Experimental study of children : including anthropometrical and psycho-physical measurements of Washington school children, and a bibliography / by Arthur MacDonald.

Fm The Royal College of Physicians, Edinburgh. present by the author.

[*Whole Number 248*

UNITED STATES BUREAU OF EDUCATION.

CHAPTERS FROM THE REPORT OF THE COMMISSIONER OF EDUCATION
FOR 1897-98.—CHAPTERS XXI AND XXV.

EXPERIMENTAL STUDY OF CHILDREN,

INCLUDING

ANTHROPOMETRICAL AND PSYCHO-PHYSICAL MEASUREMENTS
OF WASHINGTON SCHOOL CHILDREN,

AND

A BIBLIOGRAPHY.

BY

ARTHUR MAC DONALD,

Specialist in the Bureau of Education.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1899.

CHAPTER XXI.

EXPERIMENTAL STUDY OF CHILDREN,

INCLUDING

ANTHROPOMETRICAL AND PSYCHO-PHYSICAL MEASUREMENTS OF WASHINGTON SCHOOL CHILDREN.

BY

ARTHUR MAC DONALD,

SPECIALIST IN THE BUREAU OF EDUCATION.

CONTENTS.

The general reader may not be interested in all portions of this work. The following references may be of service:

CHAPTER XXI.

EXPERIMENTAL STUDY OF CHILDREN, INCLUDING ANTHROPOMETRICAL AND PSYCHO-PHYSICAL MEASUREMENTS OF WASHINGTON SCHOOL CHILDREN.

I. INTRODUCTION.

Before entering upon the introduction proper, the author may be allowed a few remarks. The original part of this work is chiefly a study of Washington school children; the rest is, in the main, an endeavor to present results of the principal investigations on school children up to the present time.

As to the original part of this study the reader will remember that all such work is in its infancy and must therefore be necessarily incomplete.

Many seemingly unimportant details are given, but, as remarked later on, to present too many details is less of a mistake than to present too few.

It is hoped that this, with the work of others, may aid in a more thorough study of children, on whom the future civilization depends.

ANTHROPOMETRY.

Anatomical measurement of children is one of the chief branches of anthropometry. Anthropometry is the measurement of the human body in general. It is a branch of anthropology, but independent in its purpose and methods.

ARTISTS THE FIRST ANTHROPOMETRISTS.

In early times measurements of the body were made in the service of art. It is in comparatively recent times that anthropometry has taken a scientific direction. The artist was interested almost wholly in the form and proportion of the human body, and so measured those only who were well-formed. The empirical investigator is interested in the measurements of all persons. The founder of this latter branch of study is the Belgian statistician, Quetelet. His purpose was to find what is typical in man, at the same time making note of the variations due to sex, age, race, and social position.

PRACTICAL NATURE OF ANTHROPOMETRY.

One of the practical aims of measurements of living men is to identify personality. It is to give to each individual a "positive, permanent, and invariable personality." Thus when a life-insurance policy or a certificate of death is to be drawn up, or when it is desired to identify some insane person or some one disfigured by sudden or violent death, by shipwreck or combat, it would be serviceable had those persons had their measurements recorded so that they could be identified with certainty. Banks and associations for mutual benefit could not be so easily swindled by the assertion of the death of a policy holder; impersonation of a pensioner or of an heir would be difficult, and "those who died in battle would not have a nameless grave."

BERTILLON SYSTEM OF MEASUREMENT.[1]

This is an extension of the idea of the Bertillon system of measurements for criminals—a system which aids in lessening crime. Crime is encouraged from the difficulty of distinguishing one person from another, so that habitual and professional criminals escape punishment.

This system, although intended primarily for a practical end, can be made of scientific value as far as it goes. Its measurements are length and width of head, distance between zygomatic arches, length of left foot, of left middle finger, left little finger, left forearm, and length and width of ear. There is a descriptive part including observation of the bodily shape and movements. Deformities, peculiar marks on the surface of the body resulting from disease or accident, and other signs, as moles, warts, scars, tattooings, etc., are noted. Experience has shown that absolute certainty of identity is possible by the Bertillon system. But the full benefits of a practical system of identification can not be reached unless applied to all individuals. There might be at first sentimental objections, as has happened in things subsequently of great utility to society. No one who intended to be an honorable citizen would have anything to fear; but, on the contrary, it would afford protection to humanity in enabling society to find its enemies. This certainty of identification would discourage dishonest voting, assist in recognizing deserters from the Army, in enforcing laws, and in facilitating many business matters.

IMPORTANCE OF MEASUREMENTS OF CHILDREN.

In the investigation of normal modern civilized man, the most important branch is probably the study of children. The importance of taking physical measurements of children in school lies in the fact that such measurements may be considered as a test for systems of physical culture. As pupils are examined periodically to test their

---

[1] See Part V, Instruments of Precision, page 1141.

mental growth and improvement, it is just as necessary for their welfare that their physical condition and development be ascertained, so that progress may be gained in body as well as in mind. But there must be some standard by which we can measure physical development and growth. This can only be ascertained by taking measurements of a large number of children of all school ages. Although the physical conditions upon which the activity of mind depends are so complex, and so much is still unknown, yet it can be said with almost a certainty that at those ages in which children grow rapidly there should be a corresponding reduction in the amount of study required, and this should be done even if the pupil is mentally capable of doing more, for no pupil should be developed in mind to the detriment of bodily conditions. The bright scholar, whom parents are too often inclined to push, needs it the least, especially if his physical condition is inferior to his mental. The saying that apples which ripen slowest last the longest is as true as it is homely. The systematic collection, then, of physical statistics in the public schools will furnish valuable facts for the hygienist and the educator.

NORMAL MAN SHOULD BE STUDIED.

Students of anthropology have confined their attention largely to uncivilized and prehistoric man, and consequently there is very little knowledge of modern civilized man, as compared with his less-worthy predecessors or contemporaries. We know more about rocks and brutes than about modern man. We have made sciences of the two former, but a science of the latter hardly exists. The men who have begun lately to study modern man have given the abnormal types, such as criminals, the insane, inebriates, paupers, etc., the advantage of their investigations. It is time that similar investigations should be made upon average normal men, who are the foundation of every community.

Also men of talent, great talent or genius, should be studied; for if it is important to study the criminal in order to find the causes of crime, and thereby prevent or lessen it, it is perhaps more needful to investigate the man of talent or genius, in order to learn those conditions and characteristics that lead to success in life.[1]

OBJECTIONS TO PSYCHO-PHYSICAL METHODS.

Objections are frequently made to the present psycho-physical methods of studying man. It is said that too much importance is attached to the physical side of man, as though the soul and mind could be measured by an instrument of precision. It is not intended here to enter upon a special discussion of this subject, about which there may be difference of opinion. The measurements made are measurements of the body or of physical effects in the body arising from either physical or mental causes or from both causes.

When, for instance, an instrument to measure pain, as a temporal

[1] See article on "Emile Zola" by author, Open Court, Aug., 1898.

algometer,[1] is pressed against the temple with gradually increasing force, and the subject tells as soon as the increasing pressure becomes in the least disagreeable—we will say that when the pressure reaches 2,000 grams it begins to feel disagreeable—the question arises as to what does this 2,000 grams pressure measure. It is not true to say that this is wholly a physical measurement, much less to say that it is wholly a mental or emotional measurement. It seems to be simply an approximate measurement of the combination of these three elements. In the present state of knowledge it would be hazardous to say which element enters most into the measurement.

The impression is sometimes formed from reading descriptions of instruments and details of long series of experiments, that psychophysical study ignores introspection; but this is a misconception.

It is natural that most investigation in comparatively new lines should take up the more elementary phenomena. Introspectional states of consciousness are perhaps the most complex, and it would have been premature to enter into their consideration before the simpler states had been thoroughly studied. There should be extensive investigation of introspection; it should be considered experimentally under definite conditions, etc. Speaking of the common error which makes experimental psychology a mere study of sensation and reaction time, Münsterberg says:

> Association and attention, memory and judgment, space and time, feelings and will, etc., these are the problems of study where the future of experimental psychology lies.

TRUTH FOR ITS OWN SAKE.

Notwithstanding the practical utility of anthropometry, which we have stated above,[2] objection is sometimes made that it, as well as other phases of scientific investigation, can not always be of immediate use.

The question is often asked as to the utility of experiments of this nature. The commercial or utilitarian spirit does not yield the best results, though it sometimes brings quick and paying returns. But in all experimental work much is done that subsequently is seen to have been unnecessary. This is mainly because the real significance of any initial truth can not be known until the discovery of other truths has been made. The purely practical point of view sometimes assumes that we ought to know beforehand what an experiment is going to prove, as though the investigation were but an interesting pastime, for, of of course, there would then be no necessity for the experiment.

In an empirical investigation new lines of study require much more detail. As a rule, it is better to have too many data than too few; for to assume in a preliminary inquiry what material is important and what not important is premature. To exclude material on theoretical grounds at the outset is to allow presuppositions undue influence. A

[1] See Part V, Instruments of Precision. [2] See page 990.

laboratory inquiry may be continued a year or more, and often the result of all the labor may be stated in one page or one sentence; or there may be only a negative conclusion, but this is no reason that an investigation should not be undertaken. Negative results may be useful for future study in indicating what methods or material to avoid.

Certain objections are sometimes made to new and necessarily incomplete lines of work. The type of objections referred to would hardly be made by investigators. Thus, it is sometimes said that unrelated facts, like a pile of bricks, do not make a house; but the answer is, you can not build a house or form a science without these separate facts; they are the material itself. It may be asked what is the use of knowing, for instance, that one group of children are more sensitive to heat than another group. We think there is some use, but we will waive that. The point of view suggested by these and similar objections overlooks the fact that such objections would have applied to all sciences in their early stages. If, for instance, individual facts about children, even if their immediate use is unknown, are not important, what is important in life? Many such objections would involve a discussion of points of view of life which it would be out of place to consider now. But it may be said, in general, that the primary object of science has always been *truth for its own sake*, and under the inspiration of this ideal many discoveries of the greatest utility to humanity have been made.

METHODS OF STUDY.

To establish the measure of work according to the strength of the individual is fundamental to the economy of health. This is especially true of children, but the difficulties here are greater than in adults, owing to the changes caused by growth. Overtaxing of the powers here leaves its mark generally throughout the whole future life of the child. No question, then, can be more important for the school, according to Combe, than:

(*a*) What is the maximum work suitable to a child in the different periods of development in its school life?

(*b*) Can this maximum be injurious at certain times, when all the vital force may be required for growth?

We must first know the physiology of normal growth, whether it is regular and when it increases or decreases in rate, and what influences this increase and decrease. There are two methods of pursuing such an investigation—the collective method and the individual method.

The collective method consists in measuring large numbers of children of every age, and obtaining the average or mean for each age, the value of which is in proportion to the number measured. Quetelet, of Brussels, was one of the first to use this method, but he only measured ten of each sex, which is too small a number to give any certainty to the results. Of much more importance are, for instance, Dr. Bowditch's measurements of 24,000 Boston school children. This method was employed by Alex. Hertel in Denmark, who measured 28,384 children in the different public schools. Axel Key in Sweden measured 15,000, most of whom were in the high schools; Erismann gives results from 3,000 children in Moscow, Pagliani for 2,016 in Turin. Kotelmann in Hamburg made very careful and extensive measurements, but on a limited number.

The individual method was employed by Liharzik in Vienna, who investigated 200 from 8 to 14 years of age, measuring them each year.

The results of both methods are not always exact. Most authors have, for example, considered children as being 9 years of age who were anywhere between the ages of 9 and 10. Others have more correctly recorded them at their *nearest age*. The result is that the averages of different authors are not for exactly the same years of age. Louis Roux, of Switzerland, employed a new and much more exact method, which consisted in following the month of birth, instead of the year, so that there were twelve groups. Thus, it was found that children born in summer were larger than those born in winter, a fact that may prove to be of some significance.

WHAT IS A NORMALLY DEVELOPED CHILD?

This question might be answered, but only within certain limits, owing to the variation and complexity of the human species. A method of inquiry would be to seek out the positively abnormal children and find what characteristics are peculiar to them. The remaining children in a general way might be called normal.

At present the desire is to find the norm, the average, the type or types of the great mass of children. This can be done only by measurements on large numbers, these measurements to be summarized according to the statistical method.

It is a common saying that "almost anything" can be proved by statistics. This may be true with their wrong interpretation. Yet without statistics there is little or no basis for opinion or conclusion. Every additional observation through counting, measuring, or weighing, every repetition of an experiment, when applied to large numbers, lessens the amount of error, giving a closer approximation to truth, against which preconceived ideas or theories have little weight.

According to Hasse, one of the aims of anthropometry is to find the normal relation between mental and physical development. The close relation of anthropometrical measurements of school children to hygiene will be evident when it is asked within what general limits shall growth in height, weight, strength, etc., be considered as representing a healthy normal child. In our present state of knowledge it would be hazardous to define a normally developed child.

ANTHROPOMETRY AND ABNORMALITIES.

There is doubtless in the early periods of life, up to adult age, a certain relation of bodily organs to one another. A want of such relation may produce abnormalities, which in turn may give a lack of grace, symmetry, or beauty to the human body. If such a relation is to be generally established, so that we may know within certain limits what can be considered the proper bodily proportions, measurements of large numbers of children at different ages and stages of growth must be made. Hence the only way to a definite knowledge as to the development of the human body will be through long and painstaking investigations. Thus the causes of homeliness, lack of beauty, deformities, and the like may be more definitely ascertained. This in turn may help in their prevention. Such abnormalities affect not only beauty, but, what is more important, health. When abnormalities are discovered early in youth there is more opportunity of avoiding their evil effects. The relation of these body abnormalities to disease may prove of practical importance. Thus Hildebrand, an experienced investigator, remarks that delicate slender people are much more subject to typhoid fever than to consumption; another says of the same class that they are much more inclined to nervous troubles than other people. Another physician of large experience asserts that where chest and trunk remain undeveloped the head and extremities are much more developed.

Beneke in Marburg has shown that the relation between the size of the heart and the circumference of the arteries is gradually changed during the growth of the body, and that there is a consequent variation in blood pressure. This is specially true at puberty, when the heart increases very fast in volume; for the arteries increase much in length with the increase of length of body, but their diameter is relatively little increased, so that much more work is required of the heart. Thus the growth in the length of body can be of the greatest importance to the development of the heart. Should this growth be irregular or abnormally fast, serious difficulties may arise, and Beneke has endeavored to show that herein lies the cause of the development of consumption at puberty. The importance, therefore, of determining the normal rate of growth is evident.

We have mentioned these general *opinions* of experienced physicians and specialists as an indication of the utility of the anthropometry of the future.

The following is a measurement blank being used by the author in the study of children:

No. ———.

Name, ——— ———; date, ———; school grade, ———; name of observer, ———; sex, ———; date of birth, ———; age in years and months, ———; color of hair, ———; of eyes, ———; of skin, ———; first born, ———; second born, ———; later born, ———.

ANTHROPOMETRICAL.

Weight, ——; lung capacity, ——; depth of chest, ——; width of chest, ——; circumference of chest, ——; height, ——; sitting height, ——; strength of lift, ——; of arms, ——; of right-hand grasp, ——; of left-hand grasp, ——; total strength, ——; is the subject left-handed? ——; maximum length of head, ——; maximum width of head, ——; cephalic index, ——; distance between zygomatic arches, ——; between external edges of orbits, ——; between corners of eyes, ——; length of nose, ——; width of nose, ——; height of nose, ——; nasal index, ——; length of ears, right, ——; left, ——; length of hands, right, ——; left, ——; width of mouth, ——; thickness of lips, ——.

PSYCHO-PHYSIOLOGICAL.

Least sensibility to locality, right wrist, ——; left wrist, ——; least sensibility to heat, right wrist, ——; left wrist, ——; least sensibility to contact on the skin, ——; least sensibility to pain by pressure of two points, ——; least sensibility to pain by pressure, right temporal muscle, ——; left temporal muscle, ——; least sensibility to smell, right nostril, ——; left nostril, ——; least sensibility of muscle sense to weight, right hand, ——; left hand, ——; pulse, ——; respiration, ——.

SOCIOLOGICAL.

Nationality of father, ——; nationality of mother, ——; nationality of grandfather, father's side, ——; mother's side, ——; nationality of grandmother, father's side, ——; mother's side, ——; occupation of parents, ——· education of parents, ——.

ABILITY IN STUDIES.

Bright, dull, or average, in general, ——; in arithmetic, ——; algebra, ——; grammar, ——; drawing, ——; geography, ——; history, ——; music, ——; reading, ——; spelling, ——; penmanship, ——; German, ——; French, ——; Latin, ——; Greek, ——; geometry, ——; physics, ——; science, ——; manual labor, ——; etc., ——.

(Answer after each study and for other studies not mentioned. When in doubt as to brightness or dullness, mark person average.)

ABNORMAL OR PATHOLOGICAL.

If abnormal or peculiar, name in what way, ——; unruly, ——; sickly, ——; defects in speech, ——; defects in sight, ——; defects in hearing, ——.

Palate, ——; aural asymmetry, ——; cephalic, ——; palpebral fissures, ——; frontals, ——; expression, ——; hand balance, ——; nutrition, ——; pigmentation, ——; ptosis, ——; rachitism, ——; epilepsy, ——; lordosis, ——; kyphosis, ——; scoliosis, ——; other defects, ——.

Remarks: ——

II. WASHINGTON SCHOOL CHILDREN.

Washington is a residential city with comparatively few foreigners. The well-to do and poorer classes among the whites are more equally divided than in most cities. There is a very general representation from all States among the residents. For these reasons a study and measurement of the school children of Washington may be capable of more general application to Americans as a whole.

In the study of the Washington school children several lines of investigation have been followed. One is a special study of 1,074 children, which considers cephalic index and sensibility to heat and locality upon the skin, with relation to sex, mental ability, and sociological condition. It is based upon measurements by the author.

Another is an anthropometrical and sociological study of all the school children, based upon measurements by the teachers.

A third is a purely psychological inquiry as to comparative mental ability in the different school studies as reported by the teachers.

A fourth is a study of the abnormal children in the schools as reported by the teachers.

TEACHERS OF WASHINGTON SCHOOLS.

Through the kindness and interest of the Superintendent of the schools of Washington, and of the teachers under his supervision, this study of the school children was made possible.

As to the value of such work, we can do no better than give the opinion of the celebrated anthropologist Virchow. In speaking of the teachers of Germany, who assisted in the investigation of the school children, Virchow says that those teachers were following out the end for which the schools strive—that is, self-knowledge; for such investigations aid in the question as to the origin of a people, that a nation may know itself.

CONCLUSIONS AS TO WASHINGTON SCHOOL CHILDREN.

For the convenience of those who may not go further into this inquiry, we give below the conclusions from our investigations of the Washington school children:

CONCLUSIONS AS TO 1,074 CHILDREN SPECIALLY STUDIED.

1. Dolichocephaly, or long-headedness, increases in children as ability decreases. A high percentage of dolichocephaly seems to be a concomitant of mental dullness.
2. Children are more sensitive to locality and heat on the skin before puberty than after.
3. Boys are less sensitive to locality and more sensitive to heat than girls.
4. Children of the nonlaboring classes are more sensitive to locality and heat than children of the laboring classes.
5. Colored children are much more sensitive to heat than white children. This probably means that their power of discrimination is much better, and not that they suffer more from heat.

CONCLUSIONS AS TO ALL THE SCHOOL CHILDREN.

6. As circumference of head increases mental ability increases.[1]
7. Children of the nonlaboring classes have a larger circumference of head than children of the laboring classes.

---

[1] It being understood that the race is the same.

8. The head circumference of boys is larger than that of girls, but in colored children the girls slightly excel the boys in circumference of head.

9. Colored girls have larger circumference of head at all ages than white girls.

10. An important fact already discovered by others is that for a certain period of time before and after puberty girls are taller and heavier than boys, but at no other time.

11. White children not only have a greater standing height than colored children, but their sitting height is still greater; yet colored children have a greater weight than white children—that is, white children, relatively to their height, are longer bodied than colored children.

12. Bright boys are in general taller and heavier than dull boys. This confirms the results of Porter.

13. While the bright colored boys excel the dull colored boys in height, the dull excel the bright in sitting height. This seems to indicate a relation or concomitancy of dullness and longbodiedness for colored boys.

14. The pubertal period of superiority of girls in height, sitting height, and weight is nearly a year longer in the laboring classes than in the nonlaboring classes.

15. Children of the nonlaboring classes have, in general, greater height, sitting height, and weight than children of the laboring classes. This confirms the results of investigations by Roberts, Baxter, and Bowditch.

16. Girls are superior to boys in their studies (but see conclusion 19).

17. Children of the nonlaboring classes show greater ability in their studies than children of the laboring classes. This confirms the results of others.

18. Mixture of nationalities seems to be unfavorable to the development of mental ability.

19. Girls show higher percentages of average ability in their studies than boys, and therefore less variability. This is interpreted by some to be a defect from an evolutionary point of view, but see conclusion 16.

20. As age increases brightness decreases in most studies, but dullness increases except in drawing, manual labor, and penmanship; that is, in the more mechanical studies.

21. In colored children brightness increases with age, the reverse of what is true in white children.

CONCLUSIONS AS TO CHILDREN WITH ABNORMALITIES.

22. Boys of the nonlaboring classes show a much higher percentage of sickliness than boys of the laboring classes.

23. Defects of speech are much more frequent in boys than in girls.

24. Boys show a much greater percentage of unruliness and laziness than girls.

25. The dull boys have the highest per cent of unruliness.

26. Abnormalities in children are most frequent at dentition and puberty.

27. Children with abnormalities are inferior in height, sitting height, weight, and circumference of head to children in general.

SECTION A.

A SPECIAL STUDY OF 1,074 SCHOOL CHILDREN, CONSIDERING CEPHALIC INDEX AND SENSIBILITY TO HEAT, AND LOCALITY ON THE SKIN, WITH RELATION TO MENTAL ABILITY, SOCIOLOGICAL CONDITION, SEX, AND PUBERTY.

All the measurements of this part of the investigation were made by the writer. There were in all more than 1,000 pupils specially studied, 526 boys and 548 girls.

The representative or typical schools were visited, and a room was set apart for making the measurements. It required about twenty minutes to measure each pupil. There were generally four pupils in the room, so that each one saw three measured before his or her turn came. The endeavor was to make all the conditions, as far as possible, similar for each pupil. Experiments were made upon the right hand or wrist first, then upon the left hand or wrist.

The pupils were selected according as it was convenient to send them in, so as to interfere as little as possible with their regular school duties.

After the measurements had all been made the teachers were requested to mark the pupils bright, dull, or average in general, and also to mark them in those special studies in which they were bright, dull, or average; and when in doubt to mark them average, so that there might be less liability to error in regard to the bright and dull, which are the two classes we specially desire to compare in all these investigations.

It may be objected that the teachers would tend to select the bright rather than the dull. After careful inquiry, we do not think this was the fact. But admitting it for the sake of argument, the teachers then might place more of the dull than of the bright under the head of average. But even in this case our main purpose would be served, which is to compare the bright and dull.

As an illustration, we give one of the detailed tables made by copying from the original cards or slips. Each number in column 1 of the specimen table that follows stands for one pupil.

Complete summaries of all the detailed tables are called "tables of anthropometrical measurements," which are given in section E, pages 1052-1094.

SPECIMEN TABLE.

Bright boys, with parents of nonlaboring classes.

[NOTE.—The experiments in pressure (column 8) were unsatisfactory; (b) indicates bright; (a) average; (d) dull.]

Number.	Grade.	Age.		Craniological. Maximum length of head.	Craniological. Maximum width of head.	Craniological. Cephalic index.	Physiological. Least sensibility to locality (æsthesiometer). Right wrist.	Least sensibility to locality (æsthesiometer). Left wrist.	Strength of grasp (dynamometer). Right hand.	Strength of grasp (dynamometer). Left hand.	Least sensibility to heat (thermæsthesiometer). Right wrist.	Least sensibility to heat (thermæsthesiometer). Left wrist.	Least sensibility to pressure, right wrist (baræsthesiometer).
1	2	3		4	4 a	4 b	5	5 a	6	6 a	7	7 a	8
		Y.	Mo.				Mm	Mm	Kg.	Kg.	°R.	°R.	
1	1	6	0	180	149	82.7	14	14	8	11	5.75	4	2
2	1	6	5	170	134	78.6	23	27	4	7	.75	2	10
3	1	6	5	170	136	80	15	15	7	7	4	5	10
4	1	6	6	170	134	78.6	15	13	7	7	1.50	2	5
5	1	6	10	181	138	76.2	12	11	10	9	3.50	2	2
6	2	7		170	137	80.5	....	14	10	11	4.50	1	10
7	2	7	9	176	133	75.5	13	15	11	11	.75	2	2
8	3	8		178	140	78.6	12	10	9	9	5	4.50	2
9	3	8	1	175	145	82.9	14	16	10	9	1.50	1.25	1
10	3	8	3	175	139	79.4	12	17	11	10	1	2	5
11	1	8	4	177	130	73.4	10	12	8	8	2.50	1.25	2
12	3	8	5	184	146	79.3	15	12	9	9	5	3	2
13	1	8	7	171	143	83.5	27	20	8	7	2	.....	12
14	2	8	9	181	150	82.8	11	12	12	11	4	5	10
15	1	8	10	185	139	75.1	20	20	15	12	.50	1	1
16	3	8	11	180	141	78.3	12	9	15	14	1.50	2	1
17	3	9		174	138	79.3	22	18	10	11	7.50	7.50	5
18	3	9		188	148	78.6	15	15	16	14	4.50	3	2
19	3	9		173	141	81.5	15	19	13	12	5	1	3
20	4	9		173	141	81.5	17	13	12	13	3.50	1.50	8
21	3	9		178	143	80.3	23	19	14	11	1	2	2
22	2	9	1	172	134	77.9	20	15	16	14	2	2	1
23	2	9	3	186	136	73.1	10	9	11	10	.12	.12	1
24	3	9	4	180	140	77.7	15	13	13	11	3	3.50	1
25	2	9	7	176	143	81.2	16	15	11	10	3	3	50-58

Number.	Educational. All studies.	Algebra.	Arithmetic.	Bookkeeping.	Chemistry.	Composition.	Drawing.	Geography.	Geometry.	German.	Grammar.	Greek.	History.	Language and English.	Latin.	Manual labor, or sewing.	Mathematics.	Music.	No studies.	Penmanship.	Phonics and sounding.	Physical culture.	Physics.	Physiology.	Political economy.	Reading.	Science—botany.	Spelling.	Nationality. American nationality.	American mixed.	German.	Irish.	Other nationalities.
1	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
1	...	...	b	...	...	...	...	...	...	...	...	...	...	b	...	b	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...
2	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
3	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
4	...	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	b	b	...	×	...	...	...	...
5	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
6	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	...	...	d	...	...	...	a	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
8	...	...	b	...	...	b	b	...	...	...	...	...	...	...	...	...	...	...	...	a	...	...	...	...	...	b	...	...	...	×	...	...	...
9	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	...	...	...	...	...
10	...	...	b	...	...	...	b	...	b	...	...	...	...	...	...	...	...	b	...	b	...	...	...	...	...	...	...	b	×	...	...	...	...
11	...	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	b	b	...	×	...	...	...	...
12	...	...	b	...	...	...	b	...	b	...	...	...	...	...	...	...	...	b	...	...	...	...	...	...	...	b	...	b	×	...	...	...	...
13	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
14	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
15	...	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	b	b	...	×	...	...	...	...
16	...	...	b	...	...	...	a	b	...	...	...	...	...	b	...	...	...	a	...	a	...	...	...	...	...	b	...	b	×	...	...	...	...
17	...	...	b	...	...	b	b	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	a	...	a	×	...	...	...	...
18	...	...	b	...	...	b	a	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	...	b	×	...	...	...	...
19	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	...	×	...	...	...
20	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
22	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...
23	...	...	b	...	...	...	b	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	b	...	b	×	...	...	...	...
24	...	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
25	...	...	b	...	...	...	a	...	...	...	...	...	...	...	...	...	...	b	...	a	...	...	...	...	...	a	b	b	...	En	...	...	...

26	4	9	8	170	146	85.8	10	6	12	10	4	1	1	..	...	b	...	...	a	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	b	a	×	...	...	...	...
27	4	9	9	176	141	80.1	15	14	14	14	5	2	1	..	...	b	...	...	b	...	b	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	b	...	b	×	...	...	...	...
28	3	9	10	190	143	75.2	16	12	16	15	4	4	50-53	..	...	b	...	...	...	b	b	...	...	...	...	...	b	...	...	...	b	...	b	...	...	...	...	...	b	...	b	×	...	...	...	...
29	1	9	11	180	142	78.8	9	8	15	15	2	5	4	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...
30	3	9	11	174	144	82.7	14	15	14	15	1.50	2	50-55	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	b	...	Gr	...	...	...
31	4	10		172	136	79	17	17	14	15	4.50	3.50	10	..	...	b	...	...	...	b	b	...	...	...	...	...	b	...	...	...	a	...	a	...	...	...	...	...	b	...	b	×	...	...	...	...
32	5	10		178	138	77.5	12	10	10	11	7	7	1	..	...	b	...	...	...	a	b	...	...	...	...	b	b	...	...	...	...	...	d	...	...	...	...	...	...	...	d	×	...	...	...	...
33	3	10		177	137	77.4	18	18	15	13	6.50	4.50	10	..	...	b	...	...	b	a	...	...	...	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	b	...	a	×	...	...	...	...
34	5	10		179	142	79.3	18	13	15	14	4	3.75	2	..	...	b	...	...	...	b	b	...	...	...	...	b	b	...	...	...	a	...	b	...	...	...	...	...	...	...	a	×	...	...	...	...
35	2	10		174	138	79.3	15	15	15	12	3	2.50	2	..	...	b	...	...	b	...	...	...	...	...	...	...	...	...	b	...	...	...	...	...	...	...	...	...	b	...	a	×	...	...	...	...
36	3	10	2	175	145	82.9	6	11	13	12	1	1.50	200-220	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	...	...	b	...	...	...	...	...	...	...	b	...	...	×	...	...	...	...

MEASUREMENTS OF THE CRANIUM.

The measurements of the cranium are perhaps the most important, as it incases the brain. It is also probable, for the same reason, that defects of the cranium are more significant than those in other portions of the body. It is sometimes said that in general the nearer a physical defect is to the brain, the more significant it is. In this connection it may be mentioned that a high palate is a frequent accompaniment of mental feebleness—a sign of congenital defect.

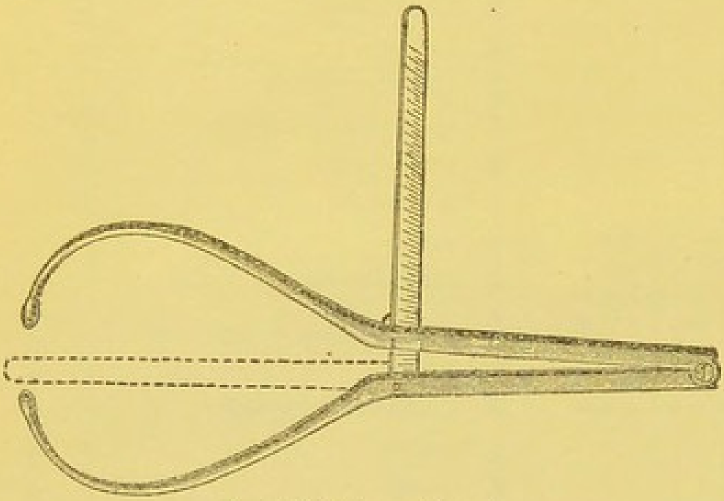


FIG. 1. Callipers (Broca).

The two most common measurements of the head are its maximum length and maximum width. In order to compare the length and breadth conveniently the width is multiplied by 100 and divided by the length, giving the cephalic index, which is one of the most important measurements in anthropology. When this index is 75 or less the person is considered long headed or dolichocephalic; when it is more than 75 and less than 80 the head is called medium or mesocephalic, and when the index is from 80 to 85, inclusive, the individual is said to be broad headed or brachycephalic.

The instrument used to measure the head is the callipers, represented in fig. 1.

SENSIBILITY TO HEAT.

There have been found on the body what are called *temperature spots* (Goldscheider and Blix). They are arranged in lines or in chains; thus in fig. 2 are represented the cold and warm spots of the upper side of the forearm.

The temperature sense seems to have special cold nerves and warm nerves which blend with the nerve of touch; thus specific cold and warm sensations are felt at points or areas on the skin which correspond to the ends of the temperature nerves. This extends the doctrine of the specific energy of the senses.

The least sensibility to heat was determined by the thermæsthesiometer of Eulenburg (fig. 3).

This is an instrument consisting of two thermometers fastened together, as seen in the figure. The electrical arrangement for changing the temperature of the instrument was not employed. The left-hand thermometer (A) was heated until it registered about 10° higher temperature than the right-hand thermometer (B); then the two thermometers were placed on the palmar surface of the wrist in a line at right angles to the length of the wrist; the subject was asked which was the warmer, and on replying correctly the thermometers were held on the skin until the subject could not tell which was the warmer; at this instant the difference in degrees between the thermometers was read. This difference must be regarded only as a *relative* indication of the least sensibility to heat. Distinguishing small differences of temperature indicates acuteness of sensibility to heat; or, on the other hand, the greater the difference of temperature required to be perceived by the subject, the greater the obtuseness to heat. Thus if C can not tell the difference between the two thermometers after their difference is less than 3° and D after it is less than 2°, D is more acute to heat by 1° than C.

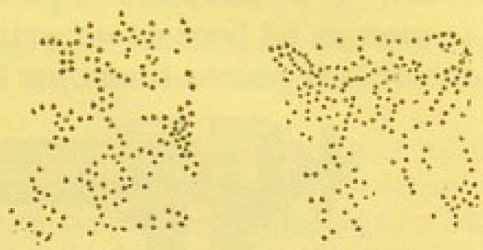


FIG. 2. Temperature spots (Eulenburg).

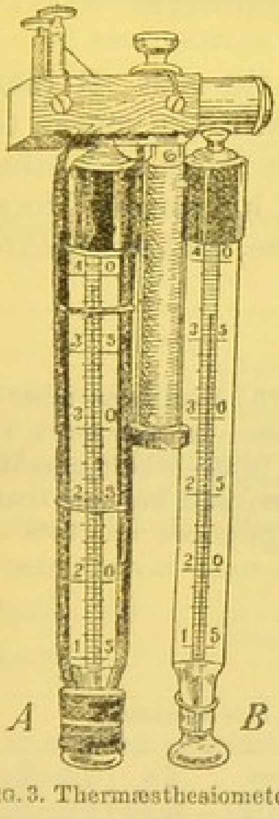


FIG. 3. Thermæsthesiometer.

STRENGTH OF HAND GRASP.

The strength of hand grasp is measured by the dynamometer. This instrument (fig. 4) is squeezed in the hand while the arm is held out horizontally from the side of the body. The strength of the right hand was generally taken first. The dynamometer is to some extent a sociological instrument, in distinguishing those who do manual labor from those who do not by the greater strength of hand in the former.

SENSIBILITY TO LOCALITY ON THE PALMAR SURFACE OF THE WRIST.

The capacity of distinguishing points on the body by the sense of touch is called the sense of locality. The palmar surface of the wrist was the part of the body chosen, owing to its convenience for making the experiment. The sense of locality on the skin varies in acuteness according to the mobility of the part, increasing in the extremities toward the fingers and toes.

The instrument used in determining the least sensibility to locality is the æsthesiometer (fig. 5).

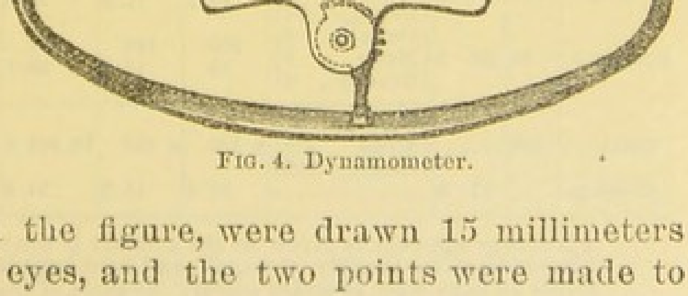


FIG. 4. Dynamometer.

The two points, as seen in the figure, were drawn 15 millimeters apart. The pupil closed his eyes, and the two points were made to touch simultaneously the skin on the palmar surface of the wrist. He was asked if he felt one or two points. In case he felt only one point, the instrument was raised and the points were moved farther apart. If he felt the two points, they were moved closer together. Just as soon as he became uncertain in either case, as to whether there were one or two points touching the skin, the distance between the points

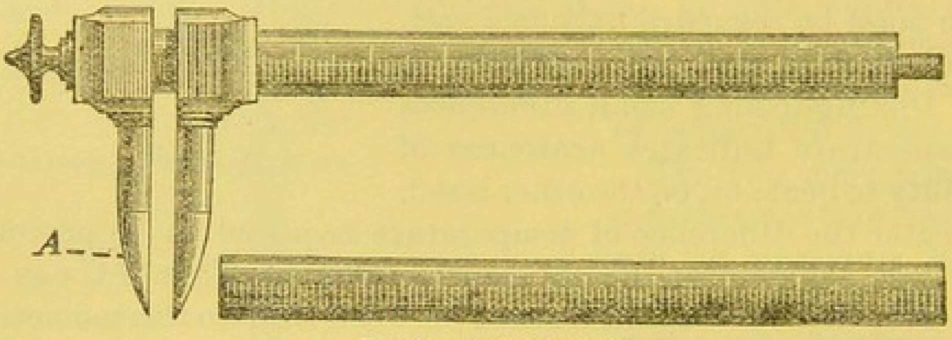


FIG. 5.—Æsthesiometer.

was read in millimeters as recorded by the scale on the rod. It takes more acuteness to distinguish two points on the skin the closer the points are together. The distance of the two points from each other, when the pupil is in doubt, is taken as a measure of his sense of locality. The less the distance the more acute is his sense, and the greater the distance the more obtuse his sense of locality.

RESULTS OF INVESTIGATION.

It is a general principle in new lines of inquiry to regard the results as more or less tentative according to the number of experiments made. In this work the results depend upon averages, which are valuable according to the whole numbers from which the averages are made. The conclusions, therefore, will be more trustworthy the larger the numbers measured. In many instances those numbers are not as large as we would desire; but we hope this will induce some investigator to make experiments upon larger numbers.

TABLE A.—*Boys.*

["Boys" means white boys. When colored children are meant, it is so stated.]

Class.	Number of cases.	Average age. *a*	Cephalic index.	Least sensibility to locality. *b* Right wrist.	Least sensibility to locality. *b* Left wrist.	Strength of grasp. *b* Right hand.	Strength of grasp. *b* Left hand.	Least sensibility to heat. *b* Right wrist.	Least sensibility to heat. *b* Left wrist.	Long-headed (dolichocephalic).	Medium (mesocephalic).	Broad-headed (brachycephalic).
		Y. M.		*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	*°R.*	*°R.*	*P. ct.*	*P. ct.*	*P. ct.*
Bright...	237	12 4	Dolicho. 20 Meso ...121 Brachy . 96	3,791 16.1	3,559 15	4,687 19.9	4,331 18.3	900.49 3.80	828.09 3.51	8	51	41
Dull	137	13 1	Dolicho. 21 Meso ... 56 Brachy . 59	2,222 16.2	2,133 15.6	3,369.5 24.6	3,161 23.1	597.50 4.36	551.25 4.05	15	41	44
Average.	142	12 1	Dolicho. 17 Meso ... 58 Brachy . 67	2,426 17.1	2,315 16.3	2,644 18.6	2,501.5 17.7	646.25 4.62	603.75 4.34	11	40	49
Unruly *c*.	10	14 5	Dolicho. 4 Meso ... 3 Brachy . 3	150 15	145 14.5	291 29.1	277 27.7	42.50 4.25	44.00 4.40	40	30	30
Total ...	526	......	Dolicho. 62 Meso ...238 Brachy .225	8,589	8,152	10,991.5	10,270.5	2,186.74	2,027.09	......	......	......
Average	....	12 9	....	16.4	15.5	20.9	19.6	4.17	3.89	11	45	44

a Average age only is given, as the number is too small for divisions according to age.
b In columns for locality, strength, and heat both totals and averages are given.
c Only 10 boys were reported unruly; no girls of the 548 (table 13) were reported unruly.

Shape of head.—It will be seen from Table A that a large proportion of the boys are broad-headed rather than long-headed. Long-headedness, or dolichocephaly, seems to be an unfavorable sign, for the bright show the smallest percentage, the average next, and the dull the largest percentage; the unruly boys have a large percentage of long heads.

Sensibility to heat.—The bright boys are the most sensitive to heat; but there is no further parallelism between sensitiveness to heat and mental ability, for the average boys are less sensitive than the dull boys.

Strength of hand grasp.[1]—There seems to be no relation between strength of hand and mental ability. Strength of hand depends more upon sociological conditions; that is, those children who through force of circumstances are compelled to work outside of school hours and are sometimes kept out of school for this purpose, naturally develop their strength. The percentage of dullness among such children is liable to be large, and this may account for the dull boys having comparatively greater strength of hand grasp.

Sensibility to locality.—Comparing girls with boys, the girls are more sensitive than the boys. In general, both boys and girls are more sensitive to locality and heat in the left hand than in the right.

TABLE B.—*Girls.*

Class.	Number of cases.	Average age.	Cephalic index.	Least sensibility to locality.		Strength of grasp.		Least sensibility to heat.		Long-headed (dolichocephalic).	Medium (mesocephalic).	Broad-headed (brachycephalic).
				Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.			
		Y. M.		*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	°*R.*	°*R.*	*P. ct.*	*P. ct.*	*P. ct.*
Bright...	269	12 10	Dolicho. 33 Meso ...137 Brachy . 98	3, 892 14. 5	3, 667 5 13 7	4, 529. 2 16. 9	4, 204 15. 7	1, 122. 11 4. 19	1, 023. 73 3. 82	12	51	37
Dull.....	149	13 8	Dolicho. 11 Meso ... 70 Brachy . 67	2, 252 15. 4	2, 068 14. 2	2, 517 17. 1	2, 419. 2 16. 5	684. 00 4. 62	631. 25 4. 27	8	47	45
Average.	130	13 0	Dolicho. 15 Meso ... 58 Brachy . 56	1, 968 15. 3	1, 838 14. 2	2, 096. 5 16. 3	1, 974. 5 15. 3	612. 25 4. 71	561. 99 4. 32	13	44	43
Total...	548	......	Dolicho. 59 Meso ...265 Brachy .221	8, 112	7, 573. 5	9, 142. 7	8, 597. 7	2, 418. 36	2, 216. 97	......	......	......
Average	....	13 1	....	14. 9	13. 9	16. 8	15. 8	4. 43	4. 06	12	48	40

In making conclusions from Table B we will compare the results with those of Table A.

Shape of head.—Bright girls have a larger percentage of long-headedness than dull girls. The reverse is the case with boys.

Sensibility to heat.—The bright girls are most sensitive to heat. Compared with the boys, the girls are less sensitive to heat.

[1] There is objection to comparing strength of hand grasp according to average age; but as remarked before, the numbers are too small for division according to ages. Yet we have thought best to give these comparisons of hand grasp.

TABLE C.—*Relation of sensibility to ability in different studies.*

[Pupils reported by the teachers as bright, average, or dull in arithmetic, language, and drawing.]

Divisions according to ability in different studies.	Number of line.	Number of individuals.	Average age.		Long-headed (dolichocephalic).	Medium-headed (mesocephalic).	Broad-headed (brachycephalic).	Least sensibility to locality.		Strength of hand grasp.		Least sensibility to heat.	
								Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.
Boys:			*Yr.*	*Mo.*	*P. ct.*	*P. ct.*	*P. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
Bright in arithmetic...	1	108	10		7	49	44	15.5	14.6	13.8	13.2	3.35	3.00
Dull in arithmetic.....	2	45	12	0	17	45	38	15.0	15.4	16.3	15.9	3.56	3.27
Average in arithmetic.	3	48	10	8	13	37	50	16.3	15.6	14.5	13.9	4.22	4.03
Bright in language....	4	56	10	11	4	50	46	16.5	15.2	15.5	14.7	3.54	3.70
Dull in language.......	5	28	13	3	23	40	37	15.9	16.2	21.9	21.3	4.40	3.99
Average in language ..	6	.50	11	6	14	30	56	16.6	15.8	16.8	16.8	4.25	4.17
Bright in drawing......	7	57	10	7	4	54	42	16.4	14.6	14.2	13.4	3.18	3.25
Dull in drawing.......	8	23	11	9	6	54	40	15.5	15.6	15.6	15.5	3.92	3.32
Average in drawing...	9	26	10	10	10	45	45	15.9	15.3	14.6	13.8	3.59	3.75
Girls:													
Bright in arithmetic...	10	73	10	10	20	51	29	14.5	13.4	12.7	11.8	3.97	3.39
Dull in arithmetic.....	11	34	12	6	9	47	44	17.1	14.8	13.9	13.7	4.15	4.03
Average in arithmetic.	12	16	10	4	7	50	43	13.2	12.9	11.5	11.0	4.20	3.78
Bright in language....	13	73	13	11	9	61	30	14.4	13.5	20.0	18.3	3.88	3.86
Dull in language.......	14	44	15	8	10	59	31	14.6	13.9	20.2	19.2	4.44	3.99
Average in language ..	15	25	14	4	8	52	40	14.2	13.0	19.7	18.3	3.48	3.32
Bright in drawing......	16	30	12	7	8	55	37	13.7	12.7	16.3	14.9	3.77	3.15
Dull in drawing.......	17	18	12	9	17	22	61	17.4	14.6	15.1	14.7	3.96	3.85
Average in drawing...	18	13	12	0	9	30	61	13.1	12.8	13.8	12.7	3.96	3.87

In Table C we desire to find what relation, if any, may exist between the sensibilities, cephalic index, and degrees of ability in different lines of study.

The arithmetical faculty is most strikingly developed, if we consider as an indication the comparatively large number of bright pupils. This number is more than double in many instances the number of bright in other studies. The exception is with the girls, where the same number are bright in both language and arithmetic.

It is striking to notice that, in general, the per cent of dolichocephaly or long-headedness increases as ability decreases. This applies to the different studies. The striking exception is with the girls bright in arithmetic. This is the more difficult to explain, because the girls, as a whole, have about the same percentage of dolichocephaly as the boys (Tables A and B). Comparing this table with the others a relatively high per cent of dolichocephaly is found to be to a certain extent a characteristic of dullness.

The average age of boys increases as we approach the dull boys. This is true of the girls, if we compare only the bright and the dull, the average age of the latter being higher than that of the former. This may be due in the main to the fact that the dull have not been promoted in due course, and hence are found associated in the different grades with pupils younger than themselves, who have advanced by regular stages. They stay out or are kept out of school very often on account of the difficulties they meet in their studies. Many dull children become discouraged and embrace every opportunity to remain away from school.

It will be seen from the table that, with few exceptions, the bright have the least strength of hand grasp, which increases in the average and reaches its maximum in the dull. One reason for this may be of a sociological nature. For, as just mentioned, the dull may be absent from school more, and work more with their hands.

In examining Table D it becomes evident that both boys and girls are more sensitive to locality and heat before puberty than after. But the boys, however, show a greater difference between these periods of life than the girls. It may be noted incidentally that, in the pubertal division, the girls still maintain their superiority in sensitiveness to locality. This superiority is greater after puberty. After puberty the boys grow relatively stronger in hand grasp as compared with the girls.

Among the boys the percentage of long heads is much greater after puberty than before, except in the case of the average boys. As the pupils were all originally selected simply from the point of view of bright, dull, or average in mental ability, the relatively high percentage of long heads could hardly be accidental. In the case of the girls, on the other hand, the percentage of long heads is the same before and after puberty. But if we look at the subclasses, the average girls seem to be an exception, just as the average boys were above.

If we look under the columns for dolichocephaly and brachycephaly, we find in the case of all the boys that as the percentage of long heads increases after puberty the percentage of broad heads decreases. This last part is common to both girls and boys; that is, there is about 10 per cent less of broad heads after puberty among the 1,074 children measured.

TABLE D.—*Puberty in relation to cephalic index, strength, and sensibility.*

[The legal ages for puberty are followed here; age 12 for girls, and age 14 for boys.]

Divisions according to puberty and mental ability.	Number of line.	Number of individuals.	Average age.		Long-headed (dolichocephalic).	Medium-headed (mesocephalic).	Broad-headed (brachycephalic).	Least sensibility to locality.		Strength of hand grasp.		Least sensibility to heat.	
								Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.
			Yr.	*Mo.*	*Pr. ct.*	*P. ct.*	*P. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
All boys:													
Before puberty	1	315	10	7	8	44	48	15.7	14.9	14.0	13.4	3.89	3.62
After puberty	2	201	15	11	16	48	36	17.4	16.5	31.3	28.7	4.57	4.20
All girls:													
Before puberty	3	186	9	7	11	41	48	14.5	13.8	10.6	10.0	4.35	3.89
After puberty	4	362	14	11	11	51	38	15.0	13.8	19.8	18.6	4.45	4.13
All bright boys:													
Before puberty	5	168	10	11	6	51	43	15.7	14.8	14.3	13.6	3.65	3.40
After puberty	6	69	15	11	13	54	33	16.8	15.4	33.1	29.7	4.17	3.71
All dull boys:													
Before puberty	7	49	9	11	6	35	59	15.1	14.5	13.0	12.8	3.94	3.46
After puberty	8	88	16	1	21	45	34	16.9	16.2	31.1	28.8	4.59	4.34
All average boys:													
Before puberty	9	98	10	6	13	38	49	16.1	15.2	14.0	13.4	4.28	4.07
After puberty	10	44	15	8	9	48	43	19.4	18.7	29.0	27.0	5.15	4.66
All bright girls:													
Before puberty	11	105	9	6	12	45	43	14.3	13.6	10.6	9.9	4.19	3.68
After puberty	12	164	14	11	12	55	33	14.6	13.7	20.8	19.3	4.16	3.89
All dull girls:													
Before puberty	13	35	9	1	9	28	63	15.4	14.4	10.4	9.9	4.01	3.94
After puberty	14	114	15	1	7	53	40	15.0	13.7	18.9	18.2	4.77	4.33
All average girls:													
Before puberty	15	46	9	9	9	43	48	14.4	13.7	10.6	10.1	4.95	4.32
After puberty	16	84	14	10	14	45	41	15.5	14.4	19.2	18.0	4.58	4.32
All boys	17	526	12	9	11	45	44	16.4	15.5	20.9	19.6	4.17	3.89
All girls	18	548	13	1	12	48	40	14.9	13.9	16.8	15.8	4.43	4.06

SOCIOLOGICAL CONDITION IN RELATION TO MENTAL ABILITY AND SENSIBILITY.

It is desirable to know whether occupation of parents or sociological conditions have any effect upon the mental and sensitive condition of children.

Any classification of parents as to occupation must be more or less open to criticism; but the schedules of Drs. Baxter and Bowditch, given below, will perhaps serve as well as any. We have followed Dr. Bowditch in making only two divisions: Nonlaboring classes, including the professional and mercantile classes; and laboring classes, embracing all others, to wit, skilled laborers and unskilled laborers.

