R E P O R T R E S U M E S

ED 011 809 RE 000 031

WHAT OPTOMETRY AND ITS RELATED FIELDS HAVE TO OFFER THE READING TEACHER, A RESEARCH PAPER.

BY- LAMBETH, JOANNE

PUB DATE 66

EDRS PRICE MF-$0.18 HC-$2.52 63P.

DESCRIPTORS- *READING RESEARCH, *TEACHING METHODS, *READING MATERIALS, *READING PROGRAMS, BIBLIOGRAPHIES, GLOSSARIES, LATERAL DOMINANCE, OPTOMETRY, PERCEPTION, MOTOR SKILLS, DUNCAN

METHODS, PROCEDURES, AND TECHNIQUES FOR TEACHING READING, ESPECIALLY TO LOW- AND NON-ACHIEVERS, WHICH DIFFER FROM TRADITIONAL CLASSROOM PRACTICES ARE DESCRIBED AND EVALUATED IN TERMS OF RECENT RESEARCH IN THE AREA OF READING. THESE METHODS ARE CLOSELY RELATED TO THE FIELD OF OPTOMETRY AND ARE CONCERNED WITH PROBLEMS OF LATERAL DOMINANCE. PERCEPTUAL ABILITY, AND MOTOR SKILLS. REFERENCES ARE PROVIDED FOR EACH METHOD. A GLOSSARY OF OPTOMETRIC TERMS AND A BIBLIOGRAPHY ARE INCLUDED. (RH)

What Optometry and Its Related Fields Have to Offer the Reading Teacher

by

Joanne Lambeth, M.Ed.

WHAT OPTOMETRY AND ITS RELATED FIELDS HAVE TO OFFER THE READING TEACHER

by

JOANNE LAMBETH, M. ED.

A RESEARCH PAPER

Written for Dr. Walter Hill
in partial fulfillment of
the requirements for the course:

Ed. 505 Reading and Conference:
Visual Elements in Reading (3 credits).

Published 1966
by
Optometric Extension Program
Duncan, Oklahoma

TABLE OF CONTENTS

ACKNOWLEDGMENTS

The writer of this paper would like to acknowledge and express her sincere appreciation to Alfred Furie, O.D., practicing optometrist in Hillsboro, Oregon, member of the Optometric Extension Program Foundation's Advisory Council, and assistant professor (part time) at Pacific University, Forest Grove, Oregon, without whose help this paper would literally have been impossible to prepare.

He provided much of the actual research material used in this project and guided this writer to resources which he could not supply.

There is no index such as the Readers' Guide to Periodical Literature available to assist the researcher in the field of optometry and without the kind assistance of both Dr. Furie and Charles Margach, O.D., professor of optometry, Pacific University, Forest Grove, Oregon, and a former editor of the Journal of the American Optometric Association, the material for this paper would have been difficult if not impossible to find.

Many thanks go to Jane Carmichael, O.D., professor at Pacific University, for her help in compiling the Glossary. It is impossible to find many of these terms defined in any kind of dictionary.

Drs. Furie and Margach were also responsible for making it possible for this writer to meet Emily Lyons, wife of and coauthor with Vernard C. Lyons, O.D., whose work is included in this paper, and A.M. Skeffington, O.D., director of education for the Optometric Extension Program Foundation, and one of the most outstanding men in the field of optometry today.

Dr. Skeffington, affectionately known as "Skeff" to his colleagues has inaugurated much of the advanced thinking and procedures of the past twenty-years in his field and is a proponent of the motor and learning theories in vision.

Dr. Furie's and Dr. Margach's enthusiasm about and interest in helping get this paper organized have no doubt been influential in giving the writer of this paper somewhat of a positive bias. It is always a gratifying experience to work with people who are willing to share a knowledge of their discipline with one who is relatively naive and unsophisticated in the field.

I. INTRODUCTION

Reading is perhaps the single most important skill acquired in an individual's school life. Very few people would argue with this statement. The only time reading becomes a subject of controversy is when the skill is not acquired. Then "everyone" becomes an expert on "Why Johnny Can't Read." Educators, psychologists, psychiatrists, neurologists, optometrists and laymen of all kinds and descriptions seem to have ideas about the best "single" way to teach reading to not only those children who have special problems in reading but all so-called normal children.

It is relatively easy to be an expert in an area where so much research is being done (both scientific and otherwise) with so little conclusive results.

There is, however, so far no known method of reading which is THE BEST or which is a panacea for all failures, and no one knows this any better than the individual who has worked with people of all ages who have had reading problems.

One of the most interesting aspects of all this hue and cry about reading is that while the majority have a great deal to <u>say</u> about reading, only a minority seem to be <u>doing</u> much about it, and educators, including reading specialists, are no exception to this.

Some of the individuals who seem to be doing less talking and more acting are related to or in the field of optometry, people like: C.Venard Lyons, O.D., and his wife, Emily Bradley Lyons; Thaddeus R. Murroughs, O.D.; R.W. Lowry, Jr., O.D.; Davis Armistead, O.D., and B.W. Armistead, O.D.; and G.N. Getman, O.D.; Newell C. Kephart, Ph.D., who is also an educator and author of a series of texts published by the Optometric Extension Program; and the educators Dorothy Simpson, Ed.D., and Carl H. Delacato, Ed.D.

These individuals have attempted to try new procedures, techniques and methods for teaching children to read which differ from the more ordinary traditional approaches used in the conventional classroom.

I. Introduction - continued

This paper will attempt to describe some of the methods these people are using, and to evaluate them in terms of recent research in the area of reading.

While all of the above people are not optometrists, their methods are closely related to the field of optometry. Their work is or has been closely allied to the philosophy and teachings of A.M. Skeffington, O.D. and the Optometric Extension Program - with the possible exception of Delacato (and he has been a lecturer on Optometric Extension Program Congress platforms). All of these individuals point to Optometric Extension Program references in their bibliographies.

II. THE LYONS AND LYONS METHOD

C. Venard Lyons, O.D., has an optometry degree from Los Angeles College of Optometry, Los Angeles, California. He has had a practice in San Francisco, California, for over forty years in which his wife has participated and been a life long assistant. They have for the last twenty years devoted most of their time towards the rehabilitation of the child who has difficulty with reading in school.

Description of the Materials

The Lyons and Lyons kit contains one set of dominoes, one set of 2" x 2" slides, two plastic arrows, one packet of screws, nails and washers, two instruction booklets, one set of graphs, and two textbooks containing detailed lesson plans. A 2" x 2" slide projector with a flashmeter attachment and screen would be necessary adjuncts to use these materials.

Description of Procedure

The authors state that their major purpose is "to introduce the individual to, and acquire, one factor of that complex set of skills termed visualization."[1] They define this one factor as "the ability to recognize and recall any viewed symbol by maximum visual appraisal with minimum auditory reinforcement."[2]

Lyons and Lyons base their method on the premise that subvocalization reduces both comprehension and rate; therefore, if subvocalization can be reduced or eliminated, comprehension and rate will be increased.

They contend that ordinary methods of attempting to speed up rate of reading only speed up the rate of inner speech, and since the speed of inner speech is limited by the rate of articulation, maximum speeds are reached very rapidly and the individual soon returns to his original rate after the training period ceases. They imply that their method overcomes this pitfall.

Recent findings about subvocalization or inner speech indicate that it may not be the bogeyman it was once considered.[3]

Edfelt in 1960 in the only comprehensive, adequately instrumented, and scientifically controlled study of the last decade reports that "efforts to eliminate it (subvocalization) should be discontinued."[4]

Anderson and Dearborn[5] seconded by Tinker[6] in 1952 made the revolutionary (at that time) recommendation that "silent speech is a desirable, developmental learning reinforcement activity and that its elimination should not be prematurely precipitated."

In carrying out their contention, however, Lyons and Lyons attempt to break the subvocalization pattern by flashing picture symbols instead of word symbols on a screen. They then require the subject to reproduce what he has seen by <u>drawing</u> what he has seen rather than by saying anything.

The symbols run from what whey call "low auditory tendency" to "high auditory tendency," meaning that some symbols are more apt to bring a subvocal response than others. They start with arrows, proceed to x's, then to dominoes, then geometrical figures.

During the first phase of the program, the learner reproduces the image exactly as he sees it. During the second phase, he is asked to reproduce the image after he has imagined moving it one-quarter of a turn clockwise. These images become increasingly more complex.

The directions are rather vague on when the visual training ends and when the training for recognizing visual signs begins. It appears that the visual training is begun prior to the work on words and is continued concomitantly with the work on words using phonetic and structural analysis skills.

They have written two manuals at two levels of difficulty with explicit directions as to how to proceed on teaching words. Part of the training is carried on in the office twice a week; part at home. A great deal of emphasis is placed on homework and this is to be done independently without the aid of parents or brothers and sisters. The homework assignments under the title "Riddles" appear to be stereotyped replicas of typical worksheets used in the average classroom. The sentence completion form is used throughout and assumes a prior vocabulary knowledge on the part of the patient from the first lesson on (e.g., Question: Opposite of women_____. Answer: men). This assumed vocabulary is apparently not based on any recommended list of basic sight vocabulary words such as: The Dolch List, Gates Primary List, Thorndike List, Dale List, Durrell-Sullivan List, or Stone List.

The other worksheets provide some variation in procedure and give practice in working with structural elements in words, and in picture and sound matching.

The authors have used Dr. William S. Gray's, On Their Own In Reading as a guide in applying phonetic and structural analysis principles to learning new words. The slides and manuals follow the developmental approach as outlined in his book beginning with teaching the consonants, then the short vowel sounds, long vowel sounds, basic vowel rules, rules for word endings, vowel digraphs, dipthongs, syllabication, prefixes and suffixes.

This is similar to the approach advocated by the Scott Foresman Basal Reading Series of whom William S. Gray is one of the authors and is used at one time or another by most primary grade teachers.

One of the unique features of the Lyons and Lyons approach in introducing this skill is that they use slides to accompany their explanations. These slides contain no words at first; only letters which accompany a picture. This is one of the reasons why they name their manual visual signs for vowel sounds.

They want the picture "hooked up with the sound, not the word," (e.g., "A" is flashed on the screen accompanied by a picture of an apple). The teacher says, "What is the sound that starts this picture?" The learner is to answer by making the short sound of "A." This is to be reinforced until the learner can answer the question, "Tell me the short sound of 'A,'" with the sound "A."

After the learner knows the short vowels thoroughly, he proceeds to tachistoscopic flash words using these vowels. He writes the words then reads them and says the vowel sound in them.

The authors stress to the student that if he spells only by sound, many words have several choices (e.g., though could be though, thoe and thow); therefore, it is necessary to visualize in order to become a good speller.

The authors have hit upon what appears to be one of the major difficulties in learning to spell words in the English language; that is, distinguishing which letter patterns represent the sounds the student hears. It is not difficult to find readers, both adult and nonadult who share the opinion of the following author:

> When the English tongue we speak
> Why is "break" not rhymed with "freak"?
>
> Will you tell me why it's true
> We say "sew" but likewise "few";
>
> And the maker of a verse
> Cannot cap his "horse" with "worse"?
>
> "Beard" sounds not the same as "heard";
> "Cord" is different from "word."
>
> Cow is "cow" but "low" is low,
> "Shoe" is never rhymed with "foe";
>
> Think of "hose" and "dose" and "lose";
> And think of "goose" and not of "choose";
>
> Think of "comb" and "tomb" and "bomb";
> "Doll" and "roll", "home" and "some";
>
> And since "pay" is rhymed with "say",
> Why not "paid" with "said", I pray?
>
> We have "blood" and "food" and "good";
> "Mould" is not pronounced like "could";
>
> Wherefore "done" but "gone" and "lone"?
> Is there any reason known?
>
> And in short it seems to me
> Sounds and letter disagree.[7]

"But after all, although such spectacular groups of inconsistent spellings do occur, most of the spellings for the vowel sounds fit into a very few patterns."[8] Lyons and Lyons teach these patterns or choices; then by visual training they try to establish the discriminating visual patterns which will recur to the student when he wishes to spell the word.

> By working from visual signs most dependable
> for cuing a specific sound, to those less dependable;

> by learning to depend less and less on the way a word sounds and more and more on the way it looks and how it is used in a sentence, we could move ever away from dependence on sound to reliance on visual memory, or "visual tracing" (as we have termed this phase of Visualization). Equipped with these essentials of consistency and insight into language, the mind is free to expand, forming abstract relationships and concepts.[9]

They came to this method via a long, circuitous route. About ten years before publishing their materials, they discovered that:

> Many of the poor achievement cases completing basic visual training with us in the conventional optometric procedure remained virtually unchanged so far as their scholastic achievement was concerned. They had improved their visual skills, produced favorable changes in attitude and concentration but spelling difficulties stubbornly persisted, as did slow, uncomprehending reading habits. We were as puzzled as the teachers, educators and psychologists who sent them. None of us appeared to have all the pieces forming the puzzle.[10]

This discovery led to the program which has just been described. The authors tried to combine the process of visual training with the initial process of teaching words by phonics and word analysis.

It is difficult to evaluate their work as far as teaching the child to depend on sight more than sound. Research in this area is conflicting. Most teachers just take it for granted that the learner retains his auditory clues and builds the sight clues in a concomitant manner with the sounds.

Perhaps the value of their training lies mainly in the area of the perceptual training which takes place, regardless of whether or not dependence on sound is eliminated.

In general, investigators are divided on the value of perceptual training per se, but Anderson and Dearborn,[11] and Vernon[12] and Morris[13] agree that training in the shape orientation and sequence of words and letters should be of value.

---

[1]C. Venard Lyons and Emily Bradley Lyons, Lyons Visualization Series (Lyons and Lyons, 1961), p. 1.

[2]Ibid., p.1.

[3]Donald L. Cleland and William C. Davies, "Silent Speech--History and Current Status," The Reading Teacher, (January, 1963), pp. 224-227.

[4]Ake W. Edfelt, Silent Speech and Silent Reading (Chicago: University of Chicato Press, 1960).

[5]Irving H. Anderson and Walter F. Dearborn, The Psychology of Teaching Reading (New York: Ronald Press, 1952), p. 160.

[6]Miles A. Tinker, Teaching Elementary Reading (New York: Appleton - Century, 1952), p. 14.

[7]Source unknown.

