine-like execution of any form of activities may be termed formal. On the other hand, if I permit free expression according to native ability of the individual, the movement, I say, becomes natural.I do believe that jerky angular free exercises are unnatural, yet this type has physiologic and corrective values.The same is true of the exercises on the various gymnastic apparatus. Personally, I shall always take the middle road: I am neither a worshipper of natural or unnatural (formal)exercises. I believe we must have both."

In the main, natural movements use only about the middle third of the possible arc of movement. That is to say, the arms are seldom

stretched completely straight nor are they bended to the fullest extent. The same holds true of other parts of the body, there is a possible over-development of certain parts of the body whereas if natural activities were supplementd by some formal physical education the best possible results would be achieved.

Relation of Physiological and Psychological Factors.

In the two previous chapters I tried to show why a program of natural activities must be supplemented by some formal physical education in order to secure the best physiological and psychological results. In this chapter I will show that there is a relation between the physiological and psychological factors; and, although there is a rhythm in their development, nevertheless, they do not have their greatest development at the same time.

Psychical Problems and Physiological Development Go Hand in Hand.

The child's body is a growing organism. It is just because a child's body and sensory and motor organs are in process of growth and development that a child's school tasks should be adjusted to physiological age. The physiological age should be the guide.

Along with physiological development many psychical problems arise which heretofore never put in an appearance. These psychical problems have a direct effect upon the mental and physiological development of the individual.

A boy may be a member of a clique or gang and in participating in its activities would be, and doubtless is, greater at fifteen than it was at ten or twelve. There might be qualitative differences. Thwarting instinctive expression almost invariably results in displeasure, if not in anger. The chagrin or rage felt by a youth of sixteen when his attempts at self-assertion are nipped in the bud

would differ markedly from the feeling exoerienced under similar circumstances by a ten year old.

In Secondary Education by Douglass you will find," There is also a physiological basis for the more intensive emotional life at adolescence.This basis is found in the increased muscular development which has already been mentioned,and in the development of the ductless glands. It should be pointed out that muscular, kinaesthetic, and organic sensations form a very important part of that stirred-up state of the organism called emotion.The secretions of the ductless glands, notably the adrenals, increase during emotional excitement and stimulate greatly both muscular and organic action.While knowledge of the ductless glands is imperfect, there can be no hesitation in saying that they exert influence upon specific aspects of bodily growth, are interdependent in their development,and undergo rapid growth during the early adolescent period. This is especially true of the gonads. Glandular and muscular growth thus give a physiological basis for intensified emotional life at adolescence."[1]

There are periods in life in which the physical development shows marked changes. It is during these periods of physiological growth that the burden is placed upon other systems of the body which in turn affect the psychical functioning capacity of the individual. Physical education must be adapted to meet the problems accruing

[1] Douglass,A.A.-Secondary Education-Houghton Mifflin Co.-1927.

from these developmental periods. Along with the periods in which there is greater physical development, consequently a different functioning individual, the psychical problems change with each development period.

Mental and Physical Growth Is Steady and Uniform.

Just as there are marked periods in physical growth, there are also marked periods in the mental development of abilities; also the changes in mental development come at the time of physiological changes in the body. These changes are steady and uniform. Freeman writes," Mental tests have shown clearly that the pupil grows in mental power or in learning capacity from the time of entering the kindergarten until later adolescence. There is not entire agreement concerning the comparative rate of growth during different periods of childhood and youth; but the more recent and reliable evidence seems to show that the rate of growth is more nearly uniform throughout these periods than investigators formerly supposed. We can count on increased capacity to do school work or on capacity to do work of a higher level or more difficult charcter, certainly up to the age of fourteen or fifteen, and very probably up to the age of eighteen or twenty. This general fact has been recognized in the organization of the curriculum into levels which make higher and higher intellectual demands upon the pupils."[1]

1.Freeman, Frank N.-Mental Tests-Houghton Mifflin Co.-1926.

Thorndike and Gates have the following to say," In general, the growth of physical and mental capacities proceeds at a steady and uniform, rather than spasmodic, rate from birth to a maturity between the middlt teens and the early twenties. The skeleton reaches its maximum length in the middle teens and persists with little change until death. Bobily strength and endurance, though nuch subject to environmental influences, reach a maximum in the vicinity of twenty, remain relatively stationary for about ten years, and then gradually decline. Speed and flexibility show a similar curve of growth and decline. The ease and speed with which most forms of information and intellectual skills may be acquired and the permanence with which they are retained increases at a rather steady pace and reaches a maximum, probably, between 18 and 22, for most persons, and maintains approximately the same level for several years, thereafter declining gradually perhaps by one per cent per year until old age. Thus while infancy is most plastic in the sense that the young child is eager to learn along lines of childish interest, is most submissive to guidance in learning, and is, so to speak, most wide open to the influence of experience, and, perhaps, most fundamentally affected by what he does learn, it is, nevertheless, not the most plastic period in the sense of ability to learn quickly. Indeed, the zenith of power to acquire most forms of information and skill appears after the eighteenth year. Sheer capacity to learn is appreciably greater in the period from 14 to 28 than from birth to 14."[1]

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[1] Thorndike and Gates-Elem. Principles of Education-Macmillan-1929.

