

the Anisa theories is integral to the Model and will help to keep it in the forefront of any educational movement.

The "practical" advocate often raises the question, "Does it work?" It is a reference to theory. As Whitehead said in *Science and Philosophy*, "the aim of practice can only be defined by use of theory."

We see theory and practice wed together in an indissoluble bond, constantly renewing each other and radiating such illumination that the most pessimistic skeptic will be attracted to partake and to sample the efficacy of this enduring relationship.

Albert Einstein and Leopold Infeld, in *The Evolution of Physics*, summarized in a beautiful metaphor the nature of theory and its function.

In our endeavor to understand reality we are somewhat like a man trying to understand the mechanism of a closed watch. He sees the face and the moving hands, even hears its ticking, but he has no way of opening the case. If he is ingenious he may form some picture of a mechanism which could be responsible for all the things he observes, but he may never be quite sure his picture is the only one which could explain his observations. He will never be able to compare his picture with the real mechanism and he cannot even imagine the possibility or the meaning of such a comparison. But he certainly believes that, as his knowledge increases, his picture of reality will become simpler and simpler and will explain a wider and wider range of his sensuous impressions.

What is clarified in this exquisite metaphor is that to relate to something that cannot be seen, one must develop some hypothesis about how and why that something works the way it does. In other words, one must theorize. Since much that concerns how learning takes place cannot be seen, comprehensive theories become practical and consequently essential for teachers.

DR. MAGDALENE M. CARNEY is a member of the faculty at the Center for the Study of Human Potential at the University of Massachusetts, where she serves as the coordinator for the implementation of the Anisa Model in the Suffield Public Schools, and as a member of the teaching staff for both undergraduate and graduate programs. She graduated from Tennessee A & I where she received a BA in English. Her MA is from George Peabody College and her doctorate in education, in the areas of curriculum development, pedagogical theory and teacher training, is from the University of Massachusetts. Before coming to the University, she taught for 18 years in public schools in Tennessee and Mississippi.

IMPLICATIONS OF THE ANISA THEORY FOR READING INSTRUCTION

By DR. SUSAN S. THEROUX and GEOFFRY W. MARKS

Few issues in elementary education have been the subject of more research, speculation, and controversy than the teaching of reading. For many, a poor grasp of the fundamentals results in the development of bad habits which make the decoding of graphic symbols troublesome and confusing. Repeated failure caused by these bad habits creates frustration and leads to the formation of negative attitudes toward reading which can be transferred to learning in general. This problem—all too common in American public schools—has its source in a lack of a clear, definitive understanding of what the fundamental processes of reading are and how they are ordered developmentally.

As a result, many children are introduced to reading without having mastered the prerequisites. This sets them up for a guaranteed failure in the initial stages, robbing them of the opportunity to acquire the basic skills. If teachers are to give all children an equal opportunity to learn how to read, the task of educational science must be to define reading, to identify the elements which comprise it and the skills required to master them, and to determine the order in which those elements should be introduced to the child. Once this information is available, it is the obligation of teachers to give each child experiences suited to his learning needs which enable him to master those skills that lead to successful reading.

The Anisa theory of development provides the conceptual means for identifying and describing the developmental prerequisites that underlie all aspects of the complex task of learning to read. The theory defines development as the translation of potentiality into actuality and identifies two basic types of potentialities: biological and psychological. Psychological potentialities may be classified further into five categories: perceptual, psychomotor, cognitive, affective, and volitional. Moreover, discrete processes which underlie the attainment of competence in each of these categories have been identified. Many of the processes are essential elements in the complex act of reading.

The theory of development also states that learning is stimulated and sustained by interaction with the environment. Learning is the ability to differentiate, integrate, and generalize experience. When one is able consciously to arrange his own environment and guide

his own interaction with it to help himself differentiate, integrate, and generalize aspects of his experience needed to achieve a purpose, he has become a competent learner. Learning competence is the key factor in the release of man's psychological potentialities because it enables him to take charge of his own destiny and actualize his own potentialities. Learning competence is more than the mere accumulation of facts. Rather it refers to *knowing how to learn*. Reading is important to the attainment of learning competence because it enables one to pursue independently whatever one wishes to learn.

