A PHILOSOPHICAL BASE FOR A PHYSICAL EDUCATION PROGRAM DESIGN

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ABSTRACT

A PHILOSOPHICAL BASE FOR A PHYSICAL EDUCATION PROGRAM DESIGN

by Ione Genevieve Shadduck

The purpose of this study was to derive a philosophical base for determining a Physical Education program design. The approach to the problem was threefold:

First, to define criteria for the selection of content in Physical Education which would, presumably, contribute to the intellectual growth and skill competence of all students. An examination of the contributions which education hopes to make to the individual in a rapidly changing environment and an interpretation of Physical Education led to the identification of specific contributions which could be made through Physical Education. These contributions were grouped into four categories: purpose-establishing, purpose-achieving, aesthetic-ethical, and emerging self-other behavior. The specific contributions which were identified served as criteria for the selection of content in Physical Education.

Second, to establish criteria for deriving a conceptual base for Physical Education content structure necessitated by the growing emphasis on subject matter

structures for intellectual achievement. Three basic criteria were used: basic unity, sequential logic, flexibility. As a result five content themes were derived to form the unifying threads which bind together the vertical components and form the scope for all horizontal components in the content structure: (1) History of Movement: Cultural Heritage, Social Structures, (2) Movement: Unity of Pattern; Diversity of Type, (3) Changes in Movement: Age, Practice, Conditioning, (4) Interrelationships: Structure and Function of the Moving Organism, (5) Individual Optimal Movement: Regulation, Balance.

Third, to develop a Physical Education program design for kindergarten using this philosophical base for selecting and organizing content and in developing evaluative tools and procedures. The performance base for kindergarten was established through a selective review of research evidence on early development of movement behavior and motor skills.

The philosophical base for a Physical Education program design is not intended as a final statement of authority, nor is it intended as the only philosophical base. Certain considerations, choices, and philosophies of the person or persons making curriculum decisions will make some developments seem of greater worth than others. It is recognized that data derived from all sources must be evaluated by those shaping curriculum.

There are many ways to formulate a philosophical base for a Physical Education program design. Implementation of a philosophical base may take many forms. Procedures used in this study included an attempt to use pertinent research information wherever possible. Careful consideration was given to theories, experiences, and speculations of others. In the final organization, the investigator has sought to bring as much wisdom to bear on the controversial problems as possible.

The ultimate worth of a program design can only be determined by implementing and evaluating it in a specific situation. This study does not undertake to evaluate the Physical Education program design for kindergarten, nor is it based on a specific group of children in a specific setting.

A PHILOSOPHICAL BASE FOR A PHYSICAL EDUCATION PROGRAM DESIGN

By

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A THESIS

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DEDICATION

This thesis is dedicated to V. Andree' Bayliss whose faith and support made this work possible.

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INTRODUCTION

The Challenge for Curriculum Change in Early Education

An Increasingly Complex Environment

American education must respond to vastly expanding knowledge, improved research techniques, new methods of communication, an ever increasing rate of technological change, a shifting American value structure, and the significant discoveries about people and learning which emphasize individual differences. Of vital significance is the education of the children in an environment which is becoming increasingly complex. Value patterns of the past are being disturbed and new directions are not clear. Experiences in the schools must develop stability within the children, skills with which to apply new information, and ethical values for guidance of behavior. Children must learn to think clearly, respond quickly, and face pressures and tensions that demand better training and greater adaptability than were required in the past. Because of the increasing interdependency of people throughout the world, children must develop a sincere interest and appreciation

for people whose appearance, language, or customs are different from their own. Cooperative effort and sensitivity to the needs of others are essential for living in a changing and widening world.

A New Emphasis on Early Childhood Education

There is a growing emphasis on early childhood education. Development of programs has moved downward--from adolescence to childhood. Recent emphasis is on early childhood extending from primary grades down through kindergarten and nursery school. Several content areas, e.g., mathematics, science, and social studies, have defined and sequenced their content starting with the primary grades. Programs such as Head Start have shown that children can benefit from earlier school experiences. New learning is rooted in previous learning and earlier learning affects that which follows. Emphasis on early childhood education is essential because the early years are root years in the development of (1) the self concept, (2) concept formation, (3) language development, and (4) creativity (117). The view of himself which the child develops in these early years has a profound and pervasive effect on how he functions in later years. A broad base of direct encounters helps the child move toward abstract structure and reasoning. Thought is intimately linked with a dependence upon language. Language development enables the

child to store information, recall information, and solve problems. Curricula must be developed which afford opportunities for original and self-selected work, and for practice of discovery techniques as ways of learning (117).

The explosion of knowledge and the new insights into the way children learn have presented the schools with a challenge for changing procedures and seeking new direction in early childhood education. The task of education is to use this new knowledge and insight in developing criteria which will guide the selection and evaluation of new curricula in meeting the challenge of a changing environment.

Physical Education--A Response to Challenge

Major national curriculum studies similar to those of science, mathematics, and physics have not been undertaken by the Physical Education profession. A number of national projects are ongoing, such as The Lifetime Sports Education Project which started in June 1965 and the Project on Recreation and Fitness for the Mentally Retarded. The President's Council on Physical Fitness has developed Physical Fitness Demonstration Centers throughout the country. The availability of federal monies through the Elementary and Secondary Education Act of 1965 (Public Law 89-10), has enabled many local units to develop curriculum projects.

To the knowledge of this author, no national or local project has structured and sequenced Physical Education content in terms of concepts and movement performance. Professional interest in the need for determining the structure of content has been expressed in professional journals. The Dance Division of the American Association for Health, Physical Education and Recreation (AAHPER) has looked at dance as a discipline and attempted to define its content (152). Two recent studies (1965, 1966) have involved the development of conceptual structures for Physical Education. One study (7) was developed for physically handicapped students; and the other study (113) was developed for higher education.

Interest in exploration and discovery about movement in relation to the self, others, and the environment has increased under the Movement Education approach (87). The concepts of discovery, problem-solving, and creativity in movement are not new. The work of Diem (41) of Germany, Morrison of England (116), and Laban (102) are well known in this area. Andrews (6) in America has utilized this approach in the development of a variety of learning experiences for young children. In spite of the increasing interest and the research evidence which stresses the importance of early experiences, there is little in the Physical Education literature which could guide the teacher

in a systematic development of concepts or movement performance during the early school years.

Current programs are not adequate to meet the needs of the children in a rapidly changing environment. Contributions which can be made through Physical Education to the learner in the school must be identified and implemented through the selection of content and evaluation of progress. If the early years are the root years in the development of the self concept, concept formation, language development, and creativity, then Physical Education can probably make its greatest contribution in the early elementary program. Movement performance is an important part of feelings of competence and therefore affects the body image and self concept (21, 56, 76). Active, continuous learning which includes many movement experiences provides the basis for cognitive processes (168, 89, 126, 114, 97, 25, 71, 10, 52, 21, 56). The symbolic communication system used in games, sports, and dance--of vital interest to children--can add to the total language development of the early years (52, 145). Certain games, sports, and folk dances can provide a channel for understanding children throughout the world. Opportunities for exploration and discovery must be provided to complement the creative endeavors of children's play activities.

Strategy for curriculum change must be planned and integrated within the total curriculum decision-making

process. Curriculum decisions are usually made at three distinct levels: local, state, federal. At the local level, decisions on general content and curriculum structure are made through curriculum committees, administrators, and school boards. Teachers at the local level make final decisions on specific content to be taught each day. General decisions about curriculum are made by education officials and authorities of the state; federal government makes certain curriculum decisions by the sponsorship and support of selected curriculum programs. Decisions about what the schools should teach depends upon the recognition that certain decisions are best made at each level.

Statement of the Problem

It is the purpose of this study to derive a philosophical base for determining a Physical Education program design by:

1. Defining criteria for the selection of content in Physical Education which would contribute to the intellectual growth and skill competence of all students;
2. Establishing and applying criteria in deriving a conceptual base for Physical Education content structure;
3. Developing a Physical Education program design for kindergarten using this philosophical base

for selecting and organizing content and in developing evaluative tools and procedures. The performance base for kindergarten was established through a selective review of research evidence on early development of movement behavior and motor skills.

Scope of the Study

A philosophical base for determining a Physical Education program design with an example of implementation at a specific level has been attempted using pertinent basic research information wherever possible. The theories, experiences, and speculations of others have been carefully considered. In the final organization of content for kindergarten, the investigator has sought to bring as much wisdom to bear on the controversial problems as possible.

The identification and structuring of content is essential not only to the subject-matter area itself, but for integration with other content areas of the curriculum. The lesson plans and evaluative tools have been developed from theoretical concepts derived by the investigator from research evidence and descriptive information. Definitive criteria need to be established for evaluating the effectiveness and teachability of the lesson plans. The evaluative tools need to be objectively checked for use as a record of status and progress of the learner.

A longitudinal study would be necessary in confirming that the specific contributions identified could be made through Physical Education and the concepts selected for kindergarten would form the base for building toward the key concepts.

The ultimate worth of a program design can only be determined by implementing and evaluating it in a specific situation. This study does not undertake to evaluate the Physical Education program design for kindergarten, nor is it based on a specific group of children in a specific setting. Methods for implementation in a specific school system need to be developed. It is recognized that the most effective strategy for curriculum development demands curriculum decisions at all levels: federal, state, local.

PART I

SELECTION AND STRUCTURE OF PHYSICAL EDUCATION CONTENT

CHAPTER II

THE SELECTION OF PHYSICAL EDUCATION CONTENT

The selection of content should be guided by the specific contributions which can be made through Physical Education within the over-all contributions of education. Direction which education takes in defining its contributions must come through an understanding of the powerful forces and ideas which are reshaping the environment. Many sources (15, 17, 44, 73, 75, 77, 104, 123, 132, 136, 171) attest to forces which are producing change in America and thereby influencing educational practices. A summarizing list of the dominant forces of change which are placing new demands on education will be found in Chart II.1.

A reconsideration of the function of education, in light of these forces, takes on a new sense of urgency. Children must be prepared for an unknown future. The pace of our activities, the impact of new ideas, new knowledge, new people, our comprehension of the nature of the universe--all these are changing continually. The commitment of the school is to the learner as a person and to the needs of individuals as members of a society. The

CHART II.1

DOMINANT FORCES OF CHANGE PLACING NEW DEMANDS ON EDUCATION

	Dominant Forces of Change		New Demands on Education
1.	Explosion of scientific and technological knowledge.	1.	Find means of handling tremendous wealth of knowledge.
2.	Transportation and communication advances.	2.	Utilize advances, recognize and deal with impact of mass media and mobility.
3.	Bigness, complexity, automation in almost everything including the schools.	3.	Counteract dehumanization and alienation from society; promote individual creativity.
4.	Ever-increasing population throughout the world.	4.	Emphasize sharing and structured planning for the future.
5.	Demand for specialization as industry and technology expand forces.	5.	Make curricula priority decisions.
6.	Rapidity of change exaggerating differences between past and future.	6.	Counteract feelings of personal insecurity, estrangement, and rootlessness.
7.	Racial integration, population mobility, and the relatively easy shift from one socio-economic level to another.	7.	Evaluate value systems and ways of integrating all races.
8.	Disintegration of family unit and striking changes in family patterns.	8.	Reinforce personal security and inner roots.
9.	Shift in value orientation which has long guided the American way of life resulting in a value crisis among the youth.	9.	Clarify value system of adults; guide youth in forming own beliefs.

task of the school is not to slow down technological and scientific advance, but to direct these forces of change toward the fulfillment of human purposes.

A continuing analysis of the forces of change and their significance for educational practices is crucial. The development of individuals with the capacity to adapt in a rapidly changing environment requires a new look at the ends sought and contributions most essential in fulfilling human purposes. The selection of content should, therefore, be based upon the contributions which can be made to the individual in a rapidly changing environment.

Educational Contributions

Many writers (55, 57, 72, 133, 140, 142, 149, 155, 156, 164, 173) have suggested a reconsideration of educational contributions because of the changing culture. Many conferences have been held to discuss educational goals as affected by these changes. Chase (32) has suggested contributions which seem to reflect general views based on analyses of the transformations in culture and society to which education must respond. These contributions are listed below:

1. "The ability to use relevant processes for selection of goals and activities" (32:290). Learning experiences can help the individual in making choices in midst of the uncertainty and value conflicts characteristic of

contemporary American culture. This involves purpose-establishing behavior.

2. "The ability to select and use means appropriate to learning and other goals" (32:291). Learning experiences can help the individual find and efficiently use the appropriate and essential means to reach chosen ends. This involves purpose-achieving behavior--effectiveness of performance.
3. The information and disposition to identify and apply aesthetic and ethical criteria to the way activities are performed. Learning experiences can help the individual bring to activities a lively sense of joy, a sense of style, and a consciousness of feelings. This involves aesthetic-ethical behavior--cognizance of form, sequence, harmony, precision, and impact on self and others.
4. The ability to respond to an increasing range of phenomena and relationships with understanding, appreciation, and appropriate action. Learning experiences can help the individual in the process of becoming--a steadily enlarging ability to respond with satisfaction to: one's self; to others; to the phenomena of nature; the perceptive insights of art; the processes of

science; technical excellence; the complexities of human nature and relationships. The desired outcome is emerging self-other behavior--an increasing openness--both to the world and to the self.

These contributions have been selected, not only because they reflect the changing culture, but also because they reflect the needs of the individual within a changing culture and the ways in which education can contribute to the fulfillment of human purposes. They will serve as the educational framework within which the specific contributions of Physical Education will be defined.

An Interpretation of Physical Education

An interpretation of Physical Education is based on the personally derived philosophy of this investigator. The philosophy is derived from evidence currently available from experimental research, observations, professional judgment, and experience.

Definition of Physical Education

Physical Education is a program of continuous search for meaning in human movement. An understanding of the forces in man and environment which enable comprehension, control, direction, and organization of his movement--not only in games, sports, and dance, but in all life situations--should be a means toward effective behavior and individual fulfillment.

That Physical Education is the search for meaning in human movement--the personal significance of participation in movement activities--is the integral idea which must be sustained so that the scope, logic, and continuity of the content is not lost during a time of rapid change. Personal discovery of the meaning of information by the individual must be a part of acquiring new information or participating in new experiences. Knowing is the result of gaining new knowledge. A change of behavior is the result of discovery of meaning. This change has to be made by the learner himself. A search for meaning necessitates experimentation, exploration, and a groping for new meanings as old ones are challenged. It encompasses a continuous process in which deeper discovery of meaning can be found in things already known.

On the basis of this definition, the domain of Physical Education can be identified. Domain is defined as that "natural phenomenon, process, material, social institution, or other aspect of man's concern on which . . ." attention is focused (99:74).

Domain of Physical Education

The domain of Physical Education is the study of human movement from conception through maturity. Human movement is a natural phenomenon which is the focus of study in Physical Education. Movement experiences compose an essential aspect of learning about self and the

world--a process which contributes to the development of a self concept and an awareness of people and elements of the environment. The extensive social structures organized for the promotion of sports, games, and dance are part of the realm of Physical Education. The concern for the individual and the fulfillment of human purposes centers around the role of physical activity in the perpetuation of vital health in an increasingly sedentary society; it emphasizes the role of expression through movement in an increasingly technological and impersonal society; it demands opportunities for communication among peoples of the world through the commonality of movement in games, sports, and dance.

Each content area has its own known and used technical vocabulary, system of notations, and precise meanings for commonly used words. The responsibility for developing a command of the language system of Physical Education cannot be escaped. The technical vocabulary of movement forms and the nonverbal communication of expressive movement comprise a system of symbols drawn from many sources but used in a unique way in Physical Education. Examples within this system of symbols are given in Chart II.2.

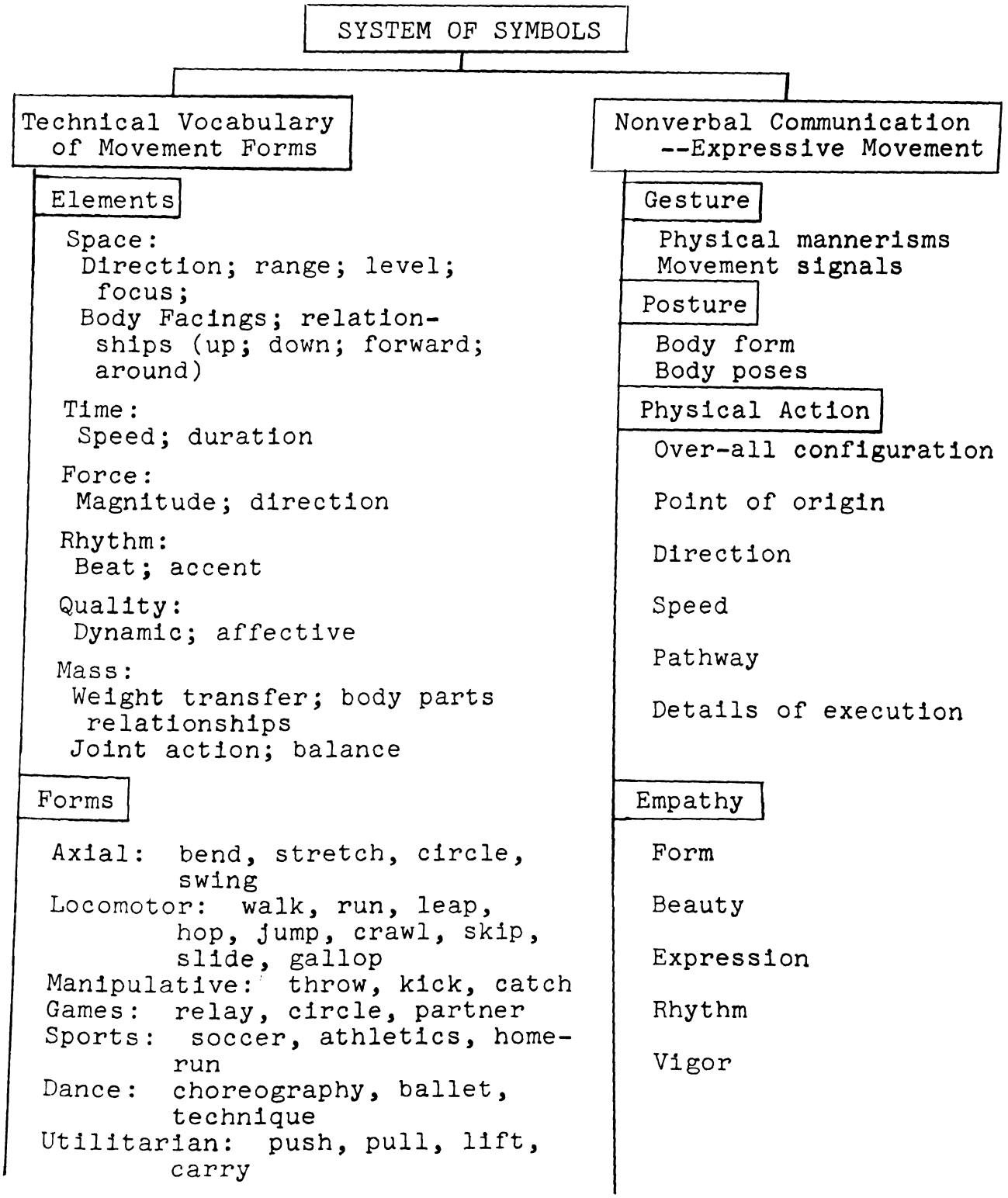
Specific Contributions of Physical Education

The selection of content in Physical Education should be guided by the specific contributions which can

CHART II.2

AN EXAMPLE OF SYMBOLS CHARACTERISTIC
OF PHYSICAL EDUCATION

PHYSICAL EDUCATION--THE STUDY OF HUMAN MOVEMENT



be made to the learner within the framework of the over-all educational contributions. The four categories of educational contributions which were identified in a previous section will serve as the framework within which the specific contributions of Physical Education will be defined. These categories are as follows:

1. Purpose-establishing Behavior
2. Purpose-achieving Behavior
3. Aesthetic-ethical Behavior
4. Emerging Self-other Behavior

In Charts II.3-a, II.3-b, II.3-c, and II.3-d, the educational aim has been defined under each category. The specific contributions which can be made through Physical Education are grouped within each category according to: (1) understandings, (2) performance, and (3) sensitive awareness.

Specific contributions should not be confused with objectives of a unit or a program. The contributions are an inherent part of each learning experience which cumulatively become integrated with the contributions of other content areas to fulfill the educational aim. It is well recognized that constructs of the learning environment are essential in making specific contributions through Physical Education. Each learning experience must have inherent worth--significance for the individual--not necessarily in terms of some eventual change in behavior, but

CHART II.3-a

SPECIFIC CONTRIBUTIONS--PHYSICAL EDUCATION

Purpose-Establishing Behavior

Educational Aim: "The ultimate aim is to help the individual choose with care the ends for which life is spent" (32:290).*

Increase Understanding Of:

The Role of:

- Movement activities in vocational and avocational pursuits;
- Participation in movement activities and competence in motor performance in becoming a contributing member of society;
- Movement as an art in the need of man to order, express, and communicate his appreciation of truth and beauty;
- Movement in man's search for values and meanings to give significance to life;
- Enduring American values--dignity of the individual; equality of opportunity; integrity of man; freedom--in movement activities;
- Movement activities in promoting feelings of physical vigor and emotional well being;
- Institutions of society (government, education, industry, religion, social units, business) in the organization of movement activities;
- Age, sex, cultural groups, socioeconomic groups in professional and leisure pursuits in movement activities;
- The moving self in relationship to the possibilities in movement.

Improve Performance In

Choosing:

- The vocational and/or avocational pursuits in movement activities which contribute to personal fulfillment;
- Movement activities and level of movement competence which enables the individual to become a contributing member of society;
- The art of movement as a means to order, express, and communicate appreciation of truth and beauty;
- Movement as one way to seek values and meaning which give significance to life;
- The enduring American values as a method of relating with others in movement activities;
- Movement activities as a way to promote feelings of physical vigor and emotional well being.
- Movement activities according to the basic purposes for which they were organized;
- Movement activities for professional and/or leisure pursuits according to an evaluation of age, sex, cultural groups, and socioeconomic groups as they influence social expectations;
- Movement which enhances the self from all the possible movements in the world.

Increase In Sensitive Awareness Of

The Relevance in:

- Setting goals in movement activities in the midst of uncertainties and value conflicts;
- Choosing movement activities with care;
- Participation in self-selected movement activities.

CHART II.3-b

Purpose-Achieving Behavior

Educational Aim: The aim is to help the individual find and utilize efficiently "the necessary and proper means to the chosen ends" (32:291).*

Increase Understanding Of

The relationship between:

Movement performance and:	neurophysiological factors of conditioning and practice, body build, nutrition and rest;
Movement activities and:	aging process, emotional release, medical restoration;
Movement and:	body function--anatomical and physiological;
Survival Potential and:	strength and flexibility, endurance, motor skills, total body coordination;
Moving organism and:	physical laws of universe.

Improve Performance In

Using:

General movement patterns; e.g., walk, run, jump;

Complex movement skills;

Movement activities which: result in efficiency of the human organism; help to maintain body weight and attractive body contour; develop strength, physical skill, and total body coordination;

Neuromuscular relaxation techniques;

Sensing and responding to rhythmic movements;

Physical forces to meet external forces;

Critical evaluation of quality of own movement form;

Communication through the symbolic systems of Physical Education;

The techniques for reconstructing the environment--the ability to adapt objects to purpose for movement experiences;

Leadership and followership qualities in movement experiences;

The techniques for organizing and conducting games, sports, and dance activities;

Movement to translate ideas;

Strategy in games and sports.