And to quote from Douglass's Secondary Education," The relationship existing between mental and physical growth has been the problem of several comprhensive investigations. Most of these were made a number of years ago, before the extensive development of mental testing. The general method of procedure, simply stated, was to determine by physical measurements and observations the physiological age of the pupils,and to determine the relationship existing between this factor and success in school work. Some of these studies gave negative results;the majority of them, and particularly the more careful and the more recent ones,showed that those boys and girls who were older physiologically did superior school work. From this the conclusion was drawn that they were likewise mentally accelerated. It was found,also, that boys and girls taller and heavier than the average reached the pubertal period earlier, and the inference was similarly adduced that they were mentally superior.It will at once be evident that the nature of the data would make these conclusions tentative.

Perhaps the most important evidence dealing with this whole question is that produced by Baldwin, who effected successive mental and physical measurements upon the same group of children over a period of years.It should be stated specifically that he determined mentality in terms of intelligence quotients- a much more scientific method than that of depending upon school progress or marks. Baldwin found mental growth curves to be strikingly similar to physical growth

curves. The upward trend in the curve of mentality for girls begins to show espacially marked changes between the ages of eleven and twelve; in the case of boys, acceleration appears somewhat later. This adolescent superiority of girls accords with other known facts indicative of the early maturity of girls. Superior girls show their acceleration earlier than average girls, and the same is true in the case of superior and average boys. According to Baldwin, there is no time at which new mental traits suddenly appear, and the rise in the mental growth curves apparent at the ages of eleven to fourteen may be due to increased strength of traits that have long been developing, or to increased mental vigor similar to the accelerated growth in physical traits. He thinks, also, that mental age ratings are the result not only of native intelligence, but also of the degree of physiological acceleration over that which is normal for the age."[1] If physical education is to be man's servant, then it must be adapted so that some particular phase can be applicable to the different stages of development.

Physical Education Must Be Adapted So That The Organs of The Body and The Mentally-psychic Abilities Develop Harmoniously.

We know that man develops mentally and physically. When education can be adapted to meet this development, only then can the best

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[1] Douglass,A.A.-Secondary Education-Houghton Mifflin Co.-1927.

results be achieved. Education, mental or physical, varies greatly but only when we know the results and make the selection to correspond to the development period at hand which will make for better adults , then education is fulfilling that for which it is intended.

It states in Thorndike and Gates's Elementary Principles of Education the following, "The function of each period of education in school is to enable every pupil at each stage to achieve the most productive and satisfying participation in life at that time. The purpose of schooling as a whole for each individual is to equip him to continue, after leaving school, to participate in life most fruitfully. The most productive and satisfying participation in life requires the achievement of physical vigor, mental health and balance, and of those adjustments to the physical world, to social, civic, economic, and family situations and the acquisitions of those ethical, religious, recreational and intellectual resources which will promote most abundantly the interests of mankind as a whole. The general aim of increasing the fullness of life for each individual by promoting the welfare of society at large requires not only adjustment to the needs of each stage in development during the whole period but specialization in school to harmonize with different careers in after-school life. That there are no breaks or separate stages in the anatomical, physi-

ological, emotional, or mental development of individuals between birth and maturity. It was also stated that education must be a continuous development produced by progressive reorganization of experience on increasingly higher and more complex levels. The range of information, the level of skill, the richness of appreciations, the strength of control, the fullness of self-activity under the best forms of education show continuous increase. Since development, both as it depends on innate growth and personal experience, is continuous, the school system should similarly be one series of intimately connected links without a break." [1] Matthias, too, writes of this development in the following manner, "We speak of a development direction. In man this manifests itself from within outward; it results from the development status of his body organs, and his mentally-psychic abilities. Real education, be it physical or mental, must aim to adapt itself to these development periods. Only then, when this is done can the most favorable results be achieved. This demand also concerns physical education. Our dissertations have taught us how varied the selection may be, physically as well as mentally, and how the results correspond. Only then, when the selection corresponds to the development need, may the best influence be attained, only then is physical education capable of

1. Thorndike and Gates-Elementary Principles of Education - Macmillan - 1929.

fulfilling its deeper meaning."[1]

One of the essential needs of the child as a mobile organism is the need of physical activity, which promotes organic development and a normal balance between this development and that of the intellect. The central principle of education consists, not in restraining at each instant the need for natural expansion, but employing and directing it in useful channels. It is desirable to enlist the energies of students as often as possible, both by word and deed, and to give every place to physical activity in every form.