The Anisa theory of curriculum, derived from the theory of development, states that anything one learns consists of both process and content elements. The process aspects of learning are the psychomotor, perceptual, cognitive, affective, and volitional potentialities that comprise the *hows* of learning. The process aspects of learning are universal and underlie all human experience. The content aspects, or the *whats* of learning, are the facts, beliefs, and bodies of information about the physical, human, and unknown environments transmitted by the culture.

Process and content are integrated in a unique way to make symbolic activity possible. The capacity for symbolization distinguishes man from all other living creatures. One would therefore expect the Model to account for this ability and its role in development. The Model recognizes three symbol systems—mathematics, language, and the arts—which mediate man's interaction with the physical, human and unknown environments, respectively. Using a symbol system involves a wide variety of psychomotor, perceptual, cognitive, affective, and volitional processes; it also involves a body of content or information that is symbolized. Reading, which translates visual symbols into the sound symbols of language, consists of a large number of both process and content elements. From these elements, process and content objectives may be derived which provide the basis for constructing a comprehensive reading program.

Reading may be defined as the translation of graphic symbols into what they are supposed to represent so that communication is achieved. This definition of reading pertains to the visual modality only. Reading may also be achieved through the tactile or auditory modalities (i.e., through Braille or Morse code). Because reading represents a fusion of process and content, the process and content objectives of reading may be classified according to complexes of skills involved in learning to translate symbols into meaning—a classification which also orders the objectives according to a general developmental sequence.

These skill complexes are (1) letter recognition and recall, (2) word recognition and recall, and (3) sentence comprehension and composition. A distinction is made between recognition and recall on the one hand and comprehension and composition on the other. Each requires different mental operations which have implications for development, and therefore, instruction.

Recognition and comprehension involve associating meaning with a symbol or group of symbols external to the individual. Recall and composition spring from within and involve selecting the proper letters or words needed to convey what one means; they depend on an internal representation of the symbols themselves. The former is essentially receptive, while the latter is creative. Because comprehension precedes production throughout language development, the implication of this distinction for instruction is that teachers may expect children to recognize before they recall, and to comprehend before they compose. Understanding this principle of development can guide teachers in organizing experiences appropriate to the child's developmental level and can help them avoid experiences which are beyond that level.

The process and content objectives of the Anisa approach to reading derived from the Anisa theory of curriculum form the basis of a diagnostic and prescriptive reading program. The objectives are tentative in nature and no doubt will be modified as programs based upon them are evaluated. Before turning to the objectives, a brief discussion of the major processes involved in reading will illustrate how the process objectives have been formulated.

Processes Involved in Reading

It will take years of careful research to clarify all of the processes which make up reading, establish developmental sequences, and determine which ones are the most critical. In the meantime, a beginning has to be made which is not arbitrary but fully justifiable on the basis of careful theoretical work. The following is a discussion of processes which on the basis of the Anisa theory of development would very likely play a significant role in learning to read. These processes are universal and apply to reading any language.

PSYCHOMOTOR. The psychomotor processes of *laterality, verticality, and directionality* are involved in all aspects of reading. All three processes underlie the ability to control the sweep of the eyes across the page from left to right, back to the left, and down to the next

line. Erratic eye movements that prevent the eyes from moving smoothly in this pattern introduce inefficiencies to reading that can impede speed and comprehension. Occular-motor training can strengthen the coordination of muscles that direct the eye and facilitate left-right movement. Laterality and verticality are also involved in discriminating the critical features of letters. For example, differentiating between "b", "d", "p", and "q" requires the ability to recognize left from right and up from down. Chances are good that children who have trouble making these distinctions lack the internal sense of left and right, up and down that comes from knowing one side of the body from the other. Gross motor movements that help children learn to differentiate their body parts are thus important prerequisites to reading. *Posture* is another aspect of psychomotor skill that influences reading. The position of the body has a strong influence on one's ability to pay attention and on the rate of fatigue.

Many teachers wonder whether handwriting should be integrated with learning to read. Handwriting involves an integration of many psychomotor processes and thus gives the child another modality through which to interpret experience. If a child is developmentally ready, handwriting can be used to strengthen letter and word recognition. The kinesthetic feedback from forming letters strengthens the differentiation of their distinctive features. In addition, exercises in writing letters without a model can consolidate the memory of how letters are formed. Writing also reinforces the left to right sequence essential to word recognition and sentence comprehension. Furthermore, because writing is a creative activity, it can be a source of inner motivation, particularly in the early stages of learning to read when the material is difficult to make exciting because of the child's limited ability.