Classification of occupations by Baxter and Bowditch.[1]

Nonlaboring classes.		Laboring classes.		
Professional.	Mercantile.	Skilled labor.		Unskilled labor.
1. Architects.	1. Agents.	1. Bakers.	26. Paper makers and hangers.	1. Barkeepers.
2. Clergymen.	2. Brokers.	2. Barbers.	27. Photographers.	2. Boatmen.
3. Dentists.	3. Clerks.	3. Blacksmiths.	28. Plasterers.	3. Carters and drivers.
4. Druggists.	4. Grocers.	4. Bookbinders.	29. Plumbers.	4. Factory hands.
5. Editors.	5. Innkeepers.	5. Brickmakers.	30. Printers.	5. Farmers.
6. Lawyers.	6. Liquor dealers.	6. Butchers.	31. Sailmakers.	6. Firemen.
7. Musicians.	7. Merchants.	7. Cabinetmakers.	32. Shoemakers.	7. Fishermen.
8. Physicians.	8. Peddlers.	8. Carpenters.	33. Stonecutters.	8. Hostlers.
9. Public officers	9. Tobacconists.	9. Carriage makers.	34. Tailors.	9. Laborers.
10. Students.	(2)	10. Cooks.	35. Tanners and curriers.	10. Lumbermen.
11. Teachers.	1. Bookkeepers.	11. Coppersmiths.	36. Telegraph operators.	11. Miners.
(2)	2. Caterers.	12. Distillers.	37. Tinsmiths.	12. Porters.
1. Actors.	3. Collectors.	13. Engineers.	38. Upholsterers.	13. Railroad men.[2]
2. Army or navy officers.	4. Contractors.	14. Engravers.	(2)	14. Sailors.
3. Civil engineers.	5. Cotton samplers.	15. Gun and lock smiths.	1. Bridge superintendents.	15. Soldiers.
4. Surveyors.	6. Detectives.	16. Harness makers.	2. Conductors.	16. Servants.
	7. Railroad superintendents.	17. Hatters.	3. Foremen.	17. Watchmen.
	8. Salesmen.	18. Iron workers.	4. Inspectors.	(2)
	9. Sea captains.	19. Jewellers.	5. Letter carriers.	1. Expressmen.
	10. Undertakers.	20. Machinists.	6. Molders.	2. Jobbers.
	11. Weighers.	21. Manufacturers.	7. Packers.	3. Pavers.
		22. Masons.	8. Policemen.	4. Puddlers.
		23. Mechanics.	9. Stable superintendents.	5. Whitewashers.
		24. Millers.		
		25. Painters.		

[1] Statistics, Medical and Anthropological, of the Provost-Marshal-General's Bureau, by J. H. Baxter, A. M., M. D., Washington, 1875. The second division in each column consists of occupations added by Dr. Bowditch.

[2] We have not followed this table strictly; for instance, many railroad men performed skilled labor.

Comparing the children whose parents belong to the laboring class and nonlaboring class, respectively, it will be seen from Table E that in the case of both boys and girls the children of the nonlaboring classes are more sensitive to locality and heat, but this difference is not great.

If the classification according to ability below line 6 is examined, the nonlaboring classes are found to be more acute in sensitiveness to locality and heat than the laboring classes, except in the case of dull boys of the nonlaboring classes (line 9), who are much less sensitive than the dull boys of the laboring classes (line 15). This striking exception may be taken in connection with the exceptionally large proportion of long heads in the dull boys of the nonlaboring classes, which is 28 per cent, while with the dull boys of the laboring classes it is 6 per cent.

TABLE E.—*Sociological condition in relation to mental ability, sensibility, etc.*

Divisions according to social classes and ability.	Number of individuals.	Average age in years and months.		Long-headed (dolichocephalic).	Medium-headed (mesocephalic).	Short-headed (brachycephalic).	Least sensibility to locality.		Strength of grasp.		Least sensibility to heat.	
							Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.
		Yrs.	*Mo.*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
Nonlaboring classes:												
All boys	205	12	6	13	51	36	16.1	15.2	19.4	18.3	4.03	3.85
All girls	183	13	10	11	51	38	14.4	13.6	18.8	17.5	3.92	3.52
Laboring classes:												
All boys	119	11	11	8	40	52	16.7	15.9	17.2	16.2	4.07	3.74
All girls	133	13	5	13	51	36	14.9	13.7	17.0	15.9	4.19	3.93
Not socially divided:												
All boys	117	14	2	11	47	42	16.8	15.9	28.0	25.8	4.40	3.98
All girls	199	12	2	9	45	46	15.3	14.2	14.7	14.1	5.06	4.60

TABLE E.—*Sociological condition in relation to mental ability, sensibility, etc.*—Cont'd.

Divisions according to social classes and ability.	Number of individuals.	Average age in years and months.	Long-headed (dolichocephalic.)	Medium-headed (mesocephalic).	Short-headed (brachycephalic)	Least sensibility to locality.		Strength of grasp.		Least Sensibility to heat.	
						Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.
Nonlaboring classes:		*Yrs.Mo*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*	*Mm.*	*Mm.*	*Kilos*	*Kilos.*	° *R.*	° *R.*
Bright boys	117	12	9	57	34	15.4	14.3	17.9	16.6	3.66	3.63
Bright girls	114	13 1	13	53	34	14.1	13.3	17.7	16.2	3.87	3.46
Dull boys	39	14 1	28	44	28	17.6	17.2	24.9	23.0	4.72	4.61
Dull girls	39	15 4	8	46	46	15.2	14.3	20.3	19.5	4.27	3.68
Average boys	49	12 6	12	43	45	16.9	16.0	18.9	18.7	4.44	4.09
Average girls	30	14 10	10	48	42	14.3	13.6	20.8	19.7	3.68	3.56
Laboring classes:											
Bright boys	53	12	8	32	60	16.7	15.5	17.9	16.9	3.86	3.46
Bright girls	62	13 2	14	60	26	14.8	13.8	17.6	16.2	3.93	3.62
Dull boys	34	12 7	6	38	56	15.9	15.8	18.2	17.5	3.48	3.09
Dull girls	34	13 9	12	44	44	15.3	13.6	16.9	16.2	4.49	4.32
Average boys	32	11 1	13	53	34	17.1	16.3	14.6	13.4	4.90	4.91
Average girls	37	13 7	11	43	46	15.3	14.6	16.4	15.5	4.36	4.10
Not socially divided:											
Bright boys	55	13 10	9	58	33	16.8	16.1	27.2	24.4	4.04	3.54
Bright girls	83	12 2	8	44	48	14.7	13.9	15.2	14.6	4.73	4.33

As compared with bright girls, the average girls of the same social classes are less sensitive and not so strong. As compared with dull girls of the same social classes, the average girls show less difference of sensibility. Sometimes they are more sensitive than the dull girls.

COMPARISON OF BOYS AND GIRLS OF THE SAME SOCIAL CLASSES.

Bright boys and girls (Table E).—Boys of nonlaboring classes are less sensitive to locality; boys of laboring classes are less sensitive both to locality and heat; boys not socially divided are less sensitive to locality, but more sensitive to heat. This last fact is what might be expected where there is no social division, for boys in general are more sensitive to heat than girls, but less sensitive to locality. (See Tables A and B.)

Dull boys and girls (Table E).—Boys of nonlaboring classes are much less sensitive to locality and slightly less sensitive to heat; boys of laboring classes and classes not socially divided are less sensitive to locality, but more sensitive to heat; boys unruly are much less sensitive to locality and slightly less sensitive to heat.

Average boys and girls (Table E).—Boys of both classes are less sensitive both to locality and heat.

These more detailed results from the special subdivisions of the tables confirm the more general conclusions from Tables A and B.

White boys; colored boys.—The percentage of long-headedness among the colored boys is more than double that of the white boys (Table F). This is doubtless due to racial influence.

The bright colored boys are more sensitive to heat than the dull colored boys (Table G).

In order to compare the white boys and colored boys further we give Table F, showing averages for all the white boys taken from Tables A, B, G, and H.

The colored boys are more sensitive to locality and much more sensitive to heat than the white boys. This is probably due to racial influence. It does not mean necessarily that colored children feel the heat more in the sense of disagreeableness, but that their power of discrimination of different degrees of heat is greater. Thus we have found that women are more sensitive to pain by pressure on the temporal muscles than men,[1] but this does not necessarily mean that they suffer more from pain, or can not endure as much pain. They probably can endure more than men, owing to their greater idealizing power.

TABLE F.

Race in relation to cephalic index, sensibility, etc.	Number of persons.	Average age.	Dolichocephalic.	Mesocephalic.	Brachycephalic.	Least sensibility to locality.		Strength of grasp.		Least sensibility to heat.	
						Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.
		Yr. Mo.	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	°*R.*	°*R.*
All boys:											
White	526	12 9	11	45	44	16.4	15.5	20.9	19.6	4.17	3.89
Colored	33	13 3	32	53	15	14.3	13.9	19.7	18.4	2.07	1.77
All girls:											
White	548	13 1	12	48	40	14.9	13.9	16.8	15.8	4.43	4.06
Colored	58	13 1	27	52	21	15.3	14.2	17.3	16.3	2.64	2.47

We regret that the number of colored children measured is so small. In making comparisons, therefore, due account must be taken of this fact.

TABLE G.—*Colored boys.*

Class.	Number of cases.	Average age.	Cephalic index.	Least sensibility to locality.		Strength of grasp.		Least sensibility to heat.		Long-headed (dolichocephalic).	Medium (mesocephalic).	Broad-headed (brachycephalic).
				Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.			
		Yr. Mo		*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*
Bright	18	12 11	Dolicho 4 Meso 9 Brachy 4	240 14.1	229 13.5	351 19.5	325 18.1	35.25 1.96	32.00 1.78	23	52	25
Dull	10	13 2	Dolicho 4 Meso 5 Brachy 1	141 14.1	140 14.0	178 17.8	165 16.5	23.00 2.30	18.25 1.83	40	50	10
Average	5	14 5	Dolicho 2 Meso 3 Brachy 0	78 15.6	77 15.4	122 24.4	117 23.4	10.00 2.00	8.25 1.65	40	60	......
Total	33	......	Dolicho 10 Meso 17 Brachy 5	459	446	651	607	68.25	58.50	......	......	......
Average for all	....	13 3	....	14.3	13.9	19.7	18.4	2.07	1.77	32	53	15
Unruly *a*	5	14 5	Dolicho 2 Meso 3 Brachy 0	78 15.6	77 15.4	122 24.4	117 23.4	10.00 2.00	8.25 1.65	40	60	......

a The unruly are included among the bright, dull, or average; so they are placed alone.

[1] Psychological Review, March, 1895; March, 1896, and March, 1898.

TABLE II.—*Colored girls.*

Class.	Number of cases.	Average age.	Cephalic index.	Least sensibility to locality. Right wrist.	Least sensibility to locality. Left wrist.	Strength of grasp. Right hand.	Strength of grasp. Left hand.	Least sensibility to heat. Right wrist.	Least sensibility to heat. Left wrist.	Long-headed (dolichocephalic).	Medium (mesocephalic).	Broad-headed (brachycephalic).
		Yr. Mo.		*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*
Bright...	33	12 6	Dolicho.. 5 Meso ....20 Brachy .. 8	499 15.1	471 14.3	547 16.6	519 15.7	94.75 2.87	78.62 2.38	11	66	23
Dull.....	18	13 8	Dolicho.. 8 Meso .... 7 Brachy .. 3	289 16.1	261 14.5	321 17.8	302 16.8	46.00 2.56	51.00 2.83	46	38	16
Average.	3	15 6	Dolicho.. 0 Meso .... 2 Brachy .. 1	36 12.0	30 10.0	63 21.0	57 19.0	4.62 1.54	5.62 1.87	......	......	......
Unruly ..	4	13 8	Dolicho.. 0 Meso .... 4 Brachy .. 0	62 15.5	60 15.0	72 18.0	68 17.0	7.75 1.94	8.25 2.06	......	......	......
Total...	58	....	Dolicho..13 Meso ....33 Brachy ..12	886	822	1,003	946	153.12	143.49	......	......	......
Average	....	13 1	....	15.3	14.2	17.3	16.3	2.64	2.47	27	52	21

The bright colored girls are more sensitive to locality than the dull. The dull colored girls have a stronger hand grasp than the bright. Comparing the colored girls with the white girls, they are less sensitive to locality than the white girls, but much more sensitive to heat. Comparing the colored boys and girls, the boys are more sensitive both to locality and heat. Colored boys are remarkably sensitive to heat on the left wrist.

COLORED CHILDREN BEFORE AND AFTER PUBERTY.

While the number of colored children measured is comparatively small, yet it may be interesting to note some differences indicated in Table I:

Among the boys and girls the per cent of long heads is much greater after puberty than before. This is also true of the white boys, but not of the white girls. The colored boys are more sensitive to heat and locality after puberty than before. The reverse is true with the white boys, but the colored girls, like the white girls, are less sensitive after puberty.

TABLE I.—*Colored children before and after puberty.*

Divisions according to puberty and sex.	Number of cases.	Average age.	Dolichocephalic.	Mesocephalic.	Brachycephalic.	Least sensibility to locality. Right wrist.	Least sensibility to locality. Left wrist.	Strength of grasp. Right hand.	Strength of grasp. Left hand.	Least sensibility to heat. Right wrist.	Least sensibility to heat. Left wrist.
All colored boys:		*Yr. Mo.*	*P ct*	*P.ct*	*P ct*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
Before puberty.....	22	12 2	27	55	18	14.1	13.6	19.0	17.9	2.42	2.00
After puberty......	11	15 5	40	50	10	13.5	13.4	21.3	18.5	1.55	1.32
All colored girls:											
Before puberty.....	15	10 1	13	47	40	14.3	12.9	11.7	10.9	2.53	2.05
After puberty... ..	36	14 2	31	55	14	15.9	15.0	19.3	18.3	2.85	2.75

CHILDREN IN THE NORTH CAROLINA MOUNTAINS.

We give, for sake of comparison, measurements of some 150 children in the North Carolina mountains. These people are principally of English and Scotch-Irish descent. They have lived somewhat in isolation, and for this reason, perhaps more than any other, are backward in civilization.

The measurements of these children were made under the direction of the author by Miss S. G. Chester, who was engaged in settlement work in the mountain district of North Carolina.

After summarizing these measurements and comparing them with those of the boys in the Washington schools, we find the schoolboys in the North Carolina mountains show a much larger (double) per cent of dolichocephaly and a much smaller per cent of brachycephaly. They are less acute to the sense of locality and stronger in their hand grasp than the Washington schoolboys.

Compared with the girls in the Washington schools, the girls in the North Carolina mountains show also a greater per cent of dolichocephaly and less acuteness to the sense of locality, but a greater strength in the hand grasp. The last may be accounted for by their doing more work that requires the use of arms and hands.

The relations of right wrist and left wrist as to sense of locality seem to be a little more variable than in Washington school children. The reason why there were so many more girls measured than boys is that many more of the latter were taken out of school to work.

The girls show an average smaller head, but are taller, heavier, and have a larger arm reach than the boys. If this should be true with larger numbers, it is somewhat striking.

TABLE J.—*Children in the North Carolina mountains.*

Divisions according to mental ability, sex, and puberty.	Number.	Average age.		Dolichocephalic.	Mesocephalic.	Brachycephalic.	Horizontal circumference of head.	Least sensibility to locality.		Strength of hand grasps.		Height.	Sitting height.	Arm reach.	Weight.
								Right wrist.	Left wrist.	Right.	Left.				
Boys, bright:		*Yr.*	*mo.*				*Mm.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	*Cm.*	*Cm.*	*Cm.*	*Lbs.*
Before puberty	14	10	1	2	8	4	530	18.1	17.1	14.1	13	120.8	65.9	119.4	76
After puberty..	6	17	11	1	3	2	549	15.4	14.7	35	33.3	167.4	84.4	161.5	131.7
All boys, bright ...	20	12	5	[a]15	[a]55	[a]30	536	17.2	16.3	20.4	19.9	134.8	71.4	132	92.7
Boys, average:															
Before puberty	9	7	10	2	7	0	511	18.4	16.7	14.2	12.6	122.9	66	114.3	64
After puberty..	3	17	4	2	1	0	562	16.3	18	46.7	46.3	173.3	87	173	140.7
All boys, average ..	12	10	2	[a]34	[a]66	0	524	17.9	17	22.3	21	135.6	71.3	129	83.2
Boys, dull:															
Before puberty	1	13	3	0	1	0	555	15	19	28	30	158.5	84	150	108
After puberty..	1	15	4	1	0	1	530	17	13	14	12	145	75	139	125
All boys, dull.......	2	14	6	1	1	0	543	16	16	21	21	151.8	79.5	144.5	116.5
All boys	34	11	8	[a]25	[a]58	[a]17	532	17.4	16.5	21.1	20.4	136.1	71.8	131.7	90.7
Girls, bright:															
Before puberty	30	9	1	2	10	18	498	15.8	14.8	11.6	11	123.2	66.8	119.6	69.7
After puberty..	25	14	6	5	13	7	534	16.5	15.9	21.5	19.8	153.2	78.8	148.9	112.2
All girls, bright ...	55	11	5	[a]14	[a]41	[a]45	515	16.1	15.3	16.1	15	136.8	72.3	132.9	89.1
Girls, average:															
Before puberty	12	11	4	4	4	4	493	16.4	16.4	14.5	11.3	130.5	68.1	127	75.3
After puberty..	36	14	10	8	21	. 7	543	14.1	13.9	22.8	21.4	155.5	78.6	152.3	113.2
All girls, average..	48	13	1	[a]26	[a]52	[a]22	530	14.7	14.5	20.7	18.9	149.3	76.1	146	103.7
Girls, dull:															
Before puberty	2	10	4	1	1	0	532	15	18	16	17.5	121.5	73.5	118.5	67
After puberty..	12	13	6	0	11	1	625	15.8	14.8	19.3	19.4	144.8	74.5	142.2	107.7
All girls, dull.......	14	13	1	1	12	1	526	15.6	15.2	18.8	19	141.4	74.4	138.8	101.8
All girls	117	12	3	[a]18	[a]51	[a]31	522	15.5	15.1	18.3	17.1	142.5	74.1	139	96.6

[a] Per cent.

SECTION B.

ANTHROPOMETRICAL MEASUREMENTS IN RELATION TO SEX, SOCIOLOGICAL CONDITION, RACE, AND MENTAL ABILITY (16,473 WHITE CHILDREN AND 5,457 COLORED CHILDREN).

The measurements of which the results are given in this section (B) were made by the teachers in the different schools, under the direction of the author.

METHOD OF INVESTIGATION.

The data were obtained by having the teachers fill out cards or sets of observation, each card representing one pupil. Below is given as a specimen card, one actually filled out by a teacher.

[Specimen card.]

SINGLE SET OF OBSERVATIONS.

1. Name, L. R. C. 2. School, Gales.
3. Grade, second. 4. Sex, male. 5. Age, 7 yrs. 9 mos.
6. Height (without shoes), 4 ft. ½ in. 7. Sitting height, 2 ft. 2½ in.
8. Arm reach, 4 ft. 9. Weight (in ordinary indoor clothes), 55½ lbs.
10. Horizontal circumference of head, 20¼ in. 11. Bright, dull, or average (*in general*), bright.
12. Bright in (name studies), reading, numbers, spelling, composition.
13. Dull in (name studies).
14. Average in (name studies), drawing.
15. If abnormal or peculiar, name in what way.
16. Is pupil unruly? No. 17. Is pupil sickly? No. 18. Nationality of father, American; of mother, American. 19. Occupation of father, floor walker.
20. Remarks, ———.
21. Name of observer, M. K.

[Reverse Side of Card.]

The height is to be taken in an upright position without shoes, the feet being close to the measuring rod.

The sitting height is the vertical distance between the top of the head and the surface upon which the individual is seated ; this should be a level inflexible surface.

The arm reach is the distance between the tips of the middle fingers, when the arms are extended horizontally, the breast and arms being in contact with a wall.

Horizontal circumference of head is to be measured with tape line in the plane of the eyebrows.

If not convenient to remove shoes, the height of heel can be measured, and subtracted from total height.

After all the cards were filled out, they were arranged in whatever order was desired, and then the figures were copied on sheets (see example below), added, and averages made, summaries of which constitute the tables given further on.

We give an example of a table made by copying the measurements and reports of the teachers from the original cards. As in the previous section (A) so here, it would require altogether too much space to give these tables in detail. The tables given in section E are simply summaries of these tables.

SCHOOLS OF WASHINGTON (SPECIMEN TABLE).

Statistics of bright (in general) boys of the same age belonging to nonlaboring classes and of American parentage.

[b=bright; d=dull; a=average.]

Number.	Grade.	Age. Yrs.	Age. Mos.	Height.	Sitting height.	Weight in ordinary indoor clothes.	Horizontal circumference of head.	All studies.	Arithmetic.	Bookkeeping.	Composition.	Drawing.	Geography.	Language and English.	Manual labor and sewing.	Music.	None.	Penmanship.	Phonics.	Reading.	Science and botany.	Spelling.	Remarks.
				Inches.	*Inches.*	*Pounds.*	*Inches.*																
1	1	5	8	42.50	23.00	40.00	20.12		a					b						b			
2	1	6	0	44.00	24.50	47.50	20.25		b	b								a		b	a	b	
3	1	6	0	43.00	25.00	38.50	16.50		b					b		b	d	b		b	a	b	
4	4	6	0	52.00	28.00	63.00	21.00		b					b			d	a					
5	1	6	1	44.00	27.00	42.50	20.75		b									d		b			Lisps; large head. Very intelligent.
6	1	6	3	42.00	24.00	43.25	20.62		b														
7	1	6	3	44.00	24.50	50.00	20.25	b															
8	1	6	3	43.75	24.00	40.00	19.00		b									d					Low voice.
9	1	6	4	46.50	26.75	45.00	20.50		b		a			b				a		b	b		
10	1	6	4	47.00	26.25	54.00	20.12		b		a			b		b		a		b		b	
11	1	6	4	40.50	23.06	38.00	19.87		b		a					a		b		b			
12	1	6	5	48.00	25.75	46.00	21.00		b										.	b			
13	1	6	5	47.37	25.37	50.00	20.50		b					b	a					b			
14	1	6	5	46.00	25.50	51.50	20.75		b			b			a		d						
15	1	6	5	48.50	27.50	56.75	20.62		b			b				b				b			Very nervous. Entered school late in year.
16	1	6	5	46.00	25.00	46.00	21.00		a						b					b			
17	7	6	5	46.50	25.25	48.50	20.25		a		b	b		b				b		b			
18	1	6	5	44.75	24.25	44.50	20.00		b			b		b	b			b		b			
19	1	6	6	44.25	24.50	46.00	20.25		b									b		b	b		Nervous and excitable.
20	1	6	6	46.62	25.00	46.50	20.00		b					b	b					b			
21	1	6	6	46.00	25.00	57.50	19.62		b					b		a							
22	1	6	6	43.62	24.62	42.00	19.12		b									b		b			
23	1	6	6	42.50	23.50	43.50	20.50		b			a		b		b	d	b		b			
24	1	6	6	46.25	25.75	54.00	20.50		b		b	a						a		b	b		
25	1	6	6	44.75	21.50	42.75	20.75		a									a		b			
26	1	6	6	43.50	24.50	41.50	21.50		b			a			b	d					b		
27	1	6	6	43.50	24.50	36.75	20.75		b				d			d		b	a	b	b		
Total		170	11	1,215.36	676.55	1,255.50	546.09	1 b	22 b, 4 a	1 b	2 b, 3 a	4 b, 3 a	1 d	11 b	4 b, 2 a	4 b, 2 a, 2 d	4 d	8 b, 6 a, 2 d	1 a	20 b	5 b, 2 a	3 b	
Average		6	4	45.01	25.06	46.50	20.23																

In reporting the pupils as bright, dull, or average, the teachers were told to mark them average whenever in doubt. In this way there was less liability to error in regard to the bright and dull, which are the classes we desired most to compare. The teachers reported upon those pupils whom they knew best. The pupils were marked after the measurements were made.

We do not agree with those who may think that teachers are not capable of judging of their pupils. While some may make mistakes, it is wholly improbable that those who do will all make mistakes the same way. Some may estimate ability too high and some too low, so that most of such errors will balance each other. It is very improbable that 100 teachers in judging of a thousand pupils (say one teacher judges as to ten pupils) will all estimate them too high or too low. When the numbers are larger, as in this section, the improbability of errors sufficient to be of consequence is very great.

It may seem to some unnecessary to mention the following objections, but as they might be made, the author has endeavored to anticipate them. It may be objected that there is no standard of mental ability. This is a fact, but the objection is weak, for a large number of investigations would be necessary to make a standard, and of course some of these measurements must be made before there could be any standard. But the objector may mean that there are no accurate measurements or exact divisions of children into bright, dull, and average,[1] and that such terms are too indefinite for statistical purposes. It might be said that many valuable statistics are only approximately true. But admitting the objections for the sake of argument, and saying that judgments as to brightness, dullness, etc., are mere matters of opinion, it may be said that the results are statistics of opinions of teachers. Then the real question is, What is the probable truth of the opinions of the teachers? The opinions of 100 teachers on 1,000 pupils, as before mentioned, and of 500 teachers on 20,000 pupils must be held as approximately true when there is any general agreement as to any division of the pupils, for so many different teachers could not make errors all the same way.

The diagrams which follow are based upon the tables in section E, pages 1052–1094. In these diagrams the age is given in years, and for convenience the months are omitted; but by referring to the tables the reader will see that age 8, for instance, means from 7 years 7 months to 8 years 6 months; that is, the nearest age.

In the previous section (A) the number measured was not large enough for division according to age, so the average age was given. But in this section (B), the numbers being large enough to make an average of value, the nearest age is given.

It is certain that anatomical measurements, such as height, sitting-height, circumference of head, etc., are influenced much by age, especially from birth till adult life. But physiological measurements, such

[1] We mention "average" last, as it is the bright and dull we wish especially to compare.

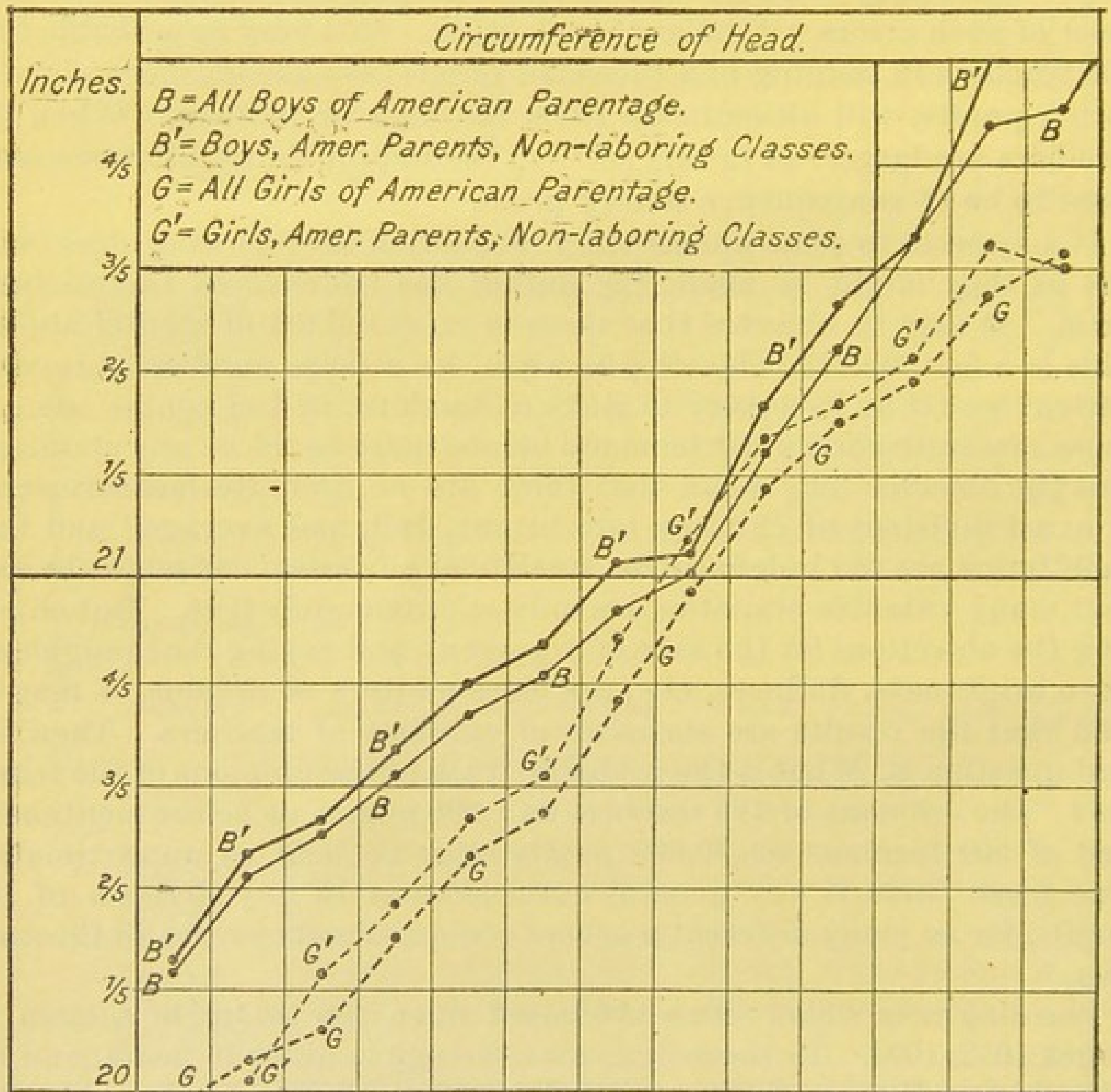
as tests of the senses (as in section A), do not seem to be influenced by age to any such degree as the anatomical.

We will now consider in detail the relations of the anthropometrical measurements to sex, sociological condition, race, and mental ability.

Circumference of head.—Circumference of head may be considered in relation to sex, sociological conditions, nativity, race, and mental ability.

Diagram I.

Diagram I of curves below is based upon the averages in Tables VIII, IX, XXXV, and XXXVI, section E.

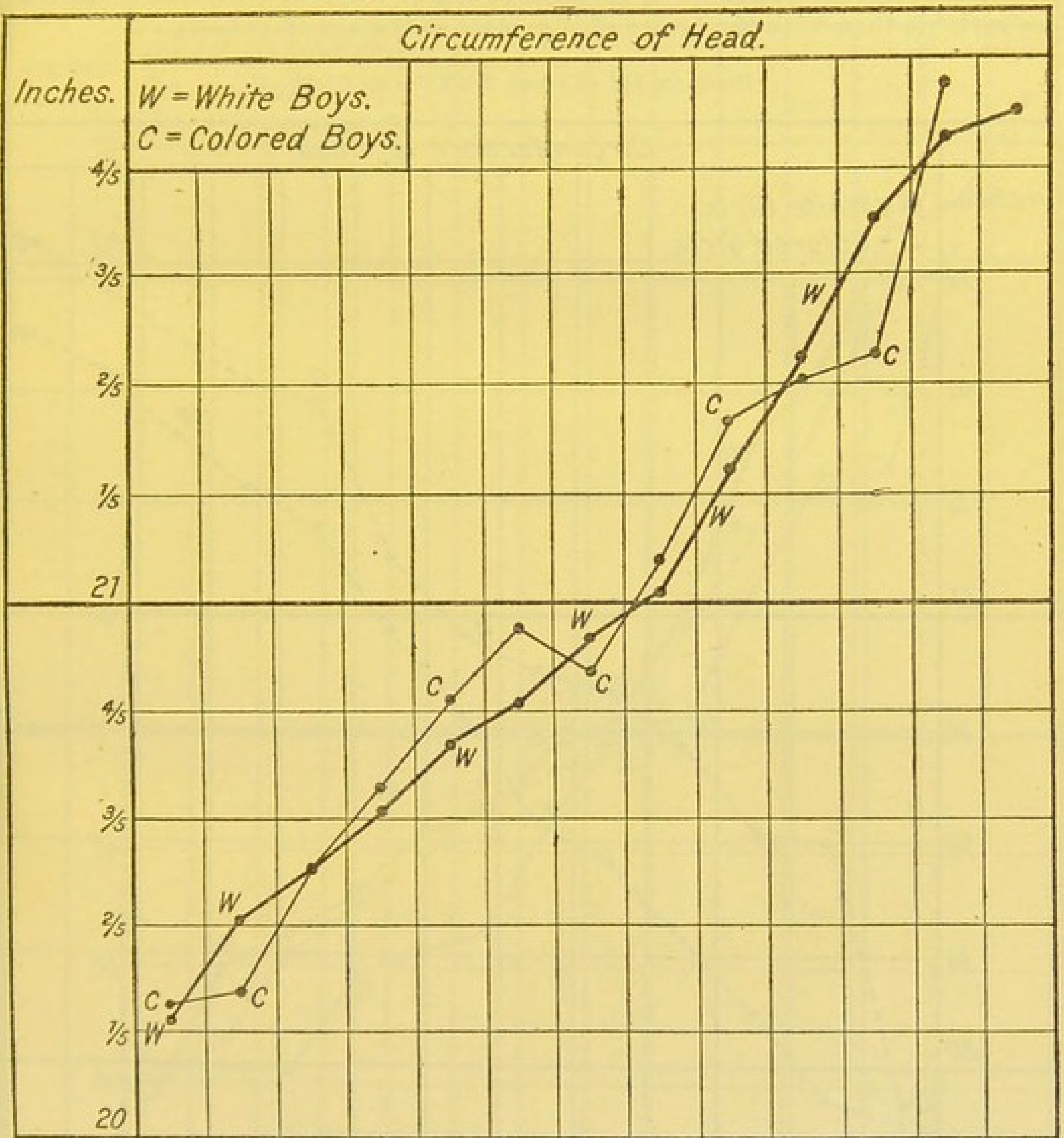


Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of B.	103	404	607	647	703	670	756	687	589	405	267	120	38
No. of B'	27	205	278	313	353	348	394	346	358	259	169	43	
No. of G.	64	375	587	669	737	721	673	706	627	490	325	258	128
No. of G'		162	259	300	351	310	335	342	304	254	195	128	63

Sex.—All the boys of American parentage have a larger average circumference of head than the girls of American parentage of the same age. The difference is greatest at the early ages, but the girls who gradually approach the boys, from 6 till 13, are nearest to them from 13 to 14, but at no age do they all equal the boys in circumference of head. This nearest approach of the girls in head circumference occurs at about the time when the girls always excel the boys most in height, weight, and sitting-height (Diagram VIII.)

If boys of the nonlaboring class (Table IX) are compared with girls of the nonlaboring class (Table XXXVI), eliminating sociological conditions, the boys still excel the girls, except at the age of 13 (Diagram I), when the girls have a little larger circumference of head. A somewhat similar relation exists when girls and boys of the laboring class (Tables X and XXXVII) are compared, except that the girls do not excel the boys at any age, but equal them at the age of 14.

DIAGRAM II (TABLES VIII AND LXI).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of W.	103	404	607	647	703	670	756	687	589	405	267	120	38
No. of C.	73	246	288	303	335	271	286	321	282	220	124	131	

From Tables XII and XXXIX it will be seen that boys of foreign parents have larger circumference of head at all ages than the girls of like parentage, except at 14, when the girls excel the boys. When the boys are of mixed nationality [1] (Table XIII) they excel the girls (Table XL) of mixed nationality at all ages except at 6.[2] Thus, whatever divisions are made, the boys are found to have larger circumference of head than the girls.

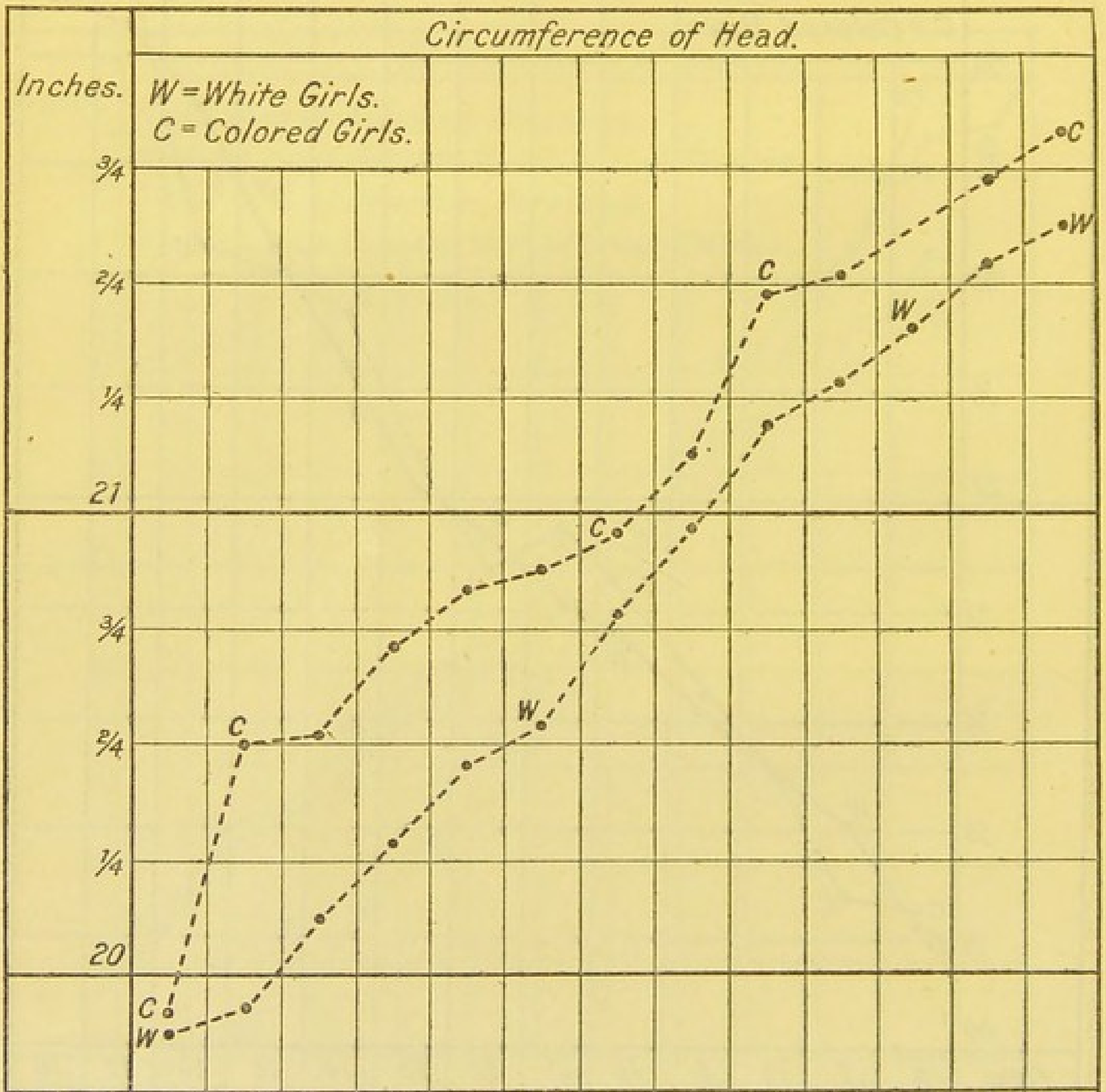
[1] Mixed nationality is synonymous with American and foreign parentage.

[2] In most of the tables the extreme early or late ages are averages based upon comparatively small numbers.

Sociological conditions.—If we compare all the boys of American parentage with those among them who belong to the nonlaboring class, this latter class have larger circumference of head at all ages except at 16, when they are equal (Diagram I). The boys of the laboring class have smaller circumference of head than all the boys in general and the nonlaboring class in particular. This is shown by examining Tables VII, IX, and X.

The same general statements are true in the case of the girls of the laboring and nonlaboring classes (Tables XXXIV, XXXVI, and XXXVII), but the difference is less variable than with the boys and is greater at the age of puberty.

DIAGRAM III (TABLES XXXV AND LXV).



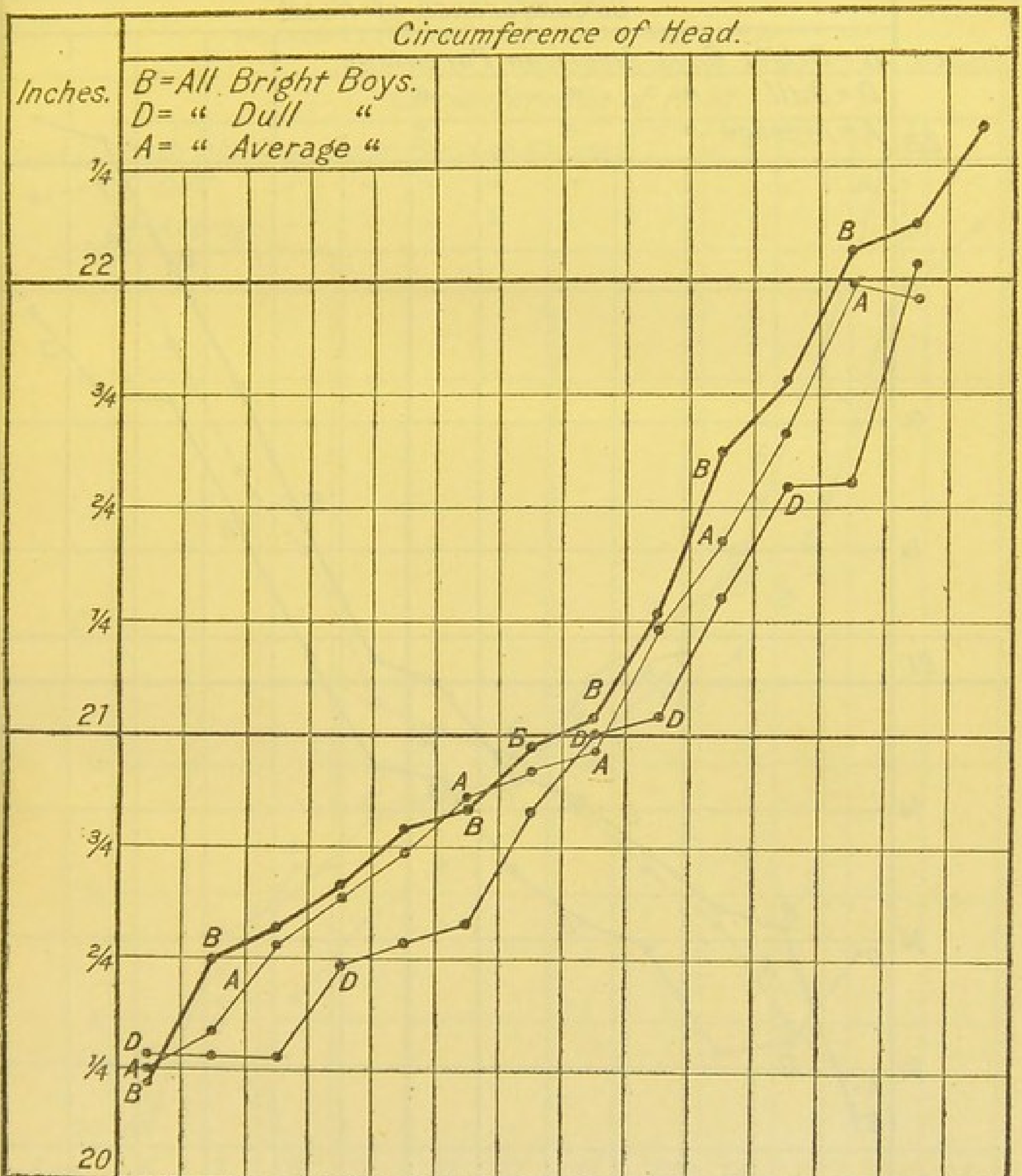
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of W.	64	375	587	669	737	721	673	706	627	490	325	258	128
No. of C.	113	248	218	209	250	266	279	270	243	167	129	83	54

Nationality.—In general, both boys and girls of foreign parentage (Tables XII and XXXIX) when compared with boys and girls of American parentage (Tables VIII and XXXV) show a slightly larger circumference of head; but a mixture of nationalities seems unfavorable to growth in circumference of heads, for both boys and girls of mixed nationalities (Tables XIII and XL, pp. 1056, 1071) have, at most ages, smaller circumference of head than boys and girls of American parentage.

Colored children.—In colored children the circumference of head (Table LXI) in the boys is superior to that of the girls (Table LXV) at ages 6 and 11, but inferior at other ages; that is, in general the girls excel the boys in head circumference.

White boys and colored boys.—Comparing the curves in Diagram II it will be seen that the white boys of American parentage have a larger head circumference than the colored boys from ages 6 to 8; again at about 12, and from 15 to 17; at other ages the colored boys excel. As the numbers compared are large this can hardly be accidental, yet we know of no reason for this alternate increase and decrease

DIAGRAM IV (TABLES XIV, XV, AND XVI).

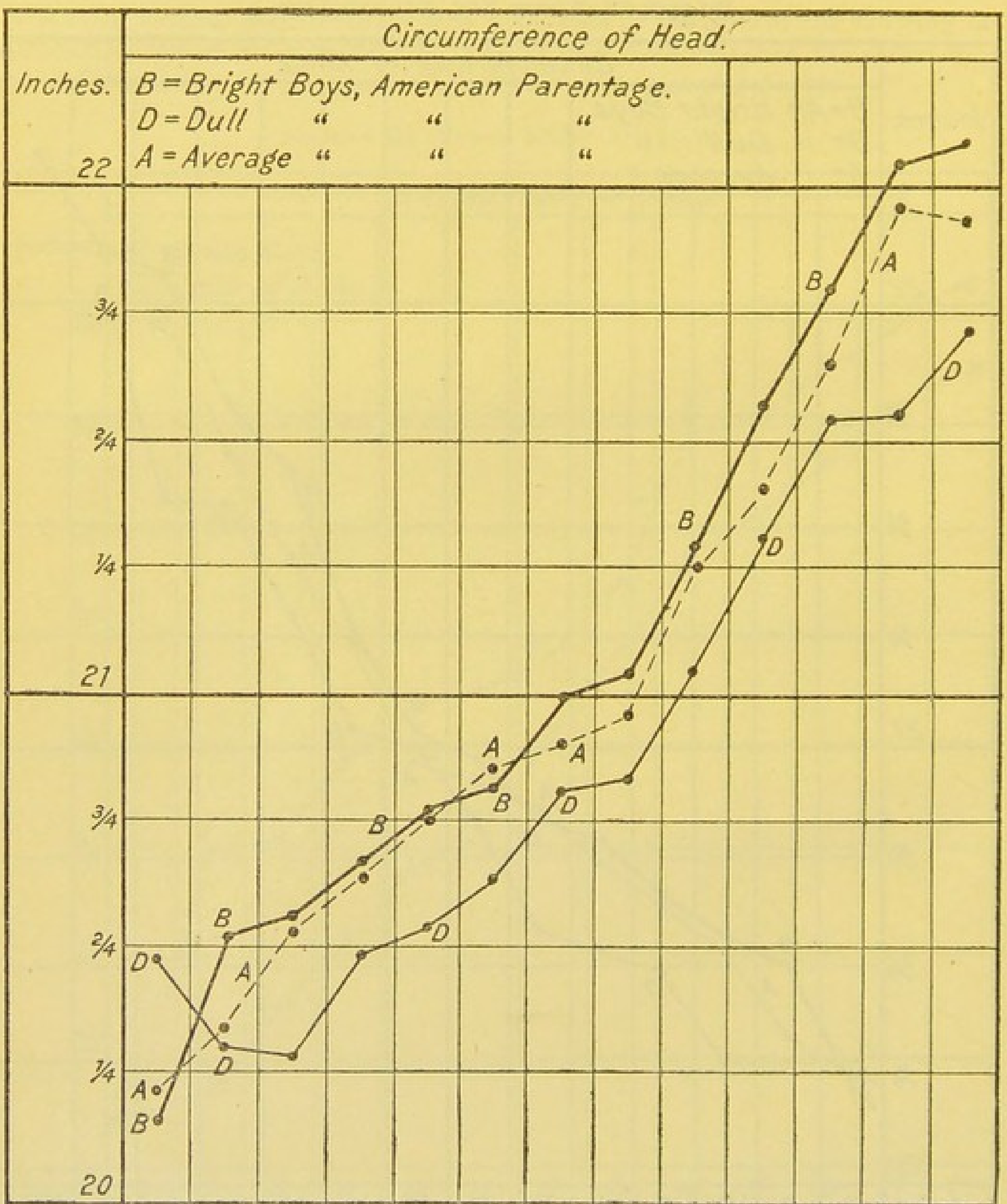


Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	19
No. of B.	53	205	320	384	392	322	349	305	227	167	104	35	14	16
No. of D.	39	99	101	102	118	97	128	131	143	116	80	32	4	7
No. of A.	45	199	326	340	355	386	459	421	371	220	144	70	24	9

between the boys of two races, for in the case of the girls (Diagram III) there is no such alternation.

White girls and colored girls.—Comparing white girls of American parentage and colored girls as to circumference of head, the colored girls show quite a marked increase from about 6 to 10 and from 11 to 15. It may be noted here that these periods of marked increase correspond to the periods of increase of colored boys over white boys in Diagram II; that is, from about 7 to 11 and 13 to 15. The colored girls excel the white girls in circumference of head at all ages. Comparing colored girls with all white girls (Tables XXXIV and LXV, Section E), the colored girls have a larger circumference of head at all ages except at 6.

DIAGRAM V (TABLES XVII, XVIII, AND XIX).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. B.	38	160	249	281	317	272	274	230	180	132	82	29	10
No. D.	24	69	73	80	81	78	93	97	98	87	66	32	8
No. A.	36	175	285	286	305	320	389	360	311	186	119	59	23

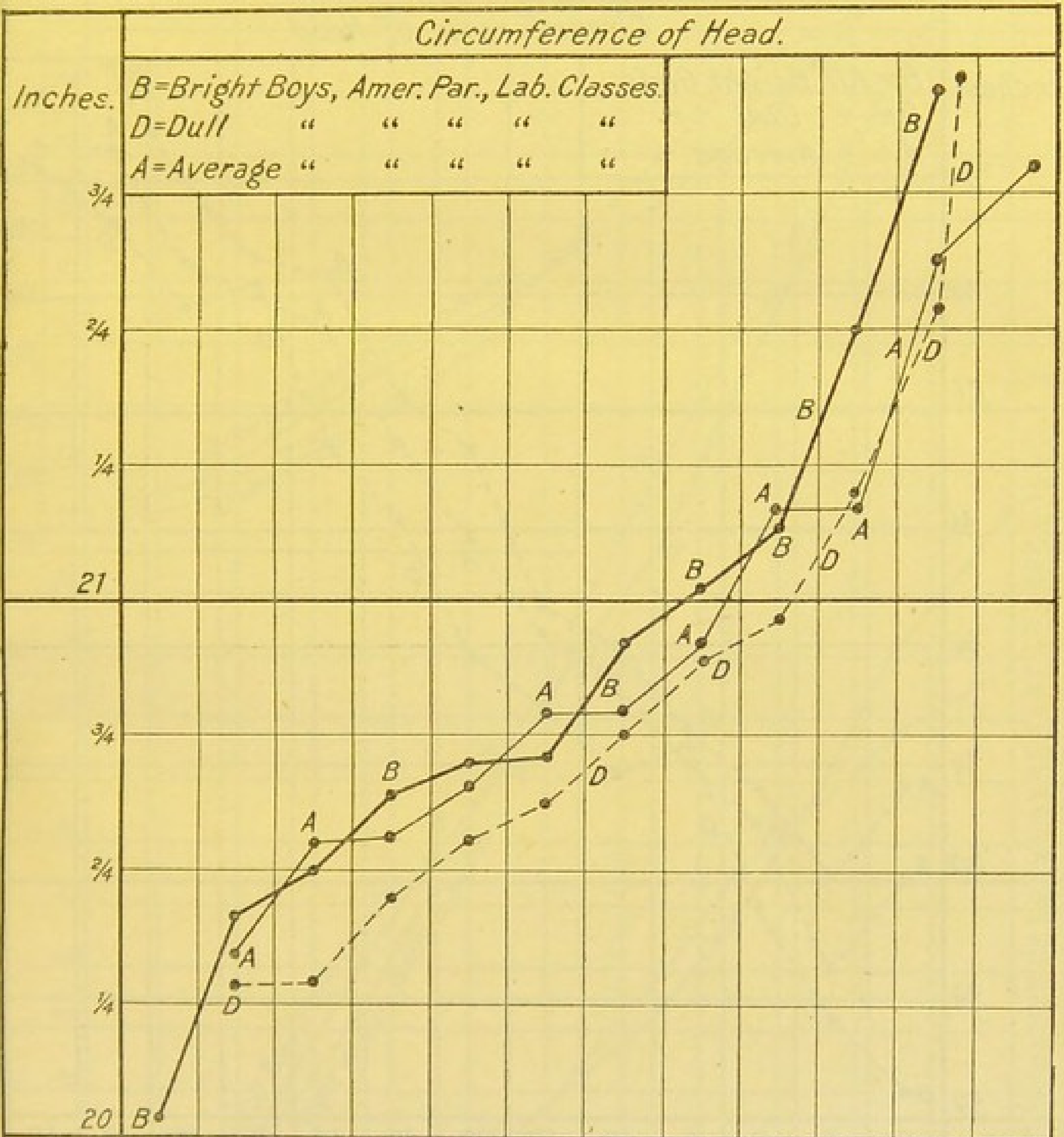
Mental ability.—Diagram IV, below, gives the curves of head circumference in relation to mental ability. There is almost a complete correspondence; that is, as ability increases the circumference of head increases. Thus the bright boys have the largest circumference of head at all ages except at 11. The average boys are next, except where they excel the bright boys at 11 and fall below the dull boys at 13.