[8]Charles C. Fries, Linguistics and Reading (Holt, Rinehart and Winston, Inc., 1963), p. 162.

[9]C. Venard Lyons and Emily Bradley Lyons, Visual Signs for Vowel Sounds and Word Structure (Lyons and Lyons, 1962), p. x.

[10]Ibid., p. viii.

[11]Anderson and Dearborn, op cit.

[12]Magdalen D. Vernon, "The Perceptual Process in Reading," Reading Teacher 13 (1959), pp. 2-8.

[13]Joyce Morris, "Teaching Children to Read," Educ. Res. 1 (1959), pp. 61-75.

III. THE ARMISTEAD AND ARMISTEAD METHOD

J. Davis Armistead, O.D., and B.W. Arimstead, O.D., both began their studies in education. B.W. changed to optometry before completing his training in education. J. Davis earned a Bachelor's degree in education, holds both elementary and secondary teaching certificates and is certified to serve as a superintendent or principal in the Texas public school system. They are both practicing optometrists in this same state.

This background gives them enough knowledge of teaching to realize that in their own words, "The optometrist is no reading teacher." In fact, they very definitely commit the remedial or nonreader student to the hands of the special education teacher, the psychologist and the psychiatrist.

The persons they feel obligated to work with are the individuals who have had no trouble in school in the area of reading skills up through the sixth or seventh grade. These individuals they feel, however, have had very little or no teaching of reading since that time and their reading ability is inadequate for the demands placed upon them. The quantity alone is tremendous (students today read an average of 400 books during their twelve years in the public school) and the difficulty in comprehension increases each year. The Armisteads believe that they have something to offer these individuals.

It is their contention that "vision is a learned skill just as is the ability to walk or talk. Reading is (also) a learned skill involving as its primary function the use of vision."[1] This is the basis for their entire program. They set forth a reading improvement program through the use of visual skills training.

Description of Materials

The main materials used by the Armisteads are: a 3-D or Keystone Tachistoscope projector and screen, a set of SRA Better Reading Books No. 2, Tachistoscopic basic form slides and digit slides, the Harvard Reading Film Series and a 16 mm sound movie projector to show them, reading pacers with reading material, metronoscopes,* Keystone Stereomotivator, Keystone color depth slides, red-green glasses for all students, Controlled Reader and accompanying films, trial lens set, Taylor's Spiral Rings, Plus 50 clip-ons, Robinson-Hall reading tests, and a classroom edition of Reader's Digest.

Description of Procedure

The program is set up to consist of thirteen sessions on a once a week basis. The first session begins with a visual screening test administered prior to the program. There are three parts to this: (1) A complete Visual Skills Test is done on the telebinocular, (2) An ophthalmograph film is completed on each student, (3) A check for internal and external pathology is made and a Near Point of Convergence test is carried out with the pen light.

*For a definition of optometric terminology, see GLOSSARY.

A Robinson-Hall reading test is administered to find speed and comprehension. Then they test the ability to grasp and record digits both visually from a tachistoscopic flash and aurally from spoken numbers.

After this testing is completed, the following are introduced and used: (1) The Flash Reader by Moulton and Nielson or the (2) Rapid Reading Kit, published by the Foundation for Better Reading.

At the beginning of the second session, questionable findings on the telebinocular are rechecked and referrals are made to the visual practitioner of the student's choice. The Armisteads insist on a complete visual analysis before letting the student enter the program. If the reading tests and ophthalmograph reveal a nonreader, he is rejected and referred to a reading specialist.

A lecture is given on vision and its relation to reading. The SRA Reading Book No. 2 is introduced at first to test and then throughout the rest of the course to build speed and comprehension.

The Renshaw SR Training Series slides are shown to illustrate that vision is learned, "Sight is seeing only. Vision is the process of attaching meaning to sight."[2] These slides demonstrate the principle of optical illusions. Detailed directions as to how to use them are written by Armistead and Armistead.

This dramatic demonstration of vision being a learned process is perhaps the most unique part of the Armistead method. Once the learner is aware of the possibility of change by training he can become a very active participant in the learning process and appears to do so according to the authors.

Tachistoscopic training is begun using digits to help the student "broaden his visual span and increase his speed of recognition."[3]

The basis for assuming that this will occur probably comes from the work of Samuel Renshaw.

> Although much pioneer experimental work had gone before,[4] present practice in the use of the tachistoscope stems mainly from the work of Renshaw. During World War II Renshaw developed a highly successful tachistoscopic method for training airplane spotters for the Navy. He also developed a system of training designed to speed up perception and increase the span of recognition, in which major attention was given to the use of series of digits. Average gains in rate of reading for groups were not highly impressive, although some spectacular individual gains were made.[5]
>
> MacLatchy tried an experimental program in the first and second grades of several Ohio schools, in which visual training with a tachistoscope was the major feature. She concluded that this training helped the pupils in fluency and comprehension, and also helped in arithmetic.[6]
>
> The value of tachistoscopic training is still a subject of controversy. Although there is evidence that tachistoscopic training can speed up reading with little if any loss in comprehension, there are studies in which the carry-over of this

> improvement to ordinary reading situations has been quite disappointing.[7] Since the average duration of fixations is about 1/4 second for college students and not much less for superior adult readers, the ability to recognize isolated words and phrases at speeds above 1/10th second may not transfer to normal reading situations.
>
> As yet the amount of well-controlled experimentation is insufficient for drawing any firm conclusions on the real value of tachistoscopic training.[8]

After the digit training, peripheral vision training is carried out on the tachistoscope using Keystone Slides 1A-C and 2A-C as well as O with the Stereomotivator attachment for floating the color depth slides. Just how this improves peripheral vision or what peripheral vision has to do with reading ability is not made clear by the Armisteads.

The Harvard Reading Films are introduced, Film No. O being shown first. A different film is then used each session.

Either the above films or the Controlled Reader filmstrips can be used. According to the authors, they serve similar purposes.

Next comes the auditory digit training where the trainer calls out numbers up to nine digits and the trainee records and checks them.

Then the students go on individual pacers. The Armisteads recommend the use of material not over three or four inches in width per column. The majority of pocketbooks would fit into this category. They also use the Junior Metronoscope to develop rhythm in reading, to train students to read by phrases, and also for accommodative rock training.

Although there has been a great deal of controversy on the use of mechanized devices for improving reading skills, Jungeblut and Traxler say, "The findings of a number of comparative studies indicate that mechanical devices may be helpful techniques, but they are not essential to reading programs. Generally speaking, a combination of techniques and approaches has been found to be more effective than the use of a single method to the exclusion of all others."[9]

Strang reports that according to results obtained by Cleland[10] students retained their newly acquired gains in rate and comprehension six months after training. As Strang points out, however, more evaluation and follow-up needs to be done on the acquiring and retention of skillls learned on machines.[11]

Extrinsic motivation is emphasized throughout the Armistead program and they give frequent pep talks and awards for outstanding achievement. Their talks are comprised of ideas and propaganda to "sell" the program.

Session number three is begun on the same order as session two with a talk, "Reading is Profitable as Well as Fun," a Harvard Film or Controlled Reader Filmstrip, the SRA Reading Book, Metronoscope exercises, tachistoscopic work and pacers.

More visual training procedures are added which may not be common to the conventional machine-centered developmental reading program. The student trains

for about fifteen minutes on what is called accommodative rock on the metronoscope. This is done with a plus two and a minus one lens.

Fifteen minutes is also given to the use of Taylor's spiral rings. Some practitioners use plus fifty lenses during this training, too.

It is suggested that the student learn the definition of at least thirty words from the Flash Reader section each week.

The same procedures are continued in the fourth session with the addition of pursuit and saccadic visual training.

The classroom edition of Reader's Digest is introduced here and used as a timed reading experience with comprehension check.

The rest of the sessions follow much this same pattern.

Perhaps the most outstanding feature of the Armistead method is their enthusiasm. Any evidence they may have of success might be partly attributed to this. They express this attitude throughout their instructions with comments such as, "Next week we will show you how to read your daily newspaper in one-half the time it now takes you to do so." Their instructions to the teacher of any program similar to theirs include:

> Give words of real encouragement to the class after each series of exposures. The group with whom you are working must always be the best in some respect, and they must constantly surprise and delight you with their accomplishments. If you feel this way about them, and convey through your enthusiasm this optimism, they will catch the spirit; and they will surprise and delight you with their accomplishments! Furthermore, they will be inspired to work up to peak capacity.[12]

By passing out pamphlets such as "You're Not as Smart as You Could Be," "How Good are Eye Exercises," "Tips for Better Reading," etc., they keep interest high. They have a visitors night and give awards for the highest achievement.

---

[1]J. Davis Armistead and B.W. Armistead, "Speed Reading and Visual Training," The Optometric Weekly (April 17, 1958), p. 1109.

[2]Ibid., p. 1109.

[3]Ibid., p. 1190.

[4]Walter F. Dearborn, The Use of the Tachistoscope in Diagnostic and Remedial Reading, quoted by Albert J. Harris in How to Increase Reading Ability (New York: David McKay Company, Inc., 1961), pp. 526-527.

[5]Samuel Renshaw, The Visual Perception and Reproduction of Forms by Tachistoscopic Methods, quoted by Albert J. Harris in How to Increase Reading Ability, pp. 526-527.

[6]Josephine MacLatchy, Bexley Reading Study, quoted by Albert J. Harris in How to Increase Reading Ability, pp. 526-527.

[7]Donald L. Cleland, An Experimental Study of Tachistoscopic Training as It Relates to Speed and Comprehension in Reading, quoted by Albert J. Harris in How to Increase Reading Ability, pp. 526-527.

[8]Albert J. Harris, How to Increase Reading Ability, pp. 526-527.

[9]Ann Jungeblut and Arthur Traxler, "Summary and Evaluation of Pertinent Research at the College and Adult Level," in Perspectives in Reading (Newark, Delaware: International Reading Association, 1963-64), p. 121.

[10]Donald Cleland, "Seeing and Reading," American Journal of Optometry, quoted by Strang, McCullough and Traxler in The Improvement of Reading (New York: McGraw-Hill, 1961), p. 63.

[11]Ruth Strang, Constance M. McCullough and Arthur Traxler, The Improvement of Reading (New York: Mc-Graw-Hill, 1961), p. 64.

[12]Armistead and Armistead, p. 1487.

IV. THE MURROUGHS METHOD

Thaddeus R. Murroughs holds a B.S. in zoology, M.S. in biological sciences, M.A. in psychology-research in vision, O.D., D.O.S. in optometry. He has a teacher's certificate and has taught in Junior College and Universities. At the present he works primarily with visual problems of children and retarded readers in his Santa Barbara, California, practice.

Where Armistead and Armistead definitely point out that their aim is to serve the reader who has been successful in school, Murroughs says his primary objective is "to present the service which modern optometry can offer to aid the retarded reader."[1] He says that Betts[2] and Dolch[3] both contend that twenty-five to forty per cent of the students in every class are retarded in reading. It is Murrough's contention that "Most of these failures have a visual perceptual or dominancy problem. Most of these children pass the Snellen school test. Since they do not exhibit marked symptoms they do not receive professional aid and often if they do, it is with an eye doctor who "knows nothing about near-point visual problems." It can be assumed that he is referring to the ophthalmologist because this is one of the differences that exist between optometrists and ophthalmologists.

Murroughs also points out, however, that even if the underachiever is corrected visually, his achievement oftentimes shows little improvement because he is so retarded in the language arts subjects at the time the remedy is administered that he can't catch up.

Therefore, he feels that it is necessary to include language arts training in the visual training program.

He also contends that perhaps one of the reasons there are more retarded readers among boys than girls may be partially explained by lack of visual performance due to lack of maturation and development.

He very shrewdly points out that educators, psychiatrists and psychologists have all been unable to solve the problem of the retarded reader. He feels that the optometrist not only has something to offer but it is his duty to do so.

After quoting extensive sources (i.e., Eames, Robinson, Witty and Kopel, Farris, Bartlett, Park and Burri, Harris, Dearborn and Anderson and Eberl) and their findings as to which single factor in visual performance is most closely related to reading failure, Murroughs says, "One is left in an extreme state of confusion." One proves one factor, another proves a different one responsible. Murroughs contends that just as there is no single causative factor for predicting remedial readers, so there is no single visual anomaly common to the remedial reader. He believes that the child operates as a totality and must be taken as an individual with subjective problems, not a person with one aberration which can be singled out and solved. He believes in the "Principle of Multiple Causation."

After giving the reasons for his stand on educating retarded readers, he goes on to explain his method of operation:

The first office call is a two-hour examination. The children he writes about have all failed to respond to help from any other source including remedial reading specialists and reading clinics. This statement must be taken with a knowledge of the requirements for reading specialists and clinics in the different areas of the United States, however. In some states any teacher holding a regular teacher's certificate can be certified as a remedial reading specialist.

He says that about "90% of these retarded readers have a visual perceptual or dominancy problem causing neural confusion."[4] As a result he gives a detailed list of the tests he administers to discover these areas of questionable performance. They are:

1. Keystone Visual Skills Battery (Form No. 3).
2. Hand-Eye Coordination Test. Targets AN 10, and AN 9.
3. Progress of Fusion Tests, at far or near, as necessary.
4. Cyclophoria, retinal slip and rivalry rate.
5. Level of stereopsis, if necessary using Multi-stereotargets.
6. Spache suppression test in reading.
7. Gray Oral Reading Test, adapted for optometric use in the Telebinocular.
8. Accommodative rock.
9. Aniseikonia, when necessary.
10. Dominancy Evaluation, with identification of preferred eye in reading.
11. Evaluation of neural confusion.
    a. Leavell test considerations.
    b. Verticality phenomenon.
    c. Rotation phenomenon.
    d. Direction of horizontal strokes.
    e. Orientation of objects.
    f. Direction of drawn circles.
12. Perceptual evaluation with tachistoscope, using digits, for
    a. Span of perception.
    b. Speed of perception.
13. Dolch Basic Sight Vocabulary, and nature of the error.
    a. 95 Common Nouns.
    b. Popper I words.
    c. Popper II words.
14. Ophthalmography, not mandatory, and not necessary in most cases.
15. Reversal evaluation.
16. Refractive analysis at far and near.
    a. Phoropter findings.
    b. Versions and rotations.
    c. Near-point of convergence.
    d. Vertical phorias and ductions.
    e. Cyclophoria target.