PERCEPTION. Because reading is based on matching visual symbols with the sounds they represent, processes which comprise auditory and visual perception are essential in the early stages of learning to read. For instance, *auditory discrimination* between vowels and consonants is a prerequisite to learning to read. *Visual discrimination* among written letters is equally important. This not only involves recognizing shapes or contours of the letters, but their orientation to a baseline in space (i.e., if you turn a "u" upside down it is no longer a "u" but an "n").

The ability to differentiate one graphic symbol from another while matching them with speech sounds requires an inter-sensory integration of visual and auditory modalities. Visual and auditory acuities

facilitate the differentiation and integration of symbols and sounds and enable the beginning reader to generalize the skills he acquires to new words and phrases. *Tactile discrimination* is another perceptual process which, while not directly involved in reading, can strengthen letter recognition. Being able to sense the shape of the letter by manipulating with his hands the features of three dimensional letters or by tracing with his fingers letters outlined with textured paper give the child tactile feedback about how letters differ from each other.

COGNITION. Decoding graphemes into speech sounds and understanding the concepts that words represent involves numerous cognitive processes. Understanding the function of letters, words, and sentences depends on being able to classify each of them on the basis of their most salient attributes. For example, letters fall into upper and lower cases, both of which must be classified into distinct groups if the child is to apprehend the syntactical and semantic information which cases convey. Distinguishing between cases also involves *conservation*; to learn that "T" is the same as "t" is facilitated if the child is able to conserve those features of the two written letters that are invariant. Matching symbols with the sounds they represent and understanding parts of speech and the rules of syntax are instances of classification that pervade all levels of reading and composition.

Understanding the abstract concepts conveyed by sentences is rooted in *analysis*. For example, sentence composition requires analyzing one's meaning and the rules of syntax, choosing the right words, and putting them together into an ordered sequence that makes the point clearly. *Extrapolation, interpolation, induction, and deduction* are involved in sentence comprehension in that one must infer the intent of the author from the relationships between the words on the page and their meanings. *Inference* may also be used in detecting semantic and syntactical cues that come from the context in which the word or group of words appears. For instance, certain parts of speech are more likely to occur in a given part of the sentence than others (e.g., "of the _____" requires a noun as the object of the preposition). Sensing this likelihood requires extrapolation, which enables the child to recognize a syntactical cue and provides a check for him as he proceeds with the decoding activity. For example, sensing that a noun is required at a specific place in a sentence eliminates all verbs, prepositions, etc., and narrows the choice, thereby increasing the chances of reading the word correctly.

AFFECT. A child's emotional disposition towards reading, books, his teachers, and school itself is an important factor in sparking and maintaining the child's interest in learning to read. The child who has positive feelings about reading will pursue activities associated with it with joy and enthusiasm, while the child who is anxious or threatened will avoid them. Positive attitudes toward reading come from the value that parents place upon it at home, from the enthusiasm exemplified by teachers, from the encouragement and support of his peers, from the personal significance inherent in the content of the material to which he is exposed. Negative attitudes are created by rejection, impatience, harshness, punishment, dull repetition, criticism, unreasonable demands and a lack of praise, enthusiasm, and humor on the part of adults who teach children how to read. Teachers who transmit positive attitudes toward reading will experience fewer motivational problems than those who do not.

VOLITION. Decoding graphic symbols into speech is predicated on the ability to differentiate between critical features that distinguish one letter from another. Focusing and maintaining attention on the critical features of individual letters and ignoring less significant cues is thus a vital part of beginning to read. In fact, *attention* is a volitional process that underlies all aspects of reading, for it enables the child to direct his energies to those aspects of reading, be they letters, words, or the concepts that stand behind sentences, that must be recognized if meaning is to be extracted from them.

Another volitional process implicated in reading is *goal setting*. Goal setting involves clarifying what one wants to achieve, articulating sub-goals, and committing oneself to a course of action designed to reach the goals set. It is a major source of intrinsic motivation. Without goal setting one must rely on extrinsic sources to arouse the child to action. Thus, the child who establishes learning to read as a goal will probably learn to read with minimal difficulty because he will approach it with enthusiasm and an expectation to learn. Therefore, teachers must help children establish learning to read as a goal and articulate manageable sub-goals that invite striving and lead to small increments of success all along the way.

