

Standardization - Efficiency -Heredity

Schools for the Deaf

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Indianapolis

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organizations. Recipient of Medal from Louisiana
Purchase Exposition for Writings and Research
Work. Member of National Society for the
Study of Education; and an Active
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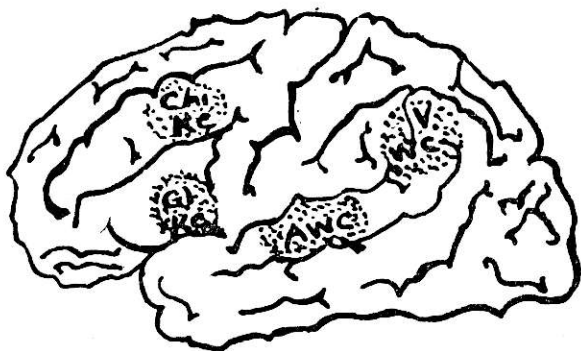
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Indianapolis



Auditory and Visual Word Centers
Kinaesthetic Centers
Left Cerebral Hemisphere

(Form A) *

Diagram showing the approximate sites of the two word centers, and their corresponding motor centers, of the left cerebral hemisphere. The auditory word center (AWC) and the visual word center (VWC) are parts of, or connected with, the general auditory and visual centers respectively, which are not depicted. These two word centers, and the glosso-kinesthetic (GL.KC) and chiro-kinesthetic (Chi.KC) centers of the left hemisphere, are also correspondingly situated in the right hemisphere but not functioning naturally except with left-handed people, the left hemisphere functioning naturally with right-handed people. (Vide Chap. XXVIII.)

* "Aphasia and Other Speech Defects"—H. C. Bastian.—D. Appleton & Co., New York, 1898.

SUBMISSION OF REPORT.

This report was submitted by the undersigned on behalf of a Special Committee appointed by the Conference of Superintendents and Principals of American Schools for the Deaf to consider the questions of standardization and efficiency of such schools.

RICHARD OTTO JOHNSON, A. M.,
Chairman of the Committee.

ACTION TAKEN ON SUBMISSION.

Submitted to the Eleventh Triennial Conference meeting in Columbus, Ohio, December 1-5, 1919. The following action was taken thereon by resolution unanimously adopted by the Conference:

"Resolved, It is felt that it would be showing ingratitude for this Conference to close without indicating our great appreciation of the work done by former Superintendent Richard Otto Johnson of the Indiana School, as Chairman of the Standardization and Efficiency Committee: and, therefore, it is moved that we extend to him our deepest thanks and gratitude for the long hours of devotion that he has given the matter.

"And it is further resolved by the Conference, that the report be printed in book-form by the Executive Committee and distributed to the members of the Conference as speedily as possible."

CONTENTS.

CHAPTER	PAGE
Submission of the Report	4
The Education of the Deaf—Conference Resolution.....	8
Appointment of Committee—Conference Resolution.....	9
A Personal Statement.....	10
I. Foreword.....	11
II. The Committee and Its Duties.....	18
III. Innovations Necessary.....	23
IV. Terminology.....	29
V. The Deaf, and Psychic Development.....	36
VI. Mental Capacity and Heredity.....	51
VII. Necessary and Desirable Information Needed.....	61
VIII. Admission Questions.....	69
IX. Function of Tests and Measurements.....	75
X. The Binet-Simon, and Other Tests and Scales.....	81
XI. The Age-Grade Scale.....	91
XII. Analysis of Pupilage.....	98
XIII. Attendance, Absence, Etc.....	108
XIV. Elimination of Pupils.....	114
XV. Deafness and Defective Vision.....	118
XVI. Percentage Factors for Miscellaneous Measurements.....	122
XVII. Instincts and Temperaments.....	127
XVIII. The Curriculum.....	133
XIX. Notes on Curriculum and School Work.....	143
XX. Industrial Training.....	150
XXI. Physical Measurements.....	157
XXII. Qualifications of Teachers.....	172
XXIII. Teacher Measurement.....	180
XXIV. Measurement of Schools for the Deaf.....	187
XXV. The Pintner Tests.....	189
XXVI. Schools for the Deaf.....	198
XXVII. Classification of Deafness and Heredity.....	202
XXVIII. Hearing and Speech.....	210
XXIX. Deafness and Adenoid Growth.....	220
XXX. The Hearing-Mute and Feeble-mindedness.....	225
XXXI. Mutism in Otherwise Normal Children.....	238
XXXII. Two Briefs: Meningitis—Development of Speech.....	241
XXXIII. Descriptive Anatomy—Head, Nose, Throat and Ear.....	246
XXXIV. Statistical Information as to Deafness.....	250
XXXV. Various Resolutions Concerning the Deaf.....	256
Combined Reference and Bibliography.....	259

RESOLUTIONS, SCALES, FORMS AND TABLES.

Resolutions—

	PAGE
1. The Education of the Deaf	8
2. Appointment of Special Committee	9
3. Convention of American Instructors of the Deaf	257
4. National Association of the Deaf	257
5. Indiana Association of the Deaf	257
6. Conference of Superintendents and Principals	258

Scales—

1. Testing Intelligence before Entering School	87
2. Testing Intelligence before Entering School	88
3. Testing Intelligence before Entering School	88
4. Binet-Simon Tests	90
5. An Age-Grade Scale	94
6. For Grade Classification	124
7. For Degrees of Deafness	125
8. For Age Deafness Occurred	125
9. For Defective Vision	125
10. Graduations, Discharges, Drop-outs	125
11. Physical Measurements	161
12. Measurement of "Success" of Teachers	176
13. Measurement of Teachers	180
14. Measurement of Teachers	184
15. School Measurement	187

Forms—

A. Diagram of Left Hemisphere and Word Centers	3
B. Admission Questions for New Pupils	70
C. Application of Percentage Factors Illustrated	126
D. Time Schedules for School Duties	142
E. Record-Card—Mental Development	167
F. Record Card—Physical Development	168
G. Figure—Descriptive of Ear	168
H. Card—The Mechanism of the Ear	168
I. Card—Defective Sight and Decayed Teeth	169
J. Schedule of Athletic Exercises	170
K. Graph Card—Teacher Measurement	183
L. Diagram—Preyer's Theory of Hearing and Speech	211
M. Diagram—Word Centers and Connections	215
N. Figure—Normal and Adenoid Faces	223
O. Figure—Sagittal Section of Head and Neck	246
P. Figure—Front View, Organ of Hearing	248

Tables—

1. Degree of Deafness	63
2. Rate of Progress	96
3. Repeaters of Grades	96
4. Retardation—And Degrees of Deafness	96
5. New Pupils Admitted	101
6. Causes of Deafness, Etc.—New Pupils	102
7. Intelligence—Progress—Retardation	105
8. Miscellaneous Averages	105
9. Mental Percentages	106
10. Deafness and Percentages	106
11. Causes of Deafness—2769 Cases	108
12. Ages at Which Deafness Occurred—2769 Cases	109
13. Discharges—700 Cases	110
14. Summary of Discharges—700 Cases	111

	PAGE
15. Non-attendance—543 Cases.....	111
16. Graduates.....	111
17. Movement of Population—Indiana, 1905-1914.....	112
18. Movement of Population—Indiana, 1844-1914.....	113
19. School Enrollment by Grades—United States and Indiana.....	114
20. Examination as to Deafness.....	119
21. Examination as to Deafness and Defective Vision.....	119
22. Examination as to Deafness and Defective Vision.....	120
23. Grade Classification—Percentage Factors.....	124
24. Degrees of Deafness—Percentage Factors.....	125
25. Ages Deafness Occurred—Percentage Factors.....	125
26. Defective Vision—Percentage Factors.....	125
27. Graduations—Discharges—Drop-outs—Percentage Factors.....	125
28. Time Schedule for Discharges.....	149
29. Table of Physical Norms—Adapted.....	161
30. School Measurement Values.....	187
31. Pintner's Years of Retardation.....	196
32. Inter-marriage of the Deaf and Their Offspring.....	205
33. Total Number of Deaf in United States.....	252
34. Present Age of Deaf in United States.....	252
35. Ability of Deaf to Speak.....	252
36. Classified Periods of Deafness—Under 20.....	254
37. Classified Periods of Deafness—Over 20.....	254
38. Percentage of Deaf to 1,000.....	254
39. Causes of Deafness—93,894 Cases.....	255
40. Effect of Causes upon Ear—93,894 Cases.....	255

THE EDUCATION OF THE DEAF.

THE CONFERENCE OF SUPERINTENDENTS AND PRINCIPALS OF AMERICAN SCHOOLS FOR THE DEAF, MEETING IN CONJUNCTION WITH THE CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF IN STAUNTON, VIRGINIA, THIS FIRST DAY OF JULY, 1914, DECLARES THE FOLLOWING AS A BASIC PRINCIPLE IN THE EDUCATION OF THE DEAF, TO WIT:

"The education of the deaf child—which is claimed as a matter of right, not of charity—while a part of the general educational movement, is a distinct and highly specialized branch of the work and, as such, requires the services of expert educators of the deaf—those who know not only the commonly applied principles of general pedagogy and psychology, but who also, through special training, active experience, and thorough research work, know the possibilities, the peculiarities, and the limitations of the deaf child—who clearly know what is possible and practicable as opposed to the impossible and theoretical. This is a knowledge not possessed even by those who proclaim themselves masters, theoretically or otherwise, of the work with the hearing child who, as a matter of fact, receives his education largely at the hands, not of his school teachers, but of the thousands with whom he comes in contact outside the schoolroom, and through the thorough acquisition of his mother-tongue with its vocabulary and expression which come to him naturally and easily from the very day of his birth—and all of which is denied the deaf child. With this special knowledge of deaf child nature as referred to above, acquired through years of study of, and experience with, the deaf, one may readily perceive that the problems presented are not ordinary ones, that they are indeed complex, and further, that the ordinary curricula, text-books, grade divisions and modes of procedure adapted to the hearing child must be very decidedly modified with the deaf child. To those who are not engaged in the work of educating the deaf this knowledge does not come and they are ill-prepared to criticise methods, progress, and results which necessarily must be seen and judged from a viewpoint entirely different from their own."

APPOINTMENT OF COMMITTEE OF FIVE.

THE FOLLOWING RESOLUTION WAS PASSED BY THE CONFERENCE OF SUPERINTENDENTS AND PRINCIPALS OF AMERICAN SCHOOLS FOR THE DEAF MEETING IN CONJUNCTION WITH THE CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF IN STAUNTON, VIRGINIA, JULY 1, 1914:

BE IT RESOLVED:

First—That a Committee of Three be appointed by the President of this Conference, to study the question of Efficiency of our Schools for the Deaf, said question to embrace all subjects pertinent thereto.

Second—That a general scheme for the measurement of such efficiency be arranged wherein Mentality Tests, and Age- and Class-Year Norms shall be established as features.

Following this action, Mr. Jones, the President of the Conference, was added to the Committee to be appointed, and later, the Committee added to its membership Mr. Kilpatrick,* thus making it a Committee of Five, which stands as follows:

RICHARD O. JOHNSON, A. M., Indiana, Chairman.

AUGUSTUS ROGERS, A. M., Kentucky.

A. L. E. CROUTER, LL. D., Pennsylvania.

JOHN W. JONES, A. M., Ohio.

WALTER M. KILPATRICK, B. Ph., Connecticut.

* Taking part in only one meeting of the committee, that at Philadelphia.

A PERSONAL STATEMENT.

To Members of the Profession:

In presenting this report permit me to speak a word or two of personal nature concerning my connection with the work of educating the deaf, all of which has been with the Indiana School, covering a period of thirty-six years. On July first, nineteen-nineteen, my connection with the school as Superintendent ceased and, consequently, my presence at the meeting of the Conference was as an honorary member only, but with as great interest in the cause as ever possessed by me. I have loved the deaf and the work with them; and that love still abides, and shall ever abide with me; my interest in the cause shall never wane. During the long years of pleasing servitude the profession has been more than kind to me in the bestowal of the highest honors in its gift: President of the Conference for nine years; member of its Executive Committee for twenty-five years, and chairman thereof for nineteen years; and various positions of honor in the Association for the Promotion of Speech (Director for twenty-one years), in the Convention of American Instructors of the Deaf, and at the national gatherings of all the bodies from year to year. I have sincerely appreciated the good will and friendship prompting the actions and have ever striven worthily to bear the honors given me. Our long intercourse with one another has resulted in the formation of many warm friendships not excelled, scarcely equalled, by any outside the sphere of the profession; and in the years to come my memories shall ever be pleasing ones to recall. As I retire from official and active life in the profession, I cherish these words of President Jones of the Conference at its last meeting expressing the good will of the profession: "Mr. Johnson will always be a welcome visitor with us and will always receive the hearty, warm hand of all those who have known him in the past." *VALEDICTION:—*

"Here's a sigh for those who love me,
And a smile for those who hate;
And whatever sky's above me,
Here's a heart for every fate."

RICHARD OTTO JOHNSON.

Indianapolis, January, 1920.

CHAPTER I.

FOREWORD.

In beginning this report it will be proper and illuminating to refer briefly to a few facts and conditions of educational nature prevalent some years ago from which, through various processes, have come newer ideas of education resulting in the present statement concerning the education of the deaf, a part of the general educational movement, yet, a distinct and highly specialized branch thereof requiring the services of those specially trained for the work. If, in this foreword, and in subsequent pages, the ever-displeasing spirit of ego seems to project itself, the writer craves pardon of his readers and sincerely assures them that what is written is written with no self-conceit whatever; it is presented simply in rehearsal of facts and conditions leading from the old to the new status of educational efforts based upon the concrete experience of the writer in the Indiana School rather than upon abstract theory; and in order to have concrete conditions, facts and figures as a basis for exemplification of future needs he has been forced necessarily to use the established data of the school.

The greatest popular educational forum of the world, and the most far-reaching in results, is the National Education Association, composed of tens of thousands of active school teachers and officials of the United States, which meets in general convention twice each year* for the discussion of educational problems of every conceivable nature. This Association met in Indianapolis in 1897—and at that meeting a distinguished educator made complaint that those in charge of the schools generally were evidently not teaching their subjects as they should, and cited in proof thereof *what the pupils could, and could not do*. Speaking of this convention and the foregoing criticism, an educational writer stated: "In terms of scathing denunciation the educators there present, and the pedagogical experts who reported the deliberations of the meeting in the educational press, characterized as silly, dan-

* Summer—General Convention; Spring—Department of Superintendence.

gerous, and from every view-point reprehensible, the attempt to test the efficiency of the teacher by finding out what the pupils could do. With striking unanimity they voiced the conviction that any attempt to evaluate the teaching of anything in terms of the ability of the pupils to do, was essentially impossible and based on a most profound misconception of the function of education." But behold the change! Fifteen years later, in 1912, this same association of school teachers and officials again assembled in St. Louis and devoted forty-eight addresses and discussions to tests and measurements of educational efficiency. The basal proposition underlying this entire mass of addresses and discussions was, that the effectiveness of the school, of the methods employed, and of the teachers, must be measured in terms of results secured. Comment is unnecessary except to say, that progress cannot be stayed in the "ever-solving but never-solved" problem of education, and that non-progression is conducive to retrogression.

Immediately following the St. Louis convention of the National Education Association, of which he has been an active member for a number of years, the writer in 1912-13 began an educational survey of the Indiana State School for the Deaf which, it was believed, was following, and in general efficiency fully abreast of, the best accredited curricula and methods of similar schools throughout the United States and Canada. This survey, to which much thought and time had been given for several years and which was well underway, was later merged into that of schools for the deaf generally which was provided for by the Staunton Conference in 1914—and consequently, many of the figures, tabulations, and scales, likewise the comment and deductions given herein, are based upon the Indiana school attendance of 1912-13 and so correlated with results as to make it inexpedient to substitute attendance of later date except in a few instances. This, however, is not at all necessary, for a careful study of the later attendance by itself discloses approximately the same general results as indicated in the computations of 1912-13.* What little change has occurred has been for the better; and this fact promises greater success in the future when the application of the newer psychological principles underlying educational procedure shall become better known, and of wider scope and more intelligent use.

* Except as to congenital deafness which is increasing. Vide page 121, footnote.

In June, 1914, the meeting of the Convention of American Instructors of the Deaf was held at Staunton, Virginia, where, because of the educational trend of the times, the survey undertaken in the Indiana school, the intermeddling of those outside the profession who assumed a "glorified superior wisdom" yet having no knowledge whatever of our distinct and peculiar work, and the direful and crushing influence upon education through domineering politicians and unwise supervision of charity boards, the writer presented the following statement:

MEASUREMENT OF EFFICIENCY OF SCHOOLS FOR THE DEAF.

Believing that at our Convention it would be a wise and beneficial thing to have a Symposium on "The Measurement of Efficiency of Schools for the Deaf," which would mean consideration of methods of teaching, curriculum, text-books used, preparation on the part of teachers, the quality of their teaching, advancement of pupils, etc., Dr. Dobyns,* upon request, has established a section for the matter and has asked me to serve as chairman thereof.

This question of "Measurement of Efficiency" is being given very properly more and more attention by the educational departments of the various States, and by educators and laymen generally who seek to evaluate our educational practice; but invariably, it seems to me, they are measuring our efficiency without any comprehensive knowledge of our particular, peculiar, and highly specialized work with the deaf, and almost solely from the view-point of hearing-speaking children and the public-school with its requirements.

These same educational authorities seem to think that the ordinary curriculum and text-books used in the public-schools as prescribed by the State Board of Education should be used also by us; and that good public-school teachers could be had to do our work all right, for it has been suggested to me by one of them that if we could not get a sufficient number of trained teachers he would agree to furnish us thoroughly competent people from the public-schools to take up the work as teachers of the deaf.

The feeling is beginning to spread over the country (and it is concurred in by the United States Commissioner of Edu-

* Dr. J. R. Dobyns (Mississippi), vice-president of Convention, and in charge of program.

cation) that the period of instruction in public-schools should extend throughout the year, giving probably four weeks of vacation for various pupils at various times—likewise, with the same vacation for teachers. This view is being approved by some of the educational boards as being especially applicable to schools for the deaf, their idea being that deaf children need it far more than others—that they should have continuous school work—that their parents will be glad to keep them away at school because of free board—that they could operate farms for the benefit of themselves and the State, etc., etc. Under such procedure our pupils would indeed become “institutionized” which would be to their detriment.

Now, it is in view of this feeling and expression that the Symposium referred to has been established. That these views of our work are somewhat distorted educators of the deaf well know—and for that very reason I think it is time for our profession to stamp its approval or disapproval upon such suggestions.

Dr. Dobyns has set aside sufficient time at the Convention for this discussion. Under the circumstances and the possibilities, nay, the probabilities in the case, I believe it will be one of the most important things to come before the Convention. And I believe further, that it will be wise for us to give heed at this time lest it be written of us by others not familiar with our work, “*Mene, mene, tekel upharsin*” without word of explanation and protest on our part.

Our work today is the sifted experience of ninety-seven years; the experience of educators, men and women, who have given their lives to the work; experience of those who have measured their success in their methods by the lives of the deaf after leaving school. The end in view has been, and is, to properly prepare those going out from us to become useful citizens, self-supporting, law-abiding, and of material worth to the State. The preservation and prosperity of a free people, or of any form of government which is of the people, depends not on those in high places nor upon those of brilliant minds; not upon those who accumulate the riches of earth, but most decidedly upon the average self-supporting men and women who are of stout hearts, clear heads, skillful hands, and of good morals. This is the class which embraces the true manhood of our country, and constitutes its bone and

sinew, its very bulwark of liberty. It is into this class we strive to graduate our deaf boys and girls—and a knowledge of what former pupils, now men and women, are doing throughout the country, tells of our success.

During the past one hundred years no greater revolution and evolution has taken place than that accomplished in changing the status of the deaf, and in their education. And the change is not yet complete. Progress is still the watch-word. The best of today will not be the best of tomorrow. The present efficiency of our schools, of methods, teachers and pupils, has increased over that of yesterday—and it will continue to increase. But this growth in methods and efficiency must be directed by those who are thoroughly familiar and sympathetic with our specialized work, and with knowledge of its possibilities and limitations; otherwise, confusion and non-progression will result.

And in this connection comes the thought, that of the ten world-famous educators whose names are inlaid in the ceilings of the Congressional Library in Washington, three of them only are Americans—Thomas H. Gallaudet, Samuel G. Howe and Horace Mann; and these three greatest of American educators have been closely identified with our own work—Gallaudet, the founder of the first school for the deaf in our country; Howe, the educator of Laura Bridgman, deaf and blind; and Horace Mann, during his whole life, closely allied to, and interested in, schools for the deaf. And significant facts they are, too, that Mr. Howe as member of the State Board of Charities of Massachusetts, and Mr. Mann, as Secretary of the State Board of Education of the same State, insisted in those early days that schools for the deaf were part and parcel of the free school system of the State, and not benevolent or charitable institutions, as they are styled by certain lesser lights today for political, personal, and financial reasons, and who refer to their pupils as “defectives” in comparison with “inmates” of prisons and reformatories, and of institutions for the feeble-minded, the epileptic, and the insane.

And there also comes the thought expressed by a progressive superintendent of one of the largest American schools for the deaf, more than ten years ago: “Teachers of the deaf have taken high rank at once as teachers of the hearing, some of them as college professors and college presidents, but no

public school teacher, nor college professor, nor college president, is competent to teach a class of deafmute children without long preparation for the task." And a foreign commentator has added, "No truer word was ever spoken."

If curriculum and text-books and methods of teaching are wrong in Indiana, where they have been recently criticized by a committee of the Board of State Charities, then they are wrong everywhere, for they are practically the same in all States. It seems to me as though the work of educating the deaf has been discredited generally. I am very much interested in this matter, and I believe every Superintendent should be. If we are wrong in our conceptions relative to the education of the deaf, we should know it; but if we are right, then let the profession voice its disapproval of those who would seek to exploit certain educational ideas by making them applicable to the deaf to the latter's detriment.

It has been deemed wise not to have subjects assigned to certain speakers but to leave the matter open for discussion by those who will deal with such phases of it as may be of interest to them. Permit me to appeal to you in this matter and to ask that you will kindly give it real, serious thinking along some of the lines and be ready to take part in the discussion which may lead to some general plan for testing the efficiency of our schools for the deaf.

Concerning mental tests for our pupils—as a general proposition, I do not look upon the Binet-Simon test as an efficient one for our American youth (although the basic principle is right) and certainly not for our deaf children—without a great deal of modification for both. This is a matter I wish to speak of at the Convention and will offer a resolution that a committee of five be appointed for the purpose of establishing a standard test with age and class-year norms for determining the mentality, grading, etc., of deaf children. * * * While, of course, mental testing is only one phase of mental diagnosis (which should include physiological and pathological consideration) in that it does not include causation factors, yet, I believe a measuring system such as is proposed would be of incalculable help to us. Concerning the Binet-Simon test, it has been criticized as one largely of language efficiency, one in which the ability to repeat words and numbers is given too much importance, and one wherein scholastic and other

attainments are tested rather than native ability, although the reverse may be claimed for it.

Following the presentation of this statement to both the Convention of American Instructors of the Deaf and the Conference of Superintendents and Principals of American Schools for the Deaf* which evoked extended and earnest consideration, the resolutions given on pages 8 and 9 were introduced by the writer and unanimously adopted by the Conference—the one, setting forth in clear and succinct form the basic principle in the education of the deaf; the other, authorizing and directing the appointment of a national committee for the making of a survey of schools for the deaf generally.

* Meeting in conjunction with the Convention.

CHAPTER II.

THE COMMITTEE AND ITS DUTIES.

In submitting this report to the Committee on Research for presentation to the Conference, the writer is pleased to take this opportunity cordially to attest the very great interest and faithfulness of purpose of the other members of the committee in the performance of the diversified duties laid upon us by the Conference. These duties have caused a great deal of study, research work, and correspondence upon the part of each member, all of which has had careful consideration at the various sessions of the committee held from time to time in Columbus, Ohio; Indianapolis, Philadelphia, and Danville, Kentucky. At these meetings, the respective schools were given thorough examination as to organization, attendance, curriculum, text-books used, methods and devices of teaching, qualification of teachers, progress of pupils in literary and industrial courses, and generally, as to the inner-life of the school, and the degree of success in the after-life of its former pupils where possible.

At these various meetings of the committee there were present through special invitation from time to time such acknowledged leaders in the educational world as Dr. Rudolph Pintner,* Dr. Donald G. Paterson, Dr. Henry H. Goddard, Dr. Bird T. Baldwin, Dr. A. Duncan Yocum, Dr. G. Hudson-Makuen, Dr. M. E. Haggerty, Dr. J. C. Frazee, Superintendent O. H. Burrell, and others, giving us the benefit of research work in their respective fields: "Psychological Development and Testing"—"Testing Intelligence of Children and the Binet-Simon Scale"—"Psycho-Etiological Study of Meningitis and Educational Development"—"Physiology and Psychology of Hearing with Special Reference to the Development of Speech"—"Development of Sense Defects"—"Possibilities and Probabilities of Vocational Training," etc., etc. For their very great interest in our work and their continued participation therein, we are greatly indebted especially to Drs. Pintner and Paterson. At the earnest request of the com-

* Vide Combined Reference and Bibliography, page 259.

mittee and with its active co-operation, they have made thorough examination of the pupilage of the Indiana, Ohio, Kentucky and Philadelphia schools for the deaf, applying in each certain well-known psychological tests standardized for hearing children (among them, the digit-symbol and symbol-digit tests*), thus reaching and examining scientifically for the first time in connection with our work about 1,500 deaf pupils. Later, these tests were given by the writer to the Illinois school, and by Dr. Pintner through a collaborator of the Texas State University, to the Texas school. Adding to these several day-schools for the deaf examined by Pintner and others, we have nearly 2,000 deaf pupils of varying localities, racial derivation, ages and school progress who have been examined, thus permitting of a fair mental comparison of the deaf with the hearing, and the establishment of a complement of norms of various mental tests for the deaf correlated with those for the hearing. The details of these Pintner-Paterson examinations, and their conclusions, were submitted to the committee and later, with its approval, were published in book-form by Dr. Pintner† as a contribution to educational science which is to be considered as constituting a part of this report. While references thereto will be made herein with quotations as to details and conclusions, it is earnestly urged that every one interested in the education of the deaf should secure a copy of the Pintner-Paterson monograph and give it most careful study in connection with this report. In addition to the text it contains twenty tabulations and thirty-four graphs, fully explanatory of the text in all its details. In this connection it is worthy of note that the work of this committee and the published monograph referred to, constitute the first effort to determine the mental status of the deaf, and to evaluate their school progress, and the efficiency of their schools, along scientific lines. It will mark an epoch in the history of the education of the deaf, a fitting one as we enter upon the second century of such education; and however experimental and crude the work of the committee, and this report, may be in the estimation of instructors of the deaf, or of any one else, it is hoped it will at least serve as a basis for more extended and better investigation by others.

* G. M. Whipple, "Manual of Mental and Physical Tests"—Also, Wm. H. Pyle, "Examination of School Children."

† "Learning Tests with Deaf Children"—Pintner and Paterson, Psychological Review Publishing Co., Princeton, New Jersey.

The problem presented us for consideration by the Conference is indeed of almost illimitable scope. The resolution directing the work says that we are to study the question of the efficiency of our schools for the deaf, said question to embrace all subjects pertinent thereto—and, further, that a general scheme for the measurement of such efficiency be arranged wherein mentality tests and age- and class-year norms shall be established as features. This broad direction given us calls not only for scrutiny and analysis of every phase of our own professional work, including the mental characteristics and educational progress of the deaf child, and of all essentials incident thereto, but, also, of education in general, including the mental characteristics and educational progress of the hearing child, and of all essentials incident thereto. While, of course, it is of great importance that we should know of the relative standing between deaf children and between schools for the deaf, yet it is of still greater importance and a thing absolutely demanded, that for the greatest possible accomplishment of good we should know of the relative standing of the deaf and the hearing child, and of their respective schools. In other words, to sense the real and true mental status and educational progress of the deaf, therefore of their schools, there must be comparison and measurement in terms of the hearing child, and of schools for the hearing—otherwise, educationally, we would continue to revolve (and it may be added, “to resolve”) complacently around a very small, though important, circle within a very much larger and more important one, and always subject to adverse criticism.

With this ever-expanding view of its duties one may readily perceive that the committee has undertaken and pursued its work with quite a degree of discouragement, not to say dismay, especially so as it had to eliminate from extended consideration in some cases, from any consideration at all in other cases, many lines and phases of educational research of deep interest and worth, and confine itself to a few of the many questions constantly arising.

The purpose and scope of this report inhibits analytical discussion of many interesting and vital problems of mental and educational nature which are referred to but very briefly; and so, for the sole purpose of raising in the mind new ideas as to plans of procedure and to emphasize the imperative need

for study and research-work upon the part of the teacher—especially as to the psychical, physiological and pathological aspects of hearing, vision, and speech, and the existing mental conditions exhibited by pupils. The writer is fully conscious of the fact that these brief references to such important subjects are rather unsatisfactory but, under existing circumstances, fuller discussion thereof seems to be inexpedient.

With public day and state schools for the deaf, and with similar schools under private and denominational control, all with more or less changeful environment, it was thought best not to attempt any effort to standardize details of the curricula, or of schoolroom practice and equipment, and the selection of text-books, etc.; and, especially, not to establish in detail an "ideal school" as a model to be followed, for as has been stated concerning our schools, "there are so many diverse interests at work forming these institutions that what has been worked out in one it is almost impossible to work out in another"—that "pears and apples cannot be added together to get peaches." As a matter of fact, it is not at all necessary, nor possible, to standardize brains, and initiative, and progressiveness, and human, educational, and political efforts, except as to certain general phases of the work as exhibited in schools and common to all.

As stated, the problem presented is of complicated nature and many phases of it necessarily must remain practically untouched by the committee which, however, offers suggestions along several lines for further reflection and future determination. Hence it is that our purpose is to offer a tentative outline for consideration in carrying out as far as possible under the conditions the duty laid upon us by the Conference. In the performance of this duty personal predilections as to this, that, and the other, while given thorough and earnest consideration, have yielded, if needs be, to a common perspective in arriving at a succinct outline of a few phases of the work that seem to be necessary, and demanded, for increased usefulness of our schools in promoting the general welfare of the deaf during, and following, school-life—for instance, an increased efficiency generally that may be measured in exact and uniform terms, understandable in any and all schools regardless of systems and methods of instruction, thus enabling just comparison of schools for the

deaf among themselves, and with schools for the hearing, and equitable comparison of the deaf with the hearing.

And in this connection, let me add the thought and recommendation that the Conference, which meets triennially, receive this report as one preliminary to others to follow, and appoint a standing Research Committee of three members *possessing thorough experience in the education of the deaf*, who shall continue the work of educational investigation which is to include everything of speculative or material nature having to do with the welfare of the deaf both in school-life and in succeeding years. The field of investigation is an immense one as the present committee has learned and which, as stated, has been compelled by force of circumstances to eliminate from its report consideration of many vital phases of the work. With such continued investigation in the light of the "Basic Principle in the Education of the Deaf", as declared at the Staunton meeting in 1914, carried on by broad-minded and earnest thinkers based upon the central tendency of existing practice from time to time, it appears possible to evolve for general acceptance by the profession, unified standards of procedure and measurements of mental attributes and resultant performance that are in consonance with modern and scientific educational requirements, and which will serve as medians for the whole country unless some pronounced and exaggerated local condition offers a good and specific reason to do otherwise.

"Attempt the end, and never stand to doubt;
Nothing's so hard, but search will find it out."

CHAPTER III.

INNOVATIONS NECESSARY.

Thoughtful consideration of the many phases and angles under present educational and commercial conditions wherein the greatest vision is that of efficiency, which is to be viewed and measured in various ways, necessarily point to some very decided innovations in our century-old work with the deaf. Theories, however beautiful and pleasing, are giving way to utilitarian facts measured scientifically, however irregular and unpleasing they may seem; long established custom and tradition may no longer be regarded as of infallible nature—in fact, they are quite the reverse in many instances. If, in the education of the deaf, old theories, customs, and traditions are consonant with modern thought and demand (and it is believed they are in some ways), so much the better and stronger for us: but if inconsonant, then change should be made for greater strength and progress. While applied mechanics, for instance, is based upon a combination of science, knowledge, and precision, educational administration, generally, seems based upon a combination of conjecture, opinion, and chance; and the present tendency is to eliminate the latter base substituting therefor the former, thus making of education an orderly and systematic effort based upon exact and scientific principles.

Discussing this new idea of education, or the idea of a new education, as one may prefer, Ayres, who has been a keen investigator of educational practices and a clear and forceful writer on educational matters, succinctly states:

“In education, as in industry, the scientific idea is at base analytic scrutiny, exact measuring, careful recording, and judgment on the basis of observed fact. Swiftly, silently, and almost without warning, the scientific methods have invaded the educational camp and have begun to demolish the hosts of theory, legend, superstition, and tradition.

“The object of the new method is the substitution of evidence for opinion, and knowledge for speculation. Its champions are working to develop measurements in education because they realize that only by this method can education

become an art and a science and its practice be changed from a vocation to a profession. They scan the history of science and remember that through the development of measurements astronomy grew out of astrology, chemistry emerged from alchemy, and physics developed from mystery. They read the history of education and realize that the astonishing progress of the past decade has come from shifting the form of inquiry from asking, 'What results can or might we get?' to '*What results are we getting?*' This makes the pupil, and not the teacher, the center of interest. * * * Simple as it sounds, this change in the form of inquiry is the keynote of the whole scientific method in education.

"'How much?' and 'How many?' and 'With what results?' are going to displace guess-work, imagination, and oratory as criteria for shaping educational policies.

"The time has already passed for us to query whether or not we shall endorse and adopt the new scientific criteria of exact measurements and judgment by results. The new method is upon us, and the question at issue is no longer, 'Shall we adopt it?' but rather '*How shall we utilize it?*'"

These words of Dr. Ayres may be epitomized in the two words, Efficiency and Measurement—efficiency of the pupil, not of teacher alone—efficiency of the pupil based upon the efficient teacher, the efficient method—and the three measured by analytic scrutiny, "the new scientific criteria of exact measurement and judgment by results." Efficiency, in its entirety, covers everything that enters into the operation of our schools of whatever nature. In this modern day everybody and every movement is coming to be measured by, and for, efficiency, a word representative of the idea of *effective* competency. This effort at the present time is not as general and thorough as we would wish it, or as it will be in the future—and that it is certainly coming with its impartial judgment, cannot be denied. Are we ready for its judgment?

Widely scattered as we are, and without uniform methods and criteria of almost every kind, the incentive for higher things may become deadened through lack of definite information as to our own shortcomings, of the excellence of others, of this procedure, or of that. With some more-or-less definite plan for measurement of efficiency, Class A schools may become still better, and Class B or C schools may clearly measure themselves in terms of Class A and improve their

standing; and the resultant will be that the general movement will be strengthened in every way.

There is an unrest pervading the whole educational field, too, more pronounced than ever before in the history of the country. Those of you who have attended the National Education Association meetings from year to year and kept up with its proceedings and trend of thought have been struck, no doubt, with what seems to be the inconsistency of that which is recommended from time to time. If you will go to these meetings and listen to the thought given expression, you will be inclined to think that the whole educational structure is weak. But this is really a vigorous and healthy sign. It indicates that we appreciate our deficiencies and delinquencies and want to move forward. If the time ever comes when we are satisfied with that which is, educationally, that means we are going backward; *we must be progressive, or retrogressive*. And in order for progress there must be constant agitation and reaching out toward ideals—"new principles formulated, new truths recognized, and traditional practice readjusted"; and these things constitute the permanent problem of the "ever-solving, but never-solved," problem of education.

Prof. Paul Klapper, writing in the *Educational Review* in December, 1914, concerning the governing end, the goal, and of time and effort in education, states that "efficiency is that state in which we approximate preconceived ends or values through economical expenditures of time and energy. In every efficient activity, one finds, therefore, three distinct elements: (1) *The selection of a goal*. The value of the end of any human endeavor determines at once its efficiency. (2) *Economy of time*. Every successive moment must find us working in a direct line gradually but surely bringing us closer to our preconceived end. (3) *Economy of effort*. There must be close concentration, faithful application, unswerving labor toward the realization of the set goal. In the final analysis, efficiency is determined by the worth of the governing end." And this statement of Prof. Klapper is emphasized by the following statement of F. W. Ballou, of Boston: "A standard of achievement is the aim or goal toward which teacher and pupil work. *Without* a well-defined standard of achievement, a teacher's efforts are likely to be scattered and much energy misspent. *With* such a standard, the teacher's problem in teaching, and the pupil's problem in learning, are

more definitely defined and the chances of better accomplishments are materially increased. * * * The ultimate purpose of all educational investigation and measurements should be to increase the effectiveness of the instruction which each child is to receive. Every educational agency—i. e., every supervisor, every special teacher, every regular teacher, every school building, all text-books, all educational equipment of whatever kind, in fact, everything within the public school system—is fundamentally for the purpose of providing the instruction which the child needs to make him individually and socially efficient.”

Thus it will be seen that in the final analysis there is presented for determination by the committee the one great question of Efficiency and its Measurement—first, individual and particular efficiency of pupil, of teacher, and of all that pertains to the progress of the pupil; and, second, collective efficiency of the school as a whole. Then, this individual and collective efficiency must be measured for expression in terms of scales, grades, and norms which, to be of worth, must be standardized, that is, must be of uniform value and use (unified procedure) in the various schools. In arriving at this efficiency and its measurement, many important and varying conditions must be given consideration and find place in the resultant algebraical equation. The problem may be stated in brief topical form as follows:

1. The establishment of a scale, or scales, for measuring the mentality and accomplishments of deaf children, giving heed to both native and acquired ability—i. e., intelligence and performance-level.*
2. The establishment of age-grade, progress, and mentality norms.
3. The establishment of a composite scale of algebraical nature for measuring the efficiency of any school for the deaf.
4. And in connection with the above, the consideration of existing conditions in the schools affecting various phases of educational endeavors, and of psychic development generally.†

* Vide footnote, page 29.

† The term *psychic*, as used in this report, refers to the mind of man and pertains to the ordinary mental development as opposed to the physical development; in no case is it to be considered as referring to the extraordinary and unusual operations of the mind (subliminal or otherwise) suggesting occult or obscure phenomena wherein thought-transference, spiritualistic performance, mesmerism, clairvoyance, etc., find expression apparently implying connection with another existence and indicative of human faculties unclassified by educational psychologists.

It is to be understood, of course, that reliable and uniform tests must be used, and that the tests, scales, and norms to be established must be of such nature as will permit of common use, and be of common value, with either the deaf or the hearing if comparison of the two is desirable, which certainly should be the case. If, however, such comparison is not wanted, if comparison is wanted only for and between the deaf (individual, class, or otherwise), then other tests not applicable to the hearing may be used; but whether the one or the other be used, it is absolutely necessary that the test selected, with resultant scale and norms, shall be of standardized form and application based upon investigations in which standard (established rule of recognized value) and prescribed methods of procedure have been followed in *rigid and undeviating* manner with a large number of individuals of all stages and types of mental development.

In the discussion and study of these topical points the diversified views of many writers having reference to the education of both the hearing and the deaf, were given thoughtful consideration and especially so as to the question of the relation of natural growth and physical defects to school progress. Antagonistic opinions and facts were frequently presented and every effort made to place upon each its own true value. In the consideration of scales of measurement attention very naturally centered at first upon the well-known Binet-Simon scale, the first scientific method used for measuring mental capacity (and perhaps incidentally, intelligence); could it be justly used, as now applied with hearing children, in measuring the mental capacity of our deaf children, or must it be revised and adapted to their needs—or, should it be rejected altogether as inadequate for just results with the deaf, and another of different kind be adapted or devised to meet the requirements? It was finally decided to do the latter. The reason for this decision will be given in a subsequent part of this report* wherein reference will be made to the Binet-Simon and other scales, and pointing out the imperative need of measuring scales in educational work, their advantages and disadvantages as used today, and the stories they tell. The day of the "little red schoolhouse" and the familiar story of "Mark Hopkins and the log," however much good was then accomplished, are of the past and re-

* Vide Chap. X.

main only as memories of faithful, yet incomplete and not far-reaching, effort to satisfy the needs of their time. Today, change and progress is evident in every line and phase of educational endeavor and its motivating spirit is for excellence and efficiency, in mental, moral, and physical, life. The world of thought and action today is coming to differentiate the forceful qualities, or lack of such qualities, of teacher, pupil, and man through the knowledge of wide experience given expression in rules, tables, and scales of measurement. We could not escape its decrees, if we would; and I feel that we would not, if we could!

There are three general questions that are being given earnest consideration by educators of the hearing and the same may be wisely considered in our own special work: (1) Does our school training develop all the senses and mental processes of the child, or does it develop a few at the expense of the others? (2) Does the child think independently, or is he mechanical and automatic in his mental efforts—in other words, are we developing the cerebrum, or training the cerebellum? Are we producing reasoning power, or simply “habits” of thought instead through the “little brain”? (3) With it all, is there a development of “common sense”—common sense, the greatest gift that we may possess? Lack of common sense and “habits” of thought usually go hand in hand.*

*In speaking of this simple reflex, i. e., of this automatic ideation in which excitation travels paths “so thoroughly trodden, so well grooved” that no new avenues or bridges must be built, or new mental combinations formed, and in which the entire process runs off easily with little or no attention and, practically, without consciousness, Haberman writes: “There is no modification through memory images, no attention, no effort; it is not determined through tonal feeling, and awareness plays little or no part. Such reflex is not specific to the occasion, but general and always much the same. * * * Thus are explained many of our modes of expression, our peculiarities in speech, thought, and action, our crotchets, idiosyncracies, dogmatic points of view and judgments, the theories we harp on, opinions that cannot be changed, mental tilts, dispositions, etc.; and here, pathologically, one must add the “idees-fixes,” stereotypes, the insistence of many a delusion or abnormal or insane thought, etc., etc. * * * We may have an automatic association then, between ideas and ideas, between an idea and an act, between whole sequences of acts, the associations at one time having been consciously acquired, now running off without consciousness. They are usually of benefit to us—but under certain conditions may be the reverse.”

CHAPTER IV.

TERMINOLOGY.

Now, the scientific consideration and measurement of anything through inductive or deductive processes must assume the existence of that thing in some degree in fixed or variable *tangible* form which may be seen, felt, or heard—for instance, in the intellectual manifestation of efficiency and competency; or its existence in fixed or variable *intangible* form imperceptible to the senses—for instance, *intelligence*, the very basis of mentality, and which is evidenced in tangible performance of varying kind and degree, and in efficient and competent service. This general conception naturally presents for consideration two questions: (1) What *is* intelligence, and (2) What, if any, is the difference between the deaf and the hearing in their psychic development? So, before undertaking to establish measurements of intelligence, performance, efficiency, and competency, with their attributive associations, it becomes necessary to answer the two questions and, incidentally, to give consideration to the status of the deaf, to the nature of their schools, and to the blight of feeble-mindedness which is to be found in varying degree with both the hearing and the deaf.

But before answering these questions it will be helpful at this point to refer briefly to some of the terms and expressions used in this report—especially, to certain distinctions made relative to the intellectual faculties. In this day of scientific investigation and measurement of mental and physical faculties and abilities, of functioning processes, of efficiency, of values of class-marking (individual evaluation), of curricula, subject-studies, etc., the results are being written in terms that should be of uniform nature and fully understood by those interested, that is, by every superintendent, principal, and teacher, who would profit by what he reads and studies along this line with endeavors to attain a higher *performance-level** as an instructor of youth. These terms are not of easy understanding nor susceptible of exact defini-

* Vide footnote, page 52 and text, pages 32 and 53.

tion, and full comprehension of their scientific meaning will require discriminative study wherein the practical use of formulae in test measurements will tend to more clearly yield the idea to be expressed; and in some cases this will require more-or-less tedious and complex mathematical calculation. Writers seem lax to some extent in uniformity of expression and frequently present pseudo-standardized results through unstandardized procedure and terminology.

Intelligence, the basis of the intellectual faculties, or mental capacity, is generally conceived as including mental attainments of all kinds, that is, all mental qualities not of volitional or emotional nature (although these are frequently included) instead of ascribing to it a definitely restricted place within the mental functions as outlined by Stern, who has defined intelligence as "*a general capacity of an individual consciously to adjust his thinking to new requirements—it is general mental adaptability to new problems and conditions of life.*" This definition of intelligence, now generally accepted by educational psychologists, differentiates it clearly from memory "whose function is the conservation and utilization of conscious contents already given" (therefore, not new)—from talent, which "is a limitation of efficiency to one kind of content" (therefore, not general capacity)—and from genius "whose nature is to create the new spontaneously" (therefore, not adaptation to external factors). But this delimiting of intelligence does not mean, Stern adds, "the erection of sharply distinct faculties as in the old faculty theory. Intelligence, for instance, does not function by itself, and memory by itself; rather, every operation of memory is more or less impregnated with intellectual functions, and vice versa: the extent of this interconnection can be indicated only by the correlation of the tested symptoms. But just on account of this composite character of every mental process it seems to me that the definition of intelligence I have given above is indispensable as a regulative principle for further investigation: I mean, that any sort of perceptive, memorial, or attentive activity is at the same time an intelligent activity *just in so far as it includes a new adjustment to new demands.*"

Below is given in topical outline a brief explanation of a few of the terms and expressions of common usage in psychological examinations (based upon the texts of Whipple, Stern,

and others) which, it is hoped, may in some degree well serve the lay-reader along lines of scientific research, and lead to greater uniformity of thought and statement concerning test examinations and conclusions drawn therefrom.

MENTAL CAPACITIES CLASSIFIED.

INTELLECT. The sum of the mental powers by which knowledge is acquired, retained, and extended, as distinguished from the senses; the understanding. The passive intellect receives the impressions of sense; the active intellect, reasons on these impressions.

MENTAL FACULTIES. Intellect, Sensibilities, Will—Memory, Judgment, Abstraction, Reason, Imagination.

INNATE ABILITY OR CAPACITY. (Intelligence) Dependent upon neuro-muscular and brain structure, difficult of differentiation, and varies greatly on account of this dependence, and individually and racially.

MENTAL CAPACITY.* A complex of many elements—the algebraic sum of assets (mental traits making for progress and success) and defects (absence of such traits); quality or state of mind; mental power.

MENTAL CAPACITY CLASSIFIED. The Feeble-minded—the Dull and Backward—the Average or Normal—the Bright; the feeble-minded including the moron, imbecile and idiot.

INTELLIGENCE AND PERFORMANCE.

INTELLIGENCE—Coming from within, not from without; innate endowment; an intangible potential; a capacity independent of training. Operative intelligence—the development and use of efficiency and competency.

EFFICIENCY—May originate from within or without in varying degree; may exist without competency, sometimes (very low) without intelligence. Ability; the power actually developed (efficiency or competency, or in combination) by effort of training based upon inherent capacity (intelligence).

* Strictly speaking, differentiation should be made between mental capacity and mentality (mental power), the former term to be considered as covering the inherited neuro-muscular mechanism and tendencies (pre-disposition) susceptible to right response through self-effort and educational processes, and lying, as it were, in fallow state; while the term, mentality, should cover the accumulative progress due to such efforts from time to time as shown in performance of whatever kind. With both, of course, the inborn intelligence is included as the necessary operative force or potential. But in common parlance and written text, because of the inclusion of intelligence in both, the two terms are so frequently used as of identical meaning that it seems inexpedient to follow this closer division in our brief reference thereto.

COMPETENCY—Result of application of intelligence to efficiency tending to development and use of efficiency which, of itself, however, does not necessarily produce competency.

PERFORMANCE—Actual achievement resulting from ability evinced under conditions. **Performance-level**—the tangible expression of intangible intelligence indicating degree of educational advancement through experience, memory, physical growth, and sex, culture and normality attainments.

MEASURES OF GENERAL TENDENCY.

THE MEAN—The ordinary arithmetical mean, more often referred to as the average. In arriving at this average in a large number of cases, a short cut, by means of grouping, is frequently used and styled the weighted arithmetical mean.

THE MEDIAN—The median, or central value, is literally the middlemost of a group of measurements arranged singly in ascending or descending order, or the measure above or below which lie an equal number of measurements. The median (contrary to the mean, or average) gives little consideration to extreme deviations which are probably to be avoided in psychological observations and test examinations.

THE MODE—In distributing a series of measurements in ascending or descending order, the measure which appears more frequently than do measures just above or below it in the series, is termed the mode, the commonest single value, or the commonest condition in the series. Its primary use is to characterize a type.

MEASURES OF VARIABILITY.

THE AVERAGE DEVIATION—The mean or average variation of a series of measurements from the mean or average, of the series. Extremes (high or low) of measurements are sometimes referred to as maximal and minimal measurements.

THE STANDARD DEVIATION—A more accurate form of average deviation and more laborious to compute. Generally used by statisticians. It is the square root of the average of the squares of individual deviations.

THE PROBABLE ERROR—The median deviation which is found midway from the representative value in either direction—that is, it is a value such that the number of deviations

that exceed it in either direction from the median or mode is the same as the number of deviations that fall short of it. This probable error is of importance in correlation of two or more traits or capabilities as will be noted below.

CORRELATION AND FREQUENCY.

CORRELATION—There are uniformities or correspondence between natural phenomena formulated as “natural laws”; biological science discovers only *tendencies* toward uniformity and correspondence. Such a tendency of two or more traits or capacities is termed correlation, the degree of which is measured by its coefficient.

COEFFICIENT OF CORRELATION—In comparing the proportionality or degree of uniformity or correspondence of two or more traits or capacities, complete and perfect agreement is represented by unity or 1.00 (or by 100, to avoid puzzling fractions), and complete absence of agreement by zero. Intermediate values between the two points indicate the varying degrees of tendency of uniformity or correspondence. This figure is termed the coefficient of correlation and must be at least three times the amount of probable error to give the ascertained correlation scientific value. This coefficient is often used to cover co-ordination (rank-orders), contingency (qualitative factors only), and association (direction and degree).

COEFFICIENTS OF WEIGHT, HEIGHT, AND VITAL CAPACITY—Of weight-height, of vital-height, of vital-weight, indicative of ratio between the pairs and secured by division of first term by the second in terms of kg. of weight, cm. of height and cu. cm. of vital capacity.

VITAL CAPACITY—Sometimes referred to as breathing or lung capacity.

THE NORMAL FREQUENCY SURFACE—Assuming errors of observation eliminated, experience has shown measurements will generally distribute themselves in the form of a symmetrical bell-shaped curve—variously known as the probability curve, the curve of error, Gauss’ curve, or the normal frequency curve—showing maximal frequency at the apex (mean) with equal deviation increases and decreases to and from it. When there are limiting or restricting conditions the resultant distribution departs from the normal curve

and is "skewed" to the right or left. With small standard deviation the curve is steep and compact; with large standard deviation the curve is broad and of easy slope.

FOR CONVERSION OF MEASURES—1 millimeter=0.03937 inch: 1 centimeter=0.3937 inch: 2.539 centimeters=1 inch: 1 meter=39.37 inches: 0.3048 meter=1 foot: 0.9144 meter=1 yard: 1 gram=0.035 ounce: 28.35 grams=1 ounce: 453.59 grams=1 pound: 1 kilogram=2.204 pounds: 1 cubic centimeter=0.061 cubic inch: 16.4 cubic centimeters=1 cubic inch.

AGES, RATIO OF PROGRESS, ETC.

CHRONOLOGICAL AGE—The number of years of life.

PHYSIOLOGICAL AGE—The stage of functional maturity attained=pre-pubertal, pubertal, post-pubertal (or pubescent).

ANATOMICAL AGE—The successive stages in anatomical or skeletal development and more or less closely connected with physiological age.

MENTAL AGE—The intellectual capacity (intelligence plus development of experience) expressed in age-years in comparison with other year-ages.

PEDAGOGICAL AGE—The normal age in years of the school class to which child belongs.

MENTAL QUOTIENT—The ratio of mental to chronological age—Formula: Mental Age divided by Chronological Age equals Mental Quotient, with exact correspondence placed at unity (1.0), or one hundred (100).^{*} This quotient will indicate retardation or acceleration, less than unity or greater.

RETARDATION AND ACCELERATION—The period which a child's mental development is behind, or in advance of, the normal level of his age and school grade.

AGE AND PERFORMANCE LEVELS—The age at which children or adults, of corresponding degrees of mentality or performance, may be classed as a group.

RANK ORDER—A class or group order arranged according to degrees of proficiency of attainments, of all, or of any one.

AREAS OF DISTRIBUTION OF IRREGULARITIES—The scope or range within which individual successes and failures may be found in qualitative or quantitative analyses.

^{*} Wherever possible, 100 is thought preferable to 1.00 as unity as it allows greater scope of consideration and avoids the use of fractions.

MORON—The higher type of feeble-mindedness—a borderline case sometimes difficult of judgment—with limited level of intelligence and performance, and incapable of further mental development.

PSYCHIATRIST—One skilled in the consideration and treatment of aberrant mental conditions: an alienist.

It may be well to emphasize here the discrimination that should be observed in the use of two or three terms, or expressions, that are frequently applied by writers and others concerning psychological matters which tend to some confusion as to just what is referred to although they may have in mind the same thing, or attribute. General intelligence, so often used, commonly means just innate intelligence which is neither general nor special, although it may be weak or strong; if it does not mean this, then the term must apply to general mental capacity which is intelligence plus something else of acquired nature. Intellect, the sum of certain mental powers, is not simply intelligence although the latter is part thereof; intellect may be developed through experience, training, and education (learning)—while intelligence cannot be. Mental capacity and mentality are synonymous as generally used. The mental quotient is frequently referred to as the intelligence quotient which is a misleading postulate if we ascribe to intelligence its innate character as elaborated by Stern and others—no child is born with intellect save that intelligence exists as the motivating power for later achievement. In arriving at the mental quotient through comparison of the chronological and mental ages, the previous life-experience enters very largely to influence the result which indicates its value as well as that of innate intelligence. But as intelligence can never manifest itself apart from the training that comes through life-experience, its measurement necessarily must be based upon learning (life-experience). To differentiate the two is not as difficult as it may seem. Assuming that all the members of a group to be measured have had equal opportunities at a certain age, or in a certain class or grade, in previous life-experience, variations in attainment under any test must be due to inherited capacity to learn, that is, to intelligence. As in these few, but important instances, so the need of discrimination could be pointed out in the use of other terms given above.

CHAPTER V.

THE DEAF, AND PSYCHIC DEVELOPMENT.

In our daily life as generally regulated today, there is probably no need for acute hearing of super-sensitive nature such as would be required by one living in a wild and dangerous environment, at least, we do not find it so, generally; on the contrary, however, there is very often imperfection of the *ordinary sense*, ranging from slight to more serious degree, which quite often is difficult of detection so largely do we unconsciously depend upon sight, action, and other varying modes of interpretation of sounds and of the spoken word. Among young children especially, for physiological and pathological reasons, the prevalence of defective hearing is very great as repeated examinations have shown; and no doubt, there has been much retardation with its evil results due to such recognized, or *unrecognized deficiency*,—in the latter case, and sometimes in the former, attributed to weak mentality, or to inattention, carelessness, or delinquency. Because of this condition it is hoped that this report may be of interest generally to those who would know something concerning the deaf, and especially so to teachers in the public schools who meet with such cases quite frequently in their various classes,—and who would probably discover additional cases upon closer observation and proper examination.

The problem of educating the deaf, who have not been able to attend the schools for the hearing, has presented, and is still presenting, many difficult questions since the first regular school for them was established in this country at Hartford, Conn., just one hundred and two years ago (1817); the same complicated questions that have ever been presented to those engaged in the education of the hearing,—and then, additional intricate ones because of the isolated and peculiar nature of the deaf and their natural lack of language ability when entering schools established for them. A marvelous advance—an evolution and a revolution—has been made in every phase of the work due to the wise and unselfish en-

deavors of hundreds of noble-minded men and women who have devoted their lives and talents to the ceaseless efforts of giving light and expression to the fettered minds of those who heard not and, consequently, spoke not—to those who, in early times, because of their affliction, “were practically outside the pale of human thought and activities; who were believed to be without reason and were little less than outcasts in society; but, who, today, have become active components of the State, possessed of education, on a level with their fellow-men nearly everywhere in the scale of human employment, capable of all the responsibilities of life, and standing in the full stature of citizenship.”—*Best*.

Notwithstanding this wonderful advance so well known to those having to do with the deaf in school, business, and social affairs, and who form so small a part of the population, the general public, seldom coming in contact with them, knows little concerning the class and possesses a vague idea that they are a “*queer*” sign-making people lacking in speech, therefore in mentality and the power to succeed as “normal people” do. This is not surprising when we consider that the education of the deaf has not always prevailed, that it was not until the fifteenth century that authenticated accounts of educational efforts were given, and that the ill-conceived and ignorant opinions of many centuries still cast their baneful shadows. References to the deaf were made and theories advanced and discussed as to their intellectual, moral, social, legal, and industrial status by the ancient philosophers and physicians, by the writers of Roman and medieval laws, and by the Church since the fifth century before the Christian era. Hippocrates and Galen, Aristotle and Pliny, the Fathers of the Church, and the noted jurists of ancient times, all discussed the status of the deaf only to recognize them as without intelligence and incapable of instruction. The Talmud classed them as not responsible for their actions and as exempt from the ordinances of the law, and the code of Justinian required that they should live under perpetual guardianship. *Tempora mutantur*.*

* Adelaide S. Baylor, at that time Assistant Superintendent of Public Instruction of Indiana, in an address of welcome to the Conference of Superintendents and Principals, meeting in Indianapolis in 1913, said in part: “Why do we welcome you? Because you are educators—educators in the real sense of the word. You are helping to build up and elevate society. You are doing more than we are, because you have difficulties to contend with that we who are teachers of normal children do not have to contend with. You are teaching us many wonderful lessons; you are doing much for society in general. You are training your pupils in such a way as to enable them to take their part in this

Now, the psychic development of those who hear, and of those who do not hear, is along a common natural line except that, lacking hearing and therefore speech, special efforts and methods of education are required with the deaf who naturally present the same general varying normal and abnormal conditions as to mental capacity as are presented by those with hearing and speech. Preyer claims that it was not language that generated intellect, but the reverse; that the human being brings with him into the world "far more intellect (intelligence?) than talent for language; and that the height of culture a deafmute can reach proves that the existence of intellect is not bound up with the hearing or the learning of articulate speech." As to the values of hearing and sight, upon the latter of which the deaf must almost wholly depend, he further says: "The great superiority of the ear to the eye, from the psycho-genetic point of view, is but slightly prominent upon superficial observation of the child that does not yet speak; but we need only compare a child born blind with one born deaf, after both have enjoyed the most careful training and the best instruction, to be convinced that after the first year, the excitements of the auditory nerve contribute far more to the psychical development than those of the optic nerve." In line with this observation is that of Pyle: "Another thing to be noticed is the complete dependence of mind, at least in man, upon sense organs. These organs are specialized nerve-endings, each type capable of receiving a certain sort of physical impression. They are the means through which the environment brings about brain changes,—the necessary accompaniment of mind. This fact makes the hygiene of the sense organs of the greatest importance to the teacher. A child without any sense organs would not have enough mind to quarrel about. And a child's mental life is incomplete if any sense organ is defective or abnormal." As to the soundness of these views there can be little question, and

bushy world; you are preparing them to become peaceful, industrious, and self-supporting citizens. We are taking boys and girls endowed with all their faculties and so teaching them as to send them out into the world as good citizens. But you are taking boys and girls hampered with limitations and fitting them for the duties of citizenship. * * * But more than that, you are also helping us. We are getting the greatest lessons we have today from you. What are we learning from you? We are learning that there are no limitations as to what we ought to accomplish in our work. * * * Then, you are helping us with our vocational work—in vocational work in which you have been the pioneers. We are just beginning to systematize these vocational ideas. * * * You have taught us the psychology of child study. We have learned our greatest lessons in psychology from your treatment of the child who is limited in his faculties. * * * We are all aiming at the same thing and your work is helping us. * * *

educators of the deaf know from experience that they are true; in combination they may well serve as an exponent of difficulties met with in the education of the deaf by and through any method, or combination of methods.

To emphasize in some degree the particular and peculiar difficulties presented when dealing with those bereft of hearing which possesses the greatest educational value of all the senses, and the loss of which results among other things in inadequate comprehension and use of language—the key which unlooses all knowledge—it may be well to refer briefly to the one problem of mental capacity as presented in children generally, regardless of the degree of hearing,—that is, the problem of congenital, or innate ability, susceptible of improvement,* and the improvement thereof within decided limitations, through educational processes. This innate ability, or capacity, which we may call *intelligence*, is probably a complex of elements of both body and mind—nerves, muscles and brain structure—difficult of differentiation. It is pretty well established, however, that all men are not endowed alike by nature (heredity) and that the “*gifts*” vary greatly as to neuro-muscular and brain structure between which there is more-or-less close reciprocal relation.

In the consideration of mental capacity and its development, it is almost needless to state that within the scope of this report it is possible to refer only briefly to a very few impressions by way of suggestion; and the writer hopes that what is written will prompt the reader to further thought and research in the matter, and especially to earnest study of the child’s mind—views, actions, instincts, impulses and instabilities—and natural causes therefor; and with further hope that what is written will lead to more individual work rather than general class-work with children who need to be approached from their own immature point of view rather than from the mature view-point of the adult—otherwise, there results a lack of mutual sympathy so necessary between child and adult, between pupil and teacher.