He gives explicit directions on how to administer these tests and what to look for in making a diagnosis and prognosis on the patient.

Most of these tests would take a certain amount of training to administer. Tests No. 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, and 15 could be administered by a teacher trained in the correct procedure. Test No. 8 requires the use of lenses.

Special training in optometric skills would be a probable prerequisite to administer this.

It is impossible to determine from the material given whether the teacher could administer test No. 9 on aniseikonia or not.

The Ophthalmography test No. 14 can be administered by anyone trained in the use of the eye movement camera; however, "interpretation of its results in the hands of a novice may be misleading and harmful."[5]

The final set of test No. 16 requires optometric procedures and would usually be administered in a visual clinic environment.

After a thorough analysis of the findings on these tests, an individual training procedure is set up for the student. The following equipment is used with an explanation of Murrough's purposes:

1. Cheiroscope (Leavell Coordinator) (Delacato Reader). While these may be used in the office, I usually reserve them for home training. The objective of using this treatment is to (a) eliminate suppression, (b) teach the child to pay attention, by ignoring peripheral distractions, and (c) develop a preferred eye for reading, as a consequence of building the unilateral coordination of writing hand and concomitant eye.

2. Teleyetrainer. I use rotor 3, alternating flash. I use the accommodative rock technique, even though I may not be training the accommodative function. Should I be doing so, the proper lenses are in place. The objective of this training is to: (a) train preferred eye to correspond with the writing hand, (b) introduce, as a review, the basic short vowel sound, and (c) to introduce basic phonograms of the English language, as trigrams, of a certain type.

3. Telebinocular. This instrument may be used for discrimination training, identification of letters and sounds, stereopsis training and in the anagram game of finding new and old words while stereo is improved.

4. Overhead projector and flashmeter, for tachistoscopic training. Used very extensively, every day. This instrument is used to build the speed of perception initially, then span of perception in phrase reading. It involves the visual identification of phonograms and related materials taken from:
   a. prepared material for projection
   b. Dolch Basic Sight Vocabulary
   c. Dolch phrases
   d. Spelling words from child's Spelling workbook
   e. Spelling workbook phrases

5. Reading Pacer. The use of this instrument is to develop speed in reading familiar material. The material is selected from a variety of sources:
   a. prepared from training steps
   b. prepared from Spelling workbook

c. McCall Crabbs Standard Test Lessons in Reading
d. Selma Herr manual
e. Reader's Digest (Ed. Div.)
f. Delacato's material
g. Any other source[6]

He recommends introducing his program by beginning to teach the sounds of the consonants and before this is complete beginning the short vowel sounds starting with "a." He has an interesting variation on the introduction of consonant sounds by first giving the student the eight consonants which begin with the sound of the letter namely: b, d, j, k, p, t, v, and z. Then he gives the seven consonants that end with the sound of the letter, namely: f, l, m, n, r, s, x. Some consonants have names which do not contain their sounds at all, namely: h, q, w, y. He introduces c and g as their hard sounds.

In order to substantiate his reasons for using the type of sequential pattern of phonics teaching, he gives the following statistics (without quoting any research data or source):

> In normal speech, five syllables per second (average) are produced. Using the letter C for consonant sound and V for vowel sound, a tabulation of such syllables shows the following percentages:

Per cent	Structure	Example
33.5	CVC	cat
21.8	VC	an
20.3	CV	go
9.7	V	a
7.8	CVCC	sand
2.8	CCVC	slat
0.8	CCV	pre
0.8	CCVCC	stamp

> It should be noted that 70% of the total represents a closed syllable. A closed syllable ends with at least one consonant. An open syllable ends with a vowel sound. It is important to bear in mind that a given V may represent more than one vowel.[7]

Murroughs says it takes one hour of preparation on the part of the optometrist for one hour of training with the child. He insists on individual instruction with individual preparation based on the specific needs of the student. He also insists on doing the training before school instead of after. He pays special attention to emotional problems and gives the student books to read which are geared toward his problems, (e.g., Adopted Jane).

He calls his program "Optometric Reading Training." The first training he does is hand-eye. For this he uses the machines described previously.

He then moves to accommodative rock "reading" training. This is sometimes done with the use of lenses, sometimes not.

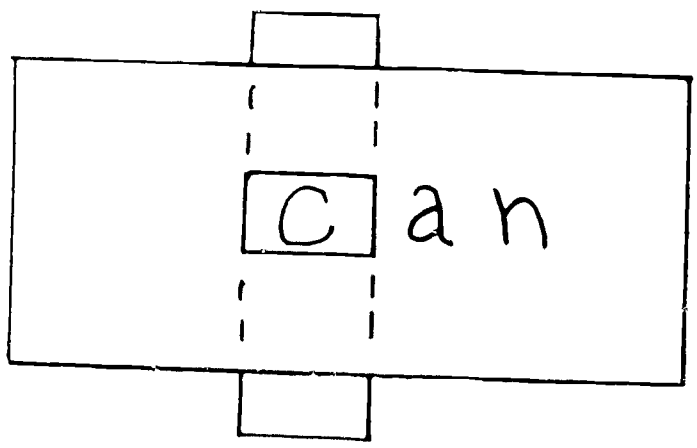
Then he introduces the tachistoscope to teach phonics. He concentrates on teaching trigrams based on the consonant-vowel-consonant pattern. First the child

listens to the teacher say the sounds of the trigram; then the child repeats them. All the while the child is viewing these words through one of the above machines--with his preferred eye (which has been determined by tests given preceding training). He points out that this does not necessarily mean the dominant eye but it is more closely allied with hand, ear, foot and body side preference.

> While the child looks through the Cheiroscope, call the words out (auditory stimulus) and have him write them (manual) while he sees them with the preferred eye (visual).

This is reminiscent of the Fernald Method[8] where the child sees, hears, traces, then writes the word from memory. Murroughs changes the order somewhat by indicating that the child should hear, see, say, write, then spell orally from memory.

The child is to practice the following type of hand-tachistoscopic work at home which has been prepared by the optometrist.



The ab, ad, ap, an, ag, am, and at combinations are used. During the second session, many of the trigrams are called out while the child writes the syllable in the Leavell Coordinator on lined paper.

The Dolch Basic Sight Vocabulary is introduced using words with the short sounds first. These twelve words are a, am, an, can, man, ran, at, cat, cap, as, has, had. This may be begun on open exposure, then 1/10 second, 1/25, 1/50, and finally at 1/100. This may take all the way from one to three hours.

Words which do not follow the phonetic pattern of consonant-short-vowel-consonant such as saw and was, he calls trouble-makers and categorizes them as such to the student with the titles of "stinkers" and "dirty" words to call special attention to their difficulty.

The next phase of treatment consists of transferring the hand-eye relationship from the Coordinator to a more lifelike situation. This involves what Murroughs calls "uniocular stimulation from trigrams produced within a binocular field." To do this, he has the child wear red-green anaglyph goggles. If the child is right-handed, the green filter is placed before the right eye. The

child is instructed "When I say the word, I want you to think about it, say it to yourself, imagine how it looks (visualization), spell it out loud and then write it down."

A red-colored ballpoint pen is used for writing the words so that they will be perceived only by the eye which has the green filter over it. Both eyes, however, participate in the fused percept involving the pencil, hand, paper outline, lines and columns.

Murroughs tries to work the spelling words which the child has at school into his program, too, whenever they fall into his planned phonic order.

Then he goes through the same procedure introducing the short "e" and short "i" that he did introduce in short "a" after which he begins having the student read sentences using only the trigrams and troublemakers the student has learned and some additional words which are underlined (e.g., The rat ran fast but the cat ran faster.) He is encouraged to say the new word if he knows it but not to sound it out. The instructor will help him if he needs it.

Murroughs continues his program on through the sequential phonetic and word analysis stages including syllabication.

He bases his method of operation on the theories of Delacato[9] in regard to laterality and dominance. He makes an effort to support these theories with reference to the book Reading Disability[10] which is a compilation of top-flight authorities representing several fields at a symposium-conference held at The Johns Hopkins School of Medicine on the subject of the dyslexic.

More will be said about whether research refutes or verifies this hypothesis in this paper under the section on "The Delacato Method."

Whether his original thesis upon which he operates is correct or not, it must be acknowledged that he gets results. His records indicate that his procedures are very successful with students who have failed the attempts of all other methods which have been used on them.

---

[1]Thaddeus R. Murroughs, "Optometric Care of Retarded Readers," in Optometric Extension Program Papers (Duncan, Oklahoma: OEP Foundation, Inc., October, 1960), p. 1.

[2]Emmett Betts, "Factors in Reading Disability," Education, May, 1952.

[3]E.W. Dolch, Manual for Remedial Reading (Garrard Press, 1955).

[4]Murroughs, Optometric Extension Program Papers, p. 12.

[5]Ibid., p. 2.

[6]Ibid., pp. 30-31.

[7]Ibid., p. 33.

[8]Grace M. Fernald, Remedial Techniques in Basic School Subjects (New York: McGraw-Hill, 1943), pp. 33-35.

[9]Carl H. Delacato, The Treatment and Prevention of Reading Problems (Springfield, Illinois: Charles C. Thomas, 1959).

[10]John Money, Reading Disability (Baltimore, Maryland: The Johns Hopkins Press). (date unknown)

V. THE GETMAN METHOD

G.N. Getman, O.D., D.O.S., is a graduate of Northern Illinois College of Optometry, was an assistant at Yale Clinic of Child Development from 1946-1950, a visual clinician in child research, Yale University in 1949-1954, director of classes in developmental vision, Luverne, Minnesota, and Purdue University, director of the Glen Haven Achievement Camp and Summer Achievement School, Wisconsin State College, a member of the Minnesota Governor's Commission on children and youth, chairman of the Optometric Extension Program Section on Child Vision Care & Guidance, a writer, and practices in Luverne, Minnesota.

Getman's contribution to the field of language arts can be said to lie mainly in the area of reading readiness.

His theories propose that a child must go through a developmental sequence of learning in the area of vision just as he goes through developmental stages in learning to walk and talk.

He feels that inability to read stems from a lack of development of basic perceptual skills and says, "It seems strange that the stages have been set for a developmental sequence of learning in everything else a child is expected to acquire as a skill, and then we still persist in our attempts to teach a child to read by immediately thrusting him into the manipulation of symbols in first grade."[1] Getman feels that a child should reach a certain level of developmental achievement before he is ready for the first grade.

Although Gesell[2] and Spock[3] in the 1940's introduced evidence to support developmental characteristics in the growth of a child and these are accepted as observable phenomena today, there has actually been little research done since the Washburne[4] study to define the exact age when a child is ready to learn to read. Even his emotional or maturational age is difficult to determine from any test although Dr. Frances Ilg[5] claims to be able to determine a great deal about the child's maturity level and whether he is ready for school or not simply by noting the way in which he adds the parts to the "Incomplete Man Test."

Getman's material is directed more to the parent than the educator. He would like to teach the parent how to provide the child with the correct environment for adequate perceptual developmental growth.

In order to do this he divides the developmental activities into five areas. Then he goes on to define these areas. He gives specific examples of activities which parents can provide for their children to be sure that they go through these states of development and acquire the correct perceptual skills.

The following is a synopsis of his approach:

A - General Movement Patterns

(Procedures for the development of exploratory skills)

"Keeping in mind that creeping is of great significance to all coordination skills of childhood, center your activities around this type of gross movement and have the child do the following exercises:[6]

1. Basic movements
   a. Angels in the Snow, or Swimming on Your Back
   b. Stomach Roll
   c. Rolling Sit Ups
   d. Sit Ups
   e. Bent Knee Sit Ups
   f. Feet Lift
   g. Roll from Back to Hands and Knees
   h. Roll from Back to Hands and Feet
   i. Toe Touch

2. Obstacle Course (a creeping exercise)

3. Jump Board exercises

4. Walking Beam exercises

5. Trampoline exercises

6. Rhythmical work

7. Running and throwing games

B - Special Movement Patterns

(Procedures for the development of manipulative skills)

"Provide your child with the following activities remembering that although there are many special movement patterns that a child must master, the eye-hand patterns are chronologically and developmentally most significant."[7]

1. A percolator to play with everywhere from the sandbox to the bathtub.
2. A toy chest into which he can "reach" and "Look."
3. Manipulative toys geared to his age level.
4. Hammer and nails.
5. Experience using his preferred hand.
6. Experience in bilateral activities such as riding tricycles and bicycles.
7. Tracing around block and cut-outs.
8. Playing catch with balloons and balls.
9. Cutting out simple forms.
10. Fitting objects together.
11. Making pictures on pegboards.
12. Tracing shapes with crayons and pencils.

C - Eye Movement Patterns

(Procedures for the development of visual inspection skills)

"Give your child the following exercises to develop ocular motilities which are absolutely essential to visual development because visual perceptions will be inadequate or incomplete if eye movements are jerky and restricted."[8]

1. Sit in front of your child and have some small objects in your lap. Pick up one of these with your right hand and hold it off to your child's left side, urging him to look at it and name it. While his attention is on this object, pick up another with your left hand and hold it off to his right side, etc.

2. Make a practice handing things to your child from the side.

3. Urge your child to look at you when you speak to him.

4. When your child asks for things urge him to point at, as well as name, the object.

5. Attach a string to a golf ball or a rubber ball (about two inches in diameter) so it can be hung from a light fixture or doorway. Have the child watch this with his eyes from both an erect and a lying down position.

6. Attach a small cut-out airplane to a pencil eraser and have the child follow it with his eyes as you "make it fly."

7. Have your child hold his right and left forefingers erect, about 12 - 14 inches apart and about 12 inches in front of his eyes. Have him look quickly from left to right.

8. Have your child hold a pencil erect about 10 - 12 inches in front of his nose. Have him look from the pencil to numbers on a calendar across the room as quickly as possible.

9. Provide chalkboard exercises for him by having him draw bi-manual circles and bi-manual straight lines.

10. Provide him with follow-the-dot exercises.

D - Vision-Language Patterns

(Procedures for the development of communication skills)

"These guidance procedures must include activities that put emphasis upon audition and articulation as they are related to visual clues. The following activities in general, are listed in the sequence of developmental and chronological order demonstrated in the first five to seven years of life."[9]

1. Make up games for verbs, adverbs, prepositions, adjectives. (e.g., What a boy can do, a mother, a tractor, etc.)
2. Have him classify objects and activities.
3. Have him imitate sounds.
4. Have him name opposites.
5. Play counting games.
6. Learn nursery rhymes and jingles.
7. Have him name words which begin with the same sounds.
8. Give oral directions involving more than one activity.
9. Have "Share and Tell" at home.