Must Know the Behavior and Reactions of an Individual in Psychological and Physiological Terms.

To know the behavior and reactions of individuals in regard to different activities in psychological and physiological terms, then physical education can be of the utmost importance in the development of man as a perfectly functioning animal. Gates writes," To understand the instinctive equipment of man is to comprehend the dirction in which activity is likely to run, to perceive, in some measure, what kinds of activity individuals are likely to seek and avoid."[2] And to add from Matthias, " It becomes then a matter of personality as to which kind of competition one should choose. Every one of these forms of expression, be it sport or gymnastics, be they apparatus exercises or light athletics, golf, swimming, tennis, cr

1. Matthias, Eugen-The Deeper Meaning of Physical Education-Barnes-1929

2. Gates, A.I.-Psychology for Students of Education-Macmillan-1929.

mountain climbing, in the last analysis calls for a peculiar type of individual. Not the system in itself is good; it can only be good when it is relative to the person who practices it. Therein lies the great secret, that the individual man understands how to select this or that kind of gymnastic or sport activity that is best suited to his physical and mental make-up. In connection with this, and that is of importance, the profession must be taken into consideration. People who are, for example, unfortunate industial autimats, whose task is one of fatiguing monotony, must select gymnastic or sport activities which occupy all their senses, bring all their nerves into play, such activities as football or apparatus gymnastics. Men who carry great responsibility, on the other hand, should select such forms, which because of their manifold changes in activity furnish soothing adjustments for the nerves." Further on he states, " The man of to-day, to-morrow, and the day after is not the same being. Our body-soul also changes in the run of time. What to-day is need and inner urge may to-morrow or the day after be unsuited to us. Other conditions, other needs, have touched us closer. Woe unto man in whom this does not hold good. Only this change enriches our lives. This change alone promotes in us the final possibilities, keeps body, senses and soul awake. For this reason this change is a determining development power for every human being. Without it the flood-

light rhythm of life gradually ceases."[1]

Regardless of the form of activity, its worth depends on how that activity is received by the individual. It involves on his part the necessity of contemplation which is a very prominent factor in human life. Activity itself neglects the inner urge of the individual, but should arouse in man the manner in which he should utilize the activities and fit them to his specific needs. Then, physical education would be exemplified to man in all its fullness and meaning.

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[1] Matthias, Eugen-The Deeper Meaning of Physical Education-Barnes-1929

Summary:

The leaders who believe that a program in physical education should consist only of natural activities over emphasize tha advantages of natural activities, and to say the least, under-state the values accruing from formal exercise and activities. The matter is very largely one of motivation and methods in teaching. To wait upon the expression of child's interest and needs for goals of activity is to neglect the approved values of race experience. The ideal is the combination of children purposes and adult purposes. The former bring them genuine motivation for real learning. But it is of primary importance to take care lest child purposes dominate the curruculum; for the child's interest and needs are of short duration, and it is impossible for him to realize without adult help the larger and more meaningful goals which direct all learning. It should also be clear in the light of modern science that the upright carriage is not yet too well fixed and that our systems of exercise should be used to strengthen the upright posture and physical poise. In the home, discipline and coorection come from the parents. They present by example and direction the highest excellence in life and sponsor such activities as will in accord with their rich experience enable the child to secure full development of personality. This ideal is insured by the helpful and prudent guidance of parents. The school is the ideal home magnified. It is made up of children from many homes, bringing a wealth of experience of various kinds.

It is a place where their horizon of learning, of doing, of cooperating, is enlarged and extended. The teacher's task is accordingly magnified. As parents do not merely provide an environment for action, neither is the teacher's task merely the provision of the best environment. The teacher is the most important factor in the school environment.

Proper supervision is necessary. What would be the thought of the teacher, who because a boy or girl was quick or capable left them to their own resources and inclination? Yet we hear people saying ' All exercises should be voluntary, should be left entirely to a boy's own choice and disposition.' Do we allow him the same license with his diet, his hours of rest, his study ? The developed capacity of the untrained body is as far from the symmetry and strength to which it may attain with proper training and under supervision as the clever, self-taught man from what he would have been with thorough professional instruction.

Those who sponsor a purely natural program are taken away by their devotion to method; and, in taking out of the program formal physical education they have deprived the science that upon which it owes its existence; and from that foundation certain valuable elements should be kept and communicated.