Two great subjects of scientific nature engrossing the attention of thinkers today are Eugenics and Euthenics (Nature and Nurture) which are as yet little understood by the general public. The first has to do with life, not after birth, nor

* Profitable employment² or ²use.

during foetal existence alone, but at and before its very creation; the second, with life-nurture after creation and birth. Emerson has stated that the "gate of gifts" is closed at birth, but he would have been more exact had he stated that it closed at the time of embryonic cellular creation; for *then* it is that life is first and finally marked with its natural distinctive quality—mental, physical and moral—which is to be ever borne through existence to be laid down only at the grave after constituent qualities may have been transmitted to children, and to children's children.*

"Life rolls away and bears along
A mingled mass of right and wrong."

Grapes are not gathered from thorns, nor figs from thistles, that we know; but do we know, or realize, that ancestors too often bind in chains of relentless tyranny (heredity) many of their innocent descendants? Now, here is one great problem of eugenics, as applied to man,—to direct through research and public discussion (not through unwise legislation and harsh and barbarous measures) such wise selection and mating of procreators as will result in wholesome, right-living offspring to the third and fourth generation. DeQuincy certainly had foundation for his assertion,—*Death we can face, but knowing, as some of us do, what is human life, which of us is it that, without shuddering, could (if consciously summoned) face the hour of birth?*

But what of environment?—what of surrounding conditions, influences, and modifying forces—are these impotent of good? Not at all! Health, and association, and education, certainly find expression in life's equation, (performance-level) sometimes for good, sometimes for evil; and freedom from inherited disease, whether active or latent, is a heritage to be prized as a basis for future development through association and education. Life-nurture has to do with these and other effective agencies, and their influence for good may be of very great force, with some so powerful as to become inwrought with one's very existence, but with others, either of no especial force or else appearing as a veneer superimposed by selfish consideration of the laws and conventional customs of the times. In any case, environmental influences must act upon what Nature has originally presented—and *this fact is*

* Vide page 53 ff with footnotes.

not to be lost sight of; and it may be added, too, that Nature is far stronger than Nurture.*

A child may be set down as a psychological being, writes Dr. Pyle, and the correct interpretation of the child requires a knowledge of biology and psychology from which springs the science of education. Sociology asserts that education is the process by which youth is trained for participation in social life, and psychology declares it is essentially a process of habit-formation—in both of which the dominant idea is one of adjustment to general environmental conditions and needs, thus re-presenting the educational principles of Rousseau, Pestalozzi and Froebel. He further adds that the acquisition of information is necessary only as a guide to the ultimate end, i. e., “a right response in the light of this information”; and that the resultant is a complex of uncertain nature when account is taken of heredity—of ancestral proclivities and the natural responses through the neuro-muscular system. “In this process of adjustment the function of the teacher is limited and his possibilities circumscribed. The utmost that he can do is to manipulate the environment of the child. Heredity, then, sets the first limitation; we can work only within the limits of heredity. We can have something to do with the outcome of the child’s actions in the way of pleasure and pain, we can make conditions favorable for the activity of one instinct or another, but more than this we cannot do, and it is well that we know it. Education, then, is a process of adjustment that teachers and parents can partially guide and control by virtue of their power to change and manipulate the child’s environment.”

Rousseau, whose writings furnished inspiration to Pestalozzi and Froebel, in writing his *Emile*—referred to by some as “*that exemplary prig*”—claimed that the wisest writers of his time devoted themselves to what a man ought to know without asking what a child is capable of learning; and such criticism is applicable today to many text-writers, lecturers,

*“All forms of human behavior may be ultimately traced to two fundamental causes, namely, inheritance and environment. Each individual is born with definitely inherited mechanisms and abilities for responding to his environment and his subsequent experience acts on his original nature to inhibit, modify or develop his inheritance in various directions. Without inborn abilities and tendencies on which experience may build, there could be no learning, and without learning there could be no behavior save that of the simplest and most rudimentary type. Learning is absolutely necessary for human attainment, but learning is always conditioned on the inherited nature of the individual. It is not worth our while here to discuss which is the more important, nature or nurture. It is sufficient to say, that if either of these two mainsprings of human conduct is markedly deficient in any individual that person can reach no high level of achievement.”—Colvin.

and teachers, with whom theorizing and "teaching above the children's heads" is a common and grievous fault. Dr. Dewey, commenting upon Rousseau's teachings, says: "His insistence that education is based upon the native abilities of those to be taught sounded the keynote of all modern efforts for educational progress. It meant that education is not something to be forced upon children and youth from without but is the growth of capacities with which human beings are endowed at birth. The first years of learning proceed rapidly and securely before children go to school (cf. the deaf—J) because that learning is so closely related with the motives that are furnished by their own powers and the needs that are dictated by their own conditions." And referring to Pestalozzi, he further says that his greatest contribution to education was the declaration that knowledge that is worthy of being called knowledge, training of the intellect that is sure to amount to anything, is obtained only by participating intimately and actively in the activities of social life. (Again cf. the deaf.)

It has been stated by some one not now definitely recalled (President Dwight, of Yale, perhaps) that of real knowledge, a child learns proportionately more between the ages of two and five years than during its after life. This dictum refers, of course, to the hearing child with his whos—wheres—whens—hows—whats—and whys—the little "live wire", all ears, and eyes, and words, in daily communion with active life and quick to respond to countless opportunities: and not to the little unfortunate bereft of hearing who receives more or less distorted images through vision, and dwells in silence and isolation, practically a stranger to the world, and even in his own family, until he is placed in a special school at seven years of age, or later. This contrast of early conditions, *despite the grade of intelligence* which may be equal in the two cases (perhaps of higher grade with the deaf) will serve to illustrate the difficulties presented in the education of the deaf; and it recalls to the writer the words of a distinguished educator of the deaf* who, in answer to his ques-

* E. H. Currier, New York. This question and three others were asked of Dr. Currier, Miss Yale (Northampton), Mr. Gruver (Rome, N. Y.), Mr. Kilpatrick, (Hartford), Mr. Argo (Colorado Springs), and Mr. Driggs (Ogden, Utah). The first question as given in the text was answered with an average of 4.3 years. The second and third questions were: "How rapidly does such a child catch up with a hearing child of corresponding age?" and, "Does he ever catch up?" The two questions were answered only in answer for the third, and the unanimous opinion was, that he *never catches up*. The fourth question was, "What is the *mental age* of a deaf child measured in terms of the

tion, "In comparison with a normal hearing-child of corresponding age, how much retarded generally is a deaf child (born deaf or losing hearing before acquirement of speech) entering school at seven years of age?" very quickly replied, "Seven years, plus", which, while perhaps an extreme view, well serves to indicate the natural backwardness of the deaf child. This natural retardation is further emphasized by the claim of the eastern psychophysicologist, if his reasoning be true, that during the first seven years of any child's life it is passing through the successive stages through which the race has evolved—a little savage, then semi-civilized, then the consciousness of the civilized man—and that he should not be asked to work out the chain of reasoning, because he cannot do it.

In this connection several queries naturally present themselves: If the child passes through the successive stages of development just cited, what effect does "silence and isolation" exert upon the proper, that is, the natural mental development?—and further, what effect upon the proper functioning of instincts and impulses, of memory-experience, and sensorimotor reactions?—and in the creation of instabilities? These, and kindred questions, are of superlative consequence in the development of children of all ages whether hearing or deaf, but especially so with the latter. A better knowledge will certainly lead to better balanced curricula and more evenly graded texts, both of which too frequently show pronounced lines of abnormality—to more successful work, in the four educational fundamentals, language, arithmetic, geography, and history, with economy of time and effort—and to more complete adaptation of life-requirements to the child's social needs; and especially so if the importance of the first six years of school-life, as stated by Superintendent Schoop of the Chicago city schools, be given full value:—"During the first six years of school-life the child's imagination is found to be active, the senses keen, the imitative powers at high tide, the will flexible, the mind receptive, and the memory retentive. It is the storage-battery period in the life of youth. It is the age when the capacity to receive a

hearing child for corresponding chronological ages at four different periods, viz., at 7, 10, 15, and 18 years?" The average of answers for the first age was 3.2 years; for the second, 6.3 years; for the third, 11 years; and for the fourth, 14.8 years. And note, these answers were made prior to the psychological testing of certain schools by Dr. Pintner, who established the fact that deaf pupils were between three and four years retarded in comparison with hearing pupils of corresponding chronological ages."

wealth of varied experiences and impressions is at its maximum."

The idealistic theorist, and the educationist trained along lines prevailing for the hearing child and its teacher in pedagogy, general psychology, and methods, and with prescribed class-room observation and practise periods all for and with hearing children, are likely to err greatly in passing judgment upon the school work and the development of the deaf to their very great detriment, however excellent they may be with the hearing. While it is true that the trend of education for the deaf child should be, and is, along the same line of effort as that for the hearing child, the many qualifications influencing the effort with the deaf child separates it as a distinct work within the educational field. This should be left to the trained educator of the deaf who, through years of close and constant experience with the class, knows the probabilities, the possibilities, and the limitations of the work as probably no one else knows them. Concerning this whole matter of deafness, which is not to be traced only as deafness from one generation to another, its causes and degrees, its transmission from one generation to another, its influences mentally, physically, and morally, and of the education of the deaf generally—these are questions that for scientific answer will require the joint services of the embryologist, the clinical observer, the teacher, and the psychopathologist. Ordinary observers may pass judgment readily; but their ignorance oftentimes obscures the truth.

While many difficulties are presented in the education of the deaf, *the* difficulty, the greatest of all and over-balancing all others combined, the only one necessary to point out herein because of its over-shadowing influence on the others, is that of giving them the power to comprehend, and the power to use, language with an adequate vocabulary in written and in hand-spelled or spoken forms in anything like easy and useful degree. Unlike the hearing child, the deaf child is almost entirely dependent upon formal education in acquiring language—language full of idiomatic and syntactical mazes. Concerning the hereditary transmission of language Weismann writes: "Language is not transmitted to our children although it has been practiced not only by ourselves but by an almost endless line of ancestors. The power of speech is

an acquired or transient character: it is not inherited, and can not be transmitted: it disappears with the organism which manifests it."* Binet speaks of the "peculiar mentality of deafmutes" in referring to their comprehension of language, and of having asked a deaf adult the question, "You were alone?", who replied, "Yes, I am alone, and I have two deafmute comrades." Pintner, who has made a more-or-less extensive examination of the language ability of deaf children, says that while some of this incorrect and often ludicrous expression is no doubt due to the difficulty that the deaf have in *expressing* themselves in idiomatic English, he believes that the greater difficulty lies in their inability to *understand* idiomatic English—that there would seem to arise a confusion of thought due primarily to partial comprehension further increased by difficulties in expression. That there is lack of ability to understand, and to express, and that there is confusion of language-thought, there can be no question; but how to overcome it is the problem of problems presented to teachers of the deaf. Hearing children during their first seven years have thousands of teachers and opportunities to acquire an understanding of language before they enter school—deaf children practically have neither teacher nor opportunity. In this day when "trenchant pens" of educators (or perhaps I should say, the pens of "trenchant educators") are writing so freely of the fundamentals in education (and no two writers seem to agree except upon a few non-essentials), the writer was prompted sometime ago to point out that the "fundamentals" (whatever they are) so far as the deaf are concerned, were all combined into one, and one only—language, and then, language—spoken, spelled, or written—and the power to read, and the power to sense what is read.† Then would other requirements follow more quickly, more easily, and with far greater results than are now attained.

Bereft of the sense of hearing and, consequently of natural speech, the deaf, with instinctive desires and impulses, seek communion with others through the use of an ideographic and grammarless *sign-language* following the line of natural thought which the English *word-language* does not do: the former is natural and of thought sequence, the latter, conventional and distorted as to thought sequence however nat-

* Vide pages 212 and 243.

† Vide page 140 this report.

ural it may seem to us through training and constant usage. To illustrate: In the latter case there would roll trippingly from off the tongue, *in words*, "Switzerland's high, snow-capped peaks are beautiful to look upon"—in the former case, "Mountains, Switzerland, high, many, uneven points, tops, fall from above white, beautiful, very", *not in words* (except the second, spelled out), but in a descriptive sweep of the hands and arms accompanied by illuminative facial and bodily expression, picturing a mental image of a thing seen—or gained from picture, narrative, or reading if never seen—pantomimic gesturing or pictorial writing in the air wherein expression is free to conform to the thought. In each case the primary concept is "mountains" with qualifying attributes, the secondary concept, "beautiful"—but the formation of the two expressions differs radically as to position of qualifying phrases; the first following the order of position indicated by our "rigid rules of obstinate syntax", the second, the order of natural thought regardless of position. Here, as in poetic or rhetorical license, it is shown that syntactical position does not of itself indicate the natural order of thought. And this is further shown by comparison of the Latin and sign versions of any syntactically written English story—the one is no more a confused jargon than the other, the two showing similarity in the arrangement and order of thoughts. However, with the ignorant deaf person, and especially with the young deaf child, some very amusing sign version stories are given, as for instance, the story told by a little deaf fellow who, with his older brother, Joe, and a dog, had run a woodchuck into a hollow log upon which the brother was pounding with a hatchet—"Joe shouted his dig, the dog hurraed his wag", was the way he wrote it afterward being "short" in language vocabulary—but the picture was all right! In the schoolroom the progress in language building is necessarily slow and particular stress is placed at first on the indefinite article, a hat, a chair, etc., to signify singleness and unity. One of these little boys after a while wanted his hair cut and applied to the superintendent for an order on the barber. The superintendent wrote on a card which he gave him, "This boy wants a hair-cut—O. K." The boy retired just long enough to read it when he returned to say excitedly in signs, "mistake, mistake, *many* hairs cut, want." These illus-

trations are given to indicate in some measure the basal idea or principle of the sign-language—not to imply that all the deaf so use it, for they do not. There are those who advocate word-signs instead of ideographic signs, and others, that signs of any kind should follow the English syntactical order which is contrary not only to the natural sequence of thought but also to the language order in the Latin countries whence it sprang. But to the writer the idea of word-signs, or signs used in syntactical order, seem out of place and character with the sign-language.

The definiteness and copiousness of the language will, of course, vary with the intelligence and education of those who use it. Sign versions may be of laconic nature (usually so) or of needless prolixity according to the signer's knowledge or disposition. Johnny, a beginner in school, had made a kite, the string broke when flying it, and the kite disappeared—and in telling of it he signed, "kite, make, fly, Jesus, get."

Generally, the sign-order referred to above is used in varying degree; but that the natural order of thought promoting it increases the difficulty of teaching the deaf the English language (so common and natural to the hearing), there can be no question. The sign-language, of necessity, has always existed and of necessity, always will exist—a beautiful, graceful language of intimate appeal, of rare descriptive power and of far-reaching effect with the deaf in every way where the cold, and quite often meaningless, words of a necessarily limited vocabulary would fall flat and fail of purpose. It is the abuse of the sign-language, not its use, that should be freely condemned. That it *is* abused by ill-advised use upon any and all occasions, and in all places, during school days, is true—and it is also true that such abuse detracts seriously from that success that should be attained in giving the deaf a full command of the English language (and all that that means—everything!) and such degree of speech and speech-reading as may be possible under existing conditions and circumstances.

In the opening lines of this chapter reference is made to the "marvelous advance—an evolution and a revolution", in the education of the deaf during the past century; and this advance may be said to have been rendered possible through

the wonderful advance in general education and its revivifying influence upon the world, a brief sketch of which may be permissible in the closing of the chapter, and of some interest and worth.

Five periods of time are to be especially noted in our educational advance since the Revival of Learning, since world emergence from the dark ages:—the World Renaissance of the 1500's; the beginning of American Education in the 1600's; the Revolutionary Stimulus of 1776; the American Renaissance beginning about 1825; and the Industrial Agitation ushering in the 1900's. The educational stories of these periods comprise the world's history of modern times, the history of the world's advance in civilization, spiritually and morally, physically, intellectually, and industrially, the history of the world's great achievements, all of which have been rendered possible, and only so, because of the diffuse of intelligence through educational lines of those great "*Doers*," or teachers and workers in the school-room:—

Sturmius (1507-1589) the Verbalist, who insisted upon masterly command of the language as the main thing to be attained.

Mulcaster (1531-1611) the prophetic English Schoolmaster, who advocated the very things which today we uphold as the cardinal virtues of our "new education."

Aquaviva (1543-1615) Commanding General of the Jesuits, who were among the first of educational reformers, and exponent of the Jesuitic system which was of such character, thoroughness, and strength as to endure almost without change even to very recent time.

Comenius (1592-1670) the first to treat of education in a scientific spirit, and urging education through the hand as well as through the eye and ear.

Basedow (1723-1790) the advocate of teaching everything according to nature, and creation of enthusiasm through variety and action.

Pestalozzi (1746-1827) who advocated, not teaching, but development through self-activity.

Froebel (1782-1852) the worthy pupil and follower of Pestalozzi whose methods he developed through self-activity and expressive action, or production, into the first *Garden of Children* established in 1837.

Horace Mann (1796-1859) the gifted and inspired educationist and the leader of the American Renaissance.

And it comprises stories of those great "*Thinkers*," or writers, who have done so much to influence the trend of education:—

Rabelais (1495-1553) insistent on wisdom, eloquence, piety and study of things, and differentiating between training and teaching.

Montaigne (1533-1592) insistent upon wisdom rather than knowledge.

Bacon (1561-1626) who sought to know the facts of nature rather than the thoughts of man.

Milton (1608-1674) advocating learning as a means of elevating the moral nature.

Locke (1632-1704) calling for development of mind and body and the formation of right habits.

Rousseau (1712-1778) claiming that education should be based on nature, men and things, and especially urging observation of children.

Spencer (1820-1903) teaching that the end and aim of education is preparation for complete living.

William T. Harris (1835-1909) ex-U. S. Commissioner of Education, who established the first public kindergarten in this country in 1873 and whose researches and writings have vitalized American education as none other since Mann.

Along the special line of educating the deaf, the history comprises stories of Pedro Ponce de Leon, of Spain (1520-1584); Charles Michel de l'Epee, of France (1712-1789); Thomas Braidwood, of Scotland (1715-1806); and Heinicke, of Germany (1729-1790)—the four great fathers and masters of deafmute education in foreign countries; and of another four, of America: Thomas Hopkins Gallaudet (1787-1851) who started the first permanent school for the deaf in this country at Hartford, Conn., in 1817; Harvey Prindle Peet (1794-1873) contemporary of the Gallaudets; Edward Miner Gallaudet (1837-1917) son of Thomas, who established Gallaudet College at Washington, D. C., in 1864, the only institution in the world for the higher education of the deaf, and served as its president for many years; and Alexander Graham Bell (1847-——) teacher, writer, scientist, inventor

of the telephone, and founder of the American Association to Promote the Teaching of Speech to the Deaf, which he and members of his family have richly endowed, as well as establishing for its use and benefit the Volta Bureau in Washington for collection and diffusion throughout the world of knowledge relating to the deaf and their welfare.

*"The singer is dead. But his mystical song
Echoes back from the gloom of the tombs,
With words for the weak, and the wise, and the strong."*

CHAPTER VI.

MENTAL CAPACITY AND HEREDITY.

It is well to begin this chapter with the question: What *is* mental capacity? The nature of this report is such as to inhibit a detailed discussion concerning it, but a very brief reference to the matter may prove worth while. Generally, it may be said, the term, mental capacity, is confused with intellect, intellectual attainment, mentality, and similar expressions, as synonymous terms—which they are not, strictly speaking.* While, of course, these latter terms are truly indicative of mental capacity, yet they stand simply as results of mental structure, functions, habits, and heredity—a mental evolution, and a joint development of the brain, the nervous system, and the physical structure, wherein training, memory-experience and volitional and emotional reactions exert a wonderful influence.

The structure of the brain with its millions of nerve-fibers and nerve-cells is of most extraordinary complexity, and the unravelling of the net-work of their interconnection and precise ascription of the faculty-powers or potencies thereof, would seem to be impossible except in assumptions of indefinite nature. Yet, considering the orderly arrangement of animate and inanimate life, it must be true that the presence, and manner of “knitting together” of these fibers and cells, surely indicate peculiar mental processes of systematic and purposeful ordination revealing “a connected structure and a common principle in its countless efforts.” With great uncertainty as to the processes of its general or particular functioning, still, much is known concerning it and its manifestation of *intelligence*—and it is with this attribute, which may be regarded as the master-key of the mind, that we are chiefly interested at this time.

What, really, is intelligence? Are the differences between bright and dull pupils differences in kind or in degree? Is intelligence inherited or acquired, or both? Is it a subtle something that is innate whatever its qualitative or quantitative character, degree, or grade—God-given only—to be dif-

* Vide footnote page 31.

ferentiated from other mental attributes but with each one of which it acts in greater or less degree as the potent force? Are all born with intelligence of the same degree tending to develop naturally and normally the same in all except that for forceful reasons it may be blighted in infancy and childhood, or cease to function correctly in the case of the epileptic, the insane, the drunkard, the criminal, and other abnormal ones? Can we distinguish general intelligence, that is, an innate unspecialized mental quality, from acquired knowledge, interests, dexterities and from specific endowment, aptitude, or talent? Can the degree of innate intelligence be increased by educational experience either in quantity or quality? These, and other questions of infinite variety but all resolvable into those mentioned above, are ever before us.

"Some believe," writes Radosavljevich, "that the child is bad by nature (Francke, Palmer, Graser); others claim that the child is good by nature but spoiled by its environment (Rousseau, Pestalozzi, Froebel); still others claim that a child is neither good nor bad—that it has only general unspecialized dispositions which may be developed in either direction (Wundt, Judd). In regard to the pure intellect some believe that the child's intelligence is inherited (Slidi's empiricism): and those who share the theory of genetism (G. S. Hall, Dean Balliet, Horne) say that the child's intelligence is both inherited and acquired. Meumann thinks that all these more-or-less different theories may be good for their own purpose and that a teacher who is dealing with a normal school child must judge a pupil's intelligence not only by its accomplishment of school tasks, but also by the energy (effort and time) expended in reaching this goal. Thus, three pupils may have the highest mark A in solving an arithmetical problem, but one did it in three minutes, another in thirty minutes, and the third, in sixty minutes. All three had the same highest mark—which is the brightest? Or, in memorizing a poem all three receive mark A, but one needs three repetitions, another thirty, and the third, sixty repetitions—which is the brightest? He gives, therefore, the following formula to determine a child's school intelligence*—*School Intelligence equals the work done divided by the energy expended.*"

* He probably means, School-Performance. Throughout this report the writer assumes intelligence as fixed in quality and quantity by Nature (heredity) and not susceptible of increase through educational training; but that resultant effects of such training based upon a given degree of intelligence is manifested in performance-level except in a few instances.

These views are very interesting as to the future conduct of the child, and it seems to the writer that the theory of Wundt and Judd as to "general unspecialized dispositions" presents a perfect connection between inherited intelligence of varying fixed quality and quantity and future performance as referred to below. With the theory that intelligence may be acquired he does not agree, believing that so-called "acquired intelligence" is in fact a manifestation of *increasing performance-level* through many influences exerted, but based upon a fixed hereditary intelligence as indicated in the following paragraphs. While the conception of intelligence enunciated by Stern is the one now generally accepted, there are others who modify or wholly disagree with him—Binet, Meumann, Ebbinghaus, et al.—and yet, a similarity pervades them all in the final analysis.

It is generally conceded that intelligence is a congenital endowment, individually and racially: that it is a force coming from within and one that cannot be given from without; that its potentiality must be considered as distinct from memory and instinctive and emotional reactions: and that its quality, or grade, is not increased by education. We cannot give one more intelligence but must do that which calls for the exercise of the degree of intelligence possessed in a way not to restrict its free play. "By insisting too much upon external discipline, training in method, and the acquisition of information, the condition may be provided which eventuates in atrophy of intelligence through disuse. We cannot give a child eye-sight if he is blind—but we can destroy his vision if he has it." (Witmer.) With varying grades of *intangible* intelligence we find their expression in *tangible* performance-levels; and it is *such* levels that may be raised through education—through memory and experience qualified by the potential (intelligence) back of it, and by physical growth, sex, culture, and normality, the latter established through consideration of deficiency-sufficiency, and insanity-equilibrium conditions.*

Following the Galton law the mass of mankind shows a most decided tendency to mediocrity. According to their natural gifts men have been divided by Galton into sixteen grades of natural ability, eight *above* a line of average attainment extending upward by successive stages to great emi-

* Vide page 100 as to progress based upon intelligence.

nence, and eight corresponding stages *below* the line extending downward to idiocy. Applying the Quetelet law of deviations from an average, with corresponding grades above and below the line embracing equal numbers, Galton's examination placed in the four lower mediocre grades (two above, and two below, the line) 838,140 out of each million, or more than four-fifths of the entire population; adding two more grades, the proportion is increased to 965,266, more than nineteen-twentieths, thus leaving but 34,734 for the remaining ten grades, five above and five below the line of average attainments, that is to say, but one-half, or 17,367, who are really worth while. In the fourth grade above the line he includes 7,848, "the mass of men who obtain the ordinary prizes of life"; in the fifth he includes 1,212; in the sixth, the lowest of the very superior classes, 117; in the seventh, 7, and in the eighth, representative of very great eminence, 1.

In this study of hereditary influences was established the law of ancestral heredity, generally known as Galton's Law. It was shown that in hereditary transmission, one-half on an average was derived from the two parents, one-fourth from the four grandparents, one-eighth from the eight great-grandparents, one-sixteenth from the sixteen great-great-grandparents, and so on, so that the offspring of such a line of ancestors would be the bearer of ancestral germ-plasms of thirty persons (four generations—133 years); while the offspring of nine generations (300 years) would be the bearer of 1,024 ancestral germ-plasms. But from the ninth generation to the present, while the *number* of ancestral germ-plasms have doubled for each successive generation (and will continue to do so), their *quantities* have been (and will be) reduced by one-half through a process of reduction due to fission in every generation (Weismann). We thus see that one-half of likely hereditary influences comes from the immediate parents, while the other half descends through a long line of ancestors in ever lessening measure as the earlier ones recede in time. In the fourth generation referred to, each single ancestral germ-plasm would form $1/30$ of the total quantity of germ-plasm in each germ-cell—while in ninth generation each single ancestral germ-plasm would form but $1/1024$ of the total quantity.*

Concerning the theory that the continuity of the germ-

* As to law of Reversion—Ativism,—vide footnote page 204.

plasm (substance of germ-cell and bearer of the tendencies of heredity—ideoplasm) is the foundation of heredity as held by himself and others, Weismann says: "A single cell out of millions of diversely differentiated cells which compose the body, becomes specialized as a sexual cell; it is thrown off from the organism and is capable of reproducing all the peculiarities of the parent body, in the new individual which springs from it by cell-division and the complex process of differentiation. * * * From the moment when the phenomena which precede segmentation commence in the egg, the exact kind of organism which will be developed is already determined—whether it will be larger or smaller, more like its father or its mother, which of its parts will resemble the one and which the other, even to the minutest detail. In spite of this, there still remains a certain scope for the influence of external conditions upon the organism. But this scope is limited, and forms but a small area around the fixed central point (nucleus) which is determined by heredity. * * * We cannot by excessive feeding make a giant out of the germ destined to form a dwarf: we cannot, by means of exercise, transform the muscles of an individual destined to be feeble into those of a Hercules: or the brain of a predestined fool into that of a Leibnitz or a Kant, by means of much thinking."

Galton, in considering the effects of heredity, claims that "each individual may properly be considered as consisting of two parts, one of which is latent and only known to us by its effects on his posterity, while the other is patent, and constitutes the person manifest to our senses. The adjacent and, in a broad sense, separate lines of growth in which the patent and latent elements are situated, diverge from a common group and converge to a common contribution. * * * The prepotencies or sub-potencies of particular ancestors, in any given pedigree, are (sometimes?) eliminated by a law that deals only with average contributions, and the varying prepotencies of sex in relation to different qualities are also presumably eliminated." Returning to Weismann, concerning variations in germ-cells, he says: "The germ-cells of any individual do not contain the same hereditary tendencies, but are all different, in that no two of them contain exactly the same combinations of hereditary tendencies. On this fact the well-known differences between the children of the same

parents depend. But the deeper meaning of this arrangement must doubtless be sought for in the individual variability which is thus continuously kept up and is always being forced into new combinations. Thus sexual reproduction is to be explained as an arrangement which ensures an ever-varying supply of individual differences."

Various hypotheses have been advanced in explanation of the mechanism of heredity—Darwin's pangenesis, Weismann's epigenetic germ-plasm, Galton's preformational, and the environmental dynamics, theories: and others, such as Hackels', His', Spencer's, et al. These various hypotheses are necessarily stated as formal and not real explanations, and with others to be offered in the future must remain, in the light of present knowledge, as scientific surmises. If ever the secret of nature should be discovered, complete transformation of the world would result—but such a discovery and transformation are of chimeric nature.

In descent, a defective character (deafness, for instance) may be eradicated through Nature's laws of reversion and extinction—*vis medicatrix naturae*—but, more probable, it may pass a generation or two in latent form to reappear later (Reversion-Atavism) when accentuated by meeting a similar taint through mating when it is commonly referred to as a "sporadic case" with no known cause—but there is a reason if ancestral facts were known. (Vide page 203.)

In theoretical curricula building, in superficial examination by diletant or superior educational inspectors who follow out lines of theory of their own subjective view, and in that common discouragement of the honest hard-working and competent teacher because her pupils do not seem to "rise to the occasion" with superior attainments—it is always well to bear in mind, the trite expression, *ex nihilo, nihil fit*, and that other common expression anent the silken purse and the swine's ear: and further, that "the development of mind, like the development of body, must be regarded as dating back far beyond the origin of the individual being." It is well, however, to balance this thought with another—that a non-progressive class is frequently the fault of the teacher.*

* The chief work of the school is to develop "thinking" and "doing" capacities and conceptions of a righteous life. Are we inclined to make good "guessers" and poor thinkers, ergo, poor "doers"? Are we co-ordinating head, hand, and heart? Does our school training develop *all* the senses and possibilities of the child,—or only a few at the expense of the others? Does the child think independently,—or is he mechanical and automatic in mental efforts? Are we developing the cerebrum for reasoning power—or

All children may be roughly divided into four general classes as to mental capacity which Witmer defines as a complex of many elements, the algebraic sum of assets (mental traits making for progress and success) and defects (absence of such traits);—that is, the feeble-minded—the dull and backward—the average or normal—and the bright—the first class including the idiot, imbecile and moron, the last, a group of exceptionally gifted children. While Nature's effort is supposed to function the same in all of them it has nevertheless stamped a varying characteristic impress (through heredity, disease, or whatnot) upon each one which must be taken into account whether the child be normal or abnormal, or with defective hearing or vision. If in some cases the causes of abnormality are severe enough to produce mentally defective children, they may also operate less severely in other cases to produce merely dull and backward children who should not be classed as feeble-minded as the term is generally used; the border-line cases should be given the advantage of every doubt. Whether measured by an age-grade scale or by a mental-capacity scale, the grade-repeaters and others form a large body of "retards" in our public schools, cited variously at from seven to sixty per cent. of the whole, (an average in nine leading cities of the country, of 35 per cent.) depending to quite an extent upon environment and its activities, individual and racial mentality, etc. Parenthetically, it may be stated that retardation is not necessarily confined to the weaker children—it may be that the exceptionally gifted child, "the best in his class", is really more retarded than the poorest in the class because of being held down to the dead level of the ordinary public-school course arranged for the average child which, as stated by Ayres, is too easy for the brighter

are we training the cerebellum into "habits of thought"? With it all, is there development of common-sense, of practical ideas? These are pertinent questions for the educator, and questions demanding the deepest consideration and a searching investigation of our methods, and the results of such methods as manifested in the performance-level of our pupils. One little illustration here will indicate the ease with which children fall into a habit of thought and automatic mental effort without thinking, which condition will grow into permanence unless overcome in time. The writer once stepped into a class-room where fractions was the subject in hand, and asked the class, "If a horse standing on four feet weighs twelve hundred pounds, what would be his weight if standing on three feet?"—and immediately came the answer from several (others giving assent by silence), "nine hundred pounds!" These children had acquired the "habit-thought" that three-fourths of twelve was nine, and applied it without thinking. This serves to emphasize the difference between "education" and "training" although the latter term is generally used as one synonymous with the former. Morrison, superintendent of public instruction in New Hampshire, tersely indicates this difference when he says: "Education stresses growth—training stresses habit. You educate the man, you train the farmer or mechanic. Adaptability is directly as education, inversely as training. Skill is directly as training, inversely as education. If you want both adaptability and skill, you must first educate, then train."

pupils, too difficult for the slower ones, and better suited for girls than for boys: and again, it may happen that a very bright child will be impeded in his progress because of physical and mental immaturity.

Now, all these four classes referred to above with resultant conditions are naturally to be expected among the deaf as among the hearing, and in about the same proportion. But in this connection, it must be borne in mind that "retardation" as used in relation to the deaf child does not carry with it the same significance as when applied to a hearing child. In the latter case, the retardation, if sufficiently great, and according to general tests as now devised (Goddard's revision of the B.-S. test with its three and two year bases, or the form-board, for instance), would signify mental turpitude or deficiency; in the former case, while these elements may naturally enter to some extent, still it largely represents a backwardness due to an enforced lack of experience and social intercourse with hearing-speaking people and their daily affairs. It is a term, as used with the deaf, for comparing the deaf child with a normal hearing child of the same chronological age, and generally indicates not so much mental retardation as it does a natural retardation due to lack of opportunity and a chance to succeed as comes to his more fortunate hearing brother; each is normal according to his mentality qualified by opportunity and experience. And in this connection it may be well to add that the ten-year-old backward normal child who grades at six years is greatly superior to the twelve-year-old moron who grades at six, eight, or ten years; there are certain characteristic traits, nodes of maturation and sensorimotor reactions that must be given consideration—the one is mentally normal although retarded, and capable of further mental development—the other is mentally abnormal, or mentally diseased, with his whole being affected, and incapable of further mental development.* Considered chronologically, the two may be at the same level temporarily, but the normal child, though slow and backward is possessed of initiative and is constantly growing in mentality and progress, however slowly, while the other has practically reached its zenith and is practically stationary. Deafness and mental defects are not necessarily associated—they are seldom associated at all. There is no more direct connection

* Vide last paragraph, page 85.

between deafness and mental defect than there is between lameness, or blindness, and mental defect; deafness is usually a physical defect as is the loss of an arm. When children, deaf through heredity, or congenitally or adventitiously so, are mentally defective (as a feeble-minded deaf person) the cause is not the deafness but some condition which causes both the deafness and the mental defect. Deafness and muteness are not two separate defects as is generally believed; muteness is simply the effect of a cause—deafness.* We imitate sounds heard and articulate speech results; those deaf do not hear and therefore cannot imitate, and muteness is the result unless overcome by artificial means which is being done in all of our schools to great or lesser extent. With hearing-mutes—i. e. those who hear but cannot articulate—the cause of mutism is nearly always mental inadequacy unless there is impairment of the organs of articulation which is seldom the case. In the first case, the muteness is generally the result of the absence of ideas, or of reflex action in the motor organs of speech; in the former, imbeciles have nothing to say, in the latter they have no desire to speak. At times cerebral disease of aphasic nature may result in partial or complete loss of power of articulate speech though the other mental powers and the vocal organs may seem unimpaired.†

The boys and girls sent to the schools for the deaf are generally not deficient in mind (imbeciles or feeble-minded), will (paupers), or emotion (criminals or with criminal instincts), and should not be placed in the general class of so-called "defectives." They are in school for the purpose of receiving an education such as given to their hearing-speaking brothers and sisters in the public school; and along the same lines and to the same extent as far as their affliction will permit. In fact, it is the duty of the State to provide for the deaf in these same public schools, but because of economical reasons, and for their more thorough instruction, they are gathered together in a central institution. The expenditure by the State for boarding, for school supplies, for salaries and wages, and, in a very few cases for clothing, is far less than would be the cost to the State for home instruction in local schools; and is not recompense to parents for the

* But see forward as to "word-deafness," page 243, footnote.

† Vide Chapters XXX-XXXI.

forced separation during nine months each year for a term of years. They resent the idea of themselves and their children being referred to as recipients of charity, and their sons and daughters as "*defectives*" as this term is generally used to designate mental and moral deficiency due to degenerative and criminal causes.

In the light of the preceding paragraphs and considering the Mendelian law, and the testimony of Weismann and Preyer, it is not surprising that today we are facing the greatest question ever presented to our social life—that of abnormal mentality and feeble-mindedness (to which the deaf contribute a due proportion) which are filling our public schools, our custodial institutions, and our general life, with socially unfit and defective classes—the insane, the epileptic, the criminal, the delinquent, the dull and backward, and the imbecile. Under the law of Mendel as applied to feeble-mindedness, and probably true for other defects (such as hereditary deafness) where the defect is of recessive nature, in the mating of a man and woman, each apparently normal, but capable of transmitting a defective neuro-muscular organization (i. e., those in whom the defective taint is borne in latent form), we will find in the offspring, on an average out of four children, one absolutely normal and incapable of transmitting the defect, two apparently normal but capable of transmitting it, (carrying the defect in latent form) and one openly and frankly defective. Careful observers claim that about sixty-five per cent. of those in institutions for feeble-minded have faulty heredity, leaving thirty-five per cent. as accidental cases, or "*cases in which exact conditions are not yet determined*"—a very large proportion of which, no doubt, may be added to the hereditary class. The problem is indeed a serious one even if the number of feeble-minded children is sometimes greatly exaggerated as the writer believes to be the case. The application of the Binet-Simon test as revised by Goddard with its two and three year bases seems to be extreme and unjust in its findings. The three per cent. rule of Pintner seems to be nearer the truth, and more just to the child, for its application reduces the Goddard proportion of feeble-mindedness about one-half and doubles the number of dull and backward children who are not feeble-minded as the term is used, and who need and deserve training and education along special, yet normal, lines.

CHAPTER VII.

NECESSARY AND DESIRABLE INFORMATION NEEDED.

In addition to a thorough knowledge of the educational work of our schools for the deaf—curriculum and the teaching force, methods employed and progressive results—definite knowledge concerning the following “five points” arranged in detail in tabulated form and given in group totals and percentages, would be most helpful in reaching just conclusions relative to the status and worth of a school; as a matter of fact it seems almost imperative that such information covering the entire existence of the school should be matter of record for inspection and consideration, for without it, uncertainty and confusion will surely result and “guess-work” will tend to establish its standard—comparison with other schools, whether for the deaf or for the hearing, will be impossible, and the individual worth of the school cannot be established so as to be judged by others except in most uncertain manner and form always open to both just and unjust criticism.

These five points are as follows:

1. Admissions—With age and date of entry.
2. Causes of Deafness—With degree of deafness and age of occurrence.
3. Discharges—Graduation and For Cause, with date and age of entry and leaving, number of years in school, and grade upon leaving.
4. Non-Attendants—Those who “drop-out” without discharge, with date and age of entry and leaving, number of years in school, grade upon leaving, and cause therefor.
5. Number of retarded, normal, and accelerated pupils by grades, showing rate of progress and grade “repeaters.”

In the tables of admissions (vide following paragraph), sex division should be made showing also the total number. Under points, 2, 3, 4, 5, sex division may also be made if desired; while this is preferable, it is not absolutely necessary.

Let me refer briefly to these points suggesting certain requisites and a plan of procedure for carrying the matter into effect.

Admissions and Causes of Deafness (1 and 2). For the information of each school and its contributing district (state, county or parish), and for comparison with other schools and school districts, it would seem desirable to arrange from the beginning—(a), a first table showing the annual admission of new pupils; (b), a second table, showing attendance by divisions of the district; (c), a third table (vide page 108), showing the causes of deafness as assigned by parents; (d), a fourth table (vide page 109), showing the ages at which deafness occurred, and (e), a fifth table (vide page 119), showing the degrees of deafness. The third and fourth tables, (c) and (d), should be arranged in groups of, say 300, or by some regular time period so as to indicate prevailing increase or decrease. It is believed that grouping by numbers with the time-period marked above is preferable to the plain time-period, and that the grouping in “three hundreds” is better than in a smaller number (which, however, may be used) in that the larger number will permit of sufficient latitude to embrace a more accurate and general average, and better provide for comparison. In small schools where the attendance has not been sufficiently large for such grouping, groups of “one hundreds” (or even “fifties”) may be used; but it is suggested that such smaller grouping be so arranged and annotated as to permit of its being included in “three hundred” groups at a later time. So far as the degrees of deafness is concerned, it is realized, of course, that where schools have not kept such records in the past, it must be taken up with pupils now in school and with incoming pupils; this applies also to other data which is not of record. Careful examination should be made of individual pupils by their teachers to determine the degrees of deafness and of hearing on the part of the pupil, for experience has clearly shown that assertions of parent and pupil are not very accurate. In testing for deafness and hearing it should be borne in mind that, for our school-purpose, it is not necessary to have searching, scientific examinations such as a specialist would make by means of specially devised instruments of delicate and exact nature for the purpose of determining pitch and intensity of

sounds, and for ascertaining the degree of bone and air conduction, etc., but should be made by teachers in the school-rooms by means of voice, bells, etc., so as to determine the degree of hearing each pupil has in either ear that could be put to use in the daily work, or that might possibly be of some benefit to the pupil in ordinary conversation. In more than this we are not practically interested. For the benefit of those who may desire closer and more exact examination of auditory acuity reference may be made to Whipple's Manual of Mental and Physical Tests, page 200, et seq.

For the purpose of uniform recording and reference to the varying degrees of deafness and hearing, it is suggested that the figure 3 stand for total deafness, 5 for feeble-hearing, 7 for considerable hearing, and 1 or 2, for one or both ears—that is, that 32 stand for total deafness in both ears, 31-71, total deafness in one ear and considerable hearing in the other, and so on, as shown in the following scale devised by the writer and used by him successfully for many years. Congenital conditions are to be represented by an asterisk placed before the term:

TABLE No. 1.

- | | |
|--------|--|
| 32. | Total deafness, both ears. |
| 31-51. | Total deafness one ear, feeble hearing in other. |
| 31-71. | Total deafness one ear, considerable hearing in other. |
| 52. | Feeble hearing, both ears. |
| 51-71. | Feeble hearing one ear, considerable hearing in other. |
| 72. | Considerable hearing, both ears. |

Discharges and Non-Attendance (3 and 4). The elimination of pupils from school is equally as important for consideration as the admission of pupils. They must come in for the purpose of education, and all that education stands for: and they should remain until that purpose has been completed, or practically so—that is to say, until they are measurably prepared to enter upon life's work for self-maintenance in consonance with both divine and human laws and requirements. If they leave before such absolutely necessary progress has been made, then, an injury has been committed against themselves and the community at large in which they reside. So, the question at once becomes of the greatest importance and, in a way, has direct bearing upon the worth of a school, although it should at once be conceded that much, perhaps the greater part, of the harmful elimination is beyond the control of the school management; but granting this

lack of control, the *State* can remedy the evil in some measure by the enactment of a compulsory school-attendance law, as suggested hereafter, and in seeing that a rigid enforcement of such a law is made.

This elimination of pupils from school presents itself in three phases—graduation or honorable discharge after full completion of the course, discharge for cause, and non-attendance. Concerning the first, nothing is to be said presuming the course an adequate one under existing conditions and that the instruction has been completed: the pupils enter, and the school exists for that purpose, and both school and pupil have performed their duties. Concerning the second phase, again not much is to be said because discharges for cause, serious and otherwise, are inevitable in all schools and to be expected and concurred in, presuming equity of action. Over these two phases the school officials have control. But it is the third phase that commands our serious attention so as to prevent as far as possible the commitment of an injury by the pupils against themselves and the community in which they live; and withal, indirectly, adverse reflection upon the worth of the school. In our schools for the deaf it is believed that thirty-five to forty per cent. of those entering have dropped out for one cause or another, neither graduated nor discharged and still privileged to return for further instruction if they would do so. Some of these non-attendants may be accounted for by deaths, sickness, and removal from the state or school district, but they constitute a small minority; the great mass of them have dropped out because of finding school duties and discipline irksome, because of childish likes and dislikes, and because of indulgent parents, or others who kept the child at home for the usufruct of its labor. Many of them, no doubt, may have found work which enticed them,—but how much better prepared they would have been by remaining in school and receiving further education. And too often it has been the case that it has been the brighter pupil who thus drops out, and not the stupid one. In this connection it should be said that comparison between the hearing child and the deaf child as to non-attendance at school, is not a just one for the reason that the former is receiving an education every hour of his life through his hearing and association with hearing-speaking people; while to the deaf child such an education is wholly denied, and he must grope in the dark.

Not only in schools for the deaf is this pernicious elimination taking place, but its prevalence in hearing schools is being decried by educators everywhere; and it is greater with them than with us which, however, in nowise presents any justification for the offense (for it *is* a most grievous offense against the community) and offers no excuse on our part for not correcting the condition as far as may lie within our power. And it is only for the purpose of clearly presenting the existence of this evil which is constantly spreading its poison through ill-conceived and ignorant ideas and efforts, that the writer refers to its general prevalence in the hope that in our schools for the deaf we shall in the future overcome in great degree, and minimize, the evil for resultant increased good to the deaf. Dr. Thorndyke, a few years ago (and the writer very much doubts whether the situation has improved greatly by this time), stated in a report issued by the United States Bureau of Education, that in twenty-three cities, elimination began in the first grade, and continued steadily—that twenty per cent. dropped out by the fifth grade, and that only thirty-three per cent. of the whole remained for the eighth grade. As stated by Ayres, ten per cent. leave the grades at or before thirteen years of age, thirty per cent. at fourteen, thirty per cent. at fifteen, and fifteen per cent. at sixteen. While there is a difference in the views of various educators on this matter of elimination, a fair and liberal consensus seems to indicate that the general tendency of city schools is to carry 100 per cent. through the fifth grade, 50 per cent. through the eighth grade, and only one in ten through the final year of high school: that there is less of a gap between the eighth grade and first year of high-school than between the seventh and eighth grades and the first and second years of high school: that less than three-fourths continue attendance for three-fourths of the year; that irregular attendance leads to low percentage of promotions followed by dissatisfaction, non-progression, retardation, and elimination: that there is 14 per cent. more girls than boys in high-schools (the only nation with more girls than boys), 25 per cent. of the boys continuing to the fourth year, and 31 per cent. of the girls: that retardation in elementary schools is 13 per cent. more prevalent among the boys than the girls and that 17 per cent. more girls than boys remain to the eighth grade; that percentages of promotions in elementary and high schools is

greater for girls than for boys, "the schools being better fitted for the girls"; that physical defects decrease with age which, therefore, is an important factor; and that certain physical defectiveness (glands, adenoids, tonsils, defective breathing, etc.) has a distinct and important bearing on progress which, however, is not the case with defective vision as would be expected.

To remedy in great degree the evil of non-attendance and to supplement the work of the superintendent of the school through correspondence with parents, city and county superintendents, court officers, and others, effort should be brought to bear for the enactment of a *compulsory education law for all children* which would include the deaf specifically; or to amend the present law which may be on the statute books to include deaf children if that provision be not now included. With this need in mind the following outline covering both the deaf and the blind is suggested for enactment into law:

If a child not physically or mentally disqualified (and in such cases a physician's certificate must be presented) shall by reason of deafness, or partial deafness, or of blindness, or partial blindness, be unable to secure in the schools named herein (public, private, or parochial) a proper education by use of the sense of hearing, or of the sense of sight, the parent, guardian, or other person having the control or charge of such children, shall cause them between seven and eighteen years of age to attend the _____ State School for the Deaf, or the _____ State School for the Blind, during the full scholastic terms of said schools unless discharged therefrom by the Board of Trustees of either of said schools; and the employment by any one of said children between the ages of seven and eighteen years during the school terms of said schools respectively is hereby prohibited unless a certificate of discharge, or a permit for absence to engage in work, issued by the superintendent of either of said schools, shall be presented.

With this section there should be added further provision as follows: Truant officers (to be appointed by the State) who fail to do and perform their duties under this law shall

be fined five dollars for each such failure. Any parent, guardian, or other person having charge of a deaf, or partially deaf child, or of a blind, or partially blind child, subject to the provisions of the law, who refuses to send such child to the proper school at any time during the compulsory years, shall be fined from one to twenty-five dollars, to which may be added imprisonment in the county jail for from two to ninety days; and any such parent, guardian, or other person having control of such child who shall permit its employment, and the person employing it, between the ages named during the scholastic year without certificate of discharge, or one of permission, from the superintendent as stated, shall be guilty of a misdemeanor and fined from ten to fifty dollars. Confirmed truants (shall or) may be sent by the judge of the juvenile court, or of the circuit court, of the truant's judicial district, to one of the custodial institutions of the State and maintained there the year round under the rules of the institution to which commitment is made. If either of said schools will not, under its rules, receive said deaf or blind (or partially so) children, then no penalty provided herein shall operate against anyone named until such children are accepted by either of the schools.

The above is, of course, only a suggested outline of a portion of a general compulsory law applying to all children, thus avoiding criticism of class legislation, to be changed and adapted as circumstances may require in different localities. There are some who may object to compulsory school laws, to compulsory laws of any kind, who are earnest and sincere in their objections, and ultra-conservative; but the many who cry out in vehemence against restrictions of any kind have made a veritable fetich of their personal liberty, forgetful that the right and liberty of one ends when that of another begins, and that uncontrolled liberty leads to anarchy. It is only in the light of controlled personal liberty that freedom holds fast.

The deaf child practically has none of the preparation of a hearing child for school. He has existed virtually as a stranger in his own family. And when he starts to *his* school at seven he must begin to acquire that which his more fortunate hearing brother of equal age has been acquiring for seven years. That he must have more time than his brother to reach a common level should be readily apparent. To expect

equal progress of the two year by year is to expect an impossibility. In order that the deaf boys and girls should go forth prepared to become self-respecting, self-supporting and worthy citizens, the State for its own protection, to say nothing of the great good to accrue to them (and to all children), has the just right to insist that they should remain in school until properly prepared to assume the burden—nay, more than this, it is a veritable obligation resting upon the State to insist and demand that they shall remain: and the obligation rests also upon the parents and others to keep them in school as long as it may receive them under its rules.

[*Rate of Progress, Retardation, Etc.* (5). In considering the normal, the retarded, and the accelerated pupils and showing their rate of progress in school work through the various grades with the number of “repeaters” of grade work, it should be done, of course, in terms of age-and grade-assignment—and this means that an Age-Grade Scale of some sort must be brought into use. In the beginning of our work in this country, just one hundred and two years ago, the deaf child was not received as a pupil until well advanced in years, perhaps, and frequently so, an adult, and was allowed but a very short time (three to five years) in school. Under such restrictions and with the small number of pupils of diversified age and mental attainment, correct grading of the school according to age, ability, school progress, etc., must have been impossible—and no systematic division was made to show the things called for today when they have reached far greater enrollment and broader scope in educational practice and outlook. Now the general entering-age for pupils has been reduced to seven years, or younger, and they may remain generally for ten to twelve years, thus approximating the rights and privileges of the hearing child. Under such circumstances it is possible to arrange the pupilage in thoroughly graded classes, and to ascertain existing conditions as to rate of progress, retardation and acceleration, and repetition of grades, etc.* But, before considering and measuring such conditions it becomes necessary to present a basic scale for the purpose which will be done following a brief discussion of admission questions and test-measurements, and scales representative thereof.

* Such gradation cannot well be made in small denominational, private, and public day schools.

CHAPTER VIII.

ADMISSION QUESTIONS.

There can be no valid objection presented, it seems to the writer, why the information called for in the preceding chapter should not be standardized and made of uniform usage in the various schools; on the contrary, every consideration demands such uniformity, if we would have an intelligent and useful knowledge and understanding of the deaf and of the educational work of our schools. And no part of such necessary and common information is more important than that to be acquired concerning pupils when they first enter school, as will be seen by a study of the subjoined questions which are submitted as a standardized outline to be followed by all schools. The answer to these questions, which are to be made matter of record, constitute a full written history of the child up to date of entrance, and should be submitted by parents, or others, when applying for its admission: and will show name, age, degree, time, and cause of deafness, degree of speech, if any, previous instruction, if any, physical, pathological, and mental conditions, the intimate family history through parents and grandparents, etc., etc. Questions 19-30, as stated on pages 71 and 87, are designed to discriminate between normal and sub-normal mentality and if the answers thereto would suggest sub-normal mentality, then the further questions and tests on pages 88-89 may be used for extended inquiry. These admission questions cover such a variety of information that it is inexpedient to refer to them here in specific detail and the reader is requested to study the list for discriminative values.

It is suggested that these questions be printed in ruled eight-page form ($8\frac{1}{2} \times 11$) the questions taking one-half of the page vertically thus leaving the other half for answers. An appropriate heading-form and closing paragraph should be added, and on the folded back should be provided a "filing-brief" and two number spaces, one for the year and one for the continuing aggregate or accession number. To the 148

questions enumerated, two more should be added, viz., 149, the certificate of an examining doctor, that the child is not insane, epileptic, or feeble-minded and is in fit condition of body and mind to be received as a pupil; and, 150, a notary's certificate of legal residence in a specified county of the State—or municipality or community. The application should also contain a properly displayed paragraph directing that a careful examination of the child should be made by family physician, or other one, for defective vision, adenoid growth, enlarged tonsils and defective teeth, and that these should be attended to before admission to the school as a pupil.

ADMISSION QUESTIONS—FORM B.

(Of confidential nature—not for publication.)

THE APPLICANT AND SUPPORT OF CHILD.

1. What is the relation of applicant to child?
(Grandparent, parent, uncle, aunt, brother, sister, cousin, guardian or friend.)
2. Does the child live with its parents?
3. If not with parents, with whom?
(Give full name and address.)
4. If not with parents, how supported?
5. If admitted as a pupil will all necessary clothing and transportation (estimated \$20.00 to \$40.00 per year) be provided, and by whom?
6. Or will it have to be provided by this School in whole or in part, and then charged up to your county for collection?
7. If by this School, will not your township trustee or county commissioners help you before coming, and thru the year? See them!
- Give name of your township trustee and his post office address.
8. Who proposes to act as correspondent for and take charge of child during vacations or at other times?
 - a. Give name.
 - b. Give post office.
 - c. Give county.
 - d. Give telegraph address.
 - e. Give telephone address.
 - f. Give name of railroad station.

All letters and notices of every kind will be sent to correspondent here named and to no one else.
9. What is the relation of this correspondent to child?
10. Your promise:
If your child be admitted as a pupil do you promise to conform to all rules and regulations of the School, and that you will not ask that your child be sent home during the holidays, nor at any other time during the school year, except in case of sickness; also, that you will do all within your power to defray cost of clothing and transportation?

THE CHILD AND ITS MENTALITY.

11. Give name in full of child (middle name included.)
12. Boy or girl?
13. Of what nationality and color?
14. Date of birth of child? Give month, day and year.
15. Place of birth of child? Give town, county and state.

16. Where is child now living (town and county)? And how long there? (Answer all three.)
17. How long has the child been a resident of State?
18. Where was the child living before becoming a resident of State?
19. What is the natural mental condition of the child? Bright and quick, or dull and sluggish?
20. Will the child obey a command?
21. Can the child do an errand?
22. Can the child distinguish forms and colors, one from another?
23. Has the child any idea of number?
24. Is the child's attention easily got and held?
25. Is the child's power of imitation strong or weak?
26. Has the child a retentive memory?
27. Has the child any constructive ability?
28. Does the child play with its brothers and sisters, and others, who hear and speak?
29. Can the child care for itself in a general way?—dress and undress itself, care for itself at table, satisfy calls of nature without assistance, go up and down flights of steps by itself, etc.?
30. What efforts have been made to instruct the child at home?
31. Has the child been under instruction at any time other than at home?—in public school or institution?
32. If so, where, when, and how long?
33. Can the child print or write? Which?
34. Can the child read?
35. Does the child understand written language?
36. Does the child draw or sketch, or attempt to?
37. Can the child count, and how far?
38. Has the child learned to perform any kind of labor or to usefully employ itself? If so, in what way?
39. What has been the general moral conduct and disposition of the child?

THE CHILD'S DEAFNESS AND SPEECH.

40. Was child born deaf? Answer, "yes," "no," or "doubtful."
41. If doubtful, give some reason for being so.
42. If born deaf can you suggest any cause for it?
How old was child when you discovered deafness?
43. If not born deaf, state cause of deafness, naming sickness or accident and age it occurred.
44. Is the deafness total or partial?
45. Have efforts been made to cure the deafness? And if so, with whom and with what results?
46. Is the deafness becoming greater or less at this time?
47. Is the child too deaf to be educated in the public schools at home?
48. Have you tried your child there? And how long?
49. If there is partial hearing is it feeble or considerable?
50. Is it better in right ear, in left ear, or equal in both ears?
51. What is the character of sounds heard by the child? "Human voice" or "other sounds." (See 53-54.)
52. Is the child's ability to distinguish kinds of sounds heard by it feeble or considerable?
53. To what extent can the sound of another's voice be heard by the child? And at what distance?
54. Name some of the "other sounds" heard by the child.
55. Could the child talk more or less distinctly before deafness occurred?
56. Can the child speak any words more or less distinctly now?
57. If child possesses speech, is it slight or considerable?
58. Is it growing better or worse at this time?

59. Give a number of the words spoken by the child?
60. Are these words well pronounced and intelligible to others?
61. Does the child understand spoken language from the motion of lips of another to useful degree? Answer "no," "slightly," or "yes."
62. How does child communicate with others? By speech, by writing, or by signs? Describe.
63. Is such communication intelligible to parents and others?

THE CHILD'S PHYSICAL CONDITION.

64. Is the child of usual size and weight for present age?
65. Was the child born at full term?
66. Was the labor difficult or ordinary?
67. Were instruments used at delivery?
68. Was there lack of animation in child at birth?
69. Had the child a convulsion soon after birth?
70. Was the child a strong or a weakly babe?
71. Has the child perfect use of legs, arms, hands and feet? Answer "yes" or "no."
Describe any imperfection fully.
72. Is there any irregularity in walking?
73. Or any difficulty in going up or down stairs without assistance?
74. Is there any paralysis, deformity, malformation or physical weakness? Answer "yes" or "no."
If any, describe fully.
75. Is there any derangement of nervous system?
76. Has the child chorea, palsy, epilepsy or fits?
77. Is there heart trouble or irregularity of any kind?
78. Is there scrofulous ulceration or glandular swelling?
79. Is the child of scrofulous nature?
80. Is there cold in the head or catarrhal trouble?
81. Is the child subject to coughs, colds, sore throat, tonsilitis, etc.—which?
82. Or subject to rheumatism or glandular swelling?
83. Are the lungs in sound condition?
84. Is there a tendency to scrofula or consumption in the family?
If so, upon which side of the family, mother's or father's?
85. Is there any suppuration or running of the ears?
86. Has the child any acute or chronic cutaneous disease of body, hands, face, or scalp, or any symptoms thereof?
87. Or rupture, or any stomach or bowel complaint?
88. Or any urinary trouble?
89. Does the child wet or soil the bed?—or its day clothing?
90. What is the condition of the eyesight? (A very important question.)
91. What is the condition of the teeth? Good, or bad?
92. Is mouth well shut, child breathing principally thru nose? Or is mouth usually open thru which it breathes?
93. Has the child adenoid growth or enlarged tonsils?
94. Has child been successfully vaccinated within past three years?
When?
95. Has the child had epilepsy, convulsions, spasms or fits? If so, which, and when?
96. Or measles, chickenpox, scarlatina, erysipelas, or smallpox? If so, which, and when?
97. Or mumps or whooping cough? If so, which, and when?
98. Or any other contagious disease? If so, what, and when?
99. Or any disease of the stomach or bowels? Or other severe sickness? If so, what, and when?
100. Do particular drugs or medicines produce a bad effect upon the child? If so, name them and describe effect.

CONCERNING GRANDPARENTS.

101. Give full name of paternal grandfather, and nationality.
102. His birthplace and date of birth.
103. Give full *maiden* name of paternal grandmother, and nationality.
104. Her birthplace and date of birth.
105. Give full name of maternal grandfather, and nationality.
106. His birthplace and date of birth.
107. Give full *maiden* name of maternal grandmother, and nationality.
108. Her birthplace and date of birth.
109. If any of above are dead, state which, giving date and cause of death.
110. Were grandparents on either side cousins or otherwise related before marriage? If so, state in what degree.
111. Are or were grandparents on either side deaf?
112. If so, were they born deaf or was it caused by sickness, accident or old age?
113. If by sickness or accident, give cause and age it occurred.
114. Did or do any of them have deaf parents, brothers, sisters, uncles, aunts or cousins? If so, name them, give cause of deafness and age it occurred, if known.
115. Are or were any of grandparents subject to consumption, neuralgia, scrofula, paralysis, or epilepsy? If so, which?
116. Or to hysteria, chorea, eccentricity, insanity, extreme nervousness or constitutional taint? If so, which?
117. Or excessively given to the use of alcoholic drinks, tobacco, opium or other narcotic? If so, which?