E - Visualization Patterns

(Procedures for the development of interpretation skills)

"There are at least three components of visualization skills that will be given the most consideration in the following procedures. These are: a) visual comparison skill, b) visual memory skill, and c) visual projection skill. These occur concommitantly; not as separate entities."10

1. Have your child put together simple jigsaw puzzles.

2. Have your child match and compare objects in the kitchen cupboards.

3. Use furniture, pictures, magazines, books, and every other household object for your child's visual comparisons.

4. Have your child keep his eyes closed while you hand him some toy or familiar object and let him tell you what it is.

5. Have him identify items in the grocery store from labels you have shown him at home.

6. Have him color colorbooks which have simple pictures with heavy outlines.

7. Put words on a chalkboard which your child is having trouble with and have him trace them several times.

8. Show him pictures of assembled objects and have him name them from memory.

9. Print labels to place on furniture, toys and objects identifying them.

10. Describe items and have your child identify them.

11. Let the child make up his own experience stories in his own words. You write them down and let him read them.

Getman ends his description of the above procedures with the following postscript:

"Visual memory, visual comparison, visual projection and visual imagination, visual localization and visual discrimination of likes and differences are all involved and basic to the performance of every activity suggested here. Vision is involved in every meaningful learning activity. Thus, vision training is intelligence training."11

Perhaps the main value of Getman's work to the teacher would be its practicality. While most teachers can tell Johnny's mother that he is not ready for school and that he needs more "readiness activities," they (the teachers) often feel at a loss to supply the parent with specific activities to encourage this readiness. Most often the child is labeled immature and the parent is instructed to let him grow another year, read a lot to him, take him to the zoo, and that is just about it.

This handbook could be a valuable tool to guide the parent or the kinder-

garten or first grade teacher in what might be termed specific trainable readiness skills. Montessori had a great deal to say about these readiness activities as far back as 1907.[12]

More will be said about taking the child through a routine of developmental skills training for the purposes of helping remedial and retarded readers under the section in this paper on "The Delacato Method."

---

[1]G.N. Getman, How to Develop Your Child's Intelligence (Luverne, Minnesota: G.N. Getman, 1962), p. 34.

[2]A. Gesell, Infant and Child in the Culture of Today: The Guidance of Development in Home and Nursery School (New York: Harper, 1943).

[3]B. Spock, Common Sense Book of Baby and Child Care (New York: Duell, Sloan & Pearce, 1946).

[4]M.V. Morphett and C. Washburne, "When Should Children Begin to Read?" Elementary School Journal 29 (1931), pp. 496-503.

[5]Frances L. Ilg, quoted by Jack Harrison Pollack in Parade Magazine (November, 1964), p. 10.

[6]Getman, p. 39.

[7]Ibid., p. 58.

[8]Ibid., p. 64.

[9]Ibid., p. 78.

[10]Ibid., p. 86.

[11]Ibid., p. 87.

[12]Maria Montessori, Her Life and Work (Fresno, California: Mentor-Omega, 1962).

VI. THE LOWRY METHOD

R.W. Lowry received his B.S. and O.D. degrees from Pacific University, Forest Grove, Oregon. He has completed graduate work toward his Master's degree and served two externships at the Gesell Institute in 1955 and 1957. He is coauthor with R.J. Apell of the book Preschool Vision published by The American Optometric Association. He has been a practicing optometrist since 1951 in his native city of Worthington, Minnesota, and is also director of reading classes in Nobles, Pipestone and Martin Counties in Minnesota.

The following material was published by the Optometric Extension Program, which is an organization formed to keep the practicing optometrist abreast of current events in his field by supplying him with postgraduate materials. The monthly series are covered up through September 1965.

In the introduction to Dr. Lowry's work, Dr. A.M. Skeffington has this to say:

> Dr. Raymond Lowry is eminently qualified to create a course in this whole matter of "rapid reading." He was one of the men whom the Optometric Extension Program requested to look into the entire matter of optometric engagement in this activity. Dr. Lowry went through the experience himself. He has demonstrated the results of optometric application to this problem. He has tried, tested and proved the methodology and has recorded the results.
>
> Dr. Lowry is emphatic in his statement that visual problems must be well on the way to elimination before the ability to process information can be significantly attained and retained. "Speed reading" can be developed as a "splinter skill." There can be a forced showing of apparent phenomenal speeds. However, to retain the ability and to really read in the sense of retained, useful information, there must be the application of optometric measures, methods and procedures to decrease the visual problem before success in increased reading ability can be attained or sustained.[1]

Dr. Lowry calls his optometric approach to rapid reading "The Digital-Visual Approach" referring to the hand and the eye.

He advocates "visualization" without oral or auditory assistance much the same as Lyons and Lyons (discussed previously in this paper). He uses a different approach to attain this, however.

He quotes Stevens and Orem[2] to justify his attempts to break the subvocalization habit in their recent article on what principle characteristices distinguish the fast from the slow reader. They (Stevens and Orem) maintain the difference is "the degree of dependence of the reader on subvocalization and inner speech in the reading process." Lowry fails to mention that this study was based on the survey technique of asking good readers how they performed.

Whether this type of evaluation is valid is questionable.

He begins his program with a diagnostic testing procedure using the Ohio State Tests, the George Parkins Cards or the SRA diagnostic Reading Tests for speed and comprehension.

He then tests the patient's eye-movements on the Reading Eye Camera and determines his grade level or relative efficiency from this. He places a great deal of emphasis on this procedure and states that:

> Not only reading level but visual malfunctions, unusual reading patterns, evidence of visual discomfort and coordination inadequacies are very evident on the film, i.e.: One eye can be observed moving more rapidly than the other, an eye can sweep too far on its return to the next line, a lack of convergence at the beginning of each line of print, a lack of lateral control, inaccurate return sweeps, too much convergence at the beginning of each line, nystagmus, an intermittant suppression, internal tension and nervousness, vocalization, excessive blinking, head movement and strabismus can be revealed.[3]

One of the benefits of his group reading training is that anyone from the sixth grade up can participate and he does not need to be grouped according to age or ability. The classes meet twelve times, once weekly, for three to four hours.

Description of Materials

I - Reading training equipment:
- The Controlled Reader
- The Prism Reader
- The Craig Reader
- Pacers
- Tachistoscope

II - Visual training equipment:
- A plateau spiral, on a rotator
- A balance board
- Telebinocular
- The AN series of cards or slides
- The Lyons Slides
- A metronome
- Clip-overs

III - Books:
1. 30 Days to a More Powerful Vocabulary (1 for each student) by Funk and Lewis.
2. How to Read Faster and Better by Norman Lewis (1 for each student).
3. The All About Books (1 each of the 36 titles of science books).
4. The Landmark Series.
5. A list of 32 popular paperbacks.

Description of the Procedure

He introduces the Digital-Visual technique described on the following pages at the beginning of the program and uses it throughout.

(See insert pages 32a-32b.)

This is similar to the Evelyn N. Wood technique where the hand is also used to increase speed.[4] Lowry, however, encompasses this one feature into a much more comprehensive program rather than making it the only method for improving speed. He also requires comprehension checks on all the material the student reads.

He lists the following goals for becoming a fast and efficient reader (provided the vocabulary and basic reading skills have been developed and that visual problems are absent):

1. Increase the speed at which the eyes move across the printed page.
2. Expand the zone which the individual can register and interpret at a single glance.
3. Eliminate regressions.
4. Eliminate verbalization.[5]

His class is so intensive and so individually geared that he requires one assistnat besides himself to teach six students. His fee is $150.00 for the course which helps make this number of teachers possible and realistic.

He works on increasing width of perception and speed of eye movements by rotations, fixations, Controlled Reader, and the Craig Reading; extending the range of focus by plus-minus training and accommodative rock; and improving hand-eye coordination by pointer training and D-V method.

He requires specific practice at home which he assigns for transfer of learning and gives exact directions and materials for keeping records of homework.

At the first session he gives, in addition to the previously mentioned speed and comprehension tests, the following vision tests:

1. Visual Skills (the standard Keystone battery).
2. Pursuits.
3. Saccadics: lateral, vertical, in and out.
4. Retinal Rivalry Rate.
5. Cheiroscopic drawing - geometric form.
6. Van Orden Star.
7. Tachistoscopic span (digits).

He then proceeds to the Controlled Reader beginning at speeds from 320 to 480 words per minute. He tells the student that it sometimes takes from two to five weeks to derive meaning from the films. He uses visual lenses on his students at this time.

After this he gives monocular pursuit training, then monocular hand-eye coordination training, then practice on the Digital-Visual (described in insert) method. Then he assigns visual training (pursuit fixations and side-to-side

fixations) to be practiced at home.

The second class session is a continuation and review of the first with the addition of the Lyons and Lyons slides on training "visualization" by means of symbols.

He also introduces ball pursuits in the second session. These are described in the section in this paper on Getman.

The third session continues in much the same manner. In the fourth session, more eye-movement exercises are introduced.

He cautions the reader that detrimental effects can result from the Digital-Visual Method of reading if the student possesses low visual skills and these deficiencies are not corrected. He gives a detailed description of the visual changes which occur due to the reading training and categorizes them into desirable and adverse conditions.

The sessions continue with the addition of new eye exercises and the introduction of some vocabulary building work, techniques of reading a newspaper and study techniques.

As his program progresses he constantly strives for higher levels of performance in vocabulary, comprehension, speed and visual performance by increas- the difficulty of the level of work.

The most striking aspect of the Lowry Method is the way in which he has apparently combined several approaches in a highly successful manner. According to his reports, these methods achieve the goals he is striving for. He gives examples of patients making spectacular reading gains from 221 words per minute to 3150 words per minute with ninety per cent comprehension and improved visual performance.

---

[1]A.M. Skeffington, "Introduction," Optometric Extension Program Foundation, Inc. (October, 1963), p. 2.

[2]G.L. Stevens and R.G. Orem, "Characteristic Reading Techniques of Rapid Readers," The Reading Teacher, 17 (November, 1963), p. 102.

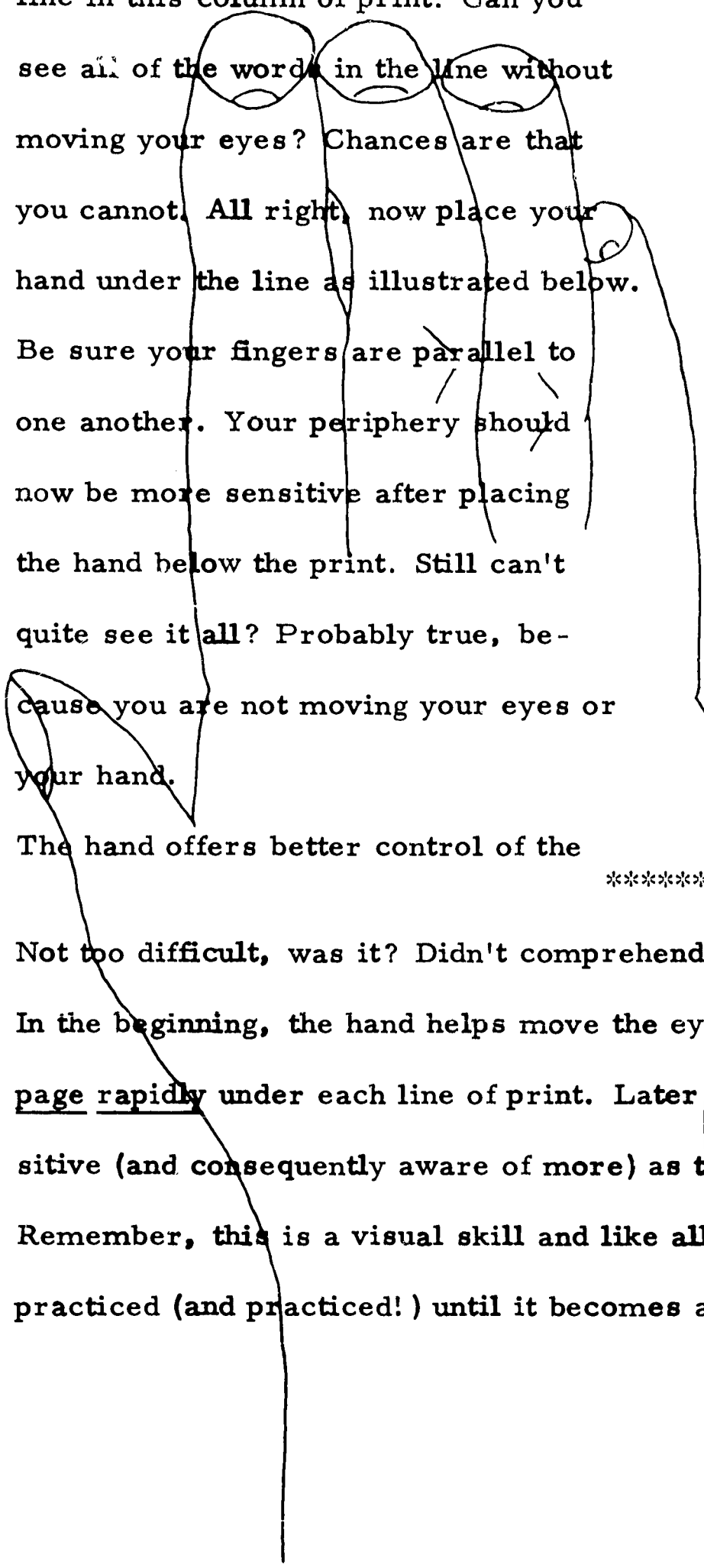
[3]Raymond W. Lowry, Jr., "An Optometric Approach to Rapid Reading," Optometric Extension Program Postgraduate Courses (October, 1963), p. 10.

[4]Evelyn N. Wood, "A Breakthrough in Reading," The Reading Teacher 14 (1960), pp. 115-117.

[5]Lowry, p. 19.

About the Method

Direct your gaze to the middle of the line in this column of print. Can you see all of the words in the line without moving your eyes? Chances are that you cannot. All right, now place your hand under the line as illustrated below. Be sure your fingers are parallel to one another. Your periphery should now be more sensitive after placing the hand below the print. Still can't quite see it all? Probably true, because you are not moving your eyes or your hand.