The dull boys have the smallest circumference of head at all ages except 6, 13, and 15. It will be noted that the average boys are much nearer to the bright than to the dull in circumference of head.

If now we eliminate whatever influence nationality may have, and compare in Diagram V the boys of American parentage only, it still holds true in general that circumference of head increases with ability.

The relation of the curves is changed very little.

DIAGRAM VI (TABLES XXIII, XXIV, AND XXV).



Age.	6	7	8	9	10	11	12	13	14	15	16	17
No. B.	11	58	112	119	141	100	112	88	57	39	21	
No. D.		45	50	54	48	44	49	58	44	40	32	
No. A.		96	167	161	161	178	201	195	130	67	45	

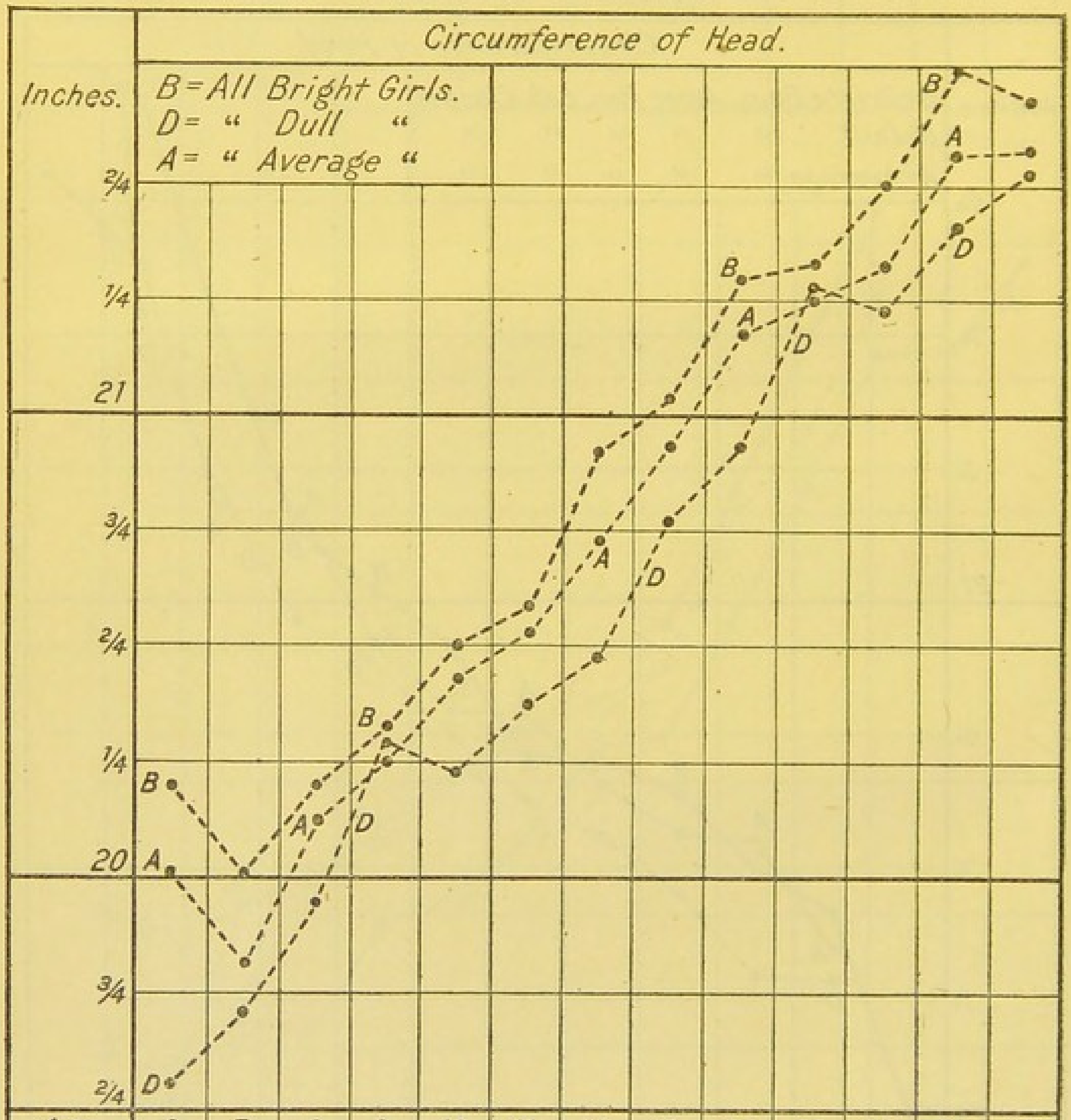
If we proceed still further and eliminate as far as possible sociological condition by dividing the boys of American parentage into laboring and nonlaboring classes (Diagram VI), the general principle still holds, except there is more variation in the curves, due probably to a lessening of the numbers by subdivision.

Girls.—From Tables XLI, XLII, and XLIII, Diagram VII (below) is made, showing the correspondence between all bright, dull, and average girls in head-circumference to be even more complete than in the case of the boys.

If, for instance, we eliminate nationality and sociological condition, comparing bright and dull girls of American parentage and laboring classes (Tables XLIX and L), the bright excel at all ages in head-circumference.

Colored children.—From Tables LXII and LXIII the bright colored boys show a larger circumference of head than the dull colored boys at all ages except 12 and from 16 on. The bright colored girls have larger circumference of head than the dull colored girls up to age of 12, after which it is variable (Tables LXVI and LXVII).

Diagram VII (Tables XLI, XLII, and XLIII).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of B.	37	236	364	403	404	388	328	338	285	204	142	45	45
No. of D.	40	41	68	62	62	86	82	113	101	112	55	60	25
No. of A.	49	231	322	418	473	457	465	515	447	339	253	165	109

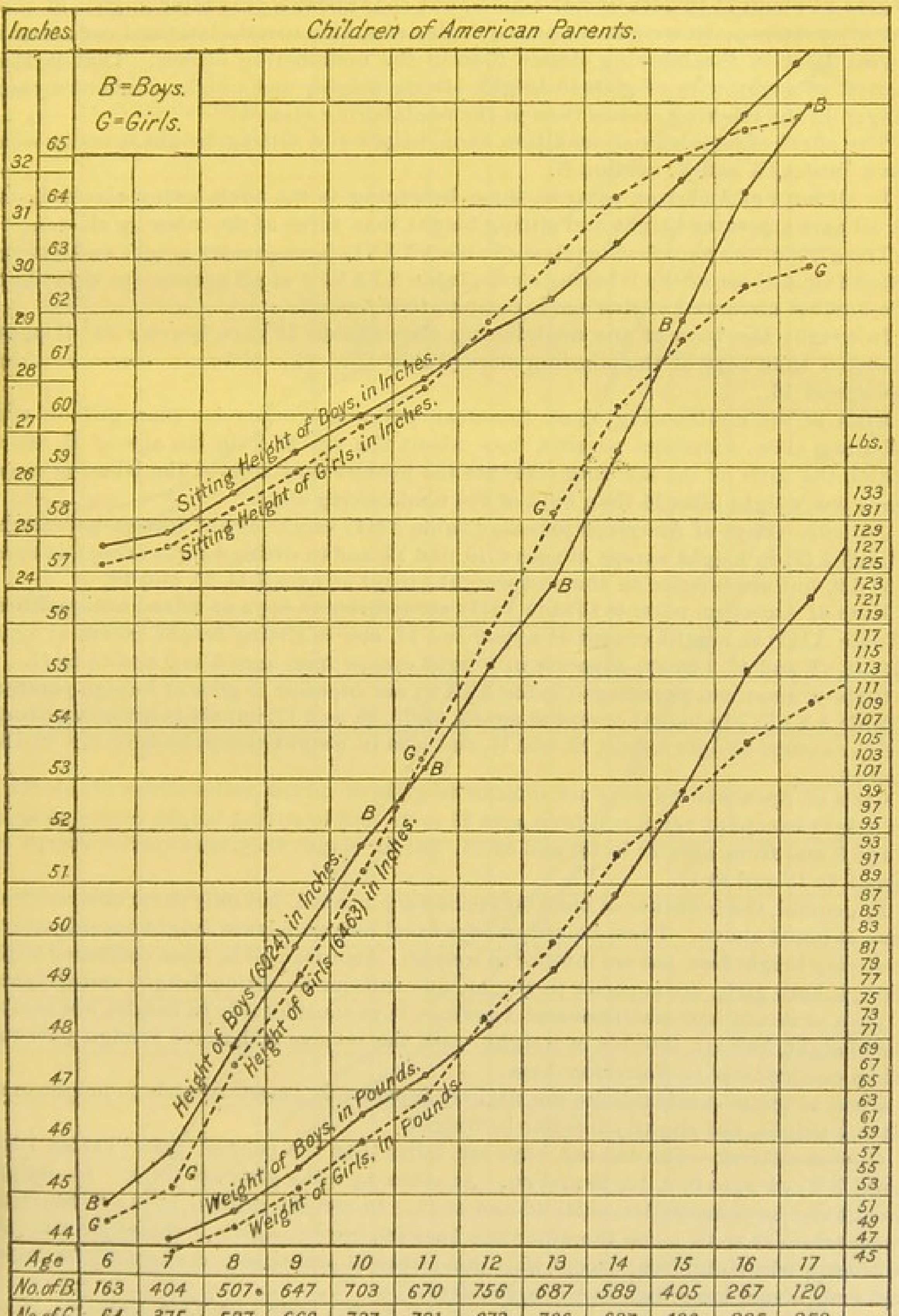
Height, sitting height, and weight.—We give below Diagram VIII (Tables VIII and XXXV), showing curves of height, sitting height, and weight of boys and girls of American parents.

Sex: The striking fact, already discovered by others, is confirmed that for a certain period of time before and after puberty girls are taller and heavier than boys, but at no other time.

This pubertal period (Diagram VIII) for height of Washington schoolgirls extends from about the age of 11, increases gradually until about 14, then decreases gradually and ends at 15.

For weight the period begins about eight months later than the height period, increasing gradually, then decreases gradually, ending about the same time as the height period (age 15).

DIAGRAM VIII (TABLES VIII AND XXXV).



NOTE.—The first column of figures (24, 25, etc.) is for sitting height.

For sitting height the pubertal period begins about eight months later than in the height period (age 11), and ends about eight months later; that is, girls continue growing in sitting height, or length of trunk, longer than in length of limbs

Sociological condition.—Comparing girls of the nonlaboring classes, American parents (Table XXXVI), with those of the laboring classes (Table XXXVII), the pubertal period of superiority of girls in height begins about three months later and ends about a year sooner than in the laboring classes. In sitting height this period begins at about 11 in both social classes, but ends about a year later in girls of the laboring classes. In weight the period begins about six months later and ends about a year later in the laboring classes than in the nonlaboring classes. That is, the period of superiority of girls in height, sitting height, and weight is about a year longer in the laboring classes than in the nonlaboring classes.

The effect of sociological condition upon height and sitting height is easily seen from Tables IX and X, Section E.

In all boys of American parents, those belonging to the nonlaboring classes have at all ages a greater height and sitting height than those of the laboring classes.

The girls of the nonlaboring class (Table XXXVI) have greater height and sitting height than those of the laboring class (Table XXXVII) at all ages except at 18; but the number measured at this age is comparatively small.

In weight the boys of the nonlaboring class (Table IX) are heavier at all ages except 7 than boys of the laboring class (Table X). This difference increases after the age of 13.

Girls of the nonlaboring class, American parents, are heavier than girls of the laboring class, American parents, from about the age of 8 till the age of 15, after which the girls of the laboring class are the heavier; but boys of the laboring class have less weight after 15 than boys of the nonlaboring class.

Nativity.—Boys of American parents (Table VIII) excel boys of foreign parentage (Table XII) in height except at ages 8, 10, and 13, and in sitting height except at ages 7 and 9, but are inferior to them in weight except at ages 6, 14, 15, and 16.

Boys of American parents (Table VIII) are inferior to boys of mixed nationalities (Table XIII) in height except at ages 9 and 14, and in sitting height except at ages 6, 9, 12, 13, and 15, but are superior in weight except from ages 6 to 9 and 15 to 17.

Girls of American parentage (Table XXXV) are superior to girls of foreign parents (Table XXXIX) in height except at ages 7, 14, 15, 16, and 17, but are inferior in sitting height except at ages 6, 8, 10, 13, and 16, and also in weight except at ages 6, 8, 10, 13, and 16.

Girls of American parents are inferior to girls of mixed nationalities (Table XL) in height except at age 6 and from ages 12 to 17, and in sitting height except at ages 6 and 8 and from ages 12 to 15, and at 16; but in weight they are superior except at ages 8 to 13 and at 17.

In general, the influence of nativity is not very marked, but only in certain particulars, as noted above. Thus, American boys excel foreign boys in height considerably, in sitting height less, but are inferior in weight. American girls, when compared with foreign-born girls, are superior in height, but inferior in sitting height and weight.

Boys of mixed nationalities excel American boys considerably in height, less in sitting height, but are inferior in weight—just the reverse of boys of foreign parents when compared with American boys.

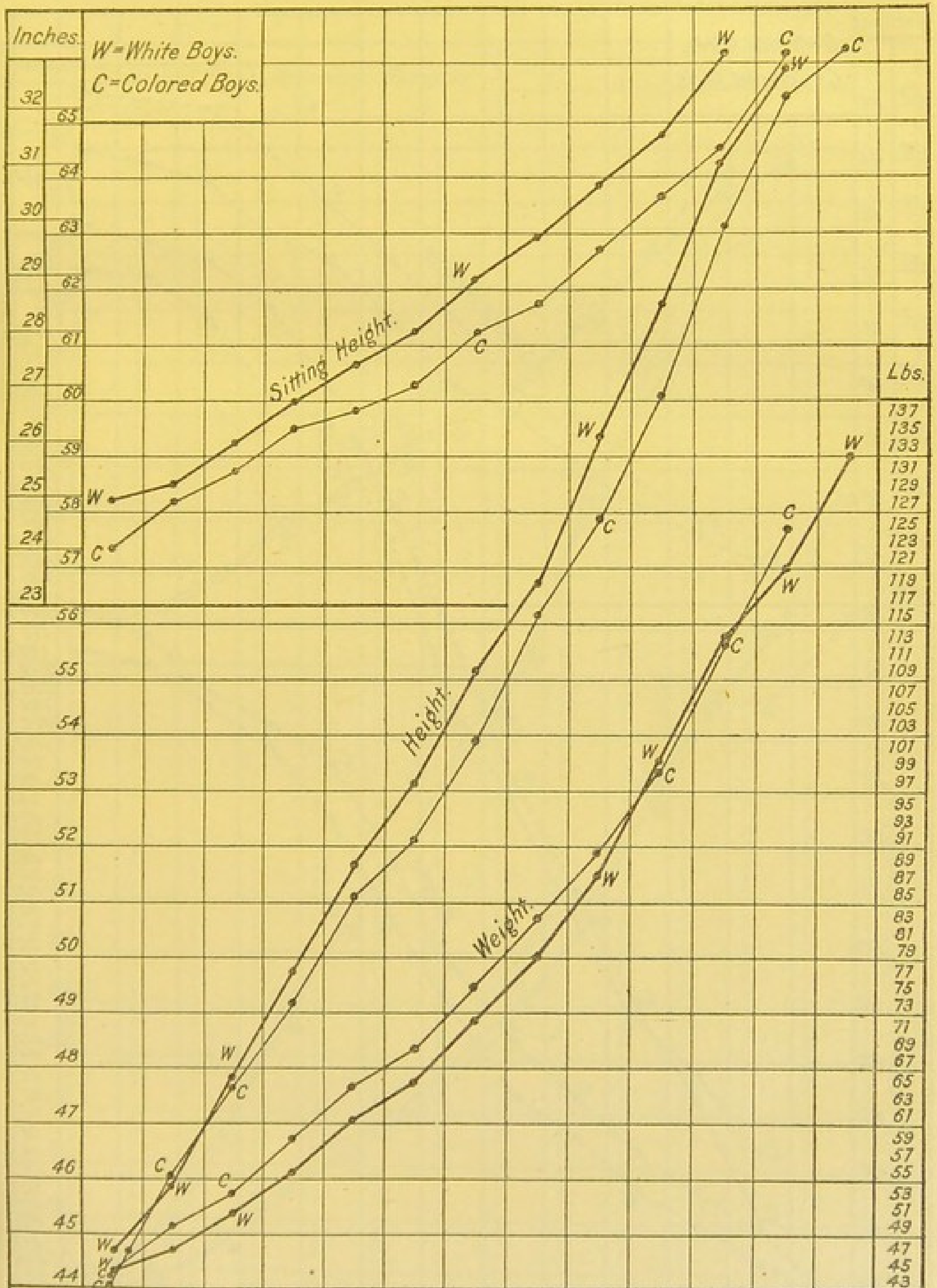
Girls of mixed nationalities are slightly superior to American girls in height and sitting height, but slightly inferior in weight.

Colored children.—The colored boys are taller than the colored girls (Tables LXI and LXV) at ages 6, 9, 10, 15 and on. At other ages the girls are taller. In sitting height the boys are taller until 10 and at 12. In weight colored boys are heavier, except from 11 to 16, when the difference between boys and girls is somewhat similar to that in white children, except that this pubertal period begins about a year later and ends a year later than in white children.

White boys and colored boys compared.—From Tables VIII and LXI is drawn Diagram IX, giving height, sitting height, and weight of white and colored boys.

The white boys are taller than the colored boys. In sitting height the difference is very striking, and it would seem to indicate that white boys have comparatively a greater length of trunk than length of legs as compared with colored boys.

DIAGRAM IX (TABLES VIII AND LXI).

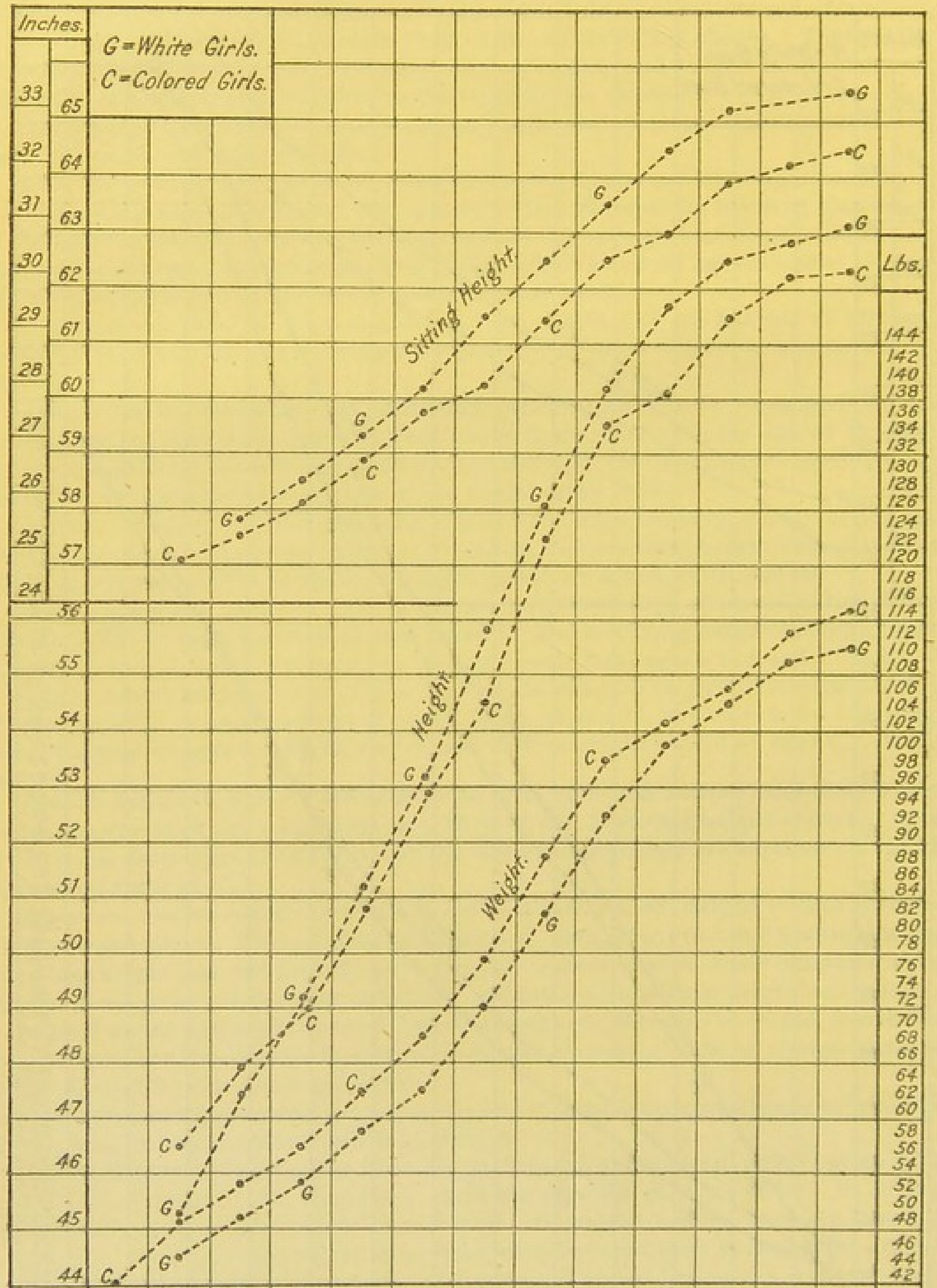


Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of W.	103	404	607	647	703	670	756	687	589	405	267	120	38
No. of C.	73	246	288	303	335	271	286	321	282	220	124		

The colored boys are heavier from age 6 to 15. From 15 to 16 the white boys are heavier.

White girls and colored girls.—Comparing Diagram X below with Diagram IX, giving the curves of white and colored boys, there is a general correspondence to those for white and colored girls. There is the same striking difference between

DIAGRAM X (TABLES XXXV AND LXV).



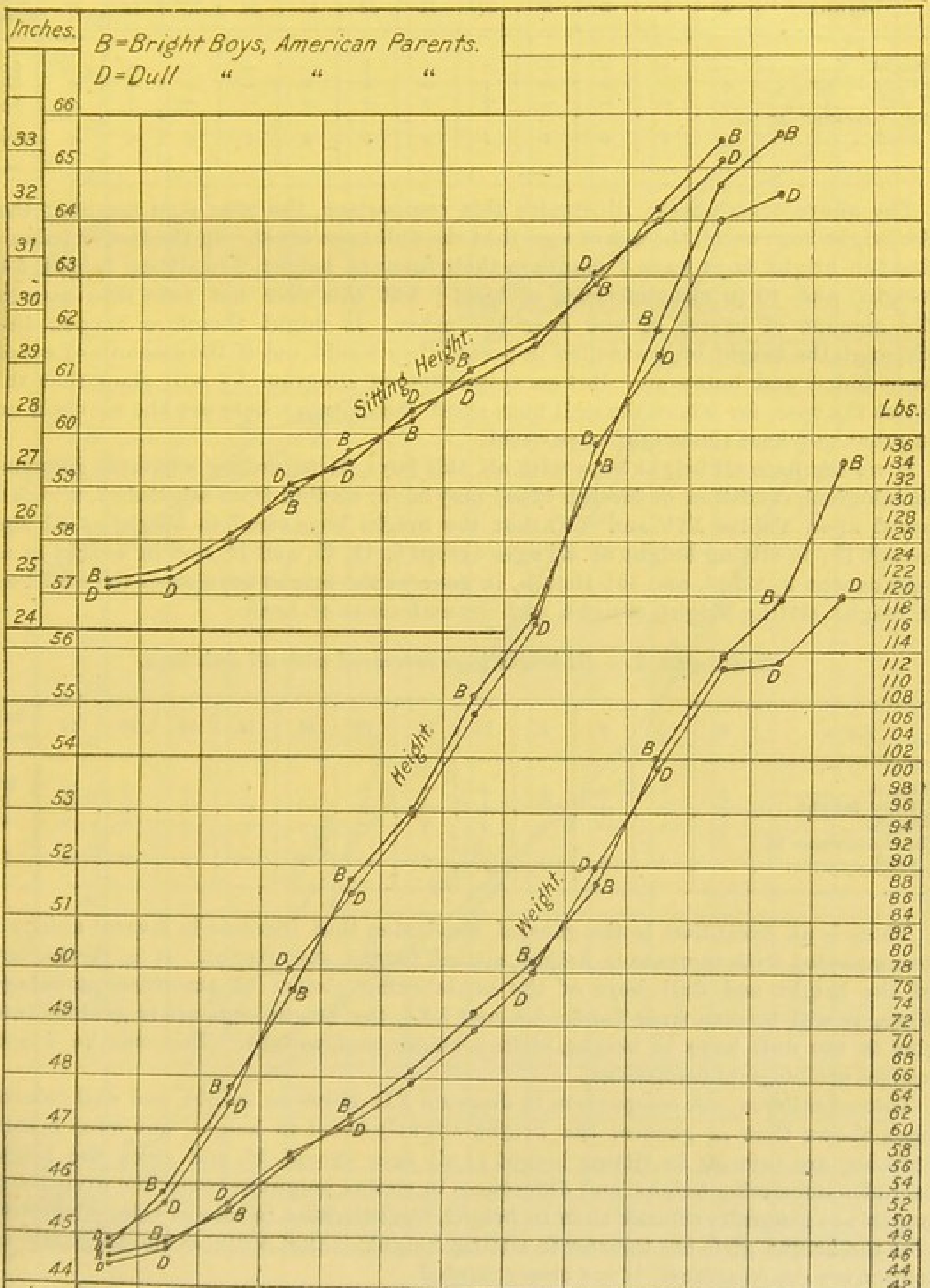
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	
No. of G.	64	375	587	669	737	721	673	706	627	490	325	258	128	
No. of C.	113	248	218	209	250	266	279	270	243	167	129	83	54	

the sitting heights, showing in general that white children have much longer bodies than colored children, and are also taller, but the colored children are heavier.

MENTAL ABILITY.

We have seen that mental ability as reported by the teachers increases as the circumference of the head increases. But the relation of mental ability to height, sitting height, and weight is not so definite or so marked, yet in general the bright boys

DIAGRAM XI (TABLES XVII AND XVIII).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of B.	38	160	249	281	317	272	274	230	180	132	82	29	10
No. of D.	24	69	73	80	81	78	93	97	98	87	66	32	

excel the dull boys in these dimensions. Thus, if we compare in Diagram XI the curves for the bright boys of American parentage with those for dull boys of like parentage we find the bright boys excel in height at ages 7, 8, 10, 11, 12, 15, 16, 17; in sitting height at all ages except 9, 11, and 14; in weight at all ages except 8, 9, and 14.

SCHEDULE 1.—*All bright and dull American boys compared.*

Ages.	6	7	8	9	10	11	12	13	14	15	16	17	Balance.
Height	—	+	+	—	+	+	+	—	—	+	+	+	4+
Sitting height	+	+	+	—	+	—	+	+	—	+	+	+	6+
Weight	+	+	—	—	+	+	+	+	—	+	+	+	4+
Circumference of head	—	+	+	+	+	+	+	+	+	+	+	+	10+

The above schedule (1) illustrates this comparison, the plus sign meaning that the bright boys excel, the minus sign that the dull boys excel. In the last or balance line the bright boys have 4 points in their favor in height, 6 in sitting height, 4 in weight, and 10 in circumference of head; but this does not take into account the amount of excess of one over the other. It might therefore happen that although the bright boys excelled in points they would not if the amounts of excess were added and balanced. But an inspection of Diagram XI will show that this is not the case, for where the dull boys excel the distance between the curves is not so great as where the bright boys excel.

If we compare all bright boys with all dull boys, disregarding whatever influence sociological condition or foreign blood may have, we find from schedule 2, which is based upon Tables XIV and XV, that the bright boys excel in height at all ages except 13; in sitting height at all ages except 9, 11, 13, and 14, and in weight at all ages except 8, 12, 13, and 14; that is, in general the bright boys excel the dull boys in height, sitting height, weight, and circumference of head.

SCHEDULE 2.—*All bright boys compared with all dull boys.*

Ages.	6	7	8	9	10	11	12	13	14	15	16	17	Balance.
Height	+	+	+	+	+	+	+	—	+	+	+	+	10+
Sitting height	+	+	+	—	+	=	+	=	—	+	+	+	6+
Weight	+	+	—	+	+	+	—	—	—	+	+	+	4+
Circumference of head	—	+	+	+	+	+	—	+	—	+	+	+	6+

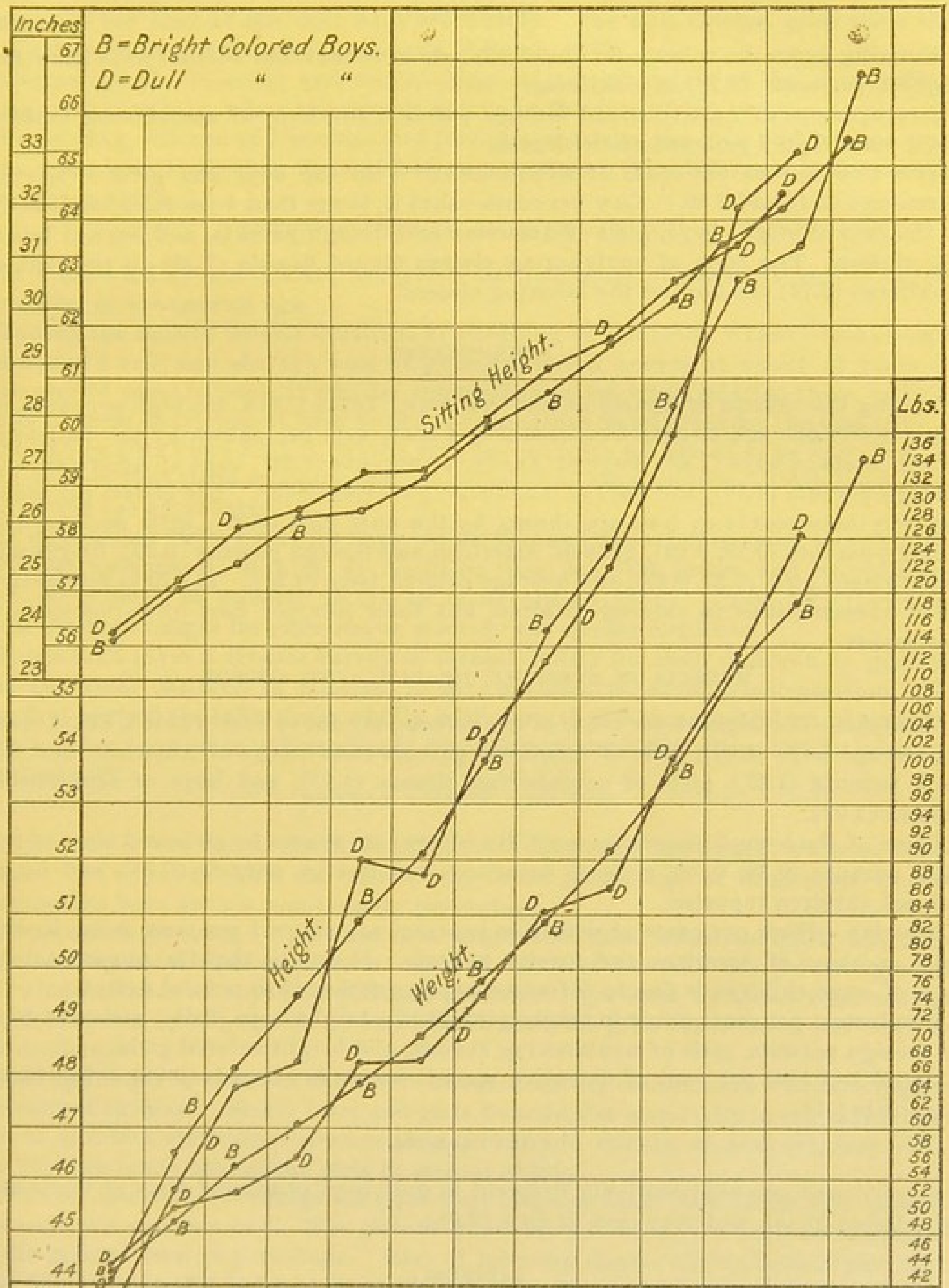
There is an exception to the general conclusion that increase in mental ability is accompanied with increase in height, sitting height, and weight. It is in the case of the bright and dull boys of the nonlaboring classes of American parentage. Here, as will be seen from Tables XX and XXI, the bright boys are in general inferior to the dull boys in height, sitting height, and weight. This may be due to special sociological conditions.

Colored children.—A comparison in diagram XII between bright and dull colored boys shows that in general the bright slightly excel in height, but what is most striking are inferior in sitting height at all ages except 16, and since the height includes the sitting height, and differences in sitting height between the divisions of pupils are generally smaller than in height, the inference in case of colored children (for the bright girls are inferior in sitting height) is that dullness and large sitting height are concomitants, if not closer related.

The dull colored boys also excel the bright in weight at 6, 7, 10, 13, and 15 on, and therefore excel them in general in weight.

The bright colored girls are superior to the dull colored girls in height, weight, and head circumference, but inferior in sitting height.

DIAGRAM XII (TABLES LXII AND LXIII.)



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of B.	27	92	127	128	159	136	144	145	116	90	42	26	
No. of D.	22	72	40	51	46	51	52	44	41	28	16	21	

SECTION C.

CHILDREN WITH ABNORMALITIES.

The word abnormality is not used in any rigid sense, and refers here to children reported by the teachers as peculiar or defective. It is evident that had specialists examined the children for defects, the percentages would have been higher, but our purpose is to give only those defects or peculiarities observed by the teachers.

Table LXIX, section E, needs no extended explanation; it gives in general abnormalities or defects in relation to sex, mental ability, nationality, sociologic condition, and race.

SICKLINESS.

Running down the column for the sickly, we note that dull colored girls show the highest per cent (12.78) of sickliness.

Average boys of American and foreign parents, and boys of nonlaboring classes, show more than 7 per cent of sickliness.

The two lowest per cents of sickliness are with the boys and girls of foreign parentage (2.13 and 2.60.) Low per cents—that is, lower than 4 per cent—are shown in the case of bright boys, girls of American and foreign parents, and boys of laboring classes. The boys of nonlaboring classes almost double (7.37) in per cent of sickliness (3.72) the boys of the laboring classes.

NERVOUSNESS.

Taking the column of figures under "nervous," Table LXIX, the high per cents, or those above one and twenty-hundredths per cent, say, are shown by the dull boys (1.24), average boys (1.42), boys of American parents (1.28), boys of American and foreign parents (1.79), and boys of nonlaboring classes (2.03). The lowest per cents, say fifty-hundredths or less, are shown by the dull girls (0.33), girls and boys of foreign parents (0.19, 0.19), girls of American and foreign parents (0.29), bright and dull colored girls (0.23, 0.45), and average colored boys (0.26). The data are meager as to abnormalities in colored children, but their low per cent of nervousness is noticeable.

DEFECTS IN EYESIGHT, HEARING, AND SPEECH.

Eyesight.—The highest per cents of eye defects, say above 1.50 (Table LXIX), occur in average boys (1.63), girls of American parents (1.52), boys of American and foreign parents (1.57), girls of nonlaboring classes (1.73), and boys of nonlaboring classes (1.97).

Some of the lowest per cents, say 0.70 and less, are shown by girls and boys of foreign parents (0.38, 0.58), girls of American and foreign parents (0.59), and by all colored children reported.

Hearing.—High per cents of defective hearing, say above 1 per cent, occur in dull boys and boys of American and foreign parents. It may be that the apparent dullness of some children is due to defective hearing rather than mental defect.

The lowest per cents occur in bright girls (0.15), bright boys (0.45), girls and boys of foreign parents, girls of nonlaboring classes, and bright colored girls.

Speech.—A low per cent of defective speech occurs in all girls (0.28), while in all boys it is 1.11.

CONVULSIONS.

Convulsions are comparatively frequent in dull boys (0.16) and boys of nonlaboring classes (0.13), and very rare in girls (0.01).

LAZINESS.

While most all children, boys especially, are lazy at times, there are nevertheless a number of children who seem to be chronically lazy. The highest per cent of laziness is shown by the dull boys (2.97). Comparing all boys and girls (0.22), the boys are much more lazy (1.33).

While of course there is no standard for laziness, yet there are certain children whose excessive laziness is apparent to every teacher. The same is true in regard to unruly children.

UNRULY CHILDREN.

As we might expect, the boys (5.47) are very much more unruly than the girls (0.25). The highest per cent of unruliness is shown by the dull boys (9.80); that is, almost 10 per cent of the dull boys are unruly. The dull colored girls show the highest per cent of unruliness in colored children (4.75).

Comparing the laboring and nonlaboring classes, the girls of the nonlaboring class are less unruly, while the reverse is true in the case of the boys.

Comparing children of American and foreign parentage, the girls of American parentage are less unruly than those of foreign parentage. The difference in the case of the boys is small.

ABNORMALITIES IN RELATION TO AGE.

In Tables LXXI and LXXII are given the per cents of different abnormalities according to the nearest age.

Taking the time of second dentition or shedding of the teeth, which begins about the age of 6 or 7, and also the time of puberty, which occurs at about 12 years in girls and 14 years in boys, it will be interesting to see what relation these critical times in child development bear to the abnormalities as reported by the teachers.

In Tables LXXI and LXXII, which give percentages for age of boys and girls, it will be seen that there is, in general, an increase of abnormalities at dentition time and at the age of puberty.

If we examine Table LXXI for boys, we see that sickliness increases as we approach puberty; nervousness is high at dentition time and just before and at puberty; laziness is large at puberty (2.17), as is unruliness (8.16). Table LXXII, which gives the percentages for girls, shows a somewhat similar condition.

Table LXX gives a general survey of mental ability for both children in general and abnormal children in relation to sex, nationality, sociological position, etc. The first part of the table deals wholly with normal children or children in general. This touches upon some points already treated as to mental ability, but in an independent way.

MENTAL ABILITY AND SEX.

Beginning at the top of the table (LXX) and following downward, we note a few points. All boys and girls show about the same percentage of brightness, but in dullness the boys have a much higher percentage.

Abnormal boys show 10 per cent less brightness than abnormal girls, but they gain, as they show 1 per cent less of dullness. But if we take the percentages on the whole number of boys and girls the abnormal boys excel by about 4 per cent in brightness but by 13 per cent in dullness, so that the girls are some 9 per cent or points ahead.

Taking the percentages on the whole number, unruly children show a much higher per cent of dullness. Sickly boys and girls do not differ materially in mental ability, but in children otherwise defective than sickly and unruly, as nervous, lazy, etc., the boys are much behind the girls in mental ability.

Boys of American parentage are 6 per cent brighter than boys of foreign parentage and 1 per cent less dull. The girls of American parentage are still more superior to the girls of foreign parentage. Boys of laboring classes show about 10 per cent less brightness and 4 per cent more dullness than boys of nonlaboring classes; the girls of the laboring classes are still farther behind the girls of nonlaboring classes. In short, advantageous sociological conditions seem closely connected with mental brightness.

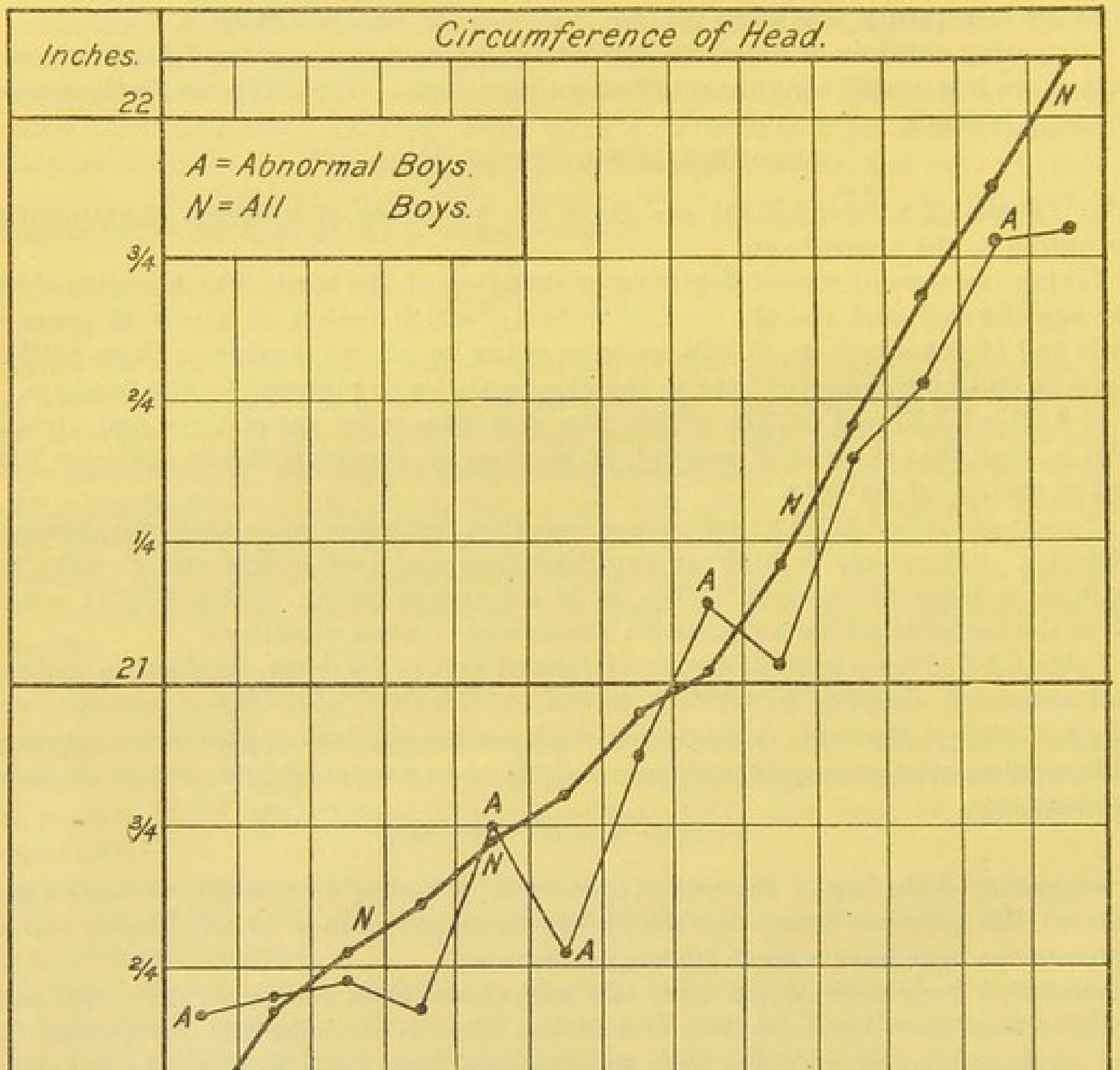
The colored boys show 25 per cent less brightness and 10 per cent less dullness than colored girls. They are therefore only 15 per cent behind, comparatively.

Abnormal colored girls show more dullness (15 per cent) than abnormal colored boys.

ANTHROPOMETRICAL MEASUREMENTS.

Diagram XIII, based upon Tables VII and LXXIII, indicates that boys in general have a larger head circumference than boys with abnormalities or defects. The same truth applies to the girls, as shown in Diagram XIV, taken from Tables XXXIV

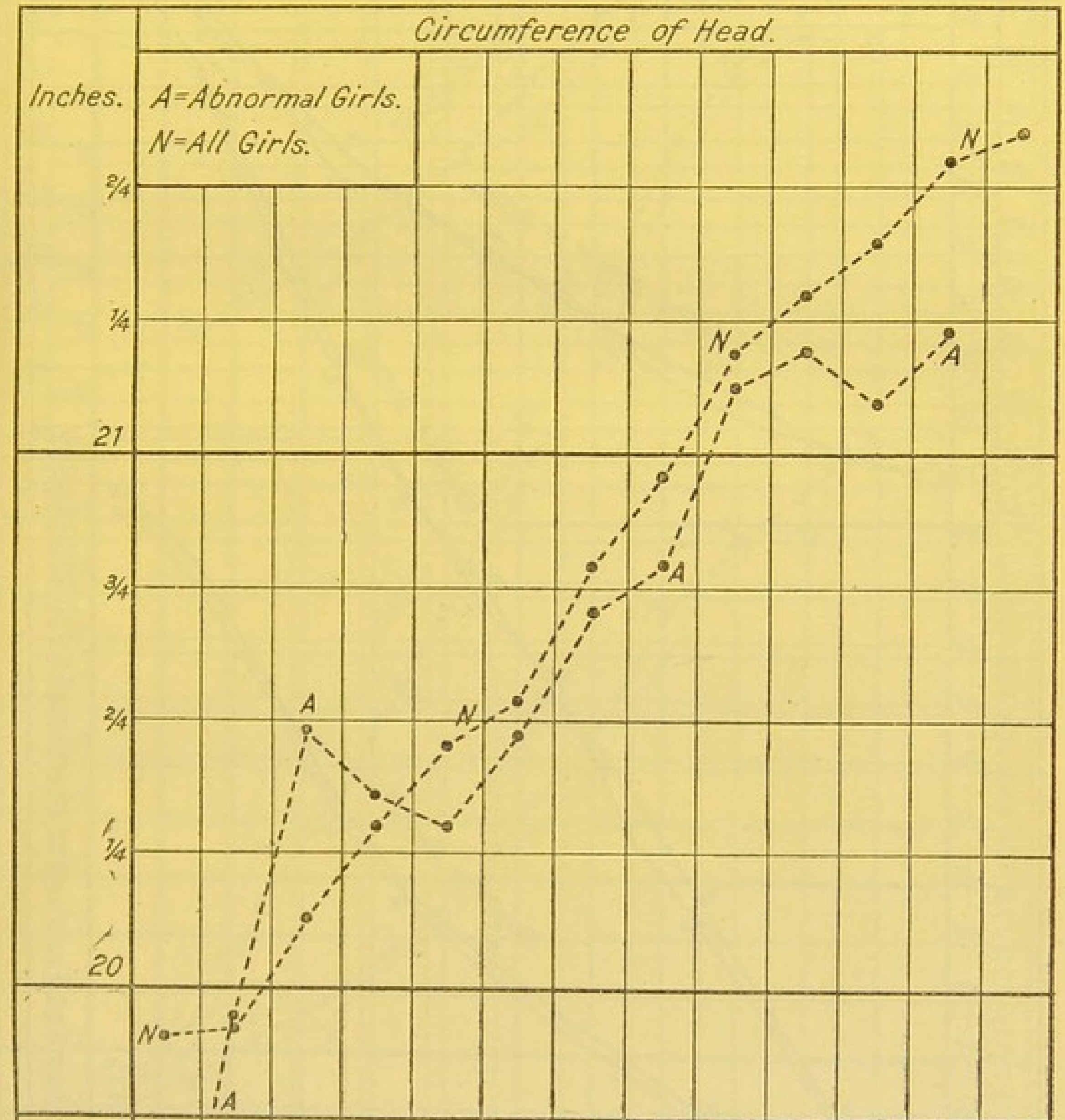
DIAGRAM XIII (TABLES VII AND LXXIII).



No. of Ab. Boys	24	88	126	141	150	191	215	205	192	106	88	43	
Total Boys.	103	533	787	878	930	862	986	926	784	528	345	120	
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18

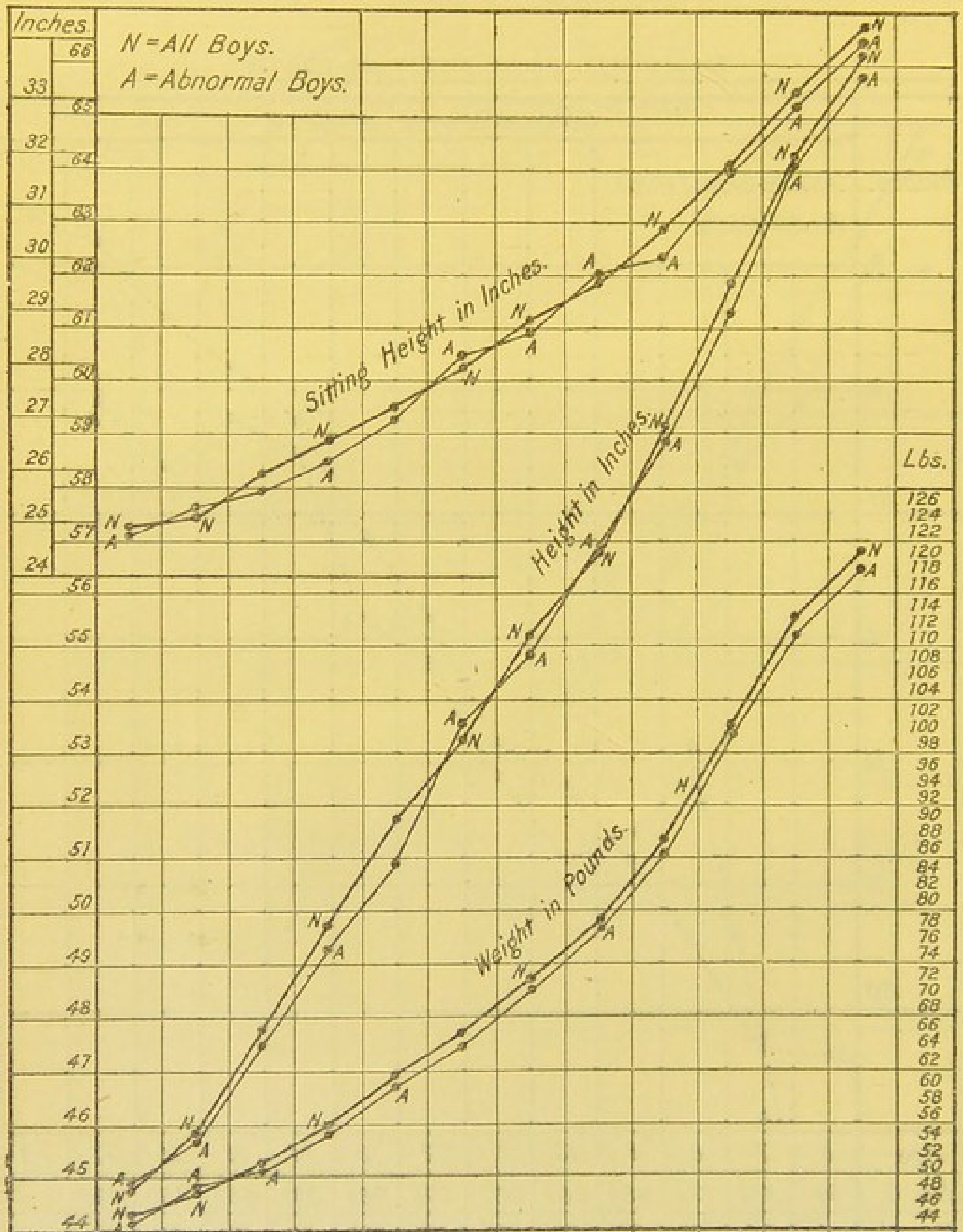
and LXXIV. Although the number of boys with abnormalities is over twice as large as that of girls with abnormalities, yet the curve for the boys is more variable. We have already seen that the boys also vary more in mental ability.