Increase in Sensitive Awareness Of

The effectiveness in:

The inherent relationship between thought, feeling, and action in movement;

The security potential in own knowledge and adaptable use of movement;

Feelings of competence in being able to master one's own movement;

Self-direction, initiative, and self-discipline in movement activities.

CHART II.3-c

Aesthetic-Ethical Behavior

Educational Aim: "The aim is to enable the individual to bring to activities a lively sense of joy, a sense of style, and a consciousness of affects" (32:291).*

Increase Understanding Of

The necessity for:

- Moving in harmony with the natural environment;
- Mobilizing all energies--physical and psychical--for action according to emotional forces of own nature;
- Gaining enrichment through increasing realm of aesthetic satisfaction in movement forms and movement activities;
- Recognizing the interdependence between men--ways of working together to overcome opposition in games and sports;
- Accepting the laws, rules, codes of conduct in games, sports, dance--spectator and participant.

Improve Performance In

Demonstrating:

- The ability to cope with opportunities, demands, frustrations, and pressures of the environment through the use of movement;
- A rhythmic consciousness--an appreciation for action expressed in line and form--in nature and art, as well as movement;
- A harmonious relationship with the natural environment through movement;
- The ability to select, organize, and integrate all experiential elements necessary for a personalized style of movement;
- Beauty in body form, poise of carriage, and grace in movement and an appreciation for these traits in others;
- The ability to work together to overcome opposition in games and sports;
- Courtesy, acceptance of others, an understanding of the mistakes or difficulties of others;
- Positive attitudes of winning and/or losing in games and sports;
- An acceptance of the laws, rules, codes of conduct in games, sports, dance--spectator and participant.

Increase In Sensitive Awareness Of

The significance in:

- The creative attitude--accepting the content of one's own personality in relation to the task at hand, selecting from it, and exercising critical judgment in seeking the meaning of one's movement experience;
- Beauty in movement, its essential character, means by which it may be judged, and its relations to the sensations, emotions, and thought processes it evokes;
- Following intuition and feelings, exhibiting joy of spontaneity, and living for the moment through movement;
- Empathy as a means of critically judging movement performance of others.

CHART II.3-d

Emerging Self-Other Behavior

Educational Aim: The aim is a steadily enlarging ability to respond, with satisfaction, to: (1) self and others, (2) phenomena of nature, (3) perceptive insights of art, (4) processes of science, (5) technical excellence, (6) complexities of human nature and relationships (32).

Increase Understanding Of

The continuing need for:

Knowing how to apply movement principles in self-selected activities;

Utilizing suitable outlets for creative, cooperative, competitive, and aggressive behavior through movement activities;

Analyzing movement theories of the past for comprehension of current cultural influences;

Using self-expression through nonverbal aspects of behavior--spontaneous and meaningful ways of moving;

Being cognizant of the trends of movement activities in contemporary society;

Knowing how to learn in order to reach a better understanding of movement;

Synthesizing research and information of movement activities within a cultural context;

Studying movement behavior as a method of gaining insight into the behavior of a culture.

Improve Performance In

Responding:

With an accurate judgment of speed, direction, distance, weight, and force in relationship to self moving in space;

In positive action to physical challenge;

With self-control in the emotionally-charged climate of sports and games;

With [illegible] behavior and self-confidence in movement experiences;

With an open, inquisitive mind to problems involving movement behavior;

Positively to evaluation, direction, and constructive criticism in learning and game situations;

With integrated movement which leads to clarification of self-image and enhancement of self-esteem;

In new movement [illegible] by applying concepts learned in earlier activities;

With suitable outlets for creative, cooperative, competitive, and aggressive behavior in movement activities;

Spontaneously and expressively in movement.

[illegible] In Sensitive Awareness Of

The challenge in:

A cultural heritage--respect for the past, loyalty to the present, faith in the future--and the role of movement in this heritage;

A communion with others and the world--meaningful contact with others and a sense of universality through the commonality of movement;

The phenomena of nature--the movement of all living things;

Movement as an inspiration for many forms of art;

Movement activities which can be satisfied through scientific research as a means of understanding human movement;

Reflection on or reconstruction of experience--continuing dialogue of the old with the new.

---

*The quotation is italicized in original text.

for the quality of living in the present. The immediate personal experiencing is a vital element in the learning environment. Choice and freedom should be part of the context of the structured task in education. An open system of transaction--acceptance, confidence, and mutual respect allows the individual to be himself, to be unique, and to go beyond, to be creative (5). This is the type of learning environment which encourages the learner to search for personal meaning in movement activities.

The specific contributions which have been identified will serve as the criteria for the selection of content in Physical Education which will contribute to the intellectual growth and skill competence of all students.

CHAPTER III

THE STRUCTURE OF PHYSICAL EDUCATION CONTENT

A consideration of Physical Education as a content area--what should be taught, how can it be most effective --is a challenge and opportunity. This is an age when assessment of status and trends is common practice and change is expected. The opportunity for change is accompanied by the responsibility for thoughtful action. This action must be made within a realistic framework of current trends in education. The full understanding of Physical Education requires insights into many facets of human movement. This means the acquisition of a body of knowledge. Serious study of human movement requires a continuous integration of two phases of study: one phase pertains to acquiring understanding and insight into movement as it has personal significance in life; the other phase pertains to movement itself as a vital part of living. The body of knowledge or content of Physical Education must be defined and organized into a unified structure which can be logically sequenced to make specific contributions during any level of learning. This structure must be flexible enough to absorb new information so that the content will remain current in a rapidly changing society. In this chapter

criteria for determining a structure of content will be identified and the content of Physical Education will be structured.

Criteria for Determining Structure of Content

A growing interest in utilizing the structures of content areas for direction in choosing learning experiences at many levels has resulted in an increased effort to define more clearly the structure of certain bodies of knowledge. The structure approach is not new. Whitehead (169), Judd (95), and an early attempt to organize social studies around generalizations (13) have emphasized this approach. Each content area has its own traditional structure (98:79). "Structure" is regarded as the identification of key concepts, together with the major relationships among these concepts, and ways of acquiring or confirming new knowledge in an area (137).

It is important that the tremendous influx of new information be evaluated, selected, and sorted into some kind of structure. Knowledge proceeds from facts. These facts become meaningful when they are perceived within the structure of key concepts (20). Many new curriculum studies--mathematics, biology, physics, social studies, health--stress key concepts throughout their courses of study. A structure of content is needed, not only to manage the diversity of accumulating knowledge, but also

to accommodate the new ideas from studies of the learning process. The work of Piaget (126), Bruner (25), and others has pointed out the potential for more effective learning through the use of a structured content.

Two recent unpublished studies have looked at a conceptual content for Physical Education. One study (7), has organized content around three unifying concepts: (1) man's organization for movement, (2) man's capacity for movement, and (3) movement potentiation. Another study (113), identified content for a humanistic Physical Education curriculum in higher education.

From an examination of current curriculum studies, three criteria have been suggested for determining the structure of content in most subject matter areas: (1) the basic unity of the total area, (2) the sequential logic of the concepts, and (3) the flexibility for absorbing new knowledge. Three three criteria are explained below.

Basic Unity

There is an urgent need for clarification of the inherent logic of each content area (166). This inherent logic allows for search and discovery in the learning process--search for patterns within the structure; and discovery of the relationships among these patterns (167). The learning of concepts and their relationships can lead to more complex thinking, use of generalizations and abstractions, in addition to concrete items (137). Mastery

of all the facts of information in an area is impossible. Bits and pieces of information have little or no meaning within themselves. If the learner loses sight of the larger concepts, the educational process may become meaningless. Facts related to larger concepts become meaningful; therefore, they should be grouped into a structured pattern (91,117).

Sequential Logic

With the basic unity developed around themes and key concepts, sequencing of concepts can be done which allows each individual to proceed at his own rate and engage in experiences appropriate to his own level of understanding (20).

Concepts should be arranged in a logical sequence in order to insure an appropriate base for later learning (115). Concepts should be organized so that the learner has an opportunity to use meanings gained in previous experiences and, thus, deepen and extend learning (172). It is the task of the educator to transform the patterned concepts which represent some part of man's knowledge into a sequence of events that is comprehensible to the learner (98).

At each concept level of understanding, each learning experience should present new information, enable children to use old information, and provide opportunities for interrelating the new with the old. The key concepts

are identical at every level of development, but the arrangement of learning experiences vary in type, level of sophistication, materials used, and depth of study (99).

Flexibility

A structure of content should provide for the discovery of new information which is then incorporated into the structure, replacing or modifying obsolete information. New and significant material as developed must be integrated into the existing structure if the curriculum is to meet the needs of the learner in a rapidly changing world. An advance in knowledge around one theme must be absorbed by the rest of the structure. With this criteria, the idea of an inflexible framework must be rejected (99).

Application of Criteria to Physical Education Content

The specific contributions which Physical Education can make to the individual have given insight into the process of defining content. Change is characteristic of contemporary culture. The concepts of Physical Education, the patterning of facts and statements of relationships, are relatively stable. This stability allows a reasonable foundation for a content structure. A definite structure of content is essential to the integration of content areas. The content themes provide a framework within which the learner can progress toward an understanding of the

key concepts. The three criteria suggested for structuring content were used in developing a content structure of Physical Education.

Basic Unity--The Content Themes and Key Concepts

The basic unity of Physical Education content is presented through the process of defining content themes. The content themes have been derived from the process of identification of specific contributions which may be made through Physical Education. These themes form the unifying threads which bind together the vertical components and form the scope for all horizontal components in the content structure of Physical Education. They are as follows:

1. History of Movement: Cultural Heritage, Social Structures.
2. Movement: Unity of Pattern, Diversity of Type.
3. Changes in Movement: Age, Practice, Conditioning.
4. Interrelationship: Structure and Function of the Moving Organism.
5. Individual Optimal Movement: Regulation, Balance.

The content themes and the key concepts which serve them are presented in Chart III.1. For further definition of scope, the key concepts are extended into scope-defining concepts in Charts III.1-a, III.1-b, III.1-c, III.1-d, and III.1-e.

CHART III.1

CONTENT THEMES AND KEY CONCEPTS
FOR PHYSICAL EDUCATION

THEME 1 — HISTORY OF MOVEMENT: CULTURAL HERITAGE; SOCIAL STRUCTURES

Key Concept: Movement is a reflection of the cultural heritage and social structures of the people.

THEME 2 — MOVEMENT: UNITY OF PATTERN; DIVERSITY OF TYPE

Key Concept: Movement is a genetic and environmental product.

THEME 3 — CHANGES IN MOVEMENT: AGE; PRACTICE; CONDITIONING

Key Concept: Movement changes with age, practice, and conditioning.

THEME 4 — INTERRELATIONSHIP: STRUCTURE AND FUNCTION OF MOVING ORGANISM

Key Concept: There is an interrelationship between the structure and function of the moving organism.

THEME 5 — INDIVIDUAL OPTIMUM MOVEMENT: REGULATION; BALANCE

Key Concept: The individual has the primary responsibility for the regulation and balance of his own movement.

CHART III.1-a

THEME

HISTORY OF MOVEMENT: CULTURAL HERITAGE; SOCIAL STRUCTURES

KEY CONCEPTS

Movement is a reflection of the cultural heritage and social structures of the people.

SCOPE-DEFINING CONCEPTS

CULTURAL HERITAGE:

People from the beginning of human existence have contributed to the cultural heritage of movement.

Movement forms change as movement theories change.

Movement which is characteristic of a culture is a reflection of behavioral patterns, mores, customs, and values.

Movement is common to all mankind; therefore, it is a means of communication and understanding among people throughout the world.

SOCIAL STRUCTURES:

Movement activities are organized and conducted through social institutions.

Organized movement activities must act in accordnace with established social rules and system of social controls.

Movement activities are structured according to: age; sex, cultural groups; social groups.

People develop institutions which support their movement activities.

CHART III.1-b

THEME

MOVEMENT: UNITY OF PATTERN; DIVERSITY OF TYPE

KEY CONCEPT

Movement is a genetic and environmental product.

SCOPE-DEFINING CONCEPTS

UNITY OF PATTERN:

Movement is characteristic of all living things.

Movement is governed by the physical laws of the universe.

Members of a biological species possess the characteristic movement patterns of that species.

DIVERSITY OF TYPE:

Movement varies with the genetic potential of the individual.

Movement varies with the physical medium: water; land; air; space.

Movement varies with climatic conditions.

CHART III.1-c

THEME

CHANGES IN MOVEMENT:	AGE; PRACTICE; CONDITIONING

KEY CONCEPT

Movement changes with age, practice, and conditioning.

SCOPE-DEFINING CONCEPTS

AGE:

Motor development follows an orderly sequential pattern which is characteristic of all human beings.

Movement behavior is influenced by the aging process.

PRACTICE:

Movement patterns can be improved with practice.

Movement patterns can be modified for specific activities.

CONDITIONING:

Movement performance can be altered through physiological conditioning.

CHART III.1-d

THEME

INTERRELATIONSHIP:	STRUCTURE AND FUNCTION OF MOVING ORGANISM

KEY CONCEPT

There is an interrelationship between the structure and function of the moving organism.

SCOPE-DEFINING CONCEPTS

Movement performance can be enhanced by the harmonious relationship between structure and function of the organism.

Functional vitality in movement is dependent upon the energy system of the organism: nutrition; rest; organic health.

Structure--body form, body coordination, body composition--is influenced by the functional use of movement.

CHART III.1-e

THEME

INDIVIDUAL OPTIMUM MOVEMENT:	REGULATION; BALANCE

KEY CONCEPT

The individual has the primary responsibility for the regulation and balance of his own movement.

SCOPE-DEFINING CONCEPTS

REGULATION:

Conservation of physical ability begins early and continues throughout life through the regulation of amount and intensity of physical activity.

Physical condition of one's organism influences the quality of movement performance.

Values govern one's world of movement--its direction (type); its dimension (extent).

Conscious control of understanding and reasoning manifests discrimination and personal choice in one's movement.

BALANCE:

Movement experiences provide means for a better understanding of self and the world.

Development of movement potential is related to the effective use of human resources in our society.

Movement provides a basic means of communication and expression.

Sequential Logic--Progression of Concept Levels

The first learning experience is based on the experiential background of the learner and where he is in his stage of development. At each concept level, experiences should consist of continuous interweaving and enlarging of the concepts, the symbols, and performance capabilities. The same key concepts within the content structure are used at every level, but the arrangement of learning experiences and the emphases vary. Learning experiences should be sequenced so they add to the foundation upon which subsequent understandings can be built and the child can move ahead in intellectual development. At each level, the learner should develop a working understanding of increasingly complex concepts. The learning experience should be designed according to the movement capabilities and interests of the learner so that personal significance can become part of the experience.

Flexibility--Potential for Absorbing New Information

Physical Education is a dynamic area. An examination of many sources indicates that new information on the effects of exercise and health on human performance is a major area of research. Interdisciplinary research is contributing to the knowledge of the interrelationships between structure and function of the moving organism and between the moving organism and his environment. The

sociological aspects of games and sports in our culture are being studied more thoroughly. Two books which have been written in this area have come out this year (1967): Man, Sport and Existence by Howard Slusher (150), and, Social Dimensions of Physical Activity by Bryant J. Cratty (34). The role of humanities in the schools has brought a new emphasis in the study of cultural heritage. The billion dollar business related to sports, games, dance and other activities in our society forces recognition and study of the problems and potential of those activities and the social structures which control and organize their development. The role of movement experiences in the optimal development of the young child and how these experiences affect learning have received a new impetus from the theories of Piaget and studies of learning disorders in children. Sedentary activity of man in an increasingly mechanized society and its effects on physical well-being have been continous research areas.

The computerized potential for storing and dispensing information should bring the new information from the research laboratories to the curriculum worker within a shorter time than ever before. The content structure of Physical Education must be flexible enough to absorb all new pertinent information in order that it may be translated into learning experiences.

PART II

IMPLEMENTATION OF A PHILOSOPHICAL BASE FOR A PHYSICAL EDUCATION PROGRAM DESIGN

CHAPTER IV

A PHYSICAL EDUCATION PROGRAM DESIGN FOR KINDERGARTEN

In Part II, an example will be given of how the philosophical base can be implemented at a specific level. The Physical Education program design will be developed for children in kindergarten. In order to give the teacher insight into the developing child and guidance in selecting appropriate movement performance activities, it will be necessary to establish the performance base for kindergarten. This is accomplished through a selective review of research evidence on the early development of movement and motor skills. Physical Education content will then be selected and organized for the kindergarten level, followed by suggestions for evaluation of learner status and progress.

The Performance Base for Kindergarten

Performance of movement patterns and movement skills plays a significant role in the understanding of self and the world. Movement experiences are basic to the varied encounters with the environment which allow the child to engage in the process of concept building. Control of the

moving self is an aspect of development which is reflected in one's total relationship with the world and becomes a cornerstone of personality development (56).

To untangle the complex interrelations of the structural, functional, and psychological factors which influence the movement characteristics of the young child is a challenging task. A child is a complex organism--a thinking, feeling, behaving organism which is not static but is in continual reciprocal interaction with his environment. At any given moment in time, the behavior of the child is a resultant of his genetic endowment plus all the environmental transactions--internal and external--which have taken place since conception.

The genetic and environmental conditions which occur prior to school entry will be discussed in the form of general statements followed by supporting evidence from the literature on the following concerns: (1) the orderly sequence of motor development and the variation among human beings regarding the time at which specific motor developmental stages are reached, (2) the variation in movement behavior--the integral relationships among an individual's movement forms (what he does), movement structures (how he does it), and movement attitudes (why he does it)--among individuals, (3) the factors in early movement experiences which help to establish effective transactions with the environment. This information is a means toward the

understanding of the integral part which movement performance has in the development of the child. It will give the teacher insight into the developing child and may be used in selecting appropriate learning experiences for the individual. A section on performance expectations will serve as a guide to the teacher in the selection of performance activities appropriate for the early years.

Human Movement--Early Development

Statement 1

Motor development proceeds in harmony with biological laws and follows an orderly sequence which is consistent within a species. There is considerable variation among human beings regarding the time at which specific motor developmental stages are reached. The timing of these events is influenced by: Race, Sex, Nutritional Factors, Body Build, Perinatal Factors, Child-Rearing Practices.

Orderly Sequence of Motor Development.--The material contained in Appendix A illustrates the motor development which characterizes the human race, and which normally develops in every child. The continuity in development from fetal and neonatal life through infancy and early childhood is readily apparent. For an indication of the growth of motor activities, as revealed in a study of twenty-five infants during the first two years of life,

see Figure A.1. Shirley (147) observed these infants at intervals of one day until they were one week old; at intervals of two days until they were two weeks old; at intervals of one week until they were a year old; and at intervals of two weeks until the end of the second year. Parents reported on the progress of the infants during the intervals through the use of specially prepared forms.

Additional information on motor development during infancy has come from a number of studies, including those of Gesell and co-workers. The developmental sequences of motor behavior (birth to age 5) have been combined with the behavior growth (embryo to age 5) as presented by Gesell (65,68) in order to illustrate the trends and fields of behavior growth (Fig. A.2). The pattern of flexor-extensor dominance during the development stages of prone behavior and the age at which a given action pattern typically appears as observed by Gesell and Ames (67) is presented in Chart A.1.

Biographical and normative studies, while differing slightly in their age norms for particular items of motor development, are largely in agreement concerning the sequential order of appearance of major items such as sitting, creeping, standing, and walking. Although the sequence of motor development is constant from child to child, it should be recognized, however, that there are wide individual differences in the age at which specific items appear.

Although normative studies indicate the age at which various motor accomplishments are to be expected, they do not necessarily reveal the details about the development of a specific activity from its initial to its final stages. In order to gain insight into this part of development, the following illustrations from the studies of McGraw (111) and Ames (3) have been included in the Appendix: (1) six phases of the resistive aspect of neuromuscular development in achieving a sitting position (Fig. A.3), (2) nine phases in the development of prone progression according to McGraw (Fig. A.4), (3) fourteen developmental stages in prone progression according to Ames (Fig. A.5), (4) seven selected phases in the assumption of an erect posture (Fig. A.6), and (5) seven phases in erect locomotion (Fig. A.7). For a detailed discussion of this development, see Appendix A.

In the progression from supported to unsupported locomotion, there are at first self-initiated stepping movements. Subsequent stages are marked by a lessening of the movements necessary, changes in foot contacts, and improved coordination. A more detailed discussion of this development will be found in Appendix A.

A better understanding of the development of the infant may be obtained relating the development of locomotion with other motor reactions. In order to illustrate this relationship, the median ages and parts of the body

controlled in various reactions in the motor sequence as observed by Shirley (147) are presented (Chart A.2). For further understanding, the development of movement during the first two and one-half years based on Montessori's (114) work with children has been reproduced in Figure A.8.

The orderly sequence of motor development presents a strong argument in favor of the view that motor development is a function of maturation. Although there is a marked tendency for the motor developmental sequence to be maintained from one child to another, different children reach a specific stage of development at different ages. Some of the major influences which cause this variation are summarized here. Research evidence to support the following statements will be found in Appendix A. The time at which the earlier patterns are reached is advanced in Negro children. Earlier skeletal and sexual maturity is characteristic of females as compared to males. The female exceeds the male in attaining the early motor patterns. Nutritional factors of the child and prenatal nutrition of the mother affect the time at which stages in motor development are reached. Caloric and protein deficiency limit growth. Poor maternal diet is positively related to stillbirths, prematurity, neonatal deaths, poor physical condition, functionally immature infants, and congenital defects. Infants who were breast fed from four to nine months were found to be physically superior to those infants who were artificially fed.

Components of fat, muscle, and bone vary and are different for the two sexes. Fatness is associated with a faster rate of growth and earlier sexual maturation.

The most crucial perinatal factor is that of prematurity. The determining factor as to when the premature infant reaches specific motor developmental stages is the weight at birth. The lower the birth weight, the greater the delay in reaching and mastering the progressive motor developmental stages. Anoxia may also affect motor behavior through hyperactivity or hypoactivity.

Child-rearing practices which are restrictive, inhibiting, psychologically traumatic, or delimiting in freedom of movement have been found to retard motor development. Customary infant sleeping position appears also to affect the timing of motor development.

Statement 2

> Movement characteristics provide each individual with a unique and recognizable movement behavior. These movement characteristics are a result of genetic and environmental variables: Timing of Motor Developmental Stages, Responsiveness to the Environment, Movement Experience.

Movement behavior is defined as the integral relationships among an individual's movement forms (what he does), movement structures (how he does it), and movement attitudes (why he does it). The state of preparedness to

respond to environmental stimuli depends upon the extent to which the child has been permitted to advance to the new developmental stages. It depends also on whether or not the child has been permitted to complete each developmental stage without being forced to proceed to a stage for which he is not ready. Differential abilities to respond to or be modified by the environment are dependent upon individual differences in the development of intra-individual maturational and acquired changes. State of preparedness also limits the modifiability of the child by his culture. Changes occur in the kinds of stimuli which reach the child and which he seeks as his thresholds of response proceed through orderly sequences (93). These are the factors which will be discussed below under the categories: timing of motor developmental stages, responsiveness to the environment, movement experiences.

Timing of Motor Developmental Stages.--In the previous section, it was illustrated that there are wide variations in the time when individuals reach each motor developmental stage. It is particularly important for adults to be constantly aware of the great variations among children in timing and achievement during the early stages of motor development. Because of this individual variation, it is inappropriate to expect a child to conform to a certain norm obtained from a group of children of a similar age. A child that develops muscular control early may respond

more effectively to the environment. The late developing child may not respond satisfactorily only because he is less mature.