The hand offers better control of the eyes during movement and will act as a constant, sustaining pacer or accelerator as you read. Let's try an experiment. Read these columns (or a column in your newspaper) just as you always read, or as rapidly as you can, if you desire. Time yourself with a stopwatch. After you have recorded your time, read the same column again moving your hand across the page, below each line of print -- your eyes following just above the fingers. Try to read the same material in one-half the previous time.

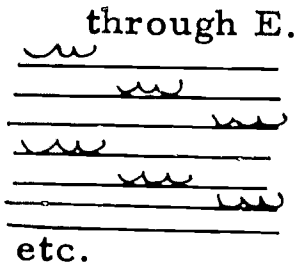
****

Not too difficult, was it? Didn't comprehend much of what you read either did you? In the beginning, the hand helps move the eyes at a faster pace by moving across the page rapidly under each line of print. Later it helps to make the periphery more sensitive (and consequently aware of more) as the scope of perception increases. Remember, this is a visual skill and like all skills it has to be learned -- and then practiced (and practiced!) until it becomes a part of you!

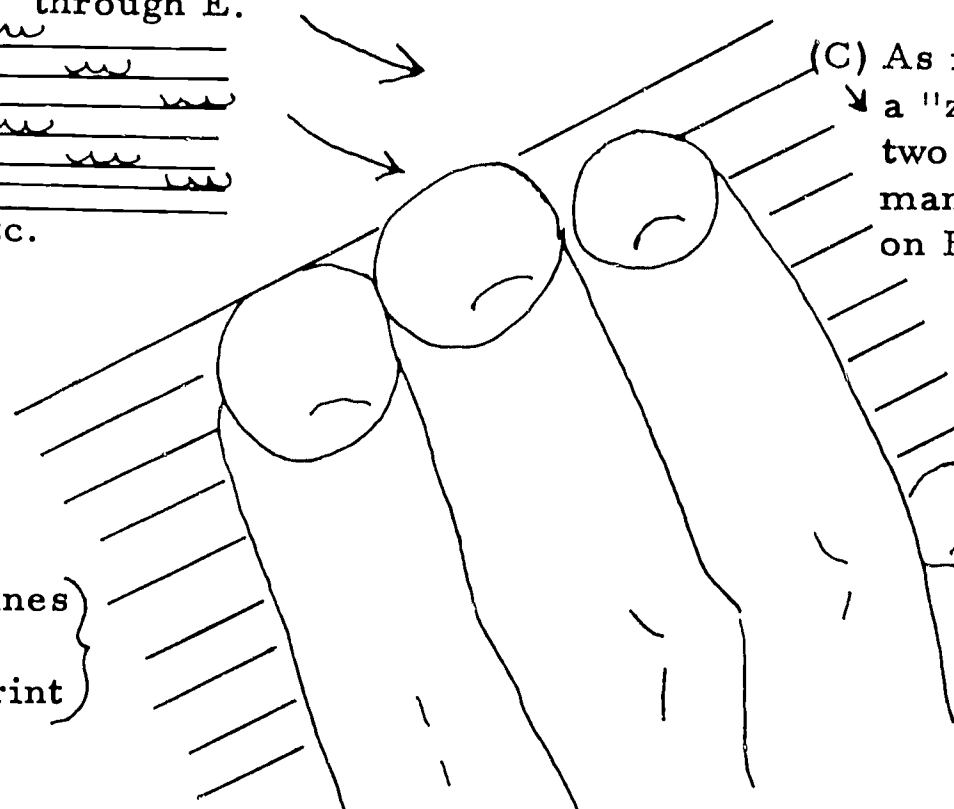
DIGITAL VISUAL READING METHODS

(A) Single finger technique (used only at the beginning). The finger moves rapidly back and forth across the page between the lines of print. This gets the eyes moving rapidly with the finger. (The eyes are directed just above the finger.)

(B) The whole hand moving diagonally down and across the page, as if seeing about three lines of print on the downward move. The student should not take literally that 3 lines are seen simultaneously, but for purposes of explanation, approximately one-third of line 1, one-third of line 2, and the last one-third of line 3. The fingers of the hand always remain parallel to the lines of print in methods A through E.

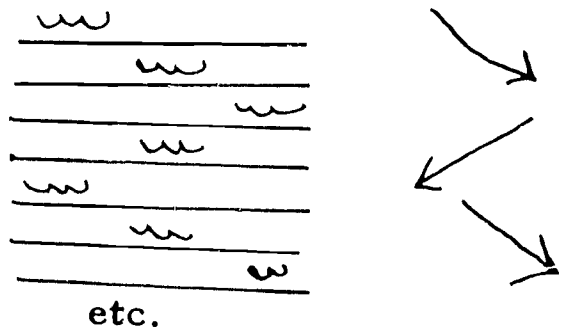


etc.



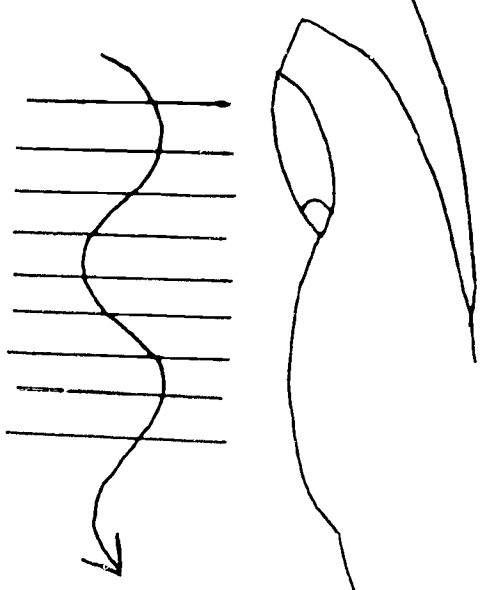
Lines of Print

(C) As in B, the hand and eyes now move in a "zig-zag" fashion. This is done in about two weeks for most students, although many students spend considerable time on B.

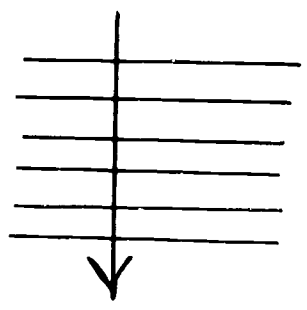


etc.

(D) As in C, except that the motion becomes more smooth and resembles the line drawn below.



(E) Many students reach this stage before the end of the course, and is as if they are reading strictly down the page. The hand does go directly down the page although the eyes may resemble method D.



It is important that the student follow the hand as it moves in the various patterns. Their attention to this should be directed frequently.

VII. THE KEPHART METHOD

Newell C. Kephart, educator, psychologist, and author, received his B.A. and M.A. degrees from the University of Denver and his Ph.D. from the State University of Iowa. He has since been a member of the department of psychology at Purdue University. Dr. Kephart's other works include The Employment Interview in Industry, and Psychopathology and Education of the Brain Injured Child. He is also the author of some fifty-five scientific articles published in a number of noted academic journals in the fields of education, psychology, child development, and "optometry."

His series on "Developmental Vision" (coauthored with Getman - 1957), "Optometry, Psychology, and Education," (1956-1957) and "Vision and the Retarded Child" (1955-1956) were published by the Optometric Extension Program.

He has long been active in the field of special education. He is executive director, Achievemnet Center for Children, Indiana State Board of Health; director, Glen Haven Achievement Center for Children, Indiana State Board of Health; director, Glen Haven Achievement Camp; and member of the Advisory Committee on Special Education, Department of Instruction, State of Indiana.

The Kephart Method is described in his book The Slow Learner in the Classroom. It is geared to the classroom teacher with the main emphasis on readiness skills and is aimed at the kindergarten and first three grades. He believes that the teacher working with the slow learner could more profitably spend her time "concentrating on preacademic skills rather than by continued drilling on the academic activities from which the child has already demonstrated that he is not ready to profit."[1]

He goes on to say:

> Modern technology has increased the demands for adaptive behavior. Higher and higher degrees of skill are demanded and no similar increase is provided in the practice of elementary skills upon which these higher skills are based.
>
> Many children are coming into our schools lacking in basic perceptual-motor skills. As a result of this basic lack, they are less able to participate in the formal educational activities which are arranged for them and they are less able to learn from these activities. They become slow learners in the classroom.
>
> For many of these children, artificial means may have to be devised to provide additional practice in perceptual-motor skills. We may have to bring the equivalent of ladders to climb, fences to walk, or horses to ride, into the classroom and help the child to build up the sensory-motor skills which are required for the more complex activities of reading, writing and arithmetic.[2]

Kephart states:

> Readiness skills are sometimes considered as something which the child acquires either through maturation or through the functioning of innate responses. We have attempted to show in the present discussion that readiness skills can be broken down into basic types of activity. We will attempt to identify some of these more basic skills, to suggest methods by which deficiencies in these skills can be detected, and to suggest training procedures which will attack the basic skills more directly.[3]

He contends that laterality is one of these important skills. If laterality is not established and if the directionality resulting from laterality has not been developed, the child will have learning problems for example in not being able to distinguish b from d; not because he is confused but because no difference exists to him because the only difference in b and d is a difference in direction and the child lacking directionality cannot see this.

His developmental outlook follows similar lines to that of Getman (with whom he worked for some time) in that they both stress the importance of muscular activity and motor development. Kephart, however, devotes much more space to explaining his position regarding how the development of the child takes place. He traces the developmental stages of growth an infant makes and ends by saying, therefore: "We should offer him motor activities and guide his motor development toward an awareness of his body in sapce and what it can do."[4]

He says that most disciplines treat perceptual development and motor development as two separate activities. He feels that such thinking is impossible and can only lead to error. He thinks of them as perceptual-motor.

Kephart maintains the child originally only sees a "blob" and that he gradually learns to discriminate and differentiate.

One of the difficulties in teaching children to discriminate is that "we cannot see what he sees, we cannot imagine the situation in which he is operating, and therefore, we have difficulty in constructing adequate learning situations to help him."[5]

To demonstrate that perception is learned, he gives a dramatic illustration of studies from Senden[6] and Riesen[7] in which adults who were born blind were given sight. They then experienced difficulty in differentiating between squares and cubes and triangles. This same thing may happen to the child.

He points out as an example that we may present a child in ordinary written or oral material with "se eSpo trun" and wonder why he does not respond with "see Spot run."

He also states that the child who is deficient in form perception may do well in the look-say method if it is based on the configuration of the word but that when word analysis begins he child cannot break the word down into its parts because it does not have any parts to begin with for him.

> He is asked to integrate in time a series of elements which were presented to him integrated in space. But for him they had no integration in space, and therefore he cannot integrate them in time. He is in the

predicament described by Vernon[8] "the implication of these studies for reading are that children are less likely to see words as wholes than as meaningless jumbles of details with no apparent relationship between these. On the other hand, letters may perhaps be seen as unanalyzable wholes, and hence there is difficulty in differentiating their structure." Again, Vernon writes, "The one universal characteristic of nonreaders suffering from specific reading disability is their complete failure to analyze word shapes and sounds systematically and associate them together correctly."[9,10]

The following is quoted in detail as a continuation of the above and also to bring up another point of view on the visualization process in regard to hearing sounds as earlier discussed in Lyons and Lyons and Lowry:

> Not only must the child analyze the word form on the page into its part, but he must associate these parts with the appropriate phonetic sound. Again, Vernon says, "We have no definite evidence as to the incapacity of such cases to perceive and analyze printed words, but it is quite clear that they often fail to recognize that a certain spatial orientation of the letters is essential, and also a particular order and arrangement of the letters within the word. Again, we have no definite evidence that they cannot hear the sounds of letters and words, though this may occur in some cases of mild hearing loss and high frequency deafness; but it is probable that many of them do not listen to, and hence do not hear, the separate phonetic units in the total word sound, and do not remember them in their exact order. This may often be due merely to inattention and lack of interest; but sometimes it seems as if they 'are like the deaf adder that stoppeth her ears, which refused to hear the voice of the charmer, charm he never so wisely!' The result is that they are unable to associate the visual and auditory units, because they are uncertain which corresponds with which."[11,12]

Kephart believes that development of adequate form perception depends upon the adequate learning of basic sensory-motor skills and that this learning begins with the development of laterality. "Our first information about form and about the spatial relationships involved in form is kinesthetic and tactual. We must learn kinesthetic laterality before we can proceed to visual form."[13]

He believes in "the importance of the control of ocular movements and the use of the eyes as a mediator of the projection of directionality into visual stimuli."[14]

He quotes Lowder,[15] Potter,[16] Robinson,[17] Small,[18] Strauss and Lehtinen,[19] and Strauss and Kephart,[20] to substantiate his claim that there is a high correlation between the ability to perceive form and copy it--and reading achievement. Therefore, he says: "Clinical evidence from these and other sources indicates that training programs designed to increase form perception ability can aid the child in increasing his achievement level."[21]

In addition to form perception, Kephart stresses the importance of space discrimination.

> As philosophers and scientists have pointed out, the only information which we get from the outside world is relative. We do

> not get absolute information through our sense organs about objects or events occurring outside us. Our only information is in terms of relationship.[22] We see and respond to objects in relation to other objects. We do not respond in terms of absolute values. For this reason, it is absolutely essential to the accuracy of our information about the physical universe that we be able to maintain at all times, and with great precision, the relationships between objects. These relationships are manitained through the development of a space structure and through the use of space structure to maintain stable relationships between the objects which lie around us. Without such a space structure, we lose or distort many of these relationships and our behavior suffers from inadequate information.[23]

Then Kephart moves into the area which so closely allies him with optometry--that is, training of visual skills.

> One result of inaccurate control of the eyes is insecurity in space. The child is not sure where his eye is pointed, and he is not confident of the location of an object in space, because he is not confident of the line of sight along which he is to project this image. Therefore, accurate and precise control of the extraocular muscles is essential to the development of spatial localization and particularly to the development of the space structure which we discussed earlier.[24]

Before he gives a recommended list of activities to develop perception, he introduces a simple "Perceptual Survey Rating Scale," which includes tests on:

1. The walking board
2. Jumping
3. Identification of body parts
4. Imitation of movements
5. The obstacle course
6. Angels in the snow
7. Stepping stones
8. The chalkboard
9. Ocular pursuits
10. Visual achievement
11. The Kraus-Weber tests,

to determine the child's level of performance. He then goes on with detailed instructions of the specific activities in which the child should engage to bring about adequate skills (i.e., He does not believe in sending a child to the blackboard saying, "Draw a square." He believes in showing him how to draw the square and devotes four pages of detailed instructions as to how to carry this out.)