Diagram XIV (Tables XXXIV and LXXIV).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. G.	94	375	754	883	939	931	876	966	833	655	450	423	
No. Ab.	4	34	59	50	79	75	83	101	53	48	40	21	

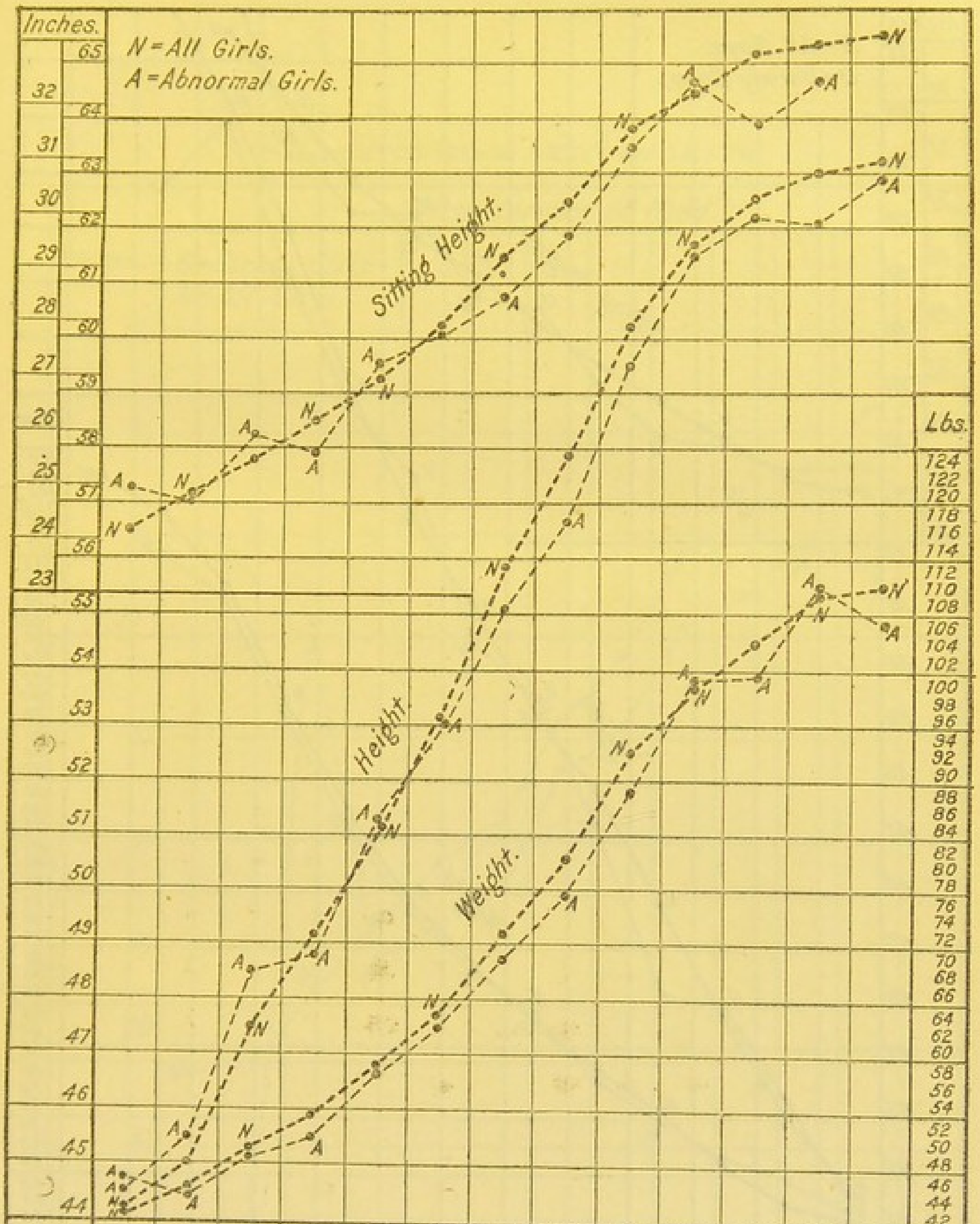
DIAGRAM XV (TABLES VII AND LXXIII).



Age.	6	7	8	9	10	11	12	13	14	15	16	17
No. of N.	103	533	787	878	930	862	986	926	784	528	345	720
No. of A.	24	88	126	141	150	191	215	205	192	106	88	43

Diagram XV, based upon Tables VII and LXXIII, shows the boys with abnormalities to be inferior to normal boys, or boys in general, in height, sitting height, and weight. The inferiority is more constant in weight.

DIAGRAM XVI (TABLES XXXIV AND LXXIV).



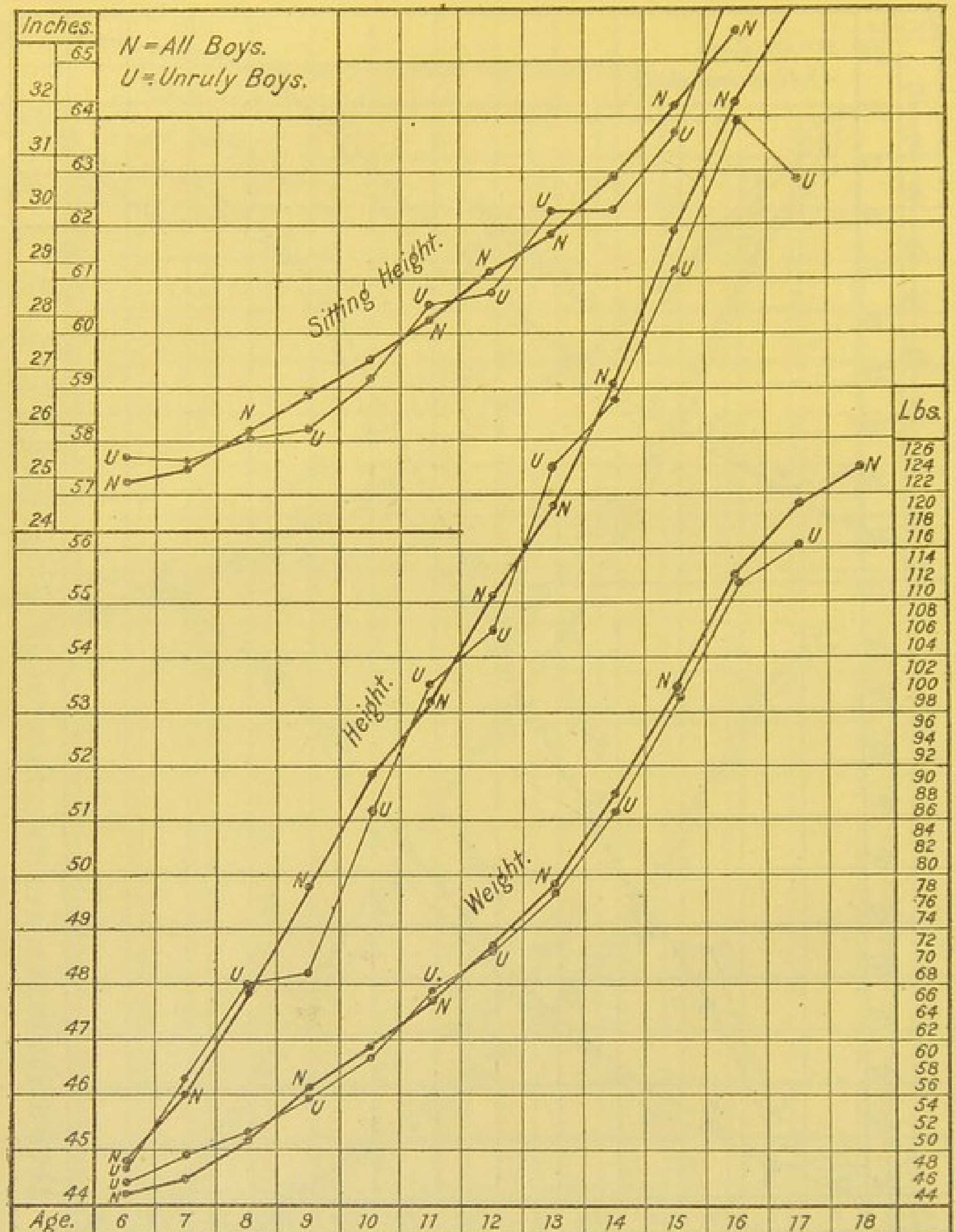
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	
No. of N.	94	375	754	883	939	931	876	966	833	655	450	323	151	
No. of A.	4	34	59	50	79	75	83	101	53	45	40	21	15	

Diagram XVI, based upon Tables XXXIV and LXXIV, shows the girls with abnormalities to have less height, sitting height, and weight than girls in general, as is true in the case of boys, only the differences are more marked in the case of the girls.

UNRULY CHILDREN.

Comparing the unruly boys, Tables VII and LXXV, with boys in general, the unruly boys are inferior in head circumference.

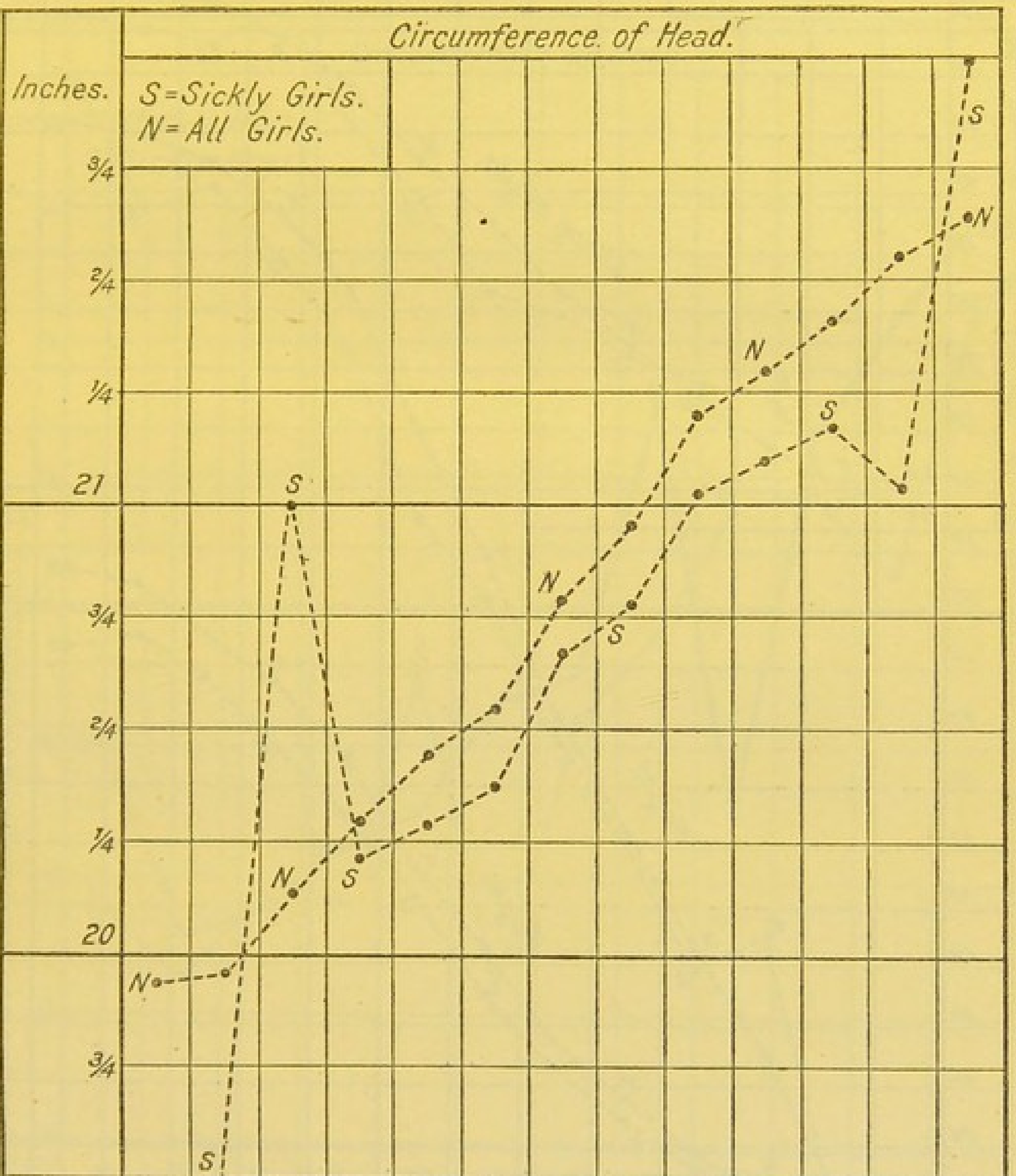
DIAGRAM XVII (TABLES VII AND LXXV).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of N.	103	533	787	878	930	862	986	926	784	528	345	120	
No. of U.	3	20	33	38	44	56	63	61	62	34	15	6	

If we compare unruly boys with all boys, Diagram XVII, Tables VII and LXXV, we find the unruly boys to have less height, sitting height, and weight. There is considerable variation in the curves until age 14 in the height, and age 13 in the weight. Normal boys excel at later ages.

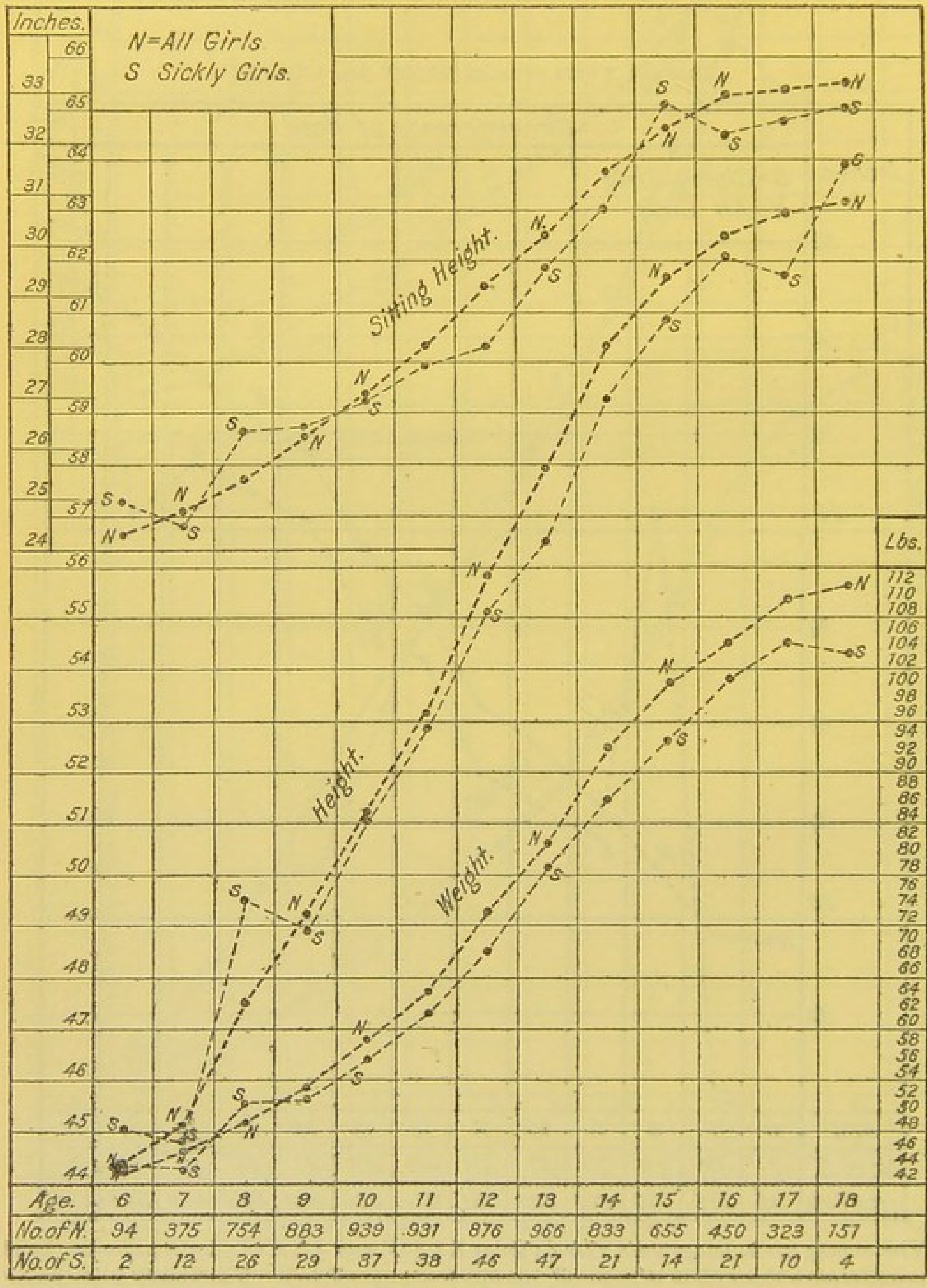
DIAGRAM XVIII (TABLES XXXIV AND LXXVI).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of S.	2	12	26	29	37	38	46	47	21	14	21	10	4
Total Girls.	94	375	754	883	939	931	876	966	833	655	450	323	151

The sickly girls, Diagram XVIII (Tables XXXIV and LXXVI), have a smaller head circumference than girls in general, except from ages 7 to 9. The sickly boys being inferior in head circumference to the unruly boys (Diagram XXI), have still less circumference of head than boys in general.

DIAGRAM XIX (TABLES XXXIV AND LXXVI).



From Diagram XIX (Tables XXXIV and LXXVI), sickly girls are seen to be still more inferior to normal girls in height, sitting height, and weight than are all abnormal girls. The difference in weight is the most marked.

DIAGRAM XX (TABLE LXXV).

DIAGRAM XX (TABLES VII AND LXXV.)

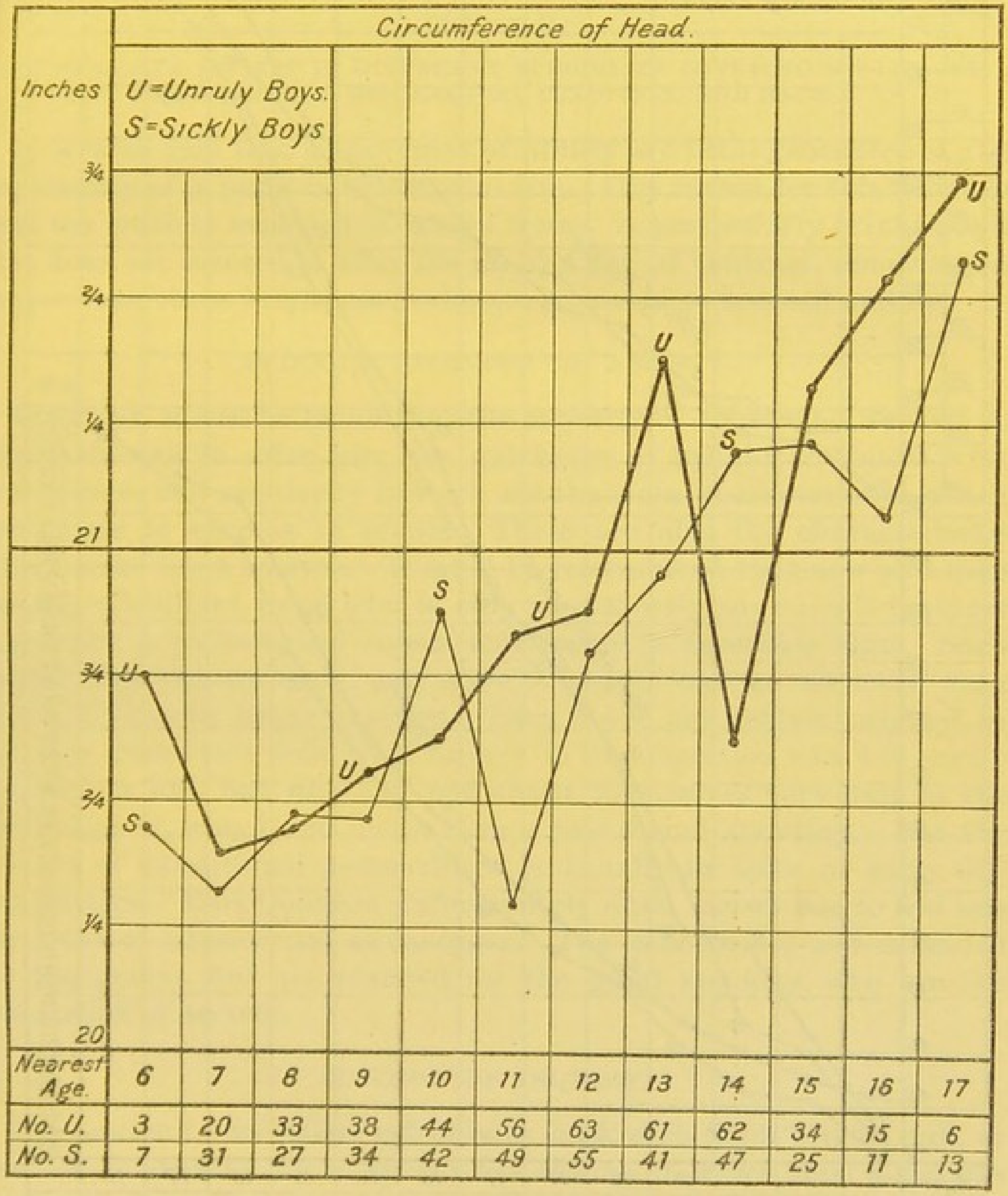
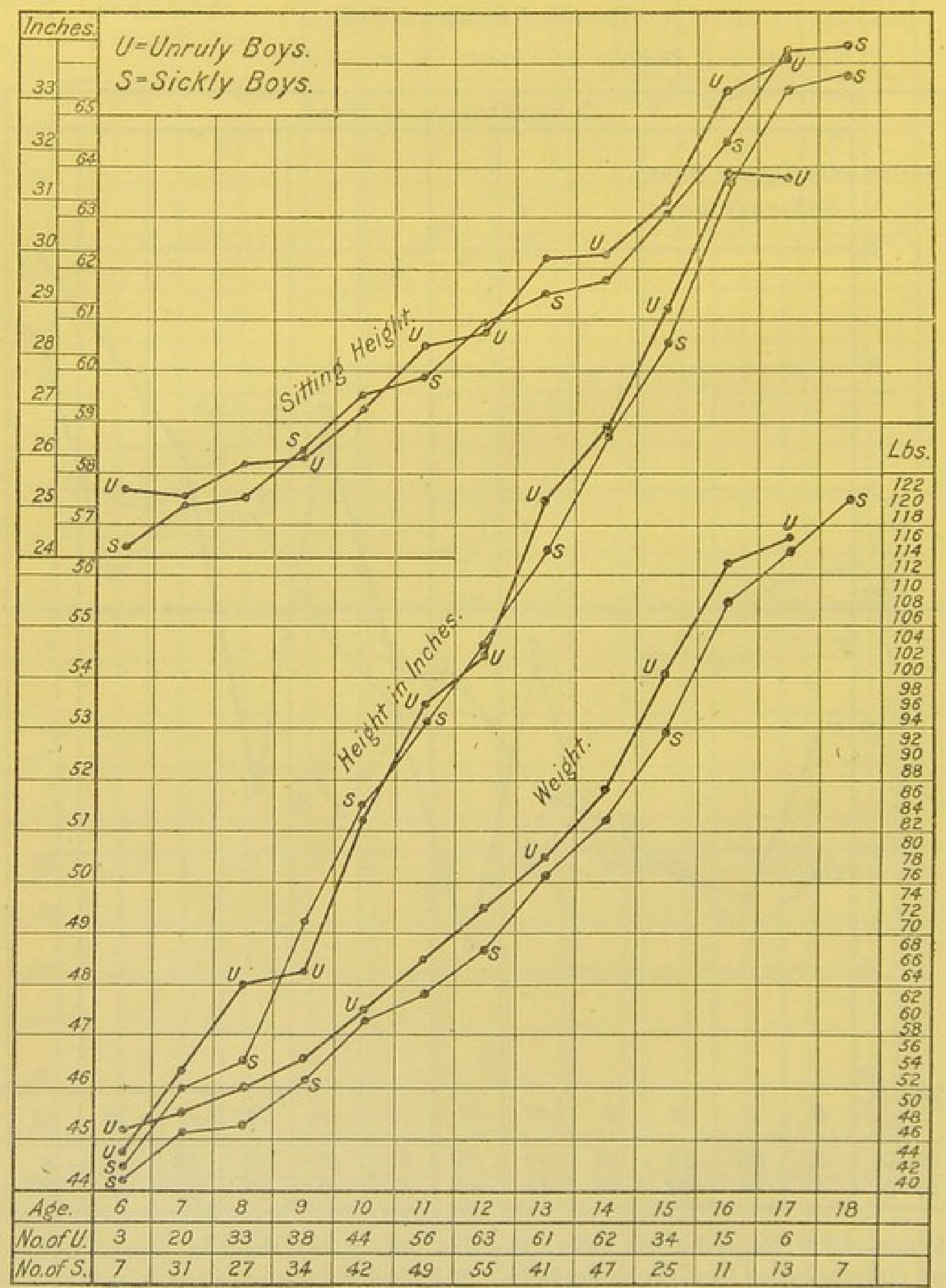


Diagram XX (Table LXXV) shows that the unruly boys have in general a larger head circumference than the sickly boys. The unruly girls are so few in number (23) that their measurements could not be utilized.

DIAGRAM XXI (TABLE LXXV).



Comparing unruly and sickly boys in Diagram XXI (Table LXXV), we find the unruly boys to excel in height, sitting height, and weight. The increase in weight is the most constant.

ABNORMAL COLORED CHILDREN.

Boys.—Comparing abnormal colored boys (Table LXXVII) with colored boys in general (Table LXI), we find the abnormal boys excel in circumference of head and sitting height, while the normal boys excel in height and weight.

Girls.—The abnormal colored girls (Table LXXVIII) are about equal in height to the normal, but are inferior to them in circumference of head, sitting height, and weight.

SECTION D.

COMPARATIVE ABILITY IN DIFFERENT STUDIES, IN CONNECTION WITH SEX, NATIONALITY, SOCIOLOGICAL CONDITION, AND RACE.

It is often said that school tests of ability are little guarantee of the superiority of a pupil in subsequent life. One reason for this belief is that too much is expected of school tests. A particularly bright pupil who does not succeed in after life is, by force of contrast, remembered longer than those bright ones who are expected to succeed and do.

SCHOOL CRITERION OF ABILITY.

We think it will be found that the majority of those who do well in school do well in after life; for quickness of insight combined with faithfulness and regularity in work are the main characteristics which contribute to success in school. These are also the characteristics which make life a success. It must be remembered that now and then there is a brilliant pupil who is only prematurely so; such brightness may have a pathological cause, and is not a favorable sign. Such pupils, who mature early, may after a certain age be no more than average or even below average. Then there are certain original or peculiar characters with great talents in one direction who will surely succeed in life, but who can not adapt themselves very well to the conditions of school, and hence have a poor school standing. But the success of exceptional personalities is usually in spite of early disadvantages. Early success unfortunately often causes one to feel less the need of educational advantages. The schools are not intended for the genius, but are planned for the great majority, who are the foundation of society.

METHOD OF INQUIRY.

The teachers were asked not only to mark each pupil bright, dull, or average, in general, but to specify the studies in which such pupil was bright, dull, or average. In this way a more complete judgment of the pupil's ability was obtained. Thus, some children generally bright are nevertheless dull or average in certain studies.

The difficulties of estimating intellectual ability in a quantitative way are well known, yet when there is an agreement in the reports of, say, more than ten teachers as to twenty or more pupils, there is a strong probability as to the general truth of the teachers' judgment. In questions where there is difference of opinion, the agreement of ten or more teachers is more trustworthy than the opinion of any single individual who is liable to have some cherished theory. For it must be noted that pupils in the same category in the tables may come from any one of four different high schools, or from all; or from any one of fifty different grammar schools, or from all; that a large number of different teachers were engaged in marking the pupils, so that any agreement as to any category in the tables (say girls of the laboring classes, bright in language) would be wholly unknown in advance.

It may be objected, again, that there is no standard of ability in studies. There is not, nor is it probable that there ever will be, any absolute standard of ability. But this does not in the least hinder us from saying, for instance, and saying truthfully, that one pupil is bright and another dull in arithmetic.

TABLE I.—*Totals and percentages of ability in the main branches of study.* a

	Mental divisions.	9 b All studies.		10 Algebra.		11 Arithmetic.		15 Drawing.		16 Geography.		21 History.		22 Language and English.		24 Manual labor—sewing.		25 Mathematics. c		26 Music.		28 Penmanship.		34 Reading.		35 Science—botany.		36 Spelling.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Boys of American parentage.	Bright	232	51	38	36	2,170	44	498	34	387	35	396	44	1,332	38	661	29	155	50	237	24	449	28	1,079	43	166	44	398	33
	Dull	64	14	20	19	912	18	327	22	143	13	134	15	675	19	475	21	48	16	286	29	424	27	509	21	44	12	297	24
	Average	161	35	48	45	1,862	38	634	44	572	52	370	41	1,493	43	1,113	50	103	34	475	47	722	45	900	36	167	44	526	43
Girls of American parentage.	Bright	281	45	90	40	1,820	37	576	35	453	36	491	41	1,705	46	860	40	141	34	416	40	658	40	1,287	54	197	45	630	48
	Dull	54	9	21	11	931	19	268	17	150	12	181	15	392	10	198	9	84	20	101	10	223	13	265	11	63	15	181	14
	Average	288	46	73	40	2,186	44	789	48	641	52	519	44	1,618	44	1,117	51	188	46	515	50	767	47	846	35	175	40	488	38
Boys of American parentage (nonlaboring classes).	Bright	144	53	31	37	1,170	46	341	39	278	42	295	51	805	42	371	31	116	56	156	25	254	30	595	48	114	48	252	35
	Dull	33	12	15	18	477	19	192	22	69	10	60	10	316	17	235	19	23	11	187	29	227	27	204	17	22	9	166	23
	Average	96	35	38	45	904	35	347	39	321	48	226	39	787	41	600	50	69	33	294	46	370	43	427	35	100	43	295	42
Girls of American parentage (nonlaboring classes).	Bright	......	....	61	50	966	42	358	41	288	46	344	50	1,002	53	488	45	97	36	265	45	359	45	684	64	128	50	372	58
	Dull	......	....	12	10	278	12	109	13	26	4	54	8	89	5	52	5	50	18	47	8	89	11	47	4	36	14	55	8
	Average	......	....	48	40	1,037	46	402	46	311	50	287	42	791	42	545	50	123	46	275	47	358	44	338	32	90	36	219	34
Boys of American parentage (laboring classes).	Bright	88	48	7	32	1,000	42	157	27	109	25	101	32	527	33	290	28	39	40	81	23	195	26	484	38	52	37	146	29
	Dull	31	17	5	23	435	18	135	23	74	17	74	23	359	23	240	23	25	25	99	27	197	27	305	24	22	16	131	26
	Average	65	35	10	45	958	40	287	50	251	58	144	45	706	44	513	49	34	35	181	50	352	47	473	38	67	47	231	45
Girls of American parentage (laboring classes).	Bright	116	40	29	46	854	32	218	28	165	27	147	29	703	38	372	34	44	31	151	34	299	35	603	45	69	38	258	40
	Dull	54	19	9	14	653	25	150	21	124	20	127	25	303	17	146	13	34	24	54	12	134	16	218	17	27	15	126	19
	Average	119	41	25	40	1,149	43	387	51	330	53	232	46	827	45	572	53	65	45	240	54	409	49	508	38	85	47	269	41
Boys of foreign and mixed nationalities. d	Bright	63	51	12	50	684	41	141	31	102	30	98	35	392	32	221	27	45	43	74	25	123	26	316	40	51	37	121	31
	Dull	18	14	1	4	311	19	111	24	51	15	58	21	260	22	183	23	16	15	71	25	128	28	162	21	20	15	109	27
	Average	44	35	11	46	665	40	202	45	189	55	123	44	561	46	400	50	44	42	144	50	216	46	306	39	65	48	165	42
Girls of foreign and mixed nationalities.	Bright	91	52	20	27	563	34	182	33	120	30	138	30	476	38	263	36	47	34	148	42	228	44	373	46	69	38	192	41
	Dull	19	11	22	30	402	24	98	17	69	18	95	21	217	18	79	11	35	25	34	10	69	13	119	15	28	16	76	16
	Average	64	37	31	43	685	42	278	50	204	52	222	49	548	44	379	53	58	41	166	48	221	43	375	39	84	46	197	43
Colored boys	Bright	358	46	30	61	1,033	54	153	47	212	45	141	51	448	42	......	....	28	44	85	36	346	45	795	49	7	25	348	41
	Dull	176	23	4	8	386	20	55	17	62	13	30	11	180	17	......	....	20	31	45	19	135	17	361	22	12	43	189	23
	Average	236	31	15	31	501	26	119	36	201	42	104	38	429	41	......	....	16	25	106	45	299	38	478	29	9	32	300	36
Colored girls	Bright	429	69	37	65	948	60	73	40	250	62	159	64	568	63	......	....	......	....	82	49	367	54	928	17	17	31	416	59
	Dull	174	28	11	19	459	29	46	25	100	25	56	22	201	22	......	....	......	....	23	14	134	19	294	21	6	11	164	23
	Average	22	3	9	16	173	11	65	35	52	13	35	14	140	15	......	....	......	....	62	37	184	27	157	62	32	58	128	18

a A great majority of the reports as to studies came from the grammar schools, but where there was a sufficient number reported from the high schools they were used.

b The numbers omitted here refer to studies on which the returns were not full enough to admit of use.

c Some of the teachers reported for "arithmetic" under the head of "mathematics." It was thought best not to combine these reports, for any agreement between them would tend to confirm the general correctness of the reports under each.

d The foreign and mixed nationalities were combined, as the number reported from each nationality singly was not large enough for comparison.

Under column 9, Table I, we have put all pupils reported bright, dull, or average in all studies; that is, those who are exceedingly bright or exceedingly dull, etc. Comparing boys and girls of American parentage, we find, from column 9, 51 per cent of the boys and 45 per cent of the girls bright in all studies, but only 9 per cent of the girls dull in all studies against 14 per cent of the boys; that is, there are 6 per cent more of the boys bright and 5 per cent more dull than in the case of the girls. Since an approximate valuation of ability is all that could be expected, the difference of 1 per cent in favor of the boys is too small to be considered. Where the difference is not more than 5 per cent in comparing dullness and brightness in each study, we have disregarded it, calling the classes compared approximately equal. In this way we have worked out Table II, which is based upon the percentages in Table I. Thus the minus sign in column 10, line 1, means that in algebra the boys of American parentage are more than 5 per cent inferior to the girls of American parentage. So the plus sign in column 11, line 1, Table II, signifies that the boys of American parentage are more than 5 per cent superior in arithmetic to the girls of American parentage. Reading line 1 in full, we find that boys of American parents are of about equal ability in "all studies," geography, history, and science, to girls of American parents, inferior to them in algebra, drawing, language, manual labor, music, penmanship, reading, and spelling, and superior to them in arithmetic and mathematics.

TABLE II.—*Comparative ability in different branches of study, according to sex, nationality, sociological condition, and race.*

Divisions according to sex, nationality, sociological condition, and race.	Number of line.	All studies. (9)	Algebra. (10)	Arithmetic. (11)	Drawing. (15)	Geography. (16)	History. (21)	Language and English. (22)	Manual labor and sewing. (24)
Boys, American parents, compared with giris, American parents	1	=	—	+	—	=	=	—	—
Boys, American parents, nonlaboring class, compared with girls, American parents, nonlaboring class	2	....	—	=	—	—	=	—	—
Boys, American parents, laboring class, compared with girls, American parents, laboring class	3	+	—	+	=	=	+	—	—
Boys of foreign and mixed nationalities compared with girls of foreign and mixed nationalities	4	=	+	+	—	=	=	—	—
Boys, American parents, nonlaboring class, compared with boys, American parents, laboring class	5	=	+	=	+	+	+	+	+
Boys of foreign and mixed nationalities compared with boys, American parentage	6	=	+	=	=	—	—	—	=
Girls, American parents, nonlaboring class, compared with girls, American parents, laboring class	7	....	+	+	+	+	+	+	+
Girls of foreign and mixed nationalities, compared with girls, American parentage	8	=	—	—	=	—	—	—	—
Colored boys compared with colored girls	9	—	+	=	+	=	=	—	....
Boys, American parents, compared with girls, American parents, as to average ability	10	—	+	—	—	=	—	—	—
Boys, American parents, nonlaboring class, compared with boys, American parents, laboring class	11	=	=	—	—	—	—	—	+
Girls, American parents, nonlaboring class, compared with girls, American parents, laboring class	12	....	=	+	—	—	—	—	—
Boys of foreign and mixed nationalities compared with boys, American parentage	13	=	+	+	+	+	+	+	=
Girls of foreign and mixed nationalities compared with girls, American parentage	14	—	+	—	+	=	+	=	+

TABLE II.—*Comparative ability in different branches of study, according to sex, etc.*—Cont'd.

Divisions according to sex, nationality, sociological condition, and race.	Number of line.	25	26	28	34	35	36	37		
								Total.		
		Mathematics.	Music.	Penmanship.	Reading.	Science and botany.	Spelling.	Minus signs.	Plus signs.	Signs of equality.
Boys, American parents, compared with girls, American parents	1	+	−	−	−	=	−	8	2	4
Boys, American parents, nonlaboring class, compared with girls, American parents, nonlaboring class	2	+	−	−	−	=	−	9	1	3
Boys, American parents, laboring class, compared with girls, American parents, laboring class	3	+	−	−	−	=	−	7	4	3
Boys of foreign and mixed nationalities compared with girls of foreign and mixed nationalities	4	+	−	−	−	=	−	7	3	4
Boys, American parents, nonlaboring class, compared with boys, American parents, laboring class	5	+	=	=	=	+	+	0	9	5
Boys of foreign and mixed nationalities compared with boys, American parentage	6	−	=	=	=	−	=	5	1	8
Girls, American parents, nonlaboring class, compared with girls, American parents, laboring class	7	+	+	+	+	+	+	0	13	0
Girls of foreign and mixed nationalities compared with girls, American parentage	8	=	=	=	−	−	−	9	0	5
Colored boys compared with colored girls	9	....	−	....	−	−	−	6	2	3
Boys, American parents, compared with girls, American parents, as to average ability	10	−	−	−	+	+	+	9	4	1
Boys, American parents, nonlaboring class, compared with boys, American parents, laboring class	11	−	−	−	−	−	−	11	1	2
Girls, American parents, nonlaboring class, compared with girls, American parents, laboring class	12	+	−	−	−	−	−	10	2	1
Boys of foreign and mixed nationalities compared with boys, American parentage	13	+	+	+	+	+	−	1	11	2
Girls of foreign and mixed nationalities compared with girls, American parentage	14	−	−	+	+	+	+	4	8	2

INFLUENCE OF SEX ON ABILITY.

Comparing in general the boys and girls of American parentage, as summed up under "totals" in column 37, the boys are inferior to the girls in eight studies, superior in two, and equal in four.

If, now, we compare the boys of American parentage, nonlaboring class, with the girls of American parentage, nonlaboring class (line 2), eliminating as far as possible the influence of sociological conditions, we find (compare lines 2 and 1) that the girls excel the boys still more, being equal to them in arithmetic, where they (line 1) were inferior, and superior to the boys in geography, where they were formerly equal to them.

Comparing boys and girls of the laboring classes, American parentage (line 3), the boys gain some; they are superior in "all studies" and history, where in line 1 they were equal to the girls; they are equal in drawing, where in line 1 they are inferior to the girls.

Comparing boys and girls of mixed nationalities (line 4), the boys become superior in algebra, where they in line 1 are inferior. Thus whatever sociological or racial division is made the girls always excel in most of the branches of study.

INFLUENCE OF SOCIOLOGICAL CONDITIONS ON ABILITY.

If we compare boys of American parents, nonlaboring class, with boys of American parents, laboring class (line 5), the influence of sociological conditions will be found to be quite marked; thus the boys of American parentage, nonlaboring class, are equal to the boys of American parentage, laboring class, in five studies, superior in nine, and inferior in none. Sociological conditions affect the girls still more, as indicated in line 7, where the girls of American parentage, nonlaboring class, excel the girls of American parentage, laboring class, in all branches.

PROBABLE INFLUENCE OF FOREIGN AND MIXED NATIONALITIES ON ABILITY.

The probable influence of foreign and mixed nationalities on ability is seen by comparing boys and girls of foreign and mixed nationalities (lines 6 and 8) with boys and girls of American parentage. The boys of foreign and mixed nationalities are superior to the boys of American parentage in one study, equal in eight, and inferior in five (column 37, line 6); the girls of foreign mixed nationalities are inferior to the girls of American parentage in nine studies (column 37, line 8), superior in none, and equal in five. The influence of foreign and mixed nationalities seems unfavorable to the development of ability.

PUPILS OF AVERAGE ABILITY CONSIDERED AS TO SEX, SOCIOLOGICAL CONDITION, AND NATIVITY.

While the girls excel the boys in ability in most branches, they at the same time show higher percentages of average ability, and therefore less variability. Thus in line 10 under "totals" (column 37, Table II), we find the boys to be inferior in average ability to the girls in nine studies, superior in four studies, and equal in one study.

From this special point of view, boys might be considered superior to the girls, for, from an evolutionary point of view, the superior species varies the most, and therefore may adapt itself better to circumstances.

Comparing boys of the nonlaboring class with boys of the laboring class (line 11), the former are inferior to the latter in average ability in eleven studies, superior in one, and equal in two. The girls of the nonlaboring class (line 12) are inferior in average ability to the girls of the laboring class in ten studies, superior in two, and equal in one study.

Girls of the nonlaboring class compared with girls of the laboring class (line 12) are inferior in average ability in ten branches, superior in two, and equal in one.

From line 13, we find boys of foreign and mixed nationalities to be inferior in average ability in one study, superior in eleven studies, and equal in two to boys of American parentage.

From line 14, it will be seen that girls of foreign and mixed nationalities are inferior in average ability in four studies, superior in eight, and equal in two to girls of American parentage.

In general, therefore, unfavorable sociological conditions and foreign and mixed nationality seem to produce an increase of, or are concomitants of, average ability.

ABILITY IN RELATION TO AGE.

From Tables III and IV, it will be seen that in both boys and girls, as age increases, the percentage of brightness decreases in all the studies, except drawing, manual labor, and penmanship; that is, in the more mechanical studies. This would suggest that ability in mechanical studies depends more upon the practice and time given to them than is true of less mechanical branches.

As age increases the percentage of dullness increases in all the studies except in drawing, manual labor, penmanship, music, and science.

TABLE III.—*Percentage of ability in different studies computed on number reported.*

GIRLS—AMERICAN PARENTAGE.

Limit of age. From— Yrs.	Mos.	To— Yrs.	Mos.	Mental divisions.	9 All studies.	10 Algebra.	11 Arithmetic.	15 Drawing.	16 Geography.	21 History.	22 Language and English.	24 Manual labor, sewing.	26 Music.	28 Penmanship.	34 Reading.	35 Science—botany.	36 Spelling.
6	7	7	6	Bright ..	58	.....	44	43	.....	.....	53	31	54	38	58	41	50
				Dull	4	.....	17	20	.....	.....	11	17	16	17	9	9	9
				Average	38	.....	39	37	.....	.....	36	52	30	45	33	50	41
7	7	8	6	Bright ..	63	.....	46	33	70	.....	58	41	46	43	59	65	51
				Dull	9	.....	14	10	10	.....	9	9	13	15	10	6	15
				Average	28	.....	40	57	20	.....	33	50	41	42	31	29	34
8	7	9	6	Bright ..	58	.....	42	36	37	.....	55	41	50	45	58	63	60
				Dull	8	.....	15	12	10	.....	7	8	8	11	8	6	10
				Average	34	.....	43	52	53	.....	38	51	42	44	34	31	30
9	7	10	6	Bright ..	62	.....	38	30	37	.....	54	43	44	38	56	37	51
				Dull	4	.....	15	22	5	.....	5	9	10	12	11	37	11
				Average	34	.....	47	48	58	.....	41	48	46	50	33	26	38
10	7	11	6	Bright ..	56	.....	39	35	39	49	49	41	37	41	58	42	55
				Dull	11	.....	19	15	8	9	11	9	9	10	9	10	14
				Average	33	.....	42	50	53	42	40	50	54	49	33	48	31
11	7	12	6	Bright ..	47	.....	33	33	41	50	43	38	38	35	53	29	45
				Dull	7	.....	20	17	9	10	11	10	5	12	13	14	8
				Average	46	.....	47	50	50	40	46	52	57	53	34	57	47
12	7	13	6	Bright ..	39	67	35	34	36	42	43	39	35	37	45	21	46
				Dull	10	11	19	20	15	13	12	7	12	18	14	16	12
				Average	51	22	46	46	49	45	45	54	53	45	41	63	42
13	7	14	6	Bright ..	35	65	34	37	33	41	44	43	24	46	44	33	41
				Dull	7	9	23	15	12	13	14	8	7	13	14	7	18
				Average	58	26	43	48	55	46	42	49	69	41	42	60	41
14	7	15	6	Bright ..	35	56	30	37	29	35	37	35	36	33	27	22	29
				Dull	14	11	30	19	26	24	17	10	16	20	21	33	34
				Average	51	33	40	44	45	41	46	55	48	47	52	45	37
15	7	16	6	Bright ..	37	34	21	48	25	42	35	35	43	43	42	43	39
				Dull	14	11	22	14	25	17	12	9	10	19	8	14	22
				Average	49	55	57	38	50	41	53	56	47	38	50	43	39
16	7	17	6	Bright ..	.....	43	8	52	.....	36	30	31	.....	10	.....	50	....
				Dull	.....	9	32	5	.....	18	7	8	.....	20	.....	6	....
				Average	.....	48	60	43	.....	46	63	61	.....	70	.....	44	....
17	7	18	6	Bright ..	.....	.....	9	19	.....	19	17	40	.....	.....	.....	42	....
				Dull	.....	.....	18	12	.....	19	6	20	.....	.....	.....	5	....
				Average	.....	.....	73	69	.....	62	77	40	.....	.....	.....	53	....

DIAGRAM I (TABLE III).

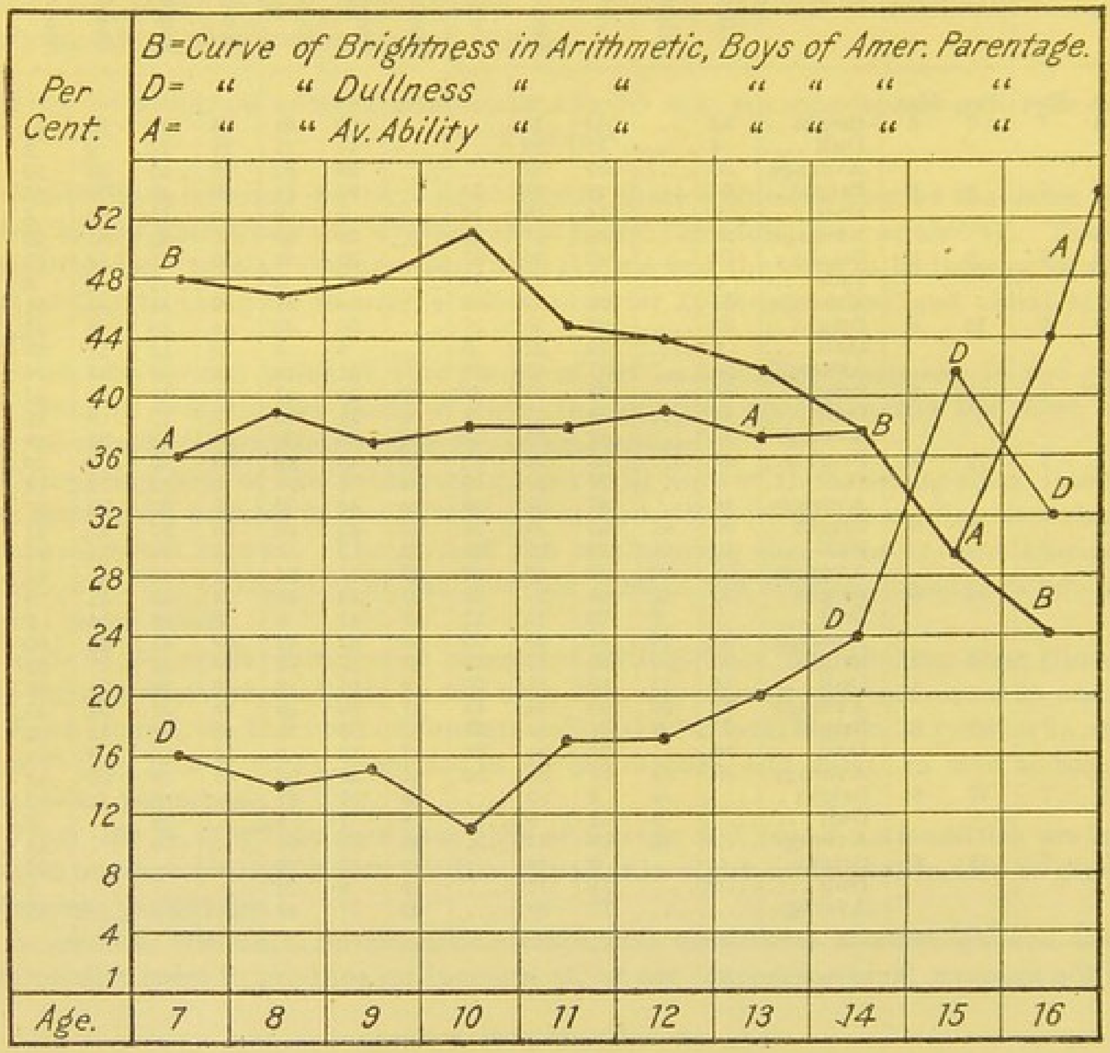


Diagram I illustrates how in arithmetic, for example, brightness decreases with age, while dullness increases.

TABLE IV.—*Percentage of ability in different studies computed on number reported.*

BOYS—AMERICAN PARENTAGE.

Limit of age.					9	10	11	15	16	21	22	24	26	28	34	35	36
From—		To—		Mental divisions.	All studies.	Algebra.	Arithmetic.	Drawing.	Geography.	History.	Language and English.	Manual labor, sewing.	Music.	Penmanship.	Reading.	Science—botany.	Spelling.
Yrs.	*Mos.*	*Yrs.*	*Mos.*														
6	7	7	6	Bright ..	43	.....	48	27	.....	.....	45	30	25	22	48	56	46
				Dull	7	.....	16	35	.....	.....	18	26	26	38	25	6	12
				Average	50	.....	36	38	.....	.....	37	44	49	40	27	38	42
7	7	8	6	Bright ..	64	.....	47	31	69	.....	39	31	35	33	50	51	37
				Dull	8	.....	14	15	8	.....	15	23	17	25	17	15	20
				Average	28	.....	39	54	23	.....	46	46	48	42	33	34	43
8	7	9	6	Bright ..	56	.....	48	33	.....	.....	48	28	37	34	49	53	45
				Dull	9	.....	15	21	.....	.....	14	20	18	20	13	9	12
				Average	35	.....	37	46	.....	.....	38	52	45	46	38	38	43
9	7	10	6	Bright ..	65	.....	51	25	54	.....	48	29	26	27	51	37	37
				Dull	15	.....	11	28	5	.....	15	19	23	27	21	12	24
				Average	20	.....	38	47	41	.....	37	52	51	46	28	51	39
10	7	11	6	Bright ..	42	.....	45	31	48	56	41	27	23	29	46	35	32
				Dull	19	.....	17	19	10	11	16	26	22	23	20	13	21
				Average	39	.....	38	50	42	33	43	47	55	48	34	52	47
11	7	12	6	Bright ..	53	.....	44	35	36	54	37	28	20	23	39	47	30
				Dull	16	.....	17	24	11	11	17	20	33	29	22	11	25
				Average	31	.....	39	41	53	35	46	52	47	48	39	42	45
12	7	13	6	Bright ..	51	.....	42	37	29	45	32	22	21	29	29	44	26
				Dull	10	.....	20	16	12	8	25	23	33	27	21	17	24
				Average	39	.....	38	47	59	47	43	55	46	44	50	39	50
13	7	14	6	Bright ..	51	42	38	35	27	41	29	27	7	22	22	25	26
				Dull	12	11	24	26	17	18	24	21	44	31	22	12	33
				Average	37	47	38	39	56	41	47	52	49	47	56	63	41
14	7	15	6	Bright ..	38	43	29	51	19	42	29	40	20	27	23	30	19
				Dull	21	18	42	23	24	17	29	15	42	27	42	10	48
				Average	41	39	29	26	57	41	42	45	38	46	35	60	33
15	7	16	6	Bright ..	52	35	24	52	19	28	27	41	11	27	10	.....	29
				Dull	24	24	32	25	26	30	28	17	47	22	48	.....	33
				Average	24	41	44	23	55	42	45	42	42	51	42	.....	38
16	7	17	6	Bright ..	.....	11	24	43	14	26	12	43	.....	.....	.....	.....	60
				Dull	.....	22	14	14	14	18	24	14	.....	.....	.....	.....	20
				Average	.....	67	62	43	72	56	64	43	.....	.....	.....	.....	20

As age increases, the percentage of average ability increases in different studies in general, except in spelling.