CONCERNING PARENTS AND CHILDREN.

118. Give full name of father, including middle name, and nationality.
119. His present address.
120. His birthplace and date of birth.
121. Give full *maiden* name of mother, and nationality.
122. Her present address.
123. Her birthplace and date of birth.
124. If either dead, state which, giving date and cause. If both living, say so.
125. If either dead, has there been second or other marriage on the part of either father or mother? Give names and dates.
126. If both living, are father and mother separated? Or divorced? Specify which, with dates.
127. If divorced, is either remarried? Give names and dates.
128. Were parents cousins or otherwise related before marriage? If so, in what degree?
129. Is, or was, the father deaf?
130. If so, was he born deaf or was it caused by sickness or accident? Give cause and age it occurred.
131. Is, or was, the mother deaf?
132. If so, was she born deaf or was it caused by sickness or accident? Give cause and age it occurred.
133. Has or had the father deaf parents, or any deaf brothers, sisters, cousins, nephews or nieces who are or were deaf? If so, give names, addresses, causes of deafness and ages it occurred, if known.
134. Has or had the mother deaf parents, or any deaf brothers, sisters, cousins, nephews or nieces who are or were deaf? If so, give names, addresses, causes of deafness and ages it occurred, if known.

135. How many children have the parents had? Give their full names and dates of birth in regular consecutive order, including any who have died, or were still-born, or of premature birth. If any by previous or subsequent marriage, give names of respective parents.
136. If any of the foregoing have died give names, dates and causes of death in regular order, including stillborn and premature birth.
137. Give names of children born deaf. Answer must agree with those to questions 40, 41 and 42, for this child.
138. Give names of children who became deaf through sickness or accident. Give also, causes of deafness and age it occurred. Answer must agree with those to questions 41 and 43, for this child.
139. Are all children now living sound in limb, body and mind, of usual size and free of malformation or deformity? If not, give names and causes of complaint.
140. What is the father's occupation?
141. What is the mother's occupation?
142. Has there been a case of blindness, insanity, epilepsy, feeble-mindedness or idiocy in the family ancestry, either direct or collateral that you know of?
143. What was the physical and mental condition of parents at time of conception of this child for whom application is now made?
144. Was the mother during pregnancy subject to any continuous anxiety or hardship, or exposed to any shock, accident or especially painful emotion? If so, describe briefly.
145. What were the ages of parents when this child was born?
146. Are or were either of parents subject to consumption, neuralgia, scrofula, paralysis or epilepsy? If so, which?
147. Or to hysteria, chorea, eccentricity, insanity, extreme nervousness or constitutional taint? If so, which?
148. Or excessively given to the use of alcoholic drinks, tobacco, opium or other narcotic? If so, which?
149. Vide above. (Doctor's Certificate.)
150. Vide above. (Residence Certificate.)

CHAPTER IX.

FUNCTION OF TESTS AND MEASUREMENTS.

Only within the past few years when educational success has come to be measured, not by the preparedness of the teacher in knowledge and various attainments, not by buildings, equipment, etc., *but by the actual accomplishment of the pupil*, has the question of scientific educational measurement been given consideration; and even now the question is being given but slight consideration, generally. It is not intended to say that the preparedness of teachers and school facilities are negligible quantities—far from it, for they do constitute a prerequisite absolutely demanded for consistent and efficient advancement of pupils; but, generally, it may be stated that educational efforts rest to quite large extent upon diversified opinion and speculation rather than upon adjusted evidence and knowledge—upon the theoretical question, “what results can or might we get?” rather than upon the practical question, “what results are we getting?” the latter to be answered in terms of the pupil. Never in educational history has there been so much uncertainty as to values in the educational field as at present—never such aggressive dissatisfaction and earnest protest concerning educational methods prevailing in schools ranging from the kindergarten to the university. This condition is one great fact easily discernible by all who give the matter reading and thought; and another great fact is, that at no time in the world have the people been more willing to give, and more bountiful in giving, than now, to the cause of education. Under the vigorous protests offered and the demanded *quid pro quo*, improved conditions must follow. Only until recently has the educational world awakened to the vast importance of experimental pedagogy, and the psychology, not of the adult, but of children—the *educational* psychology of the child. “Indeed, the more closely educators approach adult standard and ideals,” writes Radosaljevich, “the farther they are from the child’s understanding and needs. The application of the results of child-study is so new

that it must be more-or-less of an experiment. But it is an experiment of much hope and promise. The application of the results of purely adult psychology to the case of the child is almost surely doomed to failure. Such an experiment can have but one result, and that an unsatisfactory one."

With the awakening, more and more attention is being given to these subjects causing educators and patrons to view in an entirely different light than formerly the work of our schools for both the hearing and the deaf. So pronounced have been the revelations caused by educational research that scholastic conditions and requirements are rapidly changing for the betterment of the child; and scholastic efforts are now coming to be measured in terms of, and results to, the child for whom the school has been established.

In bringing the undeveloped mind under the influence of the developed one, does it not seem wiser and better to work forward from the former than backward from the latter as is the general practice—that is, to carry on the work from the view-point of the child? It seems to the writer that there can be only one answer to this query, and that in the affirmative based upon the reasoning power of the growing child which has been referred to in a preceding part of this report. This procedure is the basis of the so-called new science of experimental pedagogy—"a science which, instead of following the old *a priori* methods, accepts the surer method of experimentation and acquires more accurate and positive knowledge about pupils—a knowledge both qualitative and quantitative, and by means of which we can free ourselves from the tyranny of traditions as to what constitutes an average child.

* * * Pedagogical practice must be based on general scientific truths, not on educational idiosyncrasies and personal partiality. First of all we must see the truth, i. e., we must know exactly what pupils are, what their development is, and for what they are fitted."

Here, then, we have succinctly stated the condition given us for evaluation through measurements—and which condition may be further reduced to the one term, mentality, with its co-ordination with physical growth. This term, however, is of complex nature wherein are involved several capacities, one for instance such as memory with its range of accumulated information and experience—and the motivating influence of volitional and emotional control; and the term also

bears more or less close relation to chronological age, school grade, type of school, social level, nationality, and the like. Thus, several scales of measurement of varying nature would be required to achieve the end desired. But, ascribing to intelligence the place and function assigned it by Stern, and considering it as the *potential force actuating mental expression*, it may well be considered the index of mentality and presents the first direct and controlling factor for measurement: and then, afterwards, its various dependent attributes. So, we at once become interested in tests for the measurement of intelligence which is now a well-recognized part of psychology. Dr. Pintner writes: "The need for psychological examination has been recognized, and answers to practical situations have been demanded before the psychologist has really had time to formulate his own conceptions of the whole problem. Theoretical considerations have lagged behind the practical application of mental tests. We have been measuring intelligence long before we have decided as to what intelligence really is. Far from being a drawback, as this at first sight would appear to be, it has in fact proved to be of distinct advantage, since the measurement of this something, that we have been making, is leading us slowly, but surely, to a real knowledge of what can with profit be called, general intelligence. Only after considerable work with mental tests did psychologists arrive at the now generally accepted definition of intelligence as enunciated by Stern * * * and though even this definition may be modified in the future, it serves, at the present time, as a good working hypothesis for the selection of tests for mental measurement."

The usual measurements heretofore made of mental capacity have been opinions of teachers, and the valuations placed by teachers upon daily recitations and examinations by some irregular scheme of marking—or, perhaps by some "wise-acre," in supervision. It is a well-known fact that teachers do not think alike, and are prone to evaluate differently the same thing, although a precise scheme of evaluation, or marking, is placed before them for guidance by the superintendent who has studiously viewed the school as a whole—teachers, curriculum and pupils—and striven to bring about a coherent and uniform system of "estimating" progress and performance-level. As a matter of fact, it is true that, in addition to this difference of evaluation between teachers, the one teacher

will give different values to the same thing when re-marked at different periods, say of sixty days. With such conditions existing, and with 100, for instance, as the maximum value in classes and schools, it may readily be seen how uncertain would be the marking of 70, how discordant the comparison between pupils, classes, or schools, and how ambiguous the grading, or classification. It is to overcome just such conditions that scientific measurements of uniform nature and application, and with uniform age-norms, etc., have been called into use.

In discussing this question of tests and standards of efficiency, President Strayer of the National Education Association, states that there are three methods of measurement: (1) *by personal opinion*, (2) *by comparison*, and (3) *by well established standards or units*. Commenting on these he says, in brief, that the first is valuable in just the degree in which the person passing judgment is qualified by training and experience in any particular line of educational work, to give an intelligent opinion; that often such a person seeks to give dignity to his opinion by claiming, with more-or-less grandiloquent air, that "he speaks in terms of fact," without a painstaking comparison with *similar* situations or stating the standard which he uses in passing judgment. (Here enter the ordinary school man and others in criticism of schools for the deaf—teachers, curricula, grading, and methods.) Unless careful comparisons have been instituted, or commonly accepted standards applied in passing judgment, the opinion expressed in the light of the so-called facts and superior insight (?) remains simply an opinion,—*and frequently worthless*. Concerning the second method, that of comparison, he says it is based upon the fundamental idea that the common practice is the result of judgment of many men who have attempted to solve the same or very similar problems. In reports which have used this method of measurement the most common practice is used as the standard to which each local situation is referred,—but the common practice may be without real worth. And commenting on the third method, by well-established standards or units, he makes the statement that any adequate derivation of standards will, however, involve much more than opinions and comparisons. "Measurement in any field is not successful merely because we are able to say that one quantity is less or more than another. It is only when

we have a measuring stick which enables us to describe all the quantities with which we deal in terms of definitely determined units that we can claim to have any adequate method of measurement; and we are only beginning to have such measurement undertaken in terms of standards or units which are, or which may become, commonly recognized."

The trend to such mental and physical measurements (of mental ability, of anthropometric nature, of sensory, physical, and motor capacity, and of attention and perception) is general and coming with the force of an educational whirlwind; and those of present-day progressiveness will acquiesce in and approve the change. Now, a mental test, for instance, means experimental determination through scientific measurement of some one, or all, of the mental faculties—intelligence foremost among them as the leading and directing one with all others dependent thereon; while a physical test means experimental determination through scientific measurement of some physiological condition or capacity—size, dimension, and of functional nature—and foremost among them that of vital capacity which is an index of general physical condition more or less closely correlated and interrelated with mentality and its expression through performance. This "experimental determination" may be through mental testing or research-experiment as described by Whipple in the following rather lengthy quotation which is given because of its importance.

"The mental test," writes Dr. Whipple, "in some respects resembles, in some respects differs from, the typical research-experiment of the psychological laboratory. Like this latter, the test is superior (immeasurably so) to the casual observation of everyday life because it is purposeful and methodical: it thus possesses all the merits common to experimental investigation at large, viz., the control of conditions (including the elimination of disturbing, and the systematic isolation of contributory factors), the possibility of repetition, and the possibility of subjecting the obtained results to quantitative treatment. The primary difference between the research-experiment and the test-experiment is really one of aim. The test has a diagnostic, rather than a theoretical aim: its purpose is not to discover new facts (unless they be dormant facts hitherto undiscovered in the individual and discovered for the first time), principles or laws for the science of psychology—though such a result may indirectly be obtained—

but to analyze, measure, and rank the status or the efficiency of traits and capacities in the individual under examination. Again, unlike the typical research-experiment, the mental test ordinarily places little or no emphasis upon introspective observation by the subject, in part because of its relatively short duration, in part because it is frequently applied to inexperienced subjects who are incapable of aught but the most elementary introspection, but more especially just because it is concerned less with the qualitative examination or structural analysis of mental processes than with the quantitative determination of mental efficiency; because, in other words, it studies mental performance rather than mental content. * * * There is, however, danger of laying too much stress upon this distinction between quantitative and qualitative examination."

In the closing lines of the above quotation it should be thoroughly understood that the author refers, as he states, to the mental performance which, it is true, is based primarily upon pure intelligence, but secondarily, and principally, upon other mental traits and attributes of intelligence which possess the potentiality of a mainspring, and must be measured as best an intangible mental power can be, both quantitatively and qualitatively. The ascertained results of testing the mental performance of course give decided indication of the real force back of the performance, that is, of intelligence, but discrimination and differentiation is required to properly establish its entity, and its extent and strength. Now, this is not an easy thing to do with the present status of mental testing when the science of such testing and measuring is in formative process regardless of its general adoption and adaptation by both the experienced expert and the inexperienced layman—when there is decided confusion as to relative values of test-problems, methods of procedure, and knowledge of what is being tested—and when there is imperfect realization "of the astounding complexity, variety, and delicacy of form of our psychical nature" and of the interrelation of its constituent and reticulated parts and functions. But through earnest endeavor and experimentation covering thousands of subjects, and with most intensive study of results attained, a number of well-known test-problems have been devised and standardized for use in determining approximately the status of the subject, or groups of subjects, to whom the tests may be applied.

CHAPTER X.

THE BINET-SIMON AND OTHER TESTS AND SCALES.

First among these test-problems to be mentioned is the widely-known Binet-Simon scale "measuring the development of the intelligence of young children," by Alfred Binet and Th. Simon. In 1904, an educational ordinance of Paris required the selection of all the mentally defective children in the public schools, such selection to be made by means of individual examinations. At the time there was no definite method of making such examinations and with the object of supplying one, Binet and Simon determined to standardize their series of tests by the examination of selected groups of pedagogically average public school children, ten each of ages three to six, and fifteen each of ages seven to twelve, thus making ten age-groups to be examined. Then, following the examinations, the series of tests was finally arranged in age-groups according to the results of the examinations referred to, and thus standardized. The scale was first published in 1905 after much observation and study of the developing child-mind. In 1908, the first revision of the scale appeared, published as the result of both vigorous criticism and further experimental work; and this revision is the form of the scale most used in the United States today. Between 1908 and 1911, further criticism and experimental research was made and presently there appeared the first revision of 1911. This revision was modified by Goddard to suit American children. Later came other modified scales by Bobertag, Terman and Childs, and others—and other revisions, no doubt, will follow as adaptation to special classes may require, i. e., for instance, differentiation of social strata, for sex qualities and attainments, and especially, for use with those lacking speech and language factors as in the case of the deafmute. The 1908 scale provided from five to eight tests, or questions, for each age from three to thirteen—the 1911 scale provided uniformly for five questions to each age and many of the former questions were both modified and shifted to different age-years, and the questions for eleven, twelve, and thirteen year-olds

were eliminated and had substituted for them questions for twelve and fifteen year-olds, and adults.

This scale was put forth by Binet and Simon accompanied by this modest statement: "These tests are not the first of which we thought; we have decided on these after long trial; they seemed to us both good and practical. But we are far away from assuming that they are the best. Those who repeat the work will find better; they will certainly eliminate more of the tests dependent upon instruction." And this is exactly what has occurred, in small degree, however, in the two revisions. Severe criticism still continues, and the consensus of it is voiced by Ayres: "The tests predominantly reflect the child's ability to use words fluently and only in small measure his ability to do acts: five of them depend on the child's recent environmental experiences: seven of them depend on his ability to read and write: too great weight is given to tests of ability to repeat words and numbers: too great weight is given to puzzle tests: unreasonable emphasis is given to tests of ability to define abstract terms." Wallin writes in criticism that, while he is free to confess that the great utility of the scale cannot be questioned, "it is not by any means the marvelous, unerring machine which it is claimed to be by certain overzealous exploiters, even for the purpose merely of measuring the degree of mental arrest." Opponents of the age-scale condemn its use as witness Yerkes, who, in conjunction with Bridges and Hardwick, has developed a "point" scale not directly dependent upon age of subject tested, but by an arbitrary allotment of points regardless of age: "I believe that the age arrangement of tests is wrong in principle, violating the laws of mental development. For this reason I have rejected the age-scales. * * * Possibly, it would be wise to ignore the Binet method, and that on the presumption that nothing satisfactory exists, to proceed with the development of the sort of thing we think we should have." And thus the criticisms run, some feeling that the difference between chronological and mental ages does not represent the true degree of mental retardation, or inefficiency, as based upon intelligence, if either at all—that the scale needs correction at both ends—that it lacks the aid of introspection—that for the measurement of intelligence there should be serial tests of different mental capacities—that the social status of the subject which is of great importance, is overlooked—that additional tests

should be added to more clearly indicate the value of results—and that it is useful in any degree only for separating the moron, the feeble-minded, and the idiot from the normal child, thus, not measuring intelligence, *per se*, but the performance-level, or the nonperformance-level, of varying grades of the weak-minded. On the other hand, the Binet scale is approved and highly commended by Goddard, who made a revision of the scale of 1911 to meet American conditions, and applied it to thousands of subjects with great success, he claims. "From results and conclusions," he says, "the scale has been found to be wonderfully exact—with the insane, the epileptic, the delinquent, and the feeble-minded. There are 15,000 feeble-minded children in the New York City public schools. Although people are condemning the scale as imperfect, nevertheless intelligence is being constantly, and successfully, measured. The application of the doctrine of probability to the results proves the small liability of error." And Town, who has published the authorized translation of the scale in this country, with preface and index, lauds the scale and is ever-ready to answer criticisms, much of which she ascribes to imperfect understanding of the scale and to its use by those inexperienced and untrained in experimental psychology. Goddard and Kohs, on the other hand, assert that the inexperienced teacher may use the test for the purpose of a "rough diagnosis," the results of which, while not wholly accurate, will still possess sufficient educational significance of great value: and that experience seems to indicate that teachers untrained in clinical psychology can be taught to apply the tests and get fairly accurate results—with both of which statements the writer certainly agrees, presuming always that the "tester" is possessed of a fair analytical mind which a teacher—a good teacher—should have. While Dr. Goddard commends the scale in the highest terms, he is uncertain as to its applicability to deaf children. He has stated to the writer that he has had but little experience with deaf children but thought that because of the scale being based on fundamental processes developing at different ages, and dependent in large degree upon verbal understanding, it could not with any degree of success, unless largely modified, be applied to the deaf child who lacked so greatly the language ability natural to the hearing child. He hoped, however, sometime to be able to present such a modification as to render the scale applicable.

Now, except from an academic view-point and because it was the first effort for measuring mentality presented for general use, we are not greatly concerned in the use of the Binet scale and the discussions relative to its merits, for many reasons, the principal one being that presented by Pintner, who applied it to a miscellaneous group of deaf children (22) in the Ohio State School, not for the practical purpose of diagnosing such feeble-mindedness as might exist among them, but for the theoretical purpose of determining to what extent the scale could be used for practical purposes thereafter; and in this connection comes to mind the assertion of Healy: "It, the Binet scale, helps very little where the language factor is a barrier, either on account of foreign parentage or insufficient schooling, and with the uneducated deaf and dumb children." Speaking of the Binet test and the experiment referred to above which he, and others, have greatly emphasized in later work with the deaf along the lines of psychic testing, Dr. Pintner writes:* "The survey of the results has led us to believe that the following tests ought to be dropped from the scale if it is to be adopted for diagnostic purposes for deaf children: VI, 2; VIII, 1; IX, 2; X, 4; XI, 1; XII, 2, 5. Again it would seem that the deaf are not on an equality with the hearing as indicated by the high percentages of failures in many of the tests. The following tests appear to us to be too difficult for the deaf child for the age in which they are placed: V, 5; VI, 4; VII, 2, 3, 4; VIII, 2, 4, 5; IX, 1, 3, 4, 5; X, 2, 3, 5; XI, 2, 3, 4, 5; and all in XII. It would seem that the scale as a whole is too high for the deaf child. * * *

In summing up, we conclude that the Binet-Simon scale as it now stands cannot be applied satisfactorily to deaf children. The whole scale must, in the first place, be shifted three years forward, i. e., age three on the present scale would have to be called age six on the deaf scale, and so on. Further, there are a few tests which it would be advisable to eliminate from the scale entirely. These have been listed above. Tests to replace these, standardized on hearing and deaf children, are required, and we would suggest that the best type of test suited to fill the vacancies, would be performance tests. (Here reference is made to the Knox Imbecile Board, Casuist Board, Feature Profile Board, and the Vineland Adaptation Board, which are inadequately standardized for useful results with

* Referring to the Goddard Revision of the B.-S. scale.

the deaf.—R. O. J.) We do feel, however, that this type of test is the one that is needed to complete a Binet scale for the deaf. That such would be useful there is no doubt, in view of the thousands of deaf children in this and in other countries. We have merely attempted to point out the inadequacies of the present scale. The construction of an adapted scale for the deaf has still to be accomplished. * * * Thus it may be clearly seen that in testing deaf children, and especially those three to fifteen years of age, tests involving language would be totally unsuited for the purpose of comparing deaf children and hearing children, because the deaf child is cut off from language experience, due to his inability to imitate the audible sounds of spoken language, and is therefore deprived of normal social intercourse with those who hear and talk. It is the learning of language that forms the greatest obstacle in the education of the deaf child whose language ability is considerably below that of the hearing child."

Ayres' criticisms, while based upon the 1908 scale, will also apply to large extent to the 1911 revision, and it is worth while, considering the almost universal comment on, and use of, the Binet-Simon scale, to recapitulate some of his reasons why certain of the tests fall short of providing satisfactory criteria for the judging of native ability: "(1) They overlook the fundamental difference between the multiple and complex stimuli which contribute to the motivating impulse in coping with real problems and the few and simple ones entering as factors in answering questions or obeying commands. (2) The importance of the emotions and habit in influencing action is disregarded. (3) Real equality is attributed to verbal equality. (4) Ability to answer many of the questions depend upon the child's daily environmental experiences which differ radically among different children. (5) Ability to meet the requirements of several of the tests depend directly on the excellence of the child's schooling. (6) Several tests depend on the mere ability to repeat words and numbers. (7) Counting backwards and solving puzzles constitute several tests. (8) Several tests turn on the ability to express in words comprehension of difficult, abstract terms."

And in considering the measurements by this scale which differentiate between the mental condition of idiots, imbeciles, and morons by assignment to certain mental ages, Clara Harrison Town says: "According to this classification the idiot

never reaches the plane of spoken language—he is limited to the use and understanding of gesture; the imbecile understands spoken language and talks himself in varying degrees of fluency; the moron, in addition to using spoken language, is capable of learning to read and write. Applying this differentiation to the scale, the idiots fall to the age groups one and two—the imbeciles to the age groups three, four, five, six, and seven—and the morons to the age groups eight, nine, ten, eleven, and twelve. Further than the twelve year level the feeble-minded individual (moron) seems not to develop.”

Although at first test-problems and scales were largely, if not altogether, restricted to the attention of laboratory psychologists engaged in research-experiments of limited sphere, they have now spread widely beyond the old confines and are engaging the attention of workers in the varied fields of education, social service, industries, the professions (especially of medicine), and in many other fields where applied psychology gives promise of bettering conditions. Many new test-problems with resultant scales have been devised for the purpose of measuring and recording mental manifestation in all its varied and complex phases—intelligence; rote memory for discreet impressions; logical memory for meaningful material; quickness of learning, involving intelligence and memory (so much of the former, in adjustment to new conditions or associations, as to render it an intelligence test); inventive-ness, involving memory, attention, association and ideation; free and controlled association processes; imagination, also an association process; attention or quickness of perception; and other phases of mental activity.

In the field of physical nature, because of the correlation of mental and physical growth which will be referred to later, numerous measurements and scales have been devised—anthropometric tests, including height, weight, diameter and girth of skull; tests of physical and motor capacity, including vital capacity, strength of grip, and of back and legs, rate, precision, and steadiness of movement and motor control; tests of sensory capacity, including visual and auditory acuity, discrimination of weights and pressures, and sensitivity to pain.

Now, all these various tests to be of real use must be of standardized form and accompanied by reliable norms of performance or conditions of fact. This means that there must

have been examinations of a sufficiently large number of individuals, and groups of individuals, of all stages and types of mental or physical development so as to make it of general nature; there must have been standard and prescribed methods of procedure which were carried out in rigid and undeviating manner; and the results must show correlation, that is, a tendency toward uniformity or correspondence between the various individuals or groups, with resultant deviation from the mean or average, and the probable error, which is of importance in correlation as it tends to establish in a negative way the reliability and value of the correlation index, or coefficient, which must be at least thrice as large as the indicated error.

For the purposes of this report it is neither advisable, nor necessary, to detail the various tests, standardized or unstandardized, as given in the books for the various mental and physical test-examinations, and the reader is referred to the bibliography following for further information as to publications bearing on the subject if he would apply some of the tests himself; or preferably, to a trained psychologist who is familiar with the tests and the manner of applying them, and is thoroughly capable of working out desirable and reliable results. In this connection, it should be noted that many of the tests and scales now presented have not been standardized as to worth, scope, procedure, and norms (or improperly so) and inferences drawn and comparisons made, may really prove of no value whatever—in fact, may lead to positive harm through false conclusions.

It would be a good thing, if it were possible, to provide some reasonably sure means of testing the totally uneducated deaf child before admission to our schools, in order to discriminate between the normal and the subnormal mentality. For years the writer has attempted this with fair degree of success by means of the following questions to be answered by parents:

SCALE No. 1.

1. What is the natural mental condition of the child? Bright and quick, or dull and sluggish?
2. Will the child obey a command?
3. Can the child do an errand?
4. Can the child distinguish forms and colors, one from another?
5. Has the child any idea of number?
6. Is the child's attention easily got and held?
7. Is the child's power of imitation strong or weak?
8. Has the child a retentive memory?

9. Has the child any constructive ability?
10. Does the child play with its brothers and sisters, and others, who hear and speak?
11. Can the child care for itself in a general way?—dress and undress itself, care for itself at table, satisfy calls of nature without assistance, go up and down flights of steps by itself, etc.?
12. What efforts have been made to instruct the child at home?

SCALE No. 2.

In addition to these questions another set of similar nature, but of greater detail, were prepared to be answered when it developed that the child was a hearing-mute, viz.:

1. Is the child in a state of mental lethargy most of the time?
2. Is it difficult to arouse its attention by interesting object or picture?
3. If its attention be aroused, does it hold sufficiently long to receive a lasting impression?
4. Are the child's eyes wandering and its body seldom still?
5. Has the child any idea of number?—can it pick up one, two, three or four marbles according to the number of fingers held up to guide it?
6. Can the child distinguish form and color?—that is, from a box of simple forms and colors, can it match a form or color shown?
7. Can the child dress and undress itself, wash its face and comb its hair?
8. Does the child satisfy calls of nature without assistance, or does it soil its clothing?
9. Does the child have to be waited upon at table?
10. Can the child go up and down flights of steps without assistance?
11. Does the child obey simple commands?
12. Does the child play with its brothers and sisters or other hearing children?

Answers to these questions will give one a very fair knowledge of the child. Another test having to do directly with the child is suggested through the use of one of the earlier Binet series (1905), now discarded, having a set of seven questions in which the language element is eliminated. Six of these questions may be used. They were supposed to be applicable to any normal child three to four years of age which is the retarded mental age of a deaf child of seven as indicated by the Pintner tests. These tests may be applied by the family physician, for instance, and sent to the superintendent of the school to be considered in connection with the answers of parents to the above questions. The tests follow:

SCALE No. 3.

TEST No. 1—*Visual Co-ordination.*

Move a lighted match slowly before the subject's eyes. Note whether he follows the movements with properly co-ordinated movement of the head and eyes.

TEST No. 2—*Prehension Provoked Tactually.*

Place a small wooden cube (or another convenient object) in contact with the palm or back of the subject's hand to see whether he can ex-

cute properly co-ordinated movements of grasping. See whether he will or can carry the object to his mouth.

TEST No. 3—*Prehension Provoked Visually.*

Repeat No. 2 with the object placed within the subject's reach but not in actual contact with his skin. This test may be combined with the next.

TEST No. 4—*Cognizance of Food.*

Show the subject successively a small bit of chocolate and a bit of wood of similar dimensions. (It may be necessary with some children to use a more familiar food, a piece of candy, cookie, etc.) See which object he takes and tries to eat. If he turns away, refuses to try or makes defensive gestures, this usually indicates a very low degree of intelligence, unless his conduct is due to excessive timidity or excitement.

TEST No. 5—*Seeking Food When a Slight Difficulty is Interposed.*

This test is designed to show the presence of rudimentary memory, volitional effort and ability to execute simple co-ordinated finger movements. When sure that the subject knows the chocolate and desires to eat it, wrap up a small piece of it in a piece of paper; let the subject see this done, then give him the packet and note his action. Does he, for instance, throw it away, eat it whole, bite off the paper, pass it to someone else to unwrap, make a single futile effort, succeed or what?

TEST No. 6—*Execution of Simple Orders and Imitation of Gestures.*

When the subject first enters the room, the examiner should greet him with exaggerated politeness, extend the hand and say "Good morning", to see whether the subject understands the gesture and responds readily to it. Ask him to be seated, drop something and ask him (by gesture as much as by words) to pick it up and hand it to you. For further tests, get his attention and try to have him imitate you. Try clapping the hands, putting the hands on the shoulders, behind the back, rising on the toes, etc. This test should be conducted merrily as a children's game. A single characteristic bit of imitation is enough. Some children fail to respond merely on account of timidity or bad humor.

It is suggested that while these few and exceedingly simple tests may not be adequate for the purpose, they may serve as a nucleus on which to build. They will at least give us some scientific means of determining the mental capacity of the prospective pupil, and of convincing others as to its condition. With this double information from both the parent and child (the latter as reported by the family physician) we would not be liable to have feeble-minded children foisted upon the school—nor be forced to turn helplessly to other professions to help us out in matters regarding which we should know more than anyone else.

A general idea of the character of the age-tests for each year of the Binet-Simon scale may be gained from the following table, which, however, will only roughly reveal and indicate the nature of the tasks and questions. For full details the reader is referred to the authorized translation of "The Binet-

Simon Scale" by Clara Harrison Town, Ph. D.; to "Some Criticisms and Suggestions—Binet-Simon Scale" by Leonard P. Ayres, Ph. D.; and to "An Annotated Bibliography" of the Scale by Samuel C. Kohs.

SCALE No. 4.

THE BINET-SIMON TEST.

For Three Years.

Shows nose, eyes and mouth.
Repeats two digits.
Enumerates objects in a picture.
Gives family name.
Repeats a sentence of six syllables.

For Five Years.

Compares two weights.
Copies a square.
Repeats a sentence of ten syllables.
Counts four pennies.
Forms rectangle with divided card.

For Seven Years.

Shows right hand; left ear.
Describes a picture.
Executes 3 commissions or orders.
Gives value by counting 4-2 cent stamps and 4-1 cent stamps.
Names 4 colors shown.

For Nine Years.

Gives change for quarter, 4 cents out.
Defines objects, other than by use.
Recognizes all the pieces of our money to \$10.
Enumerates the months.
Understands easy questions.

For Twelve Years.

Resists suggestion (as to length of lines).
Composes one sentence containing 3 given words.
Says more than sixty words in 3 minutes.
Defines abstract terms.
Discovers the sense of a sentence the words of which are mixed.

For Four Years.

Gives own sex.
Names key, knife and penny.
Repeats three digits.
Compares length of two lines.

For Six Years.

Distinguishes between morning and afternoon.
Defines objects in terms of use.
Copies a lozenge.
Counts 13 pennies.
Esthetic comparison of face pictures.

For Eight Years.

Compares 2 remembered objects.
Counts backward, 20 to 0.
Indicates omissions in pictures.
Gives day and date.
Repeats 5 digits.

For Ten Years.

Arranges in order 5 weights.
Copies drawings from memory.
Detects absurd statements.
Understands difficult or subtle questions.
Uses 3 given words in two sentences.

For Fifteen Years.

Repeats 7 digits.
Gives 3 rhymes.
Repeats sentence of 26 syllables.
Interprets a picture.
Solves a problem from several facts given.

Adult (above 15).

Solves paper cutting puzzle.
Rearranges a triangle puzzle.
Gives differences in meanings of abstract terms.
Gives difference between King and President.
Gives resume of thought from paragraph read.

CHAPTER XI.

THE AGE-GRADE SCALE.

The school courses of various state schools for the deaf have been divided generally into ten or twelve year-grades and it has been generally assumed that a first-year, or beginning class, was in grade 1, that a second-year class was in grade 2, and so on upward, *seriatim*; but in a few of the schools the order is reversed, the oldest and highest class being designated as grade 1, and so on downward, *seriatim*. To the casual observer of a school's grading it would appear that promotions from year to year were a matter of course, and that the number or consecutive order of a grade indicated the number of years a child had been in school. This latter view, and the variation in the numbering of the grades, has caused more or less confusion with such a lack of uniformity in grading and curriculum as to make just educational comparison almost impossible and worthless. It was because of this condition that the writer undertook to devise a normal age and grade distribution for schools for the deaf (Scale No. 5, page 94), which is submitted for consideration with the confident belief that the general adoption of some such scale would tend to the elimination of many perplexing problems now presented, and result in a just and equitable comparison of schools to the benefit of every one of them.

It has been accepted by common consent of schoolmen that certain ages shall be considered as "normal ages" for hearing children in classifying the grades—seven (or under) for the first grade, and with yearly increase to fourteen for the eighth grade. Now, in view of the fact that the deaf child, in comparison with the hearing child, displays a natural retardation of about three years (probably four years*) due to an enforced lack of experience and social intercourse with hearing people and their daily affairs, the "normal years" assigned the deaf must be increased over those of the hearing child. This has been done by fixing ten as the normal age for the first primary grade, fourteen for the fifth, sixteen

* Vide page 195.

for the second intermediate or seventh grade, and nineteen for the third advanced, or tenth and final grade.

The regular grade divisions are arranged into five primary (first to fifth grades), two intermediate (sixth and seventh grades), and three advanced (eighth, ninth and tenth grades), the tenth approximating, so far as possible, the completion of the second year in high school. For completing the third and fourth years of the high school, two additional years should be given in a high-class, thus making the normal ages for these additional years, twenty and twenty-one. For pupils entering at seven, eight and nine, two or more introductory classes are provided. The result of such arrangement of grades and ages give the child entering at seven a school course of twelve years; if the high-class be established, fourteen years. It may be argued that these school periods are too long for the deaf child. Let us see: presuming that the object of education is to properly fit one for assuming the duties of life and therefore of actual money value to the state, and recognizing the unavoidable and natural retardation (three years)* of the deaf child, the hearing child entering at seven will have completed the eight grades in eight years (age fourteen), the first two years of high school in ten years (age sixteen) and the last two years of high school in twelve years (age eighteen); while the deaf child will follow just the same course three years retarded for which both justice to the afflicted and commercial values to the state demand should be given. However, as a matter of fact, the average hearing child is unable to complete the eight primary grades and the four years of high school in the allotted time given above, for investigation has shown that in the average city school it takes a fraction over ten years to complete the eight grades, which would make the age sixteen at completion if all were to remain—and twenty if all were to go through the high school in four years, which certainly would not be the case.

The classification of the school as to age and grade distribution, and retardation based upon the normal ages as given above for the deaf will be shown by the following table. In forming such a table it has been claimed that the age-grade standard is wrong in principle, that it exaggerates the retardation, and that progress (i. e. time required to do a given

* Certain tests made show an average retardation of 3.9 years (practically 4 years) which may be used against the hearing child entering at six.

amount of work within a specified time) alone should serve as the standard regardless of age. This contention would tend to eliminate the factors of characteristics and actions and of experience and habits of thought, which vary greatly with boys and girls, and with children of different ages. The question first to be answered is, "*Who are retarded, and to what extent?*", not as to the reasons of retardation which may be answered later. This age-grade schedule gives the facts in simple form, is easily applied, may be used at any time (which a progress scale cannot be), covers the entire retardation (which is of prime importance) whether due to late entrance, irregular attendance, or failure of promotion due to non-progression, or other reason, and shows at a glance the heterogeneous elements combined in a single class which is of utmost importance to the teacher.

With the table presented (or any table constructed in similar manner), its value would be 100, representing complete agreement between normal ages and grades, less the average percentage of sub-normals (44.5), or a value of 55.5 per cent. With such a large number of subnormals (those older than the normal age for their grade and equalling 44½ per cent. of the entire number) it would seem greater than it should be (and is) and presents a condition to be worked against and overcome. But it may be added that the proportion age-retarded is not as excessive as it may seem when thought is given to the fact that the age-retardation in the public schools runs as high as 60 per cent., for instance, St. Louis 46.6 per cent., Cincinnati, 57.8 per cent., and Erie, Pa., 60.1 per cent. What it may run in other schools for the deaf the writer does not know, and he doubts if such a calculation was ever made. Under our present system of educational administration, and referring to schools generally, it would seem that sixty would be a reasonably high value to expect—that is, an average of 40 per cent. of age-retardation, which certainly should be reduced.

In the Indiana school it was found that of the 135 age-retarded (sub-normals), fifty-three cases resulted from late entrance (39.2 per cent.), twenty-seven from late entrance and slow progress (20 per cent.), and fifty-five, from slow progress (40.8 per cent.).* While it does not express exact

* Vide page 115 for comparison with New York City schools.

THE AGE GRADE SCALE

Boys 146 Girls 157 Total 303	Grades		Grades					Grades Intermediate		Grades Advanced		Ages		Actual Average	Normals	Super Normals	Sub Normals	Totals	Percentage		
	Introductory	Grades	Primary	1	2	3	4	5	1	2	3	Over	Limit								
Year Gr.	-	-	1	2	3	4	5	1	2	3	-	-	-	-	-	-	-	-	-	-	
Normal Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	-	-	-	
Intro. 1	4	17	9	1	3	5	2	-	-	-	-	-	-	-	-	-	-	2	27	7.4	
" 2	-	-	15	3	9	5	2	-	-	-	-	-	-	-	-	-	-	10	34	24.4	
Prim. 1	-	-	-	12	14	5	2	-	-	-	-	-	-	-	-	-	-	4	20	35.0	
" 2	-	-	-	1	8	9	5	6	-	1	-	-	-	-	-	-	-	7	53	41.5	
" 3	-	-	-	-	1	1	1	2	4	1	-	-	-	-	-	-	-	16	34	47.0	
" 4	-	-	-	-	-	-	-	2	4	2	4	2	1	1	-	-	-	16	21	76.1	
" 5	-	-	-	-	-	-	-	12	8	4	6	4	2	3	1	-	-	24	38	63.1	
Inter. 1	-	-	-	-	-	-	-	5	5	-	9	-	-	-	-	-	-	8	19	59.3	
" 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	24	45.8	
Adv. 1	-	-	-	-	-	-	-	-	-	1	3	9	6	3	-	-	-	4	5	8	45.8
" 2	-	-	-	-	-	-	-	-	-	-	1	2	1	1	3	1	-	2	5	8	62.5
" 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	4	3	12	26.9
Totals 12	4	15	25	15	26	32	19	21	34	22	24	22	15	16	6	5	3	69	135	303	44.5
Classes No.	-	-	2	3	2	4	2	3	4	3	-	2	1	2	-	-	-	-	-	-	-

Year-grade and Normal-grade age at top of vertical rows
 Grades at left of horizontal rows, membership running to right
 Retardates (sub-normals) above and to right of zigzag line
 Normals immediately below zigzag line with super-normals to left.
 Normals - Those of exact grade age
 Sub-normals - Those over grade age
 Super-normals - Those under grade age
 Value of Scale Classification = 100 less percentage of sub-normals = 100 - 44.5 = 55.5

R.O.J. 13

values, the aggregate delay in entrance (supposing that all should have entered at seven years of age) will tend to show prevalent conditions with which we have to contend in getting those into school who should be here. The record shows that twenty-five were one year late in entering; twenty-five, two years; twelve, three years; nine, four years; eight, five years; two, six years; two, seven years; and four, eight years—or eighty-seven, with an average of 3.1 years, aggregating 270 years. Forty-eight were received at proper time and are included among those of slow progress mentioned above. Of course, a number of the late entrants may have resulted through deafness occurring late in childhood, or in coming from other schools for the deaf, or from schools for the hearing where they had been attempting the school work before their partial hearing became so defective as to make a special school for them their only resort. These exceptions, however, are not many; the great majority were retained at home to their detriment, and their assimilation into the school presents a difficult problem.

PROGRESS AND RETARDATION.

In the age-grade classification above with its list of age-sub-normals, no division is made between the manual, oral and kindergarten pupils except that the last constitute the introductory classes wherein regular kindergarten work for the hearing is adapted to the needs of the deaf child, and is merged into the regular primary work along oral lines. Now, the following three tabulations will show this division and illustrate another phase of the survey made, indicating the rate of progress, the retardation, and the number of those repeating their year-grades regardless of age, grade, and time of entrance. In these tabulations the kindergarten classes are included in the oral.

In all three of the tables the percentage is based upon the entire number in each separate class or division. What is meant by slow (retarded), normal (regular), and rapid (accelerated) progress will be readily understood. In the table for repeaters, the years refer not to the first, second, or third, of school life, or grade divisions, and so on, but to various years scattered throughout the entire course which have been repeated—perhaps at the beginning of the school period, or

perhaps not until several years later. In the retardation table the figure 3 stands for total deafness, 5 for feeble hearing, 7 for considerable hearing, and 1 and 2, one or both ears—that is, 32 equals total deafness in both ears, 31-71, total deafness in one ear and considerable hearing in the other, etc.*

TABLE No. 2—*Rate of Progress.*†

	No.	Slow	P. C.	Normal	P. C.	Rapid	P. C.
Manual Classes.....	82	42	51.	28	34.	12	15.
Oral Classes.....	221	43	20.	112	50.	66	30.
Totals.....	303	85	28.	140	46.	78	26.

TABLE No. 3—*Repeaters of Grades.*

Years Repeated	1		2		3		4		5		7		
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	
Manual Classes.	46	22	48.	12	26.	3	7.	6	13	2	4.	1	2.
Oral Classes....	46	31	68.	10	21.	3	7.	2	4	.....	.....	.....	.....
Totals....	92	53	57	22	24.	6	7.	8	9.	2	2.	1	1

TABLE No. 4—*Retardation—Degrees of Deafness.*

Retards	Manual				Oral					
*Degrees of Deafness...	Cong.	Adv.	Total	P. C.	Cong.	Adv.	Total	P. C.	All	P. C.
32	10	19	29	62.	11	7	18	38.	47	15.5
31-51	4	3	7	37.	8	4	12	62.	19	6.3
31-71	2	2	4	100.	.....	.....	.....	.....	4	1.3
52	.....	1	1	10.	3	6	9	90.	10	3.3
51-71	.....	.....	.....	.....	1	.....	1	100.	1	.3
72	3	2	5	45.	3	3	6	55.	11	3.6
Totals.....	19	27	46	50.	26	20	46	50.	92	30.3

It will be noted that in the manual classes 49 per cent. are rated as of normal or rapid progress as against 80 per cent. for the oral classes—that is, of the former 51 per cent. show slow progress as against 20 per cent. only of the latter. Among the repeaters who have spent two or more years covering the same work, those losing one year are 20 per cent. greater in the oral than in the manual classes (68-48), but the manual percentage is greater than for the other years, excepting for one (3 years), when it is the same as for the oral. The excess of oral one-year repeaters (20—8=12) occurs in the third, fourth and fifth primary grades. The ninety-two repeaters represent the real retardation so far as progress is

* Vide Table 1, page 63.

† Vide page 115 for comparison with New York City schools.

concerned which is forty-three (32 per cent.) less than that (135) shown by the age-grade classification, and reduces the percentage of retardation of the whole (303) from 44.5 to 30.3 per cent. This difference, however, is not significant of error in the former because they measure, or indicate, two different things. It simply shows that of the 135 age-retarded practically a third are making fair progress despite over-age, irregular attendance, and non-promotion; but would they not have made greater progress if these factors were absent? Of those retarded, seventy are totally deaf in one (23) or both (47) ears (35 cong.—35 adv.) of whom 57 per cent. are in the manual grades and 43 per cent. in the oral; and forty-five have feeble or considerable hearing in one (23) or both (22) ears (24 cong.—21 adv.) of whom 38 per cent. are in the manual grades and 62 per cent. in the oral. In these figures, of course, twenty-three cases showing deafness in one ear and hearing in the other are duplicated.

By the use of this Age-Grade Scale and the compilation of such tables (2-3-4), and of other tables to be referred to in the succeeding chapter, any school may determine exactly the number of its pupils making normal, sub-normal, and super-normal progress through the grades in terms of age, grade, and years of attendance; and be able to classify them as to rate of progress, repetition of grades, retardation expressed in terms of deafness; and also as to degrees of intelligence, the mental age, and the ratio of the mental to the chronological age (the mental quotient). Such a scale and tabulations of any school may then be justly compared with those of any other school; and will indicate the degree of successful work in any school. If, in any one, conditions (mental caliber of pupilage, lack of proper financial support, environment, etc.) tend to lower its educational status by such measurement, then these disturbing influences may be pleaded in extenuation of its lower standing in comparison with others. From such measurement, an average line of accomplishment may be established which, in conjunction with other requirements to be noted subsequently, will permit of the classification of schools as Class A, B, and C schools indicative of their educational standing, a thing to be greatly desired.

CHAPTER XII.

THE ANALYSIS OF PUPILAGE.

Following the discussion concerning the establishment of an age-grade scale, it will be proper and apposite to give consideration to certain miscellaneous averages of pupils in the Indiana school illustrating through exemplification the possibility of our schools (and of those for the hearing, too), agreeing upon some desirable and uniform method for analysis of pupilage as to parentage and family history, intelligence, mental age, progress in studies, and retardation. With such an analysis, intelligent comparison may then be made between individuals, classes, and schools. The figures here given are based upon an enrollment of 335 pupils for the year (including 32 new pupils), forty of whom for one reason or another were absent during the period of examination, thus leaving 295 for record.

Before presenting these averages it will be well at this point to speak of the values of the terms used and how they have been computed or estimated. The age-grade scale shows how retardation is established; the chronological age is known, and should be listed at the half year period, the age *six*, for instance, meaning that it stands for six and a half, and so on upward, this plan giving a better average, and avoiding the use of fractions; intelligence and mental age have been estimated by the class-teacher for each of her pupils, with an average of such estimates if made by two or more teachers coming into contact with the class-pupils through rotation; the progress-in-studies has also been the estimate of the teacher being the average of "markings" in the various subjects taught by single or rotating teachers. This will raise at once the question as to the ability of the teacher to make just and reliable estimates of intelligence and mental age—and it must be conceded that naturally there is great doubt as to exact values of such estimates. But in answer to the objection, consideration must be given to the following conditions: (1) That no just test has yet been devised whereby intelligence and mental age may be correctly measured for the deaf (if for

any) unless, for intelligence, it be the substitution performance tests (symbol-digit and digit-symbol) as used by Pintner in our schools which will be referred to later on—and, for “mental age,” the Pintner scheme for basing it upon the median-mental-age method, involving the use of some fifteen standardized performance tests, which has not been fully worked out as yet. The object of the Binet-Simon test is especially to establish the mental age of the child tested, but as we have seen, the results are somewhat unsatisfactory when applied to the hearing child in the minds of many, and absolutely so when applied to the deaf with whom tests freed from the intricacies of language form, i. e., performance tests, should be used—but such of standardized forms are not yet available. (2) That the intention of the writer is simply to suggest some procedure for only *approximate results* through “home application” that will indicate in some relatively fair degree the standing of the pupils not only for comparison among themselves and with those of other schools for the deaf and for the hearing, but also for the purpose of better enabling us to adjust the curricula to actual needs, to bring about better and more effective grading, and to prosecute our work more intelligently and with better results than is now done.

Of course, the more-or-less extreme variableness of the mental aptitude (perhaps better said, inaptitude) of teachers is recognized, likewise their natural mental inclination (difficult of change) to view intelligence and mental age through the specious media of objective performance in the schoolroom (school ability) between which and intelligence especially, there is no strict and uniform relation. A child may be gifted of a high degree of intelligence, yet weak in school efficiency for various reasons; and the reverse is also true in degree, for school ability depends not only upon intelligence but also upon other and different factors, i. e., upon memory covering experience, special talents, duration of attention and application, sense of duty, social requirements, etc., all of which, with intelligence, enter into mental ability or capacity, and the performance-level. The differentiation of these mental attributes and the drawing of conclusions therefrom, presents an intricate problem in mental science to the teacher who must realize that, while perhaps unsafe to do either, it is easier, and

more convincing, to draw conclusions from objective or school performance as to intelligence than from intelligence as to the former. But it is well to recall Stern's dictum, "When an estimation of intelligence is made (by one thoroughly qualified to make it) with special thoroughness and caution, there exists only a moderate degree of correlation between it and school efficiency."

Concerning the estimates of teachers, Stern further writes: "The question whether a teacher is really able to estimate the degree of intelligence of his pupils is one that has no little importance. * * * It is surely practically worth while for the teacher, who is accustomed ordinarily to pass judgments about his pupils primarily on the basis of their objective performance, to try for once to decide whether and to what extent a certain capacity, namely general intelligence, is concerned in these performances. He will be obliged to study his pupils more carefully, to analyze their individual disposition, and will perhaps come by this means to a better valuation of their work. * * * Evidently, the estimating of intelligence by the teacher makes contribution, not only to the psychology of the pupils, but also, to the psychology of the teacher. Teachers will vary a great deal in their capacity to undertake this work of estimating intelligence."

In asking the Indiana teachers to make an estimation of the intelligence and mental age of their pupils, following a thorough discussion of the matter by the writer at various teachers' meetings, this note of direction was handed each one:

I am anxious to establish the degree of general intelligence, and rank-order of same, of the pupils you have had this year. Please give me your estimation of same—that is, your estimate of the degrees of intelligence rated as follows: very high, 100; good, 80; medium, 60; slight, 40; very poor, 20. The intermediate figures (multiples of five) may be used for variations if you wish. In making this estimate give no thought to their objective performance in the schoolroom—that is, for class work as determined by class attainments, class marks, examinations, etc.—and *do not* use it as a starting point. Judge them on the basis of your impression of their general intelligence as outlined by Stern, as viewed by you in school, and out of school with their various activities, the impression resulting from careful study and analysis of individual disposition, and *not* on the basis of any special ability in any particular thing or subject-matter. Consider that intelligence is general mental adaptability to new problems and conditions of life: and further, that there is positive lack of agreement between intelligence and school efficiency, the latter depending not only upon the former, but also upon other different factors such as health, attendance, the teacher, the curriculum, memory good, and memory bad (thoughtless memorizing and

cramming), and qualities of character and will (degrees and duration of attention, application, sense of duty, and social requirements). Give also, for each one, the age of a normal hearing child with whom, in your judgment, the deaf child most closely corresponds in general attainment.

But, when all is said concerning the ability of teachers under the most thorough instruction of the superintendent to make just estimate of a child's intelligence, and mental age, and mental quotient; and concerning, further, the application of tests by those not specially trained and skilled in the work of psychological testing of whatever nature with resultant correlations—probable errors, coefficients (of co-ordination, contingency, association), gradations, and rank-orders, involving the pedagogical ages of normal and sub-normal children and sex-differences, age-levels, acceleration and retardation, etc.—it would seem that, at least, some one specially trained and specially gifted in psychology should be engaged to supervise the whole work; and it is suggested that certain regional schools, say three or four, should combine in the selection and remuneration of such an expert who would devote his entire time during the year to visiting the schools, thus rendering most valuable assistance in establishing the mental and pedagogical status of each pupil with his possibilities and probabilities in the various branches of the school's activities. At the same time, he would become a faculty lecturer upon psychology and, through his knowledge of the methods of teachers and of the various test-examinations of the children, would serve to bring about a greater degree of efficiency on the part of the teacher.

TABLE No. 5.

Of the thirty-two new pupils admitted during the year, the following information is given:

<i>Birthplace.</i>	<i>Fathers.</i>	<i>Mothers</i>	<i>Pupils.</i>
Indiana	20	22	27
Kentucky	3	3	3
Florida .....	..	..	1
West Virginia	1	..	..
Maryland	1	..	..
Michigan	1	1	..
Missouri .....	..	1	..
New York .....	..	1	..
Hungary	1	1	..
Russia	1	1	..
Austria	1	1	1
England	1	1	..
Unknown	2	..	..

TABLE No. 6—Causes and Ages of New Pupils Admitted.

ASSIGNED CAUSES OF DEAFNESS BY PARENTS	Number	Boys	Girls	AGE DEAFNESS OCCURRED								Partial Deafness	AGE AT ENTRANCE												
				Congenital	Under 6 Months	6 Months—1 Year	1 Year—18 Months	2-3 Years	4-5 Years	5-6 Years	7-8 Years		Total Deafness	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	16 Years	17 Years	20 Years
Congenital	13	11	2	13				1													1				
Meningitis	1	1																							
Spinal Meningitis	2	1	1			1																			
Mastoidectomy	1	1																							
Brain Fever	1	1																							
Gathering in Head	1	1	2																						
Scarlet Fever	3	2																							
Measles	3		3																						
Typhoid Fever	1	1	1																						
Severe Fever	1	1																							
Pertussis	1	1	1																						
Adenoids	2		2																						
Sickness	1		1																						
Totals	32	18	14	13	1	2	6	5	2	1	2	20	12	1	8	2	5	4	2	5	1	1	2	1	

Of the parents, one father and two mothers are dead; five cases of separation or divorce occur; in one case only are either of the parents deaf (in this case both father and mother) but deaf relatives are shown in six cases. In three cases either the parents or grandparents were related before marriage. In a number of the families the history discloses tuberculosis (7), cancer (4), scrofula (1), epilepsy (1), feeble-mindedness (1), and paralysis (5), with two of these defects occurring in the same family in one or two cases. In six instances there was difficulty at birth, instruments being used in two cases. Of the whole number, seven were weakly in infancy, three show a deranged nervous system, two physical malformation, or physical weakness, and thirteen were born deaf (40.6 per cent.). Of the offspring of families disclosing cancer, three of the four were congenital cases as were three of the seven with tuberculosis; and the two from families showing scrofula, epilepsy, and feeble-mindedness were both adventitious cases. Of the seven reported as sickly babes, five were congenitally deaf; and of the five possessing deranged nervous system or malformation and physical weakness, all were adventitiously deaf.

The total number of children born to the parents was 146, including the deaf (32) who constituted 21.9 per cent. and those who died (24) who constituted 16.4 per cent., thus leaving 61.7 per cent. (90) living and reported as not deaf and well. Of these, there can be no question but that some of them carry the condition of deafness in latency to be transmitted in active form to a succeeding generation. Of the children who died, fourteen died at birth (6) or under six months of age (8), or 9.6 per cent. of the whole number. There is no doubt but that other deaf pupils will yet be presented from some of these families.

Among the thirteen congenital cases, one had a deaf father and mother; one had grandparents who were first cousins, both the mother and grandmother dying of paralysis; three had deaf relatives, in one case, congenitally so; and two were of premature birth. Among the nineteen adventitious cases, one (brain fever) had grandparents related who also had deaf relatives; one (spinal meningitis) had consumption and deaf relatives; one (spinal meningitis) had epilepsy and feeble-mindedness in the family history; one (measles) lost two

grandparents by paralysis; and in one (pertussis) the maternal grandparents were first cousins and both died of paralysis.

In several cases no definite report could be had of family ailments and diseases, nor as to deaf relatives, etc. One child was born in a county poor asylum and no record of any kind can be furnished of his parents or grandparents, or of causes, etc.; and this same ignorance is shown in several other cases where it would seem the parents should know.

Of the entire enrollment of pupils, both new and old (335), during the year, 130 (38.2 per cent.) were born deaf—while 90 (26.7 per cent.) lost their hearing through diseases under 18 months of age (6 additional, time unknown), no doubt in many cases (probably over a third) of congenito-adventitious nature and chargeable to pre-natal causes; and this is a justifiable conclusion when we find so many reported as having lost their hearing during the first few months of life without adequate cause assigned, and with knowledge that the woeful effect of disease is the greater when attacking a vitiated and weakened system of inherited or embryological nature, the causes of which are so often disclosed in the family history. The writer believes that, taking into consideration the possible results of innate character, latency, and predisposition, which may not develop as deafness for varying periods after birth, *at least* 50 per cent. of all cases of deafness are due to pre-natal causes.*

The average intelligence of the thirty-two new pupils may be stated as good, scaling from several very high, down to one in whom it is very slight. While their chronological ages vary from six to twenty, their mental ages vary from three to fourteen. Their individual mental quotients, a combination of the two ages, range from 42 to 100 with 67 as the median, and indicate the ratio of the mental to the chronological age. With those at their normal level, i. e., close correspondence of the two ages, the value is assumed as 100, which is figured downward or upward as retardation or acceleration may demand.

In the median mental quotient above referred to (67), we find that it corresponds very closely indeed to that for twenty-seven classes (295 pupils)† divided into thirds, the best classes

* Vide page 203.

† Including both old and new pupils.

in the upper third, the next best, in the middle third, and the poorest, in the lower third, as follows:

TABLE No. 7.

	<i>Upper Third.</i>	<i>Middle Third.</i>	<i>Lower Third.</i>	<i>All.</i>
Average Mental Quotient.....	83.	71.	55.	69.
Average Intelligence	79.	68.	56.	67.
Average Progress	77.	72.	64.	70.
Average Retardation, years..	2.7	3.3	5.3	3.9

In the table, intelligence is based upon a scale running from 20, very slight, to 100, very high; and progress in the various studies, upon a scale with 100 as maximum. The figures indicate a very close correspondence between the intelligence and mental quotients of the new and the older pupils, and also between the intelligence, the mental quotients and the school progress of the entire pupilage. The mental quotient (M. Q.) is frequently referred to as the "intelligence quotient" (I. Q.) which, the writer feels, is a misleading expression in this connection when it is considered that the result is based upon mental age, which is a complex of intelligence, memory-experience, sensory motor reactions and educational training.

The following tabulations will disclose some other interesting facts concerning the pupilage. The terms Poor (0-49), Fair (50-79) and Good (80-100) are based upon Mental Quotient and Intelligence ratings which consider 100 as the maximum for comparison. In this connection it must be borne in mind that "Retardation" as used in connection with the deaf child does not carry with it the same significance as if it were applied to a hearing child.*

TABLE No. 8—Miscellaneous Averages.

	Manual		Oral		Kindergarten		All		Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
Number.....	34	29	80	99	32	21	146	149	295
Chron. Age, Years.....	14.8	15.1	13.3	13.1	9.0	9.0	12.7	13.1	12.9
Mental Age, Years.....	9.0	10.2	9.8	9.8	5.8	5.2	8.8	9.2	9.0
Retardation, Years.....	5.8	4.9	3.5	3.3	3.2	3.8	3.9	3.9	3.9
Mental Quotient.....	59.	67.	73.	75.	65.	59.	67.	70.	69.
Progress in Studies.....	59.	66.	74.	77.	64.	65.	67.	73.	70.

* Vide page 58.

TABLE No. 9—*Mental Percentages.*

		Manual		Oral		Kindergarten		All		Total
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
Number.....		34	29	80	99	32	21	146	149	295
Intelligence.	Poor.....	19.0	8.0	6.7	8.4	13.2	7.5	10.5	8.1	18.6
	Fair.....	20.6	27.0	12.9	16.2	20.8	17.0	15.9	18.7	34.6
	Good.....	14.3	11.1	25.1	30.7	26.4	15.1	23.1	23.7	46.8
Mental Quotient.	Poor.....	20.7	4.7	2.2	2.8	9.4	7.5	7.5	4.0	11.5
	Fair.....	20.6	33.3	28.0	32.4	45.3	30.2	29.6	32.2	61.8
	Good.....	12.7	8.0	14.5	20.1	7.6	.....	12.8	13.9	26.7
Intelligence Generally.....		57.		71.		65.		67.		

TABLE No. 10—*Deafness and Percentages.*

	Manual		Oral		Kinder'g't'n		All		Poor Pc.	Fair Pc.	Good Pc.
	No.	Pc.	No.	Pc.	No.	Pc.	No.	Pc.			
Congenital Deaf.....	29	9.8	64	21.7	29	9.8	122	41.3	13.9	63.9	22.2
Adventitious Deaf.....	34	11.5	115	39.0	24	8.2	173	58.7	9.8	60.1	30.1
Totally Deaf.....	37	12.6	56	19.0	15	5.0	108	36.6	15.7	65.7	18.6
Partially Deaf.....	26	8.8	123	41.7	38	12.9	187	63.4	9.0	59.5	31.5

From the preceding tables it will be seen that the number of boys and girls is about equally divided and that the girls are slightly older chronologically and mentally, higher in their mental quotient, in their progress; and in their intelligence, while their retardation is the same as that of the boys; that the oral pupils are younger chronologically and older mentally than the manual pupils,* higher in their mental quotient and intelligence, in their progress and decidedly less in retardation; that the percentage of the congenitally deaf in the oral classes is more than double that in the manual classes where the adventitious outnumber slightly the congenital deaf as they do in much greater proportion in the oral classes; that the "fair" and "good" among the adventitious cases are slightly greater than among the congenital; that the totally deaf exceed the partially deaf in the manual classes but not in near the proportion that the reverse is true in the oral classes; that the "fair" and "good" among the partially deaf is slightly greater than among the totally deaf. Summarizing, while the difference is not great, in all ways the girls seem to be doing better than the boys; the oral pupils than the manual; and the

* The manual girls are slightly older mentally.

adventitious and partially deaf than the congenital and totally deaf. This finding in Indiana differs somewhat from the tentative conclusions covering a much larger number of pupils in the three state schools referred to on page 192 but the slight difference may be easily accounted for through the inclusion of Indiana with the others where the pupilage presents different conditions.