The activities in which he believes in engaging the youngster are listed below. For a detailed description of these activities, see Kephart's text.

1. Scribbling
2. Finger painting
3. Chalkboard
4. The clock game
5. Drawing and copying
6. The circle, cross, square, rectangle, triangle, diamond, figures with diagonal lines and other forms.

7. The walking board
8. The balance board
9. Trampoline
10. Angels in the snow
11. Stunts and games
12. Rhythm
13. Ocular-pursuit training
14. Binocular and monocular training
15. Occlusion
16. The Marsden Ball
17. Puzzles, stick figures and the pegboard

Kephart's unique contribution to the language arts teacher is that he unequivocally and unabashedly advocates the use of optometric procedures of visual training in the classroom by public school teachers. The presentation of his material is so convincing that his techniques appear to be not only logical but a necessary part of all early classroom instruction.

One question that comes to mind in evaluating Kephart's work, however, is, "Why doesn't he quote more up-to-date research?" Many of his references are dated in the 1920's and 1930's (Out of 100 references, 36 are dated before 1940) even though his book was copyrighted in 1960. He does not mention any of the following people who had all done recent research prior to 1960 in the area of visual perception: Holmes,[25] Smith,[26] Gilbert,[27] Goins,[28] Rudisill,[29] Harris,[30] Morris,[31] Anderson and Dearborn,[32] Berger.[33]

---

[1]Newell C. Kephart, The Slow Learner in the Classroom (Columbus, Ohio: Charles E. Merrill Books, Inc., 1960).

[2]Ibid., pp. 16-17.

[3]Ibid., pp. 31-32.

[4]Ibid., p. 53.

[5]Ibid., p. 81.

[6]M. Senden, Raum- und Gestaltauffassung bei operierten Blindgeborenen vor und nach der Operation (Leipzig: Barth, 1932).

[7]A.H. Riesen, "The Development of Visual Perception in Man and Chimpanzee," Science, CVI (1947), pp. 107-108.

[8]M.D. Vernon, Backwardness in Reading (Cambridge: Cambridge University Press, 1957), p. 15.

[9]Vernon, p. 74.

[10]Kephart, p. 86.

[11]Vernon, p. 188.

[12]Kephart, p. 87.

[13]Kephart, p. 87.

[14]Ibid., p. 87.

[15]R.G. Lowder, Perceptual Ability and School Achievement, Available from Winter Haven Lion's Club, Winter Haven, Florida, 1956.

[16]M.C. Potter, "Perception of Symbol Orientation and Early Reading Success," (Teachers College, Columbia University Contributions to Education, 1949).

[17]H.M. Robinson, M.C. Letton, L. Mozzi, and A.A. Rosenbloom, "An Evaluation of the Children's Visual Achievement Forms at Grade 1," American Journal Optometry (1958), pp. 515-525.

[18]V.H. Small, "Ocular Pursuit Abilities and Readiness for Reading" (unpublished Ph.D. dissertation, Purdue University, 1958).

[19]A.A. Strauss and L.E. Lehtinen, Psychopathology and Education of the Brain Injured Child Vol. II: "Progress in Theory and Clinic" (New York: Grune and Stratton, Inc., 1947).

[20]A.A. Strauss and N.C. Kephart, Psychopathology and Education of the Brain Injured Child Vol. II: "Progress in Theory and Clinic" (New York: Grune and Stratton, Inc., 1955).

[21]Kephart, p. 88.

[22]M.D. Vernon, A Further Study of Visual Perception (Cambridge: Cambridge University Press, 1957).

[23]Kephart, pp. 113-114.

[24]Ibid., pp. 115-116.

[25]J.A. Holmes, "The Brain and the Reading Process," 22nd Yearbook, Claremont College Reading Conference (1957), pp. 49-67.

[26]D.E.P. Smith, "A New Theory of the Physiological Basis of Reading Disability," Reading for Effective Living (Proc. International Reading Association Conference, 1958), pp. 119-121.

[27]L.C. Gilbert, "Saccadic Movements as a Factor in Visual Perception in Reading," Journal Educational Psychology (1959), pp 8-14.

[28]Jean T. Goins, "Visual and Auditory Perception in Reading," Reading Teacher (1959), pp. 9-13.

[29]Mabel Rudisill, "Flashed Digit and Phrase Recognition and Rate of Oral and Concrete Responses: A Study of Advanced and Retarded Readers in the Third Grade," Journal of Psychology 42 (1956), pp. 317-320.

[30]A.J. Harris, How to Increase Reading Ability (New York: Longmans, Green,1956).

[31]Morris, pp. 61-75.

[32]Anderson and Dearborn.

[33]C. Berger, "Grouping, Number and Spacing of Letters as Determinants of Word Recognition," Journal of General Psychology 55 (1956), pp. 215-228.

VIII. THE SIMPSON METHOD

Dorothy Margaret Simpson prepared the following material in partial fulfillment for her Degree of Doctor of Philosophy at Purdue University under the guidance of Newell C. Kephart.* Miss Simpson holds a Bachelor's and Master's defree from the State University of Iowa, Iowa City, Iowa. She has taught grades five through high school and been a principal and supervisor from 1928 to 1964.

Miss Simpson conducted a study in the Lafayette, Indiana public elementary schools with 360 first grade pupils for the following purpose:

> (1) to determine the relative correlation between perceptual sub-tests on the Metropolitan Reading Test and the Primary Mental Abilities Test and reading achievement as measured by the Metropolitan Reading Test; (2) to test the effectiveness of certain instructional techniques and methods in the improvement of the perceptual ability of first grade pupils as indicated by their reading ability as measured by the Metropolitan Reading Test.[1]

Her conclusions were that:

> (1) The matrices of correlations indicated that relatively, the perceptual sub-tests (numbers, matching, copying, quantitative and space) had higher correlations with performance on the Metropolitan Reading Test than did other sub-tests.
>
> (2) Experimental data related to the effect of the perceptual training program yielded evidence statistically significant at between the two and five per cent level that the reading achievement of the perceptual training group was greater than that of the control group.
>
> (3) The writer believes that, at least at the first grade level, there is statistical justification for increased emphasis on the teaching of reading as if it were a PERCEPTUAL ART as well as a LANGUAGE ART.[2]

To reach these conclusions she used the following procedure:

Description of Materials

1. Monocular occluders - which consist of rectangular pieces of felt to be used by each child to cover one eye at a time.
2. Targets - which can consist of a small paper airplane attached to the eraser on the end of a pencil (or any other variation on this theme).
3. Markers - four inch by thirty-six inch pieces of tag to be used by the teacher to underline blackboard material.
4. Templates and tracing materials - a set of basic patterns for each child.

*(It was the privilege of the writer of this paper to hear her discuss this thesis at the Northwest Congress of Optometry in Portland, Oregon, shortly after she finished her thesis.)

5. Chalkboard space.
6. Large chalk.
7. Large "primary" pencils.
8. Large "primary" crayons.
9. Small plastic cars - two by four inches.
10. A "flannel board" and felt figures.
11. The walking board - (described previously in this paper.)
12. The balance board - " " " " "

Method of Procedure

Basing her work on the theory that vision is learned not innate, she uses the above listed materials to teach vision.

She gives a test to each child moving the previously described airplane target horizontally about sixteen inches in front of the child's eyes and through a distance of about sixteen inches. She has a check list of fourteen points to observe to determine whether a child has adequate ocular motility; then four tests to determine vertical eye movements; then two to determine oblique motility; and one for circular movements.

After testing for binocular movement, she uses the target to test monocular movement.

Once this testing is completed, she suggests that those who can accomplish the tasks might be eliminated from a classroom program and that the novitiate should probably concentrate on the slow group to work with.

She then suggest arranging the students in straight horizontal rows for training, not in the traditional semicircle, in the following formation:

(Trainees)

R. Eyes Occ. X X X X X X L. Eyes Occ.
L. Eyes Open R. Eyes Open

X (teacher)

(Helpers)

X X X X X X
Remaining members of reading group, standing at the sides of the teacher, "checking" to see "what good pilots" the performing pupils are.

Then the teacher is instructed to move the target back and forth horizontally, at the trainees' eye level, and through a pathway about twenty-four inches long, at a distance of about sixteen inches in front of the trainees' eyes for periods of approximately a minute at a time.

Then repeat with the "helpers" and "trainees" changing positions.

She gives very explicit directions in her thesis for practice and tells what to do if specific problems arise.

She suggests that variations and adaptations on her original directions be made at the classroom teacher's discretion.

She introduces drawing in the air, drawing on templates, tracing activities, any activities to encourage ocular motility, doing "The Back Stroke" or "Angels in the Snow," using a walking board and a balance board.

In her discussion Miss Simpson states that "most reading readiness books have been prepared on the premise that those factors contributing most to reading readiness are word meaning, sentence meaning, information, and matching."[3] She would like to see a re-examination of this process in view of her findings and perhaps have the numbers, matching, and copying sub-tests on the Metropolitan Readiness Tests included in reading readiness training.

Some authorities would probably agree with Miss Simpson. Dr. Walter Hill in his class Psychology of Reading at Portland Continuation Center in 1961 also indicated that there is a higher correlation between numbers readiness tests and reaching achievement than between reading readiness tests and reading achievement.*

Miss Simpson elaborates her point further by noting that "according to the statistical analysis of the data obtained for this study, there is a relatively high correlation between the ability to copy (reproduce form) and success at the first grade level."[4] Therefore, she says,

> It is possible that the lack of attention paid to the necessity of teaching children to reproduce form is consistent with the usual concept of the beginning first grader's visual perceptual level. Most readiness materials limit emphasis on the development of visual motility to left to right analysis of pictures, words, and symbols. As has previously been suggested, this is an extremely sophisticated level of visual development, and unless the child already possesses the visual motility required, will require more basic motility development experiences than most available readiness materials provide.[5]

Therefore,

> The apparent importance of the type of activity or activities represented by numbers, matching, and copying would seem to justify an investigation of those sub-test abilities related to or contributive to numbers, matching, and copying.[6]

She would advocate that first grade teachers recommend and provide specific home and school activities to develop adequate perceptual skills and abilities in first grade pupils so that instead of just "waiting" for maturity to take place it can be developed.

She feels that the outcomes of her study would seem to justify further investigation and exploration into perceptual training and that these findings

*Dr. Hill, former Associate Professor of Education; Director, Remedial Clinic and Reading Study Laboratory; University of Oregon, Eugene, Oregon, now at the State University of New York, Buffalo, New York.

should be made applicable to classroom teaching processes.

The most unique contribution Miss Simpson has made to the teaching of reading is that she has virtually been a pioneer in experimenting with perceptual skills in a classroom environment.

Although her technique appears to be almost too simple to be of merit, her results would indicate that perhaps it is just such uncomplicated activities which lead to reading achievement.

---

[1]Dorothy Margaret Simpson, "Perceptual Readiness and Beginning Reading" (unpublished Ph.D. dissertation, Purdue University, 1960).

[2]Simpson, pp. 75-76.

[3]Simpson, p. 77.

[4]Simpson, p. 78.

[5]Ibid., p. 79.

[6]Ibid., p. 79.

IX. THE DELACATO METHOD

Carl H. Delacato, Ed.D. has served in the following capacities: head of the Junior and Middle Schools, Chestnut Hill Academy, Philadelphia, Pennsylvania; director of Psychological Services, The Rehabilitation Center at Philadelphia, Philadelphia, Pennsylvania; affiliated instructor in Rehabilitation Nursing, Lankenau Hospital School of Nursing, Philadelphia, Pennsylvania; director of The Reading Clinic, Chestnut Hill Academy, Philadelphia, Pennsylvania. He and his wife have written articles about his work and he is author of the book, The Treatment and Prevention of Reading Problems.

Carl Delacato has been unwilling to accept the conventional methods of remediation in teaching retarded readers. He has developed some dramatic techniques of his own which he says enable low achievers to learn and he has outlined these procedures in his book.[1]

When he began setting up his program, he made an analysis of poor readers to find out how they resembled each other. He listed the following as "common" to poor readers because they occurred in thirty to forty boys in a group of forty-five poor readers:

1. Poor penmanship.
2. Poor gross coordination.
3. Poor manual dexterity.
4. Tendency to read or write backwards in the first grade.
5. History of a severe childhood illness or head injury[2].

He listed the following as "universal" in that each existed in forty or more of the group of forty-five:

1. Early childhood thumbsucking of the thumb on the dominant hand.
2. Posturalization during sleep with the subdominant hand prone, or no posturalization.
3. Made a better score on test 5 or 6 (whichever tests the subdominant eye) than on test 5 or 6 (whichever tests the dominant eye) on the Telebinocular.
4. Gave some evidence of perceptual confusion in spelling and reading.
5. Some birth complication or longer period of labor than other children in the family.
6. Some lack of unilaterality.
7. Understood and used many more words than he could read.[3]

Then he states that "one can easily deduce that these factors seem to be physical or developmental in nature:"

> The reading pattern of these children showed a very early and consistent history in grades one and two of reversals that is, reading and writing words such as was for saw, on for no, reading and writing numbers such as 24 for 42. These same children were very poor in early spelling and, if they were fair readers at the time still tended to be poor spellers, reversing letters within

> words periodically. We found in the reading pattern indications of great difficulty with the word sight method and when the method was changed equally slow mastery of the alphabet or phonetic system. We also found that at all ages these children tended to have higher vocabulary scores than comprehension scores on standardized tests and their reading speed seemed to be very slow. They tended to have significantly more difficulty during early reading years with small words than with large words. Generally they disliked reading. They seemed unable to associate symbols, be they words or sounds, with ideas. They also tended to be good in other academic areas, especially the area of arithmetic. They tended at the secondary school level to have much higher mathematical ability scores than language ability scores on tests of scholastic aptitude. They tended as they went through the junior high and secondary school years to have low marks in English and most of their reading courses but tended to do well in memory courses and courses involving mathematics and mechanical skills.[4]

From these observations, he concludes that the area in which all of the forty-five retarded readers had something in common appeared to be the neurological realm.