The boys differ from the girls mainly in the relation of average ability to age. As age increases in the boys, average ability increases in all studies except in arithmetic, algebra, manual labor, and penmanship, while in girls average ability increases in all studies except in drawing, geography, history, penmanship, science, and spelling. Thus average ability in girls increases with age in more studies than in the case of boys.

COLORED CHILDREN.

Colored girls are superior to colored boys (line 9, Table II) in six branches, inferior in two, and equal in three.

In average ability the boys show a higher per cent in all studies except science, indicating less variability than the girls, which is the reverse of the case in white children.

ABILITY AND AGE IN COLORED CHILDREN.

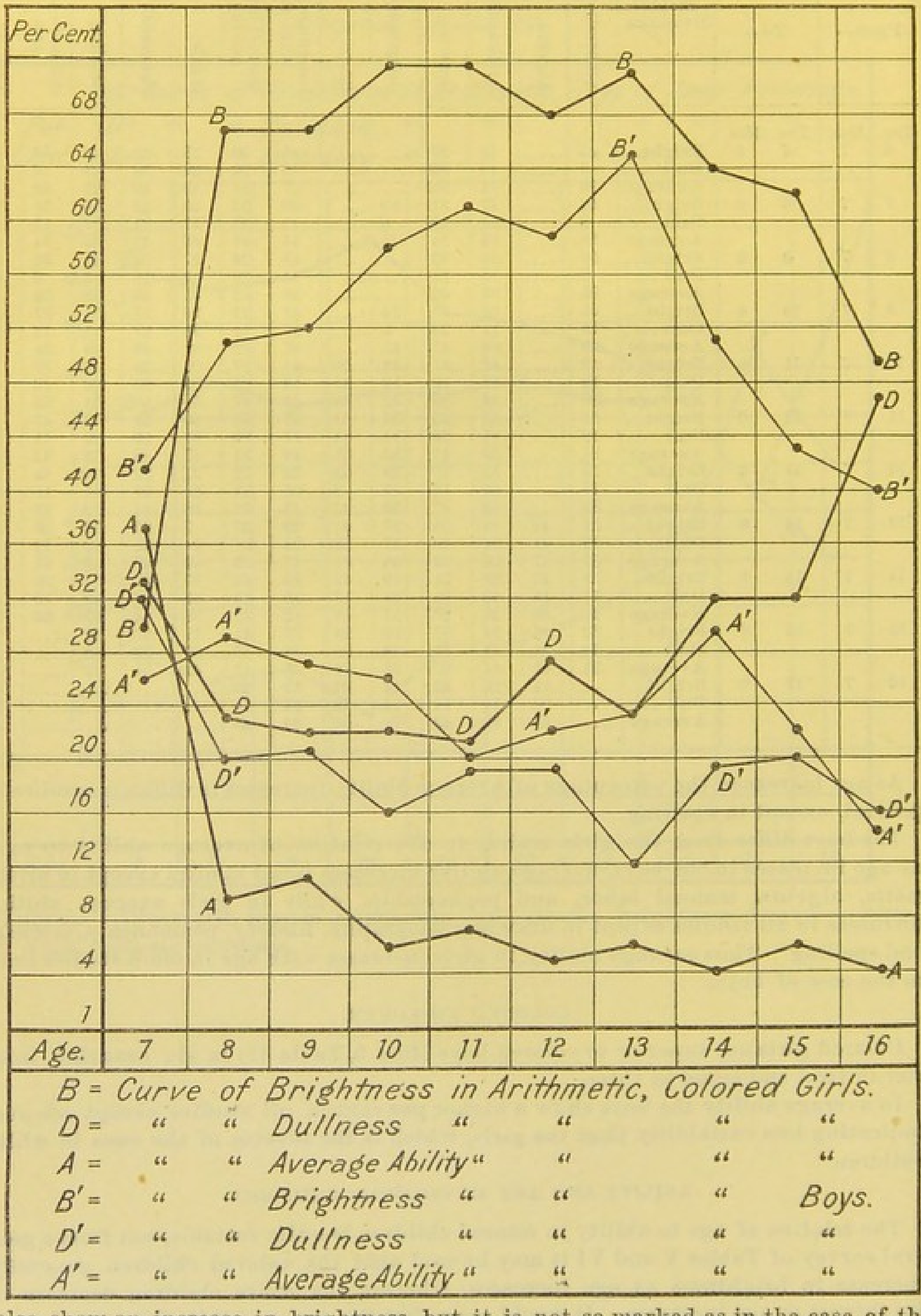
The relation of age to ability in colored children is quite variable, but from a general survey of Tables V and VI it may be said that the colored children generally increase in brightness as age increases, whereas the white children decrease in brightness as age increases. It would seem that the cause of this difference in the colored children is racial.

As age increases in girls, the percentage of average ability increases, except in drawing, geography, history, science, and spelling.

As age increases in boys, the percentage of average ability increases, except in arithmetic, algebra, manual labor, music, and penmanship.

There is a sudden increase and high percentage of brightness in all studies in colored girls at the age of 8, with a corresponding decrease in dullness and average ability, but much more marked in average ability. At this age the colored boys

DIAGRAM I*a* (TABLES V AND VI).



also show an increase in brightness, but it is not so marked as in the case of the girls. The boys differ from the girls also at this age and afterwards in having a much higher percentage in average ability in most branches of study. To illustrate this we give the following diagram of curves for ability in arithmetic for boys and girls. The report on arithmetic is the most complete.

TABLE V.—*Percentage of ability in different studies, computed on number reported.*

COLORED GIRLS.

Limit of age.				Mental divisions.	11	15	16	21	22	26	28	34	36
From—		To—			Arithmetic.	Drawing.	Geography.	History.	Language and English.	Music.	Penmanship.	Reading.	Spelling.
Yrs.	*Mos.*	*Yrs.*	*Mos.*										
5	0	6	6	Bright	27	......	......	......	43	31	27	41	42
				Dull	54	......	......	......	33	15	40	41	37
				Average	19	......	......	......	24	54	33	18	21
6	7	7	6	Bright	30	......	......	......	28	27	34	54	35
				Dull	33	......	......	......	36	18	33	29	24
				Average	37	......	......	......	36	55	33	17	41
7	7	8	6	Bright	67	60	......	......	70	83	65	80	77
				Dull	23	10	......	......	18	9	19	17	14
				Average	10	30	......	......	12	8	16	3	9
8	7	9	6	Bright	67	40	......	......	70	45	62	84	67
				Dull	22	20	......	......	14	20	15	10	17
				Average	11	40	......	......	16	35	23	6	16
9	7	10	6	Bright	72	33	78	......	77	50	65	74	62
				Dull	22	27	15	......	13	12	14	16	16
				Average	6	40	7	......	10	38	21	10	22
10	7	11	6	Bright	72	36	79	......	71	47	63	76	64
				Dull	21	32	17	......	21	16	13	16	25
				Average	7	32	4	......	8	37	24	8	11
11	7	12	6	Bright	68	37	57	......	74	70	64	66	56
				Dull	27	37	34	......	16	12	16	23	30
				Average	5	26	9	......	10	18	20	11	14
12	7	13	6	Bright	71	41	79	64	70	......	65	67	69
				Dull	23	18	17	24	21	......	3	25	21
				Average	6	41	4	12	9	......	32	8	10
13	7	14	6	Bright	64	50	53	70	50	42	53	65	55
				Dull	32	31	31	24	41	16	15	21	23
				Average	4	19	16	6	9	42	32	14	22
14	7	15	6	Bright	62	40	60	63	60	13	48	53	51
				Dull	32	7	26	29	20	50	13	25	28
				Average	6	53	14	8	20	37	39	22	21
15	7	16	6	Bright	49	53	27	60	74	......	38	41	38
				Dull	47	18	39	22	16	......	6	18	24
				Average	4	29	34	18	10	......	56	41	38
16	7	17	6	Bright	46	22	42	62	64	......	......	45	50
				Dull	50	11	32	19	18	......	......	22	20
				Average	4	67	26	19	18	......	......	33	30

TABLE VI.—*Percentage of ability in different studies, computed on number reported.*

(COLORED BOYS.)

Limit of age.				Mental divisions.	9	11	15	16	21	22	26	28	34	36
From—		To—			All studies.	Arithmetic.	Drawing.	Geography.	History.	Language and English.	Music.	Penmanship.	Reading.	Spelling.
Yrs.	*Mos.*	*Yrs.*	*Mos.*											
5	0	6	6	Bright	37	41	......	......	......	39	64	22	50	39
				Dull	42	36	......	......	......	25	9	31	26	22
				Average	21	23	......	......	......	36	27	47	24	39
6	7	7	6	Bright	28	42	13	......	......	33	29	40	51	40
				Dull	48	32	37	......	......	33	18	29	25	17
				Average	24	26	50	......	......	34	53	31	24	43
7	7	8	6	Bright	46	51	25	34	......	50	35	53	57	54
				Dull	20	20	17	33	......	10	26	17	17	17
				Average	34	29	58	33	......	40	39	30	26	29
8	7	9	6	Bright	52	52	35	59	......	43	36	42	51	48
				Dull	20	21	26	6	......	17	32	16	22	31
				Average	28	27	39	35	......	40	32	42	27	21
9	7	10	6	Bright	46	58	32	53	14	48	40	44	51	48
				Dull	21	16	24	11	29	9	20	9	18	20
				Average	33	26	44	36	57	43	40	47	31	32

TABLE VI.—*Percentage of ability in different studies, etc.*—Continued.

(COLORED BOYS)—Continued.

Limit of age.					9	11	15	16	21	22	26	28	34	36
From—		To—		Mental division.	All studies.	Arithmetic.	Drawing.	Geography.	History.	Language and English.	Music.	Penmanship.	Reading.	Spelling.
Yrs.	*Mos.*	*Yrs.*	*Mos.*											
10	7	11	6	Bright........	47	61	43	61	......	44	26	52	53	42
				Dull..........	22	19	25	16	......	18	11	15	24	24
				Average......	31	20	32	23	......	38	63	33	23	34
11	7	12	6	Bright........	51	59	41	37	......	41	29	44	46	38
				Dull..........	25	19	15	19	......	21	12	10	27	29
				Average......	24	22	44	44	......	38	59	46	27	33
12	7	13	6	Bright........	53	65	64	47	59	46	27	50	45	39
				Dull..........	18	12	12	11	13	12	18	7	24	16
				Average......	29	23	24	42	28	42	55	43	31	45
13	7	14	6	Bright........	51	51	54	42	43	45	26	36	39	39
				Dull..........	19	19	12	9	14	14	16	14	20	19
				Average......	30	30	34	49	43	41	58	50	41	42
14	7	15	6	Bright........	43	58	54	46	61	43	50	57	34	34
				Dull..........	16	20	12	14	11	16	30	24	28	28
				Average......	41	22	34	40	28	41	20	19	38	38
15	7	16	6	Bright........	40	48	54	26	45	28	50	47	41	24
				Dull..........	15	16	14	12	7	18	12	40	16	27
				Average......	45	36	32	62	48	54	38	13	43	49
16	7	18	6	Bright........	39	37	58	48	51	38	......	35	29	31
				Dull..........	22	27	6	16	9	19	......	20	12	23
				Average......	39	36	36	36	40	43	......	45	59	46

SECTION E.

TABLES OF ANTHROPOMETRICAL MEASUREMENTS.

In regard to the tables of anthropometrical measurements which follow, we desire to offer a few remarks, many of which are made as footnotes to the tables.

The tables are summaries from much larger tables which would have required too much space for insertion. A specimen of such a table is given in section B.

We have not compared or combined these tables as much as might be done. The totals and numbers omitted have been given, so that anyone desiring could make new comparisons and combinations between the tables.

The height, sitting height, and circumference of head are always given in inches. The arm reach, when given, is also in inches. The weight is always given in pounds. Arm reach is given in a number of tables, but the measurement is practically so difficult to get exact that we have not utilized it. The distance a person can stretch his arms is too much dependent upon his feeling and will power at the moment.

The heading "American parentage," or "American parents," refers to children whose parents were born in this country. The term "foreign parentage," or "foreign parents," refers to parents born in a foreign country. "American mixed nationality" refers to parents one of whom is American born and the other foreign born.

Children of foreign parentage, or of American mixed nationality, were not sociologically divided into laboring and nonlaboring classes, because the numbers were not large enough. The divisions also would have been too unequal in number for comparison.

The term "nonlaboring classes" refers to those children whose parents are engaged in mercantile and professional occupations, as distinguished from "the laboring classes," whose occupations come under the heads of skilled or unskilled labor. These divisions are of course only approximate.

A few odd and incomplete tables have been given, as it was deemed desirable to give all the results of the investigation.

"Average age" was worked out in a number of tables, but it was not continued, as the nearest age was considered sufficiently accurate. The nearest age—10, for instance—is considered to be from 9 years 7 months to 10 years 6 months, inclusive. Fractions of months were not asked for in inquiry as to the age of the children. The practical difficulties are obvious. The nearest age, however, will be seen to be quite near, and sometimes exactly equal to the average age, as in tables XX and XXI.

TABLE VII.—*All boys.* (*a*)

Limits of different ages.				Number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	3	6	6	103	1	4,557.99	[b]44.69	2	2,506.71	[b]24.82	3	4,523.75	[b]45.24	1	2,062.70	[b]20.22
6	0	6	6	44	1	1,924.22	44.75	..	1,068.36	24.28	1	1,948.25	45.31	0	892.10	20.28
6	7	7	6	533	13	23,904.47	45.97	13	13,053.92	25.10	9	24,993.24	47.70	8	10,710.06	20.45
7	7	8	6	787	6	37,357.35	47.83	5	20,243.53	25.89	6	40,201.32	51.47	5	16,039.09	20.51
8	7	9	6	878	9	43,222.10	49.74	11	23,061.99	26.60	6	48,975.24	56.16	10	17,893.58	20.61
9	7	10	6	930	6	47,775.15	51.70	11	25,037.25	27.24	5	56,926.14	61.54	10	19,070.43	20.73
10	7	11	6	862	11	45,267.48	53.19	10	23,810.77	27.95	6	56,717.49	66.26	5	17,842.41	20.82
11	7	12	6	986	10	53,816.63	55.14	16	27,898.35	28.76	4	71,419.22	72.73	6	20,517.84	20.94
12	7	13	6	926	14	51,761.94	56.76	24	26,556.26	29.44	9	72,791.57	79.38	7	19,309.62	21.01
13	7	14	6	784	7	45,953.11	59.14	27	23,128.02	30.55	6	68,672.06	88.27	13	16,356.53	21.21
14	7	15	6	528	4	32,379.07	61.79	15	16,277.61	31.73	4	52,897.12	100.95	8	11,155.10	21.45
15	7	16	6	345	4	21,934.63	64.32	11	11,042.51	33.06	5	38,662.23	113.71	4	7,388.43	21.67
16	7	17	6	120	1	7,850.06	65.97	5	3,920.30	34.09	1	14,420.55	121.18	1	2,602.38	21.87
16	7	18	6	32	1	2,059.86	66.45	0	1,096.61	34.27	1	3,850.50	124.21	1	685.99	22.13
16	7	18	10	22	0	1,474.74	67.03	0	763	34.68	0	2,708.30	123.10	1	464.61	22.12
17	7	18	6	38	0	2,548.10	67.06	2	1,257.27	34.92	0	5,015.50	131.99	0	832.72	21.91
18	7	19	6	7	0	481.12	68.73	0	244.50	34.93	0	925.75	132.25	0	157.37	22.48
18	7	21	7	28	0	1,894.35	67.66	0	975.86	34.85	1	3,660	135.56	0	625.49	22.34
				7,953	..	....	......	..	....	......	..	....	......	..	....	......

a Tables I to VI are in the previous section D.

b Used in diagrams for age 6.

TABLE VIII.—*All boys of American parentage.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.*b*	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	3	6	6	103	1	4,557.99	44.69	2	2,506.71	24.82	3	4,523.75	45.24	1	2,062.70	20.22
6	7	7	6	404	7	18,232.54	45.93	8	9,936.09	25.09	7	18,919.87	47.66	5	8,143.28	20.41
7	7	8	6	607	4	28,831.82	47.81	3	15,609.27	25.84	2	31,107.87	51.42	2	12,411.12	20.51
8	7	9	6	647	7	31,844.05	49.76	4	17,107.62	26.61	4	36,123.87	56.18	9	13,157.73	20.62
9	7	10	6	703	5	36,058.60	51.66	9	18,911.26	27.25	2	43,157.27	61.57	7	14,433.02	20.74
10	7	11	6	670	10	35,102.26	53.19	7	18,532.97	27.95	5	43,982.87	66.14	2	13,901.94	20.81
11	7	12	6	756	10	41,141.91	55.15	9	21,510.88	28.80	4	54,668.85	72.70	5	15,716.64	20.93
12	7	13	6	687	10	38,372.77	56.68	20	19,645.50	29.45	8	53,870.70	79.34	4	14,346.49	21.01
13	7	14	6	589	3	34,758.69	59.32	18	17,493.95	30.64	6	51,741.19	88.75	7	12,365.71	21.25
14	7	15	6	405	2	24,925.78	61.85	9	12,579.64	31.77	4	40,464.37	100.91	7	8,532.97	21.44
15	7	16	6	267	4	16,912.46	64.31	10	8,507.92	33.10	3	30,051.87	113.83	4	5,698.80	21.67
16	7	17	6	120	1	7,850.06	65.97	5	3,920.30	34.09	1	14,420.55	121.18	1	2,602.33	21.87
17	7	18	6	38	0	2,548.10	67.06	2	1,257.27	34.92	0	5,015.50	131.99	0	832.72	21.91
18	7	21	7	28	0	1,894.35	67.66	0	975.86	34.85	1	3,660.00	135.56	0	625.49	22.34
				6,024	..	....	......	..	....	......	..	....	......	..	....	......

a By "American parentage" is meant children of parents born in this country.
b The numbers omitted are given in case anyone should desire to make other combinations in the tables, and thus make other averages.

TABLE IX.—*Boys belonging to nonlaboring classes of American parentage.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	8	6	6	27	0	1,215.36	45.01	0	676.25	25.06	0	1,255.50	46.50	0	546.09	20.23
6	7	7	6	205	1	9,386.38	46.01	8	4,955.77	25.16	4	9,577.50	47.65	3	4,133.83	20.46
7	7	8	6	278	2	13,234.36	47.95	0	*7,200.86	25.90	1	14,202.00	51.27	0	5,707.05	20.53
8	7	9	6	313	2	15,538.51	49.96	2	8,310.43	26.72	1	17,683.00	56.68	5	6,368.25	20.68
9	7	10	6	353	1	18,317.30	52.04	5	9,536.94	27.41	1	21,820.75	61.99	2	7,300.27	20.80
10	7	11	6	348	1	18,585.40	53.56	5	9,645.39	28.12	5	22,907.01	66.78	1	7,243.73	20.88
11	7	12	6	394	5	21,545.31	55.39	6	11,238.36	28.96	1	28,691.50	73.01	2	8,240.48	21.02
12	7	13	6	346	6	19,354.16	56.92	13	9,820.91	29.49	4	27,283.37	79.78	2	7,242.16	21.05
13	7	14	6	358	2	21,258.69	59.72	9	10,762.69	30.84	4	31,780.57	89.78	5	7,528.42	21.33
14	7	15	6	259	2	16,053.27	62.46	6	8,112.81	32.07	4	26,450.62	103.73	5	5,470.38	21.54
15	7	16	6	169	1	10,914.12	64.97	3	5,543.92	33.40	2	19,288.75	115.50	1	3,640.83	21.67
16	7	17	6	43	0	2,890.22	67.21	0	1,493.84	34.74	0	5,520.25	128.38	0	945.91	22.00
				3,093	..	....	......	..	....	......	..	....	......	..	....	......

a "Nonlaboring classes" refer to children whose parents are engaged in mercantile and professional occupations, as distinguished from those occupations under the head of skilled labor and unskilled labor. (See section A.)

TABLE X.—*Boys belonging to laboring classes of American parentage.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	8	6	6	11	0	485.37	44.12	0	268.37	24.40	0	487.25	44.30	0	220.49	20.04
6	7	7	6	199	6	8,846.16	45.84	0	4,980.32	25.03	3	9,342.37	47.67	2	4,009.45	20.35
7	7	8	6	329	2	15,597.46	47.70	3	8,408.41	25.79	1	16,905.87	51.54	2	6,704.07	20.50
8	7	9	6	334	5	16,305.54	49.56	2	8,797.19	26.50	3	18,440.87	55.71	4	6,789.48	20.57
9	7	10	6	350	4	17,741.30	51.28	4	9,374.32	27.09	1	21,336.52	61.14	5	7,132.75	20.67
10	7	11	6	322	9	16,516,86	52.77	2	8,887.58	27.77	0	21,075.86	65.45	1	6,658.21	20.74
11	7	12	6	362	5	19,596.60	54.89	3	10,272.52	28.61	3	25,977.35	72.36	3	7,476.16	20.82
12	7	13	6	341	4	19,018.61	56.44	7	9,824.59	29.41	4	26,587.33	78.89	2	7,104.33	20.96
13	7	14	6	231	1	13,500.00	58.70	9	6,731.26	30.32	2	19,960.62	87.16	2	4,837.29	21.12
14	7	15	6	146	0	8,872.51	60.77	3	4,466.83	31.24	0	14,013.75	95.98	2	3,062.59	21.27
15	7	16	6	98	3	5,998.34	63.14	7	2,964.00	32.57	1	10,763.12	110.96	3	2,057.97	21.66
16	7	17	6	16	0	1,053.99	65.87	1	507.49	33.83	0	1,909.30	119.33	0	348.75	21.80
				2,739	..	....	......	..	....	......	..	....	......	..	....	......

a The term "laboring classes" refers to those children whose parents are engaged in occupations under the head of skilled and unskilled labor, as distinguished from occupations called mercantile and professional. (See section A.)

TABLE XI.—*Boys of American parents not socially divided.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	3	5	6	5	0	216.25	43.25	0	123.00	24.60	0	216.75	43.35	0	98.00	19.60
5	7	6	6	60	1	2,641.01	44.76	2	1,439.09	24.81	3	2,564.25	44.99	1	1,198.12	20.31
16	7	17	6	61	1	3,905.85	65.10	4	1,918.97	33.67	1	6,991.00	116.52	1	1,307.72	21.80
17	7	18	6	38	0	2,548.10	67.06	2	1,257.27	34.92	0	5,015.50	131.99	0	832.72	21.91
18	7	21	7	28	0	1,894.35	67.66	0	975.86	34.85	1	3,660.00	135.56	0	625.49	22.34
				192	..	....	......	..	....	......	..	....	......	..	....	......

a In a number of instances the occupation of the American parents was not given, so that no sociological division could be made.

TABLE XII.—*Boys of foreign parents not socially divided.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*Inches.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	0	6	6	25	0	1, 104. 36	44. 17	0	599. 49	23. 98	0	1, 124. 25	44. 97	0	507. 24	20. 29
6	7	7	6	67	4	2, 888. 46	45. 85	3	1, 606. 32	25. 10	1	3, 164. 25	47. 94	1	1, 341. 94	20. 33
7	7	8	6	100	2	4, 688. 05	47. 84	2	2, 539. 92	25. 92	2	5, 060. 37	51. 64	3	1, 988. 25	20. 50
8	7	9	6	116	1	5, 728. 83	49. 82	4	2, 990. 19	26. 70	1	6, 537. 00	56. 84	1	2, 368. 46	20. 60
9	7	10	6	104	0	5, 413. 68	52. 05	1	2, 790. 06	27. 09	2	6, 357. 87	62. 33	2	2, 111. 42	20. 70
10	7	11	6	102	1	5, 355. 77	53. 03	2	2, 784. 84	27. 85	0	6, 856. 87	67. 22	1	2, 105. 74	20. 85
11	7	12	6	127	0	6, 987. 27	55. 02	1	3, 604. 39	28. 61	0	9, 283. 50	73. 10	0	2, 669. 18	21. 02
12	7	13	6	123	2	6, 867. 11	56. 75	3	3, 526. 33	29. 39	0	9, 817. 25	79. 82	3	2, 531. 67	21. 10
13	7	14	6	115	3	6, 516. 66	58. 18	7	3, 241. 81	30. 02	0	9, 959. 12	86. 60	2	2, 378. 28	21. 05
14	7	15	6	73	0	4, 471. 82	61. 26	5	2, 143. 98	31. 53	0	7, 309. 25	100. 13	1	1, 548. 25	21. 50
15	7	16	6	45	0	2, 886. 20	64. 14	0	1, 472. 60	32. 72	1	4, 894. 49	111. 24	0	979. 22	21. 76
16	7*	18	6	32	1	2, 059. 86	66. 45	0	1, 096. 61	34. 27	1	3, 850. 50	124. 21	1	685. 99	22. 13
18	7	19	6	7	0	481. 12	68. 73	0	244. 50	34. 93	0	925. 75	132. 25	0	157. 37	22. 48
				1, 036	..	....	......	..	....	......	..	....	......	..	....	......

a By "foreign parents" is meant parents born in a foreign country. The foreign parents were not sociologically divided, as the divisions would have been so unequal in number that comparisons would have been of little value.

TABLE XIII.—*Boys of American and foreign parentage not socially divided.* (*a*)

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	0	6	6	19	1	819. 86	45. 55	0	468. 87	24. 68	1	824. 00	45. 78	0	384. 86	20. 26
6	7	7	6	62	2	2, 783. 47	46. 39	2	1, 511. 51	25. 19	1	2. 909. 12	47. 69	2	1, 224. 84	20. 41
7	7	8	6	80	0	3, 837. 48	47. 97	0	2, 094. 34	26. 18	2	4, 033. 08	51. 71	0	1, 639. 72	20. 50
8	7	9	6	115	1	5, 649. 22	49. 55	3	2, 964. 18	26. 47	1	6, 314. 37	55. 39	0	2, 376. 39	20. 59
9	7	10	6	123	1	6, 302. 87	51. 66	1	3, 335. 93	27 34	1	7, 411. 00	60. 75	1	2, 525. 99	20. 70
10	7	11	6	. 90	0	4, 809. 45	53. 44	1	2, 492. 96	28. 01	1	5, 877. 75	66. 04	2	1, 834. 73	20. 85
11	7	12	6	103	0	5, 687. 45	55. 22	6	2, 783. 08	28. 69	0	7, 466. 87	72. 49	1	2, 132. 02	20. 90
12	7	13	6	116	2	6, 522. 06	57. 21	1	3, 384. 43	29. 43	1	9, 103. 62	79. 16	0	2. 431. 46	20. 96
13	7	14	6	80	1	4, 677. 76	59. 21	2	2, 392. 26	30. 67	0	6, 971. 75	87. 15	4	1, 612. 54	21. 22
14	7	15	6	50	2	2, 981. 47	62. 11	1	1, 553. 99	31. 71	0	5, 123. 50	102. 47	0	1, 073. 88	21. 48
15	7	16	6	33	0	2, 135. 97	64. 73	1	1, 061. 99	33. 19	1	3, 715. 87	116. 12	0	710. 41	21. 53
16	7	18	10	22	0	1, 474. 74	67. 03	0	763. 00	34. 68	0	2, 708. 30	123. 10	1	464. 61	22. 12
				893	..	....	......	..	....	......	..	....	......	..	....	......

a "American and foreign parentage" refers to parents, one of whom is American born, the other foreign born. No sociological division is made here, as the numbers were comparatively small. The divisions, also, would have been quite unequal in numbers.

TABLE XIV.—*All bright boys.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	8	6	6	53	0	2, 382. 85	44. 96	0	1, 316. 24	24. 83	1	2, 378. 50	45. 74	0	1, 072. 32	20. 23
6	7	7	6	205	2	9, 312. 00	45. 87	4	5, 036. 40	25. 06	6	9, 500. 62	47. 74	3	4, 141. 89	20. 50
7	7	8	6	320	1	15, 228. 50	47. 74	3	8, 200. 68	25. 87	2	16, 225. 62	51. 02	3	6, 519. 89	20. 57
8	7	9	6	384	3	18, 899. 77	49. 61	5	10, 070. 02	26. 57	3	21, 255. 24	55. 79	6	7, 805. 83	20. 65
9	7	10	6	392	1	20, 218. 58	51. 71	7	10, 514. 75	27. 31	3	23, 950. 87	61. 57	2	8, 104. 22	20. 78
10	7	11	6	322	3	16, 963. 09	53. 18	5	8, 846. 28	27. 91	3	21, 147. 62	66. 29	0	6, 708. 75	20. 83
11	7	12	6	349	2	19, 160. 94	55. 22	10	9, 777. 78	28. 84	2	25, 098. 50	72. 33	5	7, 216. 07	20. 98
12	7	13	6	305	6	16, 931. 22	56. 63	9	8, 722. 69	29. 47	5	23, 514. 12	78. 38	3	6, 360. 60	21. 06
13	7	14	6	227	2	13, 354. 33	59. 35	6	6, 767. 65	30. 62	5	19, 543. 41	88. 03	4	4, 740. 51	21. 26
14	7	15	6	167	1	10, 329. 03	62. 22	3	5, 252. 94	32. 03	2	16, 955. 00	102. 76	5	3, 500. 43	21. 61
15	7	16	6	104	0	6, 749. 42	64. 90	3	3, 365. 69	33. 32	1	11, 943. 87	115. 96	1	2, 243. 77	21. 78
16	7	17	6	35	2	2, 165. 62	65. 62	2	1, 114. 86	33. 78	1	4, 048. 00	119. 06	1	750. 86	22. 08
17	7	18	6	14	0	947. 37	67. 67	0	493. 12	35. 22	1	1, 759. 50	135. 35	0	309. 74	22. 12
18	7	19	6	16	0	1, 084. 86	67. 80	0	553. 62	34. 60	1	1, 942. 75	129. 52	0	357. 74	22. 36
16	11	18	4	4	0	263. 25	65. 81	0	136. 75	34. 19	0	472. 25	118. 06	0	87. 37	21. 84
19	11	20	0	2	0	137. 62	68. 81	0	71. 50	35. 75	0	296. 50	148. 25	0	43. 25	21. 63
				2, 899	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XV.—*All dull boys.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	3	5	6	5	0	216. 25	43. 25	0	123. 00	24. 60	0	216. 75	43. 35	0	98. 00	19. 60
5	7	6	6	39	1	1, 694. 65	44. 60	1	928. 99	24. 45	2	1, 656. 50	44. 77	1	770. 96	20. 29
6	7	7	6	99	4	4, 327. 56	45. 55	3	2, 402. 29	25. 02	2	4, 564. 50	47. 06	1	1, 988. 01	20. 29
7	7	8	6	101	2	4, 708. 94	47. 57	0	2, 603. 02	25. 77	2	5, 076. 08	51. 27	2	2, 008. 96	20. 29
8	7	9	6	102	3	4, 959. 03	50. 09	2	2, 701. 59	27. 02	2	5, 696. 75	56. 97	1	2, 068. 13	20. 48
9	7	10	6	118	2	5, 961. 45	51. 39	2	3, 153. 06	27. 18	0	7, 214. 50	61. 14	5	2, 319. 83	20. 53
10	7	11	6	97	3	4, 978. 15	52. 96	2	2, 651. 08	27. 91	1	6, 224. 75	64. 84	1	1, 977. 04	20. 59
11	7	12	6	128	1	6, 980. 22	54. 96	4	3, 564. 58	28. 75	2	9, 222. 72	73. 20	1	2, 648. 58	20. 85
12	7	13	6	131	2	7, 332. 00	56. 84	1	3, 831. 57	29. 47	0	10, 426. 83	79. 59	2	2, 710. 07	21. 01
13	7	14	6	143	3	8, 339. 17	59. 57	8	4, 136. 52	30. 64	1	12, 673. 87	89. 25	3	2, 950. 10	21. 07
14	7	15	6	116	2	6, 987. 18	61. 29	5	3, 510. 22	31. 62	1	11, 506. 25	100. 05	1	2, 451. 64	21. 32
15	7	16	6	80	3	4, 923. 84	63. 95	5	2, 456. 09	32. 75	1	8, 783. 87	111. 19	2	1, 680. 55	21. 55
16	7	17	6	32	0	2, 061. 23	64. 41	2	1, 002. 36	33. 41	0	3, 630. 00	113. 44	0	689. 98	21. 56
16	9	17	9	4	0	264. 62	66. 16	0	142. 25	35. 56	0	521. 50	130. 38	0	88. 12	22. 03
16	10	18	1	7	0	462. 37	66. 05	0	239. 74	34. 25	0	848. 25	121. 18	0	152. 37	21. 77
17	7	18	2	8	0	520. 37	65. 05	1	237. 99	34. 00	0	967. 50	120. 94	0	173. 62	21. 70
18	11	20	9	4	0	267. 25	66. 81	0	138. 62	34. 66	0	546. 00	136. 50	0	89. 00	22. 25
				1, 214	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XVI.—*All average boys.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	7	6	6	45	0	2,002.34	44.50	1	1,083.34	24.62	1	1,972.75	44.84	0	911.77	20.26
6	7	7	6	199	6	8,907.04	46.15	5	4,881.74	25.16	0	9,536.62	47.92	2	4,008.55	20.35
7	7	8	6	326	3	15,498.04	47.98	2	8,409.23	25.95	1	16,871.62	51.91	0	6,692.97	20.53
8	7	9	6	340	3	16,800.51	49.85	4	8,926.54	26.57	1	19,165.25	56.53	3	6,954.68	20.64
9	7	10	6	355	2	18,289.50	51.81	1	9,620.04	27.18	1	21,797.27	61.57	3	7,301.40	20.74
10	7	11	6	386	5	20,286.26	53.24	3	10,716.56	27.98	1	25,656.62	66.64	2	8,006.48	20.85
11	7	12	6	459	7	24,915.61	55.12	1	13,150.51	28.71	0	33,499.00	72.98	0	9,608.20	20.93
12	7	13	6	421	6	23,547.13	56.74	14	11,963.30	29.39	3	33,423.37	79.96	2	8,791.50	20.98
13	7	14	6	371	2	21,702.96	58.82	11	10,964.18	30.46	0	32,693.53	88.12	3	7,817.41	21.24
14	7	15	6	220	0	13,586.50	61.76	6	6,759.46	31.59	1	21,899.12	100.00	2	4,668.13	21.41
15	7	16	6	144	1	9,168.39	64.11	3	4,657.24	33.02	2	16,122.12	113.54	1	3,099.19	21.67
16	7	17	6	70	0	4,687.95	66.97	1	2,380.70	34.50	0	8,816.30	125.95	0	1,539.66	22.00
17	7	18	6	24	0	1,613.11	67.21	1	805.41	35.02	0	3,217.00	134.04	1	504.86	21.95
18	7	19	6	9	0	607.24	67.47	0	311.00	34.56	0	1,228.25	136.47	0	202.62	22.51
20	1	21	7	4	0	278.50	69.63	0	145.62	36.41	0	572.25	143.06	0	90.25	22.56
				3,373	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XVII.—*Bright boys, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	8	6	6	38	0	1,700.73	44.76	0	944.62	24.86	0	1,742.75	45.86	0	766.58	20.17
6	7	7	6	160	1	7,284.02	45.81	2	3,954.94	25.03	5	7,358.50	47.47	3	3,219.67	20.51
7	7	8	6	249	0	11,895.16	47.77	1	6,394.96	25.79	0	12,716.37	51.07	1	5,099.46	20.56
8	7	9	6	281	2	13,850.39	49.64	2	7,429.96	26.63	2	15,651.62	56.10	5	5,702.66	20.66
9	7	10	6	317	1	16,357.91	51.77	7	8,475.04	27.34	2	19,444.75	61.73	2	6,543.90	20.77
10	7	11	6	272	3	14,297.62	53.15	3	7,509.44	27.92	3	17,796.37	66.16	0	5,662.37	20.82
11	7	12	6	274	2	15,022.34	55.23	6	7,746.81	28.91	2	19,649.25	72.24	4	5,671.00	21.00
12	7	13	6	230	4	12,800.88	56.64	7	6,586.72	29.54	5	17,696.50	78.65	2	4,779.87	21.06
13	7	14	6	180	2	10,605.49	59.58	5	5,359.19	30.62	5	15,482.91	88.47	4	3,751.41	21.31
14	7	15	6	132	1	8,130.31	62.06	2	4,158.94	31.99	2	13,303.00	102.33	4	2,762.31	21.58
15	7	16	6	82	0	5,312.43	64.79	2	2,663.70	33.30	1	9,267.87	114.42	1	1,766.03	21.80
16	7	17	6	29	1	1,844.62	65.88	2	916.61	33.95	1	3,361.00	120.04	1	617.74	22.06
17	7	18	6	10	0	679.62	67.96	0	353.62	35.36	0	1,359.00	135.90	0	220.99	22.10
18	7	19	6	11	0	742.36	67.49	0	380.12	34.56	1	1,283.25	128.33	0	244.62	22.24
19	11	20	0	2	0	137.62	68.81	0	71.50	35.75	0	296.50	148.25	0	43.25	21.63
				2,267	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XVIII.—*Dull boys, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	3	5	6	5	0	216.25	43.25	0	123.00	24.60	0	216.75	43.35	0	98.00	19.60
5	7	6	6	24	1	1,034.04	44.96	1	569.49	24.76	2	988.75	44.94	1	470.72	20.47
6	7	7	6	69	2	3,060.33	45.68	2	1,674.38	24.99	2	3,149.75	47.01	1	1,381.91	20.32
7	7	8	6	73	2	3,365.47	47.40	0	1,873.05	25.66	2	3,640.00	51.27	1	1,459.61	20.27
8	7	9	6	80	2	3,902.59	50.03	1	2,111.85	26.73	1	4,465.00	56.52	1	1,618.10	20.48
9	7	10	6	81	2	4,057.22	51.36	2	2,145.40	27.16	0	4,976.75	61.44	3	1,603.18	20.55
10	7	11	6	78	3	3,981.79	53.09	2	2,126.59	27.98	1	5,005.75	65.01	1	1,588.68	20.63
11	7	12	6	93	1	5,045.12	54.84	3	2,583.22	28.70	2	6,550.35	71.98	1	1,914.66	20.81
12	7	13	6	97	1	5,438.30	56.65	1	2,830.08	29.48	0	7,636.33	78.73	0	2,020.72	20.83
13	7	14	6	98	0	5,866.19	59.86	4	2,894.29	30.79	1	8,740.62	90.11	1	2,042.97	21.06
14	7	15	6	87	1	5,297.69	61.60	3	2,663.22	31.71	1	8,692.75	101.08	1	1,833.43	21.32
15	7	16	6	66	3	4,035.48	64.06	5	2,002.84	32.83	1	7,298.75	112.29	2	1,379.05	21.55
16	7	17	6	32	0	2,061.23	64.41	2	1,002.36	33.41	0	3,630.00	113.44	0	689.98	21.56
17	7	18	2	8	0	520.37	65.05	1	237.99	34.00	0	967.50	120.94	0	173.62	21.70
18	11	20	9	4	0	267.25	66.81	0	138.62	34.66	0	546.00	136.50	0	89.00	22.25
				895	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XIX.—*Average boys, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*Inch.*		*Inches.*	*Inch.*		*Pounds.*	*Lbs.*		*Inches.*	*Inch.*
5	7	6	6	36	0	1,606.97	44.64	1	869.60	24.85	1	1,575.50	45.01	..	727.40	20.21
6	7	7	6	175	4	7,888.19	46.13	4	4,306.77	25.19	0	8,411.62	48.07	1	3,541.70	20.35
7	7	8	6	285	2	13,571.19	47.95	2	7,341.26	25.94	0	14,751.50	51.76	0	5,852.05	20.53
8	7	9	6	286	3	14,091.07	49.79	1	7,565.81	26.55	1	16,007.25	56.17	3	5,836.97	20.63
9	7	10	6	305	2	15,643.47	51.63	0	8,290.82	27.18	0	18,735.77	61.43	2	6,285.94	20.75
10	7	11	6	320	4	16,822.85	53.24	2	8,896.94	27.98	1	21,180.75	66.40	1	6,650.89	20.85
11	7	12	6	389	7	21,074.45	55.17	0	11,180.85	28.74	0	28,469.25	73.19	0	8,130.98	20.90
12	7	13	6	360	5	20,133.62	56.71	12	10,228.70	29.39	3	28,537.87	79.94	0	7,545.90	20.96
13	7	14	6	311	1	18,287.01	58.99	9	9,240.47	30.60	0	27,517.66	88.48	2	6,571.33	21.27
14	7	15	6	186	0	11,497.78	61.82	4	5,757.48	31.63	1	18,468.62	99.83	2	3,937.23	21.40
15	7	16	6	119	1	7,564.55	64.11	3	3,841.38	33.12	1	13,485.25	114.28	1	2,553.72	21.64
16	7	17	6	59	0	3,944.21	66.85	1	2,001.33	34.51	0	7,429.55	125.92	0	1,294.66	21.94
17	7	18	5	20	0	1,348.11	67.41	1	665.66	35.03	0	2,689	134.45	0	438.11	21.91
18	9	19	4	7	0	468.62	66.95	0	240	34.29	0	962	137.43	0	158.37	22.62
20	1	21	7	4	0	278.50	69.63	0	145.62	36.41	0	572.25	143.06	0	90.25	22.56
				2,862	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XX.—*Bright boys belonging to nonlaboring classes, of American parentage.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.*a*	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	8	6	6	27	0	170	11	6	4	0	1,215.36	45.01	0	676.25	25.06
6	7	7	6	102	0	718	10	7	1	1	4,641.31	45.95	2	2,508.46	25.08
7	7	8	6	137	0	1,096	4	8	0	0	6,583.68	48.06	0	3,552.04	25.93
8	7	9	6	162	0	1,463	4	9	0	1	8,021.19	49.82	0	4.326.88	26.71
9	7	10	6	176	0	1,768	7	10	1	0	9,155.1	52.02	3	4,746.1	27.43
10	7	11	6	172	0	1,894	1	11	0	0	9,184.4	53.40	3	4,728.5	27.98
11	7	12	6	162	0	1,947	9	12	0	1	8,923.5	55.43	5	4,558.6	29.04
12	7	13	6	142	0	1,848	1	13	0	4	7,830.9	56,75	7	3,972.0	29.42
13	7	14	6	123	0	1,721	10	14	0	1	7,286.51	59.73	2	3,723.09	30.77
14	7	15	6	93	0	1,396	1	15	0	1	5,746.71	62.46	1	2,960.57	32.18
15	7	16	6	61	0	977	10	16	0	0	3,994.45	65.48	1	2,015.21	33.85
				1,357	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.*b*			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	8	6	6	0	1,197.98	44.37	0	1,255.50	46.50	0	546.09	20.23
6	7	7	6	2	4,552.60	45.53	3	4,718.25	47.66	2	2,055.70	20.56
7	7	8	6	3	6,379.73	47.61	0	7,026.75	51.29	0	2,824.19	20.61
8	7	9	6	0	8,049.42	49.69	1	9,130.00	56.71	3	3,287.16	20.67
9	7	10	6	3	8,975.9	51.88	1	10,785.00	61.63	1	3,644.00	20.82
10	7	11	6	2	9,089.6	53.47	3	11,217.00	66.37	0	3,590.2	20.87
11	7	12	6	0	8,971.3	55.38	1	11,587.00	71.97	2	3,369.2	21.06
12	7	13	6	0	8,133.5	57.28	4	10,772.00	78.06	2	2,950.2	21.07
13	7	14	6	5	7,153.48	60.62	4	10,633.41	89.36	3	2,567.20	21.39
14	7	15	6	1	5,822.11	63.28	2	9,432.25	103.65	3	1,945.33	21.61
15	7	16	6	0	4,075.87	66.82	1	6,995.25	116.59	1	1,305.42	21.76

a The average age is given in a number of tables.

b Arm reach is here given and in a number of tables; but the difficulty of getting this measurement exact is practically very great. We have given these measurements, although we have not utilized them.

TABLE XXI.—*Dull boys, American parents, nonlaboring classes.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	7	7	5	24	....	169	8	7	1	0	1,090.36	45.43	2	514.47	24.75
7	7	8	6	23	....	188	3	8	2	1	1,034.74	47.03	0	588.86	25.6
8	7	9	6	26	....	238	7	9	2	0	1,320.11	50.77	1	671.49	26.86
9	7	10	6	33	....	335	7	10	2	0	1,713.12	51.91	2	851.62	27.47
10	7	11	6	34	....	376	4	11	1	1	1,774.80	53.78	1	935.50	28.35
11	7	12	6	44	....	535	0	12	2	0	2,440.44	55.46	1	1,250.85	29.09
12	7	13	6	39	....	515	9	13	3	0	2,231.55	57.22	1	1,128.48	29.7
13	7	14	6	54	....	766	3	14	2	0	3,259.47	60.36	3	1,580.57	30.99
14	7	15	6	47	....	710	2	15	1	1	2,880.47	62.62	2	1,456.86	32.37
15	7	16	6	34	....	548	2	16	1	0	2,219.62	65.28	2	1,076.74	•33.65
				358	....	....		....		....	....	....	....	....	....

TABLE XXI.—*Dull boys, American parents, nonlaboring classes*—Continued.

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 7	7 5	0	1,065.98	44.42	1	1,064.00	46.26	1	469.52	20.41
7 7	8 6	1	1,027.36	46.70	1	1,101.00	50.05	0	465.60	20.24
8 7	9 6	1	1,279.12	51.16	0	1,507.25	57.97	1	514.98	20.60
9 7	10 6	0	1,717.36	52.04	0	2,067.25	62.64	1	657.10	20.53
10 7	11 6	1	1,774.12	53.76	1	2,198.25	66.61	1	680.60	20.62
11 7	12 6	0	2,472.36	56.19	0	3,243.50	73.72	0	918.59	20.88
12 7	13 6	2	2,131.31	57.60	0	3,188.00	81.74	0	829.10	21.26
13 7	14 6	0	3,286.12	60.85	0	4,992.00	92.44	0	1,141.56	21.14
14 7	15 6	2	2,855.74	63.46	1	4,861.25	105.68	1	984.84	21.41
15 7	16 6	0	2,262.12	66.53	0	3,926.00	115.47	0	732.90	21.56

TABLE XXII.—*Average (in general) boys, nonlaboring classes, American parentage.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Arm reach.			Weight.			Circumference of head.		
From—	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Y. M.	*Y. M.*			*Inches.*	*In.*		*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6 7	7 6	79	0	3,654.71	46.26	4	1,902.84	25.37	4	3,419.83	45.60	0	3,795.25	48.04	0	1,608.61	20.36
7 7	8 6	118	1	5,615.94	48.00	0	3,059.96	25.93	2	5,505.71	47.46	0	6,074.25	51.48	0	2,417.26	20.49
8 7	9 6	125	1	6,197.21	49.98	1	3,312.06	26.71	2	6,124.57	49.79	0	7,045.75	56.37	1	2,566.11	20.69
9 7	10 6	144	1	7,449.08	52.09	0	3,939.22	27.36	1	7,408.63	51.81	0	8,968.50	62.28	0	2,999.17	20.83
10 7	11 6	142	0	7,626.20	53.71	1	3,981.39	28.24	2	7,517.23	53.69	1	9,491.76	67.32	0	2,972.93	20.94
11 7	12 6	188	4	10,181.37	55.35	0	5,428.91	28.88	3	10,272.59	55.53	0	13,861.00	73.73	0	3,952.69	21.02
12 7	13 6	165	2	9,291.71	57.00	5	4,720.43	29.50	3	9,292.63	57.36	0	13,323.37	80.75	0	3,462.86	20.99
13 7	14 6	181	1	10,712.71	59.52	4	5,456.03	30.84	1	10,788.45	59.94	0	16,155.16	89.26	2	3,819.66	21.34
14 7	15 6	119	0	7,426.09	62.40	3	3,695.38	31.86	2	7,373.84	63.02	1	12,157.12	103.03	1	2,540.21	21.53
15 7	16 6	74	1	4,700.05	64.38	0	2,451.97	33.13	0	4,890.12	66.08	1	8,367.50	114.62	0	1,602.51	21.66
16 7	17 6	43	0	2,890.22	67.21	0	1,493.84	34.74	1	2,901.61	69.09	0	5,520.25	128.38	0	945.91	22.00
		1,378	..	....	.....	..	....	.....	..	....	.....	..	....	.....	..	....	.....

TABLE XXIII.—*Bright boys, American parents, laboring classes.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5 8	6 6	11	....	68 3	6 2	0	485.37	44.12	0	268.37	24.40
6 7	7 6	58	....	409 6	7 6	0	2,642.71	45.56	0	1,446.48	24.94
7 7	8 6	112	....	900 9	8 3	0	5,311.48	47.42	1	2,842.92	25.61
8 7	9 6	119	....	1,071 1	9 1	1	5,829.20	49.40	2	3,103.08	26.52
9 7	10 6	141	....	1,414 5	10 5	1	7,202.81	51.45	4	3,728.94	27.22
10 7	11 6	100	....	1,104 10	11 4	3	5,113.22	52.71	0	2,780.94	27.81
11 7	12 6	112	....	1,355 0	12 0	1	6,098.84	54.94	1	3,188.21	28.72
12 7	13 6	88	....	1,141 3	13 0	0	4,969.98	56.48	0	2,614.72	29.71
13 7	14 6	57	....	790 7	14 2	1	3,318.98	59.27	3	1,636.10	30.30
14 7	15 6	39	....	587 9	15 0	0	2,383.60	61.12	1	1,198.37	31.54
15 7	16 5	21	....	336 2	16 0	0	1,317.98	62.76	1	648.49	32.42
		858	....	....	....	....	....	....	....	....	....

TABLE XXIII.—*Bright boys, American parents, laboring classes*—Continued.

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5 8	6 6	0	468.12	42.56	0	487.25	44.30	0	220.49	20.04
6 7	7 6	0	2,606.24	44.94	2	2,640.25	47.15	1	1,163.97	20.42
7 7	8 6	2	5,163.95	46.95	0	5,689.62	50.80	1	2,275.27	20.50
8 7	9 6	1	5,780.58	48.99	1	6,521.62	55.27	2	2,415.50	20.65
9 7	10 6	0	7,255.81	51.46	1	8,659.75	61.86	1	2,899.90	20.71
10 7	11 6	1	5,212.23	52.65	0	6,579.37	65.79	0	2,072.17	20.72
11 7	12 6	0	6,137.45	54.80	1	8,062.25	72.63	2	2,301.80	20.93
12 7	13 6	1	4,897.97	56.30	1	6,924.50	79.59	1	1,829.67	21.03
13 7	14 6	1	3,367.23	60.13	1	4,849.50	86.60	1	1,184.21	21.15
14 7	15 6	0	2,427.87	62.25	0	3,870.75	99.25	1	816.98	21.50
15 7	16 5	0	1,335.87	63.61	0	2,272.62	108.22	0	460.61	21.93

TABLE XXIV.—*Dull boys, American parents, laboring classes.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 7	7 6	45	....	319 9	7 1	2	1,969.97	45.81	0	1,129.91	25.11
7 7	8 6	50	....	402 5	8 0	1	2,330.73	47.57	0	1,284.19	25.68
8 7	9 6	54	....	488 5	9 0	2	2,582.48	49.66	0	1,440.36	26.67
9 7	10 6	48	....	482 11	10 4	2	2,344.10	50.96	0	1,293.78	26.95
10 7	11 6	44	....	490 6	11 1	2	2,206.99	52.55	1	1,191.09	27.70
11 7	12 6	49	....	595 3	12 1	1	2,604.68	54.26	2	1,332.37	28.35
12 7	13 6	58	....	769 2	13 2	1	3,206.72	56.26	0	1,701.60	29.34
13 7	14 6	44	....	625 0	14 2	0	2,606.72	59.24	1	1.313.72	30.55
14 8	15 6	40	....	605 3	15 1	0	2,417.22	60.43	1	1,206.36	30.93
15 7	16 6	32	....	512 7	16 0	3	1,815.86	62.62	3	926.10	31.93
		464	....	....	....	....	....	....	....	....	....