Rate of development is one factor which helps determine the psychological situation in which the child finds himself. His self-perception and the reaction accorded him by others is determined largely by his physical status (9). Bodies which function poorly or develop erratically contribute to inferior self-concepts (106). The same child who faces this situation when young, will probably be exposed later to a sociopsychological environment which may have adverse affects on his personality development because of retarded physical and motor development (118).

The movements of a child who is delayed in motor development may be clumsy, awkward, and uncoordinated in comparison with his peers. This may result in the inability to join in the play activities of one's peers. Dependency because of motor incompetence may result in self-consciousness in the presence of children who are more independent in their actions. This delayed motor control during infancy and early childhood may cause withdrawal from social groups which may in turn lay the foundation for unsocial attitudes and behavior (90).

Each child needs to be allowed to follow his own timing in mastering various aspects of bodily control.

Parental expectations which are not based on knowledge of the child's maturational level may cause frustration and feelings of failure. This attitude of frustration and failure developed in the preschool years can affect his behavior not only at this time but also in the years to come (92).

Responsiveness to the Environment.--There are wide individual differences in response to environmental conditions. During a given amount of time, one individual may be considered hypoactive and another hyperactive. Movements of some individuals may be categorized as intense (strong, forceful) whereas other individuals may be considered weak. Certain individuals characteristically move slowly whereas others may move quickly. In the neurological examination of the newborn infant, spontaneous motor activity is assessed by the three factors mentioned: (1) level of activity or amount of movement in a given time, (2) the intensity (strength, forcefulness) of movement, and (3) the speed of movement (128). Movement characteristics such as these contribute to a uniqueness and recognizable movement behavior for each individual.

1. Level of Activity

Infants can be grouped on a continuum from hypoactive to hyperactive including the groups: (1) within normal range, (2) quiet, (3) moderately active, and (4) active. Hypoactive and hyperactive groups are considered

pathological (54). Level of activity in infancy is considered predictive of subsequent behavior and therefore an innate rather than an acquired characteristic (143). A high score for percentage of time active in fetal life was predictive of specialized behavior on Gesell items six months postnatally in the studies of fetal behavior by Newbery and Richards (135).

The activity level of the child may affect his development indirectly by affecting general interaction with the environment (119). In Western culture, parents expect the boy to be active and the girl inactive. The active boy and the inactive girl would, therefore, meet with much more parental approval than the inactive boy and the active girl. This cultural expectation is probably apparent with the first child-parent interaction, but may not be perceived by the infant until he is neurologically more mature.

A preference for more activity may be characteristic of boys. As a group, boys were more active than girls, according to a study by Koch and Streit (101). This preference for more activity by boys as compared with girls was also found in a study of ten three-year old nursery school children (22). Whether or not this activity pattern is based on cultural expectations or is genetically defined according to body type remains a question.

The child's relative standing in activeness may be a function of the situation in which he is placed. Interactivity correlations of preschool children were found to be low. Behavior in the afternoon was less active than in the forenoon (101).

Hyperactivity, along with short attention span and poor power of concentration, impulsiveness, irritability, explosiveness, variability and poor school work make up the components of hyperkinetic behavior syndrome (103). A hyperactive child may find physical activity, although appearing not very purposeful, to be the only mode of self expression (141).

Activity level may reflect a potential which predisposes toward a definable course of development. High activity level, in the presence of some other conditions, can lead to: (1) a maturational pattern at preschool age in which gross motor coordination is distinctly more advanced than fine coordination, and (2) a pattern of intellectual functioning in which achievement on performance items (minimally requiring abstract thought) is distinctly superior to achievement on verbal items (which predominantly tap concept formation and thought processes). Opposite patterns of motor development and intellectual functioning can be predicted for children whose infancy activity level is markedly low. Infants who are hyperactive in early life may be unduly vulnerable to

environmental stimuli and therefore more likely than others to show some degree of maladjustment (48).

2. Intensity of Movement

Each individual is endowed with certain genetically determined or constitutional characteristics of physical and mental vigor. These qualities contribute to a potential resistive or reactive response to environmental pressures (154). The importance of this vigor or intensity of response is emphasized by Duffy:

> Energy mobilization tendencies constitute one of the most significant aspects of the individual's personality. They represent the intensity with which he responds to the various environmental situations with which he is confronted. They indicate then, whether he is likely to be relatively unresponsive to situations, highly responsive, or moderately responsive. And this tendency to respond to situations with high, with low, or with some intermediate degree of energy mobilization is the basis for a wide variety of behavioral manifestations which differentiate one individual from another (46:170).

The human organism is a dynamic energy system. Wide individual differences in the use of this energy are evident as early as the fetal stage of development and permeates all aspects of later development. Evidence tends to substantiate the assumption that there is a marked degree of difference in the extent of activation in the same situation between individuals and that these differences in activation tend to persist and to characterize the individual. Habits of meeting a situation in a certain way appear to provide a considerable degree of consistency (46).

The consistency of response to stimuli for specific individuals is supported by research evidence. Individual differences in intensity of response among babies were found to show significant day-to-day constancy (14). Identifiable characteristics of reactivity were found to be persistent features of the child's behavior throughout the first two years. Specifically, intensity of reaction can be considered a stable characteristic. A given environmental influence, therefore, will not produce the same response in all children (162). Energy output, identifiable early as a trait of individuality, has been correctly appraised in terms of prediction prior to sixteen weeks (66). Available energy has been identified as a factor productive of one's "life-style" (31).

The behavior of the organism is always in response to changes occurring either inside or outside the organism or, characteristically, in both places. Children who have exceptionally low sensory thresholds and therefore high sensitivity may be unduly vulnerable to environmental stimuli. Degree of sensitivity to stimulation is, therefore, of primary importance in the adjustment to and interaction with the environment (46). Large individual differences and relative constancy for each individual were found in a study of muscular tension and emotional tendencies with children ages 2 years, 11 months and 3 years, 10 months. There was a correlation of .52 between

excitability ratings and tension scores. The author suggested that children who habitually manifest a high degree of muscular tension may have special problems which must be recognized and dealt with. These children seem to be very sensitive to stimulation of all kinds which exposes them to certain dangers which may result in complexity of social adjustments (45).

3. Speed of Movement

From the moment of birth, there appear to be differences in such things as the rapidity of crying, strength of sucking reflexes, and activity patterns (130). The findings in a study of the constancy of psyco-motor tempo in individual infants suggest considerable consistency in the tempo of movement of any one child. For example, children who creep slowly also climb and prehend slowly. Furthermore, the characteristic tempo of movement does not appear to change markedly as a result of practice. This constancy is pointed out by Ames:

> The fact that in such various fields of behavior new and often complex behavior patterns can appear for the first time in a form so complete that several weeks, often several months, of exercise do not appreciably change either their form or speed strongly suggests that such patterns are determined by internal maturational rather than experiential factors. Children do simpler things first and more complex ones later, but the individual movements, whether simple or advanced patterns, remain remarkably constant (4:445-450).

Evidence tends to support the belief that there are wide individual differences in: (1) level of activity,

(2) intensity of response, (3) speed of movement. These definite motor habits are as characteristic of the child as speech patterns or facial expressions. The conclusion can be drawn that each child presents a consistent and unique pattern of movement behavior.

Movement Experiences.--Each individual has a movement identity which is formed by the circular, reciprocal relationships between the unique motor characteristics of the individual and all experiences involved with movement. Not only does the individual have knowledge of and experience with his own body, but because people are anatomically and physiologically more alike than different, comparative and empathic assessment is possible (139).

Each individual creates his own life-space through his individualized perception and communication with his environment, whereby he is able to participate socially while living in his own idiosyncratic way, "ignoring and rejecting or attempting to escape whatever is not relevant, congruous, or consonant with his idiomatic patterns of perceiving, functioning, and communicating" (52:34). Within the framework of available environmental stimuli, each child selects those things which have meaning for him and in this way begins a pattern of unique behavior. Each culture has within it what is often a complex network of interpersonal relationships. Because relationships are not random, but are patterned, behavior to a

certain extent is predictable. However, the living, growing, developing, aging human being is an open system with a continuum of experiences--forced to interact with the environment and the symbolic cultural world. This interaction begins at birth. Charles has stated: "The newborn child arrives in the world with no knowledge of human cultural and social ways. He is as naked culturally as he is physically. . . ." (31:37).

Encouragement by parents to participate in certain movement activities probably begins with the first toy given to the infant. Many sources agree that people in American culture respond differently to girls and boys, even as early as infancy. Clear differences in play preferences have appeared by the age of two or two and one-half years. Boys prefer more rugged activities, girls more quiet ones (106). The question is whether this "preference" is cultural or a genetically prescribed motor characteristic.

Personal involvement--the feeling the individual has about his own movement--interweaves a path throughout the total circular, reciprocal relationship pattern between motor characteristics and movement experiences. The main object of study for the infant is his own body and the body's ability to enter into and explore its environment. The child uses his body to express his feelings. The process of establishing bodily control is modified by his

emotional status. Kephart has pointed out the importance of early motor responses:

> The early motor or muscular responses of the child, which are the earliest behavorial responses of the human organism, represent the beginnings of a long process of development and learning. Through these first motor explorations, the child begins to find out about himself and the world around him, and his motor experimentation and his motor learnings become the foundation upon which such knowledge is built (97:35).

Attitude affects the performance of a movement task. The ability to focus interest on a specific movement task is essential. An infant, whose interest in the environment is diffuse, may be easily distracted by other objects. When the child's interest becomes less diffuse, the child may show intense interest thus enhancing his motor performance. If the urge to perform the task is too intense, performance may be impeded. The next stage in development of attitude emerges as the total situation becomes ordered in the mind of the child. Optimum performance is found in the following stage when the child performs the movement task for the sheer satisfaction of performing. Once the movement task is completely mastered, it loses its fascination. At this time, the child may become easily distracted because of boredom and performance is dependent upon mood (37).

Movement is experienced as conduct in relation to the world. Movement occurs in space and time. When an individual moves, he finds that time has passed and his

relationship in space has changed. Movement experiences consist of sequences of movement or modes of moving rather than individual movements (157). Movement explorations are essential for the child to build up a stable body schema from which he can create a relationship to the object world. Verticality and laterality are elaborations of a stable body image learned through a long process of experimenting, observing, comparing, and differentiating the various parts of the body in terms of movement activity. These movements, then, must be integrated in terms of total body activity and in relation to the center of gravity of the child. The child's own body is the starting point for all exploration of the world and if it is variable and distorted, exploration will be variable and distorted. If his exploration is rigid and restricted, so will be his ability to explore. An orientation to time is also crucial to awareness of the moving self. A temporal awareness of self serves as a point of origin for estimates of time and duration. The child should be able to order events along a temporal continuum (47).

Evidence tends to support the belief that each individual has movement characteristics which provide a unique and recognizable movement behavior. Both genetic and environmental variables aid in the development of movement behavior. The state of preparedness and the

predisposition to respond in specific ways to environmental stimuli determine the modifiability of the child. Thus, his movement characteristics continue to shape and mold his behavior as he interacts with his environment.

Statement 3

> Early movement experiences are fundamental to establishing effective transactions with the environment.

The child is a small human being carrying on his own struggle to meet his needs and find meaning in his life. He must learn to cope with situations as best he can. Out of these efforts, he eventually develops patterned ways of coming to terms with his environment. A behavioral sequence has been observed when children are faced with a new situation: anxiety about the new situation, which gives way to interest as familiarization begins; increasing mastery accompanied by repetition; mastery of the activity after which interest wanes; readiness for new challenges (120).

During the locomotor progression, there is a dramatic expansion of the spatial world of the child. Dependency slowly diminishes and the child begins to explore on his own initiative, discovering not only new areas of space, but also new things which he can manipulate. Observe an infant placed in the prone progression. Although an attractive object may be placed within the

infant's range of vision, he will not be able to study the object except through a brief visual input if he is unable to hold up his head. As soon as he is able to maintain head control, he will be able to study the object visually. When the child is able to maintain a stable sitting posture, he can then explore objects either within his reach or objects given to him. He is now free to feel, taste, smell the objects. This he could also do previously in the supine position, however, his relationship in space in now quite different. He can add the sense of sound by pounding the object on a surface. He will probably throw the object as soon as he is able to release it. In the throwing movement, he receives kinesthetic feedback. The object, when returned to the child, is thrown again and again, but stability in the sitting position and release of the grasp must precede this action.

The child first learning to crawl or creep is concerned with getting from here to there--the process has his full attention. This is true also with the child first learning to walk when attention is focused on the specific elements of walking--how to put one foot in front of the other; how to keep from falling down. If he comes to an obstacle, he will probably revert to any earlier developmental stage, i.e., creeping or crawling, in which he has enough competence to get to his goal.

When the child has achieved postural control the vertical position has once again placed him in a new spatial relationship. He is free to engage in the exploration of his environment--free to move to the object, to touch, to taste, to smell, to throw, to strike, to kick, to stand on, to sit upon, to put on top of his head. Through experimenting with many different movement elements, he gradually extends his movement capabilities and ways of coping with his environment. The purpose of the movement has now changed from control of movement itself to the use of movement to gather information of his inner world of self and his outer world of the environment.

Abnormalities in basic movement patterns are early symptoms of learning disorders, e.g., reading problems (reversals, inversions). Clinical evidence has shown that lack of well developed crawling and creeping patterns in infancy may cause motor disorganization in later life (78, 39, 131, 70).

Child growth and development research indicates that motor development of children occurs in a sequential pattern beginning with simple reflex patterns. Development takes place in a cephalocaudal and proximodistal direction with a neurological interweaving between oppositional parts (33). The mastery of neuromuscular control and coordination at one level of development serves as a basis

for performance in the next higher level, and all succeeding levels. It is when there is inadequate development in neuromuscular coordination at any level, that the subsequent levels of performance are less than optimal.

There may be many reasons for inadequate motor development. However, one which should be considered is the lack of specific movement experiences which are considered essential to motor development. There appears to be general agreement, including Kephart (47), Barsch (10), Getman (71), and Bowers (19) on the importance of specific movement experiences during the period of time in which neurological growth and organization at a given level is proceeding in the individual. To help the child who has inadequate motor development, a number of clinicians have advocated movement experiences which follow the motor developmental sequence arranged from simple to complex and from gross to fine motor experiences--from early patterns, i.e., rolling, crawling, creeping to more complex patterns of walking and jumping.

The beginning of behavior is placed at the point in time when the neuromuscular activity begins (30). Infancy is a time of active, continuous learning during which is laid the basis for all cognitive and motor processes through which the child becomes capable of establishing effective transactions with his environment (168). There has been renewed interest in motor, sensory, or exploratory

activity as related to learning. The child responds to his environment with differences in degree and kind of activity. An intrinsic activity motivation has been stressed by Hunt (89). That the child seeks opportunities to investigate his surroundings has been demonstrated by Piaget (126). The importance of early movement experiences has been emphasized by Montessori (114), Kephart (97), Bruner (25), Getman (71), among others. Those experiences which have had repeated emphasis are those which help in developing: awareness of the body and differentiation between the body and objects in space; stability of the moving body; spatial orientation; temporal integration. The infant learns to differentiate himself from the object world. Based on an integration of all past and ongoing sensori-motor experiences, the body becomes a reference point for transactions with the environment. This reference point is stabilized through the force of gravity. Movement exploration which includes many postural adjustments is necessary for developing body awareness. The maintenance of these postural adjustments develops through the precise mechanism of coordinated balance (47). The child must develop an orientation in space--he must know "where" he is and where all other things are in relationship to himself and each other. This will enable him to move with efficiency and security as he inspects the world in front of him, behind him, above and below and to either side of him (10).

The body is also a point of origin for time. The child should learn to order events along a temporal continuum. Time and space are inseparable aspects of movement--when a child moves, he will find that time has elapsed and space has been covered. A child may perceive a span of time by the number of events which occur within that span of time. This is similar to perceiving distance by the number of objects within a given distance (47).

The human organism is designed to receive information. Vision defines objects, relationships, color, distance, direction. The auditory mechanism organizes the vast world of sound into a symbolic system of communication. The tactual sense defines texture, contours, edges, shape, heat, cold, pain. In order to understand how to position himself for performance, how it feels to move in a certain way, the child must become aware of the kinesthetic input from the muscular system. These senses bring meaningful information to the moving organism and work harmoniously with the body awareness, spatial orientation, temporal integration, and dynamic balance (10).

When the child begins to explore his world, he learns by direct contact with things and events. He discovers their temporal, spatial, and quantitative dimensions and thus begins to understand the orderliness and regularity of events. Each experience is built upon

what the child has already perceived, his expectations, patterns of response, and feelings developed through previous explorations. When adequate sensory stimulation has been denied, the child is handicapped in developing sensory and motor capacities. The early years are the most crucial for learning to learn and for establishing environmental relationships (53).

Ideas can develop from autonomous orienting processes and be woven into the child's own independent motor, emotional, kinesthetic, and other sensory experiencing. According to Murphy, the "cognitive and motor--or basic ego--resources of the child contribute a major share toward determination of the potential skill, competence, problem solving, conceptualizing, and mastery potentialities of the child" (120:251).

Motor and sensory development provide expanding horizons through which the child increases cognitive abilities. Level of motor competence affects the body image and self concept of the child (21, 48). Motor ability constitutes an important component of feelings of competence in coping with the environment (8). The motor activities of the child are basic to the varied experiences which allow him to participate in the process of concept building. Motor control is not only learning to use muscles appropriate to a given act but of learning to inhibit the action of nonessential muscle groups.

During the preschool years the child incessantly participates in gross motor activity, during which there is continual practice and improvement in locomotor action with many variations, object manipulation, and increasing skill in coordinating body action with sensory stimulation (56).

Activity is a major characteristic of the child's world. Objects of the physical world become integrated into symbols through action. Games provide an opportunity for the child to learn to abide by social rules, to show joy or anger without losing control (18). Games provide opportunities for practicing neuromuscular coordination which enables the child to cope with spatial dimension and organization as he orients himself in his small world. Play provides opportunities for dealing with the real world of objects, situations, and events and allows communication of feelings through nonverbal messages. It is a major area of opportunity for the child to learn to learn through endless practice which develops proficiency in a variety of performances (53, 145).

The active transaction of the child with his environment is essential for maximum development. Most children will seek out aspects of their environment. When a task has meaning for the child, there is no limit to his attention span. He will become so engrossed, the world literally goes on around him. The child will choose a

more complex task over a simple one which he has already mastered. Motor behavior is translated into perceptual symbols. Thus, the child engages in behavior that leads to concept attainment. These concepts about self and how to deal with the environment give the child, not only competence, but feelings of competence (76).

Motor Skills--Performance Expectations

Development of Motor Skills

The acquisition of motor skills is a gradual process growing out of postural control and the integration of movement patterns. The importance of postural control and integration of movement patterns has been presented in the previous section under Statement 3. The early years are primarily concerned with elaboration and refinement of reflex movements and the gross movements involved in neuromuscular maturation. Improvement in this process is dependent upon the capacity of the organism to anticipate response needs and the opportunity for movement experiences as the neuromuscular system becomes ready.

It is generally recognized that the infant must have reached a certain level of maturation before practice can become effective (69, 83, 84, 82). As competency in the performance of movement patterns is acquired, greater freedom is available for adapting to new situations. On

the basis of her study of Johnny and Jimmy, McGraw (109) concluded that the extent to which exercise of an activity may alter the development of a particular behavioral course in infancy is contingent upon the following conditions:

1. The neuro-structural level at which the activity is controlled;
2. The state of plasticity or fixity of the behavior-course at the time increased exercise of use is introduced;
3. The state of fixity attained by the behavior-pattern at the time the factor of special exercise is withdrawn; and
4. The phylogenetic origin and importance of the behavior-pattern.

The longitudinal study of motor performance of children studied earlier in life indicated three factors as being important in determining the permanence or deterioration of a motor skill when no special exercise had occurred for a period of years. These factors were: (1) the lack of practice per se, (2) the influence of the child's attitude toward the performance, and (3) the changing configuration of the bodily structure as a result of physical growth (110). The retention of advanced skills, after the modifying factors of intensive exercise

have been withdrawn is proportional to the quality of integration of the movement performance (110).

Development studies on the motor skills of children indicate that initial ability on all tasks increases with age (74). Although there is an increase in motor skills with age, evidence tends to indicate that this achievement could be greater in some children. A study by Gutteridge (80) implied that young children showed motor control and proficiency far in advance of the common belief or tradition. This would indicate that our expectations are set too low. A slowing down of achievement in certain activities after three years of age was attributed to a lack of environmental stimulation and challenge to further effort. The author suggested that in cases of motor retardation, a way must be found to judge whether this was due to retarded physical development or lack of opportunity suited to individual needs.

Other factors which influenced motor skill achievement have been pointed out by Jones (94): (1) interest and confidence in children as expressed by the mothers results in spontaneity, (2) the length of the legs affected the use of wheel materials--children with shorter legs propelled the materials earlier than did those with longer legs, (3) amount of intelligence affected the ability to coordinate body locomotion with locomotion of wheel materials, (4) freedom of play activities in the home

environment, presence of preschool playmates, and absence of adults other than parents were all factors which positively related to a tendency toward spontaneity in play, (5) continued practice of a skill was necessary for it to develop into graceful, coordinated performance, and (6) each skill must become automatic before the child can combine activities successfully.

Norms for Motor Skills.--Information on the development of motor skills during infancy has come from several normative studies including those of Bühler and Hetzer (26), Gutteridge (80), Griffiths (79), Cunningham (36), and McCaskill and Wellman (107). These and other workers have prepared scales or tests of motor achievements. The norms established vary somewhat from one scale to another, but are generally representative of the population. These scales contain important information for the parent or teacher responsible for guiding the motor development of the child.

Examples of tests which show the relationship of motor skill to chronological age are shown in Appendix B. A summary of criteria of satisfactory performance of motor activities has been compiled from the Gesell Developmental Schedules by Blum and Fieldsteel (16). Items were selected on the basis of their significance as indicated by Gesell, their appropriateness as judged

in wide clinical experience, and the ease and accuracy with which they may be observed. This chart is reproduced in Chart B.1. The median age-placement of some activities are similar but not identical with those of Gesell. In studying the consistency and predictive value of the Gesell Developmental Schedule, Knobloch and Pasamanick (100) also found variations in age expectancies. Charts B.2 and B.3 reflect a trend for children of today to reach specific developmental levels earlier.

In order to show chronological age expectations for a greater variety of motor items, several other tests have been included in the Appendix. The locomotor items of the Griffiths Mental Development Scale (79) include a scale for children from one month to twenty-four months (Chart B.4). Bayley's (11) tests include activities starting with crawling at two months to walking downstairs at fifty months (Chart B.5). Cunningham (36) devised a scale of motor test items for children from twelve to thirty-six months (Chart B.6). The McCaskill and Wellman (107) motor achievement items range from twenty-four to seventy-one months (Chart B.7). The age levels between six and fourteen years are covered by the Lincoln-Oseretsky Motor Development Scale, Sloan's standardization of the original Oseretsky test. For further information on this test, the reader is referred to the Genetic Psychology Monographs, 1955, 51:183-252.