When he began to research this area, he traced all references back to Samuel Orton, a neurologist who, in 1928, proposed the following (as yet unproved) hypothesis:

> Orton started with the generally accepted fact that the right hemisphere of the brain controls the left side of the body, and the left hemisphere controls the right side of the body. He assumed that the right-sided person develops memory traces for printed words in a part of the left hemisphere, and also develops memory traces in the right hemisphere which are mirror images of those on the dominant side. When the clearly right-sided person reads, only the memory traces on the dominant side are aroused. In the consistently left-sided person, the right hemisphere is similarly dominant. If, however, the individual fails to develop a consistent dominance of one side over the other, difficulties arise. In that case, according to Orton, there will be confusion and conflict between the two sides of the brain. The child will have great difficulty in learning to read and spell and reversal errors will be prevalent. Orton suggested the term strephosymbolia (meaning twisted symbols) to describe what he calls "the reading disability" and seemed to assume that poor reading which can be explained on other grounds is of little importance.[5]

While it has met with fairly wide acceptance among neurologists, its basic neurological assumptions have been challenged by studies of the effects of brain operations.[6]

Delacato goes on to say that he discovered conflicting theories and as a result studied under Dr. Temple Fay, dean of American neurosurgeons, from 1953 to 1956 to study the possible relationships of the knowledge of neurology to that of psychology and education. These three years of study are what enabled him to initiate the experimentation which resulted in the neuropsychogical rationale for the treatment and prevention of reading retardation which he goes on to describe in his book.

He maintains that one of the problems in working from the neurological point of view is that there is no real diagnostic technique for evaluating lack of performance in this area.

Delacato believes that in totally developed man the left or the right cortical hemisphere must become dominant. Prerequisite to such dominance is the adequate development of all lower levels.

He believes the chief distingusihing feature between man and the lower animals is this cortical dominance and that this whole phylogenetic process is recapitulated ontogenetically with each human being. If any obstruction to this recapitulation occurs communication and language dysfunctions occur.

He advocates encouraging cortical dominance by training a child to be unilateral (i.e., if he is right-handed, give him right-handed experiences; if he is left-handed, give him left-handed experiences).

Evidence points to aphasia (inability to communicate) occurring in people who have cortical damage to the subdominant side. This indicates that this area of the brain carries tonality.

Evidence also shows that eighty-five per cent of our population is right-handed although new babies tend to be left-handed; hence these babies are using the subdominant hand controlled by the subdominant area in the brain.

Babies language expression is purely tonal; hence, they are using the subdominant area of the brain here, also.

Therefore, oral reading and musical activities (which are tonal) should be eliminated in a child until his cortical dominance becomes established. Otherwise confused dominance will occur with the tonal subdominant side working against the dominant side.

Delacato maintains that the "tonic neck reflex" which Gesell[7] describes does not disappear after sixteen weeks but continues and can be observed in children's prone sleep patterns. What it connotes in terms of neurological organization has important implications for language and is a critical factor in evaluating the treatment and prevention of language disabilities.

He uses this as a basis for establishing sleep positions or patterns in children and maintains that if a child in a prone position does not have a complete body reorganization when his head is turned in the opposite direction, he (the normal reading child) awakens. He believes that the reason poor readers do not assume sleep patterns in this position and do not awaken when put in this position is because of a lack of organization in the neuro-muscular system.

He feels this may also explain why poor readers are often uncoordinated in running, jumping, walking and writing.

He finds that children who are poor readers either do not have a sleep pattern or have a faulty sleep pattern. Good readers do have a definite sleep pattern. Therefore, teach the poor readers a good sleep pattern and they will become good readers.

Because it has been found that severely traumatized central nervous system patients tend to react better when their carbon dioxide retention is increased,[8]

Delacato feels that remedial readers might have the same reaction. After trying this procedure with a student ten minutes per hour in two minute periods, Delacato observed that the student began to show an increase in reading ability--for the first time.

Delacato purports that even slight anoxia at birth may result in cortical cell damage which might produce reading problems. He maintains that the brain injured child and the retarded reader display the same symptomatology. They mainly differ in degree.

Delacato's investigations have led him to believe that when the controlling eye (not necessarily the dominant side) is on the side opposite that of the handedness, the motor initiation is poor and difficulties in speech, reading, and writing ensue. He says these difficulties can be relieved by shifting the control of the binocular pattern to the side of the handedness.

He finds the controlling eye by using the Keystone Visual Skills tests in a Telebinocular (as described in this paper under the Murrough's Method).

He begins rehabilitation by postural training, controlling fluid intake (He believes that too much fluid intake increases the cerebrospinal fluid and makes the child sluggish or sleepy.), ceasing all tonal activity, engaging the child in as many monocular and one-handed activities as possible.

The reading activity should originate at the sight word level through configuration and should be done in whispers not tonalizing. Then structural and phonetic analysis are introduced.

He begins actual remediation only after establishing neurological organization which usually takes around six weeks.

He devotes a chapter to recommending procedures for the prevention of reading problems. These include establishing sleep patterns, sucking the thumb of the nondominant hand, teaching games which use the "sighting" eye, keeping tonal activity to a minimum at ages five and six, engaging in one-sided activity, handing things to the child to his dominant hand, having him sleep with the subdominant side away from the wall, and not seating children opposite from each other at the table because of mirror copying.

At the end of his book he gives a resume' of case histories to show the success of his program.

Delacato's approach to the reading problem appears to be the most unique and revolutionary of all the methods presented in this paper. His ideas about sleep patterns and tonal activity are perhaps the most radical change from usual reading techniques since Grace Fernald introduced her kinesthetic approach. The Delacato Method is concerned less with the mechanics of teaching the subject matter of reading (e.g., teaching word analysis, phonics and sight vocabulary) and more with teaching the student new patterns of behavior.

The optometrically oriented teacher is allied with him by taking the same stand in regard to the student's visual performance. His "visualization" must be adequate before the so-called methods of teaching words and word analysis can take place.

Delacato's concept would also be compatible with Getman and Kephart in in-

sisting that the child must be ready--must have achieved the correct developmental level before he can read. However, he advocates a strict unilateral approach in contrast to their somewhat bilateral orientation.

It is almost impossible to criticize his theories about neurology unless one is a specialist in that area himself. Newsweek Magazine criticizes the methods under which Delacato and his two colleagues Glenn Doman and Robert Doman operate by pointing out that their request for membership in the Association of Rehabilitation Centers was turned down in 1960; also, that one unnamed doctor says, "We've studied it (the Delacato Method) but gave it up years ago. There is just no evidence that it works." Nevertheless, they (Newsweek) also point out that Joseph Kennedy, the late president's father, is receiving treatment under these men.[9] This is rather an impressive factor when one considers that the Kennedy family can in all probability afford treatment anywhere in the world. Also, their knowledge of rehabilitation work might be more extensive than the average person because of the interest their family has shown in the mental retardation area due to the mental deficiency of one of the Kennedy Clan.

The main criticism which can be leveled at Carl Delacato is that his work is neither scholarly nor scientific. His examples are not well-documented (e.g., There is no reference or footnote to accompany the statement, "It was found that severely traumatized central nervous system patients tend to react better when their carbon dioxide retention is increased,") time and again throughout the book and the reader is left wondering who found out these things and when and where.

He makes several statements which may or may not be accepted as fact (e.g., "New babies tend to be left-handed, their language expression is purely tonal in nature, this means they are using their subdominant area.") From these statements, he draws a conclusion (e.g., "Therefore, delete all tonal activity in remedial teaching") which is more or less pure speculation.

If his conclusions were valid in light of the scientific method, anyone at any time or place could repeat his experiments and come up with the same results. He claims to achieve the ends toward which he is working, but other people evidently do not get similar results.

Perhaps some of his success can be attributed to the placebo effect. The patient and his parents most certainly get a great deal of individual attention and care. At any rate, his case histories give enough evidence of success to give his credence some merit. History, long before Copernicus, proved that some of man's wildest speculations turned out to be the truth.

---

[1]Carl H. Delacato, The Treatment and Prevention of Reading Problems (Springfield, Illinois, Charles C. Thomas, 1959).

[2]Ibid., p. 7.

[3]Delacato, p. 8.

[4]Delacato, pp. 8-9.

[5]Harris, p. 251.

[6]Wilder Penfield and Lamar Roberts, Speech and Brain-Mechanisms (Princeton; Princeton University Press, 1959), Ch. 6.

[7]Arnold Gesell, et al., The First Five Years of Life (New York: Harper and Bros., 1940), pp 18, 19, 21.

[8]Delacato, p. 49.

[9]"Medicine, Pattern of Recovery?" Newsweek (May 4, 1964), pp. 84-85.

X. FINAL EVALUATION

The writer of this paper sketches her own history of educational and teaching experience below to illustrate the path of personal and professional growth that led to writing this research paper.

She taught grades one through twelve and adult speed reading classes for a period of eleven years over an area ranging from Alaska to South America. Her secondary experience has all been in the area of reading, both developmental and remedial. After obtaining her Bachelor's degree from Eastern Oregon College of Education, she attended schools as diverse as the University of Alaska and the University of Oregon. Between attending these two schools, she spent one and one-half years studying pre-optometry and optometry courses at Pacific University in Forest Grove, Oregon. She has a master's degree in Education from the University of Oregon, and is now a part-time instructor at this institution, working on her Doctor's degree in Education and Psychology.

During the first year of teaching an interest in the question of dominance and laterality was sparked before the author even knew anyone else was interested in the subject.

This interest was based on observation and was followed by a similar curiosity based also on empirical knowledge about motor skills and rhythmical activities. Was there any connection between academic achievement and handedness, motor skills and rhythmical ability?

After this writer's first-born became a predominantly left-sided individual at an early observable stage, this interest flared into a personal search for answers to the above question.

While she found that there is a tendency for reports based on intensive clinical studies to find a relationship between left-handedness and reading disability, she also found that surveys of large numbers of school children tend to give negative findings.[1] This writer tends to agree with Harris, that from her own experience, there is more than a chance relationship between lateral dominance and reading disability.[2]

A few brave individuals like the authors who have been discussed in this paper have ignored the conclusions which show a negative relationship and have gone ahead to experiment with unconventional methods based on the hypothesis that there is some connection between some slow or retarded readers and mixed dominance--and poor motor skills.

Perhaps this area as it is tied in with "vision" is the most significant contribution the optometrist has to make to the language arts teacher.

Although, as it has been pointed out several times, these authors discussed in this paper sometimes set up hypotheses which are questionable in view of the most recent research, it must be conceded that their case histories show success.

One conclusion to be drawn from this is that more research needs to be done

on what these men are accomplishing and how the new learning they seem to inspire takes place.

Although it usually matters very little to the pragmatic classroom teacher whether her methods are verified by scientific evidence or not, before these methods or techniques can ever be incorporated into the curriculum of teacher training institutions, they would probably have to be supported by more statistical evidence.

The methods now used for classroom teaching seem to be adequate for the majority of children (although this is also questioned by some authorities and will be discussed on the following page!).[3]

Perhaps it is the minority group of low or nonachievers to whom most of the authors discussed here really have something to say.

It is this author's observation that all too often the special education teacher, especially in remedial reading, uses the same methods any good primary teacher applies. The only major difference is that the special education teacher has a smaller group, sometimes one to work with.

She may employ one of the kinesthetic approaches[4] which would be somewhat inapplicable in the general classroom but otherwise she is bound be a rather conventional modus operandi and functions under a superficial facade of the "superiority of the specialist." The effectiveness and or efficiency of this behavior is questionable. There seems to be very little information available from the State Department to prove the value and worth of the present methods used by special education teachers.[5] Just how many special education recipients do turn out to be successful classroom, high school and college achievers?[5]

As this author stated previously, perhaps the teaching of reading in almost any classroom is not adequate for today's learner. This might be true of all subjects, not only language arts. Below are two examples of the growing magnitudes of knowledge to emphasize this point:

> (1) The historical mid-point for all knowledge about the human heart and its function is 1957. This means that as much has been learned about the heart since 1957 as was known up until that time. (2) The second example--let all of the knowledge that man had about man, his nature, and his ab. ity, be the Unit 1 at the birth of Jesus. This knowledge doubled in 1750. It doubled again in 1900. It doubled again in 1950. It doubled again in 1960. The estimates now are that it will double again before 1965, which is just around the time corner.[6]

Our advances in educational methods cannot claim any distinction that comes near to these figures. It usually takes between twenty to thirty years for a sound, new idea in education to achieve acceptance. Some authors place the figure close to fifty![7] The previous quotation makes this figure appear alarming enough but a look at the 1963 Handbook on Research in Teaching reveals that even though there is more educational research done in the area of reading than any other, what is known is relatively inadequate to solve the problem if it were applied today.

Consequently, it seems that educators, more specifically language arts teachers, more specifically reading teachers have an obligation to look to any and every source for help.

Actually one of the most logical directions to look is toward the field of vision. "Vision is the dominant factor in human development."[8] We cannot speak of vision and intelligence--they are one and the same thing."[9]

Although some of the work which has been done in visual training is now common in some so-called developmental reading classes, visual training per se and motor coordination exercises to be used with the specific purpose of teaching mental learning processes are relatively rare in the classroom or special reading classes.

It is inconceivable to this author that it offers a panacea. Teaching school makes one somewhat of a skeptic about all so-called revolutionary new approaches. The human being is such a complex and intricate organism that man will probably never completely understand him.

However, the writer of this paper would like to make a plea to all teachers (herself included), whether they be professional educators in the public school classroom or not, to be open-minded enough to accept new and different ideas from all sources available and to be brave enough to try to use some of them even in the face of conventional pessimistic opposition.

---

[1]Harris, p. 251.

[2]A.J. Harris, "Reading and Other Subject Disabilities," Progress in Clinical Psychology (New York: Grune and Stratton, 1956).

[3]Stanford E. Taylor, et al., "Grade Level Norms for the Components of Fundamental Reading Skill," EDL Research and Information Bulletin No.3 (Huntington, New York: EDL Inc., 1960).

[4]The Fernald Method, The VAK Method and The Betts Kinaesthetic Techniques.

[5]Letter from Verna B. Hogg, School Psychologist, State Department of Education, Salem, Oregon.