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 7	7 6	0	2,042.12	45.38	1	2.085.75	47.40	0	912.39	20.28
7 7	8 6	1	2,320.74	47.36	1	2,539.00	51.82	1	994.01	20.29
8 7	9 6	1	2,605.09	49.15	1	2,957.75	55.81	0	1,103.12	20.43
9 7	10 6	2	2,412.23	52.44	0	2,909.50	60.61	2	946.08	20.57
10 7	11 6	1	2,238.16	52.05	0	2,807.50	63.81	0	908.08	20.64
11 7	12 6	1	2,606.24	54.30	2	3,306.85	70.36	1	996.07	20.75
12 7	13 6	1	3,207.70	56.28	0	4,448.33	76.70	1	1,191.62	20.91
13 7	14 6	0	2,592.11	58.91	1	3,748.62	87.18	1	901.41	20.96
14 8	15 6	2	2,343.37	61.67	0	3,831.50	95.79	0	848.59	21.21
15 7	16 6	3	1,851.99	63.86	1	3,372.75	108.80	2	646.15	21.54

TABLE XXV.—*Average boys (white) belonging to the laboring classes, American parentage.*

Limits of different ages. From—	Limits of different ages. To—	Total number of pupils.	Age. Number omitted.	Age. Total.	Age. Average.	Height. Number omitted.	Height. Total.	Height. Average.	Sitting height. Number omitted.	Sitting height. Total.	Sitting height. Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 7	7 6	96	0	686 0	7 0	4	4,233.48	46.02	0	2,403.93	25.04
7 7	8 6	167	0	1367 4	8 1	1	7,955.25	47.92	2	4,281.30	25.95
8 7	9 6	161	0	1,473 2	9 1	2	7,893.86	49.65	0	4,253.75	26.42
9 7	10 6	161	0	1,626 0	10 0	1	8,194.39	51.21	0	4,351.60	27.03
10 7	11 6	178	0	1,983 2	11 1	4	9,196.65	52.85	1	4,915.55	27.77
11 7	12 6	201	0	2,444 0	12 1	3	10,893.08	55.02	0	5,751.94	28.62
12 7	13 6	195	0	2,555 6	13 1	3	10,841.91	56.47	7	5,508.27	29.30
13 7	14 6	130	0	1,837 8	14 1	0	7,574.30	58.26	5	3,781.44	30.25
14 7	15 6	67	0	1,001 2	15 0	0	4,071.69	60.77	1	2,062.10	31.24
15 7	16 6	45	0	721 4	16 0	0	2,864.50	63.66	3	1,389.41	33.08
16 7	17 6	16	0	272 1	17 0	0	1,053.99	65.87	1	507.49	33.83
		1,417	...	....	....	....	....	....	....	....	....

Limits of different ages. From—	Limits of different ages. To—	Arm reach. Number omitted.	Arm reach. Total.	Arm reach. Average.	Weight. Number omitted.	Weight. Total.	Weight. Average.	Circumference of head. Number omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 7	7 6	3	4,268.62	45.90	0	4,616.37	48.09	1	1,933.09	20.35
7 7	8 6	2	7,814.48	47.36	0	8,677.25	51.96	0	3,434.79	20.57
8 7	9 6	4	7,769.76	49.49	1	8,961.50	56.01	2	3,270.86	20.57
9 7	10 6	1	8,094.96	50.59	0	9,767.27	60.67	2	3,286.77	20.67
10 7	11 6	6	9,033.35	52.52	0	11,688.99	65.67	1	3,677.96	20.78
11 7	12 6	3	10,900.03	55.05	0	14,608.25	72.68	0	4,178.29	20.79
12 7	13 6	5	10,769.67	56.68	3	15,214.50	79.24	0	4,083.04	20.94
13 7	14 6	6	7,284.98	58.75	0	11,362.50	87.40	0	2,751.67	21.17
14 7	15 6	2	3,999.22	61.53	0	6,311.50	94.20	1	1,397.02	21.17
15 7	16 6	0	2,906.12	64.58	0	5,117.75	113.73	1	951.21	21.62
16 7	17 6	0	1,072.25	67.02	0	1,909.30	119.33	0	348.75	21.80

TABLE XXVI.—*Bright boys, not socially divided.*

Limits of different ages. From—	Limits of different ages. To—	Total number of pupils.	Age. Number omitted.	Age. Total.	Age. Average.	Height. Number omitted.	Height. Total.	Height. Average.	Sitting height. Number omitted.	Sitting height. Total.	Sitting height. Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 0	6 6	6	....	37 05	6 02	0	271.25	45.02	0	147.50	24.58
6 8	7 6	22	....	158 08	7 02	0	1,013.50	46.06	1	527.74	25.13
7 8	8 6	43	....	348 07	8 01	1	1,999.35	47.06	1	1,069.35	25.46
8 7	9 6	53	....	495 00	9 03	0	2,622.65	49.46	0	1,394.84	26.31
9 7	10 6	39	....	392 00	10 00	0	1,985.53	50.91	0	1,050.85	26.94
10 7	11 6	26	....	291 05	11 02	0	1,366.74	52.56	0	721.35	27.74
11 7	12 6	37	....	445 07	12 04	0	2,045.12	55.27	0	1,062.24	28.07
12 7	13 6	45	....	589 01	13 00	0	2,536.48	56.36	0	1,313.86	29.19
13 7	14 6	29	....	408 08	14 00	0	1,624.85	56.02	0	889.10	30.60
14 7	15 6	23	....	347 02	15 00	0	1,443.36	63.18	0	773.25	33.61
15 7	16 5	11	....	176 09	16 00	0	715.12	65.01	0	369.49	33.59
16 7	17 5	6	....	102 08	17 00	0	374.25	62.37	0	198.25	33.04
17 7	18 6	4	....	72 1	18 00	0	267.75	66.94	0	139.50	34.88
18 7	19 5	5	....	95 0	19 00	0	342.50	68.05	0	173.50	34.69
		349	....	....	....	....	....	....	....	....	....

TABLE XXVI.—*Bright boys, not socially divided*—Continued.

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	0	6	6	0	269.00	44.83	0	272.50	45.41	0	123.12	20.52
6	8	7	6	1	956.00	45.52	1	1,049.50	49.97	0	451.36	20.51
7	8	8	6	1	1,991.37	47.41	1	2,121.75	50.51	2	842.84	20.55
8	7	9	6	0	2,610.23	49.24	0	2,927.50	55.23	1	1.067.33	20.52
9	7	10	6	0	2,002.98	51.35	0	2,364.87	60.63	0	806.97	20.69
10	7	11	6	0	1,378.98	53.03	0	1,725.75	66.37	0	544.78	20.95
11	7	12	6	0	2,061.62	55.71	0	2,742.75	74.12	0	773.72	20.91
12	7	13	6	0	2,542.74	56.05	0	3,545.90	78.79	0	950.96	21.13
13	7	14	6	0	1,725.87	59.51	0	2,541.75	87.64	0	608.49	20.98
14	7	15	6	0	1,478.12	64.26	0	2,424.00	105.39	1	477.50	21.07
15	7	16	5	0	723.62	65.78	0	1,332.50	121.13	0	240.65	21.87
16	7	17	5	0	381.50	63.58	0	687.00	114.05	0	133.12	22.18
17	7	18	6	0	276.75	69.18	1	400.50	133.50	0	88.75	22.19
18	7	19	5	0	360.75	72.15	0	659.50	131.09	0	113.12	22.62

TABLE XXVI A.—*Bright boys, American parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.				Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
16	7	17	6	29	0	495	4	17	1	1,844.62	65.88	2	916.61	33.95
17	7	18	6	10	0	180	1	18	0	679.62	67.96	0	353.62	35.36
18	7	19	5	6	0	113	2	19 2	0	399.86	66.64	0	206.62	34.44
18	7	19	5	5	0	95	0	19	0	342.50	68.50	0	173.50	34.70
19	11	20	0	2	0	......	......	......	0	137.62	68.81	0	71.50	35.75
				52	....	......	......	......	....	......	......	....	......	......

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
16	7	17	6	1	1,885.49	67.34	1	3,361.00	120.04	1	617.74	22.06
17	7	18	6	0	694.62	69.46	0	1,359.00	135.90	0	220.39	22.10
18	7	19	5	1	348.50	69.70	1	623.75	124.75	0	131.50	21.92
18	7	19	5	1	282.75	70.69	0	659.50	131.90	0	113.12	22.62
19	11	20	0	0	144.50	72.25	0	296.50	148.25	0	43.25	21.63

TABLE XXVII.—*Dull boys, American parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.		
From—		To—			Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	3	5	6	5	0	216.25	43.25	0	123.00	24.60
5	7	6	6	24	1	1,034.04	44.96	1	569.49	24.76
16	7	17	5	32	0	2,061.23	64.41	2	1,002.36	33.41
17	7	18	2	8	0	520.37	65.05	1	237.99	34.00
18	11	20	9	4	0	267.25	66.81	0	138.62	34.66
				73	......	......	......	......	......	......

TABLE XXVII.—*Bright boys, American parents, not socially divided*—Continued.

Limits of different ages. From—	Limits of different ages. To—	Arm reach. Number omitted.	Arm reach. Total.	Arm reach. Average.	Weight. Number omitted.	Weight. Total.	Weight. Average.	Circumference of head. Number omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5 3	5 6	2	137.00	45.67	0	216.75	43.35	0	98.00	19.60
5 7	6 6	2	980.48	44.57	2	988.75	44.94	1	470.72	20.47
16 7	17 5	0	2,101.00	65.66	0	3,630.00	113.44	0	689.98	21.56
17 7	18 2	0	524.62	65.58	0	967.50	120.94	0	173.62	21.70
18 11	20 9	0	275.50	68.88	0	546.00	136.50	0	89.00	22.25

TABLE XXVIII.—*Average boys, American parents, not socially divided.*

Limits of different ages. From—	Limits of different ages. To—	Total number of pupils.	Height. Number omitted.	Height. Total.	Height. Average.	Sitting height. Number omitted.	Sitting height. Total.	Sitting height. Average.
Yrs. Mos.	*Yrs. Mos.*			*Inches.*	*Inches.*		*Inches.*	*Inches.*
5 7	6 6	36	0	1,606.97	44.64	1	869.60	24.85
17 7	18 5	20	0	1,348.11	67.41	1	665.66	35.03
18 9	19 4	7	0	468.62	66.95	0	240.00	34.29
20 1	21 7	4	0	278.50	69.63	0	115.62	36.41
		67	......	....	....	......	....	....

Limits of different ages. From—	Limits of different ages. To—	Arm reach. Number omitted.	Arm reach. Total.	Arm reach. Average.	Weight. Number omitted.	Weight. Total.	Weight. Average.	Circumference of head. Number omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5 7	6 6	1	1,536.86	43.91	1	1,575.50	45.01	0	727.40	20.21
17 7	18 5	1	1,307.99	68.84	0	2,689.00	134.45	0	438.11	21.91
18 9	19 4	1	408.50	68.08	0	962.00	137.43	0	158.37	22.62
20 1	21 7	0	284.00	71.00	0	572.25	143.06	0	90.25	22.56

TABLE XXIX.—*Bright boys, foreign parents, not socially divided.*

Limits of different ages. From—	Limits of different ages. To—	Total number of pupils.	Height. No. omitted.	Height. Total.	Height. Average.	Sitting height. No. omitted.	Sitting height. Total.	Sitting height. Average.	Weight. No. omitted.	Weight. Total.	Weight. Average.	Circumference of head. No. omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs. Mos.	*Yrs. Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds*	*Lbs.*		*Inches.*	*In.*
6 0	6 6	6	0	271.25	45.21	0	147.50	24.58	0	272.50	45.42	0	124.12	20.69
6 8	7 6	22	0	1,013.50	46.07	1	527.74	25.13	1	1,049.50	49.98	0	451.36	20.52
7 7	8 6	43	1	1,999.35	47.60	2	1,056.35	25.76	1	2,121.75	50.52	2	842.84	20.56
8 7	9 6	53	0	2,622.65	49.48	0	1,394.84	26.32	0	2,907.50	54.86	1	1,067.33	20.53
9 7	10 6	39	0	1,985.53	50.91	0	1,050.85	26.94	0	2,364.87	60.64	0	806.97	20.69
10 7	11 6	26	0	1,366.74	52.57	1	688.35	27.53	0	1,725.75	66.38	0	544.78	20.95
11 7	12 6	37	0	2,045.12	55.27	0	1,062.24	28.71	0	2,742.75	74.13	0	773.72	20.91
12 7	13 6	45	0	2,536.48	56.37	1	1,287.86	29.27	0	3,546.00	78.80	0	950.96	21.13
13 7	14 6	29	0	1,694.85	58.44	1	854.10	30.50	0	2,541.75	87.65	0	608.49	20.98
14 7	15 6	23	0	1,444.36	62.80	1	709.75	32.26	0	2,424.00	105.39	1	477.50	21.70
15 7	16 6	11	0	715.12	65.01	0	369.49	33.59	0	1,332.50	121.14	0	240.75	21.89
16 7	17 6	6	1	321.00	64.20	0	198.25	33.04	0	768.00	114.50	0	133.12	22.19
17 7	18 6	4	0	267.75	66.94	0	139.50	34.88	1	400.50	133.50	0	88.75	22.19
18 7	19 6	5	0	342.50	68.50	0	173.50	34.70	0	659.50	131.90	0	113.12	22.62
		349	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XXX.—*Dull boys, foreign parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	0	6	6	10	....	63	0	6	3	0	437.74	43.77	0	238.25	23.83
6	7	7	6	21	....	150	6	7	1	2	856.11	44.11	1	503.61	25.18
7	7	8	6	16	....	131	3	8	2	0	761.85	47.62	0	415.60	25.98
8	7	9	4	9	....	82	9	9	2	1	396.74	49.59	1	234.62	29.33
9	7	10	6	15	....	152	0	10	1	0	782.12	52.14	0	409.99	27.33
10	10	11	6	10	....	112	4	11	2	0	525.62	52.56	0	276.87	27.69
11	7	12	6	20	....	243	6	12	1	0	1,100.99	55.05	0	572.49	28.62
12	8	13	6	17	....	224	4	13	2	1	917.12	57.32	0	503.87	29.64
13	7	14	5	26	....	366	4	14	0	2	1,405.86	58.58	4	664.00	30.18
14	7	15	4	16	....	239	6	14	9	0	938.74	58.67	2	432.25	30.88
15	8	16	6	9	....	145	3	16	1	0	567.24	63.03	0	287.25	31.92
16	10	18	1	7	....	122	4	17	4	0	462.37	66.05	0	239.74	34.25
				176	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	0	6	6	1	398.62	44.29	0	454.50	45.45	0	198.75	19.88
6	7	7	6	1	903.74	45.19	0	989.75	47.13	0	423.73	20.18
7	7	8	6	0	757.12	47.32	0	818.50	51.16	1	304.49	20.30
8	7	9	4	1	399.75	49.97	1	471.50	58.94	0	183.42	20.38
9	7	10	6	1	720.93	51.50	0	931.50	62.10	1	288.99	20.64
10	10	11	6	0	527.87	52.79	0	655.25	65.53	0	205.37	20.54
11	7	12	6	0	1,099.86	54.99	0	1,511.00	75.55	0	418.24	20.91
12	8	13	6	0	970.25	57.07	0	1,385.75	81.51	1	335.11	20.94
13	7	14	5	1	1,482.36	59.29	0	2,241.50	86.21	1	523.71	20.95
14	7	15	4	0	964.12	60.26	0	1,454.75	90.92	0	339.85	21.24
15	8	16	6	0	577.25	64.14	0	925.12	102.79	0	193.00	21.44
16	10	18	1	0	456.37	65.20	0	848.25	121.18	0	152.37	21.77

TABLE XXXI.—*Average boys, foreign parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Arm reach.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Y.	*M.*	*Y.*	*M.*			*Inches.*	*In.*		*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	0	6	6	9	0	395.37	43.93	0	213.74	23.75	0	389.00	43.22	0	397.25	44.14	0	184.37	20.49
6	7	7	6	24	2	1,018.85	46.31	1	574.97	25.00	1	1,058.87	46.04	0	1,125.00	46.88	1	466.85	20.30
7	8	8	6	41	1	1,926.85	48.17	0	1,067.97	26.05	1	1,909.73	47.74	1	2,120.12	53.00	0	840.92	20.51
8	7	9	6	54	0	2,709.44	50.17	3	1,360.73	26.68	0	2,705.24	50.10	0	3,158.00	58.48	0	1,117.71	20.70
9	7	10	6	50	0	2,646.03	52.92	1	1,329.22	27.13	2	2,501.29	52.11	1	3,061.50	62.48	1	1,015.46	20.72
10	7	11	6	66	1	3,463.41	53.28	1	1,819.62	27.99	2	3,377.60	52.78	0	4,475.87	67.82	1	1,355.59	20.86
11	7	12	6	70	0	3,841.16	54.87	1	1,969.66	28.55	1	3,813.80	55.27	0	5,029.75	71.85	0	1,477.22	21.10
12	7	13	6	61	1	3,413.51	56.89	2	1,734.60	29.40	2	3,378.87	57.27	0	4,885.50	80.09	2	1,245.60	21.11
13	7	14	6	60	1	3,415.95	57.90	2	1,723.71	29.72	0	3,536.49	58.94	0	5,175.87	86.26	1	1,246.08	21.12
14	7	15	6	34	0	2,088.72	61.43	2	1,001.98	31.31	2	1,983.99	62.00	0	3,430.50	100.90	0	730.90	21.50
15	7	16	6	25	0	1,603.84	64.15	0	815.86	32.63	0	1,646.05	65.84	1	2,636.87	109.87	0	545.47	21.82
16	9	17	6	11	0	743.74	67.61	0	379.37	34.49	0	763.00	69.36	0	1,386.75	126.07	0	245.00	22.27
17	7	17	9	4	0	265.00	66.25	0	139.75	34.94	0	266.82	66.71	0	528.00	132.00	1	66.75	22.25
18	7	19	3	2	0	138.62	69.31	0	71.00	35.50	0	141.75	70.88	0	266.25	133.13	0	44.25	22.13
				511	..	....	.....	..	....	.....	..	....	.....	..	....	.....	..	....	.....

TABLE XXXII.—*Bright boys, American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	0	6	6	9	0	56	0	6	2	0	410.87	45.65	0	224.12	24.90
6	8	7	6	23	0	165	6	7	2	1	1,014.48	46.11	1	553.72	25.17
7	7	8	6	28	0	229	7	8	2	0	1,333.99	47.64	0	749.57	26.76
8	7	9	6	50	0	456	3	9	1	1	2,426.73	49.53	3	1,245.22	26.49
9	7	10	6	36	0	366	6	10	1	0	1,875.14	52.09	0	988.86	27.47
10	7	11	6	24	0	268	2	11	1	0	1,298.73	54.11	1	648.49	28.20
11	7	12	6	38	0	462	2	12	1	0	2,093.48	55.09	4	968.73	28.49
12	7	13	6	30	0	394	3	13	1	2	1,593.86	56.92	1	848.11	29.25
13	7	14	6	18	0	253	6	14	0	0	1,053.99	58.56	0	554.36	30.80
14	7	15	5	12	0	180	9	15	0	0	754.36	62.86	0	384.25	32.02
15	7	16	5	11	0	176	1	16	0	0	721.87	65.62	1	332.50	33.25
16	11	18	4	4	0	......	......	....	....	0	263.25	65.81	0	136.75	34.19
				283	....	......	......	....	....	....	......	......	....	......	......

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	0	6	6	1	365.50	45.69	1	363.25	45.41	0	181.62	20.18
6	8	7	6	0	1,047.62	45.55	0	1,092.62	47.51	0	470.86	20.47
7	7	8	6	1	1,292.50	47.87	1	1,387.50	51.39	0	577.59	20.63
8	7	9	6	1	2,406.10	49.10	1	2,696.12	55.02	0	1,035.84	20.72
9	7	10	6	1	1,814.24	51.84	1	2,141.25	61.18	0	753.35	20.93
10	7	11	6	0	1,297.98	54.08	0	1,625.50	67.73	0	501.60	20.90
11	7	12	6	0	2,100.36	55.27	0	2,706.50	71.22	1	771.35	20.85
12	7	13	6	0	1,705.99	56.87	0	2,271.62	75.72	0	629.77	20.99
13	7	14	6	1	1,012.86	59.58	0	1,518.75	84.38	0	380.61	21.15
14	7	15	5	0	762.00	63.50	0	1,228.00	102.33	0	260.62	21.72
15	7	16	5	0	739.50	67.23	0	1,343.50	122.14	0	236.99	21.54
16	11	18	4	0	275.00	68.75	0	472.25	118.06	0	87.37	21.84

TABLE XXXIII.—*Dull boys, American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	1	6	6	5	....	31	09	6	3	0	222.87	44.57	0	121.25	24.25
6	8	7	6	9	....	64	03	7	1	0	411.12	45.68	0	224.30	24.92
7	7	8	5	12	....	98	01	8	1	0	581.62	48.47	0	314.37	26.20
8	9	9	6	13	....	119	08	9	2	0	650.75	50.75	0	355.12	27.32
9	7	10	6	22	....	222	08	10	1	0	1,122.11	51.01	0	597.67	27.17
10	7	11	6	9	....	100	04	11	1	0	470.74	52.30	0	247.62	27.51
11	7	12	5	15	....	183	00	12	2	0	834.11	55.61	1	408.87	29.21
12	8	13	5	17	....	223	09	13	1	0	976.61	57.45	0	497.62	29.27
13	7	14	5	19	....	266	04	14	0	1	1,067.12	59.28	0	578.23	30.43
14	7	15	6	13	....	198	04	15	2	1	750.75	62.56	0	414.75	31.90
15	8	16	5	5	....	80	07	16	1	0	321.12	64.22	0	166.00	33.20
16	9	17	9	4	....	69	02	....	....	0	264.62	66.16	0	142.25	35.56
				143	....	......	......	....	....	....	......	......	....	......	......

TABLE XXXIII.—*Dull boys, American mixed nationalities, not socially divided*—Cont'd.

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	1	6	6	0	220. 75	44. 15	0	213. 25	42. 65	0	101. 49	20. 29
6	8	7	6	0	415. 75	46. 19	0	425. 00	47. 22	0	182. 37	20. 26
7	7	8	5	0	572. 37	47. 70	0	617. 58	51. 47	0	244. 86	20. 41
8	9	9	6	1	602. 37	50. 20	0	760. 25	58. 48	0	266. 61	20. 51
9	7	10	6	0	1, 126. 12	51. 19	0	1, 306. 25	59. 38	1	427. 66	20. 36
10	7	11	6	0	464. 62	51. 62	0	563. 75	62. 64	0	182. 99	20. 33
11	7	12	5	0	839. 49	55. 97	0	1, 161. 37	77. 42	0	315. 68	21. 05
12	8	13	5	0	983. 75	57. 87	0	1, 404. 75	82. 63	0	354. 24	20. 84
13	7	14	5	0	1, 136. 99	59. 84	0	1, 691. 75	89. 04	1	383. 42	21. 30
14	7	15	6	0	828. 37	63. 72	0	1, 358. 75	104. 52	0	278. 36	21. 41
15	8	16	5	0	325. 75	65. 15	0	560. 00	112. 00	0	108. 50	21. 70
16	9	17	9	0	272. 50	68. 13	0	521. 50	130. 38	0	88. 12	22. 03

TABLE XXXIV.—*All girls.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	4	6	6	94	5	3, 936. 59	*a*44.23	1	2, 254. 90	*a*24.25	2	3, 986. 00	*a*43.33	2	1, 833. 17	*a*19.93
5	5	6	11	37	3	1, 495. 12	43. 97	2	835. 62	23. 87	1	1, 544. 25	42. 90	0	747. 27	20. 20
6	5	7	6	375	3	16, 774. 08	*a*45.09	8	9, 060. 09	*a*24.69	0	17, 151. 50	*a*45.74	3	7, 417. 21	*a*19.94
6	7	7	6	133	1	5, 992. 81	45. 40	1	3, 269. 78	24. 77	1	5, 935. 75	44. 97	0	2, 650. 02	19. 92
7	7	8	6	754	9	35, 339. 85	47. 44	10	18, 943. 92	25. 46	8	36, 884. 67	49. 44	8	15, 022. 17	20. 14
8	7	9	6	883	4	43, 187. 44	49. 13	11	22, 871. 80	26. 23	9	46, 906. 12	53. 67	9	17, 732. 73	20. 29
9	7	10	6	939	6	47, 766. 27	51. 20	10	25, 060. 86	26. 98	4	54, 744. 69	58. 55	9	19, 004. 26	20. 43
10	7	11	6	931	12	48, 832. 69	53. 14	11	25, 598. 61	27. 82	2	59, 631. 24	64. 19	12	18, 877. 92	20. 54
11	7	12	6	876	10	48, 301. 87	55. 78	21	24, 839 42	29. 05	10	63, 390. 00	73. 20	7	18, 054. 72	20. 78
12	7	13	6	966	14	55, 133. 34	57. 91	24	28, 379. 47	30. 13	8	78, 407. 67	81. 85	11	20, 004. 75	20. 95
13	7	14	6	833	12	49, 456. 03	60. 24	32	25, 181. 28	31. 44	1	77, 388. 86	93. 02	14	17, 349. 14	21. 18
14	7	15	6	655	2	40, 257. 25	61. 65	19	20, 515. 61	32. 26	1	65, 651. 27	100. 38	8	13, 770. 70	21. 28
15	7	16	6	450	4	27, 828. 56	62. 40	17	14, 208. 34	32. 81	6	46, 702. 77	105. 19	8	9, 448. 03	21. 38
16	7	17	6	323	2	20, 221. 38	62. 99	9	10, 373. 61	33. 04	2	35, 313. 62	110. 01	5	6, 853. 70	21. 55
17	7	18	6	151	1	9, 473. 19	63. 15	1	4, 975. 80	33. 17	1	16, 725. 00	111. 50	3	3, 196. 70	21. 60
17	7	23	6	41	0	2, 579. 36	62. 91	1	1, 314. 28	32. 86	0	4, 556. 75	111. 14	0	885. 78	21. 60
18	7	19	9	13	0	836. 25	64. 33	0	438. 11	33. 70	1	1, 355. 50	112. 96	1	263. 75	21. 98
18	7	20	8	66	0	4, 158. 87	63. 01	0	2, 193. 84	33. 24	0	7, 307. 74	110. 72	0	1, 430. 60	21. 68
				8, 520	..	....	......	..	....	......	..	....	......	..	....	......

a Averages chosen for use in discussion and in diagrams.

TABLE XXXV.—*All girls of American parentage.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	4	6	6	64	2	2, 756. 86	44. 47	..	1, 558. 78	24. 36	1	2, 741. 50	43. 52	1	1, 252. 63	19. 88
5	5	6	11	37	3	1, 495. 12	43. 97	2	835. 62	23. 87	1	1, 544. 25	42. 90	0	747. 27	20. 20
6	5	7	6	375	3	16, 774. 08	45. 09	8	9, 060. 09	24. 69	0	17, 151. 50	45. 74	3	7, 417. 21	19. 94
7	7	8	6	587	7	27, 506. 58	47. 43	8	14, 758. 37	25. 49	7	28, 613. 37	49. 33	7	11, 676. 27	20. 13
8	7	9	6	669	2	32, 819. 90	49. 21	7	17, 338. 82	26. 19	8	35, 343. 12	53. 47	7	13, 434. 06	20. 29
9	7	10	6	737	5	37, 494. 71	51. 22	10	19, 629. 07	27. 00	4	42, 904. 24	58. 53	6	14, 950. 99	20. 45
10	7	11	6	721	9	37, 843. 14	53. 15	8	19, 828. 93	27. 81	1	46, 067. 74	63. 98	10	14, 611. 10	20. 55
11	7	12	6	673	7	37, 168. 96	55. 81	14	19, 152. 36	29. 06	8	48, 432. 00	72. 83	6	13, 857. 12	20. 78
12	7	13	6	706	9	40, 457. 98	58. 05	17	20, 814. 66	30. 21	5	57, 774. 72	82. 42	6	14, 680. 03	20. 97
13	7	14	6	627	11	37, 116. 88	60. 25	28	18, 824. 07	31. 43	0	58, 284. 36	92. 96	9	13, 091. 34	21. 18
14	7	15	6	490	1	30, 143. 75	61. 64	17	15, 245. 94	32. 23	0	49, 339. 00	100. 69	6	10, 305. 52	21. 29
15	7	16	6	325	4	20, 069. 50	62. 52	13	10, 254. 88	32. 87	3	34, 055. 27	105. 76	7	6, 799. 46	21. 38
16	7	17	6	258	2	16, 119. 03	62. 96	8	8, 252. 25	33. 01	1	28, 230. 37	109. 85	4	5, 474. 84	21. 55
17	7	18	6	128	1	8, 004. 32	63. 03	1	4, 211. 43	33. 16	1	14, 087. 00	110. 92	1	2, 744. 34	21. 61
18	7	20	8	66	0	4, 158. 87	63. 01	0	2, 193. 84	33. 24	0	7, 307. 74	110. 72	0	1, 430. 60	21. 68
				6, 463	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XXXVI.—*Girls belonging to nonlaboring classes, of American parentage.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	5	7	6	162	1	7, 323. 68	45. 49	5	3, 881. 32	24. 72	0	7, 378. 00	45. 54	1	3, 221. 44	20. 01
7	7	8	6	259	3	12, 231. 40	47. 78	2	6, 573. 53	25. 58	4	12, 659. 75	49. 65	4	5, 156. 11	20. 27
8	7	9	6	300	1	14, 759. 12	49. 36	2	7, 843. 26	26. 32	1	16, 120. 62	53. 92	4	6, 029. 42	20. 33
9	7	10	6	351	3	17, 937. 35	51. 54	4	9, 380. 27	27. 03	1	20, 606. 37	58. 88	2	7, 163. 85	20. 52
10	7	11	6	310	3	16, 441. 69	53. 56	4	8, 525. 65	27. 86	1	20, 072. 25	64. 96	4	6, 310. 56	20. 62
11	7	12	6	335	2	18, 670. 89	56. 07	2	9, 699. 97	29. 13	3	24. 249. 25	73. 04	1	6, 977. 90	20. 89
12	7	13	6	342	3	19, 813. 35	58. 45	7	10, 173. 47	30. 37	2	28, 635. 09	84. 22	3	7, 137. 89	21. 06
13	7	14	6	304	3	18, 279. 80	60. 73	9	9, 318. 74	31. 59	0	28, 989. 11	95. 36	4	6, 381. 72	21. 27
14	7	15	6	254	0	15, 669. 12	61. 69	7	7, 966. 20	32. 25	0	25, 535. 00	100. 53	5	5, 307. 85	21. 32
15	7	16	6	195	2	12, 105. 74	62. 72	8	6, 161. 56	32. 95	2	20, 357. 65	105. 48	3	4, 111. 99	21. 42
16	7	17	6	128	0	8, 086. 45	63. 18	4	4, 107. 10	33. 12	0	13, 913. 37	108. 70	2	2, 726. 46	21. 64
17	7	18	6	63	0	3, 974. 73	63. 09	1	2, 053. 34	33. 12	0	7, 009. 50	111. 26	1	1, 339. 31	21. 60
				3, 003	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XXXVII.—*Girls belonging to laboring classes, of American parentage.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	7	7	6	213	2	9,450.40	44.79	3	5,178.77	24.66	0	9,773.50	45.88	2	4,195.77	19.89
7	7	8	6	328	4	15,275.18	47.15	6	8,184.84	25.42	3	15,953.62	49.09	3	6,520.16	20.06
8	7	9	6	369	1	18,060.78	49.08	5	9,495.56	26.09	7	19,222.50	53.10	3	7,404.64	20.23
9	7	10	6	386	2	19,557.36	50.93	6	10,248.80	26.97	3	22,297.87	58.21	4	7,787.14	20.39
10	7	11	6	411	6	21,401.45	52.84	4	11,303.28	27.77	0	25,995.49	63.25	6	8,300.54	20.50
11	7	12	6	338	5	18,498.07	55.55	12	9,452.39	29.00	5	24,182.75	72.62	5	6,879.22	20.66
12	7	13	6	364	6	20,644.63	57.67	10	10,641.19	30.06	3	29,139.63	80.72	3	7,542.14	20.89
13	7	14	6	323	8	18,837.08	59.80	19	9,505.33	31.27	0	29,295.25	90.70	5	6,709.62	21.10
14	7	15	6	236	1	14,474.63	61.59	10	7,279.74	32.21	0	23,804.00	100.86	1	4,997.67	21.27
15	7	16	6	130	2	7,963.76	62.22	5	4,093.32	32.75	1	13,697.62	106.18	4	2,687.47	21.33
16	7	17	6	36	0	2,271.49	63.10	1	1,157.49	33.07	0	4,125.50	114.60	1	754.37	21.55
17	7	18	6	17	1	1,012.74	63.30	0	563.87	33.17	0	1,909.00	112.29	0	364.50	21.44
				3,151	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XXXVIII.—*Girls of American parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	4	6	11	101	5	4,251.98	44.29	2	2,394.40	24.19	2	4,285.75	43.29	1	1,999.90	20.00
16	7	17	6	94	2	5,761.09	62.62	3	2,987.66	32.83	1	10,191.50	109.59	1	1,994.01	21.44
17	7	18	6	48	0	3,016.85	62.85	0	1,594.22	33.21	1	5,168.50	109.97	0	1,040.53	21.68
18	7	20	8	66	0	4,158.87	63.01	0	2,193.84	33.24	0	7,307.74	110.72	0	1,430.60	21.68
				309	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XXXIX.—*Girls of foreign parents, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	8	6	6	15	2	564.12	43.39	1	331.50	23.68	1	602.00	43.00	1	274.80	19.63
6	7	7	6	64	0	2,908.34	45.44	0	1,584.22	24.75	0	2,884.75	45.07	0	1,277.47	19.96
7	7	8	6	89	1	4,161.81	47.29	1	2,241.57	25.47	0	4,425.75	49.73	0	1,788.42	20.09
8	7	9	6	114	3	5,448.62	49.09	3	2,911.26	26.23	1	6,054.00	53.58	2	2,268.79	20.26
9	7	10	6	105	1	5,300.71	50.97	0	2,811.20	26.77	0	6,144.95	58.52	3	2,074.92	20.34
10	7	11	6	101	2	5,246.34	52.99	3	2,735.47	27.91	1	6,482.25	64.82	0	2,065.93	20.45
11	7	12	6	112	3	6,060.34	55.60	5	3,112.85	29.09	1	8,371.50	75.42	1	2,308.59	20.80
12	7	13	6	112	1	6,358.70	57.29	4	3,222.35	29.84	2	8,767.20	79.70	3	2,269.39	20.82
13	7	14	6	110	1	6,574.32	60.31	3	3,381.71	31.60	1	10,198.75	93.57	4	2,245.26	21.18
14	7	15	6	73	0	4,522.56	61.95	1	2,331.34	32.38	0	7,374.02	101.01	0	1,553.50	21.28
15	7	16	6	71	0	4,398.11	61.95	1	2,290.10	32.72	1	7,242.25	103.46	1	1,494.64	21.35
16	7	17	6	31	0	1,958.73	63.18	0	1,029.24	33.20	1	3,360.25	112.01	0	673.57	21.73
17	7	23	6	41	0	2,579.36	62.91	1	1,314.28	32.86	0	4,556.75	111.14	0	885.78	21.60
				1,038	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XL.—*Girls of American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	9	6	6	15	1	615. 61	43. 97	0	364. 62	24. 31	0	642. 50	42. 83	0	305. 74	20. 38
6	7	7	6	69	1	3, 084. 47	45. 36	1	1, 685. 56	24. 79	1	3, 051. 00	44. 87	0	1, 372. 55	19. 89
7	7	8	6	78	1	3, 671. 46	47. 68	1	1, 943. 98	25. 25	1	3, 845. 55	49. 94	1	1, 557. 48	20. 23
8	7	9	6	100	1	4, 918. 92	49. 69	1	2, 621. 72	26. 48	0	5, 509. 00	55. 09	0	2, 029. 88	20. 30
9	7	10	6	97	0	4, 970. 85	51. 25	0	2, 620. 59	27. 02	0	5, 695. 50	58. 72	0	1, 978. 35	20. 40
10	7	11	6	109	1	5, 743. 21	53. 18	0	3, 034. 21	27. 84	0	7, 081. 25	64. 97	2	2, 200. 89	20. 57
11	7	12	6	91	0	5, 072. 57	55. 74	2	2, 574. 21	28. 92	1	6, 586. 50	73. 18	0	1, 889. 01	20. 76
12	7	13	6	148	4	8, 316. 66	57. 75	3	4, 342. 46	29. 95	1	11, 865. 75	80. 72	2	3, 055. 33	20. 93
13	7	14	6	96	0	5, 764. 83	60. 05	1	2, 975. 50	31. 32	0	8, 905. 75	92. 77	1	2, 012. 54	21. 18
14	7	15	6	92	1	5, 590. 94	61. 44	1	2, 938. 33	32. 29	1	8, 938. 25	98. 22	2	1, 911. 68	21. 24
15	7	16	6	54	0	3, 360. 95	62. 24	3	1, 663. 36	32. 61	2	5, 405. 25	103. 95	0	1, 153. 93	21. 37
16	7	17	6	34	0	2, 143. 62	63. 05	1	1, 092. 12	33. 09	0	3, 723. 00	109. 50	1	705. 29	21. 37
17	7	18	6	23	0	1, 463. 87	63. 86	0	764. 37	33. 23	0	2, 638. 00	114. 70	2	452. 36	21. 54
18	7	19	9	13	0	836. 25	64. 33	0	438. 11	33. 70	1	1, 355. 50	112. 96	1	263. 75	21. 98
				1, 019	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLI.—*All bright girls.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	5	6	11	37	3	1, 495. 12	43. 97	2	835. 62	23. 87	1	1, 544. 25	42. 90	0	747. 27	20. 20
6	0	6	6	5	1	174. 37	43. 59	0	124. 00	24. 80	0	209. 00	41. 80	0	106. 37	21. 27
6	7	7	6	236	3	10, 605. 02	45. 52	6	5, 699. 88	24. 78	0	10, 848. 50	45. 97	2	4, 685. 20	20. 02
7	7	8	6	364	5	17, 060. 23	47. 52	5	9, 112. 99	25. 38	5	17, 695. 00	49. 29	3	7, 292. 77	20. 20
8	7	9	6	403	4	19, 627. 74	49. 19	7	10, 353. 36	26. 14	2	21, 308. 25	53. 14	4	8, 110. 10	20. 33
9	7	10	6	404	3	20, 542. 31	51. 23	5	10, 748. 78	26. 94	2	23, 582. 32	58. 66	5	8, 178. 57	20. 50
10	7	11	6	388	2	20, 505. 64	53. 12	4	10, 677. 53	27. 81	0	24, 904. 12	64. 19	4	7, 907. 98	20. 59
11	7	12	6	328	2	18, 206. 10	55. 85	5	9, 384. 74	29. 05	1	23, 882. 50	73. 04	1	6, 836. 14	20. 91
12	7	13	6	338	4	19, 335. 72	57. 89	8	9, 949. 79	30. 15	3	27, 288. 95	81. 46	3	7, 044. 93	21. 03
13	7	14	6	285	3	17, 050. 45	60. 46	13	8, 561. 54	31. 48	0	26, 488. 61	92. 94	7	5, 917. 50	21. 29
14	7	15	6	204	0	12, 549. 98	61. 52	6	6, 354. 98	32. 10	0	20, 295. 02	99. 49	3	4, 288. 63	21. 34
15	7	16	6	142	2	8, 764. 19	62. 60	7	4, 436. 47	32. 86	0	15, 129. 75	106. 55	1	3, 031. 26	21. 50
16	7	17	6	45	0	2, 848. 36	63. 30	3	1, 380. 99	32. 88	0	4, 931. 50	109. 59	1	957. 48	21. 76
16	7	16	11	24	0	1, 490. 65	62. 11	0	779. 02	32. 46	1	2, 425. 00	105. 43	1	493. 42	21. 45
17	0	17	6	29	0	1, 851. 23	63. 84	2	901. 86	33. 40	0	3, 242. 25	111. 80	0	624. 24	21. 53
17	7	18	6	45	0	2, 859. 98	63. 56	1	1, 475. 48	33. 53	0	5, 019. 50	111. 54	0	976. 47	21. 70
18	7	23	6	19	0	1, 200. 12	63. 16	0	634. 10	33. 37	0	2, 101. 00	110. 58	0	412. 49	21. 71
				3, 296	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLII.—*All dull girls.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	4	6	6	40	3	1, 618. 87	43. 75	1	937. 50	24. 04	1	1, 645. 00	42. 18	2	745. 22	19. 61
6	7	7	6	41	1	1, 779. 85	44. 50	0	996. 49	24. 30	1	1, 783. 75	44. 59	0	808. 47	19. 72
7	7	8	6	68	1	3, 178. 32	47. 44	2	1, 698. 21	25. 73	1	3, 381. 80	50. 47	1	1, 334. 35	19. 92
8	7	9	6	62	0	3, 045. 94	49. 13	1	1, 605. 33	26. 32	1	3, 328. 50	54. 57	0	1, 258. 68	20. 30
9	7	10	6	62	2	3, 093. 98	51. 57	0	1, 690. 49	27. 27	0	3, 712. 50	59. 88	1	1, 234. 25	20. 23
10	7	11	6	86	2	4, 450. 75	52. 99	2	2, 360. 35	28. 10	0	5, 525. 25	64. 25	3	1, 689. 86	20. 36
11	7	12	6	82	1	4, 519. 95	55. 80	2	2, 335. 59	29. 19	1	5, 992. 25	73. 98	1	1, 658. 48	20. 48
12	7	13	6	113	2	6, 389. 82	57. 57	5	3, 233. 43	29. 94	1	8, 996. 12	80. 32	1	2, 325. 71	20. 77
13	7	14	6	101	1	5, 950. 58	59. 51	1	3, 128. 05	31. 28	1	8, 960. 75	89. 61	1	2, 093. 29	20. 93
14	7	15	6	112	2	6, 803. 06	61. 85	3	3, 542. 94	32. 50	0	11, 431. 00	102. 06	1	2, 361. 63	21. 28
15	7	16	6	55	0	3, 391. 00	61. 65	1	1, 749. 48	32. 40	1	5, 516. 37	102. 16	0	1, 168. 02	21. 24
16	7	17	6	60	2	3, 614. 46	62. 32	1	1, 940. 27	32. 89	0	6, 576. 00	109. 60	0	1, 283. 72	21. 40
17	7	18	6	25	0	1, 567. 24	62. 69	0	827. 98	33. 12	1	2, 608. 75	108. 70	0	538. 42	21. 54
18	9	19	9	8	0	509. 75	63. 72	0	268. 75	33. 59	0	855. 49	106. 94	0	171. 87	21. 48
18	4	20	7	2	0	128. 00	64. 00	0	61. 25	30. 63	0	230. 00	115. 00	0	43. 25	21. 63
				917	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLIII.—*All average girls.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	6	6	6	49	1	2, 143. 35	44. 65	0	1, 193. 40	24. 36	1	2, 132. 00	44. 42	0	981. 58	20. 03
6	7	7	6	231	0	10, 382. 02	44. 94	3	5, 633. 50	24. 71	0	10, 455. 00	45. 26	1	4, 573. 56	19. 89
7	7	8	6	322	3	15, 101. 30	47. 34	3	8, 132. 72	25. 49	2	15, 807. 87	49. 40	4	6, 395. 05	20. 11
8	7	9	6	418	2	20. 513. 76	49. 31	3	10, 913. 11	26. 30	6	22, 269. 37	54. 05	5	8, 363. 95	20. 25
9	7	10	6	473	1	24, 129. 98	51. 12	5	12, 621. 59	26. 97	2	27, 449. 87	58. 28	3	9, 591. 44	20. 41
10	7	11	6	457	8	23, 876. 30	53. 18	5	12, 560. 73	27. 79	2	29, 201. 87	64. 18	5	9, 280. 08	20. 53
11	7	12	6	465	7	25, 514. 32	55. 71	14	13, 087. 59	29. 02	8	33, 419. 75	73. 13	5	9, 539. 10	20. 74
12	7	13	6	515	8	29, 407. 80	58. 00	11	15, 196. 25	30. 15	4	42, 122. 60	82. 43	7	10, 634. 11	20. 93
13	7	14	6	447	8	26, 455. 00	60. 26	18	13, 491. 69	31. 45	0	41, 939. 50	93. 82	6	9, 338. 35	21. 18
14	7	15	6	339	0	20, 904. 21	61. 66	10	10, 617. 69	32. 27	1	33, 925. 25	100. 37	4	7, 120. 44	21. 26
15	7	16	6	253	2	15, 673. 37	62. 44	9	8, 022. 39	32. 88	5	26, 056. 65	105. 07	7	5, 248. 75	21. 34
16	7	17	6	165	0	10, 416. 68	63. 13	3	5, 371. 47	33. 16	1	18, 138, 87	110. 60	3	3, 494. 84	21. 57
17	7	18	6	109	1	6, 821. 46	63. 16	1	3, 567. 70	33. 03	0	12, 263. 00	112. 50	3	2, 287. 56	21. 58
18	7	19	10	52	0	3, 287. 50	63. 22	0	1, 730. 65	33. 28	1	5, 698. 75	111. 74	1	1, 107 78	21. 72
19	7	20	8	9	0	555. 62	61. 74	0	295. 62	32. 85	0	970. 00	107. 78	0	195. 99	21. 78
				4, 304	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLIV.—*Bright girls, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	5	6	11	37	3	1,495.12	43.97	2	835.62	23.87	1	1,544.25	42.90	0	747.27	20.20
6	7	7	6	171	3	7,648.80	45.53	5	4,115.44	24.79	0	7,899.25	46.19	2	3,380.27	20.00
7	7	8	6	291	4	13,641.12	47.53	5	7,275.52	25.44	4	14,124.50	49.21	3	5,816.70	20.20
8	7	9	6	307	2	15,003.76	49.19	5	7,887.89	26.12	1	16,262.75	53.15	4	6,167.70	20.36
9	7	10	6	320	3	16,252.96	51.27	5	8,491.75	26.96	2	18,624.62	58.57	3	6,499.63	20.50
10	7	11	6	308	1	16,318.79	53.16	2	8,504.05	27.79	0	19,770.12	64.19	3	6,285.04	20.61
11	7	12	6	253	1	14,084.52	55.89	3	7,260.26	29.04	1	18,299.25	72.62	1	5,266.27	20.90
12	7	13	6	262	2	15,087.01	58.03	4	7,797.14	30.22	0	21,431.00	81.80	2	5,474.42	21.06
13	7	14	6	230	3	13,701.47	60.36	13	6,824.06	31.45	0	21,216.86	92.25	5	4,789.12	21.28
14	7	15	6	157	0	9,669.29	61.59	6	4,852.51	32.14	0	15,716.50	100.11	2	3,307.03	21.34
15	7	16	6	109	2	6,708.95	62.70	6	3,390.85	32.92	0	11,689.75	107.25	1	2,319.31	21.48
16	7	17	6	89	0	5,632.25	63.28	5	2,768.62	32.96	1	9,637.00	109.51	2	1,881.40	21.63
17	7	18	6	30	0	1,896.98	63.23	0	1,002.11	33.40	0	3,347.25	111.58	0	652.85	21.76
18	7	19	10	14	0	877.50	62.68	0	466.11	33.29	0	1,559.00	111.36	0	302.74	21.62
				2,578	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLV.—*Dull girls, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	4	6	6	29	1	1,234.62	44.09	0	700.50	24.16	0	1,225.75	42.27	1	549.10	19.61
6	7	7	6	28	0	1,248.98	44.61	0	681.87	24.35	0	1,273.75	45.49	0	552.86	19.75
7	7	8	6	46	0	2,179.97	47.39	1	1,159.85	25.77	1	2,265.25	50.34	0	913.89	19.87
8	7	9	6	38	0	1,857.11	48.87	1	967.97	26.16	1	1,980.00	53.51	0	769.14	20.24
9	7	10	6	45	1	2,274.98	51.70	0	1,228.12	27.29	0	2,727.25	60.61	1	892.77	20.29
10	7	11	6	61	1	3,175.14	52.92	2	1,654.12	28.04	0	3,851.75	63.14	2	1,202.34	20.38
11	7	12	6	57	1	3,148.09	56.22	0	1,669.11	29.28	0	4,271.00	74.93	1	1,147.76	20.50
12	7	13	6	72	0	4,146.10	57.58	3	2,075.69	30.08	1	5,745.37	80.92	1	1,478.85	20.83
13	7	14	6	64	1	3,744.22	59.43	0	2,001.07	31.27	0	5,687.50	88.87	1	1,315.44	20.88
14	7	15	6	72	1	4,382.20	61.72	3	2,227.71	32.29	0	7,342.50	101.98	0	1,532.60	21.29
15	7	16	6	30	0	1,856.50	61.88	0	975.62	32.52	0	3,105.87	103.53	0	640.73	21.36
16	7	17	6	41	2	2,419.21	62.03	1	1,306.78	32.67	0	4,524.25	110.35	0	876.35	21.37
17	7	18	6	18	0	1,119.87	62.22	0	592.11	32.90	1	1,821.25	107.13	0	387.68	21.54
18	9	19	9	6	0	381.00	63.50	0	201.00	33.50	0	639.49	106.58	0	128.87	21.48
				607	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLVI.—*Average girls, American parents.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	6	6	6	35	1	1,522.24	44.77	0	858.28	24.52	1	1,515.75	44.58	0	703.53	20.10
6	5	7	6	176	0	7,876.30	44.75	3	4,262.78	24.64	0	7,978.50	45.33	1	3,484.08	19.91
7	7	8	6	250	3	11,685.49	47.30	2	6,323.00	25.50	2	12,223.62	49.29	4	4,945.68	20.10
8	7	9	6	324	0	15,959.03	49.26	1	8,482.96	26.26	6	17,100.37	53.77	3	6,497.22	20.24
9	7	10	6	372	1	18,966.77	51.12	5	9,909.20	27.00	2	21,552.37	58.25	2	7,558.59	20.43
10	7	11	6	352	7	18,349.21	53.19	4	9,670.76	27.79	1	22,445.87	63.95	5	7,123.72	20.53
11	7	12	6	363	5	19,936.35	55.69	11	10,222.99	29.04	7	25,861.75	72.65	4	7,443.09	20.73
12	7	13	6	372	7	21,224.87	58.15	10	10,941.83	30.23	4	30,598.35	83.15	3	7,726.76	20.94
13	7	14	6	333	7	19,671.19	60.34	15	9,998.94	31.44	0	31,380.00	94.23	3	6,986.78	21.17
14	7	15	6	261	0	16,092.26	61.66	8	8,165.72	32.28	0	26,280.00	100.69	4	5,465.89	21.27
15	7	16	6	186	2	11,504.05	62.52	7	5,888.41	32.90	3	19,259.65	105.24	6	3,839.42	21.33
16	7	17	6	128	0	8,067.57	63.03	2	4,176.85	33.15	0	14,069.12	109.92	2	2,717.09	21.56
17	7	18	6	80	1	4,987.47	63.13	1	2,617.21	33.13	0	8,918.50	111.48	1	1,703.81	21.57
18	7	19	6	35	0	2,226.75	63.62	0	1,170.61	33.45	0	3,940.75	112.59	0	760.00	21.71
19	7	20	8	9	0	555.62	61.74	0	295.62	32.85	0	970.00	107.78	0	195.99	21.78
				3,276	..	....	......	..	....	......	..	....	......	..	....	......