Fundamental to the arousal of *will* and the initiation of action is being in touch with the purpose of something. Knowing the purpose of something enables one to understand its values and use it effectively. Thus an important part of teaching children to read is making them aware of the purpose of reading. Reading enables one to tap the thoughts of all people—past and present. It is a door to anality); to discriminate between non-speech sounds along the dimen-

infinite of experience which can be used to direct one's advance into the future. The greatest way to help children appreciate the purpose of reading is to help them use their reading skills in a functional way as soon as possible. Making reading functional will be intrinsically motivating and will prevent reading from becoming an end in itself—a situation that will ensure a lifeless program and disinterested readers.

Process and Content Objectives: The Framework of the Reading Curriculum

The processes cited in the previous section underlie the act of reading. A fusion of process and content objectives define the complexes of skills that make up reading. They constitute the basic framework of the Anisa reading curriculum.

LETTER RECOGNITION AND RECALL. Because reading is decoding graphic symbols into their spoken counterparts, the most fundamental act of reading is distinguishing one symbol from another. To do this, the child must be able to recognize each letter of the alphabet on the basis of its distinctive features. Letter recognition involves differentiating the critical features of letters, integrating those distinctive features into a pattern which, when viewed, is recognized as the letter, and generalizing that pattern to all similar configurations, regardless of the size or style of type. All this is predicated upon knowing the purpose and function of letters. Eleanor J. Gibson has identified the major distinguished features of English letters. (See Gibson, Eleanor J. "Learning to Read." *Science*, 148, 1965.)

The content objectives for letter recognition and recall concern the following kinds of information: that something (a mark) can represent something else (a sound); that speech sounds can be represented by letters; that letters have names; that all the letters make up the alphabet; that there are more sounds than letters; that several letters can stand for one sound; that several letters can stand for several sounds; that letters come in different forms (upper and lower cases, styles, and type faces); that letters can be combined to form words; that words can be combined to form sentences.

The processes most germane to letter recognition and recall are attention, laterality, verticality, auditory perception, visual perception and classification. Some of the objectives which derive from these processes are: to attend to the critical features of letters and ignore irrelevant cues (attention); to distinguish right from left, "b" from "d" (laterality); to distinguish up from down, "q" from "d" (verti-

sions of pitch, volume, duration and timbre, to discriminate between the 45 English phonemes, to discriminate between words in a sentence (auditory discrimination); to discriminate between the graphic elements that make up letters (O, C, U, I, /, —), to discriminate between the 26 letters of the alphabet, to discriminate between the upper and lower case letters (visual discrimination); to match letters and groups of letters with phonemes (classification).

WORD RECOGNITION AND RECALL. Recognizing words involves an intersensory integration between auditory and visual perception; one must be able to derive the sound of a word from the letter or groups of letters that symbolize the sounds. To prepare children for assigning sounds to groups of letters, they can practice other more simple intersensory integrations before letter-sound relationships are introduced. For example, an exercise which requires the child to make a tapping pattern on a desk or tambourine, the frequency of which is correlated with the spatial arrangement of dots on paper, uniting a visual symbol (•) with a unit of sound (the tap).

Associating sounds with the graphic symbols that represent them is the main concern of phonics. Albert J. Harris defines phonics as "the study of the special equivalence of printed and written symbols and their use in pronouncing printed and written words. . . ." (See Harris, Albert J. *Effective Teaching of Reading*.) When children first begin to unite sounds with letters, success is more likely if confusion can be avoided by introducing letters which always represent only one sound. Thus instruction might begin with consonants and proceed to short vowels and then to long vowels, because consonants correspond more regularly to their graphic symbols than do short vowels, and short vowels tend to be more regular than long vowels. However, because English does not have highly regular letter-sound correspondences, teaching the child to read by having him learn direct phoneme-grapheme correspondences only will lead to incorrect associations and will not prepare him to handle the irregularities of English orthography.

The most reliable method of associating phonemes with graphemes is to learn clusters of letters called spelling patterns, which more or less regularly stand for particular sounds. Studies have shown that phoneme-grapheme correspondences have a high degree of reliability in English when spelling patterns are used and a low degree of reliability when individual letters are used. For example, "a" can be pronounced in many ways, depending in what cluster of letters it is found (e.g., cake, feather, arm, father, etc.), whereas in the spelling

pattern, "at", the "a" can be pronounced in only one way (e.g., bat, cat, fat, attack, battle, lattice, etc.).