The natural program is too radical a step to take because:-

1. An experimental method should not be of itself sufficient to determine the final objectives of a program.

2. A program should not be based on interests and purposes of children.
3. It isn't natural to teach children on pupil purpose basis.
4. It isn't wholesome to convey the notion to children that education is to be conducted on their interests or purposes; there should be sense of social responsibility and not overemphasized individualism.
5. Childrens' interest and needs are of short duration, and it is impossible for them to realize without adult help the larger and more meaningful goals which direct all learning.

Formal physical education should not be eliminated from the program because:

1. The physical development of children must be considered in our modern environment.
2. Formal physical education permits us to carefully supervise the activities of growing children.
3. To eliminate formal physical education from the program you are taking away a phase of physical education which has proven its worth.
4. Natural activities are types of activities in which the percentage of failures would be great. A boy or girl would become bored if not competent.
5. Physical education is being taught with a psychological meaning only.
6. There is a place for formal and natural types of activities .

Bibliography.

Bainbridge,F.A.-Physiology of Muscular Exercise-London-1919.

Baldwin,B.T.-The Physical Growth of Children from Birth to Maturity-
Univ. of Iowa Studies.

Burnham,William H.-The Normal Mind-D.Appleton & Co.,-New York-1924.

Chapman and Counts-Principles of Education-Houghton,Mifflin,Co.-
Boston-1914.

Counts,George S.-The American Road to Culture-John Day Co.
New York-1930.

Curtis,Henry S.-Education Through Play-Macmillan-New York-1917.

Dewey,John-Democracy and Education-Macmillan-New York-1929.

Dewey,John-Interest and Effort-Houghton,Mifflin,Co.-Boston-1913.

Douglass,Aubrey A.-Secondary Education-Houghton,Mifflin,Co.
Boston-1927.

Ferriere,Adolph-The Activity School-John Day Co.-New York-1928.

Freeman,Frank N.-Mental Tests-Houghton,Mifflin,Co.-Boston-1926.

Gates,A.I.-Psychology for Students of Education-Macmillan-New York-1929

Hall,G.S.-Adolescence-D.Appleton & Co.-New York-1911.

Kilpatrick,William H.-Foundation of Method-Macmillan-New York-1926.

Lee,Joseph-Play in Education-Macmillan-New York-1915.

Leighton,Joseph A.-Individuality and Education-D.Appleton & Co.
New York-1928.

Matthias,Eugen-The Deeper Meaning of Physical Education-A.S.Barnes & Co
New York-1929.

Norsworthy-Whitley-The Psychology of Childhood-Macmillan-New York-1922.

O'Hara, Rev. James H.-The Limitations of the Educational Theory of John Dewey-Washington-1929.

Peters Charles C.-Foundations of Educational Sociology-Macmillan-New New York-1925.

Rogers, Frederick Rand-Educational Objectives of Physical Activity-A.S.Barnes & Co.-New York-1929.

Rugg and Schumaker-The Child-Centerd School-World Book Co.-New York-19 28

Smith, E.R.-Education Moves Ahead-Atlantic Press-1924.

Stearns, Drury, Peabody, Howe, Thayer, Small-The Education of the Modern Boy-Maynard & Co.-1925.

Thorndike and Gates-Principles of Education-Macmillan-New York-1929.

Tyler, J.M.-Growth and Education-Houghton, Mifflin, Co.-Boston-1907.

Wayman, Agnes R.-Education Through Physical Education-Lea & Febiger-Phiadelphia-1928.

Williams, J.F.-Organization and Administration of Physical Education-Macmillan-New York-1922.

Williams, J.F.-Principles of Physical Education-W.B.Saunders Co.-Philadelphia-1927.

Wood, Thomas D.-Child Health Organization Pamphlet.

Wood and Cassidy-The New Physical Education-Macmillan-New York-1930.

The following books listed in the bibliography were studied thoroughly:

Bainbridge,F.A.-Physiology of Muscular Exercise.

Burnham,William H.-The Normal Mind.

Counts,George S.-The American Road to Culture.

Dewey,John-Interest and Effort.

Douglass,Aubrey A.-Secondary Education.

Ferriere,Adolph-The Activity School.

Lee,Joseph-Play in Education.

Matthias,Eugen-The Deeper Meaning Of Physical Education.

Rogers,Frederick Rand-Educational Objectives of Physical Activity.

Smith,E.R.-Education Moves Ahead.

Thorndike and Gates-Principles of Education.

Williams,J.F.-Organization and Administration of Physical Education.

Williams,J.F.-Principles of Physical Education.

Wood and Cassidy-The New Physical Education.

The remaining books listed in the bibliography were read and parts selected for careful studt.

In addition to the bibliography some of the material in this thesis was secured from questionaires sent to leading physical educators in different parts of the United States.