CHAPTER XIII.

ATTENDANCE, ABSENCE, ETC.

In further discussion of analysis of pupilage it is well known that attendance and absence on the part of pupils exert a great influence for good or evil upon the school generally, and upon the pupils particularly; and especially are we interested in knowing the cause of non-attendance and its remedy. The following tables are presented showing conditions in the Indiana school as to attendance, causes of deafness and age of occurrence, graduations, discharges, drop-outs, etc., and they, with similar tables referring to retardation and elimination in the public schools of the country, are offered as a suggestion toward uniform and standardized population reports of the various schools for the deaf.

TABLE No. 11—*Causes of Deafness, 1844-1913.**

CAUSES AS GIVEN BY PARENTS, ARRANGED IN GROUPS OF 300 TO SHOW INCREASE AND DECREASE. INDIANA.	300 Pupils, 1844-1854.	300 Pupils, 1854-1866.	300 Pupils, 1866-1873.	300 Pupils, 1873-1878.	300 Pupils, 1878-1883.	300 Pupils, 1883-1890.	300 Pupils, 1890-1898.	300 Pupils, 1898-1904.	300 Pupils, 1904-1912.	69 Pupils, 1912-1913.	Totals.
Born Deaf.....	147	136	101	74	56	79	110	103	127	31	964
Spinal feverst.....	5	55	117	107	64	33	41	56	4	482	
Scarlet fever.....	33	40	35	13	12	15	18	20	10	3	199
Brain inflammation.....	3	1	13	26	48	30	27	15	.....	163	
Catarrh and catarrhal fever.....	14	3	2	6	8	9	15	17	9	2	85
Measles.....	4	5	7	7	9	13	7	8	13	7	80
Inflammation of brain and ear.....	21	26	12	8	1	7	.....	1	.....	76	
Typhoid fever.....	4	6	10	7	6	2	9	7	4	1	56
Abscess in head or ear.....	.....	.....	.....	4	6	12	11	14	7	.....	54
Sickness not named.....	9	4	12	5	2	8	4	2	7	.....	53
Accidents, falls, etc.....	3	4	7	4	5	4	8	8	8	.....	51
Whooping cough.....	1	3	3	2	3	12	7	5	10	2	48
Fever not named.....	19	8	3	2	6	2	4	2	.....	46	
Scrofula.....	1	2	1	5	5	6	3	3	1	.....	27
Intermittent or malarial fever.....	2	5	6	3	.....	1	2	2	1	1	23
Mumps.....	1	3	2	1	3	4	3	.....	3	.....	20
Spasms or convulsions.....	2	3	1	2	3	1	3	.....	3	.....	18
Diphtheria.....	.....	.....	4	.....	.....	4	2	6	.....	.....	16
Pneumonia, or lung fever.....	.....	.....	2	3	.....	2	2	1	3	1	14
Influenza.....	.....	.....	.....	.....	.....	.....	5	6	2	.....	13
Hydrocephalus.....	2	4	1	3	.....	.....	.....	.....	.....	.....	10
Sore throat, or throat trouble.....	.....	.....	.....	.....	.....	1	1	2	2	4	10
Earache.....	.....	.....	.....	.....	.....	.....	1	.....	7	1	9
Erysipelas, or black tongue.....	2	1	1	.....	2	1	.....	.....	1	.....	8
Cholera infantum, or summer comp.....	.....	.....	.....	.....	1	1	.....	2	2	1	7
Cold in head.....	.....	.....	.....	.....	.....	2	1	2	2	.....	7
Epilepsy.....	2	.....	2	2	.....	.....	.....	.....	.....	.....	6
Quinine or medicine.....	.....	.....	.....	.....	1	1	2	1	.....	2	6
Remittent fever.....	.....	.....	.....	2	1	.....	1	.....	.....	.....	4
Paralysis.....	.....	.....	.....	.....	.....	.....	1	1	1	1	4
Smallpox.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	3
Fright.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	3
Hives.....	.....	.....	.....	.....	.....	1	.....	2	.....	.....	3
Croup.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2
Teething.....	.....	1	.....	1	.....	.....	.....	.....	.....	.....	2

*Up to September 30, 1913.

†Cerebro-spinal meningitis, or spotted fever; spinal fevers; spinal troubles, etc., as given in by parents.

TABLE No. 13.

DISCHARGES 1885-1913.*

Since November 1, 1884, and up to September 30, 1913, there have been discharged 700 pupils from the following grades:

Primary, first to fifth years	38.29%	268
Intermediate, sixth and seventh years	13.29%	93
Academic, eighth, ninth and tenth years	47.42%	332
Industrial	1.00%	7
Total	100.00%	700

The causes of these discharges follow:

	<i>Pri- mary.</i>	<i>Inter- mediate.</i>	<i>Aca- demic.</i>	<i>Indus- trial.</i>	<i>Total.</i>
Graduation .....	...	...	285	...	285
Completion special course ....	...	...	...	3	3
Expiration of time .....	...	...	...	3	3
Non-progression	95	46	7	...	148
Non-progression and age	11	2	2	...	15
Non-progression and defective eyes	1	...	...	...	1
Incapacity and feeble-mindedness	30	...	...	...	30
Poor health	1	...	2	...	3
Age	5	2	...	...	7
Request of parents	2	4	2	...	8
Frequent or continued absence.	22	11	15	...	48
Removal from State	30	6	2	...	38
Nonresident of State	1	1	1	...	3
Improper conduct	15	5	7	...	27
Running off	13	7	...	...	20
Improper conduct and running off .....	...	...	5	...	5
Whims of father and child...	1	...	...	...	1
Marriages .....	...	3	...	1	4
Not deaf	3	...	...	...	3
Deaths	38	4	1	...	43
Evil influence .....	...	...	3	...	3
Arson .....	...	2	...	...	2
Total	268	93	332	7	700

*Records incomplete prior to 1884. Vide foot note, table 18.

TABLE No. 14.

These discharges may be summarized as follows:*

	Primary	Intermed	Academic	Industrial	Total	Per Cent.
GRADUATES (of the 700).....			285		285	40.7
DISCHARGES (of the 700).....	268	93	47	7	415	59.3
Non-Prog.—Age—Health—Eyes	113	50	11		174	41.9
Incapacity—Feeble-mindedness..	30				30	7.2
Absence and Request of Parents.	25	15	17		57	13.7
Bad Conduct—Running Off....	28	14	15		57	13.7
Removal from State—Non-Resident.....	31	7	3		41	9.9
Marriage and Death.....	38	7	1	1	47	11.3
Completion Special Course.....				6	6	1.5
Not Deaf.....	3				3	.8
Totals.....	268	93	47	7	415	100.
Per Cent.....	64.6	22.4	11.3	1.7		100.

TABLE No. 15.

NON-ATTENDANCE 1885-1913.

	Boys.	Girls.	Total.
Entitled to return, beginning session 1885-86....	174	154	328
Since admitted—to September 30, 1913	647	564	1211
Total admissions	821	718	1539
In school September 30, 1913	149	147	296
Remaining for consideration	672	571	1243
Graduated	22.9% 152	133	285
Discharged	33.4% 247	168	415
Non-attendance (Drop-outs)*	43.7% 273	270	543
	672	571	1243

The average age of these non-attendants was 15.8 years on leaving and their average time in school, 5 years. During the past twelve years (273 cases) the average age on leaving was 15.7 years, their average years in school, 5.5 years, 75 per cent. being from the introductory and primary classes—8 per cent. introductory; 22 per cent., first and second primary; and 45 per cent., third, fourth, and fifth primary. Of the total number of graduates during the three decades, 1885-1914, the following information will be of interest and worth:

TABLE No. 16.

	No.	Av. Age	Av. Years in School	Cong.	Adv.
10 years, 1885-1894.....	96	20.4	9.2	11	85
10 years, 1895-1904.....	93	20.9	9.6	29	64
10 years, 1905-1914.....	110	19.6	10.9	33	77

* Vide page 116 for "drop-outs," six cities.

TABLE No. 17—*Movement of Population by Years, 1905-1914.*

FISCAL YEAR ENDING OCTOBER 31, EXCEPT AS NOTED	RECEIVED				DISCHARGED OR WITHDRAWN								Enrolled Close of Year				Present Close of Year				Daily Average Attendance			
	New Pupils				Enrollment During Year (Including New Pupils)				Graduated		Discharged		*Non- Attendance		Died, In- cluded un- der Dis- charges									
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total
1905.....	18	19	200	178	8	0	10	9	16	19	2	.....	191	169	175	150	175.7	147.6	323.3					
1906.....	21	23	203	178	7	6	8	3	16	16	1	.....	188	169	172	153	169.2	144.8	314.0					
1907**.....	12	11	187	170	6	12	4	4	35	20	1	.....	173	154	140	134	164.1	151.6	315.7					
1908**.....	15	16	179	162	5	2	4	3	20	19	1	.....	170	157	150	138	154.5	136.9	291.4					
1909.....	19	17	181	162	5	3	10	2	20	14	1	.....	166	157	146	143	155.8	139.3	295.1					
1910.....	20	25	175	172	3	2	4	1	8	20	.....	.....	168	169	160	149	143.0	141.3	284.3					
1911.....	27	21	188	173	8	6	7	3	19	14	.....	.....	173	164	154	150	156.0	140.7	296.7					
1912.....	15	26	179	180	8	4	7	.....	26	26	5	.....	164	176	138	150	182.0	149.5	331.5					
1913**.....	21	17	168	177	7	4	2	.....	10	20	.....	.....	159	167	149	147	138.0	145.9	283.9					
1914**.....	24	20	179	179	1	5	19	10	21	16	1	.....	159	164	138	148	142.0	156.2	298.2					
Totals.....	192	195	.....	.....	58	44	77	41	111	126	12	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Averages.....	19.2	19.5	183.9	173.1	5.8	4.4	7.7	4.1	11.1	12.6	.....	.....	171.3	164.6	152.2	146.2	155.0	145.4	300.4					

**Fiscal year ending September 30.

*Concerning those listed under Non-Attendance, it is to be stated that some of them return later in the year and some after an absence of a year or more. A few of these are graduated, some are discharged and others again drop out. The yearly figures are given for comparison, but opposite "Totals" and "Averages" are given figures showing the actual non-attendance for the entire period. This table includes the attendance for 1913-14 in order to complete the table of decades following.

TABLE No. 18—*Movement of Population, October 1, 1844, to September 30, 1914.*

FISCAL YEAR	Received New Pupils		DISCHARGED OR WITHDRAWN. (In school September 30, 1914— 138 boys, 148 girls)						Died Included Under Discharges		Average Yearly Enrollment			Average Enrolled Close of Year			Average Present Close of Year			Daily Average Attendance																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	M. F.		Graduated			Discharged			**Non- Attendance		M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			M.	F.	M.	F.	M.	F.	M.	F.													M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.

*Entitled to return beginning 1885—174 boys, 154 girls.

**See foot note, Table 17.

A complete statement of the movement of population (of pupils) since the opening of the school as a state institution October 1, 1844, up to September 30, 1914, is given above. How many of the 1,588 pupils of the first period (1844-1884) were graduated, how many discharged for one cause or another, and how many simply dropped out, although entitled to return for further schooling, is unknown. All are counted as discharged, excepting 328, who appear to have been entitled to return for the session of 1885-86. Subsequent to that session the records are more complete.

CHAPTER XIV.

ELIMINATION OF PUPILS.

Reference to elimination of pupils from the public schools has been made in the preceding pages, but believing that a more comprehensive view of the matter for comparison will prove of value to educators of the deaf who experience the trouble of non-attendance, the following table and miscellaneous data is presented.

The enrollment of pupils in the United States is arranged in grade division, and the enrollment in the State of Indiana and the State School for the Deaf are placed in similar arrangement for comparison. The number of retarded pupils, and the average age of the enrollment in the first and fifth grades, in fifteen cities of the United States, are also placed in comparison with similar data for the school. It is to be noted that in the table the 6, 7, 8, 9, and 10 grades are also designated by B, A, Jr., M, and Sr., which represent the nomenclature of the school's division following the fifth primary—the B and A intermediate grades, and the junior, middle, and senior grades, of the advanced department which is supposed to include the eighth grade of the public schools and the first two years of high school with modifications.*

TABLE No. 19.

ENROLLMENT			RETARDED PUPILS	
United States 17,077,577	State of Indiana 476,298	School 303	15 Cities, U. S. 1,087,360	School 303
Grade 1-24 per cent.	20 per cent.	27 per cent.**	35.9 per cent.	44.5 per cent.
2-15 "	13 "	17 "	<i>Average Ages</i>	
3-14 "	13 "	11 "		
4-13 "	14 "	7 "	15 Cities, U. S. 1,087,360	
5-11 "	12 "	12 "		
(B) 6-9 "	11 "	11 "	School 303	
(A) 7-8 "	9 "	.....	
(Jr.) 8-6 "	8 "	8 "	Grade 1, 7.22 years	
(M) 9-.. "	.....	3 "		
(S) 10-.. "	.....	4 "	Grade 5, 12.05 years	10.20 years 15.60 years

*Vide page 133.

**Including 2 introductory years—61 pupils.

In nine cities of the United States the percentage of age-grade retardation of pupils some years ago, as reported by the Russell Sage Foundation, was as follows: Medford

(Mass.), 7.5; Boston, 18.5; Fort Wayne (Ind.), 23.3; New York, 30; Philadelphia, 36.8; Columbus (Ohio), 37.3; St. Louis, 46.6; Cincinnati, 58.7; Erie (Penn.), 60.1. And the average time to complete the eight grades in twenty-nine cities with an enrollment of 206,495 pupils, was 9.34 years. Considering the average age, child, and city school generally, the time required to complete the eight grades was as follows: Columbus (Ohio), 9.18; Boston, 9.30; Philadelphia, 9.32; New York, 9.48; Springfield (Mass.), 9.90; Kansas City, 11.90; Erie (Penn.), 12.44. In New York City, of 9,489 pupils (only a portion of the total enrollment) of whom there are complete records, 5.1 per cent. are making rapid progress (less than normal years in school)—54.2 per cent. are making normal progress (normal years in school)—and 40.7 per cent. are making slow progress (more than normal years in school). The retardation is reported due to late entrance (30 per cent.), late entrance and slow progress (13 per cent.), and slow progress (57 per cent.). In Indiana, for the School for the Deaf, these percentages are 39, 20, and 41, respectively, for retardation, and 26, 46, and 28, respectively, for rapid, normal and slow progress. (Vide pages 93 and 96, this report.)

Considering elimination of pupils from school the reports are conflicting as to exact figures, but in any case the numbers reported are so large as to cast deep shadows upon educational endeavor. Sixty-three city schools are reported to carry 100 per cent. through grade 5; 90 per cent. through grade 6; 70 per cent. through grade 7; 50 per cent. through grade 8; 40 per cent. through first year of high school; 20 per cent. through the second year; 15 per cent. through the third year; and 10 per cent. through the fourth year. Columbus (Ohio) reports 15 per cent. as being carried through the fourth year; Fort Wayne (Ind.), 8 per cent.; Louisville, 7 per cent.; Baltimore, St. Louis and Boston, each 6 per cent.; Chicago and Cincinnati, each 5 per cent.; Philadelphia and New York, each 3 per cent. These figures are from a report issued by Ayres of the Russell Sage Foundation. With such conclusion, Thorndyke does not agree and says in a report issued by the U. S. Bureau of Education, that in twenty-three cities the elimination begins in grade 1 and continues steadily—that before grade 5 is reached, 20 per cent. drop out and that only 33 per cent. of the whole remain for the eighth grade. With other than

the first year he practically agrees with Ayres in his high-school estimate. "At least 25 per cent. of white population of our country," he adds, "who enter school stay only long enough to read simple English, write such words as they commonly use, and to perform the four operations for integers without serious errors." Dr. Draper says that 66 per cent. of entrants do not complete the eight grades, and that one-half of these do not go beyond the fifth or sixth grades. Six cities with 3,482 pupils dropping out of the elementary grades report the following causes for leaving: Work at home, 725 (20.8 per cent.); ill-health, death, and family sickness, 605 (16.9 per cent., not including death, 17.4 per cent. including); entering private school, 132 (3.4 per cent.); expelled and dissatisfied, 12 (.4 per cent.); visiting, no reason known, and miscellaneous, 221 (6.0 per cent.); removal, 1,787 (52.0 per cent.).*

Generally, the consensus of opinion seems to be that in our city schools less than three-fourths continue attendance for three-fourths of the school year, irregular attendance leading to low percentage of promotions which in sequence leads to retardation—and elimination: that in the elementary schools, retardation is 13 per cent. more prevalent among boys than girls, 17 per cent. more girls than boys remaining through the eighth grade, the boy repeaters exceeding the girl repeaters by 13 per cent., and the percentage of promotions in both elementary and high-school is greater for the girls; that there are 14 per cent. more girls than boys in the high-school (the only nation in which such condition prevails), 25 per cent. of the boys continuing to the fourth year as against 31 per cent. for the girls; that the courses of study in the city schools are adjusted to the powers of the brighter pupils, are beyond the average pupils, and far beyond the slower ones and are the cause of much of the retardation and consequent elimination; and that, generally, the schools are better for girls than boys.

A thoughtful review of what has just been written will surely raise questions in the minds of educators of the deaf as to our courses of study, primarily, and then to the manner in which we use them. We know full well the decided limitations of the average deaf child in educational development starting as he does with a retardation of three to four years in mental

* Cf. Indiana, page 110 ff, for discharges and "drop-outs."

age, to say nothing of the other handicaps so prevalent with him. Have we adjusted our courses of study to meet his conditions, or have we, forgetful of undeniable facts, and the possibilities and probabilities in the education of the deaf, been led, through our intense desire to better his educational standing, into over-reaching his capacity in our course-of-study-making wherein we have given undue prominence to non-essential and unuseful things? And do teachers of the deaf, generally, possess sufficient psychic acumen through study and broad associations to wisely administer with keen discrimination the course as presented them? Do they discriminate, for just one instance (and there are others), the various types of ideation or imagery of their pupils, some of whom no doubt fail to comprehend instruction and lag behind because their mental type of imagery was not understood, recognized, and taken into account by the teacher in presenting the subject-matter of the curriculum.*

* Vide page 127, concerning temperament.

CHAPTER XV.

DEAFNESS AND DEFECTIVE VISION.

The following tables and conclusions will be of interest as they represent examinations as to deafness and defective vision made at different periods (1903 and 1913), with entirely different groups of pupils. One of the tables also compares the 1913 examination with one made in 1906, in both of which years account is taken of defective vision as shown. It will not be necessary to critically analyze the conditions disclosed by the tabulations and conclusions as that can be better done by the reader according to predilection; but note may be made here that between the two extreme periods, congenital deafness (individuals) increased 4.9 per cent.; that total deafness (ears) decreased 8.3 per cent.; that feeble hearing increased 3.6 per cent.; that considerable hearing increased 4.7 per cent.; and that defective vision decreased from 1906 to 1913, 55 per cent. (in congenital cases 17.5 per cent., in adventitious, 37.5 per cent.). The indication is, that on an average, one-third of the cases with defective vision occur with those congenitally deaf, and two-thirds with those adventitiously deaf.

No one of these three examinations, as has been stated elsewhere in reference to the matter, was a searching, scientific examination such as a specialist would make by means of specially devised instruments of delicate and exact nature for the purpose of determining pitch and intensity of sounds, and for ascertaining the degree of bone and air conduction, etc., but were made by the teachers in the school-rooms by means of voice, bells, etc., so as to determine the degree of hearing each pupil had in either ear that could be put to use in the daily work, or that might possibly be of some use to the pupil in ordinary conversation.

The results of these examinations in comparison (with entirely different groups of pupils) follow:

TABLE No. 20.

	1903.				1913.			
	Individuals—300				Individuals—303			
	Congen-ital.	Per Cent.	Adven-titious.	Per Cent.	Congen-ital.	Per Cent.	Adven-titious.	Per Cent.
Total deaf, both ears.....	70	23.3	109	36.3	69	22.8	83	27.4
Feeble hearing, both ears.....	10	3.3	23	7.7	13	4.3	28	9.2
Considerable hearing, both ears.....	8	2.7	12	4.0	15	4.9	20	6.6
Total one ear, feeble one ear.....	17	5.7	34	11.3	22	7.3	37	12.2
Total one ear, considerable one ear....	4	1.3	5	1.7	4	1.3	5	1.7
Feeble one ear, considerable one ear...	2	0.7	6	2.0	4	1.3	3	1.0
Total.....	111	37.0	189	63.0	127	41.9	176	58.1

TABLE No. 21.

	1903—600 Ears.		1913—606 Ears.	
		Per Cent.		Per Cent.
Total deafness.....	418	69.7	372	61.4
Feeble hearing.....	125	20.8	148	24.4
Considerable hearing.....	57	9.5	86	14.2
Total.....	600	100.0	606	100.0
Congenital deafness—				
Total deafness (defective eyesight 1913—9).....	161	72.5	164	64.6
Feeble hearing (defective eyesight 1913—3).....	39	17.5	52	20.5
Considerable hearing (defective eyesight 1913—2).....	22	10.0	38	14.9
Total.....	222	100.0	254	100.0
Adventitious deafness—				
Total deafness (defective eyesight 1913—16).....	257	68.0	208	59.1
Feeble hearing (defective eyesight 1913—12).....	86	22.8	96	27.3
Considerable hearing (defective eyesight 1913—2).....	35	9.2	48	13.6
Total.....	378	100.0	352	100.0

TABLE No. 22.

CAUSES AND DEGREES OF DEAFNESS, 303 PUPILS, 1913 312 PUPILS, 1906	MANUAL			ORAL			KINDERGARTEN			TOTAL 1913			TOTALS 1906			1913	1906
	Congenital.	Acquisitional.	Total.	Congenital.	Acquisitional.	Total.	Congenital.	Acquisitional.	Total.	Congenital.	Acquisitional.	Total.	Congenital.	Acquisitional.	Total.	Defective Vision.	Defective Vision.
Total deafness, both ears.....	24	25	49	25	39	64	20	19	39	69	83	152	68	101	169	23	45
Feeble hearing, both ears.....	1	6	7	10	18	28	2	4	6	13	28	41	9	19	28	5	9
Considerable hearing, both ears.....	4	4	8	7	13	20	4	3	7	15	20	35	11	17	28	8	3
Total deafness, one ear—other feeble.....	4	7	11	16	26	42	2	4	6	22	37	59	24	53	77	10	21
Total deafness, one ear—other considerable.....	2	3	5	1	2	3	1	1	2	4	5	9	.....	2	2	2	.....
Feeble hearing, one ear—other considerable.....	.....	1	1	3	1	4	1	.....	1	4	3	7	5	3	8	1	2
Totals.....	35	46	81	62	99	161	30	31	61	127	176	303	117	195	312	.....	.....
Defective visions, 1913.....	6	4	10	8	20	28	.....	6	6	14	30	44	.....	.....	.....	44	.....
Defective visions, 1906.....	15	22	37	10	22	32	4	7	11	29	51	80	.....	.....	.....	.....	80

CONCLUSIONS.

These examinations made with the three groups of pupils seem to warrant the following conclusions, presuming ordinary conditions, i. e., absence of epidemics of widespread nature, etc.:

1. That of any given number of pupils drawn together into the school, 39 per cent. will show congenital deafness and 61 per cent. adventitious deafness, if based upon statements of parents during the past fifteen years (1898-1913)—669 pupils.*

2. That 76 per cent. will show total deafness in one or both ears; 36 per cent. feeble hearing in one or both ears, and 16 per cent. considerable hearing in one or both ears (some, of course, being twice counted).

3. That there will be 52 per cent. with total deafness in both ears (cong. 22, adv. 30); 11 per cent. with feeble hearing in both ears (cong. 3.5, adv. 7.5); 10 per cent. with considerable hearing in both ears (cong. 4, adv. 6); 22 per cent. with total deafness in one ear, feeble hearing in the other (cong. 7.5, adv. 14.5); 2 per cent. with total deafness in one ear, considerable hearing in the other (cong. 0.7, adv. 1.3); 3 per cent. with feeble hearing in one ear, considerable hearing in the other (cong. 1.5, adv. 1.5).

4. But, that these percentages are gradually decreasing, and will continue to do so to a certain extent, for those with total deafness, and increasing for those with feeble and considerable hearing because of the fact that a number of hard-of-hearing pupils of the public schools who are not making satisfactory progress therein, are now applying for admission into the school for the deaf, the nature of which is becoming better known, and wherein speech is now taught and used and the methods in vogue no longer of secret and mystifying nature but approximating as far as permissible the methods used with the ordinary normal youth.

5. That the number with defective sight will be 20 per cent. of the whole (deafness-cong. 7, adv. 13) which is lower than reports made by examiners of public school children for defective vision in various parts of the country; that 65 per cent. of the cases occur with adventitious deafness; that of the whole number 82 per cent. will be accompanied by total deafness in one (27 per cent.) or both ears (55 per cent.) and 18 per cent. by feeble (14 per cent.) or considerable hearing (4 per cent.) in one or both ears.

6. That adenoid growth, enlarged tonsils, and defective teeth have exerted deleterious influence in producing and intensifying defective hearing and vision, and causing ill-health, and that a goodly proportion of adventitious cases of deafness and of defective vision is due to the lack of proper and timely surgical interference and treatment.†

* Considering the entire number of pupils (2,769—1844-1913), the congenital deafness is 35 per cent.; but during the past fifteen years the first 300 received (1898-1904) showed 34.3 per cent. congenital deafness; the succeeding 300 (1904-1912) 42.3 per cent., and the last 69 (1912-1913) 45 per cent., an average for the period of 39 per cent. Since 1913, up to September 30, 1917, there have been admitted 141 new pupils of whom 52.5 per cent. were reported by parents as congenitally deaf, and another 15.6 per cent. as losing hearing under 18 months, a proportion of whom may be justly considered as congenital cases. Such figures as these indicate a rapid increase of congenital deafness within recent years, an increase perhaps more apparent than real, and not due wholly to transmission of hereditary affliction although of pre-natal cause. Vide Classification of Deafness and Heredity, Chap. XXVII.

† Comparison of these percentages with those listed in the following chapter will disclose certain variations; but it must be remembered that the former are based wholly upon the attendance at one school and of earlier date: while the latter is the composite estimate of four schools and of later date. In either case, the results are only of approximate nature for reasons given in the text following.

CHAPTER XVI.

PERCENTAGE FACTORS FOR MISCELLANEOUS MEASUREMENTS.

We are frequently asked questions concerning the deaf and their schools, not only of a local character but also of general nature—"not exactly," the questioner says, "but approximately"; and quite often it is difficult to answer them, if at all. And again, those engaged in the work often wonder about prevailing conditions in schools other than their own, and must resort to the dreaded questionnaire to be sent others which generally causes difficult and laborious research work on the part of the recipient, if he possesses sufficient time and inclination to go into it at all. Now, many of these questions are important ones tending to disclose certain facts and conditions that the executive head of every school should know—and yet, perhaps, does not know, and in many instances cannot learn, because of faulty or incomplete records and system. Again, the statistics of state, denominational, and private schools, and of general nature and national scope, are contained (inhumed!) in many scattered reports and compendiums rendering consideration of them almost impossible. With such thoughts in mind, the writer has attempted in the text of this report to answer a few of the many questions, and to draw together for ready reference and use some of the more important statistics concerning the deaf as given in a succeeding chapter.

In order to provide, if possible, some means of disclosing certain facts and details of a given number of the deaf anywhere, the writer felt that some sort of a *general* measuring scale (other than mental and physical scales) might be devised in the form of regular *percentage factors* (Pc. F.) to be applied to any number of pupils (or of the deaf out of school, perhaps), the results of such application giving an *Average Norm Line*, above or below which record could be made of a plus or minus nature. In pursuance of such thought, a line of percentage factors was established based upon the Indiana

school records, and were applied to the published total number of pupils in each of the three schools—Ohio, Kentucky, and Philadelphia—and sent to their respective superintendents for checking and verification. It must be understood, of course, that certain unknown quantities which cannot well be measured for general purposes, such as nature, environment, and fractional errors, enter into any equation of this sort, and that the results obtained are to be considered only as *approximate*, yet close enough to exactness to give very fair indication of existing conditions; and this “closeness” is just what the respective superintendents found in checking the statements with their own school conditions, and so reported at a subsequent meeting of the committee. In other words, the correlation between the percentage *factor-results* and the prevailing actual conditions was a very high one and many times the probable error. Following this trial-application, the matter was again worked over by the writer and based upon the actual conditions in the four schools (Indiana, Ohio, Kentucky and Philadelphia), with an aggregate enrollment of 1,685 pupils, a sufficient number to justify the establishment of such an average or norm line of a percentage scale. With these four schools, the central west was represented by two (791 pupils), the south, by one (352 pupils), and the east, by one (542 pupils)—three combined system schools (1,143 pupils) and one oral school (542 pupils). The conditions prevailing in these schools were not of uniform nature, the two most alike being Indiana and Ohio, while Kentucky and Philadelphia were quite divergent in nature of pupilage and grading. The result of any divergence will be indicated by the plus and minus quantities figured along the norm line for individual schools which could have been “smoothed” to quite an extent by mathematical process and the use of fractions. However, aiming only at approximate results and desiring to make the use of the factors as simple as the object permitted, it was deemed neither expedient to smooth these differences nor to use other than integral numbers as factors; and it is believed that such a course will be justified by the results. One exception to this procedure occurs in the case of defective vision, which is caused by the comparatively small number; here, fractional numbers became necessary in associating defective vision with varying degrees of deafness.

Table 23 deals with the grade-classification in any school with twelve (or more) full year grades divided as recommended by the committee, i. e., two (or more) introductory grades, five primary grades, two intermediate grades, and three advanced or academic grades. Table 24 refers to degrees of deafness, congenital or adventitious. Table 25 gives the age when adventitious deafness occurred. Table 26 takes account of defective vision in connection with differing degrees of deafness. Table 27 records the number of graduates, discharges, and drop-outs. In this last table, the percentage factors are based upon 4,800 pupils, the last twelve hundred to sever connection with each school named. In all the tables, the factor-results will indicate the number of pupils falling within any division.

To illustrate the use of the factors, take table 24 for instances in which the factor for congenital deafness is 45; the Indiana enrollment was 303 and 45 per cent. of 303=136.3 which would represent the proportion of the whole congenitally deaf—but discarding the fraction if under 0.5, we have the integral number 136 for the factor result. If the fraction should be 0.5 or over (136.50), the next integral number 137 would stand as the factor-result. Now, it happened that in Indiana the congenital deaf numbered 127, or nine less than the factor-result, which difference would be expressed as $136-9=127$. If the reverse had been found, that is, if there had been 140 congenital deaf, then it would read $136+4=140$. Such procedure will apply to all the tables given below.

TABLE No. 23—*Scale No. 6.*

GRADE CLASSIFICATION (100 Pc.).

Grades	Years in School	Grade-Age	P. C. Factors
In 2, (or more) Introductory Grades.....	1-2	6-9	16
In 1st and 2nd Primary Grades.....	3-4	10-11	18
In 3rd and 4th Primary Grades.....	5-6	12-13	17
In 5th Primary Grade.....	7	14	9
In 2 Intermediate Grades.....	8-9	15-16	20
In 3 Advanced Grades.....	10-11-12	17-18-19	20

In figuring factor-results from this table the "years in school" and the "grade-age" are not to be considered as they have no connection with such computation; they are given here simply as reference to normal conditions agreed upon by the committee, and which have been fully discussed in a

preceding chapter. The grades as listed above may consist, of course, of two or more divisions or classes.

TABLE No. 24—*Scale No. 7.*

DEGREES OF DEAFNESS (100 Pc.).

Degrees	Congenital	Pc. F. 45	Adventitious	Pc. F. 55	Total Pc. F.
32	Congenital	Pc. F 27	Adventitious	Pc. F 28	55
31-51	"	" 6	"	" 11	17
31-71	"	" 4	"	" 3	7
52	"	" 5	"	" 7	12
51-71	"	" 1	"	" 3	4
72	"	" 2	"	" 3	5

TABLE No. 25—*Scale No. 8.*

AGE ADVENTITIOUS DEAFNESS OCCURRED (55 Pc.).

	Pc. F.
Under 1 year.....	9
Between 1 and 2.....	12
Between 2 and 3.....	11
Between 3 and 4.....	6
Between 4 and 5.....	3
Between 5 and 6.....	3
Between 6 and 8.....	2
Between 8 and 10.....	1
Between 10 and 20.....	2
Unknown date.....	6

TABLE No. 26—*Scale No. 9.*

DEFECTIVE VISION (20 Pc.).

Degrees Deafness	Deafness Congenital	Def. Vision Pc. F 8.0	Deafness Adventitious	Def. Vision Pc. F 12.0	Def. Vision Total Pc. F 20
32	Congenital	Pc. F 4.8	Adventitious	Pc. F 6.6	11.4
31-51	"	" 1.4	"	" 2.0	3.4
31-71	"	" 0.2	"	" 0.4	0.6
52	"	" 0.8	"	" 1.7	2.5
51-71	"	" 0.2	"	" 0.3	0.5
72	"	" 0.6	"	" 1.0	1.6

TABLE No. 27—*Scale No. 10.*

GRADUATIONS, ETC (100 Pc.).

	Pc. F.		
	Boys	Girls	Total
Graduations.....	10	9	19
Discharges.....	19	12	31
Drop-outs.....	27	23	50

From these tables it will be seen that the percentage norm-line resulting therefrom establishes the following percentage-

factors* for any given number of deaf pupils in school, or of any given number of deaf persons outside of school excepting grade classification for the latter class: (1) For congenital deafness, 45, (2) adventitious deafness, 55. (3) For loss of hearing between birth and two years of age, 21, (4) between two and six years of age, 23, (5) between six and twenty years of age, 5, (6) date unknown, 6. (7) For total deafness in one or both ears, 79, (8) feeble or considerable hearing in one or both ears, 21. (9) For defective vision, 20, (10) with congenital deafness, 8, (11) with adventitious deafness, 12, (12) with total deafness in one or both ears, 15.4, (13) with feeble or considerable hearing in one or both ears, 4.6. (14) For classification in primary grades, 60, (15) intermediate grades, 20, (16) advance grades, 20. Based on the last 300 leaving school, (17) number of graduates, 19, (18) of discharges, 31, (19) of drop-outs, 50.

In comparison of results from different schools the figures will be of normal value (the established factor-results), or of plus and minus values. For instance, using the group divisions given above, eliminating the "fixed" or normal factor-results as known and fixed values, and assuming a report made by a school of, say, 300 pupils, with variations for the normal line, the statement may be made thus:

FORM C.

1. -5 (N-5=130).	11. +4 (N+4=40).
2. +5 (N+5=170).	12. +4 (N+4=50.2).
3. +3 (N+3=66).	13. -4 (N-4=9.8).
4. -8 (N-8=61).	14. N (180).
5. +5 (N+5=20).	15. -10 (N-10=50).
6. N (18).	16. +10 (N+10=70).
7. +8 (N+8=245).	17. N (57).
8. -8 (N-8=55).	18. +10 (N+10=103).
9. N (60).	19. -10 (N-10=140).
10. -4 (N-4=20).	

In this tabulation the letter N signifies *Normal*; and the figures in brackets are given only as an illustration—they are unnecessary, as the letter N and the plus and minus figures (*the index of variation*) will establish deviations from the established *factor-result*.

* Percentages are here grouped: they may be used in detail as given in the tables, if desired.

CHAPTER XVII.

INSTINCTS AND TEMPERAMENTS.

Reference has been made to delayed and irregular functioning of instincts and impulses, of memory-experience and sensorimotor reactions, and to the creation of instabilities* and it was there stated, "these, and kindred questions, are of superlative consequence in the development of children of all ages whether hearing or deaf, but especially so with the latter. A better knowledge will certainly lead to better balanced curricula and more evenly graded texts." Now, in considering the curriculum to be presented in our schools for the deaf, this question of the functioning of the instincts calls for careful thought. Do they function with the deaf child as they do with the hearing child? Probably not, because of the "silence and isolation" natural to the deaf child and resulting in delayed mental development. And another question presents itself in this connection, i. e., is there an orderly appearance and period of dominancy of instincts with the hearing child? Almost surely not, according to many observers. Hence, if we attempt to answer the first question we find ourselves basing the comparison upon a shifting and irregular condition prevailing with the hearing child. But even so, it is worth while to give the matter close thought, for if it could be established that the functioning and dominancy of the instincts resolve themselves into some degree of regularity, the desirable arrangement of a curriculum to correspond with instinctive activities would render the task much easier than we find it now.

"It is usually considered," says Weismann, "that the origin and variation of instincts are dependent upon the exercise of certain groups of muscles and nerves during a single life-time; and that the gradual improvement which is thus caused by practice, is accumulated by hereditary transmission. I believe that this is an entirely erroneous view, and I hold that all instinct is entirely due to the operation of natural selection, and has its foundation, not upon inherited

* Vide page 43.

experiences, but upon the variations of the germ * * * although many observers have followed Darwin in explaining them as inherited habits,—a view which becomes untenable if the habits adopted and practiced in a single life cannot be transmitted."

Discussing instincts and their genesis, Pyle writes: "Man has as many instincts as the other animals, perhaps more. * * * Man is a creature of instinct and habit. It is true, he is also a creature of reason—but how much there is of instinct and how little of reason! What is not instinct is, in large measure, habit. The great and powerful sources of our daily action lie deep in our nature—love and hate and fear, jealousy and rivalry, competition and strife—and the instinctive responses characteristic of them, are as old as the hills, while our little spark of reason is but a thing of yesterday and today. Our bodies have come down from the past; they have been moulded in the woods; and their equipment is that which led to the survival of our ancestors in their form of life. It is, therefore, no wonder that we find the strongest forces of our nature to be the heritage which these ancestors have left us, and, of course, suited to primitive forms of living." And what is here said of instincts may well apply also to temperaments which are generally supposed to come to us through inheritance, probably as "habits".

Bergson, in the most exhaustive inquiry into the subject ever made, reaches in "Matter and Memory" the final conclusion that "the idea that the body preserves memories in the mechanical form of cerebral deposits * * * is not, then, borne out either by reasoning or by facts." Commenting favorably upon this conclusion, an unknown writer makes the forceful statement "that much of our life, of course, has become automatic and, sinking below the level of normal consciousness, has become rooted in the structure of the brain as habit, thus giving us a kind of individual physical memory; and in the same way the individual, in the embryonic development of prenatal life, recapitulates the evolutionary history of the race which, crystalized in the form of instinct, he inherits as a kind of racial memory." Apart from this evanescent material memory there exists also in the ego, an unconscious or subliminal mind and memory beyond the disintegrating forces of time; but with this aspect of material and mental existence, so fraught with latent power, the nature of

this report inhibits consideration and discussion. It may be stated, however, that with this subliminal mind and memory, we pass from the material to the spiritual which bears its indelible impress upon each one of humankind; and did we but know, and could make use of, this latent power within us unseen and unrecognized through the conventions and artificialities of life: could this universal mind and memory be quickened into active life:—what a broader view of world-existence and its shadowed mystery would be presented to our vision!

The question as to the time of functioning, and the period of dominancy, of the instincts, while most interesting and of great value, has led to many diverse opinions, and it seems impossible to find agreement as to even averages when we come to consider the widely differing individual subjects. "An instinctive tendency," writes Pyle, "may be early subdued, or it may be strengthened and perpetuated. The nearest we can come to a solution of the problem is to determine by statistical studies the time when, on the average, an instinctive tendency is at its height, and in some cases this may be sufficiently definite to be of value to education. * * * At any rate, the instincts will have to be taken into the laboratory and worked out with a great deal more care than has ever been used in their study before we can do anything more than indicated." In his book upon educational psychology, Dr. Pyle has collated in brief form the following results of various studies of "instincts and the emotive instinctive responses" which will be interesting and, almost surely, of value to the teacher of the deaf.

Imitation—First appearance, 59th day (reflex), 171st day (voluntary), Dearborn; in 2nd half of first year, Kirkpatrick; 6th or 7th month, Baldwin; 15th week, Preyer; 237th day, Major; 4th month, Sully. Most prominent 4th to 7th year, Kirkpatrick.

Play—In the second quarter of first year, Kirkpatrick, Major, Shinn; 341st day, Dearborn. Normally, always operative later.

Migrating—1st to 3rd or 4th year, Kline; 2nd or 3rd year, Kirkpatrick; must be subdued by early adolescence or may become permanent tendency.

Collecting—Not later than the 3rd year, Burk; in the 2nd year, Kirkpatrick. At its height at 10, Burk.

Construction—Appears, 9th month, Sully; 13th month, Tiedemann; 14th month, Major. Interest in construction is prominent throughout school-life, normally.

Rivalry—According to Kirkpatrick, appears in the 4th or 5th year. It may be relied upon to function throughout child-life.

Sympathy—7th or 8th month, Tracy; 12th month, Sully; 22nd month, Baldwin; 27th month, Major; 3rd year, Kirkpatrick. Later responses are largely due to experience and training.

Pride—19th month, Preyer.

Fear—First appears, 2nd month, Tracy and Shinn; 3rd month, Major; 4th month, Dearborn and Preyer; 7th month, Sully; 1st year, Kirkpatrick. Fear is greatest in 3rd and 4th years, according to Kirkpatrick.

Anger—In young babies, Kirkpatrick; 10th month, Darwin and Preyer; 2nd month, Perez.

Curiosity—22nd week, Preyer. Under proper conditions, curiosity functions through school-life.

“It will be seen from the above,” Pyle adds, “that all the important instinctive tendencies, except the socialistic, function normally throughout the school-life of the child. The strength of these tendencies depends upon the demands made upon them in the experience of the child. The older and more fundamental to the life of man the tendency, the more independent it is of experience.”

This question of the functioning of the instincts and their periods of dominancy naturally suggests reference to disposition, that is, of temperament, a subject that has always occupied an important place in the consideration of educators, and which embraces all bodily influences so far as they show mental characteristics. Individuals are frequently met whose characteristics are written in their faces so that by their very appearance they show what they are. In directing the growth of children, this latter question of temperament becomes of great importance in outlining the curriculum and in adherence to its prescriptions in school work. It is well-known that children vary greatly in “mental make-up” and in temperament, and that all will not thrive under the same treatment. That this is a positive fact will be denied by no one, and the evident corollary is, that in both home and school activities heed should be given to the variant grades—otherwise, we not only fail in the accomplishment of much good—but initiate a wrongful trend to the child’s future life.* In discussing this matter, Dr. Allen, whose monograph on “Temperaments” should be carefully studied by the teacher, says that what will be food for one will be poison to the other, and that it is first of all necessary to determine what the temperament of the child is, and then give such treatment as will promote its healthy growth. He then proceeds to say that there are four classes of boys and girls, as there are four classes of mature men and women—the *Nervous*, the *San-*

* Refer to imagery of children, page 117.

guine, the Lymphatic, and the Bilious, and classifies them in detail as follows:

I. SANGUINE TEMPERAMENT.

Physical Characteristics—

- Color { 1. Hair—Red or reddish.
2. Eyes—Blue.
3. Complexion—More or less florid (color of face).
- Form { 4. Face—Square.
5. Nose—Outspread.
6. Neck—Short.
7. Build—Thick-Set.

Mental Characteristics—

1. Impulsive—buoyant and cheerful—favorable conclusions thoughtlessly drawn.
2. Excitable—readily provoked—easily reconciled—emotional.
3. Ardent in everything—not persistent.
4. Not enduring in work.
5. Muscular pursuits preferred to intellectual.
6. Equally happy in pursuit of little as of great ends—more happy in pursuit than in enjoyment.
7. Firm outspoken speech—not minutely informed.

II. BILIOUS TEMPERAMENT.

Physical Characteristics—

- Color { 1. Hair—Black.
2. Eyes—Black or dark brown.
3. Complexion—Dark or darkish, pale olive.
- Form { 4, 5, 6, 7—Same as Sanguine.

Mental Characteristics—

1. Not impulsive—serious—conclusions thoughtfully arrived at.
2. Passionate—jealous—vengeful—unscrupulous—in business matters, cool and wary.
3. Eager—earnest—persistent.
4. Enduring in work.
5. Business or gainful pursuits preferred to muscular or intellectual, but able to excel in all.
6. Happy in the pursuit and attainment of wealth, power, and family welfare.
7. Decided speech—always ready and informed.

III. LYMPHATIC TEMPERAMENT.

Physical Characteristics—

- Color { 1. Hair—Fair brown (flaxen).
2. Eyes—Brown, gray-green or light hazel, thinly colored, lusterless, dim-eyed.
3. Complexion—Colorless, opaque.
- Form { 4-5-6-7—Same as Sanguine and Bilious.

Mental Characteristics—

1. Not impulsive—slow—heavy—conclusions thoughtfully arrived at.
2. Not excitable—not easily provoked—forgives, but never forgets.
3. Persistent—not ardent.
4. Enduring in work—a plodder in business.
5. Muscular pursuits avoided.
6. Happy from personal comforts and indulgence.
7. Slow manner of speech—always informed.

IV. NERVOUS TEMPERAMENT.

Physical Characteristics—

- | | | |
|-------|---|--|
| Color | { | 1. Hair—Light Brown. |
| | | 2. Eyes—Gray. |
| | | 3. Complexion—Pale, clear. |
| Form | { | 4. Face—Tapers a narrow chin from a high or broad forehead. |
| | | 5. Nose—Narrow. |
| | | 6. Neck—Long. |
| | | 7. Build—Slight—slim—never corpulent—often very tall and extremely slim. |

Mental Characteristics—

1. Impulsive—animate—rapid conclusions so hastily drawn that they are often regretted.
2. Excitable—readily provoked—reconciled immediately—imaginative—sensitive—particular—fastidious.
3. Irresolute—persistent after final decision.
4. Enduring in work—will never give in—in danger of physical bankruptcy.
5. Intellectual and muscular pursuits preferred.
6. Happy from whatever pleases the senses and enriches the mind, as art, travel, literature.
7. Speech rapid—often very rapid—frequently undecided—precision gives place to fancy.

"It may be asked," adds Dr. Allen, "which is the best temperament? The reply is not doubtful. The compound in equal proportions of the four pure temperaments—the *Balanced Temperament*—is certainly the best for its possessor, for in it the four temper each other, and the troublesome special tendencies or impulses that characterize every pure temperament are toned down to comfortable smoothness of action.

"The impulsiveness of the Sanguine is tempered by the inaction of the Lymphatic; the eye-to-business, position and power of the Bilious, by the imagination of the Nervous; the love of ease and contentment with personal comforts of the Lymphatic, by the ambition of the Bilious; the perplexity and indecision of the Nervous from seeing too many ways open, by the impulsiveness of the Sanguine.

"That surely is the best temperament whose action avoids extremes; which has sufficient of the natural force of all pure temperaments to acquire any kind of knowledge; which is well fitted for any profession or business; and that retains through life the natural figure, and has equal health, free from the tendency or predisposition that every pure temperament has to disease or derangement of its special organ."

CHAPTER XVIII.

THE CURRICULUM.

In the measurement of mental progress and class-results (performance-level) of school-children, of efficiency of schools (teachers, methods, equipment, etc.), and of value of school-results as shown in after-life, it is important and necessary that consideration should be given not only to mental capacity—intelligence, memory, experience, etc., and to physical growth with all it implies—but also to that foundation upon which all educational progress, in our elementary schools especially, must be based—in other words let us say, the barriers over which the pupil must make his way, and which we are pleased to style, the curriculum (“a running”). This is a more-or-less arbitrary specified course of study supposed to be wisely weighted as to essential needs and the age and capacity of children, but which generally follows the uncertain expression of doubtful public opinion prompted by utilitarian urgency of the time which is of very changeful nature, or created by peculiar and prejudiced views of its maker—and, in either case, too often based upon what adults think the child should know rather than upon what the child is capable of learning.

As stated heretofore, it was decided by the committee not to outline the details of either literary or industrial curricula which should be left to the proper authorities of each school to establish as exigencies may require, but to be based upon the grading and work to be accomplished as recommended by the committee. It was believed, and is so recommended, that the work in schools for the deaf should cover the work of the eight grades of the common schools for the hearing and the first and second years of high school as now established: and that the entire course represent twelve years of school work divided into twelve year-grades, two preparatory, five primary, two intermediate (the first an adjunct of the primary grades, the second an adjunct of the advanced grades), and three advanced. It was further agreed that where it was desired to cover the third and fourth years of

high-school as preparation for college, two additional years could be added to be known as the "College Course." It was also agreed that in establishing the year-grades an extra reviewing-year may be added for slow pupils between the third and fourth, or between the fourth and fifth years as circumstances may require. While these additions may be useful, and necessary in some cases, they are not recommended by the committee but are left wholly optional with the various schools for adoption; and therefore but twelve years are considered as constituting the regular course and for which the Age-Grade Scale has been suggested.

As important as is a well-established curriculum to the school, and as difficult of wise construction as it surely is, we often find it apparently "thrown together" in haphazard manner with a jumble of needful and needless things; and it is no wonder that we always find it in a transitional state—and frequently not of much worth! It has been said that a poor curriculum is better than none at all which, with qualification, may be true; but how much better it would be if constructed upon right principles and based upon existing conditions as to pupilage and subject-matter. This construction is not a simple one of a few topical paragraphs but of complex nature calling for the deep and earnest consideration of those versed in the science of education who, knowing the possibilities and probabilities of educational development (especially so with the deaf), plainly discern the logical and successive steps to a definite and final goal to be reached. "The science of course-of-study-making," writes Dr. Yocum, "is no simpler than any other science, no less technical. Fundamental as it is for the mastery of all, why should it be?"

A course of study should embrace the essentials from beginning to end with explanatory details in only limited degree, and should not be burdened with a mass of non-essentials and didactic devices with insistence that they be slavishly followed, which latter procedure, with "nagging" supervision, will speedily transform the alert and resourceful teacher into a blind follower of dull routine which kills both interest and intelligent initiative. The properly constructed course, and its application, may be likened to a highway leading on from point to point from which the traveler, wishing to make all the points, may wander from time to time but always keeping the road in mind as his main thoroughfare to which he must

return; in like manner the competent class-teacher may, nay should, stray from the course-of-study, gathering here a bit and there a bit, the better to enable her to give to her pupils that which the course calls for, but always keeping it in view for guidance from point to point. The clever, resourceful teacher will know when and how far afield to go to accomplish good results—the teacher without such qualifications, who simply follows the beaten track, or wanders heedlessly therefrom, and is without ingenuity, should retire, or be retired, for she is not a real teacher who often strengthens a prescribed course out of her rich experience.

In considering the determinants of a course-of-study, Yocum has recently written as follows, and upon the four distinctions, the five forms of relationships, and the differentiation of knowledge and power, given by him, may be constructed a course of study to be emphasized or minimized in various phases as conditions and circumstances may require: “As education depends upon the *retention* of experience, and the control of new experiences through activity which has been given continuity and dominance by the old, knowledge in the educational sense means an idea or activity in the relationships in which it is retained by the learner; and power means the resulting forms of self-activity which form or control his future experience.” The distinctions cited by Yocum as fundamental for course-of-study-making are as follows:

1. Between knowledge and power;
2. Between specific and general usefulness;
3. Between general education and specialization;
4. Between essential and optional material;

the first three representing all possible forms of usefulness and the fourth resulting from the measurement of relative usefulness. And he further states that all knowledge gained in school, or out, is retained either:

1. In forgotten relationships—which results in *impression* with cumulative development of permanent interests, tastes, ideals, and points of view.
2. In single or partial relationships—which forms *vocabulary* through the partial concepts by which most words and ideas are held in mind.
3. In varying and many-sided relationships—bringing about an *interconnection of ideas* which constantly reassociates them in new and varying connections.
4. In definite and certain relationships—resulting in specific discipline in the sense of *habit and systematic knowledge*.
5. In relationships general enough to be found in various fields of experience—bringing about under favorable conditions a *general dis-*

cipline or application which carries ideas over into branches of knowledge and fields of experience other than those which have developed them.*

In this report it is not necessary to discuss the distinctions and forms of relationships pointed out as the statement itself will serve to suggest the required differentiation in the ordinary elementary schools. However, it may be well to say that in such differentiation consideration must be given to the immediacy and non-immediacy of certain subjects, or phases thereof, and instruction therein, and to the interest displayed by pupils in such subjects, phases, and instruction. It is false doctrine, according to Yocum, to proclaim that anything should be taught at a certain time, or in a certain grade, simply because the pupils are interested therein; that essential things are not useful because they are interesting—they must be made interesting because they are useful and essential; and because things are naturally interesting or ready of development in a particular grade is no positive reason why they should be taught there; and because they respond to natural interest at a later period or can be more readily developed then, is no positive reason why their teaching should be postponed; immediacy of usefulness, not immediacy of naturalness, should control; and, in all things, the essential should be winnowed from the non-essential which burdens text, teacher, and method of today.

* In the consideration of the influence of the formal mental discipline, the thought generally finds expression that thorough and efficient training of one function of the mind along some particular line such as mathematics, for instance, or language, or music, etc., will exert developmental influence upon other functions and of strengthening value in the accomplishment along other lines of mental endeavor,—in other words, that transference of the results of training will take place. But, until recently, when the affirmative view of the theory seems to be growing stronger, the consensus of opinion appeared to be of negative import. While Yocum in his fifth form of relationships does not narrow the view to this particular line of transference in specific manner but refers to it only as a general proposition, it is well to cite the fact that such particular transference, as above referred to, is still a mooted question. To present the basal thought of the two views it may be stated briefly that it is held by some "that mental development in one function has little influence on that of another—that the mind is a congeries of more-or-less independent functions, * * * that there seems to be lack of evidence of transference, * * * and that high numerical correlation between mental functions may not mean inner-mental connection"; and by others, it is held, "that the mind is a unity, or at least, consists of somewhat unified *groups of functions* which are inter-related and inter-dependent.* * * The same brain center, it is said, operates language and mechanical dexterity,—therefore, it is agreed, improve the one and you thereby improve the other." Bergson, in his "Matter and Memory," the latter of which is of great importance in transference of specialized training, states that while it is generally held that memory is a function of the brain with only a difference of intensity between perception and recollection, yet, it is something more than a function with not merely a difference of degree, but of kind, between perception and recollection. Rugg, who has given the subject of transference much earnest study, in reviewing thirty investigations of the matter, insists that "there is distinct evidence of the so-called transference of training, indicating increased efficiency as to other abilities which are in some way related to the trained abilities," thus leaning to the theory of unified groups of functions. And Wang, a Chinese doing advanced work at the University of Wisconsin, holds similar views in his published monograph on the subject. The very nature of the deaf and of our educational work with them, brings this question into greater prominence with us than may prevail with the education of the hearing who are subjected mentally to extraneous influences not applicable to the deaf.

The old order of education is rapidly passing and the present demand that there shall be teaching—not *hearing of recitations*: and that the results of teaching shall be measured *in terms of the child*, that is, in the progress of the child, and not only by preparedness and effort on the part of the teacher, is upon us; and we must meet it—and meet it with a curriculum that has been so constructed as to fully serve the new requirements. The old three-angled scale of measurement, the trigon of conjecture, opinion, and chance, so long prevalent in education and curricula, must be replaced by one of science, knowledge, and precision, which requires on our part “an understanding of industrial methods and processes, of the facts and relationships of social life, therefore, a knowledge of facts and laws of natural and social science.” It has been wisely declared by an educational commission recently that teaching is to be judged by (1) developing motives in pupils (2) training to discriminate values, (3) developing power to organize ideas, and (4) developing initiative. *Motives, values, ideas and initiative*—all to be developed in the child and youth by the teacher, and possible only through efforts incited and strengthened by the prompting of science, knowledge and precision.

Many schools, and many school teachers, seem to acquire easily the blight of inertia and are prone to follow traditions and customs, more or less hoary. It is well known there are many topics and methods or devices in existing education which date back to social conditions which are passing away or radically changing in nature, for instance, industrial methods, manufacturing, railway transportation, electric agencies, and many other agencies of everyday life. The chief effort of all educational reformers is to bring about a re-adjustment of existing scholastic institutions and methods so that they shall more readily respond to changes in general social and intellectual life and conditions.

As to just how this re-adjustment is to be made, as to what degree of change must take place, as to degrees and values of native, or natal mental endowment and acquired experience through training, as to qualitative differences in types of endowment and experience-acquisition, as to what really constitute the fundamental principles of the suggested or required present-day education—as to these things the wisest Doctors seem to be greatly gravelled.

Germany has provided, as tersely put by some one, "efficient specific education for specific, distinctly recognized social classes," while we, in our wisdom (?) have attempted a general education for all irrespective of class distinction—and regardless too, it is claimed, of individuality, of intellectual proclivities, and of efficiency. It would seem to me that any re-adjustment should be in harmony with the following precept: *Efficient specific education for specific, distinctly recognized mentalities, qualified by specific natural and social conditions if needs be.* This means the consideration and measurement of the various mental attributions of individuals under the strong rays of educational psychology. As stated in a previous part of this report (and it is worthy of repetition here)—never in educational history has there been so much uncertainty as to values in the educational field as at present, never such aggressive dissatisfaction and earnest schools ranging from the kindergarten to the university. This conditions is the one great fact easily discernible by all who give the matter thought and reading: and another great fact is, that at no time in the world have the people been more willing, and more bountiful in giving, than now, to the cause of education. Surely, the latter fact should give us improved conditions—and no doubt will, under the vigorous protests offered and the demanded *quid pro quo*.

In seeking the causes of the present dissatisfaction and the protests we may well look to over-crowded curricula introducing much extra, or new, matter some of which may justly be set down as fruitless fads and frills; the insistence upon much useless drill upon parts of subject-matter which would be better eliminated altogether; in failing to properly distinguish between essentials and non-essentials; in not giving proper attention to the immediacy or non-immediacy of usefulness of subject-matter at various ages and in varying grades; in neglecting progressive individuality by inhuming it in class units and averages; in not assigning just and proper weights to subject-matter taught; in lack of knowledge of the psychophysiological development of the child; in not discriminating between the chronological and mental ages, and the varying degrees of intelligence possessed by various children due to heredity or whatever cause; in attempting to enforce knowledge and culture dogmatically from the view-

point of maturity rather than by persuasive leading along the natural plane of thought and action of immaturity; in undue subordination of the primary grades to the high school, college and university; and all resulting in futile extensive and discursive study and curricula rather than in intensive training for the better things and actual needs of life.*

Just why such things should be, it is not the purpose of the writer to answer here; rather, he would simply refer to existing conditions in the schools of our country leaving each one to draw his own conclusions and, at the same time, compare the situation with that of our schools for the deaf. And in this connection he would call attention to the further facts that, as now constituted, it requires an average of over ten years (9 to 12½) to complete the lower eight grades of the public schools and for which only eight years are prescribed; that the number of retarded children, those too old for the grades they are in, from whatever cause, is growing greater, in some cities reaching over sixty per cent.; and that before the eighth grade is reached a very large percentage of children, probably sixty per cent., are withdrawn from school. There must be some serious cause, some glaring defect, in the educational scheme as at present devised and practiced.

The public demand now is for a return to "fundamentals"—and "vocational training," whatever that is, for no two wise men seem agreed as to just what it should cover, nor as to the how, and the when, of it. But that industrial training in some form is needed may be set down as an educational truism. And schools for the deaf have been the pioneers in this work since the first regular school in the United States was established in 1817.

It has been stated that the most complex ideas which can be included in a course-of-study are, as partial and imperfect concepts, within the comprehension of most normal children at the age when they enter school; but that this is absolutely not true with deaf children may be seen from the following quotation, which also indicates the vital necessity of very decided modification for the deaf of curriculum, school-work, text-books, etc., as arranged and prescribed for the hearing.

"Few persons have a realizing sense of the terrible affliction that deafness entails: how the eye is substituted for the ear in our efforts to reach the brain: how the years in which

* Vide page 160—Tyler.

the normal child surely, though unconsciously, lays the foundation for its future education, are the years in which the mind of the deaf child lies dormant; how the natural curiosity and acquisitiveness of early childhood is suppressed by the operation of his infirmity: how his natural disposition is warped by his misunderstanding others and not being himself understood. All these are only too well known to teachers of the deaf—but unfortunately are not known to the general public.

“When, in the course of his life, the deaf child is placed in school, an artificial method of instruction takes the place of the usual means of conveying thought. He begins his school career where the hearing infant at its mother’s knee begins its attempt to master the language of those about it. The language of his parents is to him literally and truly an unknown tongue—and it is to the acquisition of this that the long years of his tutelage are spent. For many years the subjects taught in the public schools are subordinate to this, and it is small wonder that his progress at first is slow and discouraging. He lacks the medium of acquiring definite information; his knowledge of the phenomena about him is hazy and imperfect.”