[6]"A New Look at Ocular Motilities in Visual Development," Optometric Extension Program Postgraduate Courses, Vol. 37 (Duncan, Oklahoma: October,1964), Series 9, No.1.

[7]J. Minor Gwynn, Curriculum Principles and Social Trends (New York: Macmillan Company, 1960), p. 432.

[8]Arnold Gesell, quoted by G.N. Getman in How to Develop Your Child's Intelligence (Luverne, Minnesota: G.N. Getman, 1962), p. 105.

[9]Halstead, quoted by G.N. Getman in How to Develop Your Child's Intelligence (Luverne, Minnesota: G.N. Getman, 1962), p. 105.

GLOSSARY OF OPTOMETRIC TERMINOLOGY

Accommodative rock - the ability to change focus from near to far and from far to near in a reasonable length of time (approximately one second).

Anaglyph - a method of giving depth appearnace to a flat surface without the use of a stereoscope. If two pictures are made, one from the paral-lactic angle of the right eye, the other from that of the left, and super-imposed on a common field, the former being printed in red and the latter in green, then if a red lens be placed before the right eye and a green lens before the left eye, each eye will see only the portion of the pic-ture which it would see if it viewed the real object of which the pictures are representations, and it will appear in depth relief. If the lenses are reversed, it will appear in pseudo-relief.

Aniseikonia - a special case of distortion of visual space.

Balance board - a square platform sixteen by sixteen inches. Underneath and in the middle of the board is a balance post three inches in height.

Cheiroscope - an instrument on the camera lucida principle introduced by Maddox to assist in hand-and-eye training of a squinter.

Clip-overs - lenses or prisms that clip over regularly worn glasses.

Cyclophoria - imbalance of the extrinsic muscles of the eye in which the oblique muscles play a dominant role, causing the eye to deviate, under test, obliquely.

Duction - the power of the various pairs of extrinsic ocular muscles to perform their functions. Duction tests are for determining this power.

D - V Method - the digital-visual reading method of using the hand to guide the eye as advocated by Lowry.

Fixations - in physiologic optics this term is applied to the holding of the accommodation and convergence of one eye (monocular fixation) or both eyes (binocular fixation) for a given point of distance.

Fusion - in physiologic optics this word signifies the faculty of super-imposing the two central images of the retinae and projecting them into space as one single image.

George Parkins Cards - reading cards used to determine the possibility of suppression.

Keystone Stereomotivator - an instrument using anaglyph principles for training binocular responses.

Leavell Coordinator - an instrument to train hand-eye preference on the same side.

Metronoscope - an instrument for exposing words or phrases under controlled speed and span conditions.

Near Point of Convergence Test - determines the nearest point at which the eyes are able to accommodate or converge. (This test is usually administered by moving an object toward the patient's nose until he sees more than one object.)

Ocular Motility - the movement capability of the eye.

Ophthalmography - the photography of eye movements.

Phoria - the position of the eyeball in relation to its visual axis. In common optical parlance the word "phorias" is used to indicate the various types of muscular imbalance.

Phoropter - an optical testing instrument which has banks of plus and minus lenses, prisms and cylinders. It is used to investigate conditions and ranges.

Plus 50 Clip-ons - (+ .50 D) indicates the power of convex lenses which can be clipped over regularly worn glasses.

Pointer Training - a hand and eye training procedure used to establish hand-eye coordination.

Prism Reader - a Controlled Reader with a pair of rotary prisms attached.

Renshaw Training Slides - slides used to illustrate the phenomenon of figure ground relationships sometimes designated as optical illusions.

Retinal Rivalry Rate - (a line rivalry rate) taken to establish the interference in visual performance that might effect reading.

Rotations - continual type of pursuit training.

Saccadic Visual Training - a jump type of fixation training.

Stereomotivator - (see Keystone Stereomotivator.)

Stereopsis - the visual perception of solidity or depth. Although commonly employed rather loosely, the term is properly restricted to the purely visual part of depth perception, as distinguished from the entire concept of solidity, which includes the evidence of several other senses.

Suppression - the voluntary, although usually subconscious, suppression of vision, usually in one eye, often made by patients who thereby seek to avoid the discomfort of binocular vision.

Tachistoscope - an instrument used for projecting timed, flashed exposures on a screen.

Taylor's Spiral Rings - used to establish three dimensional responses and to stimulate peripheral awareness; also used with anaglyph glasses to train binocularity.

Telebinocular - an optical instrument so arranged to simulate distance viewing within eight inches. It is used to test and to train.

Trial Lens Kit - a ket containing the necessary lenses for making subjective tests of vision and refraction.

Van Orden Star - a diagram of an individual's projection pattern at distance--performed at near through a stereo instrument (e.g., Cheiroscope).

Versions and Rotations - (pursuit movements) versions are in straight lines and parallels. Rotations are in circular lines and parallels.

Visual Pursuit Training - different types of training to establish control of ocular motilities in following moving objects.

Visual Skills Test - cards which investigate skills in the Telebinocular by means of stereograms designed to reveal the degree of efficiency within various skills areas.

BIBLIOGRAPHY

Books

Anderson, Irving H., and Dearborn, Walter F. The Psychology of Teaching Reading. New York: The Ronald Press Company, 1952, p. 160.

Cleland, Donald L. An Experimental Study of Tachistoscopic Training as It Relates to Speed and Comprehension in Reading. Quoted by Albert J. Harris in How to Increase Reading Ability. New York: David McKay Company, Inc., 1961, pp. 526-27.

Dearborn, Walter F. The Use of the Tachistoscope in Diagnostic and Remedial Reading. Quoted by Albert J. Harris in How to Increase Reading Ability. New York: David McKay Company, Inc., 1961, pp. 527-28.

Delacato, Carl H. The Treatment and Prevention of Reading Problems. Springfield, Illinois: Charles C. Thomas, 1959, pp. 7-9, 49.

Dolch, E.W. Manual for Remedial Reading. Garrard Press, 1955.

Edfelt, Ake W. Silent Speech and Silent Reading. Chicago: University of Chicago Press, 1960.

Fernald, Grace M. Remedial Techniques in Basic School Subjects. New York: McGraw-Hill Book Company, Inc., 1943, pp. 33-35.

Fries, Charles C. Linguistics and Reading. Holt, Rinehart and Winston, Inc., 1963, p. 162.

Gesell, Arnold. Quoted by G.N. Getman in How to Develop Your Child's Intelligence. Luverne, Minnesota: G.N. Getman, 1962, p. 105.

_____. Infant and Child in the Culture of Today: The Guidance of Development in Home and Nursery School. New York: Harper, 1943.

_____, et al. The First Five Years of Life. New York: Harper and Bros., 1940, pp. 18, 19, 21.

Getman, G.N. How to Develop Your Child's Intelligence. Luverne, Minnesota: G.N. Getman, 1962, pp. 34, 39, 58, 64, 78, 86-87.

Gwynn, J. Minor. Curriculum Principles and Social Trends, New York: Macmillan Company, 1960, p. 432.

Halstead. Quoted by G.N. Getman in How to Develop Your Child's Intelligence. Luverne, Minnesota: G.N. Getman, 1962, p. 105.

Harris, Albert J. How to Increase Reading Ability. New York: David McKay Company, Inc., 1961, pp. 251, 526-27.

_____. How to Increase Reading Ability. New York: Longmans, Green, 1956.

_____. "Reading and Other Subject Disabilities," Progress in Clinical Psychology. New York: Grune and Stratton, 1956.

Holmes, J. A. "The Brain and The Reading Process," 22nd Yearbook, Claremont College Reading Conference, 1957, pp. 49-67.

Jungeblut, Ann, and Traxler, Arthur. "Summary and Evaluation of Pertinent Research at the College and Adult Level," Perspectives in Reading. Newark, Delaware: International Reading Association, 1963-64, p. 121.

Kephart, Newell C. The Slow Learner in the Classroom. Columbus, Ohio: Charles E. Merrill Books, Inc., 1960, pp. 16-17, 31-32, 53, 81, 86-88, 113-16.

Lyons, C. Venard, and Lyons, Emily Bradley. Visual Signs for Vowel Sounds and Word Structure. Lyons and Lyons, 1962, pp. viii, x.

MacLatchy, Josephine. Bexley Reading Study. Quoted by Albert J. Harris in How to Increase Reading Ability. New York: David McKay Company, Inc., 1961, pp. 526-27.

Money, John. Reading Disability. Baltimore, Maryland: The Johns Hopkins Press (date unknown).

Montessori, Maria. Her Life and Work. Fresno, California: Mentor-Omega, 1962.

Penfield, Wilder, and Roberts, Lamar. Speech and Brain-Mechanisms. Princeton: Princeton University Press, 1959, Ch. 6.

Renshaw, Samuel. The Visual Perception and Reproduction of Forms by Tachistoscopic Methods. Quoted by Albert J. Harris in How to Increase Reading Ability. New York: David McKay Company, Inc., 1961, pp. 526-27.

Smith, D.E.P. "A New Theory of the Physiological Basis of Reading Disability," Reading for Effective Living. Proc. International Reading Association Conference, 1958, pp. 119-21.

Spock, B. Common Sense Book of Baby and Child Care. New York: Duell, Sloan, & Pearce, 1946.

Strang, Ruth, McCullough, Constance M., and Traxler, Arthur. The Improvement of Reading. New York: McGraw-Hill Book Company, Inc., 1961, p. 64.

Strauss, A.A., and Kephart, N.C. Psychopathology and Education of the Brain Injured Child, Vol. II, "Progress in Theory and Clinic." New York: Grune and Stratton, Inc., 1955.

Strauss, A.A., and Lehtinen, L.E. Psychopathology and Education of the Brain Injured Child, Vol. II, "Progress in Theory and Clinic." New York: Grune and Stratton, Inc., 1947.

Tinker, Miles A. Teaching Elementary Reading. New York: Appleton-Century, 1952, p. 14.

Vernon, M.D. A Further Study of Visual Perception. Cambridge: Cambridge University Press, 1957.

_____. Backwardness in Reading. Cambridge: Cambridge University Press, 1957, pp. 15, 74, 188.

Periodicals

Armistead, J. Davis, and Armistead, B.W. "Speed Reading and Visual Training," The Optometric Weekly (April 17, 1958), pp. 1109, 1190, 1487.

Berger, C. "Grouping, Number and Spacing of Letters as Determinants of Word Recognition," Journal of General Psychology 55 (1956), pp. 215-28.

Betts, Emmett. "Factors in Reading Disability," Education, May, 1952.

Cleland, Donald L. "Seeing and Reading," American Journal of Optometry, quoted by Strang, McCullough and Traxler in The Improvement of Reading. (New York: McGraw-Hill Book Company, Inc., 1961), p. 63.

Cleland, Donald L., and Davies, William C. "Silent Speech--History and Current Status," The Reading Teacher (January, 1963), pp. 224-27.

Gilbert, L.C. "Saccadic Movements as a Factor in Visual Perception in Reading," Journal Educational Psychology (1959), pp. 8-14.

Goins, Jean T. "Visual and Auditory Perception in Reading," Reading Teacher (1959), pp. 9-13.

Ilg, Frances L. Quoted by Jack Harrison Pollack in Parade Magazine (November, 1964), p. 10.

Lowry, Raymond W., Jr. "An Optometric Approach to Rapid Reading," Optometric Extension Program Postgraduate Courses (October, 1963), pp. 10, 19.

"Medicine, Pattern of Recovery?" Newsweek (May 4, 1964), pp. 84-85.

Morphett, M.V., and Washburne, C. "When Should Children Begin to Read?" Elementary School Journal 29 (1931), pp. 496-503.

Morris, Joyce. "Teaching Children to Read," Education Research 1 (1959), pp. 61-75.

Murroughs, Thaddeus R. "Optometric Care of Retarded Readers," in Optometric Extension Program Papers. (Duncan, Oklahoma: OEP Foundation, Inc., October, 1960), pp. 1, 2, 12, 30, 31, 33.

Riesen, A.H. "The Development of Visual Perception in Man and Chimpanzee," Science, CVI (1947), pp. 107-108.

Robinson, H.M., Letton, M.C., Mozzi, L., and Rosenblcom, A.A. "An Evaluation of the Children's Visual Achievement Forms at Grade 1," American Journal Optometry (1958), pp. 515-25.

Rudisill, Mabel. "Flashed Digit and Phrase Recognition and Rate of Oral and Concrete Responses: A Study of Advanced and Retarded Readers in the Third Grade," Journal of Psychology 42 (1956), pp. 317-20.

Senden, M. Raum- und Gestaltauffassung bei operierten Blindgeborenen vor und nach der Operation. (Leipzig: Barth, 1932).

Skeffington, A.M. "Introduction" Optometric Extension Program Foundation. Inc. (October, 1963), p. 2.

Stevens, G.L., and Orem, R.G. "Characteristic Reading Techniques of Rapid Readers," The Reading Teacher, 17 (November, 1963), p. 102.

Vernon, Magdalen D. "The Perceptual Process in Reading," The Reading Teacher, 13 (1959), pp. 2-8.

Wood, Evelyn N. "A Breakthrough in Reading," The Reading Teacher, 14 (1960), pp. 115-17.

Unpublished Material

Simpson, Dorothy Margaret. "Perceptual Readiness and Beginning Reading." Unpublished Ph.D. dissertation, Purdue University, 1960, pp. 75-79.

Small, V.H. "Ocular Pursuit Abilities and Readiness for Reading." Unpublished Ph.D. dissertation, Purdue University, 1958.

Lectures

Hill, Walter R., Jr., former Associate Professor of Education; Director, Remedial Clinic and Reading Study Laboratory; University of Oregon, Eugene, Oregon, now at the State University of New York, Buffalo, New York.

Letters

Hogg, Verna B., School Psychologist, State Department of Education, Salem, Oregon.

Other Sources

Lowder, R.G. Perceptual Ability and School Achievement. Available from Winter Haven Lions Club, Winter Haven, Florida, 1956.

Lyons, C. Venard, and Lyons, Emily Bradley. Lyons Visualization Series. Lyons and Lyons, 1961, p. 1.

Potter, M.C. "Perception of Symbol Orientation and Early Reading Success." Teachers College, Columbia University Contributions to Education, 1949.

Taylor, Stanford E., et al. "Grade Level Norms for the Components of Fundamental Reading Skill." EDL Research and Information Bulletin, No. 3. Huntington, New York: EDL Inc., 1960.