TABLE XLVII.—*Bright girls of the nonlaboring classes, American parents.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	7	7	6	86	....	622	1	7	2	1	3,875.58	45.59	3	2,051.60	24.72
7	7	8	6	153	....	1,233	9	8	0	2	7,250.67	48.02	1	3,897.08	25.64
8	7	9	6	164	....	1,506	5	9	1	1	8,039.06	49.31	2	4,251.19	26.24
9	7	10	6	189	....	1,913	6	10	0	3	9,594.99	51.59	1	5,070.31	26.97
10	7	11	6	163	....	1,790	2	10	9	0	8,744.20	53.65	1	4,522.45	27.92
11	7	12	6	170	....	2,055	4	12	0	1	9,448.30	55.91	1	4,900.30	29.00
12	7	13	6	168	....	2,209	0	13	0	1	9,752.55	58.40	1	5,068.93	30.35
13	7	14	6	131	....	1,843	5	14	0	0	7,917.81	60.44	4	3,997.71	31.48
14	7	15	6	107	....	1,609	5	15	0	0	6,587.81	61.57	4	3,309.31	32.13
15	7	16	6	79	....	1,262	8	15	9	1	4,906.96	62.91	3	2,506.98	32.99
16	7	17	6	26	....	445	3	17	1	0	1,653.62	63.60	3	761.62	33.11
				1,436	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	7	7	6	1	3,820.73	44.95	0	3,947.00	45.90	1	1,703.68	20.04
7	7	8	6	6	6,929.66	47.14	2	7,535.00	49.90	1	3,081.95	20.28
8	7	9	6	4	7,768.56	48.55	0	8,749.50	53.35	2	3,303.92	20.39
9	7	10	6	2	9,538.02	51.01	1	11,003.62	58.53	1	3,868.34	21.58
10	7	11	6	3	8,510.72	53.19	0	10,642.25	65.29	1	3,354.74	20.71
11	7	12	6	3	9,277.59	55.55	1	12,155.25	71.92	1	3,541.44	20.96
12	7	13	6	3	9,595.58	58.16	0	13,970.75	83.16	1	3,522.15	21.09
13	7	14	6	2	7,796.22	60.44	0	12,159.11	92.82	3	2,723.18	21.27
14	7	15	6	3	6,368.47	61.24	0	10,657.25	99.60	2	2,237.18	21.31
15	7	16	6	1	4,880.24	62.57	0	8,419.00	106.57	0	1,695.04	21.46
16	7	17	6	0	1,634.50	62.87	0	2,840.50	109.25	0	566.99	21.81

TABLE XLVIII.—*Average girls of the nonlaboring classes, American parentage.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 5	7 6	76	....	542 1	7 1	0	3,448.60	45.38	2	1,829.72	24.73
7 7	8 6	106	....	859 3	8 1	1	4,980.73	47.44	1	2,676.45	25.49
8 7	9 6	136	....	1,241 6	9 1	0	6,722.06	49.43	0	3,592.07	26.41
9 7	10 6	162	....	1,640	10 1	0	8,342.36	51.50	3	4,309.96	27.11
10 7	11 6	147	....	1,629 6	11 1	3	7,697.49	53.45	3	4,003.20	27.80
11 7	12 6	165	....	2,006 8	12 2	1	9,222.59	56.24	1	4,799.67	29.27
12 7	13 6	174	....	2,285 1	13 1	2	10,060.80	58.49	6	5,104.54	30.38
13 7	14 6	173	....	2,444	14 1	3	10,361.99	60.95	5	5,321.03	31.67
14 7	15 6	147	....	2,224	15 1	0	9,081.31	61.78	3	4,656.89	32.34
15 7	16 6	116	....	1,864 9	16 1	1	7,198.78	62.60	5	3,654.58	32.92
16 7	17 6	102	....	1,741 5	17 1	0	6,432.83	63.07	1	3,345.48	33.12
17 7	18 6	63	....	1,143	18 1	0	3,974.73	63.09	1	2,053.34	33.12
		1,567	....	....	....	....	....	....	....	....	....

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 5	7 6	1	3,348.22	44.64	0	3,431.00	45.14	0	1,517.76	19.97
7 7	8 6	3	4,814.47	46.74	2	5,124.75	49.28	3	2,074.16	20.14
8 7	9 6	2	6,518.60	48.64	1	7,371.12	54.60	2	2,725.50	20.34
9 7	10 6	0	8,273.33	51.07	0	9,602.75	59.28	1	3,295.51	20.47
10 7	11 6	2	7,627.46	52.60	1	9,430.00	64.59	3	2,955.82	20.53
11 7	12 6	3	9,038.63	55.79	2	12,094.00	74.20	0	3,436.46	20.83
12 7	13 6	3	9,984.70	58.39	2	14,664.34	85.26	2	3,615.74	21.02
13 7	14 6	2	10,389.96	60.76	0	16,830.00	97.28	1	3,658.54	21.27
14 7	15 6	3	8,870.04	61.60	0	14,877.75	101.21	3	3,070.67	21.32
15 7	16 6	3	7,021.84	62.14	2	11,938.65	104.73	3	2,416.95	21.39
16 7	17 6	0	6,367.45	62.43	0	11,072.87	108.56	2	2,159.47	21.59
17 7	18 6	1	3,894.62	62.82	0	7,009.50	111.26	1	1,339.31	21.60

TABLE XLIX.—*Bright girls, laboring classes, American parents.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 7	7 6	85	....	607 3	7 1	2	3,773.72	45.47	2	2,063.84	24.87
7 7	8 6	138	....	1,125 5	8 1	2	6,390.45	46.99	4	3,378.44	25.21
8 7	9 6	143	....	1,307 5	9 1	1	6,966.70	49.06	3	3,636.70	25.98
9 7	10 6	131	....	1,326 1	10 1	0	6,657.97	50.82	4	3,421.44	26.94
10 7	11 6	145	....	1,579 4	10 8	1	7,574.59	52.60	1	3,981.60	27.65
11 7	12 6	83	....	1,009 8	12 1	0	4,636.22	55.86	2	2,359.96	29.14
12 7	13 6	94	....	1,231 9	13 1	1	5,334.46	57.36	3	2,728.21	29.98
13 7	14 6	99	....	1,398 5	14 1	3	5,783.66	60.25	9	2,826.35	31.40
14 7	15 6	50	....	759 1	15 1	0	3,081.48	61.63	2	1,543.20	32.15
15 7	16 6	30	....	482 5	16 0	1	1,801.99	62.14	3	883.87	32.74
16 8	17 6	10	....	171 5	17 1	0	636.75	63.68	0	326.12	32.61
		1,008	....	....	....	...	....	....	....	....	....

TABLE XLIX.—*Bright girls, laboring classes, American parents*—Continued.

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	7	7	6	1	3,767.62	44.85	0	3,952.25	46.50	1	1,676.59	19.96
7	7	8	6	6	6,090.84	46.14	2	6,589.50	48.45	2	2,734.75	20.11
8	7	9	6	0	6,927.22	48.44	1	7,513.25	52.91	2	2,863.78	20.31
9	7	10	6	3	6,416.72	50.13	1	7,621.00	58.62	2	2,631.29	20.40
10	7	11	6	3	7,398.12	52.10	0	9,127.87	62.95	2	2,930.30	20.49
11	7	12	6	1	4,546.85	55.45	0	6,144.00	74.02	0	1,724.83	20.78
12	7	13	6	3	5,200.26	57.15	0	7,460.25	79.36	1	1,952.27	20.99
13	7	14	6	3	5,778.20	60.19	0	9,057.75	91.49	2	2,065.94	21.30
14	7	15	6	0	3,081.25	61.63	0	5,059.25	101.19	0	1,069.85	21.40
15	7	16	6	1	1,798.00	62.00	0	3,270.75	109.03	1	624.27	21.53
16	8	17	6	0	633.75	63.38	0	1,129.25	112.93	1	196.75	21.86

TABLE L.—*Dull girls, laboring classes, American parents.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	7	7	5	28	....	198	8	7	1	0	1,248.98	44.61	0	681.87	24.35
7	7	8	6	46	....	375	3	8	1	0	2,179.97	47.39	1	1,159.85	25.77
8	7	9	6	38	....	344	7	9		0	1,857.11	48.87	1	967.97	26.16
9	7	10	6	45	....	457	2	10	1	1	2,274.98	51.70	0	1,228.12	27.29
10	7	11	6	61	....	680	2	11	1	1	3,175.14	52.92	2	1,654.12	28.04
11	7	12	6	57	....	694	1	12	1	1	3,148.09	56.22	0	1,669.11	29.28
12	7	13	6	72	....	940	6	13		0	4,146.10	57.58	3	2,075.69	30.08
13	7	14	6	64	....	904	9	14	1	1	3,744.22	59.43	0	2,001.07	31.27
14	7	15	6	72	....	1,089	5	15	1	1	4,382.20	61.72	3	2,227.71	32.29
15	7	16	6	30	....	485		16	1	0	1,856.50	61.88	0	975.62	32.52
				513	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	7	7	5	1	1,197.62	44.36	0	1,273.75	45.49	0	552.86	19.75
7	7	8	6	3	1,984.32	46.15	1	2,265.25	50.34	0	913.89	19.87
8	7	9	6	0	1,836.40	48.33	1	1,980.00	53.51	0	769.14	20.24
9	7	10	6	1	2,263.80	51.45	0	2,727.25	60.61	1	892.77	20.29
10	7	11	6	1	3,139.97	52.33	0	3,851.75	63.14	2	1,202.34	20.38
11	7	12	6	0	3,173.60	55.68	0	4,271.00	74.93	1	1,147.76	20.50
12	7	13	6	1	4,069.10	57.31	1	5,745.37	80.92	1	1,478.85	20.83
13	7	14	6	1	3,713.22	58.94	0	5,687.50	88.87	1	1,315.44	20.88
14	7	15	6	2	4,292.11	61.32	0	7,342.50	101.98	0	1,532.60	21.29
15	7	16	6	2	1,708.99	61.04	0	3,105.87	103.53	0	640.73	21.36

TABLE LI.—*Average girls, American parentage, laboring classes.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Arm reach.			Weight.			Circumference of head.		
From	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Y. M.	*Y. M.*			*Inches.*	*In.*		*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6 7	7 6	100	0	4,427.70	44.28	1	2,433.06	24.58	3	4,292.21	44.25	0	4,547.50	45.48	1	1,966.32	19.86
7 7	8 6	144	2	6,704.76	47.22	1	3,646.55	25.50	0	6,707.72	46.58	0	7,098.87	49.30	1	2,871.52	20.08
8 7	9 6	188	0	9,236.97	49.13	1	4,890.89	26.15	2	9,021.19	48.50	5	9,729.25	53.17	1	3,771.72	20.17
9 7	10 6	210	1	10,624.41	50.83	2	5,599.24	26.92	1	10,514.19	50.31	2	11,949.62	57.45	1	4,263.08	20.40
10 7	11 6	205	4	10,651.72	53.26	1	5,667.56	27.78	8	10,305.35	52.31	0	13,015.87	63.49	2	4,167.90	20.53
11 7	12 6	198	4	10,713.76	55.23	10	5,423.32	28.85	6	10,521.08	54.80	5	13,767.75	71.34	4	4,006.63	20.65
12 7	13 6	198	5	11,164.07	57.84	4	5,837.29	30.09	4	11,187.06	57.67	2	15,934.01	81.30	1	4,111.02	20.87
13 7	14 6	160	4	9,309.20	59.67	10	4,677.91	31.19	5	9,193.85	59.32	0	14,550.00	90.94	2	3,328.24	21.06
14 7	15 6	114	0	7,010.95	61.50	5	3,508.83	32.19	1	6,918.61	61.23	0	11,402.25	100.02	1	2,395.22	21.20
15 7	16 6	70	1	4,305.27	62.40	2	2,233.83	32.85	0	4,346.11	62.09	1	7,321.00	106.10	3	1,422.47	21.23
16 7	17 6	26	0	1,634.74	62.87	1	831.37	33.25	0	1,629.37	62.67	0	2,996.25	115.24	0	557.62	21.45
17 7	18 6	17	1	1,012.74	63.30	0	563.87	33.17	1	1,005.25	62.83	0	1,909.00	112.29	0	364.50	21.44
		1,630	..	....	.....	..	....	.....	.	....	.....	..	....	.....	..	....	.....

TABLE LII.—*Dull girls, American parentage, not socially divided.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Arm reach.			Weight.			Circumference of head.		
From	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Y. M.	*Y. M.*			*Inches.*	*In.*		*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5 4	6 6	29	1	1,234.62	44.09	0	700.50	24.16	3	1,118.87	43.03	0	1,225 75	42.27	1	549.10	19.61
16 7	17 6	41	2	2,419.21	62.03	1	1,306.78	32.67	1	2,466.75	61.67	0	4,524.25	110.35	0	876.35	21.37
17 7	18 6	18	0	1,119.87	62.22	0	592.11	32.90	1	1,051.00	61.82	1	1,821.25	107.13	0	387.68	21.54
18 9	19 9	6	0	381.00	63.50	0	201.00	33.50	0	372.99	62.17	0	639.49	106.58	0	128.87	21.48
		94	..	....	.....	..	....	.....	..	....	.....	..	....	.....	..	....	.....

TABLE LIII.—*Bright girls, American parents, not socially divided.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Arm reach.			Weight.			Circumference of head.		
From	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Y. M.	*Y. M.*			*Inches.*	*In.*		*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5 5	6 11	37	3	1,495.12	43.97	2	835.62	23.87	0	1,581.87	42.75	1	1,544.25	42.90	0	747.27	20.20
16 7	16 11	24	0	1,490.65	62.11	0	779.02	32.46	0	1,477.74	61.57	1	2,425.00	105.43	1	493.42	21.45
17 0	17 6	29	0	1,851.23	63.84	2	901.86	33.40	1	1,771.75	63.28	0	3,242.25	111.80	0	624.24	21.53
17 7	18 6	30	0	1,896.98	63.23	0	1,002.11	33.40	1	1,813.00	62.52	0	3,347.25	111.58	0	652.85	21.76
18 7	19 10	14	0	877.50	62.68	0	466.11	33.29	1	811.75	62.44	0	1,559.00	111.36	0	302.74	21.62
		134	..	....	.....	..	....	.....	..	....	.....	..	....	.....	..	....	.....

TABLE LIV.—*Average girls, American parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	6	6	6	35	1	1,522.24	44.77	0	858.28	24.52	1	1,515.75	44.58	0	703.53	20.10
18	7	19	4	35	0	2,226.75	63.62	0	1,170.61	33.45	0	3,940.75	112.59	0	760.00	21.71
19	7	20	0	7	0	436.00	62.29	0	231.62	33.09	0	772.25	110.32	0	151.99	21.71
20	8	....		2	0	119.62	59.81	0	64.00	32.00	0	197.75	98.88	0	44.00	22.00
				79	..	....	......	..	....	......	..	....	......	..	....	......

TABLE LV.—*Bright girls, foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	7	7	6	29	....	208	8	7	2	0	1,318.24	45.46	0	716.23	24.70
7	7	8	6	35	....	285	7	8	1	1	1,604.99	47.21	0	891.23	25.46
8	7	9	6	43	....	392	6	9	1	1	2,041.00	48.60	1	1,089.49	25.94
9	7	10	6	41	....	418	1	10	1	0	2,089.11	50.95	0	1,096.29	26.74
10	7	11	6	40	....	444	4	11	1	1	2,053.98	52.67	2	1,058.74	27.86
11	7	12	6	42	....	512	7	12	2	1	2,268.73	55.33	1	1,184.99	28.90
12	7	13	5	29	....	379	5	13	0	0	1,662.48	57.33	2	805.93	29.85
13	7	14	6	25	....	354	9	14	1	0	1,543.24	61.73	0	801.11	32.04
14	7	15	6	22	....	336	7	15	3	0	1,361.46	61.88	0	710.24	32.28
15	7	16	5	16	....	256	9	16	0	0	998.75	62.42	0	530.50	33.16
16	7	16	9	3	....	50	4	16	8	0	187.12	62.37	0	96.75	32.25
17	7	17	11	6	....	107	2	17	8	0	379.75	63.29	1	166.25	33.25
18	1	18	5	2	....	....		....		0	125.50	62.75	0	67.62	33.81
18	9	23	6	2	....	....		....		0	123.12	61.56	0	65.12	32.56
				335	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	7	7	6	2	1,199.61	44.43	0	1,318.50	45.47	0	582.85	20.10
7	7	8	6	0	1,631.62	46.62	0	1,723.25	49.24	0	705.10	20.15
8	6	9	6	0	2,070.86	48.16	1	2,153.00	51.26	0	865.73	20.13
9	7	10	6	0	2,071.67	50.53	0	2,406.95	58.71	2	797.55	20.45
10	7	11	6	0	2,087.36	52.18	0	2,520.75	63.02	0	819.60	20.49
11	7	12	6	1	2,272.99	55.44	0	3,119.00	74.26	0	878.61	20.92
12	7	13	5	1	1,598.94	57.11	2	2,110.20	78.16	0	605.78	20.89
13	7	14	6	1	1,468.22	61.18	0	2,371.75	94.87	1	511.15	21.30
14	7	15	6	2	1,230.62	61.53	0	2,233.52	101.52	0	471.99	21.45
15	7	16	5	0	996.49	62.28	0	1,668.75	104.30	0	345.37	21.59
16	7	16	9	0	189.00	63.00	0	318.25	106.08	0	65.49	21.83
17	7	17	11	0	377.75	62.96	0	627.50	104.58	0	127.50	21.25
18	1	18	5	1	60.00	60.00	0	242.75	121.38	0	43.25	21.63
18	9	23	6	0	123.50	61.75	0	212.50	106.25	0	42.50	21.25

TABLE LVI.—*Dull girls, foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	8	6	6	8	....	50	0	6	2	2	253.75	42.29	1	164.00	23.43
6	8	7	5	5	....	35	3	7	0	0	219.87	43.97	0	120.62	24.12
7	10	8	5	15	....	122	9	8	1	0	713.11	47.54	0	383.61	25.57
8	9	9	6	16	....	147	0	9	1	0	789.25	49.33	0	425.99	26.62
9	7	10	5	10	....	101	5	10	1	1	464.50	51.61	0	274.37	27.44
10	7	11	5	16	....	177	7	11	1	1	798.74	53.25	0	455.24	28.45
11	7	12	5	12	....	145	4	12	1	0	665.00	55.42	1	325.12	29.56
12	7	13	6	22	....	286	6	13	0	1	1,210.62	57.65	1	631.37	30.07
13	7	14	6	16	....	225	1	14	0	0	961.12	60.07	0	505.74	31.61
14	8	15	6	19	....	287	8	15	1	0	1,185.24	62.38	0	621.11	32.69
15	7	16	6	15	....	242	4	16	1	0	914.75	60.98	0	484.74	32.32
16	11	17	5	8	....	137	3	17	1	0	508.50	63.56	0	271.37	33.92
18	4	20	7	2	....	39	0	....		0	128.00	64.00	0	61.25	30.63
				164	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	8	6	6	3	206.00	41.20	1	284.00	40.57	1	136.62	19.52
6	8	7	5	0	215.50	43.10	0	209.00	41.80	0	99.00	19.80
7	10	8	5	0	712.24	47.48	0	766.25	51.08	0	299.34	19.96
8	9	9	6	1	729.75	48.65	0	867.00	54.19	0	324.92	20.31
9	7	10	5	0	511.75	51.18	0	597.75	59.78	0	201.36	20.14
10	7	11	5	0	852.75	53.30	0	1,091.25	68.20	0	324.22	20.26
11	7	12	5	0	658.87	54.91	0	907.75	75.65	0	246.24	20.52
12	7	13	6	0	1,258.00	57.18	0	1,792.25	81.47	0	454.86	20.68
13	7	14	6	0	961.00	60.06	1	1,393.50	92.90	0	335.74	20.98
14	8	15	6	0	1,181.87	62.20	0	1,929.00	101.53	0	403.23	21.22
15	7	16	6	0	912.25	60.82	0	1,509.75	100.65	0	316.80	21.12
16	11	17	5	0	503.00	62.88	0	869.25	108.66	0	174.25	21.78
18	4	20	7	0	124.50	62.25	0	230.00	115.00	0	43.25	21.63

TABLE LVII.—*Average girls, foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	0	6	6	7	....	44	3	6	3	0	310.37	44.34	0	167.50	23.93
6	8	7	6	30	....	180	4	7	2	0	1,370.23	45.67	0	747.37	24.91
7	7	8	6	39	....	269	9	8	1	0	1,843.71	47.27	1	966.73	25.44
8	7	9	6	55	....	358	1	9	1	2	2,618.37	49.40	2	1,395.78	26.34
9	7	10	6	54	....	476	7	10	1	0	2,747.10	50.87	0	1,440.54	26.68
10	7	11	6	45	....	667	1	11	1	0	2,393.62	53.19	1	1,221.49	27.76
11	7	12	6	57	....	546	3	12	1	2	3,065.11	55.73	3	1,571.24	29.10
12	7	13	6	61	....	1,075	6	13	1	0	3,485.60	57.14	1	1,785.08	29.75
13	7	14	6	69	....	636	0	14	1	1	4,069.96	59.85	3	2,074.86	31.44
14	7	15	6	32	....	700	3	15	2	0	1,975.86	61.75	1	999.99	32.26
15	7	16	5	40	....	435	1	16	1	0	2,484.61	62.12	1	1,274.86	32.69
16	7	17	6	20	....	291	1	17	1	0	1,263.11	63.16	0	661.12	33.06
17	7	18	6	20	....	163	8	18	2	0	1,270.24	63.51	0	661.49	33.07
18	8	19	10	9	....	125	8	19	1	0	552.75	61.42	0	292.55	32.51
				538	....	....		....		....	....	....	....	....	....

TABLE LVII.—*Average girls, foreign parentage, not socially divided*—Continued.

Limit of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	0	6	6	0	300.37	42.91	0	318.00	45.43	0	138.18	19.74
6	8	7	6	0	1,345.87	44.86	0	1,357.25	45.24	0	595.62	19.85
7	7	8	6	0	1,822.62	46.73	0	1,936.25	49.65	0	783.98	20.10
8	7	9	6	2	2,610.10	49.25	0	3,034.00	55.16	2	1,078.14	20.34
9	7	10	6	0	2,717.35	50.32	0	3,140.25	58.15	1	1,076.01	20.30
10	7	11	6	0	2,367.86	52.62	1	2,870.25	65.23	0	922.11	20.49
11	7	12	6	2	3,058.80	55.61	1	4,249.25	75.88	1	1,162.74	20.76
12	7	13	6	0	3,499.85	57.37	0	4,864.75	79.75	3	1,208.75	20.84
13	7	14	6	0	4,104.12	59.48	0	6,433.50	93.24	3	1,398.37	21.19
14	7	15	6	0	1,992.25	62.26	0	3,211.50	100.36	0	678.28	21.20
15	7	16	5	1	2,421.62	62.09	1	4,063.75	104.20	1	832.47	21.35
16	7	17	6	0	1,248.00	62.40	1	2,172.75	114.36	0	433.83	21.69
17	7	18	6	0	1,255.87	62.79	0	2,296.00	114.80	0	435.00	21.75
18	8	19	10	0	547.87	60.87	0	948.00	105.33	0	194.28	21.59

TABLE LVIII.—*Bright girls, American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6	0	6	6	5	....	32	1	6	4	1	174.37	43.59	0	124 00	24.80
6	7	7	6	36	....	257	9	7	1	0	1,637.98	45.50	1	868.21	24.81
7	7	8	6	38	....	309	4	8	1	0	1,814.12	47.74	0	946.24	25.57
8	7	9	6	53	....	480	8	9	0	1	2,582.98	49.67	1	1,375.98	26.46
9	7	10	6	43	....	435	3	10	1	0	2,200.24	51.17	0	1,160.74	26.99
10	7	11	5	40	....	444	1	11	1	0	2,132.87	53.32	0	1,114.74	27.87
11	7	12	6	33	....	399	2	12	0	0	1,852.85	56.15	1	939.49	29.36
12	7	13	6	47	....	617	9	13	1	2	2,586.23	57.47	2	1,346.75	29.93
15	7	14	6	30	....	423	6	14	1	0	1,805.74	60.19	0	936.37	31.21
14	7	15	6	25	....	375	9	15	0	0	1,519.23	60.77	0	792.23	31.69
15	7	16	6	17	....	274	0	16	1	0	1,056.49	62.15	1	515.12	32.20
16	7	17	1	6	....	101	6	16	9	0	370.87	61.81	0	196.50	32.75
17	7	18	5	7	....	126	0	18	0	0	457.75	65.39	0	239.50	34.21
18	7	18	9	2	....	......	......	....	....	0	134.50	67.25	0	69.37	34.69
19		......	......	1	....	......	......	....	....	0	65.00	....	0	33.50	....
				383	....	......	......	....	....	....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6	6	6	6	0	212.87	42.57	0	209.00	41.80	0	106.37	21.27
6	7	7	6	0	1,613.87	44.83	0	1,630.75	45.30	0	722.08	20.06
7	7	8	6	0	1,714.37	46.33	1	1,847.25	49.93	0	770.97	20.29
8	7	9	6	1	2,529.35	48.64	0	2,892.50	54.58	0	1,076.67	20.31
9	7	10	6	1	2,150.14	51.19	0	2,550.75	59.32	0	881.39	20.50
10	7	11	5	0	2,113.23	52.83	0	2,613.25	65.33	1	803.34	20.60
11	7	12	6	0	1,831.62	55.50	0	2,464.25	74.67	0	691.26	20.95
12	7	13	6	1	2,621.99	57.00	1	3,747.75	81.47	1	964.73	20.97
13	7	14	6	1	1,747.50	60.26	0	2,900.00	96.67	1	617.23	21.28
14	7	15	6	0	1,520.48	60.82	0	2,345.00	93.80	1	509.61	21.23
15	7	16	6	0	1,065.00	62.65	0	1,771.25	104.19	0	366.58	21.56
16	7	17	1	0	365.75	60.96	0	643.50	107.25	0	128.25	21.38
17	7	18	5	0	452.00	64.57	0	802.00	114.57	0	152.87	21.84
18	7	18	9	0	134.50	67.25	0	222.50	111.25	0	45.25	22.63
19		......	......	0	65.00	....	0	107.00	....	0	22.00	....

TABLE LIX.—*Dull girls, American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	11	6	5	3	....	19	1	....		0	130.50	43.50	0	73.00	24.33
6	7	7	2	8	....	55	4	6	9	1	311.00	44.43	0	194.00	24.25
7	8	8	6	7	....	56	0	8	0	1	285.24	47.54	1	154.75	25.79
8	8	9	6	8	....	73	4	9	1	0	399.58	49.95	0	211.37	26.42
9	7	10	5	7	....	70	3	10	0	0	354.50	50.64	0	188.00	26.86
10	7	11	6	9	....	100	2	11	1	0	476.87	52.99	0	250.99	27.89
11	7	12	6	13	....	158	1	12	1	0	706.86	54.37	1	341.36	28.45
12	7	13	6	19	....	249	8	13	1	1	1,033.10	57.39	1	526.37	29.24
13	7	14	6	21	....	297	1	14	1	0	1,245.24	59.30	1	621.24	31.06
14	7	15	6	21	....	318	5	15	1	1	1,235.62	61.78	0	694.12	33.05
15	7	16	5	10	....	159	2	15	9	0	619.75	61.98	1	289.12	32.12
16	8	17	5	11	....	187	7	17	0	0	686.75	62.43	0	362.12	32.92
17	10	18	5	7	....	127	3	18	1	0	447.37	63.91	0	235.87	33.70
18	11	19	9	2	....	38	0	....		0	128.75	64.38	0	67.75	33.88
				146	....	....		....		....	....	....	....	....	....

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	11	6	5	0	136.37	45.46	0	135.25	45.08	0	59.50	19.83
6	7	7	2	1	312.00	44.57	1	301.00	43.00	0	156.61	19.58
7	8	8	6	2	235.50	47.10	0	350.30	50.04	1	121.12	20.19
8	8	9	6	1	345.75	49.39	0	481.50	60.19	0	164.62	20.58
9	7	10	5	0	347.12	49.59	0	387.50	55.36	0	140.12	20.02
10	7	11	6	1	422.50	52.81	0	582.25	64.69	1	163.30	20.41
11	7	12	6	1	638.87	53.24	1	813.50	67.79	0	264.48	20.34
12	7	13	6	0	1,089.74	57.35	0	1,458.50	76.76	0	392.00	20.63
13	7	14	6	0	1,244.37	59.26	0	1,879.75	89.51	0	442.11	21.05
14	7	15	6	0	1,283.25	61.11	0	2,159.50	102.83	1	425.80	21.29
15	7	16	5	0	614.87	61.49	1	900.75	100.08	0	210.49	21.05
16	8	17	5	0	685.75	62.34	0	1,182.50	107.50	0	233.12	21.19
17	10	18	5	0	443.75	63.39	0	787.50	112.50	0	150.74	21.53
18	11	19	9	0	128.00	64.00	0	216.00	108.00	0	43.00	21.50

TABLE LX.—*Average girls, American and foreign parentage, not socially divided.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	9	6	6	7	....	44	7	6	3	0	310.74	44.39	0	167.62	23.95
6	10	7	6	25	....	227	0	7	5	0	1,135.49	45.42	0	623.35	24.93
7	8	8	6	33	....	320	9	8	2	0	1,572.10	47.64	0	842.99	25.55
8	7	9	6	39	....	502	2	9	1	0	1,936.36	49.65	0	1,034.37	26.52
9	7	10	6	47	....	548	3	10	1	0	2,416.11	51.41	0	1,271.85	27.06
10	7	11	6	60	....	499	0	11	0	1	3,133.47	53.11	0	1,668.48	27.81
11	7	12	6	45	....	693	0	12	1	0	2,512.86	55.84	0	1,293.36	28.74
12	7	13	6	82	....	800	7	13	1	1	4,697.33	57.99	0	2,469.34	30.11
13	7	14	6	45	....	975	0	14	1	0	2,713.85	60.31	0	1,417.89	31.51
14	7	15	6	46	....	485	3	15	1	0	2,836.09	61.65	1	1,451.98	32.27
15	7	16	6	27	....	642	4	16	0	0	1,684.71	62.40	1	859.12	33.04
16	7	17	6	17	....	341	5	17	0	0	1,086.00	63.88	1	533.50	33.34
17	9	18	6	9	....	362	0	18	1	0	563.75	62.64	0	289.00	32.11
18	6	19	5	8	....	171	7	19	0	0	508.00	63.50	0	267.49	33.44
				490	....	....		....		....	....	....	....	....	....

TABLE LX.—*Average girls, American and foreign parentage, not socially divided*—Cont'd.

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	9	6	6	0	303.37	43.34	0	298.25	42.61	0	139.87	19.98
6	10	7	6	1	1,075.61	44.82	0	1,119.25	44.77	0	493.86	19.75
7	8	8	6	0	1,533.87	46.48	0	1,648.00	49.94	0	665.39	20.16
8	7	9	6	0	1,921.37	49.27	0	2,135.00	54.74	0	788.59	20.22
9	7	10	6	0	2,378.04	50.60	0	2,757.25	58.66	0	956.84	20.36
10	7	11	6	1	3,112.81	52.76	0	3,885.75	64.76	0	1,234.25	20.57
11	7	12	6	1	2,463.66	55.99	0	3,308.75	73.53	0	933.27	20.74
12	7	13	6	1	4,679.74	57.77	0	6,659.50	81.21	1	1,698.60	20.71
13	7	14	6	0	2,684.46	59.65	0	4,126.00	91.69	0	953.20	21.18
14	7	15	6	1	2,755.74	61.24	1	4,433.75	98.53	0	976.27	21.22
15	7	16	6	1	1,609.50	61.90	1	2,733.25	105.13	0	576.86	21.37
16	7	17	6	0	1,081.75	63.63	0	1,897.00	111.59	1	343.92	21.50
17	9	18	6	0	564.00	62.67	0	1,048.50	116.50	2	148.75	21.25
18	6	19	5	0	504.00	63.00	1	810.00	115.71	1	153.50	21.93

TABLE LXI.—*All colored boys.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*Ins.*		*Inches.*	*Ins.*		*Pounds.*	*Lbs.*		*Inches.*	*Ins.*
5	0	6	6	73	0	3,224.50	44.17	1	1,731.00	24.04	4	2,997.50	43.44	2	1,436.99	20.24
6	7	7	6	246	0	11,335.66	46.08	6	5,934.25	24.73	20	11,321.75	50.10	6	4,867.23	20.28
7	7	8	6	288	8	13,367.37	47.74	11	7,018.12	25.34	12	14,902.00	53.99	9	5,722.36	20.51
8	7	9	6	303	9	14,483.66	49.26	15	7,528.26	26.14	16	16,943.25	59.04	23	5,787.73	20.67
9	7	10	6	335	2	17,028.12	51.14	7	8,695.63	26.51	7	21,375.36	65.17	10	6,764.60	20.81
10	7	11	6	271	3	13,962.25	52.10	4	7,182.12	26.90	1	18,748.50	69.44	4	5,592.62	20.95
11	7	12	6	286	3	15,265.75	53.94	6	7,838.12	27.90	8	21,218.75	75.97	8	5,803.23	20.87
12	7	13	6	321	3	17,834.75	56.08	2	9,078.61	28.46	4	26,470.00	83.50	8	6,595.11	21.07
13	7	14	6	282	2	16,233.25	57.98	5	8,133.70	29.36	7	24,996.50	90.90	2	5,967.42	21.31
14	7	15	6	220	2	13,098.62	60.09	9	6,408.75	30.37	5	21,374.75	99.42	3	4,645.84	21.41
15	7	16	6	124	0	7,828.53	63.13	4	3,750.12	31.25	3	13,728.00	113.45	0	2,659.69	21.45
16	7	18	6	131	3	8,367.73	65.37	11	3,938.87	32.82	2	16,179.75	125.42	0	2,875.71	21.95
18	7	22	11	19	0	1,257.12	66.16	7	353.00	29.42	1	2,371.50	131.75	0	421.00	22.16
				2,899	..	....	......	..	....	......	..	....	......	..	....	......

TABLE LXII.—*Colored boys, bright.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5 1	6 6	27	....	168 7	6 2	0	1,190.25	44.08	0	645.00	23.89
6 7	7 6	92	....	663 0	7 2	0	4,276.50	46.48	1	2,247.75	24.70
7 7	8 6	127	....	1,036 6	8 1	5	5,866.75	48.09	3	3,135.50	25.29
8 7	9 6	128	....	1,171 8	9 1	3	6,197.66	49.58	4	3,231.01	26.06
9 7	10 6	159	....	1,618 3	10 1	0	8,082.00	50.83	1	4,148.39	26.26
10 7	11 6	136	....	1,513 4	11 1	2	6,976.25	52.06	3	3,565.12	26.81
11 7	12 6	144	....	1,744 8	12 0	1	7,692.50	53.79	3	3,912.62	27.75
12 7	13 6	145	....	1,913 6	13 1	1	8,115.00	56.35	0	4,115.62	28.38
13 7	14 6	116	....	1,638 5	14 1	1	6,649.75	57.82	1	3,370.08	29.31
14 7	15 6	90	....	1,364 1	15 1	1	5,390.00	60.56	5	2,567.25	30.20
15 7	16 5	42	....	674 2	16 0	0	2,642.50	62.92	1	1,282.50	31.28
16 7	17 6	26	....	442 9	17 0	1	1,588.74	63.55	1	797.87	31.91
17 7	18 6	18	....	326 2	18 1	0	1,214.25	67.46	2	532.50	33.28
18 7	19 4	4	....	76 0	19 0	0	269.62	67.41	1	105.50	35.17
19 8	19 11	3	....	59 9	19 9	0	191.25	63.75	0	98.75	32.92
		1,257	....	....	....	....	....	....	....	....	....

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5 1	6 6	1	1,156.25	44.47	3	1,022.00	42.58	1	528.99	20.35
6 7	7 6	0	4,329.99	47.07	11	4,044.00	49.93	5	1,769.37	20.34
7 7	8 6	4	5,982.48	48.64	8	6,584.50	55.33	6	2,500.62	20.67
8 7	9 6	4	6,246.08	50.37	5	7,397.75	60.14	10	2,452.25	20.78
9 7	10 6	1	8,218.43	52.02	4	10,124.62	65.32	4	3,236.11	20.88
10 7	11 6	3	7,092.12	53.32	0	9,432.00	70.39	3	2,779.75	20.90
11 7	12 6	3	7,757.62	55.02	5	10,586.75	76.16	4	2,917.74	20.84
12 7	13 6	0	8,386.50	57.84	0	12,168.50	83.92	5	2,958.37	21.13
13 7	14 6	4	6,677.00	59.62	1	10,507.00	91.37	1	2,453.57	21.34
14 7	15 6	5	5,331.25	62.72	2	8,846.00	100.52	3	1,859.61	21.37
15 7	16 5	1	2,687.75	65.55	1	4,599.50	112.18	0	902.12	21.48
16 7	17 6	2	1,581.00	65.88	1	2,996.25	119.85	0	573.24	22.05
17 7	18 6	0	1,254.00	69.67	0	2,423.00	134.61	0	400.99	22.28
18 7	19 4	0	271.25	67.81	1	409.59	136.50	0	89.00	22.25
19 8	19 11	0	195.50	65.17	0	374.00	124.67	0	64.50	21.50

TABLE LXIII.—*Colored boys, dull.*

Limits of different ages.		Total number of pupils	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5 2	6 6	22	....	134 0	6 0	0	954.50	43.39	0	525.75	23.90
6 7	7 6	72	....	514 1	7 1	0	3,294.50	45.76	0	1,783.50	24.77
7 7	8 6	40	....	326 7	8 1	0	1,907.25	47.68	0	1,028.87	25.72
8 7	9 6	51	....	463 5	9 0	1	2,415.75	48.32	2	1,278.25	26.09
9 7	10 6	46	....	467 3	10 1	1	2,342.62	52.06	2	1,184.37	26.92
10 7	11 6	51	....	569 3	11 1	0	2,634.50	51.66	0	1,373.75	26.94
11 9	12 6	52	....	657 9	12 6	0	2,820.00	54.23	0	1,452.00	27.92
12 7	13 6	44	....	580 3	13 1	0	2,451.25	55.71	0	1,269.50	28.85
13 7	14 6	41	....	581 2	14 1	1	2,302.75	57.57	2	1,143.50	29.32
14 7	15 6	28	....	424 0	15 1	0	1,683.25	60.12	0	858.00	30.64
15 7	16 6	16	....	257 7	16 1	0	1,028.50	64.28	0	500.75	31.30
16 7	18 1	21	....	362 1	17 2	0	1,371.75	65.32	0	672.75	32.04
18 11	22 11	2	....	....	....	0	134.75	67.38	2	....	....
		486	....	....	....	....	....	....	....	....	....

TABLE LXIII.—*Colored boys, dull*—Continued.

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	2	6	6	0	986.12	44.82	1	909.00	43.29	0	438.00	19.91
6	7	7	6	1	3,322.50	46.80	6	3,391.50	51.39	0	1,453.36	20.19
7	7	8	6	0	1,953.00	48.83	2	1,983.00	52.18	0	820.50	20.51
8	7	9	6	0	2,509.50	49.21	3	2,719.00	56.65	4	950.11	20.22
9	7	10	6	1	2,383.12	52.96	2	2,954.50	67.15	2	906.62	20.61
10	7	11	6	0	2,702.62	52.99	0	3,465.00	67.94	1	1,042.37	20.85
11	9	12	6	0	2,894.00	55.65	0	3,941.00	75.79	0	1,095.00	21.06
12	7	13	6	1	2,457.50	57.15	1	3,616.50	84.10	1	898.62	20.90
13	7	14	6	1	2,405.12	60.13	2	3,387.00	86.85	0	871.37	21.25
14	7	15	6	0	1,761.50	62.91	0	2,717.00	100.61	0	596.37	21.30
15	7	16	6	1	966.25	64.42	1	1,707.50	113.83	0	348.58	21.79
16	7	18	1	0	1,388.75	66.13	0	2,649.00	126.14	0	459.75	21.89
18	11	22	11	0	138.50	69.25	0	302.00	151.00	0	44.50	22.25

TABLE LXIV.—*Colored boys, average.*

Limits of different ages.				Total number of pupils.	Age.					Height.			Sitting height.		
From—		To—			Number omitted.	Total.		Average.		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Yrs.*	*Mos.*	*Y.*	*M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
5	0	6	6	24	....	148	9	6	2	0	1,079.75	44.99	1	560.25	24.36
6	7	7	6	82	....	587	5	7	1	0	3,764.66	45.91	5	1,903.00	24.71
7	7	8	6	121	....	......	......	....	....	3	5,593.37	47.40	8	2,853.75	25.25
8	7	9	6	124	....	1,131	4	9	1	5	5,870.25	49.33	9	3,019.00	26.25
9	7	10	6	130	....	1,308	5	10	0	1	6,603.50	51.19	4	3,362.87	26.69
10	7	11	6	84	....	934	0	11	1	1	4,351.50	52.43	1	2,243.25	27.03
11	7	12	6	90	....	1,092	4	12	1	2	4,753.25	54.01	3	2,473.50	28.43
12	7	13	6	132	....	1,738	6	13	1	2	7,268.50	55.91	2	3,693.49	28.41
13	7	14	6	125	....	1,766	8	14	1	0	7,280.75	58.25	2	3,620.12	29.43
14	7	15	6	102	....	1,541	7	15	1	1	6,025.37	59.66	4	2,983.50	30.44
15	7	16	6	66	....	1,063	7	16	1	0	4,157.53	62.99	3	1,966.87	31.22
16	7	17	6	41	....	702	8	17	1	1	2,591.74	64.79	3	1,253.50	32.99
17	7	18	5	25	....	451	2	18	0	1	1,601.25	66.72	5	682.25	34.11
18	7	19	5	5	....	95	0	19	0	0	332.00	66.40	3	68.00	34.00
19	7	20	6	5	....	100	3	20	0	0	329.50	65.90	3	80.75	40.38
				1,156	....	......	......	....	....	...	......	......	....	......	......

Limits of different ages.				Arm reach.			Weight.			Circumference of head.		
From—		To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5	0	6	6	1	1,048.00	45.57	0	1,066.50	44.44	1	470.00	20.43
6	7	7	6	2	3,664.62	45.81	3	3,886.25	49.19	1	1,644.50	20.30
7	7	8	6	2	5,753.91	48.35	2	6,334.50	53.23	3	2,401.24	20.35
8	7	9	6	6	5,975.62	50.64	8	6,826.50	58.85	9	2,385.37	20.74
9	7	10	6	8	6,377.74	52.28	1	8,296.24	64.31	4	2,621.87	20.81
10	7	11	6	1	4,452.25	53.64	1	5,851.50	70.50	0	1,770.50	21.08
11	7	12	6	4	4,837.25	56.25	3	6,691.00	76.91	4	1,790.49	20.82
12	7	13	6	4	7,366.75	57.55	3	10,685.00	82.83	2	2,738.12	21.06
13	7	14	6	7	7,138.00	60.49	4	11,102.50	91.76	1	2,642.48	21.31
14	7	15	6	7	5,918.00	62.29	3	9,811.75	99.11	0	2,189.86	21.47
15	7	16	6	8	3,831.45	66.06	1	7,421.00	114.17	0	1,408.99	21.35
16	7	17	6	1	2,685.00	67.13	0	4,986.00	121.61	0	898.24	21.91
17	7	18	5	2	1,587.37	69.02	1	3,125.50	130.23	0	543.49	21.74
18	7	19	5	1	275.00	68.75	0	645.00	129.00	0	111.00	22.20
19	7	20	6	0	336.25	67.25	0	641.00	128.20	0	112.00	22.40

TABLE LXV.—*All colored girls.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Lbs.*	*Lbs.*		*Inches.*	*In.*
5 10	6 6	113	5	4, 732. 00	43. 81	4	2, 585. 50	23. 72	8	4, 473. 75	42. 61	2	2, 211. 12	19. 92
6 7	7 6	248	8	11, 187. 25	46. 61	9	5, 903. 20	24. 70	14	11, 380. 25	48. 63	9	4, 900. 04	20. 50
7 7	8 6	218	2	10, 349. 25	47. 91	2	5, 446. 25	25. 21	7	11, 188. 25	53. 02	0	4, 471. 99	20. 51
8 7	9 6	209	3	10, 098. 62	49. 02	7	5, 199. 75	25. 74	8	11, 434. 50	56. 89	6	4, 206. 98	20. 72
9 7	10 6	250	1	12, 661. 25	50. 85	7	6, 451. 25	26. 55	12	14, 967. 50	62. 89	10	5, 001. 62	20. 84
10 7	11 6	266	8	13, 658. 62	52. 94	7	7, 084. 86	27. 35	8	17, 773. 00	68. 89	14	5, 260. 36	20. 87
11 7	12 6	279	12	14, 542. 00	54. 46	14	7, 397. 86	27. 92	11	20, 784. 25	77. 55	8	5, 678. 10	20. 95
12 7	13 6	270	9	14, 986. 35	57. 42	9	7, 591. 24	29. 09	12	22, 806. 50	88. 40	9	5, 517. 11	21. 14
13 7	14 6	243	13	13, 699. 87	59. 56	14	6, 923. 87	30. 24	5	23, 446. 75	98. 52	7	5, 068. 61	21. 48
14 7	15 6	167	8	9, 550. 12	60. 06	9	4, 856. 99	30. 74	7	16, 495. 25	103. 10	1	3, 570. 84	21. 51
15 7	16 6	129	3	7, 745. 49	61. 47	8	3, 819. 61	31. 57	0	13, 798. 50	106. 97	2	2, 730. 99	21. 50
16 7	17 6	83	0	5, 166. 74	62. 25	5	2, 488. 87	31. 91	3	9, 036. 50	112. 96	2	1, 760. 87	21. 74
17 7	18 6	54	1	3, 300. 49	62. 27	2	1, 677. 99	32. 27	0	6, 216. 25	115. 12	1	1, 158. 49	21. 86
18 7	19 6	20	1	1, 191. 87	62. 73	3	564. 61	33. 21	0	2, 355. 00	117. 75	0	435. 62	21. 78
19 7	29 11	9	0	544. 00	60. 44	0	283. 25	31. 47	0	984. 00	109. 33	0	199. 25	22. 14
		2, 558												

TABLE LXVI.—*Bright girls—colored.*

Limits of different ages.		Total number of pupils.	Age.			Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches*	*Inches.*
6 0	6 6	30	....	185 2	6 2	1	1, 281. 75	44. 20	3	637. 00	23. 59
6 7	7 6	94	....	662 2	7 0	2	4, 325. 00	47. 01	2	2, 263. 00	24. 60
7 7	8 6	166	....	1, 339 3	8 0	2	7, 866. 25	47. 96	2	4, 134. 25	25. 21
8 7	9 6	172	....	1, 556 6	9 2	3	8, 294. 12	49. 08	6	4, 276. 00	25. 76
9 7	10 6	196	....	1, 974 4	10 1	0	9, 972. 75	50. 88	7	5, 011. 75	26. 52
10 7	11 6	206	....	2, 379 5	11 5	6	10, 596. 12	52. 98	6	5, 469. 50	27. 35
11 7	12 6	210	....	2, 522 3	12 1	8	11. 007. 00	54. 49	9	5, 588. 36	27. 80
12 7	13 6	216	....	2, 819 5	13 0	5	12, 108. 12	57. 38	5	6, 119. 74	29. 00
13 7	14 6	164	....	2, 300 8	14 0	8	9, 305. 12	59. 65	8	4, 683. 62	30. 02
14 7	15 6	110	....	1, 654 1	15 0	4	6, 403. 12	60. 41	4	3, 242. 74	30. 59
15 7	16 6	81	....	1, 323 5	16 4	1	4, 907. 25	61. 34	5	2, 396. 74	31. 54
16 7	17 6	51	....	885 4	17 4	0	3, 184. 12	62. 43	4	1, 512. 00	32. 17
17 7	18 6	37	....	664 5	18 1	1	2, 241. 49	62. 26	1	1, 172. 62	32. 57
18 7	19 4	12	....	227 0	19 0	0	764. 87	63. 74	2	332. 62	33. 26
19 10	20 4	3	....	60 1	20 0	0	186. 25	62. 08	0	97. 00	32. 33
20 9	21 0	3	....	62 9	20 11	0	188. 75	62. 92	0	100. 25	33. 42
		1, 751	....								

TABLE LXVI.—*Bright girls—colored*—Continued.

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 0	6 6	3	1,193.50	44.20	4	1,123.00	43.19	1	582.87	20.10
6 7	7 6	3	4,297.00	47.22	7	4,269.00	49.07	1	1,912.93	20.57
7 7	8 6	9	7,634.12	48.62	5	8,638.25	53.65	0	3,413.99	20.57
8 7	9 6	7	8,225.14	49.85	6	9,519.50	57.35	4	3,485.49	20.75
9 7	10 6	10	9,649.25	51.34	5	12,171.00	63.72	8	3,928.75	20.90
10 7	11 6	10	10,578.62	53.97	4	13,881.00	68.72	7	4,158.99	20.90
11 7	12 6	9	11,214.12	55.79	7	15,674.00	77.21	6	4,262.35	20.89
12 7	13 6	11	12,048.50	58.77	7	18,476.50	88.40	6	4,449.11	21.19
13 7	14 6	12	9,280.99	61.06	2	15,948.50	98.45	5	3,414.74	21.48
14 7	15 6	5	6,530.49	62.20	3	11,046.25	103.24	1	2,341.73	21.48
15 7	16 6	2	4,964.86	62.85	0	8,598.50	106.15	1	1,717.12	21.46
16 7	17 6	1	3,166.75	63.34	1	5,715.50	114.31	1	1,092.25	21.85
17 7	18 6	1	2,274.24	63.17	0	4,314.25	116.60	0	809.37	21.87
18 7	19 4	0	775.87	64.66	0	1,452.50	121.04	0	261.37	21.78
19 10	20 4	1	129.00	64.50	0	336.00	112.00	0	68.00	22.67
20 9	21 0	0	191.50	63.83	0	332.00	110.67	0	64.25	21.42

TABLE LXVII.—*Dull girls—colored.*

Limits of different ages.		Total number of pupils.	Height.			Sitting height.		
From—	To—		Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Inches.*	*Inches.*		*Inches.*	*Inches.*
5 10	6 6	46	3	1,874.75	43.60	0	1,095.00	23.80
6 7	7 6	57	2	2,503.50	45.52	3	1,321.95	24.48
7 8	8 6	52	0	2,483.00	47.75	0	1,312.00	25.23
8 7	9 6	37	0	1,804.50	48.77	1	923.75	25.66
9 7	10 6	54	1	2,688.50	50.73	0	1,439.50	26.66
10 7	11 6	60	2	3,062.50	52.80	1	1,615.36	27.38
11 7	12 6	69	4	3,535.00	54.38	5	1,809.50	28.27
12 7	13 6	54	4	2,878.23	57.56	4	1,471.50	29.43
13 7	14 6	79	5	4,394.75	59.39	6	2,240.25	30.69
14 7	15 6	57	4	3,147.00	59.38	5	1,614.25	31.04
15 7	16 6	48	2	2,838.24	61.70	3	1,422.87	31.62
16 7	17 6	32	0	1,982.62	61.96	1	976.87	31.51
17 7	18 5	17	0	1,059.00	62.29	1	505.37	31.59
18 7	19 6	8	1	427.00	61.00	1	231.99	33.14
19 7	29 11	3	0	169.00	56.33	0	86.00	28.67
		673	......	......	......	......	......	......