Other examples of spelling patterns are "eigh", "per", "tion", "atch", and "sh". Learning to recognize words according to spelling patterns which regularly correspond to particular sounds is the key to word recognition because they predict most accurately the right association between graphic symbols and sounds. However, there are exceptions (e.g., comb, tomb, and bomb) which can be taught as sight words. Exceptions can be more easily accommodated by the child when he learns them shortly after learning the rule. This will help him understand that English spelling has irregularities and will prevent him from developing a learning set that will not accommodate exceptions.

When children are learning basic spelling patterns, the patterns can be combined with a single consonant to form simple words (i.e., the spelling pattern "atch" can become "match", "catch", "patch", or "latch"). While the written words the child learns first should be part of his spoken vocabulary, once the basics have been learned well, it is important that he be exposed to new words. This helps him generalize the patterns he has learned while adding to his vocabulary. A vocabulary enrichment program that runs throughout all aspects of the curriculum is thus an important component of the reading curriculum because it introduces the child to new words that can be incorporated into his reading vocabulary. Also at this time children can be taught how to look at the whole word and break it into its basic units of syllables or spelling patterns. This skill is fundamental to word recognition because it enables the child to sound out and thereby recognize words he has heard previously but never seen before.

Once children develop a basic repertoire of spelling patterns and simple words, more complex words that contain one or more spelling patterns can be introduced (e.g., nation, neighbor, hatchet, etc.). Also, words that have common roots and related meanings can be taught at the same time so that children will see the commonalities of spelling among related words and the semantic connections between them, even though their pronunciations may differ. For example, "nation", "national", "nationhood", "nationality", and "nationalism", all have a common root and related meanings, as do "unit", "unite", "unity", "union", "unicorn", "unicycle", and "uniform". When children learn a number of root words in English, the etymological forms from which they originate, and the suffixes and prefixes that are used to modify their meanings, they will see the many connec-

tions among the words of the English language and will find the key to its regularity and order.

Content objectives for word recognition and recall concern various points of information such as the following: that sounds represented by letters are combined to form words; words are put together to make a thought or message; words that represent a thought or message can be put together to make a sentence; the letters of a word are always ordered from left to right; words are made up of segments of sounds called syllables; many words belong to word families; words can undergo a change that gives them a slightly different meaning (suffixes, prefixes, and inflections).

The major processes involved in word recognition and recall are attention, auditory and visual perception, conservation, and classification. Examples of objectives which derive from these processes are: to attend to the critical features of a word (attention); to distinguish one word from another in a spoken sentence (auditory discrimination); to identify or count the syllables in a written word (visual discrimination); to recognize and say the phoneme or morpheme represented by a spelling pattern, to pronounce new words by breaking them down into their basic units, to generate a list of words from a given spelling pattern, to identify the root word from a list of words belonging to the same word family (auditory-visual integration); to conserve the identity of a word even though affixes may change it slightly (conservation); to identify a group of words as belonging to the same word family (classification).

SENTENCE COMPREHENSION AND COMPOSITION. Written sentences are concepts represented in graphic symbols according to the rules of grammar or syntax. Comprehending a sentence requires knowing what the individual words in the sentence mean and knowing how all the words relate to each other to form the intended meaning of the speaker. Composing a sentence in verbal or written form requires an ability to represent one's thoughts in the most accurate way by selecting the appropriate words and putting them in the right order.

Both comprehension and composition depend on a vocabulary large enough to permit one to communicate with thoroughness and precision. They also require a command of syntax that enables one to order words so that the meaning is clear. Competence in these two aspects of language will enable the child to understand and produce an infinite number of ideas in the clearest manner possible. Vocabulary development can be fostered by acquainting children with new words and providing opportunities to use them in their daily speech.

A command of syntax involves being able to perform transformations that cast the underlying deep structure of a sentence into a different surface form that conveys a related meaning. Transformations include questions, negation, embedding relative clauses, conjunction, tense control, and changing the voice of the sentence from active to passive or vice versa. Literary devices that are rooted in syntax and that add power and clarity to one's prose include structural techniques such as periodic and non-periodic sentences and parallel structure, and figurative language such as metaphor, simile, personification, and antithesis. Other aspects of syntax are word agreement, and the use of qualifiers (adjectives and adverbs) and prepositional phrases.