In the arrangement of a course-of-study for any elementary school, especially one for the deaf, the very first requisite is that it should be based upon the fundamentals of early education. *But what are the “fundamentals”?*

An answer, perhaps, may be given by all of us “trippingly from off the tongue”—but are we right? We would, at least, include arithmetic, spelling, handwriting, grammar, etc., among other things. But here comes Commissioner Snedden, of Massachusetts, in answer to the question of what constitutes the fundamentals, and says they are to be found “only in a study of the social needs of our time”—that is to say, the fundamentals of today may not be the same tomorrow. And J. Carleton Bell, of the University of Texas, one of the editors of the *Journal of Educational Psychology*, says “that assuredly” arithmetic is not one of the fundamentals, that “in the professions, in business, in manufacturing, in banking, in social work, in the drawing-rooms, in the kitchen, the need for arithmetic is vanishingly small”, and refers to the use of prepared tables and to mechanical devices for even the

smallest of computations. He holds that handwriting is not fundamental in this day of mechanical writing, and in turn disposes of spelling and grammar, saying of the latter, "that all experimental studies agree that its contribution to efficiency in the use of language is negligible and that it might well be relegated to the college or graduate school. "Reading may be fundamental," he agrees, "but even it is undergoing striking modifications in method of treatment."

What are the fundamentals?

Professor Bell, in answering the question, gives four fundamentals. (1) A study of the vernacular, including the technique of silent reading, a broad knowledge and appreciation of the best in modern literature, and a fluency in both oral and written expression. (2) An understanding of and respect for the natural sciences and their significance for the conduct of practical affairs. (3) The social sciences, including history, economics, government, sociology and individual and social psychology. (4) A comprehension of art as the loftiest production of human intelligence. "These," he holds, "are the four cardinal points of a liberal education, and should determine the direction of the teaching process in the elementary school, in the high school, and in the college." Hereon, Professor Bell hangs all the law and the prophets. He does not dwell upon radical and far-reaching changes in courses of study which would be made necessary by accepting the fundamentals given by him but says it remains merely to emphasize the omissions of mathematics and languages from the list of fundamentals. Far be it from him, he adds, "to underestimate the interest and value of these venerable objects of mental activity * * * but from the point of view of general social needs their significance is ancillary rather than fundamental."

Referring to only a few of the objections cited, the writer believes that our general curricula are over-crowded, that some of the so-called new matter should not be introduced, that some subject-matter, in whole or in part, should be eliminated, and that especially in our schools for the deaf, we should strive for an intensive training based upon fundamentals.

But what are these fundamentals?

One and one only!

Language, and then, Language—spoken, spelled, or written—and the power to read, and the power to sense what is read. Other requirements will then follow more easily and with greater results than now attained; and it is believed that in giving this power to read and sense what is read, *to be acquired through constant and prescribed reading*, the wisdom of leading pupils of primary—perhaps, also, of intermediate grades—into a bewildering net-work of technical and grammatical forms, is to be seriously questioned.

Recurring to the question of a standardized curriculum, that is, a uniform course-of-study for all of our schools for the deaf with prescribed text-books, etc., it is thought that such an attempt would not only fail of accomplishing good but would actually hinder improvement and progress, warping incentive, initiative, and individual effort, and resulting in positive retrogression. With the requirement presented by the committee that the work of our schools should cover that of the eight grades of the public schools and the first two years of high-school, it is believed that the trustees, the superintendent, and the teachers of any school can best arrange its course-of-study under existing conditions and circumstances so as to produce praise-worthy and required results; if they cannot, or do not, then they would also fail to produce such results with a course prescribed by others. A standardized uniform course is impossible—if possible, then wholly undesirable.*

* In close connection with the literary and industrial curricula of the school is the distribution of time (hours) for study, recitations, shop and household work, recreation, meals, sleep, etc. Based upon a scholastic year's work—36 weeks, 252 days, 6048 hours—the following schedule is presented to outline in general manner this distribution of time simply for the purpose of calling attention to the matter. It may be followed as to the various periods, or it may be changed in any one or all of them as conditions and the judgment of the superintendent may direct. It will, at least, furnish a definite line of limitations from which to deviate and devise other schedules.

FORM D.

1. Literary Work, in school room and study periods	1043 hours—17.3 pct.
2. Industrial Training, in shops and household. .	612 hours—10.1 pct.
3. Moral and Ethical Training, in chapel and Sabbath school	106 hours— 1.7 pct.
4. Chores of Household	126 hours— 2.1 pct.
5. Recreation Period	1389 hours—23.0 pct.
6. Meals	378 hours— 6.2 pct.
7. Sleep	2394 hours—39.6 pct.
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CHAPTER XIX.

NOTES ON CURRICULUM AND SCHOOL WORK.

The following notes on curriculum, bible-study, and school-work generally, based upon the prescribed Course-of-Study by Years, the Indiana Language Manual, wherein are set forth parts of speech, verb forms, sentence models, etc., and Course Limitations, wherein the scope of work for each month and term is clearly outlined, were prepared and presented for the guidance of teachers and others in the Indiana school. It is presumed that all schools have similar outlines. The "notes" are simply what they purport to be—brief comments upon various phases of scholastic work, and are given just as phrased for teachers familiar with the Indiana school outlines and requirements. It is thought they may prove helpful to others and serve to outline some of the details and requisites of both curriculum and school-room practice. In connection with these notes are given certain rules and arrangements concerning school-terms, class-marking, examinations, grade-days, promotions, and discharges now in force in Indiana, the adoption of which by other schools may well serve to standardize these phases of our work—at least, furnish the nucleus for such a standardization.

The vocabulary of a class will be governed by the verb forms taught, the daily incidents of each particular classroom, and as provided for in "Course Limitations." The general course in language is a graded one, which must be closely adhered to, as prescribed in the regular "Course of Study," in the "Indiana Language Manual," and in "Course Limitations," wherein the scope of work for each month of term is clearly outlined.

One portion of the blackboard must be reserved for permanent outline of "Parts of Speech and Verb Forms," another for permanent outline of "Sentence Models." In teaching new words, forms and sentences, and in correcting errors, use these outlines.

For journal writing a good, substantial book will be provided, which must remain in the possession of the teacher except when pupils are writing therein. It must be explained by the teacher that the book is to be a four years' record of journal writing (third, fourth, fifth and sixth years), and must show neatness, tasteful arrangement and legible penmanship; otherwise it will be to their discredit when promotions are to be made.

The Journal Record is intended to show progress in the use of language and in the assembling of ideas, and will largely qualify the "mark-

ing" upon which promotions will be based. The record must be submitted to the supervising principals for inspection at such times as they may direct.

Formal Compositions upon assigned subjects must be written by pupils in the A, Junior, Middle and Senior grades at the close of the first and second terms and on May first, and must be submitted to the Superintendent for his inspection.

In journal writing, corrections may be made upon the written page in red ink. The compositions, however, must be left and submitted just as written by the pupils, without corrections. Common errors, however, must be noted by the teacher, written upon the blackboard, and thoroughly explained to the class.

Reproduction of stories read, spelled, signed or spoken, and re-arrangement of stories incorrectly written upon the blackboard, may be substituted occasionally for journal writing and compositions.

When written lessons or lectures are to be prepared by the teacher, it is expected that the greatest care shall be taken in their preparation. A poorly prepared lesson is worse than none at all, and will work a positive injury to the child.

Lessons for the printed Daily Lesson-Papers must be written as directed by the supervising principals, and must be submitted to them for approval not later than 12 o'clock each day.*

A good teacher will avoid unusual and forced expressions in lecture and lesson paper, and especially in the latter will he studiously avoid writing that which can only be referred to as "long, rambling and without value." This sometimes occurs.

Spell words and have the pupils use dictionaries to learn how to find their meaning. Spell questions and require the pupils to spell the answers. Spell short stories and have the pupils reproduce them. Permit pupils to speak to one another or with the teacher only when they spell what they have to say. Insist upon distinctness of spelling; indistinct rapidity is a nuisance. In oral classes insist upon speech and speech-reading.

Copy exercises and stories from the blackboard. Write sentences upon the board; erase and have pupils reproduce them. Require the filling in of blanks left in short sentences. Have action writing, picture writing, journal writing, story writing, letter writing. Drill in the use of quotation marks and in conversation exercises. Require statements to be changed to questions and questions to statements.

In arithmetic, as outlined in the Course, the end in view is a practical one, and must needs be, under existing conditions, although the cultural end is not to be lost sight of. Therefore, in the upper grades, the arithmetical operations should be made to appeal to the self-interest of the pupils in no uncertain way. Encourage them to find problems around them and to bring them into the classroom for discussion and solution. While teaching "particulars" do not overlook the "generals," and present the former as leading to the latter. An understanding of the correlation of the two is necessary for practical results.

One of the most fascinating studies for children is geography, when properly taught. Proper teaching requires careful preparation on the part of the teacher. Cramming a child's mind with dry definitions and a "lifeless aggregation of unorganized facts," is not teaching geography—nor anything else. Connect these facts with the experiences of the child's life; break away from the letter and line of the text, weave in biographical, historical and descriptive matter, garnered from anywhere, everywhere—then geography becomes a cultural study, in which "observation, imagination, memory, judgment and language are all exercised, and the child's interest in the world is awakened in such a way as to increase his sympathy and love for his fellow-man."

* Issued by the class in printing (size 13 x 10) after preparation by the teachers of the primary and intermediate grades detailing all, or a portion of their daily lessons for the morrow, and used by the pupils during the night study-hour.

In teaching history, do not lose sight of the fact that history is the life development of a people, based upon five sets of ideas as exemplified in the family, in business, in the church, in the state and in the school, all of which exist, not for themselves, but as means to an end. What is said above concerning the teaching of geography applies with equal force to the teaching of history. Give the pupils to understand that history is the accumulated experience of mankind, that this experience is progressive, and that every day of our lives, our present experience, influenced by that of the past, is making history for the future. With such an understanding, history becomes a thing of living worth, not merely a receptacle for mortuary records.

Letter writing to parents by the pupils must be done in the classroom the first Monday of each month. If pupils be absent from the class because of sickness, accident or other cause, a card or envelope, properly addressed, must be sent to the Superintendent, who will write concerning the pupil, and give all needful information. Letter writing in proper form must be *taught* by the teacher—it is not sufficient to see that it is done—it must be seen that it is *properly* done.

It is desired that special attention be given to "Object and Observation Lessons," and teachers must use their ingenuity as to what, where and when. The opportunity is unlimited for the ingenious teacher—the disingenuous one is not a teacher. In this work, and in language work generally, care should be taken to correct in such a spirit as not to repress freedom of expression, which is greatly to be encouraged.

There must be regular and systematic daily instruction in "Good Morals and Gentle Manners" in all grades, based upon some text, a copy of which should be found upon each teacher's table. Lessons or short talks should be prepared by the teacher from the text for the lower grades; for the upper grades regular lessons in the book may be assigned. The daily lesson should assume the form of question and answer, conversational in its nature. Work along this line is not optional with the teacher; it is obligatory. The pupil is very apt to reflect his teacher.

In penmanship, the teacher is cautioned against too rapid work in the copy-book. The perfect formation of letters and neat appearance of the book are of utmost importance. It is suggested that the copy first be written on practice paper, then, after a few minutes' practice, in the copy-book. So plan the space that with one lesson a week one book may be covered during the first two terms, and one book during the third term.

In drawing, the regular teacher of the class, as well as the special teacher of drawing, should inspire the pupils with a desire for mastering the art, explaining its great and practical use in every walk of life. Drawing on scrap paper may be used advantageously as "busy work" when the teacher is engaged with only a part of her class.

Illustrative charts, specimens, models and apparatus appertaining to every branch taught, and to all grades, are to be found in the museum and in the supervising principals' offices, and teachers are requested to make free and constant use of them. The sand table may be used advantageously, not only in the kindergarten and lower primary grades, but also in all classes in geography.

Teachers of the lower grades, in connection with their regular instruction, should strive by conversational method to familiarize their pupils with the work of the more advanced grades. This will tend along the line of incentive, and give them an idea of progress and promotion. Too many children regard schoolroom work as a dull and dreary routine, based upon nothing, and with nothing in view. Who is to blame?—The teacher!

Manuscript work by the teachers in certain grades calls for industrious and conscientious effort on the part of teachers. They should thoroughly understand that they are to lay the foundation in either geography or history, and as this is laid, so will stand the superstruc-

ture. The ideas acquired in these grades will in great measure determine success or failure in the upper grades.

The studies in the regular course should be supplemented by general reading on the part of the pupils. The library of the institution contains books of every sort and description, and it is suggested as a judicious plan for each teacher at the beginning of the first term to go carefully over the catalogue of books, make a selection of, say, forty books, the subject matter of which is appropriate to the grade, and post the list upon the blackboard, urging the pupils to draw them in rotation during the year. From time to time effort should be made to ascertain the number and names of books read, and conversation should be held thereupon. With some effort on the part of the teacher, great good will surely result.

While believing that of any given number of deaf pupils taken at random, many thereof must be instructed, in some degree, by means of the sign-language, it is nevertheless folly to persist in the use of signs upon any and all occasions, to the total, or almost total exclusion of the manual alphabet—absolute folly. It is well known, and, in fact, conceded by all, that the use of the manual alphabet and speech tend to more speedy acquisition of *word-language* in grammatical form than do signs. A child must first possess ideas, then language to express. Let conventional signs, or natural gestures, be used in moderate degree to generate or explain ideas, abstract or otherwise; but let the manual alphabet and writing, *and always speech where possible*, be used to teach *word-language*, for this, in either verbal or written form, is absolutely indispensable to a deaf person, unless he be intended for one of a truly undesirable sign-making variety of the human race out of communion with the mass of mankind.

WHICH ALL MEANS—That officers, teachers, employes, and pupils must make as great use of the manual alphabet and speech during the year as may be possible, and especially in schoolroom work after the first year; that the only way to know a *word-language* is to use such a one; that while the sign-language may and should be used, perhaps, for the awakening of ideas in the very young, and for lectures, demonstration or explanation, and in social intercourse, it must be remembered that it is an ideographic language;—and that its indiscriminate use in the school room becomes an abuse for which the pupil suffers. Look around you!

FOR BIBLE STUDY.

Explain evil results of anger, fighting, stealing, lying, quarreling, idleness, disobedience, disorder, covetousness, etc.

Contrast wisdom and ignorance; humility and pride; modesty and boasting; thoughtfulness and thoughtlessness; cruelty and kindness; patience and impatience; constancy and fickleness; faithfulness and unfaithfulness; amiability and sulkiness; slander and standing up for one's friends; selfishness and generosity, etc.

Impart ideas of the existence, power, and goodness of God. Teach confidence in God; repentance for evil doing; resistance to temptation to do wrong.

Tell the stories of Adam and Eve, their life in Eden, their disobedience, expulsion and suffering; of Cain and Abel, their character, work, worship of God, Abel's righteousness, Cain's jealousy, the first murder, Cain's punishment; of the flood, destruction of the wicked, salvation of Noah, the righteous man, and his family, with pairs of all the beasts and birds; of Abraham, his call, his faithful obedience, God's promise to him; of Lot, his choice to live in Sodom, his escape; of Isaac, God's promise, Isaac's marriage, his sons Esau and Jacob; of Jacob, his deceitfulness and the trouble it caused with his father Isaac, his brother Esau, his uncle Laban, and with his own sons, and how at last he repented and God forgave him and gave him a new name, Israel, and renewed his promise; of Joseph's vanity, his father's partiality, his broth-

ers' jealousy, his servitude, his wisdom, his exaltation, his brothers' humiliation and repentance, his generosity in forgiving them and providing for them a living in Egypt; of Moses, his hiding and finding, his forty years' education in the king's family, his forty years as a shepherd on the mountains of Midian, the slavery of the Israelites, the call of Moses, the plagues, their escape, God's power and bounty during the forty years in the wilderness; of Joshua, his command of the Israelites, crossing the Jordan, conquest and partition of Canaan, his last address to the people; of David, the boy shepherd, the killing of Goliath, Saul's jealousy, David's escape, Saul's death, David becoming king, his great kingdom, his psalms; of Absalom, his beauty, pride, rebellion, death; of Solomon, God's offer and promise, Solomon's wisdom, wealth and power, the building of the temple; of Ahab, his idolatry, the famine, the contest between the idol-priest and Elijah, Naboth's vineyard; of Elijah, his stay at Cherite, with the widow at Zerephath, his translation; of Elisha, the Shunammite woman's boy, Naaman's visit and cure, Joash's visit; of Daniel, his education at the court of Nebuchadnezzar, king of Babylon, his conscientiousness, his rise, conspiracies against him, the lion's den, interpretation of the writing upon the wall; of Esther, chosen queen, Haman's hatred of the Jews, conspiracy against them, her intercession, the hanging of Haman; of Jonah, his call, disobedience, disaster, rescue, obedience, God's mercy, Jonah's meanness, the gourd vine.

Tell the stories of events in the life of Jesus—His birth, visit of the shepherds and of the wise men, his danger, the flight into Egypt, his return to Nazareth, the visit to Jerusalem when twelve years old, his baptism, choice of his disciples, his teachings in the Sermon on the Mount, in the parables of the Sower, the Marriage Feast, the Good Samaritan, the Shepherd and the Lost Sheep, the Prodigal Son, the Pharisee and the Publican, the Laborers in the Vineyard, the Talents, the Husbandman, the Ten Virgins, the Vine and its Branches; His miracles of healing the ten lepers, the lame man at the pool, the palsied man who was carried to him by four men, the man with the withered hand, the blind man at Jericho, the deaf and dumb boy [Mark 9:17-29], the woman who touched his garment, the raising to life of the widow's son at Nain, Lazarus at Bethany and Jairus's daughter, stilling the storm, walking upon the water, feeding the multitudes. Tell the stories of the betrayal of Jesus, his trial, crucifixion, burial, resurrection and ascension.

Teach:—Now I Lay Me Down to Sleep; the Lord's prayer; the ten commandments; the twenty-third psalm; Nearer, My God, to Thee; Rock of Ages; Just as I Am; Abide with Me; Lead, Kindly Light; Jesus, Lover of My Soul; All Hail the Power of Jesus' Name; From Greenland's Icy Mountains; I Need Thee Every Hour; Work for the Night is Coming.

TERMS AND GRADE DAYS.

A graded system, to be what it should, must possess flexibility in order to secure needed uniformity of attainment in the several classes, without unduly holding back the more capable pupils or unduly urging forward the less capable. In order to increase this flexibility, the regular annual session of the school is divided into three terms, to-wit:

First term—Opening of school to November 30.

Second term—December 1 to January 31.

Third term—February 1 to close of school.

December 1 and February 1 are to be known as Grade Days. At these times such pupils as it would benefit may be transferred to the next lower or the next higher grade, as the case may be, to remain therein for one or more terms, or part thereof, as the exigencies of the case require.

To illustrate: A pupil may fail to pass his grade in June, and yet be so proficient as to make it a hardship to compel him to spend another entire year in the same grade, when one term may remedy the deficiency.

Again, it frequently happens that a pupil may be very proficient in one or more studies, and very deficient in another; by transferring him to the next lower grade, he has the opportunity to overcome the deficiency and does not lose much in missing the regular instruction in the studies in which he is proficient, the term being short. He may also be transferred to a lower or higher grade simply for the study and recitation of any one subject, returning to his regular class for other subjects and recitations.

It is believed that short terms and grade days will incite pupils to greater effort. They will know that on December 1 and February 1 they will be "weighed" and will not wish to be "found wanting."

CLASS MARKING.

It will be the duty of teachers, on December 31 and April 30, to make and record a careful estimate of the work of each of their pupils in all branches of study. This estimate is to be based upon the fidelity and success with which the pupils have done assigned work, and also upon their success in oral and written tests which have been employed as an element of teaching, and the answers to which have not been valued numerically. It is not to be based upon daily marking of recitations, nor upon deportment, nor upon stated examinations. But the teachers may keep such memoranda of pupils' work as are deemed necessary. These recorded estimates must be certified to the Superintendent.

These estimates of the success and progress of pupils are to be made on a scale of 30 to 100, as follows: 100 perfect; 90 excellent; 80, very good; 70, good; 60, tolerable; 50, poor; 40, very poor; and 30, failure.

The "5 mark" may be used to indicate in some degree the relative standing of pupils in their class, but under no circumstances must any estimate be given which is not recorded in figures the multiple of 5, excepting the "average" which may be exact, excepting fractions. The standard of pupils is to be primarily estimated *excellent, good or poor*, and then modified, provided the higher and lower estimates can readily be made.

In estimating "intelligence," schoolroom performance should not serve as a direct guide; to the contrary, there should be a common understanding of what intelligence really is and uniformity of view in its consideration for scaling as follows—very high, 100; good, 80; fair or medium, 60; poor, 40; very low, 30. The mental age represents general attainment as indicated by equal attainment of any certain chronological age of normal hearing child.

It is the duty of the supervising principals to examine, and, when necessary, revise the teachers' estimates and averages of their pupils' proficiency, and approve the same before submitting them to the Superintendent. They will also give teachers such instruction and other assistance in estimating the proficiency and progress of their pupils as will secure requisite uniformity.

EXAMINATIONS AND PROMOTIONS.

At the close of the second term, a written examination will be held in all of the grades, except in the preparatory, or kindergarten classes, and Primary Grade 1, as a test of progress made (mid-year examination). At the close of the annual session, there will be held a written examination for all the grades, conducted by special examiners as may be arranged by the Superintendent. Pupils' examination papers are to be marked by the examiner in figures the multiple of five and certified to the supervising principal.

Promotion from the preparatory, or kindergarten classes, and Primary Grade 1 will be upon the average of the required estimates, or as the Superintendent may decide.

Promotion from all other grades will be upon the average of the

required estimates combined with the results of the mid-year and final written examinations in such proportion as the Superintendent may direct.

No pupil in Primary Grades 1 and 2 whose average is below 60 in language, or in arithmetic, will be promoted. No pupil in Primary Grade 3 and 4 whose average is below 65 in language, or in arithmetic, will be promoted. No pupil in Primary Grade 5, or in Intermediate Grades B and A, or in Junior and Middle Academic Grades, whose average is below 75 in language, or below 70 in arithmetic, geography, history or other study will be promoted.

No member of the Senior Academic, or graduating class, whose general average is below 75 will receive a diploma; if below 75, a certificate of honorable dismissal only will be given.

Transfers from one department to another, or from one grade or division thereof to another, shall be made only with approval and consent of the Superintendent.

Members of athletic teams of the school must have a standing of at least 70 in all their studies to be eligible for continuance as members.

TIME OF DISCHARGE.

The number of years a pupil may remain in the school is regulated by a time-schedule, and depends upon the mental ability, progress and conduct of the pupil himself. He may remain certainly five years, and as much longer up to thirteen years as his conduct and promotions from year to year may warrant.

The Superintendent has the power to discharge a pupil at any time from the institution for inability to receive an education, for failure to make the necessary progress, for violation of the rules of the institution, or where his retention would prove a detriment to others or to the school. He may also, when he thinks the facts warrant it, extend the period of instruction in individual cases.

Until further notice, the following time-schedule will be in force, subject to the Superintendent's power to discharge at any time, as outlined above:

TABLE 28.

- If at the end of 5 years in Grade 1 and failure to pass, discharge.
- If at the end of 6 years in Grade 2 and failure to pass, discharge.
- If at the end of 7 years in Grade 3 and failure to pass, discharge.
- If at the end of 8 years in Grade 4 and failure to pass, discharge.
- If at the end of 9 years in Grade 5, discharge.
- If at the end of 9 years in B Grade and failure to pass, discharge.
- If the end of 10 years in A Grade and failure to pass, discharge.
- If at the end of 11 years in Junior Grade and failure to pass, discharge.
- If at the end of 12 years in Middle Grade and failure to pass, discharge.
- If at the end of 13 years in Senior Grade and failure to pass, discharge.

Causes of discharge shall be as follows:

1. Graduation.
2. Expiration of time.
3. Inability to receive an education.
4. Non-progression (on account of neglect of duties, ill health, etc.)
5. Violation of Rules and Regulations.
6. Improper conduct (in school or elsewhere).
7. Frequent or continued absence.
8. Removal from state.
9. Age.
10. Industrial conditions.

CHAPTER XX.

INDUSTRIAL TRAINING.

The general trend of education at present is toward a combination of cultural and utilitarian processes, toward vocational schools. Industrial training is permeating the classroom everywhere, from the little country school to the great university; and with such force that old-time specious argument cannot withstand its just demands. It is true, perhaps, that the urgent demand of the time for vocational training is being carried to an extreme point overshadowing, in some degree, the academic or cultural training so necessary for right living; but the great importance of being prepared for self-maintenance in life is an animating incentive that cannot be disregarded, nor would one wish to disregard it, or even modify it, except to conserve in equal degree the true cultural purpose of education.

As has been stated, in the establishment of industrial and vocational training the schools for the deaf throughout the country assumed the initiative long years ago, and have ever insisted upon co-ordination of the head, the heart, and the hand, with cultural-utilitarian end in view whatever the subject or line of work. But even so, are we doing what the needs of the deaf, the demands of the times, and our bounden duty, require of us? That we have done well is undoubtedly true, as is evidenced by the very general gainful employment of those who have gone out from our schools, both boys and girls. Consider a moment:—according to the census returns,* thirty-eight and one-half per cent. of the deaf over ten years of age (as against fifty per cent. of hearing-speaking persons of the same age) are gainfully employed, entering into nearly every occupation pursued by the people of the United States (forty-three per cent. of the deaf if over twenty years of age); and eighty-one per cent. gainfully employed of those who have had schooling, thus indicating the value of education such as we have given them. Concerning the small per

* 1900—and conditions now are far better than at any time in the past. (Vide page 250 as to census returns.)

cent. of the deaf over ten years of age, who are reported as gainfully employed, it is to be noted that a great majority of those under twenty years of age are in schools. Comparing the per cent. of the deaf and the per cent. of the general population over ten years of age gainfully employed, we find that in three leading groups (Agricultural pursuits, Manufacturing and Mechanical pursuits, Domestic and personal service) the deaf number 89.7 per cent., the general population, 79.3 per cent. In trade and transportation (deaf 6.9, the general population 16.4), and in professional services (deaf 3.4, the general population 4.3), which generally require hearing and speaking power, we find 10.3 per cent. for the deaf and 20.7 per cent. for general population.

With such facts before us the value of vocational training looms up large and demands that in our schools for the deaf greater scope shall be given to such training, that better facilities be provided, and that the most efficient teachers trained by education and practice to teach the "*How*" and "*Why*", shall be employed. Shall we give heed to the necessity?—and shall we give to the deaf the opportunities their welfare in life, therefore the welfare of the State, demands? And, further, if the teaching personnel, and the industrial equipment, and the salaries paid, are not up to the standard of the academic, or literary department, or not up to the standard of what excellence demands regardless of any other department of the school, then it should be brought up by the erection of proper industrial buildings, the selection of competent teachers, a better industrial equipment, and the payment of larger salaries. The writer knows full well of his own experience the financial difficulties besetting the executive heads of state schools for the deaf through the incessant demands of those in political authority for "economy and reform", which usually results in insufficient appropriations, enforced retrenchment, and deterioration of service.

If relative values of industrial and academical training were to be expressed numerically in percentages, it is believed that the great importance of the former with its lasting influence upon the lives and welfare of the deaf, should be listed at least fifty and fifty respectively—if not sixty-forty!—and that in the industrial course there should be a combination of manual-training and trade-teaching ideas so correlated

with the literary course as to make for cultural training in all things. It has been said that vocational training of itself is a cultural training, which is perhaps true in a certain sense and degree, but not in the sense in which the term is used to indicate mental and moral and physical enlightenment, and the attainment of refinement.

As seen by the census reports, the deaf enter into nearly every occupation engaged in by people generally, but naturally their affliction is a decided hindrance in some of them and prohibitive in others, and their selection of kinds of employment into which they enter is governed somewhat (perhaps, largely) by environmental and sectional influences, yet not altogether so, for many deaf young men, willing and anxious to work as all of them are, will follow where a position for which they are fitted, or which they prefer, or which may present itself, may lead. This means that generally, the industrial curriculum of any school should be established with thought of home and sectional environment and the probability that the deaf will secure employment therein.

In a general way, it may be said, there should be established in connection with their academic work a course of industrial education for the boys which shall cover both the manual-training and trade-teaching ideas, as follows:—a manual training course covering a number of various kinds of labor, including sloyd, and wood- and iron-work, which all must follow for three years, after which they will pass into individual trades to be followed exclusively for three or four years. This combined industrial course is to be supplemented by a post-graduate course of one year during which the entire time is to be devoted to the trade in hand; and by the establishment of a summer or a winter course of six weeks for present or former pupils under certain conditions. In this six weeks course, and also in the laboratory work mentioned below, it is believed that the State's agricultural school would become interested and offer the assistance of its corps of instructors for special instruction in the way of informal talks and lectures. For the girls, in addition to minor household duties and cookery, and such occupations as sewing, dress-making, millinery, etc., there should be established a course in *general housekeeping*. A portion of a girls' industrial building, entirely separate from that for the boys, should be

planned as a residence containing five bedchambers, sitting-room, dining-room, kitchen, basement laundry, and two small rooms for fuel and storage. Classes of four, or six, girls each are to be assigned in rotation to "*a week in residence*," during which time they must do their own housework—cooking, baking, laundering for selves and of household linens, cleaning, etc., and be taught cookery for, and the care of, invalids. During the "week in residence" the members of the group are to be freed of all other school and schoolroom duties. All of this work will be under the direction of the supervising teacher of girls' industries who will room in the residence as chaperon to the girls and live with them.

To carry out this work properly calls for the erection of two industrial buildings, one for the boys, and one for the girls. An expensive proposition?—of course it will require money as will anything worth while and of value in the successful education of the deaf, or of any class! And why should the cost of educating the deaf especially, if within reason and wise and just economy, be withheld from them when their education makes for the State a self-sustaining, self-respecting and moral citizenship—a wonderful asset to the State!—differing in wide degree from the mentally and morally diseased who constitute a burden upon the body politic! Such a building for the boys, as referred to, should be of sufficient size to house all indoor industries; and the same may be said of the building for the girls which, in addition to housing the various industries, could be arranged at one end, or at the front, for the "residence" having no connection with the rest of the building. The attempt to carry on this important part of the education of the deaf in widely scattered rooms in various buildings, and in the basements thereof in some cases, which have not been constructed for such purposes, will seriously interfere with the proper prosecution of the work and tend largely to defeat the object in mind.

The following are suggested as some of the trades and occupations for boys that may be selected for inclusion in an industrial curriculum where environmental and financial conditions will permit of it: Cement work, bricklaying, lathing and plastering, calcimining, tile-setting, papering, house painting—inside and out, draughting, moulding, forge and vise

work, tinsmithing, agricultural laboratory, woodturning, carpentry, cabinet making, draughting and patterns, sign painting, varnishing, glazing, shoemaking, cutting and fitting of shoes, harness making, printing—composition and press work, bookbinding, baking, cooking, barbering, chair caning, mop making; and laboratory method with actual work in dairying, horticulture, floriculture, and agriculture.

In the laboratory work, instruction can be given in the selection, care and feed of cows, and the sanitary production, cooling and preservation of milk, the making of butter, etc.; in the knowledge of fruits, selection of trees, budding, grafting, and spraying, and the gathering and care of fruits, etc.; and in the selection of seeds, composition and fertilization of soils, care, use, and sale of products, knowledge of farm machinery, and of greenhouse equipment, and care of same, keeping of accounts, etc.

There should be closer co-ordination between the literary, art, and industrial departments, and "Teachers' Meetings" should include the teachers of the three departments as interested and active participants. Each teacher should know what his, or her, pupils are accomplishing in the other classes; and especially, the art and industrial teachers should learn from the literary teachers something of the inner nature of the pupils as disclosed to them through the office and house records, letters from home, etc. (which it is presumed they use), and through their longer and more intimate daily service with them. Reciprocity in action between the teachers will surely result in good for the child. If all of the heads of the industrial classes should not take part in these meetings for any reason, one of them might be designated to do so as representative of the others. This latter course would necessitate some degree of supervision on his part over the other shops.

Taking a practical view of the education of the deaf as a class, with their very certain and pronounced limitations, it is quite apparent that they must be as thoroughly prepared as possible to become wage-earners—that is, *bread winners*—whatever their intellectual attainment. The latter alone will not place them in position to become self-supporting—the former will; and if to this wage-earning capacity there be added a high degree comparatively of intellectual attainment,

so much the better. They go out from school into a practical and somewhat unsympathetic world which will demand of them some knowledge of some manual art or craft, and competency to do and perform it; and if they fall short of this demand, they remain simply as "hewers of wood and drawers of water"—misfits in the social economy. If they lack the natural mental ability to succeed, such a fate is unavoidable—but this is not the condition with the very great majority, and they will succeed if we perform our duty to them while in school.

In the arrangement of industrial hours for a school, that is, the time for regular systematic industrial training under vocational teachers, it should be borne in mind that shop work for three hours each day (18 hours weekly) during a school year of thirty-six weeks for six years, as is now the universal custom, means but 648 hours* of instruction and practice each year, and but 1,944 hours for the first three years. Now, the hearing boy in learning a trade must spend three years at it with eight hours of instruction and practice each day (48 hours weekly), which means 2,496 hours each year, and 7,488 hours for three years. Comparison of the two classes shows the deaf boy at a disadvantage of 5,544 hours of instruction and practice: and even if he be given the second three years of training, he will still be at a disadvantage of 3,600 hours. In other words, the hearing boy through actual "bread-winning" contact with his work learns his "job" much faster, and far better, in any given period than does the deaf boy, and it is futile to expect a narrowing of this divergency from common results and benefits except through greater effort on the part of the school, through thoroughly competent industrial teachers, through more intensive instruction, through longer hours of industrial training, and through post-graduate and special summer or winter (or both) courses, the former for a full scholastic year, the latter for six weeks.

It has been the practice in the Indiana School to place all boys in the regular shop classes, operating three hours per day, when they reached the fourth primary grade, or when fourteen years of age, regardless of grading, which would give them six years of training. The writer believes that the

* This period is 36 hours greater than given in Form D—footnote page 142. In some schools the Saturday shop work is limited to two hours.

industrial time should be lengthened by requiring entrance to the shop classes upon reaching the second primary grade, or when twelve years of age regardless of grading; that the time in such classes be lengthened one hour each day; and that schoolroom work be lessened in some degree if necessary. Such an arrangement would increase the years of industrial training from six to eight, and the aggregate shop hours from 3,888 to 6,912. He also believes that increased industrial training should be given certain retarded pupils in the literary department, that is, that such pupils, if retained in the school, should be transferred to the industrial department for the greater part, if not all, of his school work.

CHAPTER XXI.

PHYSICAL MEASUREMENTS.

There are those who believe that there is both a decided, and a high, correlation between physical features (weight, height, vital capacity, etc.) and mental ability (intellectual performance-level); and there are others who do not so believe. The former base their belief, not upon individual cases, but upon groups of individuals which show a tendency toward such agreement, or correlation; and the latter regard the apparent correlation to be explicable as a phenomenon of growth not clearly demonstrable, if at all, in adult stage of life. With so many exceptions and qualifications noted by the writers as to the various phases of the contention, it is unnecessary in this report to argue the matter when, at least, it is generally agreed that proper physical development naturally, and through corrective procedure if needs be, leads to better health, greater endurance, and a more lively interest in life and its duties. So, under these conditions it becomes necessary that we should know to the greatest extent possible the facts and probabilities concerning the present and future physical development of the child.

The co-ordination of physical development and health with mental strength and progress is so strongly marked that consideration of the former becomes peremptory in the consideration of the latter, and the aphorism, *mens sana in corpore sano*, expresses the attainment of educational hope. Yet, there is laxness on the part of schools in not observing this relationship, this inter-connecting of functioning attributes, which should be given practical enforcement through mandatory and scientific direction. So important is this matter that the following rather lengthy quotation is apropos: "Popular notions regarding personal hygiene," writes Terman, "are little better than a seething welter of ignorance and superstition, not all of which is confined to those who are confessedly uneducated. * * * Two-thirds of all school children have physical defects prejudicial to health—malnutrition, defective teeth, obstructed breathing, enlarged cer-

vical glands many of which are tubercular. * * * We shall not expect to find normal instincts, emotions, intelligence, or conduct in children who are unhealthy or disinclined to play. * * * Too often tuberculosis stints the child, or spinal curvature deforms him, while we wrangle over methods of teaching him. * * * Instruction can wait * * * but the demands of health are imperative. * * * On the laws of muscular development, if the related facts were fully at our command, an entire *philosophy* of education could be based. * * * The nervous system is so intimately concerned in every act of knowing, feeling, and willing that, if our knowledge were only greater, education could be described in purely *neurological* terms.* However, we do not yet know the precise degree to which either pubertal or skeletal development is correlated with brain development, or with vitality. The relation between the anatomical, physiological, and mental ages is one of the urgent problems of educational hygiene. * * * The use of the brain in varied physical and mental activities improves its circulation, its nutritional processes, and therefore, its finer development and highest functioning—and delays degeneration processes of old age.”

Some years ago (1902) Arthur McDonald, Specialist in the United States Bureau of Education, made an examination of 20,000 school children of Washington† and among his conclusions were the following: That 39 per cent. fell within the bright class, 47.5 per cent. within the average or normal class, and 13.5 per cent. within the dull or backward class;†† that the boys and girls had the same percentage for “brightness” but for “dullness” the girls ranked five per cent. less than the boys, but that this was due perhaps to the fact that girls reach maturity sooner than boys; that children of professional and mercantile classes are superior to those of the laboring classes, indicating advantages of good social conditions, but that boys especially of the first named classes showed a much higher percentage of sickliness and nervousness than those of the laboring classes, indicating that easier social surroundings are not always conducive to health; that a large head is frequently accompanied with a contracted chest with the result that mental action may be

* In man there are 304 muscles, 160 nerves and 68 arteries, with their branches.

† Representatives of all parts of the country.

†† Cf. Pintner's conclusion from examination of deaf children, fifteen years later, page 193.

slow due to deficient supply of purified blood; that boys with small frames and very large heads are liable to be deficient in repose of character; that generally, those inferior in body (sight, hearing, lungs, heart and digestive system including teeth) are also inferior in mind; and generally, that all children with abnormalities are inferior to children in general not only in mental ability, but in weight, height and circumference of head.

Physical measurements (weight, height, grip, vital capacity, etc.), it is asserted by Terman, are complex resultants of many factors working from within, and of functioning process, and that norms established thereon are but averages that may serve for guidance only in a general way. It follows therefore that the range of variation with the given norm as a central point may be of greater or less degree according to the individual traits and functional development of the subject. "Each individual is a law unto himself * * * and measurements of size can give little clue to the normality of the processes within"; and Tyler adds, that in giving value to physical measurements, "it should always be borne in mind that the muscular and nervous systems are closely inter-related, and that in their development, the one reacts upon the other; the two constitute the neuro-muscular system and must be considered together. Great individual and local variation may be expected."

In forming tables of physical norms (or norms of any kind) precise methods are required; and if trustworthy comparison is to be made between different results obtained, the methods should possess at least some degree of uniformity in devices and procedure. Unfortunately, these conditions do not always prevail and the opinions and work of one investigator is frequently not acceptable to another; and the ordinary "non-expert" who may desire to profit by scientific research is placed in an uncertain and wondering attitude toward the various diversified "findings" presented with official and academic stamp.

In considering the growth of children four ages present themselves—the chronological, the mental, the physiological, and the pedagogical—which are to be correctly judged only from individual observation and examination, for these ages, though perhaps suggested, are not presented to full view in

the reading of a table of average norms however helpful they may be in general way. Baldwin insists that the stages of physical and mental maturity are parallel irrespective of precocity or brightness; and that the obvious educational corollary is, that we should take into careful consideration the physiological age and the accompanying stages of mental maturity of boys and girls, rather than the chronological age and brightness, as is now done. This, of course, includes consideration of pre-pubescent, pubescent, and post-pubescent periods and the nodes of development, not necessary to dwell upon in this report.

As to correlation between physical and mental development (including school progress), the question is a mooted one but the preponderant opinion seems to indicate that generally the two fall and rise together, especially when considered in connection with physiological age; but as stated by Whipple, "the whole subject of physiological age and its relations with chronological, psychological and pedagogical age is much in need of more careful and extensive investigation."

Burk presents the consensus of opinion of various writers in stating that the preliminary formative development of the higher mental powers covers the period of childhood up to the point of puberty at which time they begin to mature. Says Tyler: "These views are supported by a large amount of evidence of great variety. If we accept them, it is evident that we often expect mental powers in the child other and higher than he really possesses. The child learns language mostly by imitation of parents and teachers, very little, if at all, by any understanding of rules of grammar. He imitates and acquires methods. He thinks, but he thinks as a child; largely in terms of movement and concrete action, not of rules or laws. Hence, courses of study, methods, and text-books based upon systems of adult psychology are very likely to prove disappointing, when applied to the child. Indeed, the more closely they approach adult standards and ideals, the farther they are from the child's understanding and needs. The application of the results of child-study is so new that it must be more or less of an experiment. But it is an experiment of much hope and promise. The application of the results of purely adult psychology to the case of the child is almost surely doomed to failure. Such an experiment can have but one, and that an unsatisfactory, result."

Age	Pounds		Inches		Pounds		Chest		Chest		Height		Height		Tree		Increase		Increase	
	B	G	B	G	B	G	B	G	B	G	B	G	B	G	Sys	Diast	B	G	B	G
															mm.	mm.			Table— Physical Norms	Root 1916
Years																				
6.5	46.1	44.9	45.2	44.8	20.3	18.6	18.4	17.0	68.4	62.1	1.02	1.00	1.51	1.38	92.6	67.3	5.8	5.4	1.9	2.1
7.5	51.9	50.3	47.1	46.9	23.6	22.2	21.7	20.3	79.0	72.8	1.10	1.07	1.67	1.55	94.4	66.4	5.8	5.4	1.9	2.1
8.5	56.6	56.2	49.0	49.0	27.3	25.7	24.6	23.0	88.7	79.1	1.15	1.14	1.81	1.61	93.6	64.7	4.7	5.9	1.9	2.1
9.5	62.4	61.0	51.0	50.7	31.6	29.6	28.1	26.3	99.7	86.9	1.22	1.20	1.95	1.71	94.3	71.0	5.8	4.8	2.0	1.7
10.5	70.1	69.1	53.3	52.8	36.4	34.3	32.2	30.2	112.4	98.0	1.31	1.30	2.10	1.85	99.2	67.1	7.7	8.1	2.3	2.1
11.5	75.0	78.2	55.1	55.3	41.5	39.0	36.4	34.2	118.2	108.1	1.36	1.41	2.14	1.95	97.1	65.6	4.9	9.1	1.8	2.5
12.5	82.8	87.5	56.5	57.6	46.8	43.4	41.7	39.1	131.0	123.8	1.45	1.52	2.31	2.15	102.3	65.2	7.8	9.3	1.4	2.3
13.5	89.6	98.0	58.4	59.4	53.8	49.6	48.3	44.9	145.0	132.4	1.53	1.65	2.48	2.23	103.6	70.5	6.8	10.5	1.9	1.8
14.5	100.0	107.6	61.0	61.2	62.6	57.7	54.6	50.5	164.5	143.1	1.64	1.75	2.69	2.33	106.1	67.4	10.4	9.6	2.6	4.8
15.5	115.1	114.6	63.9	62.4	73.6	68.0	59.5	54.9	193.7	153.9	1.80	1.83	3.03	2.46	105.6	67.5	15.1	7.0	2.9	1.2
16.5	127.8	118.6	66.1	62.9	86.7	80.2	63.2	58.5	211.9	159.3	1.93	1.88	3.20	2.53	106.3	68.0	12.7	4.0	2.2	0.5
17.5	132.3	120.7	66.9	63.2	98.6	90.2	65.1	60.4	227.8	163.6	1.97	1.91	3.40	2.58	107.0	68.5	4.5	2.1	0.8	0.3
18.5	136.8	122.8	67.7	63.5	108.6	99.2	65.5	60.9	238.0	167.4	2.02	1.93	3.51	2.63	108.0	68.7	4.5	2.1	0.8	0.3

A TABLE OF PHYSICAL NORMS—ADAPTED.

(Concerning Coefficients, vide page 163.)

TABLE No. 29—Scale No. 11.

The preceding table of physical norms is an average-adaptation of the figures presented by Burk and Baldwin as to weight, by Boas and Baldwin as to height, and by Smedley and Baldwin as to vital capacity. Burk's table of weights is based upon the examination of 68,000 children (with clothing) in the cities of Boston, St. Louis and Milwaukee; while Baldwin's table covers 2,000 consecutive measurements of 100 boys and 100 girls (without clothing) from the Horace Mann School, the Francis W. Parker School, and the University Elementary and High Schools of Chicago, "representing the best developed children available who have had physical training, school-medical inspection, directed play, and remedial treatment where necessary." Boas' table of heights is based upon 98,449 children in Toronto, Boston, Milwaukee, St. Louis, and Oakland (California)—and without shoes; and Smedley's table of vital capacity, upon Chicago school children. With such a special selection by Baldwin it necessarily follows that in comparison with the general selection of public school children by the others, the norms of weight, height and vital capacity run quite a good deal higher in the former case, the difference in excess in weight running from 1.8 to 15.4 pounds (average 8.3); in height from 1.1 to 3.2 inches (average 2.4); and in vital capacity from 3.2 to 32.6 cubic inches (average 16.2). In this comparison, Baldwin's original weights have had added thereto for clothing 5 per cent. of the weight for ages $6\frac{1}{2}$ to $13\frac{1}{2}$ years, and 6 per cent. for age $14\frac{1}{2}$ to $18\frac{1}{2}$ years.* An average of the two was then made with results as given in the table, as was also done for height (both without shoes) and vital capacity. The norms given for the strength of grip are those established by Smedley using a dynamometer devised by himself, after testing 2,788 boys and 3,471 girls in Chicago, and he claims that he has found positive correlation between strength of hand and mental ability. In this claim he is corroborated by Miss Ada Carman, who examined 1,507 children between the ages of ten and nineteen years in Saginaw, Michigan: but flatly contradicted by A. McDonald after an examination of Washington (D. C.) children in whom he found no such correlation.

While of course the difference in numbers of children measured by the four is great, and a true average should be based upon the entire number of individuals measured, still, in view

* Baldwin insists to the writer that this percentage of addition is slightly excessive.

of the lack of special selection by Burk, the higher figures with what are really selected ones by Baldwin, the fact that the Chicago children are heavier and taller than others as demonstrated by Smedley in his measurements, and the knowledge that our deaf children are often times weakened by the ravage of disease causing deafness—it is believed that the average as made will more closely fit the situation in our own schools. In this connection it may be stated that Burk's and Boas' figures have been selected for comparison with those of Baldwin because they are more national and cosmopolitan, and therefore more general, than those of Smedley and others. The figures of the latter have been adopted for grip measurement, though they may be a little high because of the apparent superiority of Chicago children as above referred to.

The table also gives the weight-height and vital-height coefficients which indicate that in a well-developed child weight, height and vital capacity are relatively proportionate to each other, whether it be a well-developed large child or a similarly well-developed small child (Baldwin). The coefficients are obtained by dividing the weight and vital capacity by the height. In the table the weight-height and vital-height coefficients mean that for the various ages given, each inch of stature should equal in pounds of weight and cubic inches of vital capacity the amounts indicated, thus presenting a health correlation of weight, height, and lung capacity. In making the computations it will be found, of course, that the ratio is not absolutely exact because of elimination of fractions—and this usually prevails in any condensed general table of measures unless decimal fractions are carried at least to the fourth point.

"Vital capacity," writes Whipple, "is considered an important index of general physical condition and capacity. * * * It is affected by sex, age, stature, weight, posture, occupation, amount of daily physical activity, and by disease, and may be markedly increased (e. g., 300 cc. in three months) by various forms of physical exercise which demand active respiration. * * * The ratio of vital capacity to weight is held to be of extreme significance because it expresses the balance between bodily size and the rate and completeness with which oxidization of the blood is, or may be, affected. A high ratio is undoubtedly a preventive of auto-intoxication, gives increased resistance to disease, and

is the root of endurance under effort. Thus, athletic training consists primarily in the reduction of weight and the increase of breathing capacity."

The strength of the grip indicates the general bodily health and secures an index to dextrality (right-handedness). It may also be modified to secure indexes for endurance or fatigue, and combined with other forms of strength measurement. In this measurement, as in all others, factors of age, sex, race, season, incentives, social status, and intelligence, present themselves to vary resultants. If the index for sinistrality, or left-handedness, should be the greater (found in about 3 per cent. of subjects measured) the question presents itself whether the left-handed ones should be taught to use the right hand, especially in writing which is believed to interfere with the motor mechanism of speech resulting in defective speech; and, by the same token, probably interfering with the proper acquisition of speech if the subject be deaf, who may develop a "stuttering" or hesitant mentality through the change which will result in defective acquisition of speech.*

Columns are also given in the table showing the average yearly growth in weight and height. In all cases, except for blood pressure, norms are given for both boys and girls. Concerning the measurement of weight and height, it is usually more convenient in our schools to obtain both while subjects are clothed. Christopher found in Chicago that the ordinary school clothing (in May) weighed on an average, not less than 4 per cent. and not more than 7 per cent. of the gross weight; or an average of 5.5 per cent. which was to be deducted for nude weight. For height, the height of heels is to be deducted. Terman reports that seasonal influences affect the growth in height and weight and says that children gain most in height March 15-August 15 (minimum, August 15-November 15), the most in weight July 15-September 15 (minimum, April 15-July 15), thus leaving a period of about four months, November 15-March 15, when both increasing height and weight seem to be at a standstill. This suggests January as a good time for annual measurements in our schools. Girls exceed boys in height and weight at ages 11.5 to 14.5, being practically the same in height at age 8.5. The girls also exceed

* In this connection, vide *Hearing and Speech*, Chap. XXVIII, and especially, pages 214 and 244.

the boys in annual growth—in height at age 7.5 and 8.5, and again at 11.5 to 12.5—in weight at age 8.5 and again at 10.5 to 13.5. In considering growth, thought must be given to the influence exerted by racial and family strain (heredity), to pre-natal causes, and to diseases of body and glands, malnutrition, overwork, school and home environment, lack of exercise, temperature, seasons, air, city life, sex, and growth rhythms.

BLOOD PRESSURE.

The measurement of blood pressure (arterial tension or pressure of the blood in vessels within which it is contained) is of such recent origin and use that little is known generally of its practical significance and value. Its literature is scant, and in 1915 a small treatise dealing with its importance was issued by Nicholson, who stated that he starts with the assumption that he “is dealing with a new subject.” And so he was, although previously the life insurance companies had used it for some two or three years; and lately it has been used by some of the more important gymnasium schools over the country.

From the contraction of the heart (*Systole*—the moment of greatest pressure) and the forcing of the blood through the arteries, capillaries and veins back to the heart again when expansion occurs (*Diastole*—the moment of least pressure), the measurements at the beginning and ending give the systolic and diastolic pressures and, by subtracting the latter from the former, we find the pulse pressure, or peripheral resistance to the flow. A knowledge of these pressures affords valuable diagnoses of physical and pathological conditions important alike to the doctor, the gymnasium director, and the educator; and give warning of abnormal conditions and existence of many ills in latent form prior to the appearance of the usual symptoms.

The norms given in the table are the averages for ages $6\frac{1}{2}$ to $15\frac{1}{2}$ years and were calculated after an examination of 2,300 children by Nicholson ranging in age from three to fifteen. These readings made by the use of a sphygmomanometer registering the pressure on a mercury column in millimeters (0.0394 inch) and classed as blood pressure standards, cannot of course be regarded as absolutely fixed and the range of variation will vary according to weight, height

and other conditions; but, so far as children are concerned, the question of sex is negligible, although in adults the pressures are less (10 mm.) in women than in men. After the age of 15, when physiological functioning has largely taken place and maturity is well under way, the pressure rises slowly to age 30 (105 to 120), again to age 40 (115 to 145), again to age 50 (120 to 145), and again to age 60 (125 to 155). In children, extremely low or high pressures sound a note of alarm demanding physical examination as well as being explanatory probably of non-progression along scholastic lines. And for adults, the saying is, "below 90 or over 160, go consult your physician at once and be guided by him."

It has been said by a physician: "The child or student may look well, may seem to be the very embodiment of health, yet when the blood pressure is taken there may be revealed the beginning of a disease of great danger. Is it not possible that the problem of slowness in the classes or mental apathy may be easily solved by the use of this system?*" Is it too much to hope that all the gymnasiums in the near future may bring forth an opportunity to all individuals for a more systematic physical examination, the first step of which shall be the taking of the blood pressure by this valuable little instrument, the sphygmomanometer?"

As stated, the true significance of correlation in any degree between physical and mental development (including school progress) is perhaps a mooted one in individual cases, but it would seem that taken collectively, there is more or less analogy (general tendency) between the two as indicated by Whipple: "Those boys whose physical condition is good, whose growth is unimpaired by ill-health, faulty nutrition, etc., and who realize to the full the possibility of physical development inherent in them * * * will be found to exhibit the best mental condition and the most rapid mental development." So, for the purpose of recording the parallelism of physical and mental development, the following form is suggested for use in our schools. Upon the one side is the grading for intelligence, mental age, mental quotient, and progress marks (school markings, averaged), the grade or class, and number of years in school. Below these will be found the date lines for graduation (the full course), discharge, and "drop-outs", i. e., those who leave school although

* Vide footnote page 224.

FORM F.

Physical Development—Name: _____

Number of Examination	Date	Age	W	H	VC	G Lbs.		W H	V H	Bl'd Press		GH	Vis'n
			Lbs.	Inch.	Cu. In.	R	L	C	C	Millimeters S D			
1
2
3
4
5
6
7
8
9
10
11
12

In connection with this question of physical development and measurements, the writer suggests that information be sent to parents of new pupils before their admission concerning the certain evil results of defective eyes and teeth, and of adenoid growth—and not only to the parents of new pupils, but also to parents of pupils already admitted—old pupils—from time to time as long as necessity requires, if the authorities of the school do not possess financial resources and the legal right to act and operate to correction upon their own initiative. And information should also be sent parents concerning the mechanism of the ear so that they may have a more intimate knowledge of their child's affliction with deafness and consequent evils. For this purpose the following cards are suggested: Form G opposite, and Forms H and I.

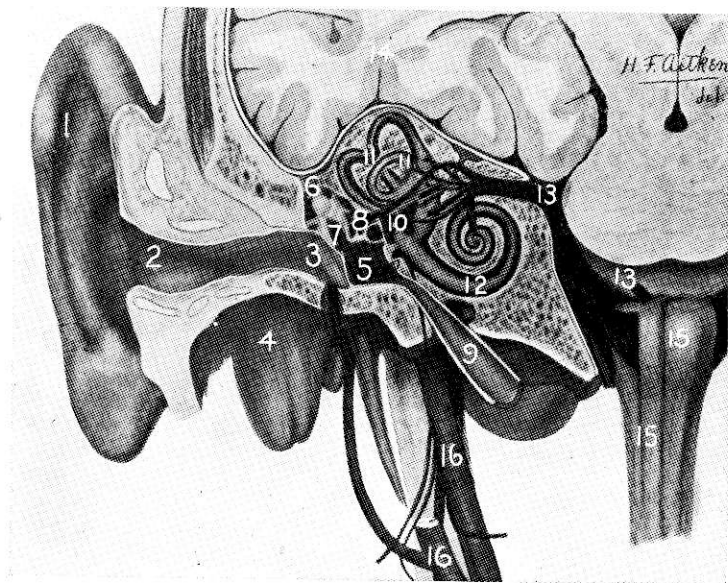
FORM H.

THE MECHANISM OF THE EAR.

Nature has provided a wonderful, and a most delicate, mechanism for receiving and registering sound vibrations in the process of which there must be reception, conduction and perception; and the auditory apparatus is so constructed that each of three parts has its own function to perform, the three working together from the outward ear-drum to the auditory nerve passing to the brain from the internal ear.

The three parts may be briefly described as follows: *The External Ear* comprises the auricle, or ear as we see it, and the outer canal, or opening leading to the ear-drum. This canal, of bone and cartilage, is about one inch long extending inward, slightly upward, then downward, being narrowest at the middle point. *The Tympanum, or Middle Ear*, comprises the closing membrane, or ear-drum, an ovoid cavity back of the drum (1-5 in. x 1-3 in. x 1-5 in.) into which enters the eustachian, or ventilating, tube from the upper back part of the throat, and contains a chain of three very small bones (malleus, or hammer—incus, or anvil—stapes, or stirrup), muscles, ligaments, nerves, and mastoid cells. *The Labyrinth, or Internal Ear*, filled with a fluid, comprises the vestibule, a common central ovoid cavity (1-5 in. x 1-5 in. x 1-5 in.) with which all

FORM G.



THE EAR.*

REFERENCE

- | | | |
|--------------------------------|-----------------------------|-------------------------|
| 1 Auricle (Outer Ear) | 6 Malleus (Hammer) | 11 Semi-circular Canals |
| 2 Auditory Canal | 7 Incus (Anvil) | 12 Cochlea |
| 3 Tympanic Membrane (Ear-drum) | 8 Stapes (Stirrup) | 13 Auditory Nerve |
| 4 Mastoid Process | 9 Eustachian Tube | 14 Cerebrum |
| 5 Tympanum (Middle Ear) | 10 Labyrinth (Internal Ear) | 15 Medulla Oblongata |
| | | 16 Carotid Artery |

* Vide page 248.

parts of the internal ear communicate; three curved bony tubes (semi-circular canals of 1-15 in. diameter) each lying at right angle to the other two and serving for maintenance of equilibrium; the cochlea, of conical, snail-shell formation which contains a very marvelous organ (organ of Corti) wherein are found about 9,600 infinitesimal rods and 15,500 hair cells each with 20 hairlets, all serving for transmission of sound of varying intensity to the various ramifications of the auditory nerve.

In hearing a sound, there must be first, sound vibrations from without, hence condensation and rarefaction of the air; then, the vibration of solid bodies, the ear-drum and ossicles (chain of small bones); next, vibration of the fluids of the labyrinth, and passage of the sound vibration through the spiral cochlea and over the sounding rods of Corti, to the elastic ends of the auditory nerve in the labyrinth; after this, nerve excitation; finally, transformation of the nerve excitation into the sensation of sound.

That which seems so simple to us, the hearing of sound, is indeed a complicated process which will fail of its purpose if a single link be broken—if a single part fails to perform its function. Especially, avoid "picking" at the ear to avoid rupturing the ear-drum—give close attention to adenoid growth and inflammation which will interfere with proper ventilation of the middle ear through the eustachian tube upon which so much depends—and remember that catarrhal troubles may result in a sloughing degeneracy of the ear-drum, ossicles, ligaments, and muscles. Do not stop-up "running ears" without medical advice.

Consult your physician and a specialist.

FORM I.

DEFECTIVE SIGHT AND DECAYED TEETH.

Proper treatment for defective sight and for decayed teeth of pupils must be given at home by parents during vacation periods. The School will provide all necessary medical attention and treatment for sickness occurring during the school-year; but it will not provide the services of an oculist for defective sight, nor of a dentist for defective teeth.

If these matters can not be attended to at home and it is the wish of parents to have same looked after while the pupil is in school, notify the Superintendent of that fact, at the same time sending him sufficient money to pay the oculist for examination, the optician for glasses, and the dentist for dentistry, and he will be glad to give all necessary assistance. Write him about these matters.

Defective sight in children, not corrected by the wearing of proper glasses prescribed after careful examination, is hurtful to good school work. A child so afflicted fails to understand because he can not see properly, and loses interest and becomes indifferent, and is designated as lazy, or dull, or stupid—while naturally, with good sight, he may be quite the reverse of these things. It also results in headaches and nervous disorders of serious nature.

The most precious possession of a deaf child is good sight. A deaf ear demands a sharp eye.

Decayed or decaying teeth are not only unsightly, a cause of foul breath, and the source of much excruciating pain, but a most prolific cause of digestive disorders leading to very serious physical illness, and to physical and mental weakness.

A tooth should never be extracted that dentistry may save.

Talk to your family physician about these matters. I am sure he will corroborate and emphasize my advice to you, to promptly and properly look after defective sight and defective teeth of your child.

To be vigorous and healthy, every organ of the body must be used. Every organ and every tissue must act well its part

to be of the best service. To keep the body in health, it is absolutely necessary that a certain amount of muscular action or physical exercise should be taken every day.

The following simple positions and actions, rearranged by the writer from Infantry Drill Regulations, United States Army, will well serve as a basis for any system of physical exercise, and teachers are requested to give their classes daily practice in some of the exercises. The "*Position*" given will teach the proper and healthful manner of standing. The various exercises will give muscular activity to arm, hand, trunk, leg and foot.

FORM J.

Exercise I—Position.

- Heels on the same line and as near each other as conformation will permit.
- Feet turned out equally and forming with each other an angle of about sixty degrees.
- Knees straight, without stiffness.
- Body erect on hips, inclining a little forward; shoulders square and falling equally.
- Arms and hands hanging naturally, backs of the hands outward; little fingers opposite the seams of the trousers; elbows near the body.
- Head erect and square to the front; chin slightly drawn in, without restraint; eyes straight to the front.

Exercise II.

1. Raise arms laterally until horizontal, palms upward.
 2. Slowly describe small circles front to rear, arms well back.
 3. Elevate arms in circular direction over head, tips of fingers touching top of head, backs of fingers in contact full length, thumbs pointing to the rear, elbows well back.
 4. Extend arms upward, full length, palms touching.
 5. Throw arms obliquely back, at the same time raising body on toes.
- Position.

Exercise III.