Achievement norms for motor skills and components of motor skills, e.g., strength, flexibility, etc., are incomplete for children within the age range of three to five years. Those for which information is available are presented in Chart IV.1. Part I includes standards for specific tests, and Part II includes additional information which can serve as a guide to expectations at certain levels. This chart has been compiled from the material given in Appendix B--Motor Skills--Performance Expectations, plus other references cited on the chart. It is important to emphasize that this information should act as a guide only.

Clues to developmental variations in skill achievement in several familiar motor activities based on studies of children from two to seven are given below:

Climbing

1. Extremely wide variations in ability.
2. No significant difference between ability of boys and girls.
3. Descending was more difficult than ascending.
4. Increased height may cause reverting to earlier form.
5. Extreme versatility in climbing skill.
6. Climbing well established for half of children at 3 years of age.

CHART IV.1--PART I

MOVEMENT PERFORMANCE AND PHYSICAL FITNESS GUIDE

Item	Girls			Boys		
Age	5	6	7	5	6	7
30 Yd. Dash (sec.)	7.67	6.69	6.17	7.47	6.78	6.28
Shuttle Run (sec.)		13.83	12.99		13.83	13.12
Standing Broad Jump (inches)	33.1	41.2	48.6	35.9	42.9	49.1
Hurdle Jump (inches)	14.4	17.8	20.1	14.4	17.0	19.0
Softball Throw (ft.)		19.0	25.8		34.1	45.2
Accuracy Throw (pts.) 9" Rubber Ball		12.4*	7.7		9.1*	9.0
50' Hop (sec.)	10.2	7.3	5.9	10.6	7.4	7.0
Mat Hop/Jump (pts.)		24.6	33.2		18.9	23.3
Beam Balance (sec.)	22.1	33.7	33.3	23.2	30.1	35.8
Beam Walk (steps)	15.7	20.6	20.7	15.7	17.8	21.0
Side Step (points)		8.2	11.1		8.8	10.7
Cable Jump (no.)		3.5	5.2		1.8	3.0
Grip-Right (lbs.)	16.6	19.3	22.9	18.3	23.5	26.3
Grip-Left (lbs.)	15.8	18.4	22.2	18.1	21.8	23.6
Push-ups		2	3		4	6
Rope Climb		2'	3'		4'	5'
Leg Hold (sec.)		30	35		30	35
Sit-ups		5	8		5	8
Knee Raising		10	15		15	20
Endurance		500 yds. or 5 min.	600 yds. or 10 min.		500 yds. or 5 min.	600 yds. or 10 min.
Kick-Utility Ball		10'			10'	

*Girls--Age 6 - 10' & 15'
Age 7 - 15' & 20'
Boys---Age 6 - 15' & 20'
Age 7 - 20' & 25'

From Jack Keogh, Motor Performance of Elementary School Children. Los Angeles: University of California, Department of Physical Education, March 1965; and State Department of Education, Guide for Teaching Physical Education--Grades 1-6. Columbia, S. C.: State Department of Education, 1966.

CHART IV.1--PART II

ADDITIONAL GUIDES TO ACHIEVEMENT IN MOVEMENT

Approximate Ages		
60 Months	72 Months	84 Months
Long jump is attempted.	Throw 8" ball up and catch.	Curl-ups--10 continuous.
Alternates feet descending stairs.	Play catch 8" ball 10' distance.	Play catch, 8" ball, 5 yds. distance, 4 out of 6.
Tricycling.	Bounce 8" ball and catch 3 out of 5 times.	Hit 2" x 4" target with volleyball 3 out of 5, 12' distance.
Climbs, jumps, slides, hops, gallops, skips, throws, bounces balls, catches balls.	Kick rolling ball 4 out of 5 times.	Bounce 8" ball for 2 min. continuously, both hands.
March to music.	Jump 5 successive rope turns by self.	Throw beanbag through 13" hoop, 10' away, underhand.
Detailed construction with blocks.	Clap rhythmic patterns: 2/4; 3/4; 4/4; 6/8 in even and uneven rhythms.	Hit 8" x 4" moving target 10' away with 8" ball.
Can draw a circle, cross, square.	Walk, run, hop, jump, skip, gallop, slide, stop, turn, leap, dodge, tag.	Throw 8" ball 3' up and catch ball above head.
Can button and lace.	Create movements to music.	Run in, jump 10 times, run out of long rope.
	Modified push-ups--6.	Jump rope 10 times--self.
	Curl-ups, legs bent--5.	Two forward rolls in succession and stand.
	Jump rope turned by two others 5 times in succession.	Two backward rolls and come to a stand.
	Run into turning rope and jump 5 times in succession.	Change tempo when music changes.
	Forward roll and come to feet.	Walk forward 7' x 4 ' beam turn around and return.
	Walk on 7' balance beam 4" wide.	Jump from 4' height and maintain balance.
		Change directions while moving to 2/4, 4/4 beat.

From Appendix B and State Department of Education, Guide for Teaching Physical Education-Grades 1-6. Columbia, S. C.: State Department of Education, 1965.

Jumping

1. Jumped from high to low at 2 years.
2. 42 percent jumped well at 3 years; 72 percent at 4 1/2 years.
3. Jumping over an obstacle presented a different hazard than jumping up or down.

Hopping

1. 33 percent were proficient at age 4.

Galloping

1. Could not gallop at age 3; 78 percent could gallop at age 5.
2. Different ways of learning to gallop; most introduced it into their running or to strong beat of music.

Skipping

1. Later than gallop; 14 percent at age 4; 72 percent at age 5.

Ball Throwing

1. None threw well at ages 2 and 3.
2. Range wide even at 6 years of age.
3. Size of ball made a difference; 2 hands were used first with many movements (80).

Median ratings at half yearly age levels in each of the various activities for each sex are given in Appendix B.

The acquisition of motor skills is a gradual process growing out of postural control. Many tests have been developed which indicate expectations for early motor

skill achievement. These motor achievement test items can serve as a guide to the teacher in the selection of performance activities in Physical Education for the early years. Individuals who are retarded in their motor development may not be ready (neurologically) to participate in certain learning experiences: jumping, hopping, skipping, galloping. Individuals who are accelerated in their motor development may need more challenging learning experiences. Teacher and student need to understand that chronological age is not necessarily the best criterion for comparing motor development; that there are wide differences among individuals, a fact which is acceptable and desirable. They should understand that motor skills improve with age and/or practice; that prior experiences make a difference in their ability to perform now; that present experiences will influence future performance.

The Selection and Organization of Content

Specific content must be identified for kindergarten. This content should provide a base for interpreting the continuous encounters of the child with his environment. The content themes set forth in Part I, and the key concepts which serve them, lend themselves to basic experiences for children as they study their own movement and the movement in the world around them. It is believed

that each concept introduced at the first level is basic to understanding the theme as it is developed at the next level. The themes are not taught directly to the children nor are the key concepts; rather, they are the eventual goals of understanding which the learner will reach through selected learning experiences. This involves a sequential process of concept formation throughout all grades. Movement performance, the other vital phase of Physical Education learning experiences, should also be sequenced so that each learning experience provides a base upon which more efficient and effective performance can be continuously built.

The following procedure was used in the selection and organization of content for kindergarten:

Task 1.--Identification of the specific contributions from Charts III.3-a-d which should be a part of learning experiences.

Task 2.--Selection of scope-defining concept(s) under each theme from Charts III.1-a-e, and determination of the number of units necessary to develop the key concepts with five-year-olds.

Task 3.--Determination of the performance emphasis appropriate at this developmental level.

Task 4.--Suggestion of topics based on the general interests of children of this age level.

This information was organized into a Flow Chart for Kindergarten (Chart IV.2).

CHART IV.2

FLOW CHART--KINDERGARTEN

THEME	HISTORY OF MOVEMENT: CULTURAL HERITAGE; SOCIAL STRUCTURES	MOVEMENT: UNITY OF PATTERN; DIVERSITY OF TYPE	CHANGES IN MOVEMENT: AGE; PRACTICE; CONDITIONING	INTERRELATIONSHIP: STRUCTURE AND FUNCTION OF THE MOVING ORGANISM	INDIVIDUAL OPTIMUM MOVEMENT: REGULATION; BALANCE	THEME
KEY CONCEPTS	Movement is a reflection of the cultural heritage and social structures of the people.	Movement is a genetic and environmental product.	Movement changes with age, practice, and conditioning.	There is an interrelationship between the structure and function of the moving organism.	The individual has the primary responsibility for the regulation and balance of his own movement.	KEY CONCEPTS
SCOPE-DEFINING CONCEPTS	Movement activities are organized and conducted through social institutions.	Members of a biological species possess the characteristic movement patterns of that species.	Movement patterns can be improved with practice.	Structure--body form, body coordination, body composition--is influenced by the functional use of movement.	Movement provides a basic means of communication and expression.	SCOPE-DEFINING CONCEPTS
PERFORMANCE EMPHASIS	Participation in active games which can be shared by family.	Developmental motor patterns (cross-lateral, homolateral): crawling, creeping, hands-feet walking; walking, swimming, climbing, galloping, jumping.	Walking, running, jumping with: rhythm, directional changes, speed changes, and distance changes	Exercises specifically designed for strength building.	Movement expression.	PERFORMANCE EMPHASIS
UNIT	MOVEMENT ACTIVITIES IN OUR HOME	HOW THINGS MOVE	HOW WE CAN CHANGE MOVEMENT	WHY WE MOVE AS WE DO	WHAT MY MOVEMENT MEANS	UNIT
TOPICS	Family Games	How Animals Move How Fish Move How Birds Move How Children Move	We Can Change Direction We Can Change Speed We Can Change Distance Covered	We Use Our Muscles to Move We Can Become Stronger We Can Move Better If We Are Strong	We Can Move So Others Know How We Feel We Can Tell How Others Feel By Watching Them	TOPICS
SPECIFIC CONTRIBUTIONS: Understanding	The role of the family unit in the organization of games. The necessity of accepting rules in games.	The relationship between movement and anatomical body function.	The relationship between movement and mechanical principles of practice.	The relationship between movement and physiological body function. The relationship between movement performance and psychological factors of conditioning.	The continuing need for using self-expression through nonverbal aspects of movement.	SPECIFIC CONTRIBUTIONS: Understanding
Performance	Choose movement activities according to the purpose for which they were organized. Use techniques which adapt objects for use in games. Demonstrate courtesy, positive attitudes of winning and/or losing. Accept rules in games.	Use general movement patterns. Move in harmony with environment.	Use general movement patterns. Use movement activities which result in gross motor skills and total body coordination. Sense and respond to rhythm. Respond with accurate judgment of speed, direction, distance.	Use exercises which develop strength. Respond with self-confidence in movement activities.	Respond expressively in movement. Use movement to translate ideas.	Performance
Sensitive Awareness	Participation in self-selected games. Adaptable use of movement.	Effectiveness in security potential of own knowledge of movement. Significance in beauty in movement. Challenge in phenomena of nature.	Effectiveness in feelings of competence in movement mastery, and self-discipline in movement.	Effectiveness in self-direction in movement activities, security potential in adaptable use of movement.	The significance in empathy as a means of critically judging movement performance of others.	Sensitive Awareness

Task 5.--Structuring a pattern for the development of lesson plans.

Task 6.--General discussion of each key concept to aid the teacher in looking at each theme in its totality.

Task 7.--Development of lesson plans.

The Pattern of a Lesson

In each Physical Education lesson, the learner participates in experiences which will enable him to take one small, specific step toward the understanding of one important concept. Although the child may never hear it stated in specific terms, after a number of lessons dealing with the same concept, the child gains in his understanding of that concept.

Each lesson plan has an introductory section which includes: Level, in this case kindergarten; the content theme; the key concept; the scope-defining concept; and the aim of the learning experience. Each lesson plan has a main body which includes: topic; focus; an introduction of the concept--materials and approach; concept development; and, performance development. Each lesson plan also includes an extension of the lesson which provides for individual differences among the learners. Included in this part are suggested experiences which are broader for the learner having difficulty, more challenging for those who grasp the concept easily. This section is entitled Concept Exploration.

In the lessons, the learners become aware of new relationships as they discover similarities in movement which may not have appeared to be related previously. This recognition of similarities and differences which leads to an understanding of patterns of relationships is the base for building concepts.

The development of each theme is similar in that the focus is related to some phase of human movement from conception through maturity. Movement performance is an integral part of each concept so that in the process of concept development, there is an increasing need for mastery of the moving body leading toward a total efficient and effective response of the individual to his environment.

The theme which is developed first at each level depends upon correlation with other content areas, availability of necessary facilities, equipment and materials, and the pattern of logical unity for each level. Time for each unit is variable. The teacher should be guided by pupil success in acquiring concepts, movement performance, effective use of communication symbols, and sensitivity to the total process.

It is not expected that all children will reach all understandings in a lesson. Specific conceptual and performance development will vary from individual to individual in relation to their maturity. The creative

teacher will help the children toward understanding and performance through varying the lesson content according to their separate abilities. Some of the activities suggested will be for broadening understandings; other activities will emphasize deepening understandings; still other activities will focus on the effective use of symbols, performance in movement forms, level of mastery of the process of learning, and the sensitivity to the tradition of Physical Education. These are the various things which help the children and the teacher to evaluate progress in a specific area.

Lesson Plans for the Teacher

A general description of each key concept is given below:

1. Movement is a Reflection of the Cultural Heritage and Social Structures of the People

Movement which is characteristic of a group of people is a reflection of their cultural heritage--their behavioral patterns, values, morals and customs. Movement activities are organized and conducted by social institutions such as the schools, the churches, governmental agencies at all levels, philanthropic groups, industrial, and commercial organizations. The work-leisure patterns of the people are closely linked with movement activities. The well-being and physical vigor of the people are partially

dependent upon the movement activities in which they participate. This key concept encompasses the development of movement history--how things have come to be as they are and why they are different in various regions of the world.

2. Movement is a Genetic and Environmental Product

Members within a biological species possess the characteristic movement patterns of that species--man walks; fish swim; birds fly, etc. These characteristic movement patterns depend upon anatomical principles. The physical laws of the universe, e.g., gravity and the laws of motion, govern the movement of all species. Movement varies genetically. People in different regions of the world develop different ways of moving because of such things as temperature, wind, humidity. The type of movement of a species is limited by the physical medium--water, land, air, space. Movement is characteristic of all living things. When things move, they are interdependent with one another and with their environment. Objects may be moved and must follow the same physical laws as living things which move. This key concept encompasses the many ways in which moving things are characterized by a unity of pattern and the many reasons for diversity in ways of moving.

3. Movement Changes with Age, Practice, and Conditioning

Motor development follows an orderly sequential pattern which is characteristic of all human beings. Movement behavior is influenced by the aging process. The neurological maturation and potential for environmental transaction of the child govern the quality of development. The movement patterns--locomotion, throwing, striking--which grow out of reflex movements can be improved with practice and modified for specific activities. These are the basic movements which can be modified for use in games, sports, dance, and work activities. Movement performance can be altered through physiological conditioning--improvement in strength, flexibility, cardiorespiratory efficiency. This key concept encompasses the age changes in movement, the changes which can be made through practice or modification of movement patterns, and the improvement which can result in movement performance through physiological conditioning.

4. There is an Interrelationship Between the Structure and Function of the Moving Organism

The body is the instrument for moving. All things which affect the body, therefore, may affect the way in which one moves. The vigor of movement is dependent upon the energy system of the organism. The level of tension which may be directly due to sensitivity to environmental stimuli can influence movement response. Movement behavior

at any time is the resultant of the biological condition of the body, the conceptual level of movement understanding, and the way in which one feels about movement. This key concept encompasses the interrelationship between the status of the organism and movement.

5. The Individual Has the Primary Responsibility for the Regulation and Balance of His Own Movement

Each individual should be aware of the personal potential in utilizing--understanding, controlling, directing--movement. The responsibility for the application of knowledge in one's own life is that of the individual. The development of movement potential is closely related to the effective use of human resources in our society. Discrimination and personal choice through conscious control of understanding and reasoning are manifested through movement. The values which one holds will govern the direction and dimension of one's own world of movement. Movement experiences can be positive forces in the integration of personality--a means of communication and expression. This key concept encompasses assessment of individual movement potential, criteria for personalized selection of movement activities, and personal projection of future responsibility.

Lesson plans for kindergarten based on these five themes with their supporting key concept follow.

UNIT: Movement Activities in Our Home

LESSON PLAN: Kindergarten

THEME: History of Movement: Cultural Heritage; Social Structures

Key Concept: Movement is a reflection of the cultural heritage and social structures of the people.

Scope-defining Concept: Movement activities are organized and conducted through social institutions.

Aim: Games are a basic part of the world of children--children play games alone; children play games with other children; and children play games with their families. Many of these games utilize movement skills. Some games are organized; some games start spontaneously. Both are important. Through the learning experiences of Theme 1, the children should become consciously aware of the games played within the family group--whether away from home or within the home environment.

Topics: Family Games.

Games are organized so that families can play together; sometimes these games are played at home and sometimes away from home.

Focus--Awareness of games utilizing movement skills which are organized for participation within the family group.

Introduction of Concept

Material--Cardboard boxes, ropes, tires, balls, hoops, etc.

Approach--Encourage children to discuss the games which they play at home with their family. Who is the organizer? Who are the players? What are the responsibilities; skills; rules? Why is it fun? Give the children the opportunity to play various games as they consider these factors.

Concept Development

1. Various materials, e.g., balls, boxes, ropes, can be used to organize a game.

2. Specific movement skills are needed for certain games.

3. Games have rules which all must follow.

4. The number of players may vary according to the game.

5. Some games are more fun than others.

6. Different people can organize games.

7. Parents are good game organizers at home.

8. There are games which are organized for the family unit.

Performance Development

Have children work in groups or twos utilizing the simple materials available; allow them to organize a game. They should be able to identify the movement skills; rules, number of players.

Emphasize the ability to reconstruct the materials of the environment in such a way that it will suit their purposes in organizing a game. The movement skills which they choose to use in their game should be precise and in good form.

Concept Exploration

1. Have the children bring in the idea of a new game from home which they can share with other children.

2. Teach children a few simple games which they can take home and play with other members of the family.

3. Provide additional opportunities for children to structure their materials (using various materials) into games which they can share with others in the classroom.

UNIT: How Things Move

LESSON PLAN: Kindergarten

THEME: Movement: Unity of Pattern; Diversity of Type

Key Concept: Movement is a genetic and environmental product.

Scope-defining Concept: Members of a biological species possess the characteristic movement patterns of that species.

Aim: Movement is a basic part of the world of children--children move; animals move; objects move; clouds move--all living things move. Many non-living things can be moved. Children are exposed to all kinds of movement. Through the learning experiences of Theme 2, they are helped to become consciously aware of movement--how things move alike; how things more differently.

Topics: How animals move; how fish move; how birds move; how children move.

Animals move in different ways--some animals move alike; some animals move differently. (Repeat for other topics.)

Focus.--Awareness of movement.

Introduction of Concept

Material--Pictures of animals in their characteristic mode of moving. Pictures should depict comparative sizes. Pictures should be chosen for their familiarity to the children and should be clear, colored, and large. Appropriate movement symbols, e.g., walk, run, leap, jump, should be available for placement on the picture for recognition, description, and a beginning sense of animal-movement relationship. Moving animal cut-outs may also be used for tactile stimulation.

Approach--Encourage children to look at the "movement" of the animal. They will discover that some are moving alike, e.g., walking, running. Some may be leaping, some jumping, galloping. The children should be able to recognize the movement. Add the symbol. Give opportunity for children to relate symbol with movement (movement with symbol) and recognize each separately.

Concept Development

1. Group pictures according to types of movement, e.g., all "walking" animals together.

2. Group animals in two's. Each of the two in one group should be moving differently.

Performance Development

Have children perform the various animal movements as precisely as possible--they should know which movement they are performing. Give children time to explore, study, think, try movements, practice, perfect.

Emphasize the homolateral and cross-lateral crawling, creeping, and hands-feet walking; climbing; crawling under, over, and through; walking; swimming; galloping; jumping.

Concept Exploration

1. Have children make (or collect) pictures of moving animals. Label them with prepared word blocks, e.g., walk, run, etc. Group. Categorize. Describe. Relate.

2. Develop topic in the same way with animals who are bending, stretching, pushing, pulling, throwing. Awareness of movement can also come through lack of overt movement, such as, lying, sitting, standing. Can a horse sit? How about a cow? Can a dog throw? Can a cat pull?

3. Visit a zoo or a farm and observe the way different animals move--identify, describe, relate. Note the movement of pets, e.g., cats, dogs, rabbits, squirrels, etc. When living animals are being observed, help the children toward sensitivity to the beauty of movement--the efficiency; the purposefulness. Out of this may grow respect and love of other living creatures.

Concept Extension

The other topics can be developed in a similar manner. When studying fish, there is an excellent opportunity to bring in the skill of swimming. The emphasis under each topic is: awareness of movement.

UNIT: How We Can Change Movement

LESSON PLAN: Kindergarten

THEME: Changes in Movement: Age, Practice, Conditioning

Key Concept: Movement changes with age, practice, conditioning.

Scope-defining Concept: Movement patterns can be improved with practice.

Aim: Movement patterns are common to all children--they walk, run, jump, throw, kick, strike. Children will vary in their ability to do these patterns well. All are essential for the further development of skills in games, sports, and dance. These skills can be improved. Theme 3 learning experiences provide the opportunity for the children to become more proficient in handling the moving body in these basic patterns, and aware that they can perform better with practice.

Topics: We can change direction;
We can change speed;
We can change distance covered.

Movement experiences in changing direction, changing speed, and changing the distance covered while performing the locomotor movement patterns can result in improvement of the patterns.

Focus -- Awareness of the improvement in performing the movement patterns as a result of the specific practice.

Introduction of Concept

Material--Drum or some other type of rhythm instrument; measuring tape; and, simple objects which can be used for obstacles to move over, under, around, and through.

Approach--Children should know when they are walking or running or jumping. Situations should be structured so that children are challenged by the signal to change direction or speed or distance covered. Concern for the movement pattern itself will cause the child to have difficulty in meeting the challenge. A good walking, running, and/or jumping pattern are necessary to the tasks

in this learning experience. If the level of difficulty is sequenced from simple to complex, the experiences will improve the movement patterns.

Use a rhythm beat to move by: give signal to which the children are fully aware for a change in speed or direction; place obstacles in the moving path both before and during the movement. Give time for children to practice those things which they find challenging.

Concept Development

The children should understand what a walk is; a run; a jump. They should know the difference between a change of direction and a change of speed. They should know whether one distance is longer or shorter than another.

The children should know that in order to improve walking, they must walk; to improve running, they must run; to improve jumping, they must jump; and, that it is important to practice these things under varying circumstances.

Performance Development

The children should improve in their ability to respond to a rhythmic beat.

The children should be better able to judge speed, distance, and direction in relationship to themselves as they move in space.

Concept Exploration

1. Develop an obstacle course which is simple enough for all to utilize and challenging enough so that the best can barely succeed. Make this available for practice time.

2. Give children with movement pattern problems additional help in correcting any mechanical faults which may be holding them back from rull performance.

UNIT: Why We Move As We Do

LESSON PLAN: Kindergarten

THEME: Interrelationship: Structure and Function of the Moving Organism

Key Concept: There is an interrelationship between the structure and function of the moving organism.

Scope-defining Concept: Structure--body form, body coordination, and body composition--is influenced by the functional use of movement.

Aim: The body is the instrument for moving. All things which affect the body, therefore, may affect the way in which the body moves. Muscles enable us to move. Some people have stronger muscles than others. Strength can be improved. Other things being equal, the stronger person will probably be able to move better than the less strong. Through the learning experiences in Theme 4, the children should become aware of muscles, some of the major muscle groups, how differently the muscles feel when they are working, and some of the things they can do to make their own muscles stronger.