Content objectives for sentence comprehension and composition include several items of information as follows: that the grammatical arrangement of words combining a noun phrase or subject with a verb phrase or predicate makes a sentence; an infinite number of sentences may be generated by using grammatical rules to order words into phrases that reflect patterns of thought; words have to be arranged in a certain way if meaning is to be conveyed.

The function of words (parts of speech, i.e., noun, pronoun, verb, adverb, preposition, conjunction, adjective, interjection) is largely determined by the position of the word in the sentence; kernel structures (the basic noun phrase and verb phrase construction) may be transformed by asking questions, by expressing negation, by inserting relative clauses, changing the tense, etc.

Punctuation marks signal how a written message is divided into units and how these units relate to each other (punctuation marks include the period (.), comma (,), colon (:), semi-colon (;), dash (—), hyphen (-), question mark (?), exclamation mark (!), and quotation marks (" "). Written sentences in English begin with an upper case letter and end with a period, question mark, or exclamation mark; stress, pitch, and pause indicate how to divide oral speech into phrases and sentences and give clues to function.

Cognitive processes most directly involved in sentence comprehension are classification, deduction, induction, extrapolation, and interpolation. Examples of objectives include the following: to match words or phrases with meaning (classification); to make inferences based on information read and to anticipate what will happen next in a sequence of events (deduction and induction); to draw cause and effect relationships based on information read and to anticipate what will happen next in a sequence of events (extrapolation and interpolation).

Other Approaches Viewed from the Anisa Perspective

BASAL READERS. Basal readers are the mainstay of reading instruction in most school systems throughout the nation. Their intention is to provide reading materials geared to the reading ability of the child. The widespread use of such readers is based upon the assumption that all children learn best through a common approach. This assumption stands in conflict with the Anisa theory of development. On the basis of the theory we would expect that one basal reader will not suit the needs of all children; therefore, the books themselves should not dictate how reading is taught to all children. Rather, a reading program should be organized around objectives that are developmentally based, from which diagnostic measures may be generated that make possible the prescription of experiences designed to meet individual learning needs. Unfortunately, far too many teachers follow the lessons presented in basal readers with no justification other than they are prerequisites to subsequent lessons in the basal series.

Another flaw of basal readers is that, because they try to serve everyone, they contain a selection of very common words which, by virtue of their commonness, introduce little novelty and lack emotional significance. When this is combined with a needless repetition of overused words in an unnatural dialogue, it is not difficult to see why basals tend not to relate effectively to any child's background and are therefore uninspiring.

In sum, basal series by themselves are inadequate as a means of teaching reading in the most effective way. If used, they should supplement a variety of other reading materials whose use is determined by the objectives of the curriculum.

LOOK-SAY OR WHOLE WORD APPROACH. The look-say method is based on studies conducted by J. Cattell in 1885 which showed that when adults read, they do not focus on individual letters but rather recognize at a glance the total word and even several words at a time. Educators deduced that the best way to teach reading would be to teach children to recognize whole words without learning grapheme-phoneme correspondences. Unfortunately, the way adults read is very different from the way children learn to read. The fundamental error of the look-say method is that it neglects to teach children the most reliable method of recognizing words, which is identifying words on the basis of the letters that form them. Instead, the look-say method introduces children to a group of words carefully

chosen on the basis of easily identifiable cues, such as the shape of the word, the initial letter, and the last letter.

For example, a child is taught to recognize "fork" on the basis of the initial letter "f" and the shape of the word. No attention is given to the other letters and the sounds they represent. Problems therefore arise when new words are introduced that have the same shape and begin or end with the same letters, such as "ford", "furl", "feel", "fool", etc. This explains why children who are taught to read by the look-say method acquire a basic sight vocabulary relatively fast, but then experience difficulty and confusion in reading new words, particularly if they are the same size and shape and begin with the same letter.

It also explains why children who learn to read by the look-say method turn out to be poor spellers. Because they are taught to recognize words according to word shape, which is only remotely connected with spelling, they lack a knowledge of how letters are combined to form words, and thus cannot generate spelling patterns from the sound of the word.