1. Raise arms laterally until horizontal, palms upward.
 2. Close hands with force, then open quickly, spreading fingers.
 3. Place tips of fingers on tops of shoulders, upper arm horizontal.
 4. Force elbows first to front, then to rear.
 5. Extend arms vertically, full length, till hands meet above head, fingers pointing upward, palms to front, thumbs locked, right in front, shoulders pressed back.
 6. Bend over till hands, if possible, touch floor, arms and knees straight.
- Position.

Exercise IV.

1. Raise forearms until nearly vertical, fingers extended and joined, palms toward each other.
2. Thrust arms forcibly upward, full length and down again. Make forearm horizontal.
3. Tightly close hands, back down, elbows well back.
4. Thrust arms forcibly to front, turning backs of hands up, arms horizontal, and back again. Position.

Exercise V.

1. Raise hands and place on hips, fingers to rear, thumbs to front, elbows back.
2. Bend trunk forward and back.
3. Bend trunk to right and left.
4. Bend trunk to right, to rear, to left, to front, circular motion. Position. These movements to be executed slowly, bending at hips, without twisting, feel flat on floor, knees straight.

Exercise VI.

1. Raise hands and place on hips, fingers to rear, thumbs to front.
2. Lower body, separating and bending knees, heels on floor, head and trunk erect; then up.
3. Repeat 2, but with heels raised, weight of body on balls of feet.
4. Raise, first left leg, then right, to the front, bending and elevating knee as much as possible, leg from knee to instep vertical, toe depressed; then lower. Position.

CHAPTER XXII.

QUALIFICATIONS OF TEACHERS.

The question of the qualifications necessary for a good teacher is always a live one whether it be for a teacher of hearing children, or for a teacher of deaf children, for the two have many problems and requirements in common; but it is special thought of the deaf child that prompts the following queries. The guiding hand in education is pre-eminently that of the teacher—and it is the teacher who may make or mar the pupil. Generally, it may be said that it is the teacher that makes the class, the teachers that make the school; and both classes and schools will reflect the teachers and be rated as good, bad, or indifferent. What a responsibility, then, rests upon them, and how important their qualifications!

Some time ago a well-known superintendent in our special work defined these qualifications as follows: (1) Preparation for the work, (2) Competency to do it, (3) Good character, (4) Energy and industry, (5) Willingness to work for the success of the school, (6) Faithfulness and frankness, (7) Thoughtfulness for others, and finally, (8) Interest in the work and in others around him in his daily work. Now, as to the requirements under 3-4-5-6-7-8, there can be no doubt on the part of anyone as to their justness and necessity; and others, such as professional reading and study, attendance upon conventions, teachers' institutes, and special summer courses, etc., may well be added; but concerning 1 and 2, which seem stated in general and indefinite terms, several very relevant questions are suggested.

What is meant by "preparation"—what lines of preparation does it cover? Should a collegiate education evidenced by graduation diploma or university degree be required, and if not, then, should one be a graduate of a first-class normal school with a two, three, or four-year course made obligatory for a diploma; or indeed, should such a normal course be required in addition to the collegiate work? And further, with, or without, such diplomas or degrees, what should be the

nature, and period, of special training for teaching the deaf,—not confined to any one special phase of the work, but so as to be of greatest use and value in giving the deaf, as far as possible under existing and certain limitations, a good all-around education evidenced by successive performance-levels growing greater each year, and fitting them gradually for social life and its requirements. Does “preparation” include a formal prescribed course or training in educational psychology (not general psychology, or child-psychology) and the laws of physical growth, when we rightly consider the child as a psychophysical being upon which the teacher is to “work” for its proper development, and depending primarily upon its native degree or grade of intelligence which, of itself, cannot be increased through educative efforts? And in this connection, as heretofore referred to, are the native instinctive impulses of a young deaf child altered, or delayed in functioning process due to environmental inactivity?

Now, the preceding questions lead to three other very important ones, i. e., is a high-school graduate who is keen and active as well as being very intelligent, properly fitted without further college or normal school work to prepare herself along the special lines required for teaching the deaf; and if so, is it true that such a teacher is likely to reach a mental and professional limit within three or four years beyond which neither teacher nor pupil will make any satisfactory progress? And is it ever possible for a non-high-school graduate to so prepare herself as to become a worthy and valuable teacher of the deaf?—or is such a view wildly conceived? The writer at one time had as a member of his board of trustees one who urged that for one to be a good and successful teacher both a college and normal school training evidenced by diplomas and degrees, were absolutely necessary—that a high school graduate, whatever his or her native endowment, without further training as indicated was wholly unfitted mentally for teaching and reached the “limit” of mental effort after one or two years—a rank failure. A non-high school graduate was simply the “impossible thing” to him. The writer did not agree with him then, nor does he now, in such an unqualified theoretical pronouncement.

As to the second requirement set out above—“competency to do the work”—this, according to Dr. Lightner Witmer

(Univ. Penna.) is a complex of many elements—natal intelligence, measured in terms of invention and resource: proficiency, measured in terms of efficiency and the number of operations: the disciplined will: and finally, the algebraical sum of multifarious assets and defects which constitute one's total mental capacity. The query naturally arises, to what extent does "competency to do the work" depend upon either collegiate, normal, or high-school preparation, and to what extent upon the special training which must be given to enable one to teach the deaf? It is hoped that these apposite questions suggested by the superintendent's definition may be given further thought and answered in the light of consideration of the natural limitations presented in pupil, in scope of subject-matter, in demand for teachers, etc., of the necessity that there shall be a natural love of children on the part of the teacher, and of that valuable, yet indefinable, quality of personality which is not to be gauged by intellectual endowment or attainment. What is "preparation for the work", and "competency to do it"? What is the correlation between general scholarship, scholarship in subject taught, knowledge of general methods of teaching the hearing, and *success in teaching the deaf*? What makes a successful teacher of the deaf?

The teacher who would be successful must apply herself—must be possessed of that true educational spirit that comes to one only through interest in the work, and study—incessant study—of the end and aim of modern education, and of the methods to be pursued. Not only must she be a student of why she teaches, but also, of what she teaches and of how she teaches. Not only must she know herself, but others as well, and especially must she know existing conditions in those whom she teaches. And above all, must she be wise of her own ignorance in order to possess an incentive to wisdom, and thoroughly realize that *an intense longing to do better is a mighty power contributing to better doing*.

The teacher who, though well-equipped mentally, imagines that she knows it all and thinks that there is no need of further study because "she has been over it so often," or for any other reason, deludes only herself, and will soon find herself out-stripped in the race for both success and emolument by the erstwhile novice who diligently applies herself. The

teacher who is the same yesterday, today and tomorrow, and who does not keep abreast of the advance in educational thought and endeavor, leans upon but a broken reed which is invisible to her because of her own ignorance, or conceit, or unnatural conservatism, but which is plainly discernible to others. The teacher of the deaf, to be successful, needs all the light that the successful teacher of the hearing-speaking possesses, and then, more of a special nature; and to no teacher is a more thorough knowledge of educational foundations more necessary, or of more real use and benefit, than the one engaged in the education of the deaf. Without such knowledge she is illy prepared for her high calling—she builds upon the sands of ignorance and “but grasps at the skirts of the thing she would be and falls back into the lap of a false destiny”; and through procrastination in crossing over from the old to the new, from unpreparedness to preparedness, she emulates Horace’s rustic who, wishing to cross over, stood upon the river’s brink waiting until it should cease to flow.

The successful teacher is not born so except as to intelligence and the inspiration of humanity—she is made—she makes herself by study, and through experience and study; through study she assimilates her experience and attains success with all that accompanies it. The following stray extract from the pedagogical creed of some unknown educator is so full of truth that it should be memorized by all teachers and repeated daily with the mental inquiry,—“Am I formal, and artificial, and lifeless, in my teaching? If I am, I will change, or I should either retire, or be retired”:

“I believe that some people are born with so much tact and grace that they teach well by instinct, and that some of the best work done in primary schools is done by such people. But I have noticed that such people, after a little experience, unless they set themselves seriously to work to learn the science of education, become formal, and artificial, and lifeless in their teaching, so that I firmly believe that the only safe way for all teachers is to continue to study while they teach, and to seek through all the days of their teaching life for the better ways of teaching. I believe that methods devised empirically and used formally are of little real worth, but that methods wrought out by close observation, generous reading, and profound thinking, and applied under a high ideal and a deep feeling of responsibility, are full of life and worth.”

In the second preceding paragraph reference is made to the success and emolument of teachers: and to the measurement of these two vital points the committee has given serious thought and suggests the following with a total rating

value of 100 as a measurement for the First (SUCCESS), presuming initial qualifications—i. e., sufficient educational attainment and pedagogical training, interest in the work and love of children, and good health without which all else will fail:—

SCALE No. 12.

A. TEACHING POWER—*Value 50.* Many items enter into this, the principal ones being educational study, preparation of lesson, skill in presentation, and results attained as shown in the pupils' progress.

B. GOVERNMENT—*Value 30.* This to be shown in the general spirit of the class, by the attitude pupils exhibit toward each other, the teacher, and school authority and property, in their daily tasks, and in their personal appearance.

C. GENERAL CHARACTERISTICS—*Value 20.* This to include personality, professional and community interests, and qualities generally making for the best citizenship.

As to the second point (EMOLUMENT) the committee feels that salary schedules for teachers of the deaf as now arranged are woefully inadequate for the better class—that is, for teachers graded as good, and excellent; for those graded as poor, and fair, the present salaries paid are deemed as adequate for services rendered. The best interests of the deaf child, for whom our schools are established, demand the elimination of the poor teacher and decided improvement in service of the fair teacher, or her elimination, thus leaving only the good, and the excellent, who should be amply remunerated for self-sacrificing work. Until adequate increase is made in salaries paid, the cause of education and the welfare of the deaf child must suffer. The men are leaving the work for more remunerative labor in other fields, and their going is a distinct loss to us; they should be retained through commensurate compensation. The general salary-schedule should be sufficiently high to hold and reward the excellent teacher and to offer those prepared for such a position strong incentive to enter and remain in the work; the poor and fair teachers should have no lodgment left them! With such condition prevailing the teachers of the deaf would indeed become, not only of greater benefit to the deaf but, through the elimination of the unfit teacher, an art and a science, and its practice changed from a vocation to a profession.*

* At the present time the supply of teachers for the deaf is not equal to the demand with the result that many schools are not only without a full complement of teachers, but are compelled to accept and keep in employment many inefficient teachers. This condition also prevails in the public schools for the hearing, where recent investigation discloses the following facts: Number of teaching positions in the United States, 650,000; number dropping out during the past year, 135,070 (20.78%); entering work, 151,645 (23.33%); shortage, 36,920 (5.68%); below standard, 43,830 (9.82%); shortage and below

In establishing a salary-schedule it is believed that efficiency and competency as measured by results, should stand as major quantities, and age and years of service as minor quantities, in the equation of worth, which would at once eliminate the idea of time-serving annual increases of salary regardless of merit; those who earned them through studious and progressive endeavor and excellent class results as measured in terms of the pupil, should have them—otherwise, they should not receive them. When age, or length of service, results in non-progressiveness, then should come retirement from service and age and service pensions should be thought of, and not increases of salary, which should be bestowed only upon the ever up and doing progressive. With such qualification, a maximum salary may be established with a fixed annual increase until the maximum, *which must be earned*, is reached. A fixed minimum salary is neither necessary nor desirable under any circumstances—the superintendent, or the employer, should determine what a beginning salary should be, a high one or a low one according to conditions.

In illustration of the salary question, consider the following record of two teachers, A and B, as extremes, with others of varying worth between them:

A—Work mechanical, lack of intelligent insight, follows book without reason why, poor voice, poor manner, cannot keep pupils up, slow and inefficient, heavy, reaction time slow, pupils making poor progress and copying teacher, knows nothing else, too old to learn;

B—Clever, sees everything, knows what not to see, quick, alive, good restrained energy, sense of humor, work done with despatch, forces pupil up, every pupil kept alive and interested, pupil taught to reason, reaction time quick.

With such teachers what is the percentage of pupil possibilities, what the percentage of efficiency and competency, and what percentage of the salary of an efficient and competent teacher should they receive? Just such discrimination should be made in fixing salaries in the employment of new

standard, 80,750 (15.5%). In categorical answers received from some 1,700 signed reports, representing over 262,000 teaching positions uniformly distributed over the forty-eight states of the country, the following conditions were disclosed: "Has it been necessary to accept lower qualifications?"—Yes, 1469; no, 291. "Have teachers' salaries increased as in other vocations?"—Yes, 225; no, 1560. "Have salaries increased in proportion to cost of living?"—Yes, 80; no, 1691. "Is the number of teachers below twenty-one years of age increasing?"—Yes, 1165; no, 546. "Are promising young men and women attracted to teaching as in the past?"—Yes, 122; no, 1629. The seriousness of the present emergency in education not only darkens the present, but casts its portentous shadow over the future; and but one thing will tend to remedy the existing evil—an adequate living salary, that is, an adequate "right-living" salary, which will give merited recognition to mental ability and accomplishments in at least the same ratio as to mere brawn and muscle, which, to the shame of the people, is not now the case.

teachers and in holding old ones, regardless of age and years of service; the salary should be commensurate with the active and continuing efficiency and competency of the teacher—and *earned!*

In addition to the possession by teachers of requirements necessary to give them a high rating on measurement of "Success" based upon educational attainment and pedagogical training, interest in the work and love of children, and good health, it is believed that the irreducible minimum as to attainment and training is that they must be, at least, graduates of a first-class or commissioned high-school, or its equivalent, and have had, following such graduation, at least two full years of training in an efficient training school for teachers of the deaf approved by the Conference of Superintendents and Principals of American Schools for the Deaf. In this connection it is also believed that no teacher should be given more than twelve pupils to the class; that exchange of teachers between schools for three, six, or nine month periods would result in good for teacher, pupil, and school; and that the establishment of retiring pensions should be in connection with teachers in public schools under state or municipal laws and supervision, and not dependent upon schools for the deaf, nor upon associations among themselves which are comparatively small in numbers.

In concluding this chapter the writer wishes to refer again to the nature of the work engaged in by teachers. What is teaching, and how do teachers regard it, and their own status in the community as teachers? Is teaching a job, an occupation, a trade, or a profession?—is it a calling, an art, or a science? Is teaching engaged in as a "makeshift" to something else, a temporary position, a resting place because of incapacity to accomplish other worth-while things, or is it engaged in as a permanent work because of love for it and the wonderful opportunities it presents to benefit others? A *profession*, you say! Well, it is both an art and a profession—but teachers must make it such by their own earnest intellectual endeavors and ceaseless activities, and by the establishment of a superior morale reflecting the ethics of a profession—otherwise, teaching falls to the level of a job and the teacher becomes merely a time-server of incompetency. Schools and colleges of education cannot alone make the suc-

cessful teacher, and all the "preparation" made by one by whatever means will not insure even fair success if the teaching spirit is lacking, and constant study not practiced—the teacher must make herself.

President Brubacker of the State College of Teachers, Albany, New York, says a profession may be distinguished by certain well-marked characteristics, one of which presupposes a body of scientific and technical knowledge and corresponding skill in practice; and another, that this knowledge and skill can be acquired only by extended study and careful practice by persons who have the native endowment. Commenting in detail upon this matter, he says: "Teachers must grow in knowledge and in the graces of their art if they wish to remain professionally alive. *Stagnation in teaching is certain professional death.* But the normal-school graduate is proverbially stagnant. She reads no books; she investigates nothing for herself; she expects the impetus provided by the normal-school training to last through her teaching-life, and the community she serves receives rapidly diminishing returns. And college-graduates are not notably more progressive. While it is true that they *start* with a wider horizon and with more extensive scholarship, their enthusiasm for learning is not notably contagious. Teachers' colleges and schools of education do not contribute vigorously to a spirit of progress and the advancement of learning. These institutions love pedagogy and pursue it sometimes to the exclusion of other good things; they are magnifying the teaching process to the detriment of the learning process; teaching skill is refined to the point where the child is *taught* everything so skillfully that he *learns* nothing. * * * The school of pedagogy is concerned with method rather than with the matter of knowledge, and the product is therefore somewhat pedantic as might be expected. It mistakes the shadows for the real substance and accepts for its standard the mere conceit of learning." While this statement of President Brubacker may seem a little extreme in its arraignment, it nevertheless discloses much of truth to the thoughtful reader along educational lines, and emphasizes the fact that even with sufficient native endowment and preliminary scholastic training, the teacher must make herself by earnest intellectual endeavors, extended study, careful practice and ceaseless activity.

CHAPTER XXIII.

TEACHER MEASUREMENT.

The measurement of general or specific efficiency and competency of teachers may be made by themselves to a certain extent as well as by others, and for such purpose the following outlines are presented: (1) Teacher Measurement, (2) Personalities of Teachers, (3) Pertinent Questions for Teachers. The simplicity and value of the first outline was described by its author (Witham) in the *Journal of Educational Psychology*, May, 1914, and has been reprinted in separate form with appropriate graph-cards, both of which may be obtained at nominal expense of the publishers.* Every teacher should be given a copy of this outline-scale and a graph-card. After reading outlines 2 and 3, and carefully studying the scale, she should measure herself and record the result on the card, and then send it to the superintendent. He will also want to measure the teachers and plot graphs of their standing, some of which will probably want to be changed or completed after receiving the teacher ratings of themselves. These printed cards, about 5" x 2" in size, are ruled by three horizontal lines spaced half an inch apart marked respectively, +, a, — (plus, a, and minus) and are intersected by forty-six vertical lines, numbered 1 to 46, through which the line of self-examination is to be drawn linking together the +, a, — qualities.

TEACHER MEASUREMENT—*Scale No. 13.*

- | | |
|----------------|---|
| 1. Morals. | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">+</div> <div style="display: inline-block; vertical-align: middle;">Uplifting influence on others.</div> </div> <div style="display: inline-block; vertical-align: middle; margin-left: 5px;"> <div style="display: inline-block; vertical-align: middle;">a</div> <div style="display: inline-block; vertical-align: middle;">Upright but not influential.</div> </div> <div style="display: inline-block; vertical-align: middle; margin-left: 5px;"> <div style="display: inline-block; vertical-align: middle;">—</div> <div style="display: inline-block; vertical-align: middle;">Questionable character.</div> </div> |
| 2. Leadership. | <div style="display: inline-block; vertical-align: middle;">+</div> <div style="display: inline-block; vertical-align: middle;">Among students and in community.</div> |

a

Among students only.

—

Lacking.

* Warwick & Yorke, Baltimore, Md. Scale, 40c per doz.—Cards, 30c per doz.

5. Ideals.
 - + Of an idealistic temperament.
 - a* Narrow (local or selfish or both).
 - Lacking.
6. Education
 - Elementary Teacher.**
 - + College education.
 - a* High school education.
 - Grammar school education.
 - Secondary Teacher.**
 - + University education.
 - a* College education.
 - High school education.
7. Travel.
 - + Over 1000 miles from place of birth.
 - a* 500 to 1000 miles from place of birth.
 - Less than 500 miles from place of birth.
8. Professional Training.
 - Elementary Teacher.**
 - + Normal school graduate.
 - a* One year of normal school work.
 - Summer normal school.
 - Secondary Teacher.**
 - + Year or more at a teachers' college.
 - a* Summer session at a teachers' college.
 - Majored in college in the subject now teaching; or did undergraduate work in a department of education.
9. Experience.
 - + Successful experience in several positions.
 - a* Several years in one position.
 - Frequent change of position.
10. Physical Ability.
 - + Strong and vigorous.
 - a* Seldom absent from duty, but not very rugged.
 - Frequently absent from duty.
11. Endurance.
 - + Tenacious.
 - a* With close supervision, able to keep at a thing until it is mastered.
 - Changeable.
12. Action.
 - + Energetic.
 - a* Easy-going.
 - Lazy.
13. Reliability.
 - + Does more than is required.
 - a* May be depended on for all requirements.
 - Sometimes fails to do all expected, or is late in getting things done.
14. Resourcefulness.
 - + Shows quick mental grasp, decision and initiative.
 - a* Has some capacity for independent action.
 - Has to be told how to do everything new.
15. Study Habit.
 - + Is diligent in study, careful in planning.
 - a* Studies daily without much system.
 - Does nothing outside of preparation of subjects taught.
16. Professional Spirit.
 - + Recognizes greatness of teaching profession.
 - a* Considers teaching as good occupation until marriage, or as stepping-stone to some other business or profession.
 - Indulges in destructive criticism of fellow-teachers.
17. Professional Reading.
 - + Educational papers and books.
 - a* Some educational paper.
 - Practically nothing.

18. Reading for Breadth and Culture. $\left\{ \begin{array}{l} + \text{Constant reading of books of real value (not over 50 per cent. fiction); also some periodical like the "Outlook."} \\ a \text{ Little besides fiction.} \\ - \text{Practically nothing.} \end{array} \right.$
19. Professional Library. $\left\{ \begin{array}{l} + \text{Owns more than 10 modern books on education.} \\ a \text{ Owns from 1 to 10 modern books on education.} \\ - \text{Owns no such books.} \end{array} \right.$
20. Educational Magazines Subscribed to. $\left\{ \begin{array}{l} + \text{More than one.} \\ a \text{ One.} \\ - \text{None.} \end{array} \right.$
21. Educational Organizations Allied with. $\left\{ \begin{array}{l} + \text{Local, State and N. E. A.} \\ a \text{ Local and State.} \\ - \text{Local.} \end{array} \right.$
22. Neatness. $\left\{ \begin{array}{l} + \text{Has high ideal of neatness in everything.} \\ a \text{ Is neat in either personal appearance or about the schoolroom; not in both.} \\ - \text{Is slovenly about person and schoolroom.} \end{array} \right.$
23. Thrift. $\left\{ \begin{array}{l} + \text{Wise expenditure of salary. Bank account.} \\ a \text{ Wise expenditure of salary. No bank account.} \\ - \text{Spends recklessly all the money earned.} \end{array} \right.$
24. Disciplinarian. $\left\{ \begin{array}{l} + \text{Has the feeling that the pupils want to do his will.} \\ a \text{ Keeps good control, but with considerable anxiety or by sheer authority.} \\ - \text{Allows whispering, noise and confusion.} \end{array} \right.$
25. Organizing Ability. $\left\{ \begin{array}{l} + \text{Is able to successfully establish new features, such as school gardens, parents' associations, etc.} \\ a \text{ Is successful in maintaining any such features.} \\ - \text{Allows such features to die out.} \end{array} \right.$

26 to 40 INCLUSIVE, ABILITY TO TEACH.

(Apply the same standard to all subjects.)

- + Knows and applies the best special methods.
 a Shows good natural ability; is weak on special methods.
 — Shows no methodology and not much natural ability.

26 Reading, 27 Writing, 28 Spelling, 29 Geography, 30 Drawing, 31 Nature, 32 History, 33 Number or Arithmetic, 34 Physiology and Hygiene, 35 Language, 36 Grammar, 37 Civics, 38 Music, 39, 40

41. School Civic Improvement. $\left\{ \begin{array}{l} + \text{Active aid in getting and adding to schoolroom and building.} \\ a \text{ Insists on proper care of schoolroom, building, and premises.} \\ - \text{Irresponsible for the care of school property.} \end{array} \right.$
42. Loyalty to Superior Officers. $\left\{ \begin{array}{l} + \text{Constructive helper.} \\ a \text{ Shows acceptable recognition of authority.} \\ - \text{Is rebellious or deceptive.} \end{array} \right.$
43. Loyalty to Fellow-Teachers. $\left\{ \begin{array}{l} + \text{Manifests fraternal spirit.} \\ a \text{ Is chummy with a few, indifferent to the many, cliquish.} \\ - \text{Takes selfish or jealous attitude.} \end{array} \right.$
44. Loyalty to Subordinates. $\left\{ \begin{array}{l} + \text{Has clear conception and recognition of their rights and feelings and ready to defend them.} \\ a \text{ Not actively interested in them.} \\ - \text{Domineering.} \end{array} \right.$

45. Ability to take Suggestions. $\left\{ \begin{array}{l} + \text{ Always willing to receive and carry out good suggestions.} \\ a \text{ Shows moderate ability to receive and to incorporate good suggestions.} \\ - \text{ Unable or unwilling to receive suggestions.} \end{array} \right.$
46. $\left\{ \begin{array}{l} + \\ a \\ - \end{array} \right.$

FORM K.

THE GRAPH CARD—TEACHER MEASUREMENT.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
+																									
-																									
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46				
+																									
a																									
-																									

PERSONALITIES OF TEACHERS.*

The personalities with whom we are brought into daily contact offer material for study which is both valuable and interesting, valuable as throwing light upon the effect of personal influence upon the children—that personal touch—that subtle something which begets in those coming under its sway an unconscious reflection of itself. The following notes taken from actual experience may illustrate this:

A. is a calm, self-reliant, gentle teacher, full of enthusiasm for her work, heedless of self, devoted to the children whose good points she always discovers and makes the best of. She has them really in the hollow of her hand. Their respect and love for her never fails, and it lasts even into manhood and womanhood.

B. is another born leader, clever, keen, richly endowed with the power of sympathy and human appeal. A sense of humor that is irresistible, and with all this, ability to command and a sufficiency of force and good sense to carry her followers intelligently along. There is devotion and slavish following, but this is the misfortune rather than the fault of such a leader.

C. is another born leader, clever and keen in many ways, but full of conceit and an overpowering belief in self. Lacking in breadth, only able to see things from one point of view. A decided autocrat in government. Obtains good immediate superficial results, but holds and trains with such a tight hand that her work shows nothing suggestive of a fuller life ahead; rather is there a tendency to distaste for the very things in which such apparently good work is being done, and an intention on the part of the workers to have a good time as soon as they are unfettered.

D. is a calm, self-reliant nature; clever, restrained, most patient. A slave to duty and excellence, whose work with the children is always more for the future than the present. Influence a matter of very slow growth, but abiding in its nature. Her pupils always respect her, but

* Miss Minnhinnich. The Pestalozzian School, Plymouth, England. Published in English School Journal.

few of them realize what she has been to them until they have left school some distance behind.

E. is enthusiastic, interesting, and in certain ways, capable, but erratic and unstable. Sustained effort is not easy to her, constantly getting into difficulties because of this and her lack of method. Influence strong with children at moment, but not abiding.

F. Not clever, diffident of her own power, absolutely honest and true, most persistent and succeeds because of her doggedness, charming in many ways, and very appealing to children.

Personality shows itself in manner and bearing which should be its unconscious expression. When it is not, when there is the faintest trace of artificiality or insincerity, then something is wrong, and the influence or lack of it upon the children is proportionately bad. Too many are either on stilts, so superior that they never get near enough to the children in sympathy to know much about them, or to be of any real use to them; or are so apologetic, so flabby, so weak, that they fail to inspire with confidence or anything strong and stimulating. The superior people must get off their stilts and be natural. The apologetic must stiffen and try to cultivate that habit of self-forgetfulness which thinks only of the work.

PERTINENT QUESTIONS FOR TEACHERS*—*Scale No. 14.*

PERSONAL CHARACTERISTICS.

Is my personal appearance as good as I can make it?

Am I careful to keep myself in as good physical health as possible?

Is my mien natural and sincere rather than affected or assumed?

What mannerisms have I that can be overcome?

Is my voice well modulated?

Is my speech so well enunciated that I am easily understood by my pupils?

How do I know that my use of English is worthy of the mother-tongue?

What traits are there in my disposition which I should hold in check?

MANAGEMENT OF THE ROOM.

Is the ventilation in my room as good as I can make it?

Is the temperature satisfactory?

Are the seats properly adjusted to the pupils?

Is the lighting of the room as good as I can make it?

What methods do I employ to have readily available for teaching purposes, the appropriate educational material such as charts, maps, pictures, globes and practice work?

Have I done all that can be done to make my room an attractive place to work?

MANAGEMENT OF THE CLASS—DISCIPLINE.

How do I know that my ideal of good order is a worthy one?

Do I secure good order by the best methods?

What evidences are there that my pupils are acquiring habits of good physical bearing?

Do I find more difficulty in handling my class at dismissals than during recitation periods?

Do I lead or command the pupils in maintaining proper order?

What shows that my pupils are learning self-control?

In what ways is the responsive and co-operative spirit among the pupils shown?

* Dr. Franklin B. Dyer, Superintendent of Schools, Boston, Mass., in the "Foreword" of a circular on "Questions on Teaching" prepared by the Department of Educational Investigation and Measurements, and sent to the teachers of that city.

TEACHING THE LESSON.

Do I distinguish the following types of lesson and employ each at the proper time,—a drill lesson, a thinking lesson, a lesson for appreciation (of literature or art), and a lesson to teach children how to study?

What method of teaching do I use most often—*a.* The conversational, in which the pupils both answer and ask questions? *b.* The quiz, in which the pupils only answer the questions which I ask them? *c.* The lecture, in which the pupils merely receive what is given them?

Do I choose my method of teaching in view of the character of the lesson to be taught?

What part of the recitation time do I take up—*a.* By asking thought-provoking questions and trying to get the pupils to talk freely about the subject which they are learning to handle? *b.* By merely “quizzing”? *c.* By giving information? *d.* By working at the blackboard? *e.* By using illustrative material?

What part of the recitation time do the pupils take up—*a.* By working out new information through free conversation about the subject which they are trying to learn? *b.* By repeating information memorized from the book? *c.* By drill or practice work to apply the principles taught? *d.* By giving thoughtful answers? *e.* By working at their seats or at the blackboard?

To what extent in each lesson do I help the pupils to prepare the next lesson—*a.* By good ending of recitation? *b.* By a judicious assignment? *c.* By stating the aim? *d.* By anticipating their difficulties? *e.* By suggestions or directions?

How do I find out that the pupils have clearly in mind the aim or purpose of each lesson?

Do I take appropriate means to ascertain how much the pupils know about the subject of the lesson before I attempt to teach them the new lesson?

To what extent do I secure the proper attention of pupils to their work through interests that are natural to them?

What means do I take to present the material in the form of problems which stimulate the curiosity of the pupils?

* * *

Are my questions simple, direct and logical, or are they rambling, ambiguous and suggestive of the answer?

Are most of my questions for the purpose of developing new ideas or to find out how much of the assigned lesson the pupils have learned?

What means do I adopt to insure a judicious distribution of my questions among the pupils?

How many different pupils of my class do I give a chance to recite in each recitation? In a week?

What pains do I take to make my questions such that the pupils must answer them with a complete statement rather than with one word?

What methods do I employ to have each pupil as he recites, address himself to the class rather than to me?

How do I make it necessary for the pupil to make the proper use of his past experiences and his present knowledge?

Do I make desirable use of pictures, objects, charts, maps, blackboards, and other objective material?

Am I distributing my attention judiciously among the better and poorer pupils so that each pupil is getting the largest possible value from my instruction?

Am I training my pupils to discriminate between what is essentially important in the lesson and what is only relatively so?

* * *

Am I teaching my pupils to organize their own ideas in proper relation and sequence?

How do I see to it that the pupils feel that the object of the lesson has been accomplished?

By what methods do I clinch the main idea of each lesson before closing the recitation?

What evidence is there that my pupils are increasing in power of self-control and initiative? Are they learning to solve their own difficulties?

Are my pupils increasing their feeling of responsibility for their own improvement?

Do my pupils attack hard work gladly or do they want help in every little difficulty?

Are my pupils being trained in conscious methods of study and work?

To what extent do drills and practice work of pupils carry over into their other work?

Is my teaching such that there is inculcated in my pupils the desire to learn, to render some valuable service, and to be somebody worth while?

IN GENERAL, WHAT AM I AS A TEACHER DOING, WHAT AM I DOING IT FOR, AND WHY AM I DOING IT IN THIS PARTICULAR WAY?

CHAPTER XXIV.

MEASUREMENT OF SCHOOLS FOR THE DEAF.*

In the measurement of the efficiency of schools for the deaf, ten points of varying values are suggested for consideration in a group measurement and the establishment of a scale, the various values totalling 1,000. In this connection, attention is called to "Notes in Detail" given below and referring to the various points enumerated in the group scale. These notes indicate the scope of consideration in fixing values and will serve for further investigation as to relative worth and influence in the education of the deaf, and in estimating the value of schools established for them. The ten points to be given consideration follow:

TABLE No. 30.

1. Mental, Physical, and Moral Conditions of Pupilage.....	Value	100
2. General Attendance	Value	100
3. Equipment and Environment of School	Value	75
4. General Organization	Value	75
5. Curricula—Literary and Industrial	Value	100
6. Teaching Force	Value	200
7. Supervision	Value	100
8. Progress of Pupils	Value	100
9. Independence and Self-Containment of Pupils.....	Value	50
10. Results as Demonstrated in After-Life of Pupils.....	Value	100
Total Value, the Maximum		1,000

SCALE No. 15.

In group measurement these various points are to be combined into four groups, A, B, C, D, covering Pupilage, Organization, Instruction, and Results, as follows:

A—Pupilage—Value, 100.

1. Mental, Physical, and Moral Conditions	100
---	-----

B—Organization—Value, 250.

2. General Attendance	100
3. Equipment and Environment	75
4. General Organization	75

C—Instruction—Value, 400.

5. Curricula—Literary and Industrial	100
6. Teaching Force	200
7. Supervision	100

D—Results—Value, 250.

8. Progress	100
9. Independence and Self-Containment	50
10. Results Demonstrated in After-Life	100

* This scale with modifications may also be applied to other schools.

NOTES IN DETAIL.

The ten points referred to are based upon the following details:

1. Inherited tendencies and defects—acquired defects—moral and educational environment at home—degrees of deafness and muteness—defective vision, teeth and breathing—Hypertrophied tonsils and adenoids—enlarged glands—general health—age of admission—the psycho-physical development of the deaf child compared with that of the hearing—measurement of mentality—congenital vs. adventitious deafness—nationality—factor of experience—difference in mentality, native and acquired, at 1, 3, 5, 7, 10, 15, 18 years of age.
2. Percentage in attendance of those for whom the school is established—effort made to increase attendance—compulsory education laws—graduations, discharges and non-attendants (“drop-outs”) and causes of last two—daily average attendance—absence account sickness, home-visits, etc.—“survivors,” the more fit, the brilliant, the youngest, the stupid.
3. School Museums—libraries—gymnasiums—play ground apparatus—special rooms for special teaching purposes—industrial equipment—influence of outside life surrounding the school—laboratories—school room equipment.
4. Business administration—educational organization—medical, dental and optical attention—culinary department and dietaries—household equipment—heat, light and power—salaries and wages paid—rules and regulations—admission history required of pupils—etc., etc.—household services of pupils.
5. Object in view—Utilitarian or cultural, or both—relative values of literary and industrial education—curtailment of subject-matter taught, or additions thereto—text books used, and elimination of parts thereof—relative values of subjects taught—years required for completion—holiday periods or continuous session—life environment—prescribed curricula and texts by state—hours per week, literary and industrial.
6. Qualifications necessary—recruiting of force, and training—number required—duties outside of school room, monitorial and otherwise—salaries paid and contracts—normal departments—tenure—school and professional ethics—pensions.
7. Superintendent, principals and teachers—Scope of their supervision—of school work generally—supervision by teachers outside of school house—household supervision by supervisors and others—industrial supervision—supervision of social diversions—of study hours—of dormitory life—of recreation periods—political interference, etc.
8. Percentages of retardation, elimination, promotion, and non-promotion—establishment of age and grade norms (sub-normal,* normal, and super-normal ages)—or, grade and progress norms (rapid, normal and slow progress*)—or, age, grade and progress norms—single or rotating classes—measurements of progress—grading, by terms or annually—advance as class or individual units—rotating classes or teachers and extent of—semi-annual and annual examination and how conducted—promotions, when—backward pupils—increased industrial for retards—measurements, individual or grouped—forcing promotion and graduation account conditions.
9. Coming and going of pupils—restrictions—manliness—social life—athletic contests with schools for the hearing—familiarity with civic life of community—attendance at public lectures, theatres, etc.
10. Self-supporting, law-abiding citizenship—trades and callings followed—wedded or single life—community interest—loyalty of former pupils—moral and religious life—segregation.

* In the public schools, statistics indicate that averages are practically the same for subnormal age and slow progress—but with different individuals (37 per cent.).

CHAPTER XXV.

THE PINTNER TESTS.

As stated in a preceding part of this report under the caption, "The Committee and its Duties," Dr. Rudolf Pintner, Professor of Psychology, Ohio State University, and his associate collaborators, Donald G. Paterson and Mrs. Margaret Pintner, upon invitation of the committee became interested in our work, which was new to them, and generously offered their time and services toward its successful prosecution, which were gladly accepted. We feel greatly indebted and grateful for their enthusiastic co-operation and have pleasure in here acknowledging it. We further feel that Dr. Pintner, who stands among the foremost American educational psychologists of the day, stands also without a peer among them in the special field of psychologic knowledge of the deaf due to his intensive study of the class in our schools.

The primary object of the investigation agreed upon was to test the learning ability of deaf children in already established and standardized terms of the hearing child. The two tests selected for the purpose were the Substitution, or Digit-Symbol and Symbol-Digit Tests heretofore referred to. It is not claimed that these two tests alone will give an absolute measure of any particular individual's learning ability, but it is believed that when large numbers of children are tested, as was done in this investigation, a fairly definite view of the learning ability of the whole group may be attained. As a matter of fact, no single test, however good it may be, should be relied upon absolutely, as a reliable and exact measurement of one's intelligence although it may serve fairly well to indicate the trend of truth. These two tests referred to are tests not only of learning ability but also serve to determine the speed with which a person can build up new associations, and are in part both memory tests and tests of intelligence, i. e., general capacity of one to consciously adjust his thinking to new requirements, to new problems and conditions. Language is not required in their performance which strongly recommends

their use with the deaf, for it is the learning of language that forms the great barrier in their education.

The form of these two tests may be described as follows:

A sheet ruled in 200 blank squares, five to a line, opposite each line being printed five digits or five symbols: and at the top of the sheet over the squares are nine circles each enclosing one digit and one symbol. The pupil, with the sheet in front of him for constant inspection, is required to write in the blank squares the corresponding symbols or digits for the printed digits or symbols on that line under a time-limit (reaction time)—eight minutes for the lower grades and five minutes for the higher grades. Starting altogether at a given signal and stopping promptly at the time-limit signal, each square correctly filled is counted as one point—and the total number of points thus made divided by the time-limit gives the score. If, for instance 200 points are made (or any number) that number divided by either eight or five (the time-limits) would give respectively 25 or 40 for the score.

These tests were given by Pintner and Paterson to the pupils in the Indiana, Ohio, Philadelphia and Kentucky* schools wherein about 1500, nearly equally divided between boys and girls, were tested. These particular tests were chosen because considerable work with hearing children had been done with them and standardized norms established for comparison, and for the further reason as stated, that they are in no sense a language test which is a desideratum with deaf children to whom the Binet-Simon test, largely a word and language test, may not be justly applied. To quote Dr. Pintner: "Learning tests involving language would be totally unsuited for the purpose of comparing deaf children and hearing children, because the deaf child is cut off from language experience, i. e., normal social intercourse. It is the learning of language that forms the greatest obstacle in the education of the deaf child. We believe, therefore, that the choice of the two tests was happily made as they can be administered and performed without the aid of spoken or written language." The tests were given as class tests, the first and second in two of the schools on the same day, in the other school, two months apart, and all by Messrs. Pintner and Paterson thus insuring uniformity of procedure in each test.

The written report of these gentlemen to the committee concerning their examination was a lengthy and exhaustive one containing twenty tabulations and thirty-five curvegraphs, accompanied by full explanatory text. Throughout, comparison is made with the normal hearing child—and this research work will stand as the first important effort to compare

* Vide page 197 as to Kentucky school.

through mental tests the deaf and the hearing child along normal lines. Division is made as to age, sex, cause of deafness (congenital or adventitious), oral and manual groups, etc., and consideration is given to acceleration and retardation in some of their phases. The report was presented and read by the chairman and discussed by the committee, section by section, and approved for publication.*

In closing their report the examiners say: "Two important features are to be noted in summing up the results of this investigation. The one is the general similarity of the results found in each of the three schools taken separately, (Indiana, Ohio, Pennsylvania); and the other is the general similarity of the results for each of the two tests. It seems safe to say that, since we find this general similarity in the three schools and in the two tests, the conclusions we have arrived at may be regarded as supported by sufficient evidence. * * * * In conclusion, we are of opinion that something has been gained in establishing norms for the deaf in these two tests. We believe that they form a reliable basis for comparing the work of any individual deaf child with the average deaf child of the same age. We wish emphatically to deny the possibility of an accurate mental diagnosis of any one child on the basis of these two tests, and yet a very poor performance on both these tests might arouse a suspicion that could be verified by other mental tests. In regard to groups of deaf children we have faith that the results of a group compared with our norms will give a good indication of the general mental level of the group. In this sense we believe that these two tests are admirable for a general survey of the mental level of a school. It will not do, however, for such work to be carried out by individuals indiscriminately. A certain technique is necessary and a strict conformity to the procedure as laid down by us is indispensable if results are to be at all comparable. We hold that most teachers are not fitted to give the tests from the mere fact that their attitude towards the child is naturally one of help and assistance. In some classes she would explain more than in others. This would invalidate the results. Strict adherence to a uniform mode of procedure is absolutely necessary. The results of tests conducted in such manner would undoubtedly prove useful in the classification of deaf children in practical school work."

* Vide page 19 as to publisher.

GENERAL REFERENCE TO RESULTS.

Without entering into a discussion at this time of the details and the argument of the examination leading to tabulations and curvegraphs, arranged according to chronological ages, the writer will state briefly and generally that among the results obtained after careful correlation are those that indicate that the deaf child is between three and four years behind the hearing child in learning ability, as tested by the rapidity and accuracy of forming associations between numbers and forms; that the deaf boy and the deaf girl are equal in learning ability which is not the case with the hearing boy and the hearing girl, the latter being the superior; that the deaf boy, however, approximates more closely the hearing boy than does the deaf girl the hearing girl; and that there is practically no difference between the learning ability of the congenitally deaf and the adventitiously deaf. It may be also stated that comparison was made in two of the schools between the totally deaf and the partially deaf and that the curves show no radical difference between the two groups; but as the degrees of deafness were based upon the estimate of the teacher which does not possess exact value, the comparison may be unreliable and no definite finding is made concerning the matter because of the extreme difficulty in estimating the amount of hearing power without close scientific examination. Variations, of course, occur in the curves plotted for the separate schools and between those for classifications, but generally, they approximate each other rather closely. The curves for girls are more irregular and variable than those for boys, but in no case are the variations uniform and constant excepting in two instances, i. e., in all three schools the girls at eleven years of age show a pronounced drop in attainment while the same occurs in lesser degree for boys at fourteen years of age. In distinctions between the oral and manual groups no reflection is made upon either of the two methods of teaching; the results merely indicate the learning ability of the children. "But it is customary," writes Dr. Pintner, "in most combined schools where both oral and manual methods of instruction are used, to relegate the slower and duller pupils to the manual classes, and this fact is shown clearly by the results of the tests * * *

The fact, however, that we do find many manual pupils who are decidedly superior to oral pupils in this

test of learning ability might raise the question whether there is not a type of pupil who, for some reason or another, cannot make progress under oral instruction and yet is by no means lacking in ability in other directions, where speech and lip-reading are not required. The results may, of course, be interpreted in another way, as meaning that the selection of the brighter pupils for oral instruction has not been carried out consistently." The writer is very decidedly of opinion that the former suggestion is the correct one, and that there are many who are, or deserve to be, placed in that class; and that, unless by keen discernment the mentally brightest have been selected for the oral classes where they generally remain regardless of inability to acquire really worth while speech and speech reading, the location of the pupil is manual or oral classes has no direct bearing upon his intelligence and learning ability.

In this connection the writer finds that in two of the schools, one with twenty-six classes, the other with twenty-three, the average Pearson coefficients of correlation between the two tests are higher for the manual classes than for the oral—in one, .16 and in the other .12, while the average mean variations are lower, .05 and .03 respectively.* This would seem to indicate that at least, the manual classes were as good as the oral in learning ability; but herein the influence of number must be considered as by far the greater number of pupils is in the oral classes, thus giving greater probability of the action of chance—and perhaps, too, as stated by Dr. Pintner "the selection of the brighter pupils for oral instruction has not been carried out consistently." Concerning these results the examiners say, "We are not able to interpret this phenomenon at the present time." In one of the three schools the results show that there is a decided tendency for the correlation to become lower as we go upward from the primary classes to the more advanced, which should not be the case as it indicates that learning ability decreases with age.

Concerning children classed as Bright (two or more years accelerated), Normal ("at age" or one year advanced or retarded), Backward (two or three years retarded), and Dull (four or more years retarded), the report shows that in each

* Correlation—Manual .71, oral .55; manual .72, oral .60. Variation—Manual .12 oral .17; manual .18, oral .21.

test, and in each school, the largest percentage of pupils fall within the dull group (39 per cent) while the percentages in the normal and backward groups (almost 53 per cent) do not differ greatly in the three schools. The "bright" pupils average about 8 per cent.* The combined curve of retardation for the three schools is slightly skewed to the right, that is, the greater number of children lie below two years retardation, and the median falls within the three year group.

In order to draw valid conclusions from the two tests, correlations (tendencies toward uniformity or correspondence) were made both by classes (90) and by ages for the three schools, and the coefficients of correlations (degrees of uniformity or correspondence—from 0 to 1) were carefully worked out, likewise the degree of probable error of coefficients (from 0 to 1). When the coefficient is from three to five times the amount of probable error, the correlation may be said to have scientific value and to indicate results worth while. Now, in combining the various classes in each school, (26 in one and 23 and 41 in the other two, with an average correlation of .65 for the entire 90 classes) the average class correlation for each is .61, .64, .68, respectively with mean variations of .16, .21, and .16; while for the age correlation of the three schools combined, the average for all ages is very high, .78, larger than that for the classes because of the relatively smaller number of pupils in the class groups, and twenty-two times greater than the probable error of .0351 which is very low. These figures indicate the high correlation between the tests, between the three schools, and with nearly one thousand deaf children, and give evidence of the reliability of conclusions reached—in fact, the correlation is much higher than some of the correlations upon which standardized norms have been established for hearing children.

Correlation between the class grades (markings of teachers) and the standing of pupils in the tests was possible only in the two western schools where rank correlations for each test and school standing were computed for each class with the result of an average correlation of .20 and with average deviation of .22. "It will be noted," Pintner adds, "that all of the correlations are very low. The large average deviations show the great fluctuations from class to class, and indi-

* Cf. MacDonald. *Washington School Children*, page 158.

cate the presence of quite a number of negative correlations. In short, the vast majority of classes show little correlation between the pupils' standing in the tests and the standing as determined by school grades (markings). If the tests are testing intelligence, then the ordinary school examination is evidently testing something different. This raises a question too extensive to go into here. Our findings agree with those of other workers as cited and discussed by Stern."

Regarding the acceleration and retardation of pupils as disclosed by the tests, group measurement as to age in each school when averaged for the three schools shows percentages as follows: Bright, 8.2; Normal, 24.4; Backward, 28.4; Dull, 39. In each school the dull group is four or more years retarded, and the percentages show that the greater number of children lie below two years retardation rather than above it. The median falls in the three year group. This corresponds fairly well with the retardation of 3.7 years as tentatively established with about 1,000 children under examination through the digit-symbol test which was the first given. With the symbol-digit test next given the retardation was not so great, being 2.9 years. An average of the two would give us a retardation of 3.3 years. Concerning the use of the tests generally, the examiners state: "We feel confident that our estimate of the deaf child's ability on these two tests is most certainly not too low—it is, probably, a little too high". It is because of this assertion, and of the writer's investigations that, in arranging the age-grade and other scales and seeking a basis for computations generally he assumed as normal for the six year old deaf an average retardation of four years, due as stated previously, not to degenerative processes but to enforced lack of experience and free social intercourse with hearing-speaking people and their daily affairs.

The tables of Pintner indicating average retardation at various ages may be epitomized as follows. No result is recorded for ages 8 to 11, because of the low scores made for such ages and the further fact that the Pyle ages assumed as normals do not give any age below eight, thus rendering comparison impossible where the minus score of the deaf is too great.

TABLE No. 31.

	<i>D. S. Test*</i>	<i>S. D. Test</i>
Years of Retardation at 8 years.....	...	...
Years of Retardation at 9 years.....	...	...
Years of Retardation at 10 years.....	...	...
Years of Retardation at 11 years.....	...	2.5
Years of Retardation at 12 years.....	3.	2.
Years of Retardation at 13 years.....	2.	3.
Years of Retardation at 14 years.....	2.5	2.5
Years of Retardation at 15 years.....	3.	1.5
Years of Retardation at 16 years.....	3.5	2.5
Years of Retardation at 17 years.....	4.5	3.
Years of Retardation at 18 years.....	5.5	4.
Years of Retardation at Adult years.....	6.	5.
Average	3.7	2.9

In both tests the individual child's score was compared to the age norms established by Pyle for hearing children (Pyle Ages), and the age to which the score most closely agreed was noted. This gives the deaf child's performance in terms of the chronological age of the hearing child; and the difference between the two will indicate the number of years accelerated or retarded on the test for each individual child.

For full details concerning the tests as applied to deaf children in our schools, and as to conclusions drawn therefrom, the reader is referred to the psychological monograph of Pintner and Paterson which, as stated and worthy of repetition here, should be in the hands of every teacher of the deaf.† In this connection it may be added that the monograph deals with but three schools, Indiana, Ohio, and Philadelphia, the examination of the Kentucky school occurring after its publication; and the writer's references, of course, to tables, graphs and text of the monograph, deal with only the three schools except in some general conclusions. The same investigation was made in Kentucky as in the other states and the results simply corroborated the previous findings, so that conclusions drawn and norms established in the monograph apply equally to that state. Concerning the matter, Pintner and Paterson, in their supplementary report for Kentucky filed with the committee, stated: "The similarity of the results obtained by the two tests tends to strengthen our belief in the validity and reliability of these two tests. This is further brought out by the comparison of the conclusions arrived at in this report with the conclusions arrived at previously in the

* D. S. Test, the first given, followed later by the S. D. Test.

† Vide footnote page 19.

reports on the other three schools. In all four schools the two tests bore out our conclusions separately."

In the Kentucky school additional divisions were made as to mountain, city, and country residence, and it was found that on the average, the children coming from the mountains are of lower mentality than are those from the city or country; and that between the latter, there was no difference. The median retardation for the whole school (excepting the negro) was placed at five years, somewhat more than in other schools as the table will show. The curve suggests a number of retarded pupils around a retardation of seven years, larger than in the others, and indicates that Kentucky has a larger proportion of mentally retarded pupils. The tests were given to the colored pupils also, but the results were so low that they are not included with the results arrived at for the white children, and the examiners repeat for Kentucky, as for the other schools: "It is to be remembered that these two tests are testing *inherent native ability* for learning, and not anything that is taught in school, except insofar as the children are taught to write digits. The result of our tests, therefore, do not in any way reflect upon the methods employed in teaching, nor upon the ability of the teachers. They are merely tests which measure to some extent the kind of raw material with which the teacher has to deal."

CHAPTER XXVI.

SCHOOLS FOR THE DEAF.

The nomenclature of the class entitled to enter the special schools for the deaf is not a definite one, the terms deaf, deaf-mute, deaf and dumb, and mute, being used indiscriminately by the public, and frequently by those in authority in the school and by the deaf themselves. The varying degrees of hearing and speech possessed by many of them causes this confusion of terms and has at times apparently bewildered census-directors and takers as census reports have shown. The deaf may be classified generally into three groups—(1) *Deafmute*, one who is totally deaf and without articulation, or practically so for each, regardless of causes—(2) *Semi-mute*, one who is totally deaf, or practically so, but who once had hearing as well as speech which he now uses in fair degree either naturally or through training—and (3) *Semi-deaf*, one who has a fair degree of hearing and natural speech. In addition to these three *general terms* are others such as semi-deafmute, deaf semi-mute, and semi-deaf semi-mute, according to degrees of hearing and speech. In all cases the degree of deafness is such as to prevent those afflicted receiving proper education in the public schools. Hearing-mutes, ordinarily, are not admitted to schools for the deaf.* The tendency at present, however, is to refer to all classes as “the deaf,” and to their schools as “schools for the deaf,” irrespective of any special acquirement or degree of hearing,—and especially so since effort is being made to give articulate speech in some degree to all the deaf regardless of cause and degree of deafness.

The first school for the deaf in America was established at Cobbs, near Petersburg, Virginia, in 1812 by a lineal ancestor of the present Mrs. Woodrow Wilson, Col. William Bolling, who had two deaf brothers and one sister who were sent to Edinburgh, Scotland, for their education, and also, a deaf son and a deaf daughter, for whom the Cobbs School was established under the direction of a son of Thomas Braidwood who

* Vide Chaps. XXX-XXXI.

conducted the school for the deaf in Edinburgh. The wife of Col. Bolling was a sister of John Randolph of Roanoke who had another nephew who was deaf and had been educated abroad. Attending the Virginia school with the two Bollings was a great grandson of Richard Henry Lee, one of the signers of the Declaration of Independence. This school lasted but a short time owing to the inefficiency of the younger Braidwood who proved to be of dissolute character. Previous to this, an effort had been made to teach a deaf person or two in the New York Almshouse in 1807 by the Rev. John Sanford, but nothing of a permanent nature resulted. Really, the first attempt in America to teach speech to the deaf was made by one Philip Nelson in the neighborhood of Rowley, Mass., 252 years ago—1667. This was in the frenzied days of witchcraft and Nelson was "duly accused" with witchery "when he pretended to cure a deaf and dumb boy in imitation of our Savior by saying, Ephphatha." This boy was interrogated closely by the inquisitors-general, "but there he stood," says the church records, "like a deaf and dumb boy as he was—they could not make him hear, nor could he speak." And Mr. Nelson was saved! It is not known what his effort was, nor as to its success, but in those days when a successful oral teacher would have been "hanged or pressed to death" it is quite probable that there was neither much effort nor success.

In this connection an interesting sidelight is thrown upon the early years of the 1800's relative to charity and the education of the deaf, by Francis Green, a merchant of Boston (1749-1809) who had a deaf son educated abroad and was greatly interested in the welfare of the deaf, publishing several pamphlets concerning it. In 1805, Mr. Green wrote: "The philanthropy and charity of the present age seem to be elbowed off from the stage by the predominant speculations of the banking mania and the universal lust of lucre—neither compassion, humanity nor taste are likely to prevail." The earnest and vigorous agitation of Mr. Green and others for the education of the deaf, though appearing somewhat futile at the time, was to bear fruit abundantly at a later date.

In 1817, the first regular school for the deaf as we know them today was established in Hartford, Conn., by Thomas Hopkins Gallaudet whose son, Edward Miner Gallaudet (1837-1917) in 1864 established in Washington, D. C., what was

then, and is today, the only institution in the world devoted to the higher education of the deaf, Gallaudet College. Other schools similar to the Hartford School were rapidly established in other states and today (1917) we have 64 public state residential schools, (enrollment 11,723) 74 public private schools (enrollment 2,132) and 19 denominational and private schools (enrollment 454) with a total enrollment of 14,309 pupils and 1,944 instructors, and with buildings, grounds and equipment valued at over \$20,000,000. Since the Hartford School was established over 75,000 deaf people have been educated in the various schools; and who will have the temerity to assert that they have not contributed to the country's welfare as self-supporting, honorable men and women.

In the education of the deaf two distinct lines of cleavage are presented—the one relative to general methods of instruction and the other, relative to the nature and management of the schools. *AS TO METHODS:*—In general there are two methods and one system, viz.: (1) the Manual method (using the sign-language, finger alphabet and writing) of which there is a variation that may be called the “Alphabetic” wherein only the finger alphabet and writing are used, (2) the Oral method (using speech and speech-reading and writing) of which there is a variation that may be called the “Auricular” wherein special attention is given to retaining and developing residual hearing through which instruction is given as far as possible, (3) the Combined, or *American system* (a combination of all methods) in which the dominant idea is, “*Any method for good results—All methods and wedded to none,*” which had been selected by the writer as the motto of the Indiana school and was later adopted as its motto by the “Convention of American Instructors of the Deaf” in 1895 which, with a new constitution, was incorporated in 1897 by special action of the United States Congress. *AS TO THE NATURE AND MANAGEMENT OF THE SCHOOLS:*—The main question here is, whether there shall be day-schools as a part of the public school system whereby deaf pupils may remain at home and attend special classes (small and poorly graded generally) in the ordinary schools (not special classes for retarded, delinquent and defective pupils); or whether it is better that dependence shall be had upon state or other residential schools thus removing children

from their homes during the scholastic year (9 months) but giving them the advantages of larger numbers and equipment, better grading and industrial training, better moral, social, and civic training, etc., to be found especially emphasized in the state schools. The continuance of family life, the elimination of the fear of "institutionizing" children sent to the state schools (*which does not occur*) and the idea that speech and speech-reading may be more successfully taught and practiced, constitute a trinity of claims for the day-schools. As noted above there are only 3 per cent (454) of the present attendance of 14,309 pupils in denominational and private schools, 15 per cent (2,132) in the day schools, while 82 per cent (11,718) are in state institutional schools.

These questions of methods and schools have been discussed for many years—and will continue as questions for contention for yet other years to come. As "volumes" have been written to uphold the one view or the other, and mindful of the contentious Virginia professor who was said to have written a book to prove his views as to place of accent in the opening line in Vergil, *Arma virumque cano*, the writer will not undertake to argue the matter herein; it will suffice to say, that many claims and arguments, pro et con, (a la C. V. P.) have been advanced, some good and some bad. As a matter of fact, it may be cited that thirteen of the sixty-four state institutions follow the oral method; two, the manual method; one, the alphabetical method; and forty-eight, the combined system. Of the seventy-four public day schools, all follow the oral method excepting two which follow the combined system. Of the nineteen denominational and private schools, twelve follow the oral method and seven, the combined system. In all of the combined system schools over two-thirds of the pupilage is taught by the oral method; in nearly every school, the auricular method is used to greater or less extent; and the manual, or finger alphabet is used everywhere.

CHAPTER XXVII.

CLASSIFICATION OF DEAFNESS AND HEREDITY.

The inquiry is often made as to the number of persons born deaf (congenital deafness) and the number who have lost their hearing through disease and accident (adventitious deafness). In schools for the deaf, the only information concerning the matter is given by the parents, and in many cases they are more or less uncertain, for various reasons. As returned by them to the Indiana school from the beginning (October 1, 1844, to September 30, 1913), 2,600 (not including 169 "unknown"—6 per cent. of the whole and two-thirds of whom are probably congenitally deaf) about 39 per cent. were congenitally deaf and 61 per cent. adventitiously deaf, the latter including a large proportion (15 per cent.) losing hearing under one year of age, and a still larger proportion (20 per cent.) between one and two years—that is, 35 per cent. under two years—many of whom, no doubt, were deaf through prenatal cause.*

The line of separation between the two classes is more or less a shadowy one, the latter class (the adventitious deaf) being largely qualified by conditions. To such an extent is this true that a third class should be enumerated as "congenito-adventitious,"† to embrace all cases of deafness occurring after birth, *but in consequence of prenatal cause*, hereditary or otherwise. It is believed that this class will embrace a sufficiently large proportion of the so-called adventitious class as to make the congenital class and the congenito-adventitious class added together at least one-half, or more, of the whole, and chargeable to prenatal causes.

Deafness always results from a cause, and causes may be classified as follows:

* Of 141 pupils entering during the four years ending September 30, 1917, the congenitally deaf listed 52.5 per cent., those losing hearing under eighteen months, 20 per cent. This would indicate either that the number of congenitally deaf children is increasing contrary to statements made, or that there is clearer discernment on the part of parents and probably less hesitancy in reporting true conditions, thus indicating that the later increase may be more apparent than real. Vide footnote page 121.

† Deafmutes and Their Education, by the writer.—The Inland Educator, 1895.

Non-hereditary (probably 80 per cent.—congenital or adventitious)—Arrested development, or malformation; syphilitic, cancerous and alcoholic degeneration; tubercular and scrofulous affections; injury to the auditory apparatus caused by the use of instruments at birth, or before or shortly after the power of speech has been attained (sometimes long afterward to adult life) through certain infectious and inflammatory disease, trauma, etc. (providing no hereditary predisposition thereto can be established); parental conditions at time of conception (initial heredity?); and parental mentality (insane, epileptic, feeble-minded, idiotic) which may be ascribed to direct heredity, initial heredity, or non-heredity according to conditions; and

Hereditary (probably 20 per cent., arising from nuclear substance of the organism and due to germ-plasm of one or both parents)—Deaf ancestors and relatives; racial and environmental conditions; exceptional and forcible diatheses resultant of any of the foregoing conditions and affections enumerated under nonhereditary causes; and the transmissions of defects, malformations and acquired characters* through two or more generations, direct or collateral. Hereditary deafness usually develops at birth or in early childhood—but it may remain latent until adult life, or reappear in a succeeding generation.

In any discussion concerning the hereditary transmission of traits and defects it is to be noted that this influence of nature exerted upon offspring may come through parents, grandparents and preceding generations, the potency of each becoming less as the number of intervening generations becomes greater—that is, while the influence of a parent will be a half, that of a grandparent will be a fourth, of a great-grandparent, an eighth, of a great great-grandparent, a sixteenth, and for preceding generations, a thirty-second, a sixty-fourth, and so on. But the potency sometimes, through Nature's law of reversion (atavism), exerts a very pronounced influence upon offspring as shown in the sudden reappearance of a long-lost character of some remote ancestor, which is then commonly referred to as of sporadic or unknown origin; but which is as clearly hereditary and potent as if passed direct from parent to child.