Topics: We use our muscles to move;
We can become stronger;
We can move better if we are strong.

Focus -- Awareness of strength: how to increase it; and, what it enables one to do.

Introduction of Concept

Material--Target for vertical jumping; mats for floor exercises; stall bars or ropes for climbing; markings for horizontal jump.

Approach--Help children to identify major muscles or muscle groups--use technical terms, e.g., biceps, hamstrings, gluteus--point to and name; palpate and name. Observe and palpate the working muscle--note the difference in hardness, size and/or shape. Discuss how muscles become strong--through use. Identify muscle groups; work them in familiar exercises, i.e., sit-ups; palpate while working--know that if you can do more tomorrow than you did today, it is because you are stronger.

Concept Development

We have muscles in our body.

Muscles enable us to move.

We can make muscles stronger by using them.

If we have strong muscles, we will be able to move better.

If our muscles are strong, we will look better.

Performance Development

Children should perform the various exercises which develop the different parts of the body: legs, back; arms; abdominal region; shoulder girdle; and pelvic region. Strength will vary with the individual. See Performance Expectations Chart for guidance in expectations of some of the exercises.

Concept Exploration

1. Vary the exercises so that everyone will be successful in a method of developing strength and all will be challenged to do his best.

2. Question the children on the muscle terms--know what the name of a muscle group is; where it is; and what exercise will strengthen it. Use printed word forms for recognition. Label a large figure of a child: muscles and name of muscles.

3. Display pictures of various exercise movements. Identify muscle group being strengthened.

UNIT: What My Movement Means

LESSON PLAN: Kindergarten

THEME: Individual Optimum Movement: Regulation; Balance

Key Concept: The individual has the primary responsibility for the regulation and balance of his own movement.

Scope-defining Concept: Movement provides a basic means of communication and expression.

Aim: Each individual should be aware of the personal meaning in his movement. The learner should realize that the responsibility for applying knowledge acquired is his own and begins early. The way one moves characterizes his unique personality. The way one moves tells others how one feels about the world and self. You can also tell how others feel by watching them move. For example, you can tell when a dog is happy; when a cat is angry; when a bird is upset; when father got a raise. Through your movements you can talk to people. Through the learning experiences of Theme 5, children are made more aware of the meaning behind movements and how movement can help in understanding others.

Topics: We can move so others know how we feel;
We can tell how others feel by watching them move.

Focus -- Awareness of the communicative and expressive aspects of movement.

Introduction of Concept

Material--Pictures of people or animals moving; pictures should express clearly the way the person feels.

Approach--Encourage the children to look at the "expression" of the movement. Identify it. Express it in own movement.

Observe other things and try to understand what the movement means. Identify. Express.

Use word cues which are familiar to the children. Have them respond in movement.

Concept Development

I can let others know how I feel through movement.

I can tell how others feel by watching the way they move.

Other people will know how I feel by watching me move.

Performance Development

Practice and improvement in the ability to translate ideas into movement.

Concept Exploration

1. Have the children bring in pictures of people or animals moving which depict expression in movement. Identify. Label basic expressions, e.g., joy; sadness; anger.

2. Have children suggest some stimuli for moving expressively: e.g., sounds, colors, feelings, objects.

Evaluation of Learner Status and Progress

All learning involves evaluation. The learner moves toward effectiveness in the best way he can define effectiveness. He moves into his physical and social environment trying out ways of relating to it and learning through these trials. Feedback enables the learner to continue building a concept of self which would be more effective and a conception of means which would lead toward effectiveness. Evaluation should be built into the learning experience and move the learner toward self-assessment and self-direction.

The learner must progressively see himself squarely in the center of the content structure as he gains a better understanding of self in relationship to the concepts being developed and performance emphasized. More and more choices, opportunities, challenges should be discovered, explored, and made a part of the intellectual resource. The learner should increasingly demonstrate a more effective use of the system of symbols which is uniquely used in Physical Education. He should begin to utilize other forms of communication such as, literature, art, music, and research publications which relate to human movement. Performance of characteristic forms of movement should become more efficient and effective.

Not only is evaluation a part of each lesson, but there should be a record of progress made during each year. As the child enters a new grade level, assessment of status on those variables essential to satisfactory progress should be made. These variables have been identified and organized into a Movement Behavior Entry Profile--Chart IV.3.

Movement Behavior Entry Profile

A teacher with a more thorough understanding of the individual learner will be in a better position to select appropriate learning experiences. The material contained in the section entitled, "The Performance Base for Kindergarten" has emphasized the individual differences in motor development and movement behavior. It is crucial that the teacher recognize individual differences so that she can vary the lesson according to the individuality of the learner. Following are some examples of questions the teacher may want to ask herself in preparation for a specific lesson:

1. What is his stage of development--is he walking, running, climbing . . . ?
2. How well does he understand the concepts he needs to use in this experience?
3. Will his height cause him concern? Is he too fat to successfully participate?

4. Does his body type make any difference in this experience?
5. Does his postural form enhance or limit his opportunity for participation?
6. Does he fall near the pathological end of the activity continuum?
7. Is he tense? Does he react with vigor?
8. Does being female (or male) make a difference in this expectation?
9. How does he appear to feel about himself as he runs, jumps . . . ?
10. Does he perform with balance and symmetry?
11. Is he aware of "movement"--his own; objects; animals; other people?
12. How does he respond to physical challenge? Bravely? Fearfully?
13. Can he solve a problem in a game situation?
14. Does he think before he acts?

The Movement Behavior Entry Profile has been devised for recording status and progress as follows: Part I--Individual Variables; Part II--Movement Performance Status; Part III--Movement Conceptual Status.

Part I. Individual Variables.--Part I of the Movement Behavior Entry Profile consists of three sections: (1) a section on descriptive characteristics--motor development stage; body type; sex, activity level, speed of movement; energy level--which have been discussed

under the performance base of Physical Education, and the moving self concept, (2) a section which provides a record of postural form, and (3) a section on adaptive capacity which includes some of the components necessary for the development of motor skills.

Body type is recorded in somatotyping terms according to Sheldon and Burgess as organized for nursery school by Walker (165). Inspectional criteria is based on the three types: endomorphy--roundness, softness, smooth contours; mesomorphy--squareness, hardness, massive; and, ectomorphy--linearity, fragility, delicacy. For detailed inspectional criteria, the reader is referred to the Appendix B, Body Build and Behavior in Young Children: I. Body Build and Nursery School Teachers' Ratings, Richard N. Walker, Monographs of the Society for Research in Child Development, Volume 27, Number 3, 1962.

The "moving self concept" refers to how the child feels about himself in specific situations which involve movement, e.g., when he is running, dancing, etc.

It is recognized that posture is a dynamic quality. To be mechanically efficient, all parts of the body should be maintained in equilibrium--arranged symmetrically about a line which passes through the center of gravity. This center of gravity shifts as the child matures. Figure IV.1 illustrates changes in posture from early childhood to preadolescence. The protruding abdomen, usually

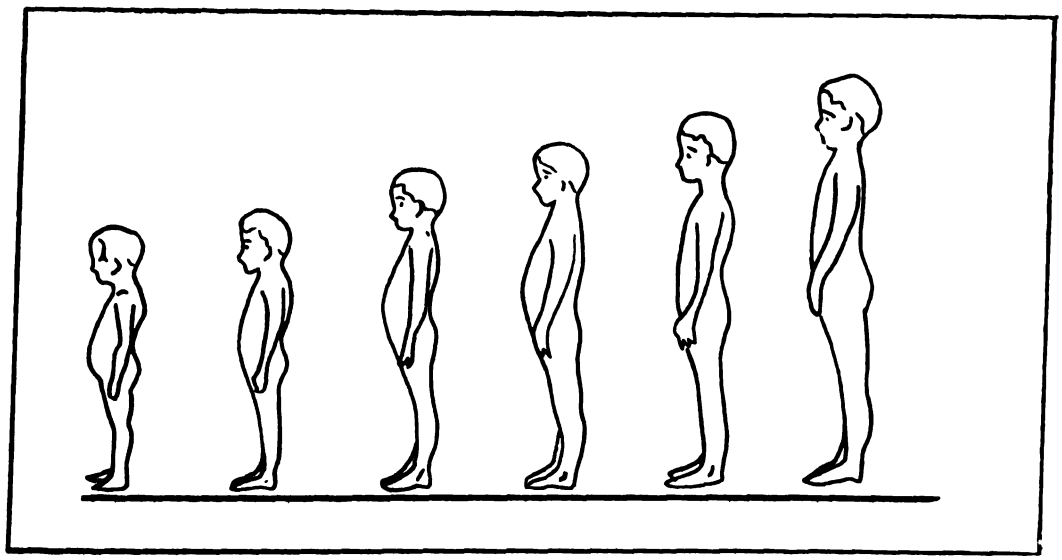


FIGURE IV.1.--Postural changes. These drawings are of a girl at various ages from early childhood to preadolescence. From M. E. Breckenridge and M. N. Murphy, Growth and Development of the Young Child. Philadelphia: W. B. Saunders Company, 1964, p. 314.

considered a postural fault, is characteristic of the early ages. Poor posture may be indicative of chronic fatigue, functional asymmetry, organic disturbance, lack of muscle development, or poor movement habits (21). Many postural deficiencies can be alleviated through movement activities. It is, therefore, important that the teacher note postural status.

Components necessary for the development of motor skills usually include strength--explosive, dynamic, and static; flexibility; endurance--muscle and cardiorespiratory; coordination. The section on adaptive capacity does not suggest any specific tests, but only the areas of the body and types of tests which are important. This allows the teacher the flexibility necessary to deal with individual differences.

Part II. Movement Performance Status.--The items selected for this part were based on availability of norms for the age range 4 through 7 years. One other criterion used was balance of kind of performance to be tested. Included are: accuracy and distance throws; accuracy and distance kicks; horizontal and vertical jumps; sprint run; static and dynamic balance; and, coordination. A distance run may be substituted for the coordination item. Norms on some of these items will be found in Appendix B or Chart IV.1.

Part III. Movement Conceptual Status.--This part of the Profile can be used to record progress of concept attainment for each key concept developed under each content theme at the kindergarten level. Four conceptual tasks are identified: (1) description, (2) grouping and labeling, (3) integrating information, making inferences, and (4) predicting, explaining (158). Each conceptual task has three levels of understanding. Therefore, the Profile reads across and down. It is suggested that the teacher utilize this information in designing conceptual sequencing within the learning experience and record progress of each individual for each major idea being developed. A code which is convenient for the teacher, such as a plus or minus sign, can be recorded.

Evaluation of the understanding of the symbols which are characteristic of Physical Education as illustrated in Chart II.2 is one of the responsibilities of the teacher. Concepts such as up, down, speed, circle, throw, or walk are an essential part of the learning experience in Physical Education and progress in comprehension and application of these concepts should be evaluated.

An example of how to use the Movement Conceptual Status Profile would be as follows: in the lesson plan on Theme 2, Unit "How Things Move," the child should be able to recognize an animal in terms of its movement, i.e., "walking." This then could be checked in the

Description Task, Level I. If the child is able to look at two animals who are walking and indicate that both are walking, he would get a plus in the Description Task, Level II column. When the child is able to group all animals who are walking, running, or leaping, for example, he would get a plus in the Description Task, Level III column.

Part II is designed for recording four age levels: 4 years; 5 years; 6 years; and 7 years. The purpose here is to encompass children of all age levels in this early grade regardless of the age of school entry. There should be a continuous recorded assessment for each age level in order to clearly indicate progress in these three areas. The Movement Behavior Entry Profile can be used for more than one level by using different colors--a color coding--for specific years.

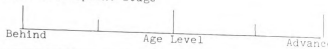
It is necessary to assess the learner at the beginning and close of each school year in addition to the continual evaluation of specific progress inherent in each lesson. Each lesson should be a search for meaning in human movement. A growing concept of human movement from conception through maturity becomes part of the child's equipment for living each day of his life.

CHART IV.3

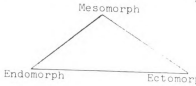
MOVEMENT BEHAVIOR ENTRY PROFILE--PART I

Individual Variables--Levels I (4 yrs.) II (5 yrs.) III (6 yrs.) IV (7 yrs.)

Motor Development Stage



Body Type Sex--M F



Activity Level (Quantitative)

Speed of Movement

Energy Level (Intensity of Response)

"Moving Self" Concept

Ht.____ Wt. ____	Side View	Back View
Postural Form:		
Head		
Shoulders		
Chest		
Abdomen		
Hip		
Pelvis		
Knees		
Ankles		
Toes		

Scale: 0 = Poor; 1 = Good; 2 = Excellent

Adaptive Capacity:	I	II	III	IV
Strength--				
Grip, L				
Grip, R				
Abdominal				
Back				
Shoulders				
Legs				
Flexibility--				
Front				
Back				
Side-L,R				
Endurance--				
Muscle				
Cardiovascular				
Coordination				

CHART IV.3--PART II

Movement Performance Status*

	30 yd. Dash	Hurdle Jump	Standing Broad Jump	Distance Throw	Accuracy Throw	Beam Balance	Beam Walk	Distance Kick	Accuracy Kick	Coordination	
4 years (48 mo.)											Above
											Average
											Below
5 years (60 mo.)											Above
											Average
											Below
6 years (72 mo.)											Above
											Average
											Below
7 years (84 mo.)											Above
											Average
											Below

*Norms available (Chart IV.1) for all tasks except kicks.

CHART IV.3--PART III

Movement Conceptual Status*

Conceptual Task	Level I	+	Level II	+	Level III	+
Description	Recognition of object		Relation between 1 object and another		Classification and order on basis of number, size, weight, color, form, volume	
Grouping and Labeling	Enumerating specific and general information		Group information		Categorize and label information	
Integrating information; making inferences	Enumerating, grouping, categorizing		Giving reasons or making inferences		Making inferences, relating cause and effect relationships, stating principles	
Predicting; explaining	Predicting and explaining without rationale		Giving information that establishes parameters; giving conditions; predicting or explaining with reasons		Stating conditions and establishing logical connections; predicting using stated or implied principles	

Adapted from Hilda Taba, Samuel Levine and F. F. Elzey, Thinking in Elementary School Children, Cooperative Research Project No. 1574. San Francisco: San Francisco State College, April, 1964, page 143.

PART III

SUMMARY, OBSERVATIONS, AND RECOMMENDATIONS

CHAPTER V

SUMMARY, OBSERVATIONS, AND RECOMMENDATIONS

The purpose of this study was to derive a philosophical base for determining a Physical Education program design. The approach to the problem was threefold:

First, to define criteria for the selection of content in Physical Education which would, presumably, contribute to the intellectual growth and skill competence of all students. An examination of the contributions which education hopes to make to the individual in a rapidly changing environment and an interpretation of Physical Education led to the identification of specific contributions which could be made through Physical Education. These contributions were grouped into four categories: purpose-establishing, purpose-achieving, aesthetic-ethical, and emerging self-other behavior. The specific contributions which were identified served as criteria for the selection of content in Physical Education.

Second, to establish criteria for deriving a conceptual base for Physical Education content structure

necessitated by the growing emphasis on subject matter structures for intellectual achievement. Three basic criteria were used: basic unity, sequential logic, flexibility. As a result five content themes were derived to form the unifying threads which bind together the vertical components and form the scope for all horizontal components in the content structure: (1) History of Movement: Cultural Heritage; Social Structures, (2) Movement: Unity of Pattern, Diversity of Type, (3) Changes in Movement: Age; practice; Conditioning, (4) Interrelationships: Structure and Function of the Moving Organism, (5) Individual Optimal Movement: Regulation; Balance.

Third, to develop a Physical Education program design for kindergarten using this philosophical base for selecting and organizing content and in developing evaluative tools and procedures. The performance base for kindergarten was established through a selective review of research evidence on early development of movement behavior and motor skills.

The philosophical base for a Physical Education program design is not intended as a final statement of authority, nor is it intended as the only philosophical base. Certain considerations, choices, and philosophies of the person or persons making curriculum decisions will make some developments seem of greater worth than others.

It is recognized that data derived from all sources must be evaluated by those shaping curriculum.

There are many ways to formulate a philosophical base for a Physical Education program design. Implementation of a philosophical base may take many forms. Procedures used in this study included an attempt to use pertinent research information wherever possible. Careful consideration was given to theories, experiences, and speculations of others. In the final organization, the investigator has sought to bring as much wisdom to bear on the controversial problems as possible.

The ultimate worth of a program design can only be determined by implementing and evaluating it in a specific situation. This study does not undertake to evaluate the Physical Education program design for kindergarten, nor is it based on a specific group of children in a specific setting. It is recognized that the most effective strategy for curriculum development demands curriculum decisions at all levels: federal, state, local.

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APPENDICES

APPENDIX A

HUMAN MOVEMENT--EARLY DEVELOPMENT

Orderly Sequence of Motor Development

The material contained in this section illustrates the motor development which characterizes the human race. The cephalocaudal sequence is clearly illustrated in the development of locomotion, outlined in Figure A.1: the infant gains control of his head, then shoulder and trunk, and finally his legs and feet. Although the time when a particular child is able to do these things varies among individuals, the general sequence of development is the same for all children.

The developmental sequences of motor behavior (birth to age 5) in combination with the behavior growth (embryo to age 5) are presented in Figure A.2. Four areas of development are considered: motor, adaptive, language, and personal-social.

Prone behavior has been recorded in terms of its flexor dominance and extensor dominance pattern. The development of this pattern from 1 week to 60 weeks is presented in Chart A.1.

The development of a particular activity from its initial to its final stages is illustrated in the next five figures.

Figure A.3--Phases in Achieving a Sitting Position

The newborn baby, when pulled slightly beyond the right angle with respect to the surface, gives very little

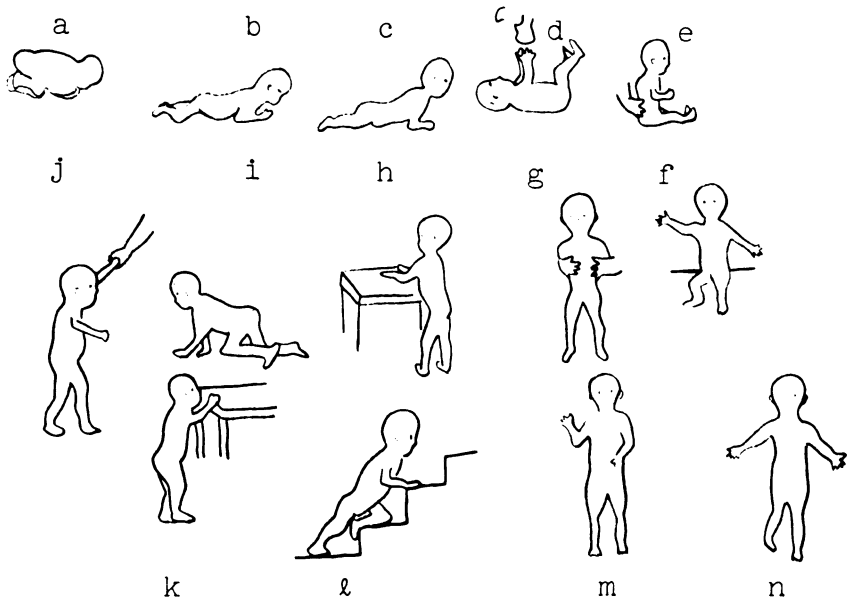


FIGURE A.1.--The development of locomotion. Adapted from Mary Shirley, "The Motor Sequence," The First Two Years, Vol. II, Intellectual Development (Minneapolis: The University of Minnesota Press, 1933), Frontispiece.

a = 0 month fetal posture
b = 1 month chin up
c = 2 months chest up
d = 3 months reach and miss
e = 4 months sit with support
f = 7 months sit alone
g = 8 months stand with help
h = 9 months stand holding furniture
i = 10 months creep
j = 11 months walk when led
k = 12 months pull to stand by furniture
ℓ = 13 months climb stair steps
m = 14 months stand alone
n = 15 months walk alone

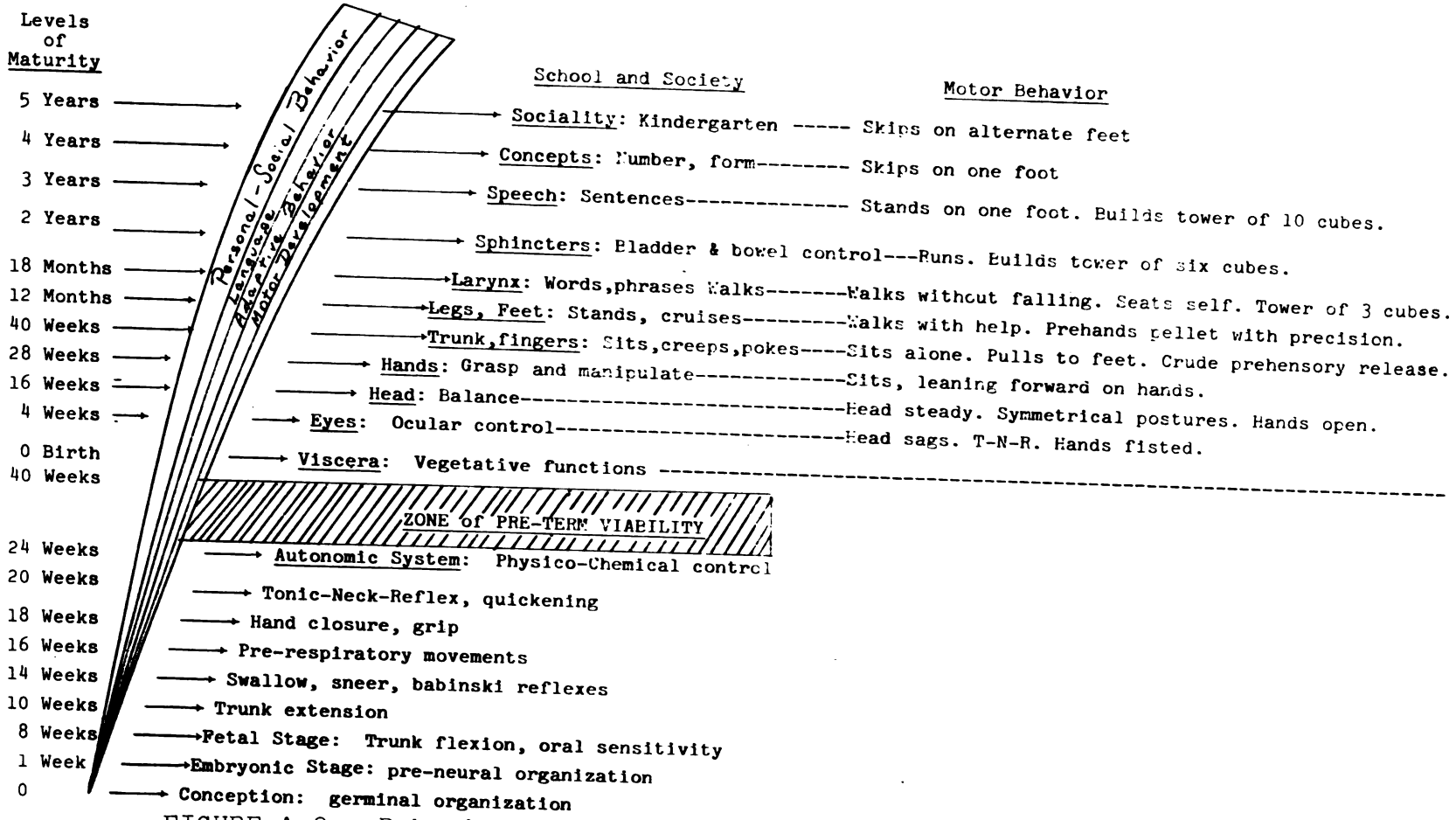


FIGURE A.2.--Behavior growth and motor behavior sequences (Embryo--Age 5) (Birth--Age 5). Adapted from Arnold Gesell and C. S. Amatruda, Developmental Diagnosis (New York: Paul B. Hoeber, Inc., Harper & Bros., 1941), p. 11; and Arnold Gesell and F. L. Ilg, Infant and Child in the Culture of Today (New York: Harper & Bros, 1943), p. 63.