MODIFIED ALPHABETS. Modified alphabets, such as ITA (Initial Teaching Alphabet) or color-coded letter systems, were developed to make learning to read easier by making letter-sound correspondences regular, thereby avoiding the irregularities of English spelling. While children may learn to read more quickly with a modified alphabet, the Anisa theory of development maintains that once something is learned, having to "unlearn" it and replace it with something else is confusing and inefficient. Complex operations like reading involve the formation of learning sets based on observed patterns. If learning sets are organized around the unnatural consistency of grapheme-phoneme correspondence in the modified alphabet, the child will have to "undo" his learning set and acquire a new one that accommodates a different and more complex system of correspondences.

This shift may present complications that can be frustrating and lead to a decrease in interest. The Anisa approach to reading holds that since the spelling patterns that underlie English orthography have to be learned sooner or later, they should be carefully introduced (so as to avoid confusion) at the beginning so that learning sets which accommodate the irregularities may be formed. While initially this may make learning to read slower, it will become increasingly more rapid later on, and without the sudden regression often encountered when children have to switch from a modified to the standard alphabet.

Summary

The Anisa theory of development provides a framework from which a diagnostic and prescriptive program of reading instruction may be conceived. Objectives based on processes that underlie the development of psychological potentialities and those based on the content aspects of reading have been derived, classified, and developmentally ordered according to the basic skills of learning to read. As the program is implemented and as research designed to test hypotheses of the theory is carried out, the objectives, diagnostic instruments, and teaching strategies of the program will be modified and refined. Because the Anisa approach to reading instruction accounts for both the process and content aspects of the curriculum, a significant breakthrough in giving all children an equal opportunity to read is anticipated.

DR. SUSAN S. THEROUX, a staff associate at the Center for the Study of Human Potential at the University of Massachusetts, is the coordinator of the implementation of the Anisa Model at the McGraw School in Hampden, Maine. In that position, she is responsible for research and instructional activities in the areas of morale development, auditory perception, reading, handwriting, and teacher training. Dr. Theroux earned a BA in psychology from the University of Chicago and a MEd and EdD from the University of Massachusetts. Her essay, "Beyond Dogmatism and Unbelief," appeared in the Winter, 1975, issue of *The Constructive Triangle*.

GEOFFREY W. MARKS is a Research Associate at the Center for the Study of Human Potential at the University of Massachusetts. He serves as a teacher trainer in the implementation of the Anisa Model at the McGraw School in Hampden, Maine, and as Administrative Assistant to the Director. Mr. Marks has a Bachelor of Arts and Master of Arts in Teaching from Beloit College, Beloit, Wisconsin. His doctoral studies concern man's ability to symbolize with a special emphasis on language acquisition and language arts programs.

NUTRITION AND DEVELOPMENT

By DR. S. P. RAMAN and ELIZABETH L. BOWEN

The coherence and efficacy of any educational system to a large extent lies in the comprehensiveness of its theory of development—our understanding of the process of man's becoming. As Jerome Bruner points out, "theories of development are guides for understanding the perfectability of man as well as his vulnerability." The organismic view of man provides the Anisa educational system with the broadest and most comprehensive framework for purposefully integrating all that is known to date about human growth and development.

The Anisa theory of development defines development as the process of translating man's potentialities into actuality—an epigenetic process initiated and sustained by the organism's interaction with the environment. Development is therefore not just an increase in size, but is a process of change involving an increase in complexity of organization and functioning both physiologically and psychologically.

The theory of development recognizes two broad and interdependent categories of potentialities—biological and psychological. It identifies nutrition as the key factor in the actualization of the biological potentialities and fixes learning as the fundamental factor in the development of the psychological potentialities.

While the role of nutrition in growth and maturation may be self-evident to researchers in the biomedical disciplines, its role in education as traditionally conceived is not so evident; hence the need for a theory of development that explains the relationship between biological and psychological development.

The Anisa theory not only shows how proper nutrition is essential for the maintenance of the biological integrity of the organism but why it is a prerequisite for the actualization of psychological potentialities. In other words, learning depends in the first place on the existence of a sound physical and neurological base. The integrity of the child as a biological organism on the one hand, the characteristics of his environment on the other, and the interaction between them—these factors define and determine his functional capacities. No educational program can therefore be considered comprehensive if it merely concentrates on enriching the intellectual, social and