* This question of the transmission of acquired characters has long been a mooted one, the consensus of scientific thought agreeing with the views of Weismann, Lankester, and His, that such characters are not transmissible, despite the fact that the opposite view is expressed by Spencer, Haeckel, and Turner, the first (S) declaring: "Close contemplation of the facts impresses me more strongly than ever with the two alternatives—either there has been inheritance of acquired characters, or there has been no evolution." Weismann, in agreement with DuBois Reymond, and others, declares "the hereditary transmission of acquired characters remains an unintelligible hypothesis, which is only deduced from the facts which it attempts to explain." Lamarck, with Darwin in seeming agreement, asserts that "external influences may lead to the transmission of acquired characters, that the smallest changes may be increased by summation in the course of generations into characters of the highest degree of importance." The thought is suggested here, what would have been the effect upon Darwin's theories had he fully known of the Mendelian Law contemporaneously discovered but remaining unknown to the scientific world for many years? In discussing this matter, the questions of innate characters, latency, and predisposition, arise to influence, or modify, definite assertions; and concerning predisposition, which must assume an innate character of latent nature, Weismann says: "An organism cannot acquire anything unless it already possesses the predisposition to acquire it * * * for every acquired character is simply the reaction of the organism upon a certain stimulus. Hence, I should never have thought of asserting that predispositions cannot be transmitted."

All hereditary deafness (and predisposition thereto) is congenital, *but all congenital deafness is not hereditary*, and this distinction and the fact that either may disclose at birth (usually so), or afterwards, on to adult age, should be kept in mind. To distinguish between the two is difficult, almost impossible in a very great number of so-called sporadic cases unless illumined by the family history of at least three or four generations; and more embryological and pathological knowledge than we possess at present is needful for true diagnosis. In any class of deafness there may remain some degree of hearing in one or both ears ranging from considerable to none at all, which certainly should be made use of.

Consanguineous marriages may prove harmful (usually so) because of accentuation of any taint that may be inherent in the family strain and too frequently result in deafness or other defects, or in combinations of defects. If the strain is free of taint, if desirable family traits and characters are distinctly clear, healthful and strongly developed through several generations, no harm is likely to come from such marriages; but of this latter condition we never can be sure because of marriage "running afield" and being induced largely through blind sentiment rather than reason, ignorance of family history, and because of latency of defect of some near or remote ancestor which may burst forth into activity when "nourished" by some similar strain in the family of the other partner, or, indeed, without this contributory cause, and due to exaggerated potency of the single family strain the origin of which is unknown.* And this same reasoning would interdict the intermarriage of those diseased, of those physically and mentally weak, and of those who bear the seeds of degeneracy from whatever cause. The very frequent deplorable results in offspring of such marriages should teach us to sedulously avoid them. And in giving consideration to "preven-

* Even though the hereditary power of the tenth generation backward exerts but 1-1024 influence of an ancestor upon one of the tenth succeeding generation, this diminished power may nevertheless "exercise influence over the development of the offspring, for the phenomena of atavism show that the germ-plasm of very remote ancestors can occasionally make itself felt, in the sudden reappearance of long-lost characters. Although we are unable to give a detailed account of the way atavism happens, and of the circumstances under which it takes place, we are at least able to understand how it becomes possible; for even a very minute trace of a specific germ-plasm possesses the definite tendency to build up a certain organism, and will develop this tendency as soon as its nutrition is, for some reason, favored above that of the other kinds of germ-plasm present in the nucleus. Under these circumstances it will increase more rapidly than the other kinds, and it is readily conceivable that a preponderance in the quantity of one kind of nucleoplasm may determine its influence upon the cell-body" (Weismann).

As to hereditary power and its continuance through succeeding generations, vide pp. 54-55 with footnote.

tion" of whatever nature, be it of deafness, or of mental, moral, and physical imperfections of any kind, the potential influence of "*Carriers*" presents a most important factor to be reckoned with—that is, advisement of parental relatives, of brothers and sisters, in whom the imperfection is carried in latent form, liable and likely to present itself at opportune time through improper mating or otherwise.*

The intermarriage of the deaf as concerns deaf offspring is a question of too great scope and of too many lines and qualifications to consider here, but briefly, it is believed, the following is a fair *general* statement of the matter:

TABLE No. 32.

<i>Intermarriage of</i>	<i>Deaf offspring.</i>
1. The hereditary deaf.....	Almost surely.
2. The hereditary and congenital deaf.....	Very likely.
3. The hereditary and adventitious deaf.....	Likely, unless overcome by potency of latter.
4. The congenital deaf.....	Liability.
5. The congenital and adventitious deaf.....	Likely not.
6. The adventitious deaf.....	Almost surely not.
7. The deaf generally, and hearing.....	Almost surely not, eliminating heredity.

No enumeration is made of congenito-adventitious deafness for obvious reasons, and the liability of deaf offspring from intermarriage of this class, or from marriage of this class with another, must be considered in connection with the other classes and will depend upon conditions, potency of defect, and the family history. In classes one, two and three, the hereditary deaf, the likelihood of *deaf* offspring is great and almost certain, although of diminishing degree from one to three. Conditions largely govern classes four and five, and the advent of *hearing* offspring in four, five, six and seven is to be expected in increasing degree from four to seven with it practically assured in the last two. It is needless to say that mental and physical conditions, deaf relatives, family history, causes and degrees of deafness, and potency, must be taken into account with all of the classes; likewise, Nature's law of reversion and the law of extinction—*vis medicatrix naturae*.

Marriages between the deaf generally and the hearing, and the probability of deaf offspring from such unions depends upon the family history as to deafness, or other defects of

* *Vide* Mendelism, page 60.

common origin, of both parties thereto. If there be no pronounced hereditary taint on either side, there probably will be no deaf offspring; but if there should be such a taint, then there is liability to such offspring, although in small degree. In 1,100 marriages between the two classes, ten per cent. of them resulted in deaf offspring—230 children out of a total for all marriages of 2,773—or eight and one-third per cent. being deaf. (Fay.) With a congenitally deaf partner of hereditary nature there is likelihood of deaf children; but where the partner is non-hereditarily (congenital or adventitious) deaf, there is no likelihood at all, presuming the hearing partner to be free of any taint.

As stated, hereditary deafness constitutes probably twenty per cent. and nonhereditary deafness, eighty per cent. of the whole. The offspring of the former (deaf or hearing) *carry* the cause of this defect of deafness, while the offspring of the latter (generally the deaf, sometimes the hearing), excepting about twenty-five per cent. thereof, do not. This would give us about forty per cent. of the whole who are liable to have deaf offspring, and these are largely included in classes one to four above, the hereditary and congenital classes; but in this connection it should be stated that the number of marriages resulting in deaf offspring, and the number of deaf offspring, will probably not exceed thirty per cent. for either, thus indicating that the cause of the defect is an expiring force, or, more likely, that many children carry it in a latent form which is liable to be transmitted in active force to a succeeding generation according to the Mendelian law, that is, that out of four children, one will be hearing, one deaf, and two will carry deafness in latency although born with hearing.

Hereditary and congenital deafness, and other defects, may occur together—blindness, epilepsy, feeble-mindedness, etc., all congenital—and probably are of common origin with deafness being epiblastic in nature; but these, and structural and other defects, sometimes accompanying deafness, are not due generally to the same cause as deafness, and the exciting cause of the former may result in deafness incidentally. As has been stated, “deafness and mental defects are not necessarily associated—they are seldom associated at all. There is no more connection between deafness and mental defect than

there is between lameness or blindness and mental defect." (Love.)

Some types of deafness do not appear until late in life, but, even so, in many cases it may be ascribed to prenatal causes, hereditary or otherwise, just as surely as deafness showing at birth or shortly afterward. These persons have *carried* the latent germ of deafness, as also do the hearing brothers and sisters of the deaf, and are "carriers" of the defect which may develop in any of their offspring, especially so if the deafness is of hereditary nature. In the latter case, hearing cousins of the deaf-afflicted are also carriers and may procreate deaf offspring. Considering these "*hearing-carriers*" of a latent defect among the hereditary and other classes, the adventitiously deaf, and many of the congenitally deaf who will not reproduce their kind; and considering further, the tubercular and scrofulous, and the many victims of infectious disease, etc., all of whom are possible carriers of defects resulting in deafness; then, how ridiculous such wild assertions as "sterilize the deaf"—"make it illegal for them to marry"—"shut them up in asylums"—"fine and imprison them for having children", etc.

In Indiana there are probably 3,600 persons known and referred to as deafmutes—and perhaps five times as many more not so known who are deaf in varying degree through prenatal cause. Now, without taking into account others of the general population who are physically diseased and mentally defective and liable to transmit their afflictions to offspring in the form of deafness, and considering procreative ages, we may safely assume twenty per cent. of the whole (21,600), or 4,320, as possible carriers of deafness. Multiplying the latter number by three (if deafness be Mendelian and recessive in character) to represent hearing brothers and sisters, and cousins of the hereditary deaf, who are also possible carriers, we have 12,960 to whom such laws should justly apply if heroic measures are to be adopted to stamp out deafness!—and this number may be considered as a very conservative one when consideration is given to Mendel's law concerning the transmission of varieties and defects, and to the fact that the State's enrollment of school children is 476,298 of whom perhaps one in every five has some defect of hearing. (Vide Adenoid Growth, page 220.)

And equally ridiculous is it to term them "degenerates", and to constantly compare them with the mentally deficient, the incorrigible, and the convict. The deaf are no more deficient in mind, will and emotion than is the general run of humanity. Sir Francis Galton, in his work on Hereditary Genius, assumes a normal line of average mentality with ascending and descending scales above and below the line, the upper leading to the illustrious, the lower to the idiot. Out of one million people he assigns 965,266 (96½ per cent.) to mediocrity—one-half above the line in three grades and one-half below in three grades, 48¼ per cent. for each.*

The loss of hearing through any cause during the first two years of life prevents the development of speech which is only acquired through imitation of sounds heard; if lost between two and seven years of age the speech acquired during the period will also be lost unless extraordinary care is taken to preserve it; and if lost between seven and twelve years of age the further development of the vocabulary will be arrested, and the preservation of acquired speech must be carefully maintained or it, too, will disappear, or become very defective.

Mental backwardness and physical depravity are commoner amongst the acquired and so-called sporadic cases than among the hereditary cases. When hereditarily deaf children are mentally defective, the cause is not the deafness, but some condition which causes both the deafness and the other defect. Heredity and degeneration are not the same thing, although there may be hereditary degeneration.

One of the greatest causes of deafness, if not the greatest, as shown by various tabulations, is meningitis in one of its several forms arising so often in scarlet fever and measles; and it is maintained by one of the greatest aural surgeons of England (Love) that when meningitis (often of syphilitic causation) attacks the internal ear, auditory nerve, or hearing centers, it generally results in total deafness besides wrecking to some degree both mind and body. He cites meningitis as, "the commonest cause of acquired deafness and probably of congenital deafness too." And speaking of scarlet fever, he says, "Now the ear disease following it, is not only infective and produces further cases, it is not only apt to return, to persist and destroy hearing, but in the long run

* Vide page 53.

it kills. The run is often a very long one. It may persist for five, ten, fifteen, twenty or even thirty years and then kill the patient by a brain affection. Every hospital surgeon knows this, and every aural surgeon has to operate oftener for the complications of the ear suppuration of scarlet fever and measles than for any other disease."

Dr. Bird Baldwin, in considering retardation from a psycho-etiological standpoint, refers to the residual case resulting from a severe or prolonged attack of cerebrospinal meningitis where, previous to recent methods of antitoxin-serum injection, large and frequent doses of drugs were administered. "In some of the left-over cases," he says, "no noticeable physical or mental after-effects may persist, but frequently the meninges of the brain may become so thickened as a result of the prolonged action of the disease toxin, and to the physical effect of the inflammatory exudate, that bundles of cerebral and spinal neurones may become so degenerated, or atrophied, that permanent scars leave the individual almost totally or partially paralyzed, with irreparable sense defects; on the other hand, the subject may become mentally deficient or retarded with few or many physical defects, or both. Mental deficiency of this origin has, as a rule, been pronounced non-educable by psychoclinicists and physicians, and no detailed psychological literature has been found available on the subject." (Vide page 241.)

CHAPTER XXVIII.

HEARING AND SPEECH.

In order to possess hearing there must be reception, conduction, and perception of sound-vibrations, and the auditory mechanism (pp. 168 and 243) is so constituted that each of three general divisions has its own peculiar function to perform. These three divisions, or parts, are commonly known as the external ear, the middle ear, and the internal ear—the first collecting the sound-vibrations and directing them to the second which in turn, through a chain of small bones, transmits them to the third wherein is found an expansion of the auditory nerve and a receptual center for the conscious perception of the sensation of sound. Following this conscious perception of sound, now held as word sound-images (referring only to hearing in connection with articulate language), comes motor excitation of volitional nature resulting in speech. Below is reproduced a description of this process of hearing and speech as given by Preyer. While there are differing hypotheses concerning the psychic development of these functions, the description of Preyer is given because of its clear and concise wording although it differs in detail somewhat from the theory set forth in following paragraphs.*

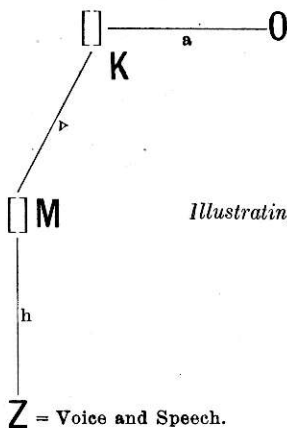
"The peripheral ear 'O' with the terminations of the auditory nerve is, by means of sensory fibers 'a' that are connected with the auditory nerve, in connection with the storehouse of sound-impressions 'K.' This is connected by means of the intercentral paths 'v' with the motor speech-center 'M.' From it go out special fibers of communication 'h' to the motor nerves of speech, which terminate in the external instruments of articulation 'Z.'

"The impressive nerve-path 'O a K' is centripetal; the expressive, 'M h Z,' centrifugal; 'v,' intercentral. When the normal child learns to speak, 'O' receives the sound impressions; by 'a' the acoustic-nerve exci-

* While Preyer's theory agrees in a general way with the one preferably accepted by the writer in succeeding paragraphs dealing with the psycho-physiological view of hearing, vision and speech, to bring the two into closer relation, and assuming proper aural reception of sound, let O, in Form L, represent the two auditory centers (general, and word), and K the auditory motor, or glosso-kinæsthetic, center; then, suppose in super-position to O and K, (cf. Form M, page 215) another primary couplet, O¹ and K¹, representing respectively the two visual centers (general and word) and the visual motor, or chiro-kinæsthetic, center, all six of them being closely related through fibre connections (commissures). As the theory of Bastian considers the kinæsthetic centers as identical with Preyer's "motor speech centers," M, the latter may be eliminated, voice and speech being given through the excitation of the glosso-kinæsthetic center resulting from impulse from without, or from the force of memory from within. (As to kinæsthesia, and bilateral development of centers, vide page 214 et seq.)

tations are passed along to 'K' and are here stored up, every distinctly heard sound (a tone, a syllable, a word) leaving an impression behind in 'K.' It is very remarkable here that, among many sounds and noises that impress themselves upon the portions of the brain directly connected with the auditory nerve, a selection is made in the sound-field of speech, 'K,' since all those impressions that can be reproduced, among them all the acoustic images necessary for speech, are preserved, but many others are not, e. g., thunder, crackling. Memory is indistinct with regard to these. From 'K,' when the sound-images or sound-impressions have become sufficiently strong and numerous, the nerve-excitement goes farther through the connecting paths 'v' to 'M,' where it liberates motor impulses and through 'h' sets in activity the peripheral apparatus of speech 'Z.'

FORM L.



Illustrating Preyer's theory.

"Now, speech is disturbed when at any point the path 'O-Z' is interrupted, or the excitation conducted along the nerve-fibers and ganglionic cells upon the hearing of something spoken, or upon the speaking of something represented in idea (heard inwardly), is arrested, a thing which may be effected without a total interruption of the conduction, e. g., by means of poison and through anatomical lesions.

"A tone heard is sung correctly, a sound heard is repeated accurately, with the same timbre, in the same pitch and about the same force; and yet the way, the path, must be open all through; from the vibrating tympanum through the auditory ossicles, the oval aperture, the fluid of the labyrinth, the cochlea, the auditory nerves, the auditory nerve ganglia, the fibers connected with the cerebrum, the auditory spheres, and the motor centers of the cerebral cortex, as well as the motor nerves for the laryngeal muscles. First, sound vibrations, hence condensation and rarefaction of the air; then vibrations of solid bodies, the tympanum and the auditory ossicles; next, vibrations of a fluid and of the elastic ends of the auditory nerves in the labyrinth; after this, nerve excitement; finally, transformation of this nerve excitement into the sensation of sound. Out of this arises the idea of tone, and then the will to reproduce the content of it; following this, motor command in the form of centrifugal nerve excitement, muscular contraction, tension of vocal chords, contraction of the glottis, exhalation—lo! the tone that has been heard! What a chain of complicated processes, which must all take place in a perfectly definite succession, in order to the existence of a phenomenon apparently so simple as the imitation of a sound heard, an 'A'! Yet so it is; and if a single link in this long chain is wanting—if the

internal ear is injured, or if the auditory nerve does not conduct, or if the cerebrum declines its office, or the motor nerves of the laryngeal muscles, or if these muscles themselves, are paralyzed—then the child does not learn to speak.”

With such a delicate mechanism for receiving and registering sound-vibrations and for the reproduction of sound-images, and considering further the many ills of inheritance, likewise the ills of a physical nature incident to childhood, is it not marvelous we do not find more deaf persons than we do!—persons totally or partially deaf from birth, or disease and accident, all with or without speech, according to cause, and time, and degree of deafness.

Makuen, in discussing the physiology of hearing and speech, says it has been a subject for investigation and study since before the Christian Era began, but that Helmholtz* was the first to really place it upon a scientific basis, “his resonance theory, with slight modifications, being the one now most generally accepted, the only important modification of the theory being the substitution of the tectorial for the basilar membrane as the resonance body. * * * Helmholtz located the perception of tone in the cochlea and its final analysis in the cerebral cortex—and, with few exceptions, physiologists have subscribed to this disposition of these functions. * * * The importance of hearing as a factor in the development of speech is of later recognition, and even now it is not generally understood. Spontaneous speech development takes place only as the individual is capable of hearing speech-sounds, both subjectively and objectively, and speech acquired in any other way is a forced and artificial product. A little hearing in the development of speech is better than no hearing at all, and hearing, like speech, may be improved by training.† * * * The eye is the best substitute for the ear in the development of speech, but the tactile and other avenues to the brain may be trained to take the place of either or both under favorable conditions, and in case of necessity. * * * The conditions favoring the de-

* Helmholtz assumed that the rods of Corti (Organ of Corti containing 10,500 rods and 21,300 hair-cells, each supposed to vibrate to a single sound) responded to different notes as do the strings of a piano, but when it was shown that some animals have no rods, he transferred this function to the fibres of the basilar membrane which, because of its peculiar structure, received the sound-waves and transmitted them through the hair-cells (resting upon the membrane) onward to the ramifications of the auditory nerve.

† “The sense of hearing is essential to the modulation of the voice, and this fact is of great diagnostic importance. It is a rule without exception in my experience that the so-called deafmute who learns to speak in modulated tones has some hearing power that may be improved by exercise.” (Makuen.)

velopment of speech in the absence of important receptive avenues to the brain, are chiefly cortical and they are included in the terms, intellectualism, attention, and volitional, or will, power."* The reference to residual hearing as made by Dr. Makuen suggests its great importance and the succeeding thought if we, in our school work with the deaf, are giving as much attention to aural training as we should: the writer fears not. (Vide page 234.)

The question, generally, as to the complex cerebral processes of hearing and speech with total or partial elimination of either, and involving thought with its equally complex processes, is one concerning which, while much is known of empirical nature through necropsy and deductive reasoning, much still remains obscure and uncharted requiring greater critical insight than has yet been given it, especially as to exact localization of certain functions in the cerebral cortex. The nature of this report inhibits, of course, any extended, or even satisfactory, consideration of such a matter at this time, and the reader is referred to the various writers with their various postulations concerning localization of brain functions. However, it is believed that brief reference to the matter may be of suggestive interest, and the following outline is presented of the scientific theory advanced by Bastian and others as to the localization of the cortical regions, or centers of hearing, vision, and speech, i. e.,—perception of sounds and visual images, apperception (intellectual perception), and memory-motive excitations,† all of which are closely involved in the production of articulate language. It is claimed that the potentiality of attaining to such a power is received by the child largely as an inheritance from many antecedent generations: that is, that while speech itself is an *acquired art* and not of spontaneous nature and possessed at birth, it is still a reproductive power governed by the laws of mental association and depending largely upon inherited structures which must undergo development in the child's

* Vide page 229.

† Memory-motive excitations come through the auditory, visual, and kinæsthetic centers in conjunction, and not through separate and distinct "psycho-motor" centers. It is insisted (a) that kinæsthetic centers do precisely the kind of work which cortical motor, or psycho-motor, centers were originally supposed to perform, (b) that there is no independent evidence whatever in favor of the existence of such separate centers controverting this view of the kinæsthetic centers, (c) that the glosso-kinæsthetic center is the cortical speech center and is composed of two parts most intimately related, functionally and structurally, one of them being the center for the oral mechanism, and the other the center for the vocal speech mechanism, and (d) that both the glosso-kinæsthetic and the visual-kinæsthetic centers are of limited autonomy acting only in response to definite excitations coming to them from the auditory and visual word centers.

muscular and nervous system during which period the child "is learning to speak."*

It is now generally believed that while the left cerebral hemisphere is especially developed in its power of excitation for acts of speech in right-handed people, and conversely for the left-handed — yet, the two hemispheres are equally provided by nature with centers for hearing and vision and with memory-motive centers directly connected therewith, although the one or the other hemisphere may remain undeveloped, or lie inactive, as to function. That is to say, there is *bilateral* perceptive accommodation for the hearing of sound (*general auditory centers*), for the registering of sounds of words (*auditory word-centers*), for vision of images of whatever kind (*general visual centers*), for the registering of the form of words (*visual word-centers*) and also, centers for the storage of memory-motive impressions corresponding with the articulation of different letters and words, or speech movements (*glosso-kinaesthetic centers*), and for the storage of memory-motive impressions corresponding with the writing and reading of different figures, letters and words, or writing movements (*chiro-kinaesthetic centers*).† This localization, therefore, gives us twelve cortical centers for hearing, vision, and speech, six in each hemisphere of the brain; but, as stated above, two or more, perhaps all, of these centers upon one side (especially the auditory and visual centers, and they nearly

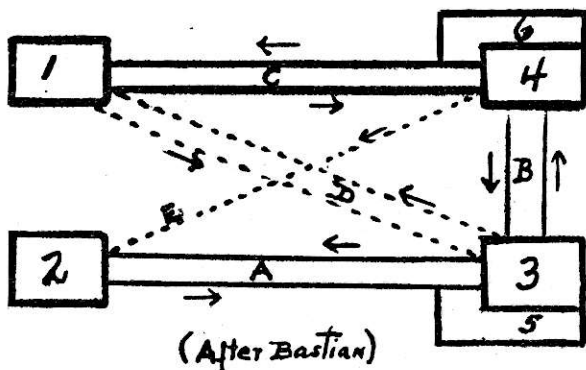
* "The young infant first begins to distinguish natural objects from one another by differences in shape, color, touch, odor, etc., which these may present to its different senses; it is then taught (slowly and with difficulty) to associate some object possessing certain combined attributes by which it is remembered, with a certain articulate sound which has been often repeated whilst the object is pointed at, till by dint of continual repetition this sound (or word) becomes so identified with the various attributes of the object that, when heard, it invariably recalls to memory the object of which it may now be said to form a kind of additional attribute, just as the sight or touch of the object will in turn call up the memory of the sound which has been employed as its designation. At first these articulate sounds (or spoken words) are only connected with external objects, though soon certain adjectives, signifying approval or disapproval (positive or negative *tonal feeling*—J), are added as qualifying sounds. By degrees the number of nouns and adjectives in use increases, and also other parts of speech are added. * * * The process of learning is the same in all cases, whether the spoken sound is to be associated with an external object, with an emotional condition, or with a conception of the mind: first, it is necessary that we should be able to recollect and identify, when again presented to the consciousness, either the set of attributes belonging to the object, the peculiarities of the emotional state, or of the intellectual conception; and secondly, that we should be able to recollect the particular vocal sounds which have been associated with these several modifications of consciousness when previously existing."—(Bastian.)

† *Kinaesthesia* is a compound word of Greek derivation signifying, generally, movement and perception; in psychology, it signifies the voluntary effort of sensations, considered as a form of perception, to transmit themselves through movement, i. e., as in sight and hearing for instance, in which the movement, originating in some cortical region, or center, is represented to the mind as seen or heard. Therefore, a *kinesthetic* movement is one in which the mental representation (image) is sufficient to induce its voluntary performance. The acquisition of such voluntary control over the muscle and nerve structure is due to *kinesthetic* images: and *kinesthetic* memory is the sum of such images representing movements of the mind, as in auditory, visual, tactile, and other sensations. As stated in a preceding footnote, *kinesthetic* centers may be regarded as identical in function and place with the so-called cortical motor, or *psycho-motor*, centers.

always so) may remain undeveloped to any notable extent, or lie inactive as to function, until disease, traumatism, or other cause acting deleteriously upon any center of the more developed side may require, through nature and educational effort, an "emergency" development of the corresponding center upon the hitherto less developed side.

The following diagram (with no reference to exact positions—vide text below) illustrates in a general way the relative positions of the four word-centers and their connections by means of commissural fibres for the transmission of stimuli: the chiro-kinaesthetic center is represented by 1; the glosso-kinaesthetic center by 2; the auditory word center by 3; and the visual word center by 4. The general auditory center is represented by 3-5, and the general visual center, by 4-6. There are supposed to be other commissures between the parts (and between corresponding parts of the two hemispheres) not shown here, and unnecessary for consideration in this brief reference to such complicated processes. The diagram as given is sufficient to outline the theory of the six areas, or centers of hearing, vision, and speech in each hemisphere and their principal connections tending to unity of action. The dotted lines (D and E) indicate possible but less habitual routes of passage of stimuli as referred to below.

FORM M.*



Now, as to the location of these various centers, it is assumed that approximately the general auditory center (3-5) lies just above the auricle of the ear about midway of the upper temporal convolution, with its associated special center

* Cf. diagram page 3.

(3) of later and slower development for registering word impressions or images, i. e., the auditory word center; the general visual center (4-6) lies slightly superior, and posteriorly, to the general auditory center, with its associated special center (4) of later and slower development for registering visual images of words, i. e., the visual word center; the glosso-kinaesthetic center (2) lies about the middle of the lower frontal convolution midway between the eye and the ear, opposite to, and slightly higher than the auditory centers; the chiro-kinaesthetic center (1) lies slightly superior, and posteriorly, to the glosso-kinaesthetic center, in the middle frontal convolution and slightly higher than the visual centers.

In some persons, it is stated that the glosso-kinaesthetic center may be stimulated directly through the visual word center (indicated by dotted line, E), as with the deafmute and the word-deaf (psychic deafness) in teaching them to speak in some degree if never having spoken, and in retaining speech, in whole or part, if once acquired and lost through disease or accident, by means of drill in speech-reading;* but in such cases, as in all others in which there is interference with the recall of auditory and visual images of words, and therefore of speech, the tactile lines to the brain become important media, "for without the sense of touch," according to Makuen, "we can have no kinaesthetic centers whatever, and the acquirement of speech would be quite impossible." It is this tactile center that replaces the visual center with the blind child. It is also believed that with some persons the chiro-kinaesthetic center may be stimulated directly from the auditory center (indicated by dotted lines, D) rather than from the visual center, as with the blind and the word-blind (psychic blindness). And in this connection, it may be further stated that a view of the speaker's mouth always better interprets his spoken words to the auditor through the joint and simultaneous action of his auditory and visual centers. Pathology tells us that all the recollections of a certain kind may be gone while the corresponding faculty of perception remains unimpaired—psychic deafness does not hinder hearing, psychic blindness does not hinder seeing.

A pertinent question arises at this point: What is the

* The writer considers this term far preferable to "lip-reading" which falls short of full explanation of the real action; "speech-reading" indicates this action in which the eye, facial expression, and varied bodily movement serve greatly to interpret the spoken word to one who cannot hear it and must depend upon the action of visual centers.

influence exerted by the visual and kinaesthetic impressions of chiology and forced and artificial articulation upon the mode of thought of deafmutes? Bastian states: "In the case of the deaf and dumb child taught to speak and understand others by means of hand and finger movements, their thought-counters would be combined visual and kinaesthetic impressions, or in the case of one who had been taught to read much from early life, they might be 'visual typographic images.'

* * * Thus the deafmute thinks in the main with revived visual symbols (either of hand or lip movement) and it is from the organic seats of these that excitations pass to related parts of the glosso-kinaesthetic center. A stimulation of these centers direct from the visual word center seems occasionally to obtain in persons who are not deafmutes." And to this dictum of Bastian, it may be added even in this day of wonderful progress and success in teaching speech to the deaf, that it is only with visual symbols—whether of hands, fingers, lips, chiro- and typo-graph, one or all—that the deafmute habitually thinks unless, having acquired speech prior to becoming deaf, he may still possess auditory images of spoken words. That he still possesses such auditory impressions is, however, quite improbable if deafness supervened in early childhood, for the reason that the intensified force of the visual impulse, or excitation, subsequent to the loss of hearing, would tend to certain diminution of the impulse of auditory images to the point of confusion (or, as James has stated in another connection, "a big, blooming, buzzing confusion") and memory loss. This same condition probably would prevail in some degree even with those who lose their hearing in youth and adult age. It is true that in some cases where there was speech prior to deafness, but where later "symbol-thought" became habitual, articulate speech will sometimes burst forth under emotional impulse, or stimulus, which, being of higher tension is stronger than volitional stimulus, i. e., in such instances, there has been under great stress a sudden revival of auditory word impressions in thought. But such "explosions" pass, and the subject reverts to his habitual mode of symbol-thought.* An occurrence of this kind is notable in that it

* An emotional stimulus may occasionally force its way along channels and against resistance which the volitional stimulus alone has been unable to overcome. Illustrations of this are frequently to be met with among persons who, from the effects of disease, have temporarily lost the power of speaking. Such individuals occasionally utter some word or short phrase under the influence of emotion which they are afterwards quite unable to repeat." (Bastian.)

suggests the possibility of "emotionalizing" the volitional impulse, or stimulus, with both the hearing-mute and the deaf-mute who once heard and spoke, however little the latter might be, for the purpose of the better teaching of speech. (Vide footnote, page 232.)

No normal person remembers how he learned to talk. From the time "whereof his mind runneth not to the contrary" he has possessed thought and hearing and speech, the first presumably because of the second and third, for a widespread prejudice declares "without verbal language,* no understanding, no reason." But that this is a fallacy has long been proved, and Preyer, in a general conclusion, as heretofore stated, truly states the case when he says: "It was not language that generated the intellect; it is the intellect that formerly invented language; and even now the human being brings with him into the world far more intellect (intelligence?) than talent for language."

Thought consists in the combination and separation of ideas which are sense-impressions qualified by sensations of time, space and causalty, which are the first efforts of intellectual activity. These, the new-born babe possesses long before verbal language, which follows in due order as one of the co-ordinate lines of intellectual development. But even if this line be wanting, if hearing and speech be obliterated, then there still may be constant and continued development of intellect by means of gestures, signs and written language, which, while rendering the task more difficult, answers in great degree the requirement that verbal language must exist before there can be that higher development absolutely un-

* Thompson, in his *Laws of Thought*, says: "Language, in its most general acceptation, might be described as a mode of expressing our thoughts by means of motions of our bodies: it would thus include spoken words, cries, involuntary gestures that indicate the feelings, even painting and sculpture, together with those contrivances which replace speech in situations where it cannot be employed." In speaking of articulate speech, which is the universal mode of communication and which is generally regarded as inseparably related with thinking processes, he adds: "Speech is, indeed, nothing else than a system of articulate words adopted by convention to represent outwardly the internal process of thinking." It has been maintained by some theorists, as referred to by Henri Bergson in his "Matter and Memory" (but with whom he does not agree), that speech is possible with only the use of concrete nouns, recalling visual and ordinary word images of things seen or heard, and that the injection of other parts of speech establishing the relationship and shades of meaning of these images are actually not necessary, and stand as "the refinements of a highly developed language." While such a "noun-language" was no doubt of the primitive form it must have caused a great degree of "guess-work" and increased mental effort (which was really the predominant stimulus resulting in the growth and refinement of language) to establish in the mind just what was the real idea seeking expression. As a matter of fact, however, every language, whether elaborated or crude in its extreme simplicity, leaves many more things to be understood than it is able to express. To the reader of these lines must occur the thought of the young and uneducated deafmute seeking expression of an idea in spoken, spelled, or written form of language than which his natural gesture language is far more expressive.

attainable by the feeble-minded and the idiotic, who are so, not because of lack of language, in whole or in part, but because of brain deficiency, lack of ideas, lack of sense-impressions co-ordinated in time and space. Deafmutes without hearing and speech have at their disposal "an elaborately developed mimic art that is extraordinary. They are pantomimists; and the height of culture such as a deafmute can reach proves at least that the existence of the intellect is not bound up with the hearing or learning of articulate speech."—(Preyer.)

Though the loss of hearing and speech is a serious inconvenience, nay, more, a serious handicap, yet in spite of it a goodly proportion attains to high rank in the arts, in general business and in the industrial trades. The late Dr. Frederick H. Wines bears further testimony when he writes: "The loss of hearing does not necessarily imply defective intelligence; on the contrary, many deafmutes have attained to distinction in various walks of life, notwithstanding their infirmity, and have successfully competed with learned and scholarly men and women, whose hearing was perfect." And a former president of the National Association of Charities and Corrections has stated that the deaf are not deficient in mind, as the imbeciles and feeble-minded, nor in will, as the paupers, nor in emotion, as the criminal or those with criminal instincts, and should not be placed in the general class of so-called defectives.*

* A. O. Wright of Wisconsin.

CHAPTER XXIX.

DEAFNESS AND ADENOID GROWTH.

It may be stated generally that most ear diseases (72 per cent) are caused by affections of the naso-pharynx and that perfect hearing depends largely upon free ventilation of the tympanic, or middle ear, cavity, which is provided for by nature through the eustachian tube. This middle ear affection may be of suppurative or non-suppurative process. Deafness may be due to impacted cerumen, foreign bodies, and miscellaneous causes in the external ear (3 per cent), or to affections of the labyrinth, auditory nerve, brain center or miscellaneous causes in the internal ear (25 per cent). It is believed by some that there is direct relationship between the ear and certain forms of epilepsy, gastroenteritis, and other diseases that are supposed to have their origin elsewhere, but which are caused by pent-up secretions of the middle ear. Chronic aural suppuration is often symptomless so far as the ear is concerned, and the experience of Ponfick, of Breslau, has been cited as corroborative of this condition. In the examination of the middle ears of 100 consecutive cases of infants dead under three years of age, and of whom only nine had exhibited rupture of the membranes or other external symptom of ear disease, he found 169 diseased tympana, 77 ambilateral and 15 unilateral. Another authority* reports that in 133 autopsies on nursing infants there were found only five cases in which the middle ear was free from exudation. Many of these 233 cases, no doubt, would have become deaf, and deafmutes, had they not died, as have thousands of others similarly affected who have lived.

The prevalence of defective hearing among pupils attending the public schools is far greater than is known and investigations in various parts of the country have disclosed from ten to thirty per cent of the number examined as having defective hearing. One report,† which may be taken as fairly representative of the condition, states that investigations in

* Simmons.

† Southworth.

many places tend to establish the following points: (1) that at least one child in every five has some defect in one or both ears; (2) that in the majority of cases neither teacher, parent nor child is aware of the defect; (3) that these children, usually accounted careless, inattentive, or positively stupid by parents and teachers who are ignorant of the real cause, become "repeaters" of grades and, as they grow in age and stature, are assigned to rear seats in the schoolroom where their chances of hearing are reduced to a minimum; (4) that a child who is hard of hearing can hear better at certain times than at others which causes misjudgment, and the common remark, "Don't tell me that Jimmie is deaf, he can hear as well as anybody when he wants to." Can anyone doubt that such children, unless placed under the care of a skilled specialist (the few) or under special training in a school for the deaf (the many) are left behind in the race and, discouraged, become indifferent and acquire a tendency down the scale to delinquency and perhaps, depravity? And in this connection it should be added that, as a general proposition and regardless of conditions, there is no child, excepting the lower classes of the feeble-minded, who does not have within him some degree of personal pride which can be appealed to with strong hope of response.

Another great fact brought out by investigations is the very rapid increase of defective hearing and sight in the early school years of the child, which culminates around the ninth or tenth year, a remarkable time in the life of the child, for at this period the brain has about reached its full weight and in its development is changing from increase in size to increase in function, while at the same time there comes sudden growth, increased strain upon the heart, and consequent fatigue.

How important, then, that parents and teachers should make and have made by the family physician (preferably by skilled specialists), careful examination of the pharynx and naso-pharynx, of the membrana tympani, and for middle ear inflammation and nasal obstruction—that there should be correct diagnosis and prompt and efficient treatment by means of excision of enlarged faucial and pharyngeal tonsils and nasal obstructions, and incision of the membrane for proper exudation if inflammation be found, in all diseases of infancy and childhood. Proper attention and treatment will probably

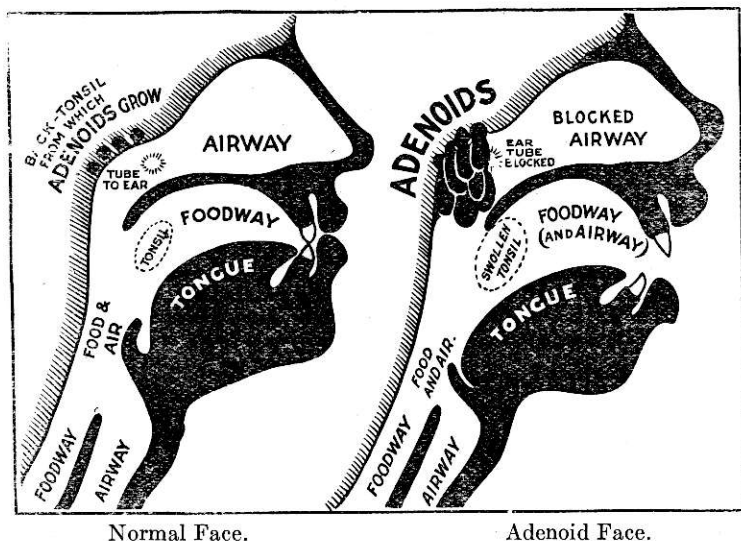
save the child's life and preserve wholly, or in some degree, its hearing and speech, for it is a fact that a child losing its hearing under seven years of age will almost surely lose its acquired speech unless strenuous efforts be made to retain it upon the part of the child, the parent, and the teacher.

In appealing to parents and teachers for constant and effective watchfulness generally in certain exanthematous and inflammatory diseases that always tend to affect the hearing (catarrhal affections, scarletina, meningitis, measles, mumps, colds, etc.), and without consideration of hereditary and adventitious causes of deafness, their classification and rate of frequency, etc., the various phases of which cannot well be considered within the scope of this report, there is one very common cause of deafness to which I wish to refer specifically, i. e., the occlusion, or closure, by means of adenoid growth (a glandular blood-filled mass) of the eustachian tube leading from the naso-pharynx to the tympanic cavity and through which is afforded the *only means for absolutely necessary ventilation of the middle ear*. The occlusion by adenoids of this tube, which is about one and one-half inches long and barely large enough in diameter at its middle part to pass a darning needle, is the primary cause of a very large percentage of cases of defective hearing; and with inflammation of the tube through disease, the two probably constitute a decided majority of all cases of adventitious deafness where not due to hereditary tendency which is certainly transmissible and susceptible of development through the action of causes not affecting one free of such tendency. Constant watchfulness and care will frequently overcome such a condition; *nature needs assistance*.

The adenoid growth, so baneful, so common in children and so prevalent everywhere, is easy of detection and easy of remedy if one has but eye to see and thought to act *before it is too late*; but delay usually occurs, or nothing is done at all with mistaken belief that it will finally disappear—as it does in later years, but not until almost irremediable damage has been done. While the growth is in the post-nasal space above the uvula and cannot be seen, it is indicated by one or more unmistakable symptoms: hypertrophied faucial tonsils, cough, croup, tonsillitis, asthma, epileptic seizures, repeated colds in the head, intermittent spells of deafness and of earache, diffi-

cult breathing and deglutition, mouth-breathing, irregular and protruding teeth, high-arched palate, swollen neck glands, discharges from nose and ear, frequent periods of malaise, and various other troubles frequently attributed to digestive disorders, etc.—and close attention should be given every one of them.

FORM N.



The accompanying cut (Form N) illustrates plainly the pernicious effects of adenoid growth. The face to the left is the normal face showing the natural back, or pharyngeal, tonsil from which the adenoid mass may grow in pendant form around, and sometimes into, the eustachian, or ventilating, tube to the middle ear as shown in the face to the right, the so-called adenoid face. In the one, the natural airway through the nostrils is wide, the roof of the mouth is properly arched, the teeth are straight, and the mouth is closed; in the other, the airway through the nostrils is blocked so that breathing must be done through the mouth, or foodway, which remains open for air, the faucial tonsil is swollen, exerting pressure upon the uvula, and gradual transformation has taken place in the structure of the face, mouth and teeth interfering with correct articulation among other things. Deafness of total or less degree may also be present—and

generally it occurs. It has been said that adenoids and tonsillar enlargement unattended to, will result in disease, deafness, and impaired growth, both physical and mental, and in the lack of moral stamina. "There is no condition or diathesis or disease which can abort the good, distort the beautiful, and prostitute the useful like the neglect of the adenoid condition; there is no medical or surgical transaction which will call forth more expression of gratitude and praise for the physician than this operation of tonsillotomy when successfully performed."

As stated above, Nature needs assistance; and with assistance as outlined, many evil conditions sure to follow non-attention will surely be avoided. *An effort is decidedly worth while—why not make it?**

* "No child," writes Dr. Harrison Allen, of the biological department of the University of Pennsylvania, "who does not breathe through the nose can be said to have a normal brain. The power of attention, the tenacity of the memory, the control of the emotions are all weakened. * * * The removal of an enlarged third tonsil (adenoid) from the naso-pharynx improved all conditions (referring to a case of excision) and the mental improvement indeed was greater than the aural. * * * *Instead of a brain of naturally poor quality there was found one whose functions had been simply in abeyance—a brain of retarded development, and not one which was blighted and could never develop.* * * * How many children are held as stupid, inattentive, if not imbecile, who are simply suffering from a congested brain?—a brain whose inflow of venous blood from the nose is greater than it can accommodate, and whose delicate cell structure is kept in an unnatural state. * * * Is it not reasonable to infer that under these conditions (blood congestion from whatever cause) the brain ceases to expand? It is not going too far, I believe, to make yet larger inference, namely, that children who are really defective in intelligence, whose brains cease to grow, and yet do not have diseases of the nasal chambers or of the naso-pharynx, may have as an essential cause some persistent interference with the return flow of blood from the interior of the brain."

CHAPTER XXX.

THE HEARING MUTE AND FEEBLEMINDEDNESS.

By the term, 'hearing-mute' is meant one who hears but cannot, at least does not, use articulate language; and, referring to the title of this chapter, it may be stated generally that, while many of the feeble-minded are hearing-mutes, all hearing-mutes are not feeble-minded in the estimation of the writer, some of them (a very small minority, perhaps), possessing intelligence reaching towards the average, and capable of making fair and worthwhile progress under special teachers of retarded or backward classes, in either the ordinary public schools or in our schools for the deaf—especially so in the latter where special educational methods are prevalent, and always will be, regardless of the effort to "public-schoolize" them. This question of hearing-mutism, if the term will be allowed by the critical, is so often presented to the superintendents of schools for the deaf by parents and others seeking entrance for children who hear but do not articulate (*"outside of this, as bright a child as you ever saw,"* they claim), it is felt that some brief consideration of the matter is called for in this report, not for the purpose of making positive assertions concerning the condition but with intent of presenting certain phases of it as will lead to further and more intensive study of a condition that now seems somewhat more prevalent than in former years.

Wm. Wade believed that not all hearing-mutes are feeble-minded, which belief he claimed was contrary to the opinion "always held by superintendents of schools for the deaf who were too prone to make assertions of feeble-mindedness, and surround themselves with a wall of prejudice to be battered down"; that some of the class are of average mentality; that there are as many idiotic deafmutes as idiotic hearing-mutes; and (strange conclusion for him!), that all hearing-mutes of any degree of intelligence should be sent to institutions for the feeble-minded.* Murdoch states that he has had no ex-

* This was not Mr. Wade's former opinion as expressed many times to the writer—that those of fair mentality should be sent to schools for the deaf—but which was changed later as a result of correspondence with Dr. Murdoch.

perience with "hearing-mutes with average mentality" as Wade asserted there are, and as the writer believes to be the case with a small minority of the class; and with Wade's belief that all classes of hearing-mutes should be sent to an institution for the feeble-minded Murdoch agrees, as the writer positively does not. Murdoch does not consider it any more of a reflection upon an individual that he be feeble-minded, imbecile, idiotic, or insane, than that he be blind, or deaf, or afflicted with heart disease, tuberculosis, or any of the manifold ailments to which mankind is susceptible. As to the afflicted individual himself, perhaps in some degree this may be true,—but what of his progenitors? As a matter of fact, however, there is serious reflection on the individual of some of the classes named resulting from the invidious comparison: popular opinion is oftentimes practical and harsh, not theoretical and sympathetic, and holds in disdain in increasing degree the feeble-minded, the imbecile, and the idiotic, however much the feeling may be tinged with pity for an unfortunate class. Carroll takes a more conservative position and believes that the child should be classified according to the *severity* of the mental and physical defects, and then sent to the institution best adapted to his needs. He speaks of the "border-line" cases (and they are legion!) difficult of diagnosis, and of that "backwardness" of an otherwise normal child which is sometimes mistaken for feeble-mindedness and imbecility. "How necessary," he adds, "that diagnosis should be made by one who knows what degree of mentality is required to constitute the normal and the subnormal child—and what, the feeble-minded, regardless of mutism."*

These views representing conflicting opinions in some degree are important, are worthy of deep study, and should be considered with great interest by those engaged in educating the deaf by whatever method. Will they endorse the views presented, in whole or in part? Will they agree that there is justness in the comparisons made? Eliminating later-year aphasia, is there a hearing-mute of average mentality? What is the cause of mutism, partial or absolute, in a hearing-

* From an educational point of view feeble-minded children have been classified by Dr. Ireland into five groups: (1) Those who can neither speak nor understand speech, and who have simply sensations which they do not reduce to perceptions. (2) Those who can understand a few easy words. (3) Those who can speak and be taught to work. (4) Those who can be taught to read and write. (5) Those who can read books for themselves. With such thought and classification indicating the scope of work with the feeble-minded, it may readily be seen that the star of educational hope for this afflicted class, not sinning themselves but sinned against, is indeed difficult of discernment.

mute? Can he be taught to speak—and if not, why not? Where should such a one of fair intelligence be sent—to a school for the deaf, or to an institution for the feeble-minded? Would environmental associations in the latter place be of depressive and repressive nature and prevent proper mental development and the acquisition of speech?*

The last two questions at once suggest the difference between the two institutions. Generally speaking, the predominant idea in a school for the deaf is to *educate* those entering as *students* along intellectual, moral, and industrial lines because of having been denied admission to schools for the hearing on account of their physical affliction of deafness. The object in view is to make of them self-supporting men and women of stout hearts, clear heads, skillful hands, and of good morals—heads of families, useful citizens, and of material worth to the State. On the other hand, and generally speaking again, the predominant idea in an institution for the feeble-minded is to care for and train feeble-minded children including the idiotic, the imbecile, and the moron, and the epileptic and paralytic—to *train* its *inmates* from a lower to a higher level checking as far as may be possible a general tendency to degeneration of body and mind.

While the motivating spirit of those establishing the first institutions for this class of children was to 'cure' the mental defects of many and restore them to social life, those now engaged in the work in such institutions, realizing how imperfect the results of the best training possible, believe that the greatest part of the real good to be accomplished for the class (perhaps, all the good) lies outside of strictly school work. The idea of curing feeble-mindedness and returning children so afflicted to social and self-respecting life has been abandoned—and the so-called 'custodial group' is being constantly increased both in theory and in fact, and looked upon as comprising cases for permanent detention, burdens to society to be kept in safe retreat because of their inability to care for themselves, to prevent procreation of their kind,† and who need for all time more-or-less constant supervision

* If it be answered that there is no such depressive or repressive influence on any particular inmate, then, it would seem to the writer that the child has, indeed, been properly placed as one possessing a feeble mind beyond the reach of the influence of things tending to higher and better life in the outside world. The very fact that one would be more happy and contented with such associations than with mentally normal children but proves the serious retardation due to feeble-mindedness.

† As to procreation, vide p. 236.

as to daily routine of life. Dr. David F. Lincoln, an expert in the treatment of the feeble-minded, some years ago in a comprehensive report to the United States Commissioner of Education concerning the class, said: "Typically, the feeble-minded child is weak on all sides—weak in perception, attention, memory, in power over number and language, in combination, in judgment, in mental endurance, and no less defective in touch, in hand-power, in general bodily activity, and constitutional vigor; but while a full definition comprises all this, we must acknowledge that in some cases the defect is only partial, while in others it is so concealed as to require a skillful judgment to detect it. If there be one thing which is pretty generally acknowledged as characteristic of the class, it is some form of weakness of practical judgment which renders its possessor unfit for independent life. A want of normal insight or self-control is equally disabling. * * * As regards the effect of training upon the higher grades of pupils (inmates) the attitude usually taken by experts is that feeble-mindedness is not cured by education; if a case turns out 'all right',—*then, it was a case of wrong diagnosis!* * * * Those of a higher grade of intelligence, when trained and taught, often show a degree of improvement which misleads to a belief in the child's recovery, and many such are sent out (from institutions) year by year at request of parents. * * * Their defects may re-appear after a trial, their want of self-control may lead them into difficulties, even crime * * * and a great many are sent back to reapply for admission after remaining outside a while." And these statements of Dr. Lincoln may be emphasized in greater degree today!

Mutism, the state of inability on the part of a human being to utter articulate sound, a lack by him of articulate language, results in a general way from four causes:—(1) mental inadequacy, (2) cerebral disease or accident, (3) defective or diseased vocal organs, and (4) deafness. In the first case, the muteness is generally the result of the absence of ideas, or of reflex actions in the motor organs of speech; with the former, imbeciles have nothing to say—with the latter, they have no desire to speak. In the second case, at times accident or cerebral disease of aphasic nature may result in partial or complete loss of the power of articulate speech though

the other mental powers and the vocal organs may seem unimpaired; however, in some cases there may also result in connection with the loss of speech an impairment of the visual centers leading to partial or complete loss of the power of writing, with confused spelling in the former condition. In the third case, muteness may result from impairment or destruction of some part, or parts, of the vocal organs through accident or disease of aphonic nature, or because of imperfect development, ante-natal or post-natal. In the fourth case, that of deafness, either congenital or adventitious and from whatever cause, the mutism is, it may be said, directly the result of deafness—not hearing sound it is, of course, impossible to imitate it as must be the mode in natural speech, and presents a clear case of cause and effect. However, mental inadequacy to the point of imbecility may co-exist with deafness thus accentuating resultant mutism; but mental inadequacy and deafness are wholly separate conditions, and neither one is cause or effect of the other.

Speech is the result of complicated processes occurring in perfectly definite succession as we have seen. There must be mental perception of sound heard from without (sound impressions) involving centripetal nerve excitement of the auditory mechanism from membrane (ear drum) to mental perception center: or of something represented in idea heard inwardly (volitional recall of sound images, or impressions). Then, there must be will to reproduce the mental impression followed by motor command in the form of centrifugal nerve excitement, muscular contraction, tension of vocal cords, contraction of the glottis, exhalation—and then, the expression of the sound of what was heard or thought. The seat of the faculty of speech, as the phrase goes, is generally supposed to be in the lower frontal convolution of the left hemisphere of the cerebrum with right-handed people. Necropsies have shown softening or other lesions of cerebral nature interfering with the exercise of both will-power and speech-center. Impairment of speech may follow severe injuries to the cranium—blows, falls, use of instruments at birth by unskilled accoucheurs, etc.—and the presence of tumors. Infantile paralysis is chargeable with defects of speech, and scrofula is cited as of most baneful influence. Loss of speech resulting from brain lesions (aphasia) may be of either congenital or adven-

titious nature; if the former, through lack of perfect cerebral development, it is organic, or structural, and probably irremovable—if the latter, it may be functional and transient, or organic and usually hopeless. It may result from occlusion of a blood vessel of the brain by a clot, which may be absorbed in time with return of speech; or terminate in paralysis, or death.

And the same general division made above may also be made for loss of speech due to laryngeal defects (Aphonia). There may be ulcerative destruction of the vocal cords, tumors, etc., of the larynx, or paralysis of its muscles or their nerves. In those of hysterical nature there is apt to be enfeeblement of the vocal power: and attacks of aphonia, ranging from whispered articulation to absolute loss thereof, may occur from time to time, the affliction frequently lasting for days together. Aphonia and mutism are most intimately related, and the oral and vocal speech mechanism are probably concerned in all speech whether it be sonorous or whispered. Aphonia may lead to mutism, and defective innervation may cause either.

The writer knows of a case of aphasic nature where speech was lost in an adult who regained it only after long and arduous trial. Caused by a depression with pressure in the left hemisphere (cause unknown) over the seat of the faculty of speech, or by a paralytic scar across the nerve-fibres connecting the auditory and visual word-centers, he lost the power of expression by both speech and writing, although retaining the powers of reading and thought without any apparent diminution thereof. In slowly regaining the lost powers of speech and writing he had to relearn as a child, developing the dormant word and speech-centers of the right hemisphere; and in writing was prone to make many mistakes in the spelling of words.

In another case of personal knowledge, a bullet of small caliber entered the head near the outer corner of the right eye, pierced the bone and, with upward course, passed through, lodging just above the temple. The bullet was not removed for reasons and no evil result was presented until eight years after the occurrence. At that time there appeared some hesitancy in speech as if due to lack of mental control

over the vocal organs. When in tranquil frame of mind there was no indication of this hesitancy, but with overwork or worry of any sort, it became pronounced. Dr. Nicholas Senn, of Chicago, was consulted and the bullet located by means of the Xrays. Dr. Senn stated that the trouble was due to pressure of the bullet upon the optic nerve causing vibrations thereof which affected the entire nervous system, resulting in the hesitancy of speech as a symptom. This condition lasted for nearly a year during which time several convulsions occurred. After a year's time the condition again became normal and has so continued despite the fact that the bullet has never been removed.

Defects or abnormalities of the vocal organs, it may be stated generally, may exist as cause or effect of other conditions, mental or structural, and result in partial speech (imperfect or limited), in convulsive speech (stammering), or in no speech at all. Dr. Harrison Allen writes concerning this matter: "The jaw may be under-developed or over-developed, the tongue may be shortened, there may be defect of the size of general efficiency of the tongue, and resultant failure in reaching the roof of the mouth at its anterior part—there may be lack of development of the larynx, enfeebled condition of soft palate and pharynx (diphtheria, scarlet fever, etc.), a "strain" in the muscles of the vocal organs, faulty nerve supply, and many other phases of interference with laryngeal and lingual movements."

Now, with these thoughts before us, with consideration of the causes of deafness, of adenoid growth, of the location and interconnection of the auditory, visual, and kinaesthetic centers, and generally of organic and structural *impedimenta* of mental and physical nature: and giving attention especially to the "border-line" cases referred to by Carroll, wherein it is almost impossible to make absolute and correct diagnosis—it well may be taken for granted that in some cases, however few it may be, hearing-mutes are of average intelligence and should be classed, not as feeble-minded but as normal although greatly retarded and very backward in speech and mental attainments. In some of the cases of hearing-mutism presuming fair mentality, abnormalities of the vocal organs or of speech and school progress generally, may

be overcome in varying degree by natural or artificial means. What is the existing condition of the hearing-mute child? Perhaps it may be bettered!*

While it is believed that probably a very great majority of hearing-mutes are feeble-minded to such extent as not to be able to make satisfactory progress in schools for the deaf, yet, it is also believed that there are cases where the mentality is such as to call for and justify their acceptance into such a school where they may receive an education under the care of a special teacher in the beginning, later, in the regular, classes. It would seem only just that a hearing-mute apparently of fair mentality should at least be started in such a school and be given a good, fair trial for speech and education through speech and other means. Just where to draw the line of separation with the school for the deaf with its educational care upon the one side, and the institution (practically, asylum) for the feeble-minded with its custodial care upon the other side—is, indeed, a difficult problem in some cases; but in its consideration it is well that we should bear in mind the number of mentally weak pupils now in our schools, and Tilden's dictum as to cases of wrong diagnosis, likewise that of Harrison Allen† as to functions of the mind held in abeyance. In this connection the writer recalls two small colored boys who were brothers that were sent to him some years ago. Although possessed of very good hearing neither could make use of articulate language which they understood in some degree when addressed to them, yet when together as was always the case, by means of a "chattering noise" in treble scale and suggestive of the sounds emanating from monkeys and birds, they seemed to thoroughly understand one another. No information as to the cause of the

* In regard to the important class of cases in which children are brought to us because they have never spoken at all, these will be found mostly to belong to one or other of two categories: either (a) the children have been liable to fits in infancy, or (b) the children are semi-demented or semi-idiotic. It is important to bear in mind that some of the children belonging to the first of these classes may, as I have known, remain perfectly dumb up to the fourth, fifth, and even the sixth year, and then begin to talk, making rapid progress till all defect disappears. I have previously referred to two very remarkable cases of this kind in which the children did not begin to speak till six and eight years old respectively, and then, after a very brief interval spoke quite well, though they had been untaught in the ordinary sense of the word. In the second class of cases there is generally not much ground for hope, though occasionally marked improvement does take place when continuous efforts are made, and the attention of the child can be aroused. * * * In the Eastern Counties Asylum for Idiots (England), one boy supposed to be a deafmute was heard one night to sing a chant which had been used at public worship, pronounced the words distinctly, and giving the tune correctly. Another boy, also passing for a deafmute, broke into a violent passion on account of something on his slate being rubbed out, and demanded of another boy why he had done it."—(Bastian.)

† See footnote, page 224.

condition could be gathered of the parents save that, "they were born so, had always been so, and that each understands the other's 'talk'." These boys certainly were not feeble-minded to any serious extent and were doing fairly well in school in the regular beginning classes (kindergarten and first primary) when, after a few months, they dropped out of school and trace of them was lost. They had rightly been placed in a school for the deaf, and had they remained for two or three years longer there is no doubt but they would have made fair progress, to say the least of it, in the regular school work.

This whole subject dealing with abnormality of mind is one fraught with great possibilities and responsibilities (the latter especially upon educators), and one which should receive deep and serious study. It is a question to which superintendents of schools for the deaf especially must give more and more attention. Dealing, as they do, with questions of deafness and mutism, the one or the other, together or separately, and resulting from whatever causes, there seems to be a growing necessity for their taking into consideration the causes producing these conditions, and therein, of defective mind and word and speech centers, abnormalities thereof, and causes leading thereto. Cause and effect must be considered together before we may properly apply the remedy for the deficiency and attain the best results in the way of education.

Backwardness in a child is sometimes mistaken for feeble-mindedness or imbecility. Backwardness is often the result of the child's early environment. It receives no attention, "it just grows," and, as usual in such cases, the surroundings are such as to retard rather than stimulate mental activity or development; and should a child reared in the midst of such environment be so unfortunate as to be afflicted with deafness or mutism, natural mental growth would be stunted almost, if not quite so, to the point of the child being declared feeble-minded or idiotic. Such children, however, respond quickly when removed to a healthier atmosphere and proper training methods are applied, and it will depend very largely upon the correctness of the diagnosis made at this time as to what the child's future will be. How necessary it is, therefore, that this diagnosis should be made by one versed

in the science of the powers and functions of the mind and who is merciful enough to extend the subject the benefit of doubt.