CHART A.1

Prone Behavior in the Human Infant
Flexor-Extensor Dominance Pattern

Flexor Dominance	Extensor Dominance
1. Passive kneel (1 week) Both arms and both legs are symmetrically and sharply flexed. Cheek contacts platform, or head may be everted.	
	2A. Passive leg extension (4 weeks) The legs passively assume a symmetric extended posture. Arms still flex, fists at shoulders. Head lifts slightly less than 45°.
2B. Active kneel (about 4 weeks) Infant spontaneously draw's up one knee at a time by (unilateral) flexion.	
	3A. Active leg extension (8 weeks) Legs actively assume a symmetric extended posture. Arms flex slightly forward.
3B. One knee thrust (about 8 weeks) Infant spontaneously draws up one knee by flexion with an abducted thrust (unilateral). Head lifts from 45° to 90°.	
	4A. Alternate extensor kick (12 weeks) Infant lies with legs well extended and kicks in alternation. Fists at temples. Head lifts slightly.
4B. Abducted one knee thrust (about 12 weeks) Infant draws up one knee by flexion with increased abduction (unilateral). Head lifts 45° to 90°.	
	5. Swimming (16 weeks) Back arches so that infant's weight rests on abdomen and lower chest. Arms lift, flexed symmetrically. Legs lift, in symmetric extension. Head lifts 90°.
6. Simultaneous low creep (20 weeks) Both arms and both legs are flexed symmetrically. Face and chest contact the supporting surface but abdomen is lifted.	
	7. Frogging (24 weeks) Arms are flexed or extended symmetrically. Legs are extended symmetrically in abduction, feet everted. Head lifts 90°.
8. Advanced unilateral knee thrust 9. Same with foot eversion (28 weeks) Both arms extend symmetrically, or one extends and one flexes. Infant draws up one knee by flexion with an abducted thrust. (9). Same except that foot is everted. Head lifts 90° or more.	
	10. Pivoting (29 weeks) Arms alternately flex and extend, one after the other, causing trunk to pivot on abdomen. Symmetrical leg extension is followed by forward flexion of one knee, in abduction. Head lifts about 90°.

Flexor Dominance	Extensor Dominance
11A. Inferior low creep (30 weeks) Arms flex symmetrically. One knee flexes forward in adduction. Other knee then flexes forward after heel has rotated outward. Weight rests on side of body. Head everted, cheek on floor.	11B. Backward crawl (31 weeks) Legs extend symmetrically and passively and abdomen rests on the supporting surface. Infant pushes body backward from symmetrically flexed arms which come to extension as body pushes away from them. Head lifts less than 90°.
12. Low creep (32 weeks) Both arms are flexed symmetrically. Legs flex forward in adduction, one at a time. Face and chest contact supporting surface but abdomen is lifted.	13A. Crawling (34 weeks) Legs extend symmetrically and are dragged forward psssively. Infant pulls trunk forward by extending then simultaneously flexing both forearms. Head lifts 90° or more. 13B. Later (34 1/2 weeks) Pulls weight forward by extending and then flexing forearms one at a time.
14. High creep (35 weeks) Both arms are extended and both legs are flexed symmetrically. Knees are forward under trunk in adduction lifting abdomen and chest from supporting surface. Head is well up from floor and eyes look ahead.	15. Backward creep (36 weeks) Infant is in the high creep position. Extends first one leg then the other, lowering abdomen and falling backward. Arms are flexed symmetrically.
16. Rocking (about 36 weeks) Arms extend symmetrically and both legs are flexed symmetrically. Knees are forward under trunk lifting abdomen and chest from supporting surface. Infant rocks back and forth, remaining in one location.	17. Creep-crawl (37 weeks) In high creep position, both arms extended and both legs flexed. Falls forward, both legs coming to extension. Arms extend forward and infant attains high creep position again. Progresses in this fashion.
18. Creeps (40 weeks) 19. Creeps, near step one foot (42 weeks) Both arms extend downward from shoulder, then extend forward, alternately. Legs flex forward alternately. Arm and leg on opposite sides of body move simultaneously.	20. Creeps, step with one foot (45 weeks) Arms extend forward alternately. Legs move forward alternately, one flexed, one extended. 21A. Plantigrade position (49 weeks) Arms and legs both extend downward. 21B. Plantigrade progression (49 1/2 weeks) Arms and legs extend forward, alternately; left hand and right foot moving at same time. 22. Standing (56 weeks) Trunk upright. Arms and legs extend bilaterally. 23. Walking (60 weeks) Arms and legs both extended, move alternately.

From Arnold Gesell, and L. B. Ames, "The Ontogenetic Organization of Prone Behavior in Human Infancy," J. Genet. Psy., 56:247-263, 1940, pp. 249-251.

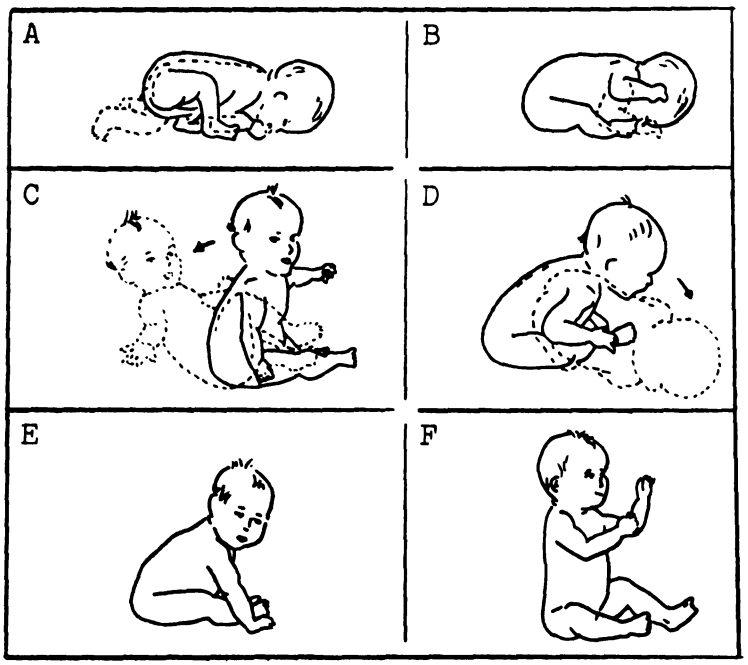


FIGURE A.3.--Phases in achieving a sitting position. A. The newborn baby gives very little resistance to gravity; attempts to elevate pelvis and extend lower extremities (see lined drawing). B. A few weeks later some resistance is shown in jerks back and forth; shoulder girdle movements are used in attempts to free himself. C. Resistance later becomes exaggerated and the tendency is to fall backward (see lined drawing). D. During the next phase, the infant moves forward from the vertical position and uses the trunk muscles to maintain posture. E. In the next phase, the child is able to maintain a leaning posture supported on the extended upper extremities. F. Finally, the child can maintain an erect sitting position on a flat surface and the arms are now free to engage in other activities. From M. B. McGraw, The Neuromuscular Maturation of the Human Infant (New York: Columbia University Press, 1943), p. 64.

resistance to gravity and falls forward so that his face rests near his feet on the surface. He attempts to elevate the pelvis and extend his legs which are pinioned beneath his body (Fig. A.3-A). A few weeks later the infant shows some resistance against falling forward by a few jerks back and forth as the axis of the body passes beyond the right angle. Discomfort may be expressed by crying. Primarily movements of the shoulder girdle are used in an attempt to free himself (Fig. A.3-B). The resistance to falling eventually becomes exaggerated and when pulled into the sitting position, the tendency is to push backward into the dorsal position (Fig. A.3-C). During the next phase, the infant moves forward from the vertical position and uses the trunk muscles to maintain the posture. He then topples forward or sidewise (Fig. A.3-D). When the child is able to maintain the leaning posture supported on the extended upper extremities, further advancement toward the sitting posture is clearly indicated. The angle of flexion widens and the child gradually decreases dependency on the upper extremities for support (Fig. A.3-E). When the infant can maintain an erect sitting position on a flat surface, usually with one of the lower extremities flexed and abducted, while the other is fully extended in front of the body, mature development has been reached. The arms are now free to engage in other activities (Fig. A.3-F). Data from 1717

records on 82 infants ranging in age from a few minutes to two-and-one-half years were analyzed for this study (111:68-72).

Figure A.4--Phases in the Development of Prone Progression (McGraw)

A newborn baby placed in the prone position assumes a posture in which the legs and arms are flexed and the face rests on the surface (Fig. A.4-A). The head is sometimes lifted momentarily and although there is a great deal of activity in the lower extremities, progression is normally absent. In McGraw's observations on 82 infants, this phase of development gradually, within the first 100 days, progressed to that shown in Figure A.4-B. The baby can now hold his head off the surface for a short period of time, and the arms are less flexed. The next phase (Fig. A.4-C), which overlaps the two preceding phases is characterized by sustained raising of the head and chest, use of the elbow or palm to provide support, and generalized activity directed toward a desired object. There is still no obvious urge to move the body forward. Phases D, E, and F overlap a great deal in time with the preceding stage and with each other. They are most evident at approximately 200 days. In phase D there is an impulse to progress, which is not successful, although pivoting and even backward movement may occur. In phase E, as illustrated in Figure A.4, movements in the hip region and pushing with

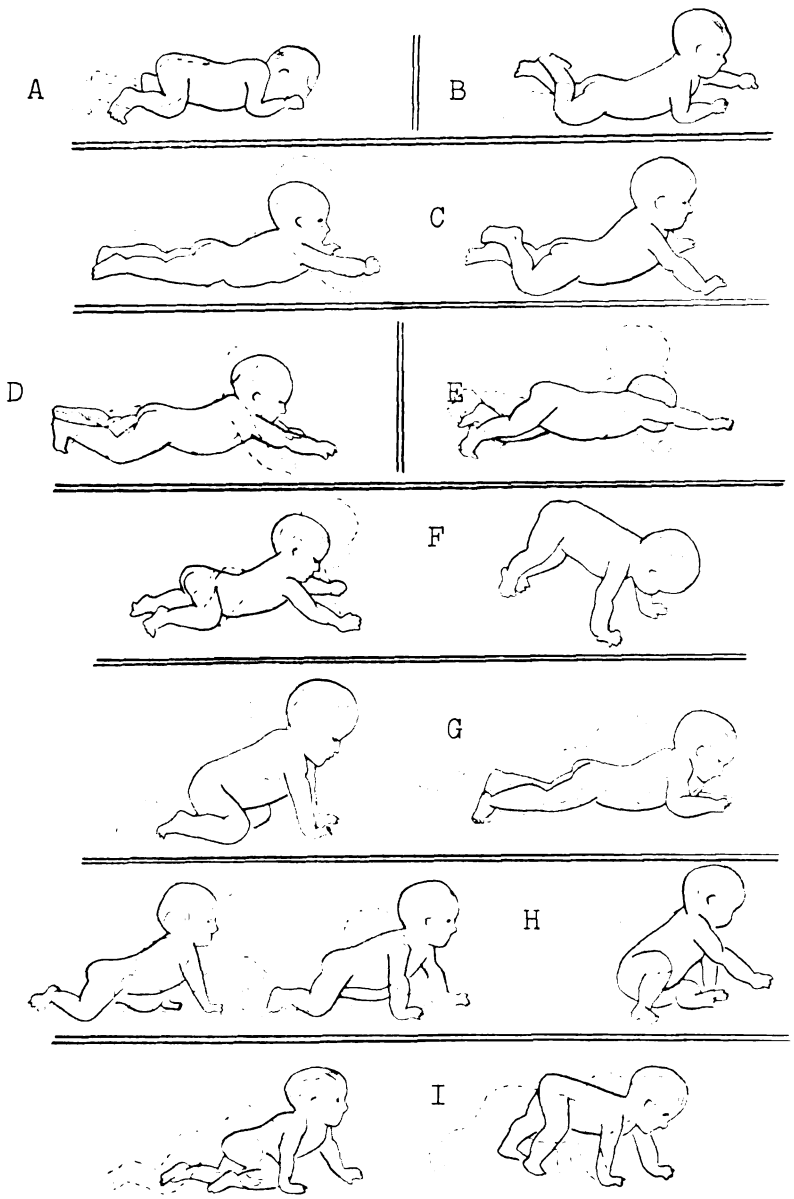


FIGURE A.4.--Phases in the development of prone progression--McGraw. These nine phases are clearly distinguishable, according to McGraw, and represent gradual assumption of control. For descriptions of these phases and an indication of the age levels at which they appear, see the discussion in the text. From M. B. McGraw, The Neuromuscular Maturation of the Human Infant (New York: Columbia University Press, 1943), p. 51.

the feet as well as reaching out with the hands are usually not sufficiently synchronized to produce propulsion. Phase F is characterized by assumption of a creeping posture, either by raising the abdomen by flexing the legs and lifting the head and shoulders (as in the first part of F); or, by straightening the legs (as in the second part of F). There is apparently deliberate but unorganized progression in phase G which is most evident in babies between the ages of 200 and 300 days. Phases H and I are characterized, respectively, by organized (although somewhat staccato) progression and progression with relatively smooth integration.

Figure A.5--Stages in the Development of Prone Progression (Ames)

Other descriptions of the development of prone progression differ somewhat from that of McGraw and from each other. Although these descriptions are not in complete agreement, all investigators emphasize the sequential nature of development which they attribute to neuromuscular maturation. For purposes of comparison, the fourteen stages differentiated by Ames (3) in her analysis of moving-picture records obtained with twenty babies are illustrated in Figure A.5. Median ages at which successive stages were reached are indicated in the legend, along with a brief description of the development.

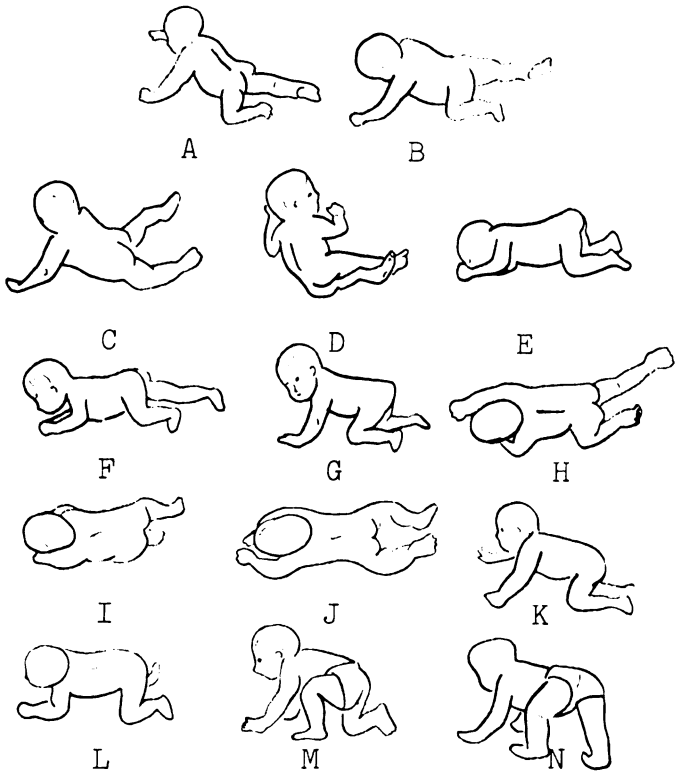


FIGURE A.5.--Stages in the development of prone progression--Ames. Median ages for attainment of each stage by twenty infants are given at the end of each description. A. Knee and thigh forward beside the body--28 weeks. B. Knee and thigh forward, inner side of foot in contact with floor--28 weeks. C. Pivoting--29 weeks. D. Low creep position--30 weeks. E. Less inferior low creep position--32 weeks. F. Crawling--34 weeks. G. High creep position--36 weeks. H. Retrogression--36 weeks. I. Rocking--36 weeks. J. Creep-crawling--36 weeks. K. Creeping on hands and knees--40 weeks. L. Creeping, near step with one foot--42 weeks. M. Creeping, step with one foot--45 weeks. N. Quadrupedal progression (creeping on hands and feet)--49 weeks. From L. B. Ames, The sequential patterning of prone regression in the human infant, Genet. Psyc. Monog, 19:436, 1937.

Figure A.6--Selected Phases in the Development of the Ability to Assume an Erect Posture

The ability to roll from a supine to a prone position and the assumption of a sitting position were found to be necessary antecedents to the assumption of upright posture. McGraw, in her study of eighty-two infants, did an intensive observation of antigravity reactions such as sitting upright (see Fig. A.3) and standing, with or without help (see Fig. A.6). According to McGraw, mature sitting becomes evident around 300 days. Around 400 days, some of McGraw's infants helped to an upright posture, were maintaining it and taking a few steps. This followed a period of standing by pulling up to furniture, standing with help, and continuing to stand after help is withdrawn. The infant finally reaches the stage where he assumes the upright posture unaided. Selected phases of this series of development are illustrated in Figure A.6.

Figure A.7--Developmental Phases in Erect Locomotion

Reflex stepping movements were exhibited in some newborn babies when they were supported with their feet in contact with a surface. These stepping movements were more evident around the third week than immediately after birth, according to McGraw (see Fig. A.7-A). During the following phase (B), reflex stepping motions appeared to be suppressed. The movements illustrated in phase C,

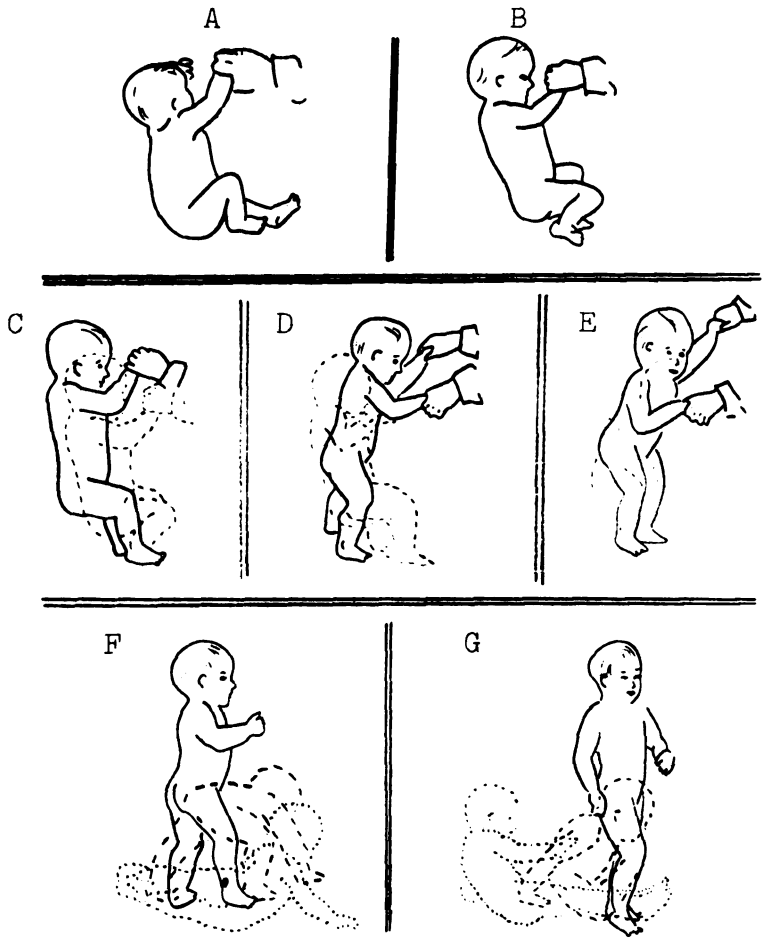


FIGURE A.6.--Selected phases in the development of the ability to assume an erect posture. The upright position is achieved only by holding onto furniture or being helped by others, in the early stages. From M. G. McGraw, The Neuromuscular Maturation of the Human Infant (New York: Columbia University Press, 1943), p. 87.

A. Passive response.
B. Extensor thrust in attempt to push upward.
C. Extension of lower extremities.
D. Erect position.
E. Vertical push.
F. Rise from recumbent to standing position independently.
G. Rising characterized by smooth movements.

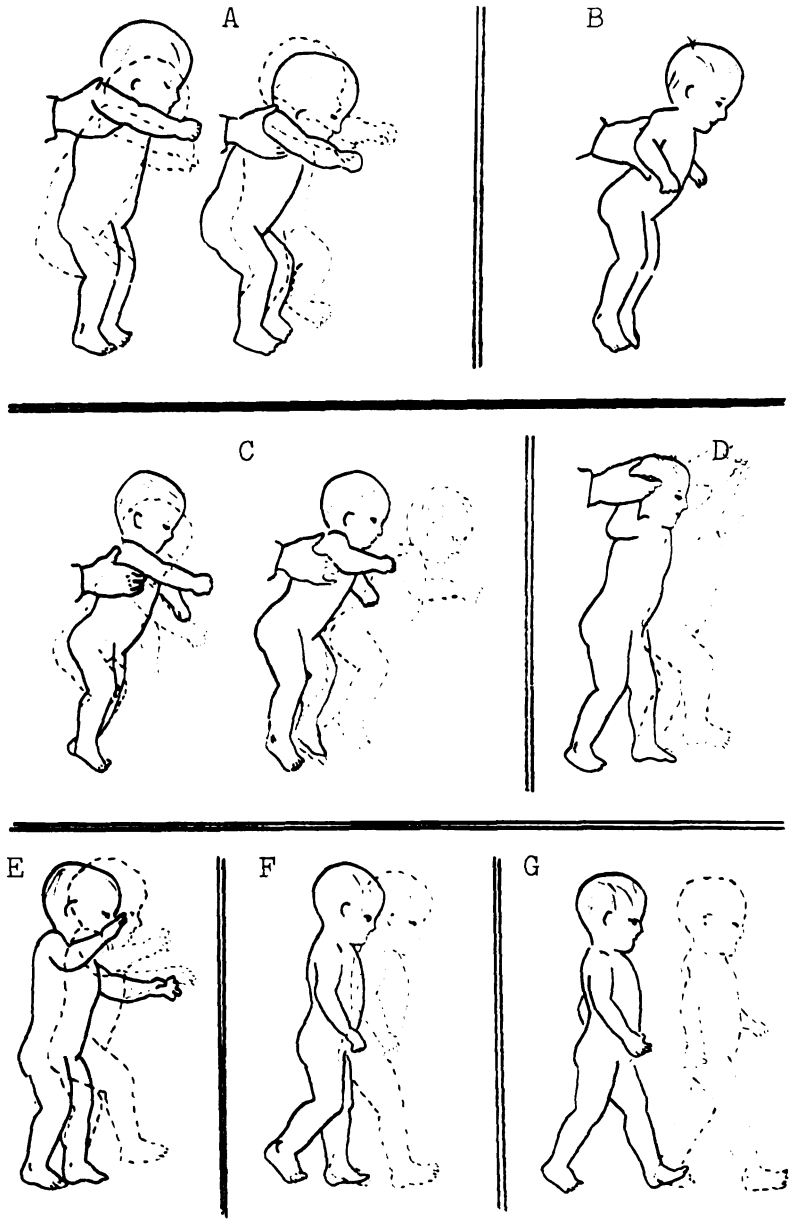


FIGURE A.7.--Developmental phases in erect locomotion. A. Newborn, supported with feet on surface, displays reflex stepping movement which become more evident around three weeks. B. Suppression of stepping motions. C. Transition stage--up and down movements of body and stepping motions which are different than the reflex stepping motions of the newborn. D. Self-initiated stepping movements while supported. E. Independent stepping. F. Heel-toe progression. G. Integration--maturity of erect locomotion. From M. G. McGraw, The Neuromuscular Maturation of the Human Infant (New York: Columbia University Press, 1943), p. 77.

differed from the reflex motions in phase A. The infant moved his body up and down while holding feet in position; stamped, and made stepping movements. Self-initiated stepping movements followed, at first with support and then without it (see phases D, E, F, and G). Improved coordination, a lessening of motions, and changes in the contact made by the feet followed. Some of these aspects will be considered in the discussion of Chart A.3.

Several investigators, including Burnside (28), Shirley (146), and McGraw (111), have studied the mechanical aspects of locomotion. The following description of locomotor mechanics as discussed by Shirley is in agreement with the data of Burnside and McGraw. Shirley (146) studied the footprints of her subjects and found the median length of the step increases as a function of age and the number of weeks which the child has been walking alone. The speed of progression also increases with age and walking experience. There is a slight decrease in speed around the twenty-sixth week of walking which may indicate the child is now attending to other pursuits. The width of the step increases until the baby walks alone and then it begins to decrease slightly. The width of the standing base and the stepping angles show great irregularity in the early stages. These angles gradually decrease and approach zero degrees after the babies walk alone. Dancing or walking

on the toes only is common in the early stages; later on the full footprint is visible on a paper. In the early stages of walking a large percentage of the footprints are out of sequence, but after the babies start walking alone their feet follow one another in sequence.

For purposes of showing the relationships between the development of locomotion and some other motor reactions, Chart A.2--Various Reactions in the Motor Sequence--and Figure A.8--Development of Movement--are included. The median age in weeks is given for locomotion, fine motor reactions, motor play, and parts of body controlled from three weeks to sixty-six weeks as observed by Shirley (147). The general development of equilibrium and the use of the hand for children ages one month to two-and-one-half years of age has been recorded by Montessori (114). This record of development is illustrated in Figure A.8.

Variation in Time Children Reach Specific Stages of Motor Development

Some of the major influences which cause children to reach specific stages of motor development at different ages are presented below.

Race

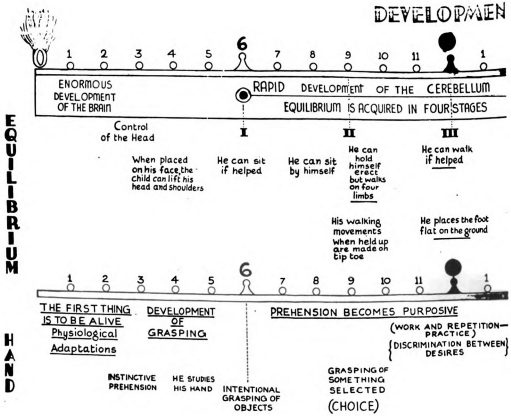
Investigators who have compared the progress of motor development between infants of the Negroid and Caucasian races report that the Negro children are more

CHART A.2

VARIOUS REACTIONS IN THE MOTOR SEQUENCE

Median Age In Weeks	Locomotion	Fine Motor Reactions	Motor Play	Parts Controlled
3.0	Chin up			Eyes, head, neck
9.0	Chest up		Smile	
14.0	Adjust for lifting	Reach and touch		Arm and upper trunk
15.0		Grasp object	Play with hands	
18.0	Sit on lap	Retain object (thumb opposition)		
21.0		Grasp dangling object	Object to mouth	Hands and lower trunk
25.0	Sit alone momentarily	Transfer object hand to hand	Plays with toes	
28.5	Roll		Pat toy, rock, shake head	
30.5	Sit alone 1 minute			
31.5	Stand with help			
38.0	Some progress on stomach		Suspension bridge	
41.0	Scoot backward		Pat-a-cake Peek-a-boo	
42.0	Stand holding to furniture	Point with index finger		Pelvis region, legs, and fingers
45.0	Creep			
45.0	Walk when led			
47.0	Pull to stand by furniture	Open simple boxes		
56.0-62.0			Put fingers in holes	
62.0	Stand alone			
66.0	Walk alone		Run, climb	

Adapted from Mary Shirley, The First Two Years, Vol. II, Intellectual Development (Minneapolis: The University of Minnesota Press, 1933), p. 40.


DEVELOPMEN
1 2 3 4 5 6 7 8 9 10 11 1
ENORMOUS DEVELOPMENT OF THE BRAIN
RAPID DEVELOPMENT OF THE CEREBELLUM
EQUILIBRIUM IS ACQUIRED IN FOUR STAGES
EQUILIBRIUM
Control of the Head
I
II
III
When placed on his face the child can lift his head and shoulders
He can sit if helped
He can sit by himself
He can hold himself erect but walks on four limbs
He can walk if helped
His walking movements when held up are made on tip toe
He places the foot flat on the ground
1 2 3 4 5 6 7 8 9 10 11 1
HAND
THE FIRST THING IS TO BE ALIVE
Physiological Adaptations
DEVELOPMENT OF GRASPING
PREHENSION BECOMES PURPOSIVE
(WORK AND REPETITION—PRACTICE)
{DISCRIMINATION BETWEEN DESIRES}
INSTINCTIVE PREHENSION
HE STUDIES HIS HAND
INTENTIONAL GRASPING OF OBJECTS
GRASPING OF SOMETHING SELECTED
(CHOICE)

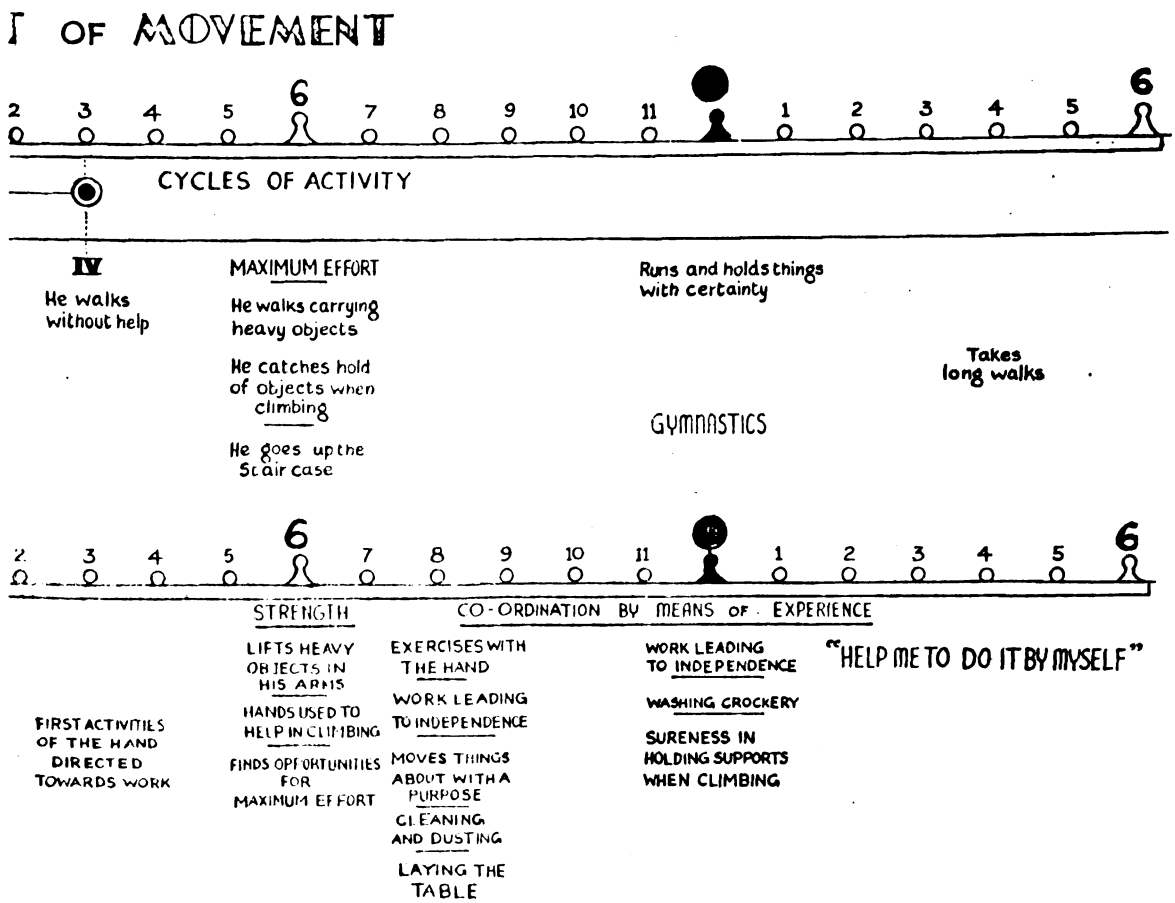


FIGURE A.8.--Development of movement. From Maria Montessori, The Absorbent Mind, translated by Claude A. Claremont (India: The Theosophical Publishing House, 1961), p. 100.

advanced during the months shortly after birth. A representative sample of 1409 infants was given the revised forms of Bayley's Scales of Mental and Motor Development. It was found that Negro babies tended consistently to score above the Caucasian on the Motor Scale. It was suggested that the superior performance of the Negro babies may be due to generally heightened muscle tonus (12). The muscle tone of the African infant was found superior to that of the European infant starting from birth in a study of African children ages 1 through 72 months. The head was held better and there was earlier standing, prehension, and manipulation in the African children (63).

The younger the child the greater the precocity of development in African over European children. The advancement in motor development is evidenced in the following achievements: (1) the child had a straight back and could keep his head from falling backward when drawn into the sitting position starting with the first day, (2) at six weeks the child could control his head whatever his position, (3) at four months he could sit alone, (4) at eight months he could stand without support, (5) at ten months, walk, (6) at eleven months was able to use his thumb and forefinger accurately for picking up objects (62).

A comparison of the skeletal ages of Negro and Caucasian infants born in East and West Africa and in the

United States led Tanner (160) to conclude that the differences were genetic in origin. This advancement of the Negro in skeletal ossification at birth was associated with the advancement of motor behavior in Negroes.

Several studies which compared the motor development of American born Negro and white infants reported early motor achievement in favor of the Negro children. Scott (144) found the American Negro infant advanced in certain psychomotor developmental milestones such as sitting up and vocalizing during the first year of life when compared with established standards for Caucasian children. Pasamanick detected a definite acceleration in gross motor behavior in Negroes, although he did not find an outstanding characteristic which could be called a "racial" difference (124).

Not all investigators agree that early motor development is advanced in Negro children. A study of 725 children from seven races failed to disclose significant racial differences on the age at which children walk (151). McGraw found white babies superior to Negro babies in terms of developmental age, developmental quotient, and percentage of successful reactions. This study was done on white and Negro infants in the south (108). In another comparative study of Negroes and whites, Rhodes (134) found little, if any, difference in the motor abilities measured at any level of development. She

found both rate of motor development and organization of motor abilities strikingly similar for the two races.

Although some studies did not reveal an advancement in motor development of the Negro infants as compared with white infants, the majority of studies do substantiate this belief.

Sex

On the average, the female is more advanced than the male in nearly all maturation indicators. In skeletal maturity, girls are ahead by about two weeks intrauterine age, about 4 weeks at 40 weeks or birth, and roughly 18 months at adolescence (159). Fifty percent of terminal stature, on an average, was attained by girls between 1 1/2 and 2 years and by boys between 2 and 2 1/2 years (148). Osseous precocity was found in females in spite of the heavier weight in males in a study of over 900 infants born of Negro mothers. In the same weight and/or length category, the frequency of ossification centers was higher for females than for males (161). Acceleration of skeletal age in the female over the male increased from late fetal life to maturity (49). Girls have been found to complete their skeletal maturation, on the average, two to three years before boys (138). The mean age at onset and termination of the circumpubertal growth acceleration occurred approximately two years earlier in girls than in boys (112).

Girls walked approximately two weeks earlier, on the average, than boys according to four different studies including 1449 children (151). Garn and Rohmann (61), in reviewing Gesell test performance scores of over 500 long-term participants in the Fels Longitudinal Studies, found that the general advance of girls over boys was clear. A larger percentage of girls were able to successfully achieve each given task at each age level. The girls were distinctly ahead of the boys in 61 of the 91 items. When looking at the 91 Gesell test items, the sex difference was less clear on the motor items and in the perceptual-motor behavior the boys were actually ahead of the girls. The boys were distinctly ahead in form-board and performance-box triangle drawing, circle copying, and rod-in-hole activity. Boys had a higher activity level and were bigger. The question of whether or not the boys were advanced in motor behavior because of the size differential was not answered.

There is substantial evidence to support the theory that females are accelerated in skeletal age and reach skeletal maturity earlier than males. This advanced maturation is also characteristic of sexual maturation and motor development. The earlier maturation is evident before birth and persists throughout the growing years.

Nutritional Factors

The interaction between the state of nutrition and the genetic endowment influences size from infancy through adolescence. Progressive behavioral retardation in manipulative and gross motor tasks following weaning has been found related to protein-calorie malnutrition. Generally, the more a child falls behind in somatic growth, the more retarded he becomes in his motor development (35).

"Nutritionally, the newborn infant is the result of a long series of metabolic processes within the mother, which, in turn, were the result of metabolic processes in the maternal (and paternal) body previous to pregnancy and ad infinitum" (163). Nutrition is the prime factor in the propagation of individuals with maximum potential for physical development and maintenance of the best possible physical status throughout life (163:30).

The mother and the fetus form a unity and must be considered together. Because of its negative influence on the well-being of the mother, nutrition is a chief cause of prematurity. A girl whose nutrition may not be adequate for her own body because she has not completed her growth could not be expected to develop a good fetus. An older woman may have already depleted her store of food factors. If the dietary pattern of a woman is habitually poor, her store of food would become more depleted with each succeeding pregnancy. The maternal body should be rebuilt after each pregnancy and lactation period (163:131).

Because of the interrelationship between prematurity and stillbirths, neonatal deaths, and physically and mentally defective children, it follows that malnutrition ranks as one of the leading causes in these events (163: 130). In a study of maternal nutrition and its relationship to the condition of the infant at birth, the following results were recorded: (1) 95 percent of a sample of 284 infants were in good or excellent physical condition when the maternal diet was excellent or good, (2) 65 percent of the infants were in the poorest physical condition at birth when the maternal diet was poor to very poor, (3) 27 percent were in fair condition and 8 percent were in either good or excellent condition when the maternal diet was poor to very poor. All the stillborn infants, all of the neonatal deaths but one, and all of the premature infants but one (a neonatal death), all of the functionally immature infants, and most of the congenital defects were found in the group of infants born to mothers with poor to very poor prenatal diets (27).

All other things being equal, the state of nutrition clearly determines the rate of growth. Protein deficiency is growth-limiting in many parts of the world today, i.e., Central and South America, Africa, Asia, and Indonesia. In two-thirds of the world's population, caloric and protein deprivation limit childhood growth (59).

The long-range effects of adequate nutrition were demonstrated in a study comparing the physical and mental traits of artifically fed and breast fed children. Of the 383 children, ages 7-13, children who had been artifically fed were inferior physically and mentally to those who were breast fed. Except for height, the children who were artificially fed ranked lowest in all physical traits measured. Children breast fed from 4 to 9 months were definitely superior physically and mentally to all other groups. Those fed exclusively by breast for over 9 months had the lowest I.Q's of all groups, although they apparently developed physically at a normal rate (85).

Severe malnutrition interfered with motor performance among institutional children (40). Prolonged feeding problems in children between two and four years of age appeared to have a definite effect on weight and a lesser effect on height (43). Serious undernutrition in Serbian children during infancy did not appear to affect normal physical characteristics, but did affect normal mental capacity when they reached school age (29).

Undernutrition has been found to not only retard development but to reverse many of its characteristic changes. For this reason, body composition as well as retarded linear growth is an important consideration. A study of body composition was made on eight children who died of malnutrition. These children differed most markedly from the other children in a very low fat and

high water content. Protein as a percentage of body weight was not so conspicuously affected. It was concluded that what is important in protein depletion is not simply the weight or percentage of total body protein which is lost, but the degree of depletion of certain types of protein and the distortion of the protein pattern which results (23).

Children are capable of growing and maturing at an accelerated rate when care is improved after suffering from undernutrition (2). Growth is a regular process under dynamic and complex biological control. When this process is disrupted, this control tends to return development into its original channel. If growth is retarded by illness or malnutrition, growth becomes more rapid at the end of the illness or period of malnutrition. This tends to put the child back on his normal growth curve (127). It should also be pointed out that in the case of chronic illness in which growth-inhibiting drugs are used, this "catch-up" growth may not occur unless growth-inducing drugs are administered (50).

Nutritional factors of the child and prenatal nutrition of the mother affect the time at which stages in motor development are reached. Caloric and protein deficiency limit growth. This growth may be made up in an accelerated growth pattern following illness or malnutrition.

Body Build

Each individual has a characteristic body build. The width of the bone, muscle, and fat layers of the calf of the leg, even in the neonate, are distinctive for each individual and different for the two sexes (170). In all anthropometric dimensions in infancy, the boys' means are larger than the girls' means (148). Girls have a wider fat shadow than boys (105). Whatever theoretical bias one may hold toward constitutional or body typing, it is quite evident that children come in different shapes and sizes.

Fat thickness and length were found to be positively correlated from infancy through early adolescence in a study of 259 white children unselected with respect to obesity. Children who were one standard deviation above average in fat between the years 1.5 and 12.5, were advanced by approximately half a year's growth. Menarche was reached early by children who were fatter at 8.5 to 9.5 years. Marked differences in rate of growth and up to 5 years difference in menarcheal age were characteristic of extremes of fatness (60).

Not all studies have noted this relationship. An inverse relationship between weight gain and achievement of sitting and walking alone was found in a study of 708 full-term Negro infants (51). When malnourished and obese children were not part of the sample this trend toward earlier adolescence, greater skeletal maturity, or taller

height in the "fat" children of either sex was not found. Significant differences were not found in the mean menarcheal age between obese and non-obese adolescent girls (81). Bone age of short adolescents was mostly markedly delayed in a study by Hortling (86). Degree of overweight was not positively correlated with advanced bone age indicating that acceleration in obesity is probably a hereditary factor.

Contrary evidence has been found in the relationship between physique and rate of skeletal maturation in boys. There is a tendency for boys with a delicate and linear physique to be slower maturing and taller; obese boys tend to mature more rapidly and become smaller adults; endomorphs and mesomorphs tend to be among the faster maturers (1).

Genes are basic determinants of size and growth. Generally speaking, the larger the parents (taller or greater in muscle mass), the larger the infant; the shorter the parents, the shorter the infant. Sibling correlation in size is evident even at birth. Menarcheal age shows a two-generational similarity and considerable similarity in sibling pairing. Early behavioral development, i.e., creeping, crawling, rolling over, standing, is often faster in children of parents who have a large lean body mass, and slower in children of parents with a very small lean body mass. Sibling similarity is also evidenced in Gesell item attainment (59). Children of broad-chested parents

are characterized by early ossification of the skeleton, and advancement in motor and manipulative development. Those children gain in stature more rapidly and add more weight per unit of stature than do children of narrow-chested parents (88).

Children who are taller are slightly but consistently advanced in a variety of developmental measures and tend to be advanced in skeletal age. Children who are taller tend to walk earlier (122). Children with a larger lean body mass tend to be advanced in gross motor development. There is reason to believe that a faster rate of behavioral development will occur in those children who are physically advanced. Infants with large leg muscle masses stand up and walk earlier than infants with small leg muscle masses. Garn suggests that greater body size in either the horizontal or vertical direction is attained through a faster rate of growth, and that this faster rate of physical growth is associated with more rapid acquisition of skills and abilities measured (58).

Each individual has a characteristic body build which is determined basically through genetic endowment. The tissues which make up the configuration or physique of an individual--fat, muscle, and bone--vary greatly among individuals and between sexes. Individuals with a higher muscle and fat component tend to grow and mature at earlier ages than their peers of a linear body build.

Because of the high positive correlation between physical growth and motor development during the early years, it may be stated that, in general, the larger child will also be the one who is most proficient in motor skills within his age group.

Perinatal Factors

The periods of prenatal growth and infancy are the foundations of adult structure. Infant deaths during the first months of life are traceable to factors that are damaging to the mother as well as to the infant. Prematurity, anoxia, birth injuries, and malformations are the principle causes of infant mortality, and are attributable to maternal conditions (163).

Studies indicate that it is birth weight, rather than prematurity, per se, which is the major concern in development. A weight of less than 2500 grams in the newborn is generally accepted as premature regardless of length of gestation (163). Different criteria may be necessary to judge prematurity in Negro infants, who are naturally smaller and may fall into the artificial weight division of prematurity although they may be healthy infants (24). Drillien studied prematurely born infants according to birth-weights and age of passing three locomotion milestones: (1) sitting unsupported on a hard surface for 10 minutes, (2) standing unsupported for 30 seconds, and (3) walking alone across a room. Lower birth weight was

positively correlated with a later age of passing these milestones (see Chart A.3) (42).

CHART A.3

BIRTH WEIGHT AND DEVELOPMENT

Birth Wt. (lb. oz.)	Months	Locomotion			No. of Cases
		Sit	Stand	Walk	
3.8 and under	6	-----	-----	-----	40
	12	67.5	5.0	-----	
	18	92.5	57.5	40.0	
	24	100.0	85.0	85.0	
3.9--4.8	6	-----	-----	-----	57
	12	84.2	14.0	1.8	
	18	96.5	82.4	73.7	
	24	96.5	93.0	89.5	
4.9--5.8	6	-----	-----	-----	139
	12	97.8	25.9	7.9	
	18	99.3	95.7	92.8	
	24	99.3	99.3	98.6	
5.9 and over	6	11.5	-----	-----	113
	12	100.0	51.3	21.2	
	18	100.0	100.0	99.1	
	24	100.0	100.0	100.0	

Adapted from: Cecil M. Drillien, The Growth and Development of the Prematurely Born Infant (Baltimore: The Williams and Wilkens Co., 1964).

In 132 cases in which anoxia had occurred, the nervous system of each child was damaged seriously enough to affect subsequent behavior. Hyperactivity combined with hyperexcitability occurred with a lesser degree of anoxia. A greater depth of anoxia resulted in exhibition of a degree of apathetic behavior incompatible with normal living

(129). During the critical period immediately following birth, failure to establish satisfactory respiration is a common cause of neonatal death and brain injury (121).

In a follow-up study of 500 children of varying birth weight, Drillien concluded that at 4 years the mean weight for the total premature group and mature group were closely related to birth weight for singleton births. The highest weight increments occurred in the smallest at birth and the lowest for those between 4 1/2 and 4 1/2 pounds in the prematures. The prematurely born tended to be lighter and shorter than the controls as well as underweight for their height at 4 years (43).