As pertinent not only to the preceding paragraphs dealing with hearing-mutes and feeble-mindedness, but also to what has been said in a preceding chapter on hearing and speech and especially as to correct aural training, it may be stated that if a child can hear speech but is unable for any reason whatever to give attention and thought to what he hears, his hearing will be of no value to him and the acquirement of speech will be impossible. In this connection it has been stated (Bezolt) that many young children who become deafmutes have had in their first years some hearing power (may still have) which, for various reasons, may have failed either to develop normally or to be of sufficient strength to be of value as a means for mental conception of sound—they heard but did not understand—and prophylaxis and aural training *through the use of the speaking-voice* would have aided them in retaining in some degree both hearing and speech. It is known that even an adult person being partially deaf from whatever cause, may become entirely so by a lack of the exercises of the function of hearing—and this is especially true of partially deaf children (and perhaps of some hearing-mutes) because, never having experienced the advantages of acute hearing, they have no incentive to give attention to sounds that are not clearly audible to them. They may have a fair degree of hearing power and yet lose it from disuse. They do not hear enough of the conversation about them to attract their attention and cause them to reflect upon it, and consequently, they have no inducement to continue to listen. The inevitable result of such a situation is atrophy of the nerve tracts leading to the auditory and glosso-kinaesthetic centers of the brain, and probably a lack of development of these centers themselves—there is no clear perception of sound, and there are no sound nor word memories stored up in the brain upon which the development of speech depends. And the remedy is, it may be repeated, prophylaxis and aural training through the use of the speaking voice.

The condition of feeble-mindedness is so closely associated with gross mental, moral, and physical degeneracy in the minds of the people, and is so frequently referred to by

us in our work with deaf children, by those engaged in the education of hearing children, and in sociological studies and reports by the learned and the unlearned, the writer believes the following views, some of which run decidedly contrary to prevalent thought upon the subject, may be of interest and worth to the earnest seeker after the truth. At least, they may serve in leading one to more intensive study of the condition and cause us well needed hesitancy in making, or in receiving as truth, certain dogmatical assertions as to the degree of possession or non-possession of mental faculties by those referred to in a most broad and general term,—the feeble-minded. In this connection it may be well to refer to the concluding paragraph of Chapter VI, wherein it was stated that the application of the Binet-Simon test as revised by Goddard seemed to exaggerate the number of feeble-minded children and the degree of feeble-mindedness, and that the three per cent. rule of Pintner would give more just results.

Dr. J. Victor Haberman, of Columbia University, in discussing the results of mental testing by the Binet scale, writes: "The curves and correlations given in such abundance by those testing for feeble-mindedness among institutional delinquents, among inmates of prisons, reformatories, etc., are most unreliable; and the constant citation of these figures only helps to obscure the issue. * * * This sort of statistics were given in a dozen studies on delinquency at the meeting of the American Psychological Association a year ago (1917). The method of acquiring these statistics was readily enough perceived in these papers. The Binet testing hysteria has written the word *feeble-mindedness* so large in the minds of all 'testers' that nothing else is seen or sought for. One would almost think there was no other mental abnormality, but feeble-mindedness. And if these examiners knew of any other cause of delinquency than feeble-mindedness they surely did not divulge the fact in their papers, for the word psychopathology was not mentioned, and diagnosis had but one single meaning—something got to with Binet tests! And yet it seems the consensus of opinion among Continental authors (among whom the Binet hysteria has haply not broken out) that feeble-mindedness has in itself nothing to do with delinquency—that psychopathology, environment, suggestion, poverty, etc., are the preponderant causes. * * * If a

kidney is diseased, the urine is analyzed—and microscopically examined—and through the findings one determines the nature of the pathological condition obtaining. There are but a half dozen types of kidney abnormality—and *scores of different types of brain disorder*. Are we to disregard the fact? Are we blindly to accept a patently false hypothesis to the effect that abnormality of mind is always one and the same, namely, *defect*, and that this is to be measured in quantitative gradations from a supposed norm (hence the everlasting 'idiot', 'imbecile', or 'moron!'), and furthermore, that this defectivity is a homogeneous thing affecting the mind generally, like a saturation? The Binetist does, and because of it a decade of Binet testing has added not a whit to our knowledge of mental pathology, diagnosis, or therapy."

A belief that is generally held by students of heredity, and one thoroughly believed by the writer, is, that according to Nature's law of procreation, as a general proposition, like begets like, and exceptional variations are of sufficient rarity to cause comment and investigation tending to emphasis of the general law. It is believed that feeble-mindedness falls well within the limitations of this law and that the procreation of children by feeble-minded parents will result in feeble-minded offspring. Yet, such results are controverted by some students of psycho-genesis, concerning which Haberman writes: "Whenever there is an apparent lack of knowledge, feeble-mindedness is assumed. In several such studies I have seen, as well as in papers relating to feeble-mindedness, one constantly hears of the feeble-minded procreating feeble-minded—as if *feeble-mindedness were hereditary!*" And he then quotes from a report of the New York Committee on Feeble-mindedness, as published in the Journal of the American Medical Association (December 1, 1917) which reads: "One of the greatest causes of feeble-mindedness is heredity, and the birth rate among the mental defectives is found to be approximately twice that of the normal population." To this assertion Haberman strongly demurs and says: "The majority of cases of feeble-mindedness are congenital, or natally and postnatally occasioned—not *hereditary*—and according to Weismannism, and the facts in general, such feeble-minded *do not* reproduce their kind. * * * There are stigmata of syphilis, of rickets, and so-called stigmata of degeneracy

(more properly termed stigmata of hereditary taint). These latter occur singly here and there in normal individuals. They are more frequent in psychopathic constitutions, and especially in certain individuals who have a severe psychopathic, or convergently psychopathic, heredity (degenerative psychopathic constitution). But these stigmata* have no connection with feeble-mindedness, though they may be found in such cases that are feeble-minded through vicious hereditary strain. Finally, they have been found even numerous in individuals who have little or no mental abnormality, and again they are often wanting in individuals who are most abjectly psychopathologic.

* In reply to Terman who asserts that the stigmata which Lombroso thought to be ear-marks of criminality, are rather the physical accompaniments of feeble-mindedness and that they have no diagnostic significance except insofar as they are indications of mental deficiency.

CHAPTER XXXI.

MUTISM IN OTHERWISE NORMAL CHILDREN WITH REPORT OF CASE.

There is an ever increasing interest on the part of the profession concerning the various phases and psychopathological aspects of mutism, and it is coming to be recognized through research work and differentiation that there is real necessity for getting away from *over-generalization* (or even, generalization) which too often takes for granted things that are not true. This may be postulated not only of mutism, but also of abnormality, and generally, of the education of the deaf, and of special classes in schools for the hearing wherein generalization too often shadows the real psychic and pathological conditions. Few will assert that normal brains mature alike generally, or have average similar abilities. Even the ordinary man is aware that some excel in certain abilities and are greatly lacking in others. We all know people in whom the most exceptional excellence is found alongside of general mediocrity which, as established by Galton and others, comprises about nineteen-twentieths of mankind as measured in terms of super-excellence. With this view of the matter, the writer believes the following report of a most interesting case by the late Dr. Makuen will prove of real worth to superintendents of schools for the deaf: and because of its importance in that it suggests the opportunity of similar work with others who, under broad generalization, would have been thrust aside, it is given in full. Dr. Makuen, lately deceased, was greatly interested in the matters of deafness and speech, and in the education of the deaf, and his untiring research work along these lines, duly reported to the national associations of his brethren, was exceeded by none other. In personal conversation and correspondence with the writer concerning this and other cases coming under his observation and treatment, he always evinced great enthusiasm and ability in pointing the way to ameliorating the afflictions of deafness and mutism. The report follows:

* By G. Hudson Makuen, M.D., Philadelphia. Read at a meeting of the Southern Section of the American Laryngological, Rhinological, and Otological Society, held in New Orleans, La., February 16, 1912.

The ever increasing interest in the deaf child, not only in our own and allied special societies, but in the profession at large, has led me to write of the possibility of mutism in children who are not deaf and to report a case illustrating this possibility.

Mutism denotes the absence of speech and speech is the oral symbol of language. The deaf child has no language which is at all comparable with that of his fellows, and therefore, he has no speech or oral symbol for the expression of language. In other words, he is mute. Likewise, the idiotic or the imbecile child, having little or no language, and no conception of language, may also be mute. When, therefore, a child fails to develop speech in the second or third year, we begin to think that he may be either deaf or feeble-minded, or possibly both deaf and feeble-minded.

There is, however, another possibility, although a less likely one perhaps, and it is that he may be neither deaf nor feeble-minded, but only idiopathically mute. He may be in full possession of his child language, and yet be utterly unable to symbolize it in speech. He differs from the deaf child in that he both hears and understands, and from the feeble-minded child chiefly in the degree of the understanding of what he hears.

The physiologic explanation of this condition is found in the fact that although the child hears well and is of normal mentality, the auditory cortical impressions of words heard are not sufficiently strong to arouse and propagate through the somewhat sluggish communicating nerve tracts the motor impulses requisite for the development of the articulatory mechanisms. The child hears and understands speech and is mentally alert, but he is mute because he lacks the one thing necessary to the development of speech, viz., the motor impulse. On the other hand, the motor impulse may be of normal, or nearly normal intensity, and yet not be sufficient to start the machinery of speech, because of certain peripheral obstructions, of which enlarged tonsils are a type. The obstructions to articulatory movements may be so great that the somewhat indifferent psycho-motor impulses simply cannot overcome them. The machinery seems to be out of gear, the engine will not start. The trouble may be in the carburetor, in the magneto, in the sparking plugs, the cylinder valves, the clutch, or the transmission. At all events the differential diagnosis is an exceedingly difficult one.

The pathology of idiopathic mutism, must be looked for in the organs of speech themselves, and chiefly, perhaps, in the central mechanisms, although the immediate or proximate cause of the difficulty may be found in the peripheral mechanisms.

In illustration of this fact, I beg leave to report the following interesting and unusual case:

The patient was a well nourished lad of six years with a history of never having talked at all. A four year old brother had not commenced to talk, and his mother had a marked peculiarity of speech. She was said to have had brain fever when a child, and this left her with impaired mentality as well as defective speech. In other respects, the patient's family history was good, and barring a rather irritable temper, which was probably the outgrowth of his inability to talk, his mentality seemed to be quite up to that of the average boy of equal age. He had never had a severe fright or injury, and he had entirely escaped the infectious diseases of childhood. There were no physical signs of degeneracy, and the reflexes were normal. The alveolar arches were well formed, there was no especial malocclusion of the teeth, the laryngeal examination was negative, and the nostrils were free, although there seemed to be some difficulty in breathing, and it was found that he had very large faucial and pharyngeal tonsils. The boy could neither read nor write, of course, and at times when he desired most to express his feelings, he could only with great effort ejaculate a repetition of the single sound ah—ah—ah.

From the foregoing clinical history, it would appear that the patient probably inherited a weakness in the psycho-motor speech centers,

which rendered them unequal to the task of overcoming the tonsillar and adenoid obstructions in the peripheral mechanisms of speech. In all other respects he seemed to be a perfectly normal boy, but so great was his disability in this respect that his grandfather, in whose care he was at the time, concurred with me in the belief that unless something could speedily be done for him, he would forever remain dumb.

As a preliminary measure in the treatment, of course, I advised a removal of the peripheral obstructions, and after the tonsil and adenoid operation, the child was immediately placed under special instruction with a view to overcoming his disinclination or inability to talk.

He was at first put in a room with a few others doing similar work, although in a more advanced stage. He was partially ignored in the beginning and allowed only to observe, in order that he might the more fully appreciate his shortcomings and feel his inferiority. As soon as he began to take notice and evince a little interest in the proceedings, he was shown how to do some of the simpler things that the others were doing, such as making the respiratory movements, preparatory to their use in vocalization; and then employing the same methods which are used in the teaching of deafmutes, he was gradually induced to make the particular use of the mechanisms which is necessary for phonation and articulation.

The work that we did with this boy is somewhat similar to that of cranking a refractory automobile, and it took quite as much patience. After a few fruitless revolutions of the engine, if we are wise, we cease our cranking and start in to look for the cause of the difficulty. When we have discovered the cause and removed it, the engine immediately starts on the first revolution, and takes the strenuous work of cranking entirely out of our hands. So it is with these children. As soon as the obstructions to speech development are removed and they are once started in the right direction, nature takes up and completes the work in a very rapid and satisfactory manner.

I have described this case somewhat in detail, because it is the only one of the kind, so far as I know, in which the results of treatment have been so altogether satisfactory. In a single year the boy has learned to talk freely, and he is now going to school with hearing and speaking children.

It may be worthy of note also, that the special treatment, including the operation, covered a period of only seventeen days.

CHAPTER XXXII.

TWO BRIEFS—MENINGITIS AND DEVELOPMENT OF SPEECH.

At one of the meetings of the committee we had with us Dr. Bird Baldwin, then director of the department of psychology and education of Swarthmore College, and Dr. G. Hudson-Makuen, always interested in the education of the deaf, who delivered addresses, the former upon "Psycho-Etiological Study of Meningitis and Educational Development," and the latter upon "The Physiology and Psychology of Hearing with Special Reference to the Development of Speech." These addresses, heretofore referred to, were most interesting and instructive, and it is believed that further brief reference thereto will be of equal interest and instruction to the reader.

Dr. Baldwin, in speaking of mental and physical retardation following cerebro-spinal meningitis, said, "My own observations lead me to believe that any scale that measures a deficient child in terms of the normal child overlooks certain characteristic traits, certain stages and nodes of mental maturation, and possibly certain acuity of sensory-motor reactions which must be taken into consideration. In short, a mentally defective child is not simply a younger normal child as an uncritical application of the Binet scale, or any other, would indicate. Again, mentally deficient children of a given general mental level may differ in traits and capacities among themselves very decidedly according to the cause of retardation."

Meningitis, in some of its varied forms, more particularly cerebro-spinal meningitis, being so largely a cause of congenital and acquired deafness, due perhaps in many instances to specific poison in the blood which may become operative before, at, or after birth (sometimes long after) and manifested frequently by spasms, or convulsions: and the ravage of the disease often causing dire physical and mental affliction as well as deafness, the address of Dr. Baldwin was intensely interesting to teachers of the deaf who have to meet its victims so frequently in our schools. In referring to causes he

stated that with the case in hand, which he had been treating for some time, some phases of the impaired mental condition may be due to degeneration of certain neurons (nerve cells and fibers) of the posterior roots of the cord and the cortex, as the paralysis, heightened reflexes and hyperaesthesia indicate, or to toxins in the cerebro-spinal fluid; and perhaps, to be added, to the effects of large portions and varieties of drugs, notably bromide and chloral which tend to cause a general decrease in mental efficiency. The clinical picture of such a case, familiar to many of us, was presented by him as follows: "Normal condition in early childhood, physical and mental, followed at twenty months by a protracted illness of seven months due to cerebro-spinal meningitis. The subject at seventeen years, though possessing hearing and speech, exhibited pronounced mental defects, high nervous tension, partial paralysis of left leg and arm, excessive sensitiveness of skin (hyperaesthesia), instability, constant vacillation and shifting of attention, marked suggestibility, high-pitched voice, sense of form not well developed in either hand, and a decided unevenness in mental traits." Dr. Baldwin, in interesting way, outlined his treatment of such a case along educational lines, physical, mental, and moral, stating that his problem was to find and control an environment sufficiently simple for the subject's capacity and abilities, to lead him from the somewhat morbid feelings of failure to the joy of accomplishment and, as far as possible, to help him to be able to adjust himself to his rather complicated social surroundings. He soon found that the fundamental mental defects were lack of knowledge and apperception of form, size, direction, distance, number, and abstract concepts; an indifference to intellectual (not moral) truth; small capacity for initiative or inventiveness; and pronounced distraction of attention. Now, if we should add to the above, deafmutism, we may readily recognize some of the cases presented to us in our schools.

In his efforts to develop all weakened traits or capacities showing, and to substitute for those entirely lacking, the standardized form-boards, cylinders, etc., were first used, followed by free use of Montessori material, simple forms of industrial and mechanical work, athletic games, and the usual school work for young children. Added to these efforts and in co-ordination therewith, was the effort to eliminate abnormally

developed instincts and to arouse into action dormant instinctive tendencies. Now, at eighteen years of age, the subject ranks fairly well in reading and spelling (grade 5), not so well in English (grade 4), physiology and arithmetic (grade 3), in arithmetic, however, being unable to do only the very simplest subtraction and division which seem extremely difficult of accomplishment. (Philadelphia public school grades.)

Dr. Makuen stated that now there was no question as to the anatomy of the external portions of the ear, nor as to the physiology of hearing through the auricle, the tympanic membrane, and the ossicular chain to the oval window opening into the inner ear, or labyrinth; but that when the sound waves are transmitted through this opening to the labyrinthine fluid, uncertainty arises and varied theories created as to the physiology of hearing.* Difference of opinion exists, he further stated, as to the exact location of the perception of tone but the best evidence gives it peripheral location with inner connection to *bilateral* centers in the cerebral cortex, in the region of the first temporal lobe on either side (primary, or general auditory centers) associated with an adjacent *unilateral* center wherein word images only are received and registered (specialized auditory word-center).† This last, following the development of the general auditory centers, and to some extent, the motor centers, is of slow growth and is developed upon the left side in right-handed, and upon the right side in left-handed people. Dr. Makuen made use of charts to demonstrate this division of centers and their interconnection, and also the interconnection between them and the

* "The auditory nerve assumes its natural function only after it has become medullated, and all hearing-power, therefore, is largely a matter of education. The hearing-power for speech depends not alone upon an intactness of the peripheral auditory organs, but also to great extent upon the condition of the auditory centers in the brain and of the entire so-called cerebral zone of language. * * * While hearing goes before speech in point of development, yet its highest development takes place contemporaneously with speech-development, the ear standing guard over speech, and thus improving itself by exercise. Moreover, a child may apparently have normal hearing-power for sounds generally and yet lack any hearing-power whatever for speech. This fact, as is well known, is due to a lack of development of the auditory word-center in the brain, and the affection has been called "word-deafness." A child having word-deafness, although the hearing for other sounds may be perfect, will be as mute as a congenitally deaf child, and for the same reason, namely, that he cannot hear speech. Absolute and uncomplicated word-deafness is, of course, a somewhat rare affection in children; but absolutely perfectly functioning word-centers are probably quite as rare. In other words, the faculty of hearing words accurately is an acquired one. It is a result of more or less conscious training and effort on the part of the individual, and like any other of the so-called faculties of the brain, it varies greatly with different individuals, because it depends for its fullest development upon a correspondingly full development of the associated faculties such as that of attention, memory, etc." (Makuen.)

† Differing from Bastian and others as to bilateral word centers unless he refers only to ordinary development and functioning.

general visual, and visual word centers, which play an important part in the development of speech and the power to read and write. Hearing, an acquired faculty dependent upon proper functioning of the auditory nerve which is the last of the efferent nerves to become medullated, is of course the great factor in the development of speech, he stated, but with that missing, the eye may substitute for it as outlined on page 212.

Presuming the faculty of hearing to have been duly acquired, it would seem to the writer that in the requirements necessary for speech, reading, and writing there may be for some reason lack of complete development of either the specialized auditory and visual word centers, or of the two motor centers, resulting in congenital aphasia or agraphia in some of their varied forms, which should not in every case relegate the hearing mute to the feeble-minded class. True, in the very great majority of such cases the resultant aphasia and agraphia are due wholly to general mental degeneracy instead of a mental defect limited to the language field: and concerning these there can be no question as to their care. But is it not possible, nay, probable, that in a few cases the hearing mute may belong to the *backward normal group* rather than to the feeble-minded group!—and should not special classes for such, if they possess a fair degree of intelligence, be established in our schools for the deaf? The writer believes so. "The whole question of localization is still, after a half century of debate and investigation, a matter of heated controversy, and Moutier's exhaustive treatise which appeared in 1908, weights the scale pretty heavily on the negative side." (C. H. Town.)

Discussing the methods of developing speech in a deaf-mute, Dr. Makuen presented a very bright young girl, about sixteen years of age, a patient to whom he had given treatment and instruction for several years and directing the mother in her efforts to teach her child to speak. Whether the deafness was congenital or not, was not stated, but at eight years of age, when first seen, the girl gave no evidence of hearing and made no attempt to speak.* At this age faucial

* Dr. Makuen, in discussing this case with the writer at a later date, stated: "This child had whooping-cough at two and one-half years; not sure about her hearing before that time, but she had acquired only a few words, and those very imperfectly; after illness it was found that she had practically no hearing; we saw her first at eight years of age." It is a natural presumption, therefore, that she possessed hearing and ordinary baby speech in infancy.

and pharyngeal tonsils were removed and the general condition of nose and throat improved. Afterwards measures were employed to develop some hearing-power and to teach her speech and speech-reading. The treatment and efforts have continued over about eight years and the young girl is now able to talk fairly well, to read the speech of others in fair degree, and to give good inflection to her words,* although Dr. Makuen has been unable to develop any hearing-power whatsoever in the left ear and but very little under loud tone in close approximation to the right ear.

This case illustrates the possibilities of accomplishment with a deafmute child of good mentality, under the careful and frequent direction of an expert otologist and the constant efforts of a teacher who has no other one to look after. Would that our schools were filled with such children, that such expert direction could be given so frequently and constantly, and that we might have a teacher for each child! But such is not the case, and in the very nature of things, cannot be; our schools are but reflexes of the great world about us where mediocrity is the common condition and where deficiency in so many cases has been stamped by Dame Nature ere birth occurred.

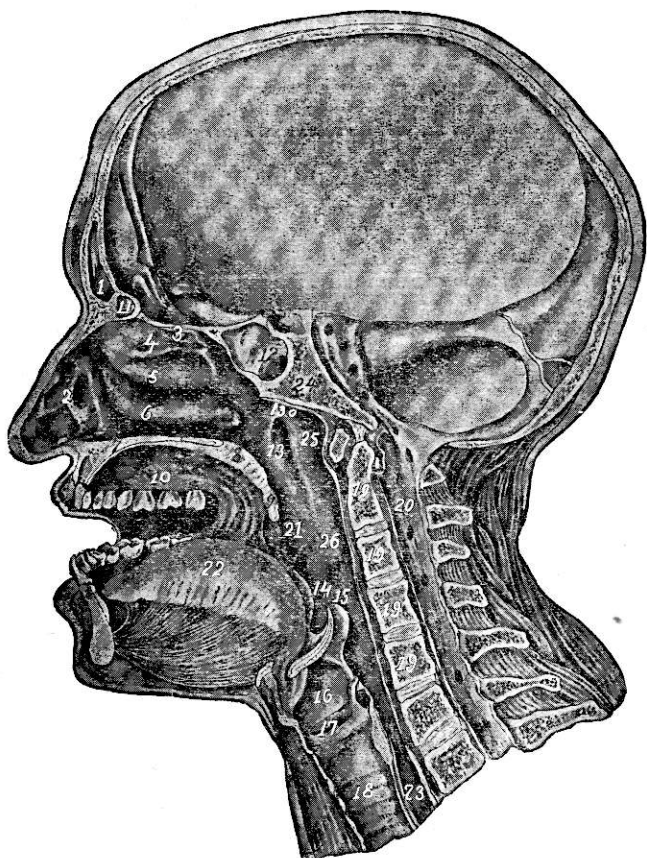
* Refer to Makuen footnote, page 212.

CHAPTER XXXIII.

DESCRIPTIVE ANATOMY OF HEAD, NOSE, THROAT AND EAR.

Believing that a knowledge of the anatomy of head, nose, throat, and ear, is to be greatly desired on the part of any teacher, and especially so by the teacher of the deaf, who wishes to be thoroughly informed as to the mechanism of

FORM O.



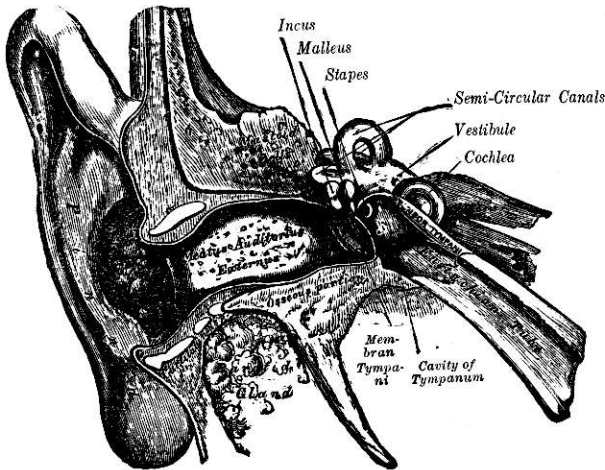
Sagittal Section of Head and Neck.

hearing and of speech, the following brief descriptive outline will no doubt prove of value in schoolroom work with the teacher who is up-to-date, efficient, and anxious to produce good results through intelligent efforts. In this day of critical evaluation of teaching-theories and schoolroom practice, and with an awakening to the fact that defective hearing, on the part of pupils everywhere and in all schools (one in every five pupils, probably) is producing long lines of lost-interest, retardation, inefficiency, and delinquency, an intimate knowledge of the why and wherefore of things is absolutely necessary. The "hit-or-miss" pattern of educational effort must be relegated to the realm of "mistaken notions"—it has no place of standing today. Science, knowledge, and precision must replace conjecture, opinion and chance.

1. Frontal sinus; opening into nasal chambers; absent in child.
2. Lateral cartilages of nose; 2 upper, 2 lower; fifth cartilage, of septum, not shown.
3. Fourth turbinate; not constant; present in one-third of all cases.
4. Superior turbinate; smallest and least rolled.
5. Middle turbinate; anterior free margin dividing line between olfactory area and respiratory region.
6. Inferior turbinate; longest and largest.
7. Hard palate; bony portion of roof of mouth.
8. Soft palate; movable partition between mouth, nasal cavities and throat; raised in pure vowel sounds; impeded movement results in poor enunciation.
9. Uvula; usual length rarely over $\frac{3}{8}$ inch; elongation and relaxation occurs in 90 per cent. of affections of soft palate and uvula, exercising injurious effects on voice.
10. Arch of roof of mouth; high or irregular arch caused by adenoids and mouth breathing, affecting voice and causing irregular teeth.
11. Anterior ethmoidal cells; opening into nasal chambers.
12. Sphenoidal sinus; opening into nasal chambers; absent in child.
13. Eustachian orifice; about $\frac{3}{8}$ inch from inferior turbinate; eustachian tube about $1\frac{1}{2}$ inches long; outer $\frac{1}{3}$ bone, inner $\frac{2}{3}$ cartilage and fibrous tissue; tympanic opening $1\frac{1}{2}$ inch, pharyngeal $\frac{1}{3}$ inch, diameter; diameter of middle part only large enough to pass a darning needle.
- 13a. Position of pharyngeal tonsil—adenoid tissue; tubal tonsil, when orifice eustachian tube involved.
14. Position of lingual tonsil; slightly elevated nodules of lymphoid tissue on base of tongue.
15. Epiglottis; thin, pliable, leaf shaped cartilage covering "voice-box" or larynx.
16. Vestibule of larynx; in male $\frac{1}{3}$ larger than in female; laryngeal tonsil within ventricle of larynx.
17. Position of vocal cords; variable length and calibre; $\frac{1}{2}$ to $\frac{3}{4}$ inch, female and male.
18. Trachea, showing rings; 16 to 20 rings of cartilage; transverse diameter $\frac{3}{4}$ to 1 inch.
19. Bodies of cervical vertebræ.
20. Spinal canal, showing foramina of exit of nerves.
21. Position of faucial tonsil; lymphoid structure, highly vascular; enlarged, results in impaired articulation, and especially so with consonants.
22. Tongue.

23. Esophagus; muscular canal nine inches long.
 24. Basilar process of occipital bone.
 25. Nasopharynx; upper portion of pharynx—postnasal space; resonating chamber.
 26. Oropharynx; lower portion of pharynx; pharynx $4\frac{1}{2}$ inches in length.

FORM P.



Front View of the Organ of Hearing (Right Side).

External ear—Auricle, or pinna; external auditory canal, or meatus. Middle ear, or tympanum—Membrana tympani; tympanic cavity and attic; ossicles; eustachian tube; antrum; mastoid process.

Internal ear, or labyrinth—Osseous labyrinth (vestibule; semicircular canals; cochlea). Membranous labyrinth (utricle; saccule; membranous semicircular canals; membranous cochlea).

Auditory nerve; divided into vestibular and cochlear branches at bottom of internal auditory canal.

Muscles of auricle—Nine; but slightly developed in man.

Vascular and nervous supply to auricle—Three arteries, and veins to correspond; six nerves.

External auditory canal—About $1\frac{3}{4}$ inch in length, cartilage $\frac{1}{2}$ inch, bone $\frac{3}{4}$ inch; slightly curved, convexity upward; narrowest near central portion beyond which pouch-like expansion; greatest diameter vertical at outer end but transverse at inner end; average width $\frac{1}{4}$ inch.

Membrana tympani—Drum head, an oval, translucent membrane placed obliquely at bottom of meatus; $\frac{3}{8}$ inch diameter.

Tympanum, or tympanic cavity—Of irregular form, about $\frac{1}{2}$ inch front to rear, $\frac{1}{3}$ inch vertically, $\frac{1}{5}$ inch transversely; carotid canal in front, mastoid cells behind, auditory canal externally, labyrinth internally.

Attic of tympanum—Upper portion thereof.

Ossicles—Malleus (hammer), incus (anvil) stapes (stirrup); a moveable chain of small bones connecting drum head and labyrinth through oval window; malleus upper bone, incus middle bone, stapes lower bone and smallest bone in the body ($\frac{1}{6} \times \frac{1}{10}$ inch); malleus $\frac{3}{8}$ inch long; incus $\frac{1}{2}$ inch long.

Eustachian tube—About $1\frac{1}{2}$ inches long, outer $\frac{1}{3}$ bone, inner $\frac{2}{3}$ cartilage and fibrous tissue; tympanic opening $1\frac{1}{2}$ inch, pharyngeal, $\frac{1}{3}$ inch diameter.

Antrum—Opening into mastoid process from tympanum.

Mastoid process—Distinct prominence back of ear, conical in shape, apex downward; consists of cells of various number, size and shape intercommunicating; but one at birth (antrum of good size), others developing.

Fenestra ovalis vestibuli—Oval window, kidney-shaped, leading from tympanum into vestibule and closed by foot-plate of stapes; 1-10 inch long diameter.

Fenestra rotunda cochlea—Round window, leading from tympanum into cochlea and closed by membrane; 1/12 inch diameter.

Tensor tympani—Muscle of tympanum to increase tension of drum-head by drawing same inward.

Vestibule—Ovoid cavity between cochlea and semicircular canals, about 1/5 inch from before backward, 1/5 inch from above downward, and with which all parts of internal ear communicate.

Semicircular canals—Three curved bony tubes of unequal length (3/5 to 1 inch) springing from rear portion of vestibule 1/20 inch in diameter, each lying at right angle to other two, and each containing a membranous canal of same shape 1/60 inch in diameter; a peripheral space-organ acting through brain center for preservation of equilibrium.

Cochlea—Conical, snail-shaped cavity in front of vestibule about 1/4 inch in length, breadth of base 1/4 inch; divided and sub-divided into spaces by diaphragms, one of which near apex contains organ of Corti with 10,500 rods and 21,300 hair cells, each supposed to vibrate to a single sound.

Internal auditory canal—About 1/3 inch long, through which facial and auditory nerves enter internal ear between semicircular canals and cochlea.

Perilymph—Fluid in space between membranous and osseous labyrinths.

Endolymph—Fluid contained within membranous labyrinth.

Otoliths, or ear stones—Minute crystals, carbonate of lime, found in various parts of labyrinth, but mostly in saccule and utricle; function problematical.

CHAPTER XXXIV.

STATISTICAL INFORMATION AS TO DEAFNESS.

A survey of the deaf, and of causes leading to deafness, in any one school, or in any one district whether of municipal or state magnitude, must be of great value within its special and limited confine; but of far greater value, is comparison with similar surveys in other schools and districts, and from which important general conclusions may be drawn. Now, while real and just comparison cannot well be made between mental surveys* because such surveys have not been made generally, there does exist a general survey of deafness and causes thereof made by the general government, arranged by states and as a whole, with which comparison may be made. The general purpose of the investigation authorized by the Conference not only permits, but calls for, some consideration and comparison of such surveys. The scope of this report, however, will not allow of consideration and comparison by states for obvious reasons; but against the figures of the country as a whole (89,287) the figures relating to Indiana (3,667) are given for comparison; and for this purpose the figures of any other state may be substituted.

The 1910 census is not used for the reason that the inquiry then made was to find and enumerate only the deaf *and dumb*—all who could articulate however slightly, although deaf, were not listed; and it is also very probable that many *dumb* persons, so because of feeble-mindedness and other causes, were listed. No inquiry was made as to causes of deafness, nor as to degrees of hearing, etc. The census of 1900 was the most complete as to the deaf ever taken, but at that the matter was placed in the hands of Dr. Alexander Graham Bell for his study and arrangement. In 1906, he completed his work and the government published its statistics of the deaf which stand as the latest and fullest and most reliable exposition concerning the deaf. It is not believed that conditions

* Except in very limited degree as in the survey of the Indiana, Ohio, Kentucky, and Philadelphia schools undertaken by this committee through the generous and valuable assistance of Pintner, and others.

were radically different in 1910 from those prevailing in 1900, although the returns would so indicate.

The following statistical tables have been compiled by the writer from the special report (1906) relating to the deaf and blind made by Dr. Bell in accordance with an act of Congress and based upon the census returns of 1900, which were made more complete by inquiry and correspondence addressed by him to individuals throughout the country. All figures are to be considered as for the year 1900, and the percentages relating to the effect of causes upon the ear refer to the figures for the United States only.

In this report 89,287 cases are listed as to causes as follows: Classified cases,* 47,959; unclassified cases, 31,213; and unknown cases, 10,115. It was found (classified cases) that more than 90 per cent. of the deafness from scarlet fever, meningitis, and brain fever, more than 75 per cent. of the deafness due to measles, and over 65 per cent. of the deafness due to disease of the ear, occurred in childhood (under 20 years); that more than 60 per cent. of the deafness from influenza, catarrh and colds occurred in adult life (over 20 years); that 65 per cent. of the cases due to brain fever occur before the age of 5 years; that meningitis produces deafness chiefly before the age of 5, scarlet fever before the age of 10, malarial fever and quinine, and typhoid fever between the ages of 15 and 40, catarrh between the ages of 15 and 60 (in most cases occurring over 20 and being the only conspicuous cause between 40 and 60) and catarrh and old age (the latter chiefly) between the ages of 60 and 80.

Among the unclassified cases (31,213) 14,472 were born deaf, the remainder (16,741) becoming deaf through various causes, such as old age, military service, accidents, "sickness," "fevers," etc., about 65 per cent. of the cases occurring among adults, although over 70 per cent. of the deafness due to fever, over 65 per cent. of the cases due to accidents, and over 60 per cent. of the cases due to sickness, occurred during childhood.

CAUSES AND DEGREES OF DEAFNESS.

Concerning causes and degrees of deafness, it appears that affections of the internal ear result chiefly in total deafness, and of the middle ear chiefly in partial deafness; that affec-

* Causes classified according to effect upon the ear—external, middle and internal. Vide tables following.

tions of the auditory nerve and suppurative affections of the middle ear result chiefly in total deafness, while nonsuppurative, or catarrhal, affections of the middle ear and labyrinthine affections result chiefly in partial deafness; that of the diseases affecting the middle ear scarlet fever seems to be the only one producing total deafness in a majority of cases; that catarrh produces chiefly partial deafness, more than 80 per cent. of those deaf from influenza, catarrh, or colds being only partially deaf; that of the diseases affecting the internal ear, meningitis and brain-fever produce chiefly total deafness, more than 80 per cent. of those deaf from these causes, and congenitally so, being totally deaf; that among those deaf from affections of the external ear (impacted cerumen, foreign bodies in ear and miscellaneous causes) 55 per cent. of the cases occurred during childhood, 45 per cent. during adult life, there being total deafness in 23 per cent. of the cases and partial deafness in 77 per cent.

TABLE No. 33—*Total Number of Deaf, Etc.*

CENSUS 1900	INDIANA*			UNITED STATES		
	No.	Totally Deaf	Partially Deaf	No.	Totally Deaf	Partially Deaf
Deafness occurring—						
Under 20.....	2,093	1,487	606	50,296	33,148	17,148
At 20 and over.....	1,421	122	1,299	35,924	3,483	32,441
At age unknown.....	93	29	64	3,067	795	2,272
Totals.....	3,607	1,638	1,969	89,287	37,426	51,861
Present age—Under 20.....		509	141		14,070	4,451
Over 20.....		1,129	1,828		23,356	47,410

*In all comparisons between Indiana and the United States, the figures for the former are included in those for the latter.

TABLE No. 34—*Present Age, Etc.*

CENSUS 1900	Under 20	Over 20	White	Colored	Native	Foreign Born	Unknown
Indiana.....	650	2,957	3,584	23	3,245	345	17
United States.....	18,521	70,766	84,361	4,926	74,791	13,786	710

TABLE No. 35—*Ability to Speak.*

CENSUS 1900	INDIANA			UNITED STATES		
	Well	Imperfectly	Not at all	Well	Imperfectly	Not at all
Total deafness under 20.....	195	236	1,056	4,578	5,657	22,913
Total deafness over 20.....	115	3	4	3,203	161	119
Age unknown.....	8	2	19	246	99	450
Partial deafness under 20.....	496	92	18	13,486	2,888	774
Partial deafness over 20.....	1,281	12	6	31,924	457	60
Age unknown.....	61	3		2,064	155	53
Totals.....	2,156	348	1,103	55,501	9,417	24,369

Concerning the ability of the deaf to speak, Dr. Bell writes as follows:

"* * * It will thus be seen that the ability to speak (whether well, imperfectly or not at all) is largely dependent upon the period of life when the deafness occurred (whether under twenty years or over), and upon the degree of deafness (whether total or partial). A correlation exists between these three elements. * * * Speaking broadly, about one-third of the deaf who speak well lost hearing before they were 20 years old, one-third between 20 and 40, and one-third after reaching 40. Of the deaf who speak imperfectly or not at all, most lost hearing at a very early age—before they were five—and practically all became deaf before they were twenty. Comparatively few of the totally deaf speak well, and comparatively few of the partially deaf speak imperfectly or not at all. The deaf and dumb consist mainly of persons totally deaf from nearly childhood—under 5. The deaf who speak well consist mainly of persons who became partially deaf in adult life. The deaf who speak imperfectly form an intermediate class, more closely affiliated with the deaf and dumb than those who speak well."

RATIO OF DEAF TO POPULATION.

The ratio of the deaf to the general population is greater in Indiana than in any other State or Territory, excepting Maine and the District of Columbia. In the former there is a high rate of congenital deafness; in the latter a large attendance of students from all parts of the United States at the Columbia Institution for the Deaf (Gallaudet College and Kendall School). In Indiana the percentage of deaf (2,093, those losing hearing under twenty years old) to each 1,000 of general population was in 1900, when the census was taken, .832, and in surrounding States as follows: Kentucky, .801; Michigan, .778; Ohio, .749; Illinois, .713. In the United States the percentage was .662 only. Indiana therefore had .170 per cent. more per thousand than the general average for the United States, and .692 more than Wyoming, which had the smallest percentage in 1900.

TABLE No. 36—*Classified Periods of Deafness.**
(Deafness Occurring Under 20.)

<i>Ages</i>	<i>Indiana</i>			<i>United States.</i>		
	<i>No.</i>	<i>T. D.</i>	<i>P. D.</i>	<i>No.</i>	<i>T. D.</i>	<i>P. D.</i>
At Birth.....	447	413	34	14,474	12,609	1,865
Under 2.....	431	366	65	7,396	5,998	1,398
Bet. 2-5.....	509	390	119	10,536	7,545	2,991
Bet. 5-10.....	276	163	113	7,018	3,718	3,300
Bet. 10-15.....	187	72	115	4,464	1,425	3,039
Bet. 15-20.....	165	47	118	4,061	865	3,196
Unknown	78	36	42	2,347	988	1,359
Totals ...	2,093	1,487	606	50,296	33,148	17,148

TABLE No. 37.
(Deafness Occurring Over 20.)

<i>Ages</i>	<i>Indiana</i>			<i>United States.</i>		
	<i>No.</i>	<i>T. D.</i>	<i>P. D.</i>	<i>No.</i>	<i>T. D.</i>	<i>P. D.</i>
20-40	667	74	593	16,588	2,021	14,567
40-60	399	25	374	9,437	867	8,570
60-80	227	19	208	6,595	374	6,221
80 over	55	2	53	1,021	57	964
Unknown	166	31	135	5,350	959	4,391
Totals ...	1,514	151	1,363	38,991	4,278	34,713

Percentage of Deaf to Each 1,000 Population.
(From Childhood—Under 20.)

TABLE No. 38.

<i>Census</i>		<i>Indiana</i>		<i>United States.</i>			
1830.....	No. 144	Per cent. .420	No. 6,106	Per cent. .475			
1840.....	No. 312	Per cent. .455	No. 7,665	Per cent. .449			
1850.....	No. 537	Per cent. .543	No. 9,803	Per cent. .423			
1860.....	No. 600	Per cent. .444	No. 12,821	Per cent. .408			
1870.....	No. 872	Per cent. .519	No. 16,205	Per cent. .420			
1880.....	No. 1,764	Per cent. .892	No. 33,878	Per cent. .675			
1890.....	No. 1,837	Per cent. .838	No. 40,592	Per cent. .648			
1900.....	No. 2,093	Per cent. .832	No. 50,296	Per cent. .662			

From this table is to be noted the very great increase since 1870, which may be in part more apparent than real for two reasons: (a) the inaccuracies of returns in 1870, and prior thereto, may have been "caught up" in the more accurate returns of succeeding years; and (b) there may have been in later years clearer discernment on the part of parents, and probably less hesitancy in reporting true conditions. Then again, the enormous foreign emigration to this country from distressful environment and of peculiar social life and customs, during the thirty years ending in 1900, may account for much of the increase.

* T. D., totally deaf; P. D., partially deaf.

TABLE No. 39—*Causes of Deafness, 1900.*

	<i>Indiana.</i>		<i>United States.</i>	
Catarrh, Colds, Influenza...	698	19.3 per cent.	16,552	18.6 per cent.
Congenital	447	12.4 per cent.	14,472	16.2 per cent.
Scarlet Fever	232	6.4 per cent.	7,424	8.3 per cent.
Meningitis and Brain Fever.	504	14.0 per cent.	6,004	6.7 per cent.
Ear Diseases	134	3.7 per cent.	4,210	4.7 per cent.
Old Age	130	3.7 per cent.	3,361	3.7 per cent.
Military Service	162	4.5 per cent.	3,242	3.6 per cent.
Measles	123	3.4 per cent.	2,469	2.8 per cent.
Typhoid Fever	115	3.2 per cent.	2,055	2.3 per cent.
Misc. Causes and Unknown.	1,062	29.4 per cent.	29,498	33.1 per cent.
	3,607	100.	89,287	100.

TABLE No. 40—*Effect of Causes Upon the Ear—1900.*

		<i>Indiana</i>		<i>United States</i>	
		Totally Deaf	Partially Deaf	Totally Deaf	Partially Deaf
External Ear—	(Impacted cerumen.....)	3	6	71	286
1.8 per cent. U. S.....	(Foreign bodies.....)	1	6	50	247
1.3 per cent. Ind.....	(Miscellaneous.....)	5	7	86	131
Middle Ear—					
72.6 per cent. U. S.....	(Suppurative process.....)	281	347	7,390	10,143
62.2 per cent Ind.....	(Non-suppurative process.....)	154	589	2,836	14,424
Internal Ear—	(Labyrinth affected.....)	29	89	661	2,065
25.6 per cent. U. S.....	(Auditory nerve affected.....)	531	149	6,931	2,430
36.5 per cent. Ind.....	(Brain center affected.....)	4	2	96	33
	(Miscellaneous.....)	1	1	42	37
Unclassified causes.....		572	533	16,950	14,263
Unknown causes.....		57	240	2,313	7,802
Totals.....		1,638	1,969	37,426	51,861

CHAPTER XXXV.

RESOLUTIONS OF PROTEST.

The following resolutions severely condemning a prevalent condition of obnoxious nature, were unanimously adopted by the associations named in expression of the feeling of their members against the common practice of the country in looking upon and listing schools for the deaf, so insistently supervised by boards of charities, as charitable and benevolent institutions, and the pupils of such schools, as "wards" and "defectives": and associating both schools and pupils in comparison with the feebleminded, the epileptic, the insane, the incorrigible and criminal, the physically deformed and diseased, and others, who constitute the real class of "defectives," a term which has come to bear an opprobrium meaning among the many. The deaf rightfully resent such terms and associations, and condemn those who, through thoughtlessness and mistaken view, or for political reasons and supervisory power, insist upon the continuance of the practice to the injury and humiliation of the deaf.

In 1907, the General Assembly of Indiana through insistence of the writer and resultant legal enactment changed the name of the "Indiana Institution for the Education of the Deaf and Dumb" to the "Indiana State School for the Deaf," and provided "that it should not be regarded nor classed as a charitable or benevolent institution, but as an educational institution of the state conducted wholly as such." However, that such a law is upon the statute book is about all that can be said concerning it—the status of the school and the procedure of management remains the same as before the enactment of the law which is disregarded because of prevalent desire for concentrated power in the conduct of the state's institutions. In some of the more progressive states that which was provided for in Indiana has been honestly and wisely carried into effect to the betterment of the deaf and their schools—and to the credit of these states and their officials. These resolutions, it may be added, stand as the first formal expression on the subject ever adopted by any of the associations

named, even as the resolution on the education of the deaf, set out in full on the first page of this report, stands as the first formal expression of the profession concerning the work.

RESOLUTIONS BY THE CONVENTION OF INSTRUCTORS OF THE DEAF.

Resolved, By the American Convention of Instructors of the Deaf, assembled in seventeenth triennial meeting at Morganton, North Carolina, July 8 to 15, 1905:

That the deaf youth of our land unquestionably deserve and are lawfully entitled to the same educational care and advantages as their more fortunate hearing-speaking brothers and sisters; and that this education, the constitutional duty of the State, should be accorded them by the State as a matter of right, not of charity, recognized by and standing in law, as it is in fact, a part of the common school system.

RESOLUTIONS BY THE NATIONAL ASSOCIATION OF THE DEAF.

(Preamble Statistical.)

Resolved, By the delegates of the Eighth Convention of the National Association of the Deaf, assembled at Norfolk, Va., July 4 to 6, 1907:

First, That education of the deaf on the part of the state is simply fulfillment of its duty as a matter of right and justice, not of sympathetic charity and benevolence to the deaf.

Second, That schools for the deaf should not be known and regarded, nor classified, as benevolent or charitable institutions. On the contrary, they should be known and regarded, and classified, as strictly educational institutions, a part of the common school system of the state under the advisory supervision of the regularly constituted school authorities, instead of being supervised by boards of charity, legislative benevolent committees, and the like, which tends to foster a spirit of dependence in the pupils and marks them as objects of charity, wards of the state, etc., which they are not any more so than are children with hearing who attend the public schools.

Third, That we enter our vigorous protest against the constant association and comparison in convention assemblies of whatever nature, and in published reports, etc., of deaf children with the feeble-minded, the epileptic, the insane, the incorrigible, the physically deformed and diseased, with inmates of penal institutions and others of like classes, generally referred to as "defectives," a term which we resent as opprobrious when applied to the deaf, used as it commonly is to designate mental, moral and physical degeneracy.

Fourth, That for the furtherance of more complete emancipation from the thralldom of the past, with its ill-conceived and false notions concerning those who cannot hear, or hear but imperfectly, we recommend the appointment of a committee of five to work for its attainment, and earnestly urge agitation of the matter upon the part of every member of the convention.

RESOLUTIONS OF THE INDIANA ASSOCIATION OF THE DEAF, SEVENTH TRIENNIAL REUNION.

(Indianapolis, June 6, 1908.)

Resolved, That we unreservedly endorse the preamble and resolutions concerning the education of the deaf, *a veritable bill of rights*, adopted by the Eighth National Convention of the Deaf, held in Norfolk, Virginia, July 4-6, 1907, and we recommend the appointment of a com-

mittee of five to work for its attainment in Indiana and earnestly urge agitation of the matter upon every member of the Legislature. And be it further

Resolved, That the published proceedings of this Seventh Reunion of the Indiana Association of the Deaf give the aforesaid preamble and resolutions in full, and that same shall stand as our faith and belief.

RESOLUTIONS OF THE TENTH CONFERENCE OF SUPERINTENDENTS AND PRINCIPALS OF AMERICAN SCHOOLS FOR THE DEAF.

(Indianapolis, June 27, 1913.)

Whereas, It has long been recognized that every American child is entitled to a primary, grammar-school, and high-school education at the public expense, and,

Whereas, The gathering together of deaf children in residential schools is for expediency in education only, and not for custodial care, therefore,

Be it resolved, by the Conference of Superintendents and Principals of American Schools for the Deaf, That schools for the deaf should be regarded, classified, and supervised solely as educational institutions.

Be it further resolved, That this Conference extends its congratulations to all states which recognize by law that their schools for the deaf are a part of their educational system, and

Resolved further, That marked copies of the report of these proceedings be forwarded to the heads of departments of charities and of departments of education in every state of the United States, and to the governing bodies of every school for the deaf in Canada.

COMBINED REFERENCE AND BIBLIOGRAPHY.

- Allen, Dr. Harrison—Biol. Dept., Univ. Penn.
 Allen, Jerome—Temperaments.
 "American Annals of the Deaf"—A Magazine, Washington, D. C.
 Aquaviva, Claudius—Commanding General of the Jesuits. 1543-1615.
 Argo, W. K.—Supt. Sch. for Deaf, Colorado.
 Aristotle—B. C. 384-322.
 Ayres, L. P.—Dept. Educ., Sage Foundation; Laggards; The Binet Scale.
 Bacon, Francis—1561-1626.
 Bagley, W. C.—Educational Processes; Mental and Motor Ability; Ed. Jour. Educ. Psychol.
 Baldwin, B. T.—Dept. Psychol. and Educ. Swarthmore College.
 Baldwin, J. M.—Mental Development of Child and Race.
 Balliet—Quoted.
 Ballou, F. W.—Boston. Educator.
 Basedow, J. B.—Educ. Reformer. 1723-1790.
 Bastian, H. C.—Aphasia and Other Speech Defects.
 Baylor, A. S.—Ass't Supt. Pub. Instruct., Indiana.
 Bell, A. G.—Scientist and Author; Founder and Patron, Volta Bureau—Washington, D. C.
 Bell, J. C.—Univ. Texas; Ed. Jour. Educ. Psychol.
 Bennett—School Efficiency.
 Bergson, H. L.—Prof. College of France. Matter and Memory.
 Best, H.—The Deaf and Their Position in Society.
 Betts, G. H.—Classroom Method and Management.
 Bezold, F.—Wiesbaden. Quoted.
 Binet, A.—The Binet-Simon Measuring Scale.
 Boaz, F.—Physical Measurements (Scattered).
 Bobbitt, J. F.—The Curriculum.
 Bobertag, O.—German Psychologist.
 Bolling, Wm.—Estab. First Priv. Sch. for Deaf in America.
 Bolton, F. E.—Principles of Education; Relation of Motor Power to Ability.
 Braidwood, The Elder—Educator of the Deaf, Edinburgh, Scot.
 Braidwood, The Younger—Son of the Elder.
 Brains and Personality—W. Thompson.
 Bridges, J. W.—Point Scale for Measuring Ability (Yerkes, Bridges, Hardwick).
 Brubacker, A. R.—Pres. Teacher's College, Albany, N. Y.
 Burk, F. L.—Physical Measurements. (Scattered).
 Burrell, O. H.—Supt. Sch. for Blind, Penn.
 Carman, Ada—Physical Measurements; Saginaw, Mich.
 Carroll, A. E.—Supt. Sch. for Feeble-minded Youth, Indiana.
 Child Study and Training—
 Childs, H. G.—Tentative Revision and Extension Binet-Simon Scale (Terman & Childs).
 Christopher, W. S.—Physical Measurements, Chicago.
 Claparede, E.—Experimental Pedagogy.
 Colvin—Concerning Nature and Nurture.
 Comenius, J. A.—Educ. Reformer. 1592-1670.
 Crouter, A. L. E.—Supt. Sch. for Deaf, Phila.
 Currier, E. H.—Supt. Sch. for Deaf, New York.

- Darwin, Charles—Origin of Species; Biographical Sketch of an Infant.
- Dearborn, W. F.—Concerning Instincts.
- De l'Epee, C. M.—1712-1789.
- Dewey, J. and C.—Schools of Tomorrow.
- Dewey, J.—Democracy and Education; How We Think.
- Dobyns, J. R.—Supt. Sch. for Deaf, Miss.
- Driggs, F. M.—Supt. Sch. for Deaf, Utah.
- Dumville, B.—Fundamentals of Psychology; Child Mind.
- Dyer, F. B.—Supt. Boston Schools.
- Earhart—Teaching Children to Study.
- Ebbinghaus, H.—Psychology.
- Fay, E. A.—Marriage of the Deaf; Ed. Amer. Annals of Deaf, V. Pres. Gallaudet College.
- Foundational Study in Pedagogy of Arithmetic—
- Frank, A. H.—Referred to.
- Frazee, J. C.—Direct. Vocational Training, Phila. Schools.
- Froebel, F. W. A.—Educ. Reformer; Education of Man. 1782-1852.
- Galen—130-200.
- Galton, F.—Hereditary Genius.
- Gallaudet, E. M.—Son of T. H.—Founder and Pres. Gallaudet Coll. for Deaf, Washington, D. C.
- Gallaudet, T. H.—Founder of Pub. Education of the Deaf in America, 1817.
- Goddard, H. H.—Dept. Research Vineland Training School; Binet-Simon Tests, etc.
- Gordy—A Broader Elementary Education.
- Grasser—Referred to.
- Green, Francis—New England, 1749-1809.
- Gruver, E. A.—Supt. Sch. for Deaf, Rome, N. Y.
- Haberman, J. V.—M. D., Columbia Univ.
- Haeckel—German Biologist.
- Haggerty, M. E.—Dept. of Psychol., Indiana Univ.
- Hall, G. S.—Pres. Clarke Univ., Mass.
- Hall-Quest—The Text Book.
- Hardwick, R. S.—Point Scale for Measuring Ability (Yerkes, Bridges, Hardwick).
- Harris, W. L.—Comm. of Educ., United States.
- Healy, W.—Psychologist.
- Heinicke, S.—1729-1790.
- Helmholtz—German Scientist.
- Henderson, C. H.—Education and the Larger Life.
- Hippocrates—B. C. 460-359.
- His—Referred to.
- Hopkins, Mark—Referred to.
- Horne, H. H.—Psychological Principles of Education.
- Ireland, Dr.—Classification of Feeble-minded.
- James, W.—Principles of Psychology; Talks to Teachers.
- Jones, J. W.—Supt. Sch. for Deaf, Columbus, Ohio.
- "Journal Educational Psychology"—A Magazine, Baltimore.
- Justinian—483-565.
- Judd, C. H.—Psychology.
- Kilpatrick, W. M.—Supt. Sch. for Deaf, New Jersey.
- Kirkpatrick, E. A.—Fundamentals of Child Study.
- Klapper, P.—Principles of Educational Practice.
- Kline, L. W.—The Migratory Insect (Ped. Sem.).
- Knox, H. A.—Form Board and Other Tests.
- Kohs, S. C.—Annotated Bibliography, B-S. Scale.
- Lamarck—Fr. Zoölogist.
- Lankester—Eng. Zoölogist.
- Lee, Richard Henry—Virginia.

- Lincoln, Dr. D. F.—Report on the Feeble-minded.
 Locke, J.—1632-1704.
 Love, J. K.—Aural Surgeon, England.
 MacDonald, A.—A Plan for Study of Man; Physical Measurements.
 Major—Concerning Instincts.
 Makuen, G. H.—Otologist, Phila.
 Mann, Horace—1796-1859.
 McManis, —.—The study of Behavior of Individual Child.
 McMurray—Conflicting Principles; How to Study.
 Mendel, G. J.—Abbot of Brunn; Founder of Mendelism, 1822-1884.
 Mental Deficiency—
 Neumann, E.—Univ. Leipsig.
 Milton, John—1608-1674.
 Minhinnich, Miss—The Pestalozzian School, Plymouth, Eng.
 Monroe, W. S.—Text Book, A History of Education.
 Montaigne, M. E. de—1533-1592.
 Morgan—The Backward Child.
 Morrison—Supt. Pub. Instruct., New Hampshire.
 Moutier—Referred to.
 Mulcaster, R.—1531-1611.
 Münsterberg, H.—Psychology and the Teacher.
 Murdoch, J. M.—Supt. Sch. for Feeble-minded, West Penn.
 Murray—Froebel as Pioneer in Modern Psychology.
 Nat. Educ. Asso. Proceedings—Secretary Asso., Washington, D. C.
 Nelson, Philip—Mass. 1667.
 Nicholson, P.—Blood Pressure.
 "Normal Instructor and Primary Plans"—A Magazine, Danville, N. Y.
 Oppenheim, N.—Development of the Child.
 O'Shea, M. V.—Every Day Problems in Teaching; Education as Adjustment.
 Palmer—"The Teacher."
 Paterson, D. G.—Collab. with R. Pintner, Learning Tests with Deaf Children, Etc.
 Peet, H. P.—Contemp. Gallaudet. 1794-1873.
 Perez, B.—The First Three Years of Childhood.
 Pestalozzi, H.—1746-1827.
 Pintner, M.—Collab. with R. Pintner.
 Pintner, R.—Prof. Psychol. and Author, Ohio State Univ.; Learning Tests with Deaf Children; A Scale of Performance Tests, Etc.
 Pliny—23-79.
 Ponce de Leon, P.—1520-1584.
 Ponfick—Prof. Pathol. Univ. Breslau.
 Preyer, W.—The Mind of the Child—Pt. I, The Senses and the Will.
 "Primary Education"—A Magazine, Boston.
 "Psychological Clinic"—A Magazine, Witmer, Univ. Penn.
 Psychopathology of Every Day Life.
 Psychological Review Pub. Co., Princeton, N. J.
 Punnet, R. G.—Mendelism.
 Pyle, W. H.—Outlines of Educational Psychology; Examination of School Children.
 Quetelet—Astronomer Royal, Belgium.
 Rabelais—1495-1553.
 Randolph, John, of Roanoke.
 Rogers, Augustus—Supt. Sch. for Deaf, Danville, Ky.
 Raymond, Du Bois—Referred to.
 Radosavljevich, P. R.—New York Univ.
 Rousseau, J. J.—"Emile."
 Rugg, H. O.—Experimental Determination of Mental Discipline in School Studies.
 Schoop—Supt. Chicago Schools.

- Sandford, Rev. John—N. Y. 1807.
- Sargent—Fine and Industrial Arts in Elementary Schools; Problems in Experimental Pedagogy of Drawing.
- Senn, Dr. Nicholas—Surgeon, Chicago.
- Shinn, N. W.—Univ. Calif.; Magazine Articles.
- Simmons—Archives of Otology.
- Simon, T. H.—The Binet-Simon measuring Scale.
- Slidi—Slidi's Empiricism.
- Smedley, F.—Physical Measurements (Chicago).
- Snedden, D. S.—Comm. Education, Mass.
- Southworth—Supt. Sommerville Schools.
- Spencer, Herbert—1820-1903.
- Stern, W.—Psychological Methods of Testing Intelligence.
- Storer, Mrs.—Child Training.
- Strahan, S. A. K.—Marriage and Disease.
- Strayer, G. D.—Columbia Univ.; Pres. N. E. A.
- Study of Man, Plan for—Contains Full Bibliography of Child Study; Pub. U. S. Gov't, 1902.
- Sturmius, J.—1507-1589.
- Sully, J.—Childrens' Ways.
- Talmud, The—Jewish Law.
- Terman, L. M.—Hygiene of the School Child.
- Thompson—Heredity.
- Tiedemann, D.—German Scientist.
- Titchener, E. B.—Experimental Psychology of the Thought Processes.
- Thorndyke, E. L.—Educational Psychology.
- Town, C. H.—The Binet-Simon Method, etc.; Authorized Translation.
- Tracy, F.—The Psychology of Childhood.
- Turner—Referred to.
- Tyler, J. M.—Prof. Biol. Amhurst College; Growth and Education.
- Valentine, C. W.—Introduction to Experimental Psychology.
- "Volta Review"—A Magazine Devoted to Speech and Speech-reading, Washington, D. C.
- Wallace, A. R.—Social Environment and Moral Progress.
- Wallin, J. E. W.—Experimental Studies of Mental Defectives.
- Wang—Value of Sense Training in Children.
- Warren, J.—Defective Speech.
- Warwick & Yorke—Educational Publishers, Baltimore.
- Watson, J. B.—Behavior.
- Weismann, A.—Essays Upon Heredity.
- Whipple, G. M.—Manual of Mental and Physical Tests—Pt. I, Simpler, Pt. II, Complex.
- Wilson, Mrs. Woodrow—
- Wines, F. H.—One-time Pres. Nat. Asso. Charities and Correction.
- Witham, E. C.—Teacher Measurement.
- Witmer, L.—Special Classes Backward Children; Relation of Intelligence to Efficiency; Ed. Psychol. Clinic, Univ. Penn.
- Wundt, W.—Univ. Leipsig; Outlines of Psychology.
- Yale, Caroline—Prin. Sch. for Deaf, Northampton, Mass.
- Yerkes, R. M.—Point Scale for Measuring Ability (Yerkes, Bridges, Hardwick).
- Yocum, A. D.—Dept. Educ. Research, Univ. Penn.; Determinants of Course of Study.