Almost identical neurological development was revealed in comparing two infants whose gestational age was identical although their legal age was different by three months (a premature infant born at 28 weeks of gestation and reaching 41 weeks, and a normal newborn infant at term). Distinct differences were observed, however, in muscle tone. Hypertonicity was characteristic of the full-term infant. Good muscle tone was characteristic of the premature infant; the angles of the joints were more open and the limbs moved more freely. When the straightening and automatic walking reflexes were elicited, the premature infant walked on tiptoe whereas the full-term infant rested heavily on his heels. Evidently the premature was not able to benefit from his precocious emergence into the world. Ontogenesis follows and depends solely upon the degree of completion of inherited biological structure and functions (38).

The most crucial perinatal factor is that of prematurity. Birth weight of the premature appears to be the determining factor in when an infant attains motor developmental stages. The premature is not able to benefit from an enriched environment until maturation occurs in the genetic structure and functions. Anoxia is another perinatal factor which may affect the motor behavior of the child either through hyperactivity or hypoactivity.

Child-rearing Practices

Child-rearing practices which are restrictive, inhibiting, psychologically traumatic, and delimit types of movement have been found to retard motor development. Permissiveness about generally non-approved habits, freedom to move about the home, encouragement of active interplay with objects in the environment, and opportunity to develop at own rate in the motor area were found to have significant positive relationship to a higher developmental quotient. Gesell's gross motor items were administered to two groups of Negro children: one from the upper and one from the lower socio-economic levels. The mean Developmental Quotient was found to be 107.57 for the upper group and 114.32 for the lower group. This difference was credited to the more permissive home environment of the lower socio-economic group (170).

Rigid toilet training in conjunction with a number of other practices that might be called restrictive seems

to slow down motor development in infancy (106). Retarded motor development has been found to be associated with maternal deprivation (neglect, rejection, and isolation form normal social contacts) (125).

Superiority of motor development was found in babies who habitually sleep in the prone position when compared with babies who sleep in a supine position. The extensor phase of development is emphasized over the flexor aspect when in the prone position. Because of the importance of extensor muscle development in attaining upright posture, children with prone behavior appear more adept and integrated. Sitting appears unimportant to the development of locomotion in babies maintained principally in the prone position, but was developed as a parallel to crawling and creeping. However, for babies who sleep in the supine position, the sitting posture seems to be an important preliminary (79).

APPENDIX B

MOTOR SKILLS--PERFORMANCE EXPECTATIONS

The early years are primarily concerned with elaboration and refinement of reflex movements and the gross movements involved in neuromuscular maturation. Improvement in this process is dependent upon the capacity of the organism to anticipate response needs and the opportunity for practice as the neuromuscular system becomes ready. As skill in motor patterns is acquired and becomes a habit, greater freedom is available for adaptation to new situations. The adaptive mechanism enables the child to increase the degree and precision of response which involves eliminating non-useful responses and selecting those which bring satisfaction.

The acquisition of skill is a gradual process growing out of postural control. In order to illustrate this process, selected motor items from the Gesell Developmental Schedules, compiled by Blum and Fieldsteel (16), are reproduced in Chart B.1. The items were selected for their appropriateness as judged in clinical experience, their significance as indicated by Gesell, and the ease and accuracy with which they can be observed. The median age-placement is similar but not identical for all items with those of Gesell. A trend toward reaching developmental levels earlier was found in an evaluation of the consistency and predictive value of the 40-week Gesell Developmental Schedule. This study was done by Knobloch and Pasamanick (100). (See Charts B.2 and B.3.)

Many tests or scales have been developed which indicate age level expectations for motor skill achievement. The following tests or scales have been adapted for reproduction as follows:

1. Chart B.4--Griffiths Mental Development Scale--Locomotor Items. Ages: 1-24 months.
2. Chart B.5--Motor Development Test Items (Bayley) Ages: 2-50 months. Items are classified into three categories: (a) manual coordination, (b) motion, and (c) anti-gravity behavior. Test items are listed in order of difficulty.
3. Chart B.6--Motor Test Items (Cunningham) Ages: 12-36 months. These test items are listed in order of difficulty with the test passed most frequently listed first.
4. Chart B.7--Motor Achievements (McCaskill and Wellman) Ages: 24-71 months.
5. Chart B.8--Median Ratings for Various Activities Ages: 24-83 months. Half-yearly age level median ratings are given for climbing, jumping, sliding, tricycling, hopping, galloping, skipping, throwing, bouncing, and catching. Ratings are given for boys, girls, and the combination of boys and girls.

CHART B.1

SELECTED MOTOR ITEMS FROM GESELL DEVELOPMENTAL SCHEDULES (Blum and Fieldsteel)

Age in Months	Motor Activities
4	Head erect--in supported sitting posture head.
5	Prone, shoulders raised--arms may be extended.
6	Rolls to prone position.
7	Sits momentarily erect.
8	Pivots in prone position.
9	Stands at rail--may lean forward at hips when standing.
9	Sits alone--re-erects self.
10	Pulls self to feet at rail--without assistance pulls to feet.
10	Creeps.
11	Walks at rail--lifts foot at rail.
11	Walks--2 hands held.
12	Walks--1 hand held.
14	Stands momentarily alone.
15	Walks alone--toddles--walks with feet wide apart.
18	Walks alone--well--balance good.
21	Walks upstairs--walks downstairs with one hand held; upstairs holding rail.
24	Walks up and downstairs alone.
24	Runs well.
30	Walks on tiptoes.
30	Jumps with both feet--can jump a distance of 8 inches.
36	Stands on one foot momentarily.
36	Rides tricycle.
42	Stands on one foot for two seconds.
48	Walks downstairs one foot to step.
48	Throws ball overhand.
54	Hops on one foot.
60	Alternates feet descending stairs.
72	Stands on each foot alternately, eyes closed.

Adapted from L. H. Blum and N. D. Fieldsteel. Blum-Fieldsteel Development Charts: Manual of Directions (Great Britain: World Book Company, 1953), p. 6.

CHART B.2

PERCENT OF 40 WEEK OLD INFANTS PERFORMING AT OR ABOVE INDICATED GESELL DEVELOPMENTAL LEVEL

Gross Motor Behavior Sitting: Static Erect	Percent Positive At Weeks of Age		Normative Level in Weeks	
Item of Behavior	Age 40 N=216	Ages 39, 40, 41 N=376	Gesell (1941)	Suggested
Sits 10 minutes steadily	4.9	4.0	36	<36
Leans forward and re-erects	4.5	4.5	36	<36
Sits indefinitely steadily	90.3	90.0	40	36
Pivots in sitting	30.3	24.6	48	44
Supports full weight at rail	8.2	7.5	36	<36
Lifts and replaces foot at rail	76.3	71.7	44	40
Stands momentarily alone	26.7	26.2	56	48

Taken from H. Knobloch and B. Pasamanick, An Evaluation of the Consistency and Predictive Value of the 40-Week Gesell Developmental Schedule, in Child Development and Child Psychiatry (Washington, D. C.: American Psychiatric Association, 1960), p. 17.

CHART B.3

PERCENT OF 40 WEEK OLD INFANTS PERFORMING AT OR ABOVE INDICATED GESELL DEVELOPMENTAL LEVEL

Gross Motor Behavior Dynamic	Percent Positive At Weeks of Age		Normative Level in Weeks	
Item of Behavior	Age 40 N=216	Ages 39, 40, 41 N=376	Gesell (1941)	Suggested
Goes over to prone	82.5	84.1	40	36
Pulls to feet at rail	74.3	74.1	40	40
Creeps	61.5	58.7	40	40
Cruises at rail	60.5	61.2	48	40
Walks with 2 hands held	57.1	59.0	48	40
Walks with 1 hand held	23.3	23.3	52	48
Walks alone	6.2	4.7	>56	52

Taken from H. Knobloch and B. Pasamanick, An Evaluation of the Consistency and Predictive Value of the 40-Week Gesell Developmental Schedule, in Child Development and Child Psychiatry (Washington, D. C.: American Psychiatric Association, 1960), p. 18.

CHART B.4

GRIFFITHS MENTAL DEVELOPMENT SCALE
LOCOMOTOR ITEMS

Months of Age	Locomotor	
1	Lifts chin when prone	1
	Pushes with feet against examiner's hands	2
	Holds head erect for a few seconds	3
2	Lifts head up when prone	4
	Kicks vigorously	5
3	Active in bath--kicks	6
	Lifts head when in dorsal position	7
	Rolls from side to back	8
4	Back firm when held in sitting position	9
	Lifts head and chest when prone	10
	Holds head erect continuously	11
5	Lifts head and shoulders, dorsal	12
	Rolls from side to side	13
6	Plays with own toes	14
	Crawling Reaction Draws up knees, etc.	15
	Sits with slight support	16
7	Can roll from back to stomach, etc.	17
	Stepping reaction Dancing movements	18
8	Crawling, tries vigorously to crawl	19
	Sits alone for a short time	20
	Stepping reaction: One foot in front of the other	21
9	Crawling. Can turn around when left on floor	22
	Can be left sitting on floor	23
	Crawling. Makes some progress forwards or backwards	24
10	Stands when help up	25
	Sits well--in a chair	26
11	Pulls self up by furniture	27
	Can stand holding to furniture	28
12	Crawling. Creeps on hands and knees, etc.	29
	Side-steps round inside cot or play-pen holding rails	30
	Can walk when led	31

Second Year	Locomotor	
13	Climbs on a low ledge or step	32
	Stands alone	33
14	Walks alone	34
	Kneels on floor or chair	35
15	Climbs stairs (up)	36
	Likes pushing pram, toy horse, etc.	37
16	Trots about well	38
17	Stoops	39
	Climbs on a low chair	40
18	Can walk backwards	41
19	Walks pulling toy on string	42
	Climbs stairs (up and down)	43
20	Jumps	44
	Runs	45
21	Walks upstairs	46
22	Climbs to stand on a chair	47
	Can jump off a step	48
23	Can seat himself at table	49
	Walks up and down stairs	50
24	Can kick a ball	51
	Can be trusted on stairs alone	52

Adapted from Ruth Griffiths, The Abilities of Babies (New York: McGraw-Hill Book Co., Inc., 1954), Appendix II.

CHART B.5

MOTOR DEVELOPMENT TEST ITEMS (BAYLEY)

Age Placement Months	Test Items	Classification of Items		
		Manual Coordinations	Motion	Anti-gravity Behavior
(0.2)	Crawling movements		X	
(0.5)	Postural adjustment when held to shoulder			X
(0.5)	Lifts head at shoulder			X
(0.6)	Lateral head movements		X	
(0.7)	Retains red ring	X		
(1.7)	Arm thrusts in play		X	
(1.8)	Leg thrusts in play		X	
(1.9)	Head erect--vertical			X
(2.6)	Dorsal suspension--lifts head			X
(2.9)	Head erect and steady			X
(3.4)	Turns from side to back		X	
(3.5)	Prone--elevates self by arms			X
(3.5)	Sits with support			X
(3.6)	Hands predominantly open	X		
(3.6)	Holds head steady			X
(4.1)	Beginning thumb opposition	X		
(4.6)	Sits with slight support			X
(5.0)	Turns from back to side		X	
(5.1)	Partial thumb opposition	X		
(5.4)	Effort to sit		X	
(5.5)	Head balanced			X
(5.7)	Simultaneous flexion and thumb opposition	X		
(5.7)	Sits alone momentarily			X
(6.2)	Pulls to sitting position		X	
(6.2)	Sits alone 30" or more			X
(6.4)	Unilateral reaching	X		
(6.7)	Rotates wrist	X		
(7.0)	Rolls from back to stomach		X	
(7.6)	Complete thumb opposition	X		
(7.5)	Sits alone, steadily			X
(7.8)	Partial finger prehension	X		
(8.5)	Sits alone with good coordination			X
(9.0)	Prewalking progression		X	
(9.3)	Fine prehension with pellet	X		
(9.4)	Raises self to sitting position		X	
(9.6)	Early stepping movements		X	
(10.5)	Pulls to standing position		X	
(10.6)	Stands up		X	
(10.9)	Stepping movements		X	
(11.6)	Walks with help		X	
(12.5)	Sits down			X
(13.3)	Stands alone		X	
(13.7)	Walks alone			X
(14.0)	Aufstehn I		X	
(16.5)	Walks sideways		X	
(16.9)	Walks backward			X
(18.0)	Stands on right foot with help			X
(19.3)	Stands on left foot with help		X	
(20.3)	Walks upstairs with help		X	
(20.5)	Walks downstairs with help			X
(22.5)	Tries to stand on walking board			X
(22.5)	Aufstehn II		X	
(24.3)	Walks upstairs alone; marks time		X	
(24.5)	Walks downstairs alone; marks time		X	
(27.6)	Walks with one foot on walking board			X
(28.0)	Jumps off floor; both feet			X
(29.2)	Stands on left foot alone			X
(29.3)	Stands on right foot alone		X	
(30.1)	Walks on tiptoe			X
(31.0)	Stands on walking board with both feet			X
(31.3)	Walks on line; general direction		X	
(32.1)	Jumps from chair			X
(32.7)	Aufstehn III		X	
(32.8)	Attempts step, while on walking board		X	
(33.2)	Walks backward three meters			X
(35.5)	Walks upstairs, alternating forward foot		X	
(36.2)	Walks tiptoe three meters		X	
(37.1)	Jumps from height of 30 cm.		X	
(37.3)	Distance jump--10 to 35 cm.		X	
(38.0)	Walking board--alternates part way		X	
(38.5)	Keeps feet on line, three meters		X	
(39.7)	Distance jump--36 to 60 cm.		X	
(41.5)	Jump over rope less than 20 cm. high		X	
(48.4)	Distance jump--60 to 85 cm.		X	
(49.3)	Hops on right foot less than 2 meters		X	
(50.0)	Walks downstairs--alternating forward foot		X	

Adapted from Nancy Bayley, The Development of Motor Abilities During the First Three Years, SRCD Monograph, 1:1-25, 1935, p. 3.

CHART B.6

MOTOR TEST ITEMS (CUNNINGHAM)

Twelve Months Tests

1. To remove a paper cup from head
2. To walk with help
3. To stand supporting self
4. To tap a small bell
5.5. To remove a hoop from knees
5.5. To remove feet from box--baby seated on floor
7.5. To take hoop off of neck
7.5. To obtain a toy from the second step
9. To crawl out of a hole in a board elevated 5 inches

Eighteen Months Tests

1. To walk without help
2.5. To obtain a toy from step 3
2.5. To get off inverted box. Infant seated on box 6 inches high
4. To get off stool. Infant seated on stool 10 inches high
5.5. To climb over long obstacle
5.5. To climb 3 steps
7. To roll a bowling ball 8 feet, ball weighing 10 lbs., 10 oz.
8. To climb upon low box
9. To slide or back down 3 steps

Twenty-four Months Tests

1. To get off chair, height 13 inches
2. To climb upon chair, height 17 1/2 inches
3. To roll a rubber ball halfway up an incline, 3 feet, 8 inches long with six-inch elevation
4. To throw a bean bag into a twelve-inch hole after practice
5. To roll a bowling ball 9 feet and over a small obstacle

Thirty Months Tests

1. To throw a bean bag into hole at 3 feet, twice with three trials
2. To walk up eight-foot flexible plank elevated 8 inches at upper end
3. To roll a ball up an inclined board 3 feet, 8 inches long.
4. To walk upon two parallel 4 x 4 x 4 inch beams 6 feet long placed 8 inches apart. (Scored correct if child does not step off.)
5. To walk between straight parallel lines painted on floor 8 inches apart. (Scored correct if child does not step on lines.)
6.5. To step into 3 eight-inch hoops without stepping out or on hoop
6.5. To roll the bowling ball 10 feet and over obstacle
8.5. To walk on double diverging beams without stepping off. Beams 4 inches apart at narrow end, 12 inches apart at wider end
8.5. To walk between converging lines not stepping out more than once, lines 12 inches apart at wide end, 4 inches apart at narrow end.

Thirty-six Months Tests

1. To roll a rubber ball up an inclined board twice with three trials
2. To throw a soft ball into a basket from a distance of 3 feet (elevation of basket--3 ft.)
3.5. To walk between converging lines without stepping out
3.5. To walk on 4 x 4 x 4 beam without stepping off more than twice
5.5. To walk up steps without support.
5.5. To jump with two feet from eight-inch elevation
7.5. To walk down steps without support. (Alternating steps not expected.)
7.5. To roll bowling ball 11 feet
9.5. To throw hoop onto rod from distance of 3 feet, rod elevated 3 feet
9.5. To start to run within two seconds of signal.
11. To walk on alternating block 3 x 3 x 6 inches without stepping off. (Blocks placed 12 inches apart in each row.)

Tests Too Difficult at Thirty-six Months

1. To walk on separated blocks without stepping off more than twice. Blocks 3 x 3 x 6 inches placed in straight row 5 inches apart
2. To run and stop within two seconds of signal
3. To jump with two feet over hurdle 3 1/2 inches high
4. To hop on one foot

From Bess V. Cunningham, "An Experiment in Measuring Gross Motor Development of Infants and Young Children," J. of Ed. Psych., 18:458-464, 1927, pp. 462-464.

CHART B.7

MOTOR ACHIEVEMENTS (McCASKILL AND WELLMAN)

Months	Item
71	Bouncing large ball, one hand
68	Catching large ball, elbows at side of body, success on 2 or 3 trials
68	Bouncing large ball, both hands
[illegible]	Throwing small ball, both hands or one hand
63	Throwing large ball, both hands or one hand
[illegible]	Descending large ladder, alternate feet, with facility
60	Hopping on one foot, 10 or more steps
[illegible]	Skipping, alternate feet
57	Throwing small ball, both hands or one hand
[illegible]	Descending large ladder, alternate feet, with caution
55	Catching small ball, elbows at side of body, no success or success on one trial
55	Descending long steps, alternate feet, unsupported
[illegible]	Hopping one foot, 7 to 9 steps
53	Throwing large ball, both hands or one hand
53	Descending small ladder, alternate feet, with facility
[illegible]	Throwing small ball, both hands or one hand
[illegible]	Descending small ladder, alternate feet, with caution
51	Catching large ball, elbows at side of body, no success or success on one trial
50	Catching small ball, elbows in front of body, success on 2 or 3 trials
49	Descending short steps, alternate feet, unsupported
48	Descending long steps, alternate feet, with support
48	Descending short steps, alternate feet, with support
47	Ascending large ladder, alternate feet, with facility
46	Bouncing large ball, both hands
46	Jumping 28 inches, alone, feet together
46	Hopping one foot, 4 to 6 steps
45	Ascending large ladder, alternate feet, with caution
45	Walking circle, no steps off
44	Throwing small ball, both hands or one hand
44	Catching large ball, elbows in front of body, success on 2 or 3 trials
43	Hopping one foot, 1 to 3 steps
43	Jumping 24 inches, alone, one foot ahead
43	Throwing large ball, both hands or one hand
43	Skipping on one foot
42	Hopping both feet, 10 or more steps
41	Ascending long steps, alternate feet, unsupported
41	Hopping two feet, 7 to 9 steps
40	Hopping two feet, 4 to 6 steps
40	Bouncing small ball, one hand
38	Descending large ladder, mark time, with facility
38	Ascending small ladder, alternate feet, with facility
38	Catching small ball, elbows in front of body, no success or success on one trial
38	Skipping, shuffle
38	Hopping both feet, 1 to 3 steps
37	Catching small ball, arms straight, success on 2 or 3 trials
37	Jumping 18 inches, alone, feet together
37	Walking path, no steps off
36	Jumping 24 inches, with help
35	Catching large ball, elbows in front of body, no success or success on one trial
35	Walking circle, 1 to 3 steps off
34	Catching large ball, arms straight, success on 2 or 3 trials
34	Descending long steps, mark time, unsupported
34	Jumping 12 inches, alone, feet together
34	Ascending small ladder, alternate feet, with caution
33	Ascending large ladder, mark time, with facility
33	Throwing small ball, both hands or one hand
33	Jumping 9 inches, alone, feet together
31	Ascending long steps, alternate feet, with support
31	Ascending short steps, alternate feet, unsupported
31	Jumping 18 inches, alone, one foot ahead
31	Walking path, 1 to 3 steps off
30	Throwing large ball, both hands or one hand
29	Throwing small ball, both hands or one hand
29	Ascending short steps, alternate feet, with support
29	Ascending long steps, mark time unsupported
28	Descending short steps, mark time, unsupported
28	Walking circle, 4 to 6 steps off
28	Walking path, 4 to 6 steps off
24	Bouncing small ball, one hand
24	Ascending short steps, mark time, unsupported
24	Jumping 18 inches, with help
24	Jumping 12 inches, alone, one foot ahead
24	Descending large ladder, mark time, with caution

Adapted from C. L. McCaskill and B. L. Wellman, "A Study of Common Motor Achievements at the Preschool Ages," C. D., 9:141-150, June, 1938, p. 148.

CHART B.8

MEDIAN RATINGS FOR VARIOUS ACTIVITIES

Age in Months	Climbing			Jumping			Sliding			Tricycling			Hopping			Galloping			Skipping			Throwing Balls			Bouncing Balls			Catching Balls		
	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All	B.	G.	All
24-29	4.0	5.4	5.5					8.0	8.0																					
30-35	5.8	4.0	5.8				8.0	7.0	7.5	7.0		6.0													4.5					
36-41	6.8	5.5	6.7		6.5	4.5	8.0		8.2			8.0								6.0	4.5									
42-47	8.2	8.5	8.3	8.0	6.5	7.0	8.0		6.5	8.5		8.5							4.1	4.0	4.2		5.8	5.6		4.3	4.4		3.5	3.5
48-53	8.9	8.9	8.8		3.5	3.7	9.0	7.5	8.7	10.0	8.6	10.0							6.5	5.0	5.5			6.5		3.5	3.5		4.0	5.0
54-59	8.5	8.0	8.6	10.0	7.8	9.0	9.0	7.5	9.0		9.0	9.0	6.5	7.0	6.3	4.8	9.0	6.0	5.5	6.0	5.7	7.5		6.8	5.5	5.5	5.4	6.0	7.0	6.0
60-65	8.6	8.3	8.7	9.0	8.8	9.0	8.5	9.5	9.5	8.5	9.3	9.0	8.5	8.6	8.6	9.0	8.9	5.9	7.5	9.8	8.6	9.0	8.9	8.8	6.8	7.7	7.2	7.3	8.0	7.7
66-71	8.9	8.8	8.8	9.7	9.0	9.5	10.0	9.5	9.9	10.0	10.0	10.0	8.7	8.8	8.7	9.5	9.3	9.4	8.6	9.5	9.1	9.4	9.0	9.3	7.6	8.8	8.0	8.3	8.9	8.6
72-77	9.8	8.5	9.6	8.5	9.8	9.4	9.6	9.0	9.6	9.7	10.0	10.0	8.0	9.2	8.8	9.6	9.8	9.8	9.1	10.0	9.8	8.8	7.8	8.7	7.4	10.0	8.4	7.8	8.7	8.2
78-83	9.6	9.5	9.5	9.2	9.6	9.4	10.0	10.0	10.0	9.9	10.0	10.0	8.0	10.0	9.2	10.0	10.4	10.3	9.9	10.0	10.0	9.7	9.3	9.8	9.0	9.5	9.3	10.0	9.0	9.3

From Mary V. Gutteridge, "A Study of Motor Achievements of Young Children," Archives of Psych., (H. S. Woodworth, Ed.), No. 244, May, 1939, p. 114.