Limits of different ages.		Arm reach.			Weight.			Circumference of head.		
From—	To—	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.	Number omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
5 10	6 6	1	1,992.25	44.27	2	1,872.00	42.55	0	914.00	19.87
6 7	7 6	3	2,468.75	45.72	3	2,535.50	46.95	5	1,043.37	20.06
7 8	8 6	0	2,523.50	48.53	2	2,550.00	51.00	0	1,058.00	20.35
8 7	9 6	1	1,776.75	49.35	2	1,915.00	54.71	2	721.49	20.61
9 7	10 6	3	2,611.02	51.20	7	2,796.50	59.50	2	1,072.87	20.63
10 7	11 6	5	2,993.12	54.42	4	3,892.00	69.50	7	1,101.37	20.78
11 7	12 6	3	3,675.00	55.68	4	5,110.25	78.62	2	1,415.75	21.13
12 7	13 6	0	3,197.49	59.21	5	4,330.00	88.37	3	1,068.00	20.94
13 7	14 6	5	4,559.25	61.61	3	7,498.25	98.66	2	1,653.87	21.48
14 7	15 6	3	3,341.50	61.88	4	5,449.00	102.81	0	1,229.11	21.56
15 7	16 6	5	2,736.00	63.63	0	5,200.00	108.33	1	1,013.87	21.57
16 7	17 6	1	1,971.99	63.61	2	3,321.00	110.70	1	668.62	22.15
17 7	18 5	1	1,010.49	63.16	0	1,902.00	111.88	1	349.12	21.82
18 7	19 6	0	493.75	61.72	0	902.50	112.81	0	174.25	21.78
19 7	29 11	1	120.00	60.00	0	316.00	105.33	0	67.00	22.33

TABLE LXVIII.—*Average girls, colored.*

Limits of different ages. From—	Limits of different ages. To—	Total number of pupils.	Age. Number omitted.	Age. Total.	Age. Average.	Height. Number omitted.	Height. Total.	Height. Average.	Sitting height. Number omitted.	Sitting height. Total.	Sitting height. Average.
Yrs. Mos.	*Yrs. Mos.*			*Yrs. Mos.*	*Y. M.*		*Inches.*	*Inches.*		*Inches.*	*Inches.*
6 0	6 6	37	....	227 2	6 2	1	1,575.50	43.76	1	853.50	23.71
6 7	7 6	97	....	705 9	7 2	4	4,358.75	46.87	4	2,318.25	24.93
		134	....	....	....	....	....	....	....	....	....

Limits of different ages. From—	Limits of different ages. To—	Arm reach. Number omitted.	Arm reach. Total.	Arm reach. Average.	Weight. Number omitted.	Weight. Total.	Weight. Average.	Circumference of head. Number omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs. Mos.	*Yrs. Mos.*		*Inches.*	*Inches.*		*Pounds.*	*Pounds.*		*Inches.*	*Inches.*
6 0	6 6	2	1,542.00	44.06	2	1,478.75	42.25	1	714.25	19.84
6 7	7 6	5	4,352.12	47.31	4	4,575.75	49.20	3	1,943.74	20.68

TABLE LXIX.—*Abnormalities or defects in relation to sex, mental ability, nativity, sociologic condition, and race, as reported by the teachers.*

Divisions according to sex, mental ability, nationality, sociologic condition, and race.	Whole number. Total.	Sickly. Total.	Sickly. Per ct.	Nervous. Total.	Nervous. Per ct.	Defective in— Eyesight. Total.	Eyesight. Per ct.	Hearing. Total.	Hearing. Per ct.	Speech. Total.	Speech. Per ct.	Convulsions. Total.	Convulsions. Per ct.	Lazy. Total.	Lazy. Per ct.	Unruly. Total.	Unruly. Per ct.
Bright girls	3,296	133	4.04	19	0.58	44	1.33	5	.15	5	0.15	1	0.03	7	0.21	1	0.03
Bright boys	2,899	111	3.83	32	1.10	31	1.07	13	.45	16	.55	1	.04	9	.31	43	1.48
Dull girls	917	57	6.22	3	.33	7	.76	6	.65	2	.22	....	....	3	.33	14	1.53
Dull boys	1,214	64	5.27	15	1.24	16	1.32	13	1.07	14	1.15	2	.16	36	2.97	119	9.80
Average girls	4,304	217	5.04	35	.81	57	1.32	20	.47	17	.40	....	....	9	.21	6	.14
Average boys	3,373	241	7.15	48	1.42	55	1.63	27	.80	58	1.72	2	.06	61	1.81	273	8.09
Girls, American parents	6,463	344	5.32	52	.80	98	1.52	26	.40	22	.34	1	.02	15	.23	7	.11
Boys, American parents	6,024	330	5.48	77	1.28	82	1.36	41	.68	67	1.11	5	.08	89	1.48	339	5.63
Girls, foreign parents	1,038	27	2.60	2	.19	4	.38	3	.29	....	....	....	....	1	.10	10	.96
Boys, foreign parents	1,036	22	2.13	2	.19	6	.58	2	.19	9	.87	....	....	6	.58	46	4.44
Girls, American and foreign parents	1,019	36	3.53	3	.29	6	.59	2	.20	2	.20	....	....	3	.29	4	.39
Boys, American and foreign parents	893	64	7.17	16	1.79	14	1.57	10	1.12	12	1.34	....	....	11	1.23	50	5.60
Girls, laboring classes	3,151	204	6.47	27	.86	46	1.46	18	.57	18	.57	....	....	6	.19	6	.19
Boys, laboring classes	2,739	102	3.72	14	.51	21	.77	12	.44	21	.77	1	.04	30	1.09	121	4.42
Girls, nonlaboring classes	3,003	140	4.66	25	.83	52	1.73	8	.27	4	.14	1	.04	9	.29	1	.03
Boys, nonlaboring classes	3,093	228	7.37	63	2.03	61	1.97	29	.94	46	1.49	4	.13	59	1.91	218	7.05
All girls	8,520	407	4.78	57	.67	108	1.27	31	.36	24	.28	1	.01	19	.22	21	.25
All boys	7,953	416	5.23	95	1.20	102	1.28	53	.67	88	1.11	5	.06	106	1.33	435	5.47
Bright boys, colored	......	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bright girls, colored	1,751	116	6.63	4	.23	4	.23	2	.11	3	.17	....	....	....	....	27	1.54
Dull boys, colored	......	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dull girls, colored	673	86	12.78	3	.45	4	.59	6	.89	5	.74	....	....	....	....	32	4.75
Average boys, colored	1,156	76	6.57	3	.26	5	.43	4	.25	8	.69	1	.09	....	....	28	2.42

TABLE LXX.—*Mental ability in relation to sex, nationality, sociological condition, abnormality, and race, as reported by the teachers.*

Divisions according to sex, nationality, sociologic condition, abnormality, and race.	Bright.		Dull.		Average.		Per cent of all.		
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Bright.	Dull.	Average.
All boys	2,890	38.72	1,214	16.22	3,373	45.06	......	......	
All girls	3,296	38.70	917	10.77	4,304	50.53	......	......	......
Boys, American parentage	2,267	37.63	895	14.86	2,862	47.51	......	......	......
Girls, American parentage	2,578	39.90	607	9.40	3,276	50.70	......	......	......
Boys, foreign parentage	349	33.69	176	16.99	511	49.32	......	......	......
Girls, foreign parentage	335	32.30	164	15.82	538	51.88	......	......	......
Boys, American and foreign parentage	283	31.69	143	16.01	467	52.30	......	......	......
Girls, American and foreign parentage	383	37.58	146	14.33	490	48.09	......	......	......
Boys, laboring classes	858	31.33	464	16.94	1,417	51.73	......	......	......
Girls, laboring classes	1,008	31.99	513	16.28	1,630	51.73	......	......	......
Boys, nonlaboring classes	1,357	43.87	358	11.58	1,378	44.55	......	......	......
Girls, nonlaboring classes	1,436	47.82	......	......	1,567	52.18	......	......	......
Abnormal boys	304	20.01	362	23.83	853	56.16	10.49	29.82	25.29
Abnormal girls	205	30.97	147	22.20	310	46.83	6.22	16.03	7.20
Unruly boys	51	11.83	97	22.51	283	65.66	1.76	7.99	8.39
Unruly girls	0	......	18	78.26	5	21.74	......	1.96	.11
Sickly boys	95	25.96	50	13.66	221	60.38	3.28	4.12	6.55
Sickly girls	107	34.85	49	15.96	151	49.19	3.25	5.34	3.51
Boys otherwise defective	158	21.88	215	29.78	349	48.34	5.45	17.71	10.35
Girls otherwise defective	98	29.52	80	24.10	154	46.38	2.97	8.73	3.58
All colored boys	1,257	43.36	486	16.76	1,156	39.88	......	......	......
All colored girls	1,751	68.45	673	26.31	134	5.24	......	......	......
Colored boys, abnormal	......	......	3	2.70	108	97.30	......	.62	9.34
Colored girls, abnormal	128	51.20	110	44.00	12	4.80	7.31	16.34	8.96
Colored boys, sickly	......	......	......	......	72	100.00	......	......	2.48
Colored girls, sickly	103	54.79	75	39.89	10	5.32	5.88	11.14	7.47
Colored boys otherwise defective	......	......	3	7.69	36	92.31	......	.62	3.11
Colored girls otherwise defective	25	40.32	35	56.45	2	3.23	1.43	5.20	1.49

TABLE LXXI.—*Per cent of different abnormalities according to age, computed on the total number of boys for each age.*

Nearest age.	Total number.	Sickly.		Nervous.		Defective in—						Convulsions.		Lazy.		Unruly.	
						Eye-sight.		Hearing.		Speech.							
		Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
Years.																	
6	147	7	4.76	3	2.04	....	.....	....	.....	4	2.72	....	.....	1	0.68	4	2.72
7	533	28	5.25	3	.56	5	0.94	2	0.38	10	1.88	....	.....	1	.19	18	3.38
8	787	28	3.56	11	1.40	4	.51	5	.64	12	1.52	1	0.13	2	.26	30	3.81
9	878	41	4.67	9	1.03	13	1.48	5	.57	8	.91	....	.....	6	.68	40	4.56
10	930	44	4.73	14	1.51	15	1.61	3	.32	13	1.40	....	.....	13	1.40	45	4.84
11	862	57	6.61	12	1.39	10	1.16	3	.35	9	1.04	....	.....	13	1.51	59	6.84
12	986	61	6.19	16	1.62	17	1.72	8	.81	9	.91	2	.20	15	1.52	71	7.20
13	926	54	5.83	10	1.08	13	1.40	11	1.19	10	1.08	1	.11	16	1.73	62	6.70
14	784	48	6.12	9	1.15	7	.89	10	1.28	6	.77	....	.....	17	2.17	64	8.16
15	528	31	5.87	5	.95	7	1.33	3	.57	2	.38	....	.....	9	1.70	31	5.87
16 and over	592	17	2.87	3	.51	11	1.86	3	.51	5	.84	1	.17	13	2.20	11	1.86
All ages	7,953	416	5.23	95	1.19	102	1.28	53	.67	88	1.11	5	.06	106	1.33	435	5.47

TABLE LXXII.—*Per cent of different abnormalities according to age, computed on the total number of girls for each age.*

Nearest age.	Total number.	Sickly.		Nervous.		Defective in— Eye-sight.		Defective in— Hearing.		Defective in— Speech.		Convulsions.		Lazy.		Unruly.	
		Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
Years.																	
6	131	....	.....	1	0.76	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....
7	508	14	2.76	7	1.38	3	0.59	2	0.39	5	0.98	....	.....	....	.....	2	0.39
8	754	27	3.58	10	1.33	6	.80	1	.13	2	.26	....	.....	3	0.39	1	.13
9	883	33	3.74	2	.23	15	1.70	2	.23	2	.23	....	.....	1	.11	1	.11
10	939	51	5.43	5	.53	16	1.70	7	.75	3	.32	....	.....	....	.....	2	.21
11	931	49	5.26	6	.64	15	1.61	2	.21	5	.54	1	0.11	2	.21	4	.43
12	876	59	6.74	6	.68	16	1.83	8	.91	1	.11	....	.....	3	.34	2	.23
13	966	67	6.94	7	.72	18	1.86	4	.41	4	.41	....	.....	1	.10	3	.31
14	833	35	4.20	4	.48	11	1.32	....	.....	1	.12	....	.....	5	.60	1	.12
15	655	33	5.04	4	.61	3	.46	....	.....	1	.15	....	.....	4	.61	4	.61
16 and over	1,044	39	3.74	5	.48	5	.48	5	.48	....	.....	....	.....	....	.....	1	.10
All ages	8,520	407	4.78	57	.67	108	1.27	31	.36	24	.28	1	.01	19	.22	21	.25

TABLE LXXIII.—*All boys with abnormalities.*

Limits of different ages. From—		Limits of different ages. To—		Total number of pupils.	Height. No. omitted.	Height. Total.	Height. Average.	Sitting height. No. omitted.	Sitting height. Total.	Sitting height. Average.	Weight. No. omitted.	Weight. Total.	Weight. Average.	Circumference of head. No. omitted.	Circumference of head. Total.	Circumference of head. Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	0	6	6	24	0	1,074	44.75	0	594	24.75	1	1,032	44.87	0	489.09	20.38
6	7	7	6	88	5	3,790	45.66	3	2,140	25.18	2	4,116	47.86	2	1,755.54	20.41
7	7	8	6	126	2	5,895	47.54	1	3,205	25.64	1	6,305	50.44	1	2,558.25	20.47
8	7	9	6	141	1	6,906	49.33	3	3,627	26.28	2	7,703	55.42	1	2,856.89	20.41
9	7	10	6	150	1	7,586	50.91	3	3,966	26.98	1	9,033	60.62	3	3,048.25	20.74
10	7	11	6	191	0	10,220	53.51	1	5,325	28.03	1	12,401	65.27	0	3,917.26	20.51
11	7	12	6	215	2	11,652	54.70	2	6,090	28.59	1	15,351	71.73	1	4,468.94	20.88
12	7	13	6	205	5	11,395	56.98	7	5,865	29.62	2	16,088	79.25	2	4,291.21	21.14
13	7	14	6	192	1	11,253	58.92	9	5,460	29.84	0	16,613	86.53	1	4,018.05	21.04
14	7	15	6	106	0	6,498	61.30	4	3,233	31.70	2	10,430	100.29	0	2,266.97	21.39
15	7	16	6	88	0	5,644	64.14	3	2,799	32.93	1	9,687	111.34	0	1,894.14	21.52
16	7	17	6	43	0	2,810	65.35	3	1,347	33.67	0	5,115	118.95	0	936.73	21.78
17	7	20	9	13	0	857	65.92	0	444	34.15	0	1,582	121.69	0	283.36	21.80
				1,582	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXIV.—*All girls with abnormalities.*

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Lbs.*	*Lbs.*		*Inches.*	*In.*
5	0	6	6	4	0	178	44.50	0	100	25.00	0	185	46.25	1	58	19.33
6	7	7	6	34	1	1,500	45.45	1	814	24.67	0	1,545	45.44	0	678.20	19.95
7	7	8	6	59	0	2,856	48.41	1	1,506	25.97	0	2,922	49.53	1	1,188.18	20.49
8	7	9	6	50	2	2,339	48.73	1	1,255	25.61	0	2,598	51.96	0	1,017.31	20.35
9	7	10	6	79	0	4,049	51.25	1	2,111	27.06	1	4,528	58.05	2	1,562.01	20.29
10	7	11	6	75	1	3,927	53.07	0	2,080	27.73	0	4,745	63.27	1	1,515.03	20.47
11	7	12	6	83	1	4,520	55.12	3	2,270	28.38	2	5,682	70.15	2	1,675.88	20.69
12	7	13	6	101	3	5,553	56.66	4	2,867	29.56	0	7,855	77.77	1	2,080.12	20.80
13	7	14	6	53	1	3,092	59.46	2	1,584	31.06	0	4,701	88.70	1	1,097.69	21.11
14	7	15	6	48	0	2,955	61.56	2	1,491	32.41	0	4,868	101.42	0	1,016.87	21.18
15	7	16	6	40	1	2,426	62.21	1	1,234	31.64	1	3,977	101.97	1	822.97	21.10
16	7	17	6	21	0	1,304	62.10	0	682	32.48	0	2,314	110.19	0	445.46	21.21
17	7	19	9	15	0	943	62.87	0	497	33.13	0	1,612	107.47	0	323.99	21.60
				662	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXV.—*Unruly, sickly, and otherwise defective boys.*

UNRULY BOYS.

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Lbs.*	*Lbs.*		*Inches.*	*In.*
5	0	6	6	3	0	134	44.67	0	76	25.33	0	139	46.33	0	62.25	20.75
6	7	7	6	20	2	834	46.33	0	505	25.25	1	938	49.37	0	407.60	20.38
7	7	8	6	33	1	1,533	47.91	0	850	25.76	0	1,714	51.94	0	674.48	20.44
8	7	9	6	38	0	1,831	48.18	0	984	25.89	0	2,103	55.34	0	761.97	20.05
9	7	10	6	44	0	2,253	51.20	2	1,132	26.95	0	2,677	60.84	1	886.06	20.61
10	7	11	6	56	0	2,993	53.45	1	1,550	28.18	0	3,759	67.13	0	1,166.31	20.83
11	7	12	6	63	0	3,431	54.46	1	1,758	28.35	0	4,543	72.11	0	1,315.65	20.88
12	7	13	6	61	0	3,512	57.57	1	1,791	29.85	0	4,814	78.92	0	1,303.56	21.37
13	7	14	6	62	0	3,651	58.89	2	1,797	29.95	0	5,413	87.31	1	1,258.69	20.63
14	7	15	6	34	0	2,079	61.15	1	1,034	31.33	0	3,411	100.32	0	725.16	21.33
15	7	16	6	15	0	959	63.93	1	465	33.21	0	1,705	113.67	0	322.98	21.53
16	7	17	6	6	0	383	63.83	0	202	33.67	0	698	116.33	0	130.49	21.75
17	7	20	9	......	*0	....	......	0	....	......	0	....	......	0	....	......
				435	...	....	......	...	....	......	...	....	......	...	....	......

SICKLY BOYS.

5	0	6	6	7	0	311	44.43	0	170	24.29	1	251	41.83	0	142.99	20.43
6	7	7	6	31	0	1,424	45.94	1	751	25.03	0	1,448	46.71	0	629.73	20.31
7	7	8	6	27	1	1,209	46.50	1	656	25.23	0	1,293	47.89	1	532.21	20.47
8	7	9	6	34	0	1,673	49.21	0	882	25.94	0	1,785	52.50	0	695.45	20.45
9	7	10	6	42	1	2,114	51.56	1	1,111	27.10	0	2,532	60.29	0	875.95	20.86
10	7	11	6	49	0	2,599	53.04	0	1,351	27.57	0	3,095	63.16	0	993.81	20.28
11	7	12	6	55	1	2,946	54.56	0	1,568	28.51	0	3,772	68.58	0	1,142.63	20.78
12	7	13	6	41	2	2,202	56.46	1	1,172	29.30	1	3,042	76.05	0	858.91	20.95
13	7	14	6	47	0	2,765	58.83	3	1,294	29.41	0	3,943	83.89	0	996.50	21.20
14	7	15	6	25	0	1,515	60.60	2	714	31.04	1	2,252	93.83	0	530.23	21.21
15	7	16	6	11	0	702	63.82	0	354	32.18	1	1,091	109.10	0	231.87	21.08
16	7	17	6	13	0	851	65.46	2	371	33.73	0	1,505	115.77	0	282.50	21.73
17	7	20	9	7	0	460	65.71	0	237	33.86	0	845	120.71	0	151.06	21.57
				389	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXV.—*Unruly, sickly, and otherwise defective boys*—Continued.

BOYS OTHERWISE DEFECTIVE, MENTALLY OR PHYSICALLY.

Limits of different ages. From— Yrs.	From— Mos.	To— Yrs.	To— Mos.	Total number of pupils.	Height. No. omitted.	Height. Total. Inches.	Height. Average. In.	Sitting height. No. omitted.	Sitting height. Total. Inches.	Sitting height. Average. In.	Weight. No. omitted.	Weight. Total. Pounds.	Weight. Average. Lbs.	Circumference of head. No. omitted.	Circumference of head. Total. Inches.	Circumference of head. Average. In.
5	0	6	6	14	0	629	44.93	0	348	24.86	0	642	45.86	0	283.85	20.28
6	7	7	6	37	3	1,532	45.06	2	884	25.26	1	1,730	48.06	2	718.21	20.52
7	7	8	6	66	0	3,153	47.77	0	1,699	25.74	1	3,298	50.74	0	1,351.56	20.48
8	7	9	6	69	1	3.402	50.03	3	1,761	26.68	2	3,815	56.94	1	1,399.47	20.58
9	7	10	6	64	0	3,219	50.30	0	1,723	26.92	1	3,824	60.70	2	1,286.24	20.75
10	7	11	6	86	0	4,628	53.81	0	2,424	28.19	1	5,547	65.26	0	1,757.14	20.43
11	7	12	6	97	1	5,275	54.95	1	2,764	28.79	1	7,036	73.29	1	2,010.66	20.94
12	7	13	6	103	3	5,681	56.81	5	2,902	29.61	1	8,232	80.71	2	2,128.74	21.08
13	7	14	6	83	1	4,837	58.99	4	2,369	29.99	0	7,257	87.43	0	1,762.86	21.24
14	7	15	6	47	0	2,904	61.79	1	1,485	32.28	1	4,767	103.63	0	1,011.58	21.52
15	7	16	6	62	0	3,983	64.24	2	1,980	33.00	0	6,891	111.15	0	1,339.29	21.60
16	7	17	6	24	0	1,576	65.67	1	774	33.65	0	2,912	121.33	0	523.74	21.82
17	7	20	9	6	0	397	66.17	0	207	34.50	0	737	122.83	0	132.36	22.06
				758	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVI.—*Unruly, sickly, and otherwise defective girls.*

UNRULY GIRLS.

Limits of different ages. From— Yrs.	From— Mos.	To— Yrs.	To— Mos.	Total number of pupils.	Height. No. omitted.	Height. Total. Inches.	Height. Average. In.	Sitting height. No. omitted.	Sitting height. Total. Inches.	Sitting height. Average. In.	Weight. No. omitted.	Weight. Total. Lbs.	Weight. Average. Lbs.	Circumference of head. No. omitted.	Circumference of head. Total. Inches.	Circumference of head. Average. In.
5	0	6	6	....	0	....	......	0	....	......	0	....	......	0	....	......
6	7	7	6	2	0	90	45.00	0	49	24.50	0	84	42.00	0	39.24	19.62
7	7	8	6	1	0	48	48.00	0	25	25.00	0	52	52.00	0	20.12	20.12
8	7	9	6	1	0	47	47.00	0	26	26.00	0	50	50.00	0	20.12	20.12
9	7	10	6	1	0	50	50.00	0	27	27.00	0	50	50.00	0	19.75	19.75
10	7	11	6	4	0	214	53.50	0	114	28.50	0	285	71.25	0	84.49	21.12
11	7	12	6	2	0	112	56.00	0	60	30.00	0	134	67.00	0	39.37	19.69
12	7	13	6	5	1	224	56.00	1	115	28.75	0	365	73.00	0	102.75	20.55
13	7	14	6	....	0	....	......	0	....	......	0	....	......	0	....	......
14	7	15	6	3	0	188	62.67	0	100	33.33	0	337	112.33	0	63.87	21.29
15	7	16	6	1	0	61	61.00	0	....	......	0	97	97.00	0	20.25	20.25
16	7	17	6	1	0	62	62.00	0	32	32.00	0	100	100.00	0	19.62	19.62
17	7	19	9	2	0	124	62.00	0	66	33.00	0	244	122.00	0	41.75	20.88
				23	...	....	......	...	....	......	...	....	......	...	....	......

SICKLY GIRLS.

From— Yrs.	From— Mos.	To— Yrs.	To— Mos.	Total number of pupils.	Height. No. omitted.	Height. Total.	Height. Average.	Sitting height. No. omitted.	Sitting height. Total.	Sitting height. Average.	Weight. No. omitted.	Weight. Total.	Weight. Average.	Circumference of head. No. omitted.	Circumference of head. Total.	Circumference of head. Average.
5	0	6	6	2	0	90	45.00	0	50	25.00	0	88	44.00	1	18.75	18.75
6	7	7	6	12	0	535	44.58	1	269	24.45	0	521	43.42	0	235.86	19.66
7	7	8	6	26	0	1,286	49.46	0	683	26.27	0	1,332	51.23	1	523.97	20.96
8	7	9	6	29	1	1,366	48.79	1	735	26.25	0	1,490	51.38	0	586.08	20.21
9	7	10	6	37	0	1.889	51.05	1	963	26.75	0	2,096	56.65	1	730.14	20.28
10	7	11	6	38	0	2,013	52.97	0	1,049	27.61	0	2,356	62.00	1	753.58	20.37
11	7	12	6	46	1	2,478	55.07	3	1,203	27.98	2	3,032	68.91	2	909.53	20.67
12	7	13	6	47	0	2,650	56.38	2	1,333	29.62	0	3,714	79.02	0	975.96	20.77
13	7	14	6	21	1	1,184	59.20	2	583	30.68	0	1,811	86.24	1	420.23	21.01
14	7	15	6	14	0	857	61.21	2	393	32.75	0	1,414	101.00	0	295.24	21.09
15	7	16	6	21	1	1,241	62.05	0	677	32.24	1	2,028	101.40	1	423.11	21.16
16	7	17	6	10	0	617	61.70	0	324	32.40	0	1,049	104.90	0	210.36	21.04
17	7	19	9	4	0	256	64.00	0	132	33.00	0	407	101.75	0	88.00	22.00
				307	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVI.—*Unruly, sickly, and otherwise defective girls*—Continued.

GIRLS OTHERWISE DEFECTIVE, MENTALLY OR PHYSICALLY.

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
5	0	6	6	2	0	88	44.00	0	50	25.00	0	97	48.50	0	39.25	19.63
6	7	7	6	20	1	875	46.05	0	496	24.80	0	940	47.00	0	403.10	20.16
7	7	8	6	32	0	1,522	47.56	1	798	25.74	0	1,538	48.06	0	644.09	20.13
8	7	9	6	20	1	926	48.74	0	494	24.70	0	1,058	52.90	0	411.11	20.56
9	7	10	6	41	0	2,110	51.46	0	1,121	27.34	1	2,382	59.55	1	812.12	20.30
10	7	11	6	33	1	1,700	53.13	0	917	27.79	0	2,104	63.76	0	676.96	20.51
11	7	12	6	35	0	1,930	55.14	0	1,007	28.77	0	2,516	71.89	0	726.98	20.77
12	7	13	6	49	2	2,679	57.00	1	1.419	29.56	0	3,776	77.06	1	1,001.41	20.86
13	7	14	6	32	0	1,908	59.63	0	1,001	31.28	0	2,890	90.31	0	677.46	21.17
14	7	15	6	31	0	1,910	61.61	0	998	32.20	0	3,117	100.55	0	657.76	21.22
15	7	16	6	18	0	1,124	62.44	1	557	32.76	0	1,852	102.89	0	379.61	21.09
16	7	17	6	10	0	625	62.50	0	326	32.60	0	1,165	116.50	0	215.48	21.55
17	7	19	9	9	0	563	62.56	0	299	33.22	0	961	106.78	0	194.24	21.58
				332	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVII.—*Colored boys with abnormalities.*

SICKLY BOYS.

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	4	7	6	11	0	497	45.18	0	272	24.73	0	506	46.00	0	225.00	20.45
7	7	8	6	14	1	606	46.62	1	335	25.77	0	762	54.43	2	245.75	20.48
8	7	9	6	11	1	471	47.10	1	256	25.60	0	600	54.55	1	209.50	20.95
9	7	10	6	4	0	205	51.25	0	111	27.75	0	254	63.50	0	84.50	21.13
10	7	11	6	7	0	366	52.29	1	168	28.00	0	454	64.86	0	147.50	21.07
11	7	12	6	7	0	380	54.29	0	196	28.00	0	528	75.43	0	142.12	20.30
12	7	13	6	4	0	228	57.00	0	116	29.00	0	324	81.00	0	86.00	21.50
13	7	14	6	7	0	406	58.00	0	205	29.29	0	601	85.86	0	148.25	21.18
14	7	15	6	3	0	178	59.33	0	88	29.33	0	269	89.67	0	63.00	21.00
15	7	18	6	4	0	244	61.00	1	86	28.67	0	399	99.75	0	86.50	21.63
				72	...	....	......	...	....	......	...	....	......	...	....	......

BOYS OTHERWISE DEFECTIVE, MENTALLY OR PHYSICALLY.

Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	4	7	6	3	0	139	46.33	0	73	24.33	1	105	52.50	0	60.25	20.08
7	7	8	6	3	0	146	48.67	0	79	26.33	0	178	59.33	0	62.95	20.98
8	7	9	6	3	0	144	48.00	0	77	25.67	0	156	52.00	0	65.00	21.67
9	7	10	6	6	1	250	50.00	1	129	25.80	0	394	65.67	1	103.50	20.70
10	7	11	6	4	0	208	52.00	0	114	28.50	0	254	63.50	0	85.75	21.44
11	7	12	6	4	0	209	52.25	0	114	28.50	0	292	73.00	0	82.50	20.63
12	7	13	6	6	1	282	56.40	1	140	28.00	0	470	78.33	0	127.00	21.17
13	7	14	6	4	0	227	56.75	0	118	29.50	1	271	90.33	0	85.37	21.34
14	7	15	6	4	0	238	59.50	0	125	31.25	0	368	92.00	0	85.00	21.25
15	7	18	6	2	0	131	65.50	1	34	34.00	0	247	123.50	0	44.25	22.13
				39	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVII.—*Colored boys with abnormalities*—Continued.

ALL COLORED BOYS WITH ABNORMALITIES.

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	4	7	6	14	0	636	45.43	0	345	24.64	1	611	47.00	0	285.25	20.38
7	7	8	6	17	1	752	47.00	1	414	25.87	0	940	55.29	2	308.70	20.58
8	7	9	6	14	1	615	47.31	1	333	25.61	0	756	54.00	1	274.50	21.12
9	7	10	6	10	1	455	50.56	1	240	26.67	0	648	64.80	1	188.00	20.89
10	7	11	6	11	0	574	52.18	1	282	28.20	0	708	64.36	0	233.25	21.20
11	7	12	6	11	0	589	53.55	0	310	28.18	0	820	74.55	0	224.62	20.42
12	7	13	6	10	1	510	56.67	1	256	28.44	0	794	79.40	0	213.00	21.30
13	7	14	6	11	0	633	57.55	0	323	29.36	1	872	87.20	0	233.62	21.24
14	7	15	6	7	0	416	59.43	0	213	30.43	0	637	91.00	0	148.00	21.14
15	7	18	6	6	0	375	62.50	2	120	30.00	0	646	107.67	0	130.75	21.79
				111	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVIII.—*Colored girls with abnormalities.*

SICKLY GIRLS.

Limits of different ages.				Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—		To—			No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	0	6	6	16	0	718	44.88	0	379	23.69	1	667	44.47	0	321.75	20.11
6	7	7	6	19	0	886	46.63	1	412	22.89	1	793	44.06	0	383.50	20.18
7	7	8	6	29	0	1,392	48.00	0	718	24.76	0	1,443	49.76	0	591.25	20.39
8	7	9	6	21	0	972	46.29	0	510	24.29	0	1,104	52.57	1	389.50	19.48
9	7	10	6	11	0	549	49.91	0	290	26.36	2	507	56.33	1	207.50	20.75
10	7	11	6	24	0	1,295	53.96	0	668	27.83	0	1,543	64.29	0	486.50	20.27
11	7	12	6	19	2	935	55.00	1	511	28.38	1	1,387	77.06	0	396.25	20.86
12	7	13	6	14	0	799	57.07	0	408	29.14	0	1,183	84.50	3	232.75	21.16
13	7	14	6	9	2	424	60.57	0	275	30.56	0	884	98.22	0	197.50	21.94
14	7	15	6	9	0	532	59.11	0	276	30.67	0	907	100.78	1	171.50	21.44
15	7	16	6	9	0	563	62.56	2	222	31.71	0	949	105.44	0	190.50	21.17
16	7	17	6	5	0	307	61.40	0	161	32.20	0	547	109.40	0	109.75	21.95
18	7	21	6	3	1	115	57.50	0	95	31.67	0	310	103.33	0	66.00	22.00
				188	...	....	......	...	....	......	...	....	......	...	....	......

GIRLS OTHERWISE DEFECTIVE, MENTALLY OR PHYSICALLY.

Yrs.	*Mos.*	*Yrs.*	*Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6	0	6	6	4	0	194	48.50	0	95	23.75	1	142	47.33	0	81.50	20.38
6	7	7	6	10	1	393	43.67	1	215	23.89	2	361	45.13	4	119.25	19.88
7	7	8	6	3	0	150	50.00	0	79	26.33	0	157	52.33	0	63.25	21.08
8	7	9	6	....	0	....	......	0	....	......	0	....	......	0	....	......
9	7	10	6	10	1	460	51.11	0	265	26.50	0	640	64.00	1	190.50	21.17
10	7	11	6	5	0	265	53.00	0	138	27.60	0	355	71.00	0	107.50	21.50
11	7	12	6	9	0	500	55.56	0	260	28.89	1	610	76.25	0	193.25	21.47
12	7	13	6	6	0	286	47.67	0	170	28.33	0	460	76.67	0	125.00	20.83
13	7	14	6	3	0	182	60.67	1	60	30.00	0	277	92.33	0	64.50	21.50
14	7	15	6	8	1	419	59.86	1	215	30.71	0	763	95.38	0	169.62	21.20
15	7	16	6	....	0	....	......	0	....	......	0	....	......	0	....	......
16	7	17	6	4	0	246	61.50	1	93	31.00	0	442	110.50	0	85.25	21.31
18	7	21	6	....	0	....	......	0	....	......	0	....	......	0	....	......
				62	...	....	......	...	....	......	...	....	......	...	....	......

TABLE LXXVIII.—*Colored girls with abnormalities*—Continued.

ALL GIRLS WITH ABNORMALITIES.

Limits of different ages.		Total number of pupils.	Height.			Sitting height.			Weight.			Circumference of head.		
From—	To—		No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.	No. omitted.	Total.	Average.
Yrs. Mos.	*Yrs. Mos.*			*Inches.*	*In.*		*Inches.*	*In.*		*Pounds.*	*Lbs.*		*Inches.*	*In.*
6 0	6 6	20	0	912	45.60	0	474	23.70	2	809	44.94	0	403.25	20.16
6 7	7 6	29	1	1,279	45.68	2	627	23.22	3	1,154	44.38	4	502.75	20.11
7 7	8 6	32	0	1,542	48.19	0	797	24.91	0	1,600	50.00	0	654.50	20.45
8 7	9 6	21	0	972	46.29	0	510	24.29	0	1,104	52 57	1	389.50	19.48
9 7	10 6	21	0	1,009	48.05	0	555	26.43	2	1,147	60.37	2	398.00	20.95
10 7	11 6	29	0	1,560	53.79	0	806	27.79	0	1,898	65.45	0	594.00	20.48
11 7	12 6	28	2	1,435	55.19	1	771	28.56	2	1,997	76.81	0	589.50	21.05
12 7	13 1	20	0	1,085	54.25	0	578	28.90	0	1,643	82.15	3	357.75	21.04
13 7	14 6	12	2	606	60.60	1	335	30.45	0	1,161	96.75	0	262.00	21.83
14 7	15 6	17	1	951	59.44	1	491	30.69	0	1,670	98.24	1	341.12	21.32
15 7	16 6	9	0	563	62 56	2	222	31.71	0	949	105.44	0	190.50	21.17
16 7	17 6	9	0	553	61.44	1	254	31.75	0	989	109.89	0	195.00	21.67
18 7	21 6	3	1	115	57.50	0	95	31.67	0	310	103.33	0	66.00	22.00
		250	...	....	......	...	....	......	...	....	......	...	....	......

III.—MEASUREMENTS OF SCHOOL CHILDREN IN THE UNITED STATES.

The object of this section is to give brief summaries of anthropometrical and psycho-physical measurements made by different investigators in this country. For a more extended study of the measurements, the reader is referred to the original articles noted in the bibliography.

BOSTON SCHOOL CHILDREN.

The results of Dr. Bowditch's measurements of Boston school children are given below.

Dr. Bowditch finds in general the children of the nonlaboring classes to be larger than the children of the laboring classes (see Tables A and B). This is not only true of children of American parents but also of children of Irish nationality. This is mainly, although not wholly, due to conditions of greater comfort and ease in life.

TABLE A.—*Showing average heights and weights of Boston school boys, irrespective of nationality.*

Occupation of parents.	Age at last birth-day.	Number of obser-vations.	Height.		Weight.	
			Inches.	*Centimeters.*	*Pounds.*	*Kilograms.*
Nonlaboring	5	135	41.64	105.8	41.21	18.70
	6	243	44.11	112.1	45.50	20.64
	7	294	46.23	117.5	49.77	22.57
	8	295	48.08	122.2	54.64	24.78
	9	272	50 03	127.1	59.89	27.16
	10	262	52.12	132.5	66.31	30.08
	11	284	53.84	136.8	71.81	32.57
	12	277	55.92	142.1	80.38	36.46
	13	277	58.13	147.7	88.59	40.18
	14	265	60.52	153.8	96.54	43.79
	15	231	62.68	159.3	108.81	49.36
	16	169	65.23	165.8	122.48	55.56
	17	97	66.17	168.1	128.23	58.16
	18	46	66.69	169.4	132.00	59.87
Laboring	5	694	41.57	105.6	41.00	18.60

TABLE A.—*Showing average heights and weights of Boston school boys, etc.*—Continued.

Occupation of parents.	Age at last birthday.	Number of observations.	Height.		Weight.	
			Inches.	*Centimeters.*	*Pounds.*	*Kilograms.*
Laboring	6	1,007	43.74	111.2	45.06	20.44
	7	1,133	45.61	116.0	48.93	22.19
	8	1,161	47.67	121.2	53.67	24.34
	9	1,097	49.73	126.4	59.22	26.86
	10	1,023	51.55	131.0	64.89	29.58
	11	956	53.17	135.1	69.67	31.60
	12	899	54.84	139.4	75.88	34.42
	13	800	56.89	144.5	83.40	37.83
	14	582	59.31	150.7	93.67	42.49
	15	365	61.90	157.3	104.88	47.57
	16	162	64.65	164.3	119.03	53.99
	17	77	65.75	167.1	125.28	56.83
	18	28	66.35	168.6	131.60	59.69

TABLE B.—*Showing average heights and weights of Boston school girls, irrespective of nationality.*

Occupation of parents.	Age at last birthday.	Number of observations.	Height.		Weight.	
			Inches.	*Centimeters.*	*Pounds.*	*Kilograms.*
Nonlaboring	5	120	41.66	105.9	40.55	18.39
	6	172	44.12	112.1	44.14	20.02
	7	247	45.71	116.3	48.02	21.73
	8	297	47.92	121.8	52.79	23.94
	9	224	50.16	127.5	58.78	26.66
	10	232	51.66	131.3	63.76	28.92
	11	210	53.66	136.4	70.49	31.97
	12	237	56.16	142.7	80.18	36.37
	13	191	58.67	149.1	90.68	41.13
	14	226	60.28	153.2	99.40	45.09
	15	168	61.19	155.5	107.70	48.85
	16	147	61.46	156.2	111.22	50.44
	17	98	61.88	157.3	115.15	52.23
	18	77	62.26	158.2	115.83	52.54
Laboring	5	491	41.26	104.8	39.48	17.91
	6	809	43.24	109.9	43.13	19.56
	7	921	45.41	115.4	47.16	21.39
	8	982	47.47	120.6	51.81	23.50
	9	913	49.27	125.2	56.74	25.74
	10	854	51.25	130.3	61.98	28.11
	11	719	53.41	135.7	68.01	30.85
	12	671	55.70	141.5	77.52	35.16
	13	593	58.01	147.4	87.88	31.66
	14	419	59.84	152.1	97.92	44.42
	15	258	61.00	155.0	105.11	47.68
	16	169	61.55	156.3	112.59	51.07
	17	89	61.92	157.4	115.72	52.49
	18	46	61.70	156.8	112.94	51.23

The number of children measured was 24,626, of which 13,722 were boys and 10,904 girls. The following are some of the conclusions of Dr. Bowditch:

1. Maximum yearly growth in height and weight occurs in boys two or three years later than in girls.

2. Large children make their most rapid growth at an earlier age than small ones.

3. In boys at 11 years of age there is remarkably slow growth in height and weight; a similar period but less marked in retarded growth is found in girls at 9 years of age.

4. At about 13 or 14 years, girls are during two years both taller and heavier than boys at the same age; though before and after that period the reverse is the case. The prepubertal period of accelerated growth occurs earlier in girls than boys. This fact may account for the temporary superiority of the girls.

5. Children of American-born parents are taller and heavier than those of other nationalities. The relation of weight to height is as follows: Below 58 inches boys are heavier; above 58 inches girls are heavier. Dr. Bowditch illustrates how healthy growing children, during adolescence, may vary within a range of 4 or 5 per cent on either side of an average. To determine how much wider the variation may be without passing the limits of health would necessitate a very large number of observations.

Milwaukee School Children.

These results were obtained by George W. Peckham. The conclusions from his study are:

I. Rate of growth is such that the boys are taller until the twelfth year and heavier until the thirteenth; between 13 and 15 the girls are both taller and heavier; after 15 the boys excel the girls; girls nearly cease to grow when about 17 years of age.

II. Children of purely American descent are taller than children of foreign-born parents; but children of German parents are heavier; Irish children are taller than the German; greater height is due to stock or race.

III. School children in Milwaukee are taller than those in Boston; boys are heavier also, but girls are slightly lighter; superiority of height may be due to less density of population; the struggle for existence is not so severe; urban disadvantages are fewer in Milwaukee.

IV. The height of American-born men is modified by density of population. Urban life decreases stature from five years of age on.

V. Growth of Germans is much modified by residence in this country through one generation. In intermarriage with Americans, the offspring seem to take the height of taller parent.

VI. The sitting height in girls is less than in boys until the tenth year and then greater till the sixteenth year. From 15 to 18, sitting height in girls increases only 2 inches, but over 4 inches in boys. At 14 the lower extremities of girls almost cease growing, while those of boys increase 4 inches between 14 and 19.

School Children of St. Louis, Mo.

In 1892 Dr. Porter studied the school children of St. Louis, securing results from 33,500 boys and girls, as to weight, height, length and breadth of head, vital capacity of chest, acuteness of vision, and nationality of parents. The larger part of the measurements were made by the teachers. The classification of pupils is irrespective of nationality; the children were weighed in indoor winter clothing; the shoes were taken off when the standing height was measured.

It is the opinion of Dr. Porter that weight may be looked upon as an index to physical development; and that weight also has a very close relation to strength.

The general conclusions from the following table (No. 1) are that there is a physical basis for precocity (brightness) and dullness. Dull children are lighter and precocious children heavier than the average child. Mediocrity of mind is associated with mediocrity of physique.

TABLE No. 1.—*Average weights of St. Louis schoolboys.*

Age at nearest birthday.	Average weights.	Average weights distributed by grades.									
		Kindergarten.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	High school.
6	**43.49**	**43.27**	**44.99**								
	19.75	19.64	20.42								
7	**47.73**	**45.26**	**48.49**	**52.75**							
	21.67	20.79	22.01	23.95							
8	**52.39**	**48.21**	**51.58**	**54.32**	**57.33**						
	23.78	21.89	23.42	24.66	26.02						
9	**57.41**		**55.52**	**57.56**	**59.26**	**61.91**					
	26.06		25.22	26.13	26.90	28.11					
10	**62.38**		**60.36**	**61.10**	**63.57**	**64.33**					
	28.32		27.41	27.74	28.86	29.20					
11	**68.30**		**64.22**	**65.55**	**67.77**	**71.39**	**72.37**	**74.12**			
	31		29.16	29.76	30.77	32.41	32.85	33.65			
12	**73.82**			**70.63**	**71.86**	**74.31**	**75.26**	**77.83**			
	33.51			32.06	32.63	33.73	34.17	35.33			
13	**80.65**			**74**	**77**	**78.83**	**81.94**	**83.69**	**86.83**	**82.26**	
	36.61			33.60	34.96	35.79	37.20	38	39.42	37.33	
14	**89.09**				**84.63**	**85.59**	**90.68**	**87.75**	**93.28**	**98.22**	**91.88**
	40.44				38.42	38.86	41.17	39.87	42.35	44.59	41.72
15	**101.80**					**92.52**	**98.71**	**99.38**	**106.16**	**104.72**	**103.27**
	46.22					42	44.81	45.12	48.20	47.54	46.88
16	**113.65**							**116.60**	**102**	**114.57**	**123.77**
	51.60							52.93	46.31	52.01	56.19

In table No. 1, is found the average weights of boys distributed by school grades and the average weights irrespective of grade. Pounds are in heavy-faced type and kilograms in light-faced type. In other tables Dr. Porter shows that his results are supported by means[1] as well as averages.

If weight is to be regarded as a good index of physical development then, a priori, height, chest girth, and other dimensions follow the same law, as Dr. Porter shows in table No. 2, which follows:

TABLE No. 2.—*The mean and the average height, standing, of boys, aged 10.*

School grade.	Mean.	Average.	Number of observations.
	Cm.	*Cm.*	
I	126.50	126.13	109
II	129.39	128.78	440
III	130.29	129.96	436
IV	131.22	131.99	185

TABLE No. 3.—*The mean and the average height, standing, of girls, aged 12.*

School grade.	Mean.	Average.	Number of observations.
	Cm.	*Cm.*	
II	136.06	135.93	73
III	139.04	138.97	217
IV	140.08	139.77	395
V	141.96	140.57	227
VI	141.90	141.80	110

Boys at age 10, and girls at age 12, may be selected, as at these ages the number of observations is large and the pupils are found in several grades. From the table

[1] Porter found the mean weight, for instance, by adding the figures in the column, beginning at the bottom, until the sum could not be increased by the next number without exceeding 50 per cent of the total number in the column.

above it appears that precocious children are taller as well as heavier than dull children.

From the following tables, Nos. 4, 5, and 6, it will be seen that precocious children have larger chests than dull children:

TABLE No. 4.—*Distribution of girls, aged 12.*

School grade.	Number of observations.
I	13
II	68
III	204
IV	381
V	210
VI	111
VII	13
VIII	3

The girth of chest was taken over the shirt in boys, and over the dress in girls, in each case on a level with the nipples.

Grade IV, containing the greatest number of girls, is the mean grade at this age. With it may be compared the mean chest girth of the 285 girls in grades I, II, and III, and the 337 girls in the higher grades V, VI, VII, and VIII. The following results appear:

TABLE No. 5.—*Girth of chest at forced expiration in dull, mediocre, and precocious girls, aged 12.*

School grade.	Mean.	Number of observations.
	Cm.	
I, II, III	66.21	285
IV	66.78	381
V, VI, VII, VIII	67.89	337

TABLE No. 6.—*Girth of chest at forced expiration in boys, aged 10.*

School grade.	Mean.	Average.	Number of observations.
	Cm.	*Cm.*	
I	62.96	62.62	115
II	63.27	63.11	454
III	63.94	63.81	462
IV	64.24	64.32	189

The width of the head or distance from one parietal eminence to the other is also greater in more advanced pupils than in the less advanced:

TABLE No. 7.—*Width of head of girls, aged 12.*

School grade.	Mean.	Average.	Number of observations.
	Mm.	*Mm.*	
II	144.25	143.68	68
III	145.52	144.77	193
IV	145.75	144.94	343
V	146.24	145.50	217
VI	148.08	147.64	89

TABLE No. 8.—*Width of head of boys, aged 10.*

School grade.	Mean.	Average.	Number of observations.
	Mm.	*Mm.*	
I	146.06	145.86	92
II	146.38	146.73	408
III	146.71	146.48	397
IV	147.45	147.21	170

The head measurements were made by the undergraduates of the St. Louis Medical College.

Gratsianoff, of Russia, measured a number of children, showing that the bright pupils were larger than the dull, but the number was too limited. Sack studied some 4,245 boys, measuring 2,600 twice. He confirms the results of Gratsianoff, that the brighter children have a larger chest girth and are taller than the dull. Sack found the rate of growth regular. Dr. Porter arrived at his conclusions independently, without any knowledge of the results of the Russian scientist.

TABLE No. 9.—*Mean of the weights of boys of mean precocity and dullness compared with the mean weight irrespective of school grade.*

Age.	Mean precocity.	Mean dullness.	Mean.	Mean irrespective of school grades.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
7	48.64	46.69	47.66	47.73
8	53.50	51.59	52.54	52.58
9	58.64	56.12	57.38	57.75
10	64.05	60.95	62.50	62.48
11	69.57	66.96	68.26	68.47
12	75.24	72.26	73.75	73.61
13	81.00	77.36	79.18	79.85
14	90.57	85.69	88.13	88.08
15	105.27	94.78	100.02	100.20
16	120.96	105.00	112.98	114.17

TABLE No. 10.—*Mean of the weights of girls of mean precocity and dullness compared with the mean weight irrespective of school grade.*

Age.	Mean precocity.	Mean dullness.	Mean.	Mean irrespective of school grades.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
7	46.96	44.68	45.82	45.84
8	51.20	49.52	50.36	50.35
9	56.25	54.32	55.28	55.17
10	61.34	59.44	60.39	60.46
11	66.73	64.84	65.78	65.64
12	74.59	71.72	73.15	73.23
13	86.43	80.39	83.41	83.73
14	96.61	92.00	94.30	93.94
15	104.54	100.03	102.28	103.20
16	113.31	108.39	110.85	110.06

From the two preceding tables Dr. Porter concludes:

1. That the comparative rate of growth of dull, mediocre, and precocious children of the same sex is the same at all ages from 7 to 16, inclusive.

2. That the acceleration in weight preceding puberty takes place at the same age in dull, mediocre, and precocious children.

3. The point in the period of accelerated development at which girls become heavier than boys is the same in the dull, the mediocre, and the precocious.

These conclusions of Dr. Porter are based upon both means and averages, but how far they are applicable to individuals he does not think can be determined from the per cent data; but notwithstanding this he thinks the results of his research warrant the following practical deduction:

4. *No child whose weight is below the average for its age should be permitted to enter a school grade beyond the average of its age, except after such a physical examination as shall make it probable that the child's strength be equal to the strain.*

THE GROWTH OF FIRSTBORN CHILDREN.

Measurements of children in Toronto were made by Dr. A. F. Chamberlain and in Oakland, Cal., by Prof. Earl Barnes, under the general supervision of Dr. Boas, who finds that firstborn children excel later-born children in stature as well as weight, and that this difference prevails from the sixth year to the fifteenth in boys. The material is not sufficient to show whether the same is true of adult males. The difference is not large, but it occurs with such regularity that there can be no doubt as to its reality. It would seem that the greater vigor of the mother at the time of birth of first child and the more care she can give them than to later-born children is the cause that gives the firstborn the advantage; but it is interesting to know that the relations of size existing at the time of birth are reversed in later life, for the weight and length of new-born infants increases from the firstborn to the later-born children.[1]

WORCESTER (MASS.) SCHOOL CHILDREN.

GROWTH IN BODY, HEAD, AND FACE.

In 1891 an investigation of growth of the Worcester school children was made by Drs. Boas, West, and Chamberlain, assisted by Drs. Bolton, Reigart, and Professors Lee, Russell, and others.

TABLE No. 11.

Age.	Average stature.		Average sitting height.		Average length of head.		Average breadth of head.		Average breadth of face.		Cephalic index.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
	Mm.	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*
5	1,097	1,074	603	586	176	174	140	138	114	112	79.56	79.40
6	1,127	1,113	614	615	177	172	142	139	114	114	78.94	79.60
7	1,170	1,175	642	639	179	175	142	140	117	114	79.42	80.02
8	1,223	1,216	666	656	180	174	143	141	116	115	78.71	80.41
9	1,270	1,266	689	678	181	176	144	140	120	117	79.63	79.71
10	1,340	1,328	708	698	182	177	145	142	120	118	80.30	79.46
11	1,388	1,370	722	726	183	180	144	142	121	120	78.80	78.90
12	1,429	1,447	747	757	183	180	145	143	122	122	79.40	79.40
13	1,476	1,479	766	783	184	181	147	145	124	123	79.50	79.60
14	1,543	1,537	799	806	187	183	147	144	126	125	78.60	79.00
15	1,622	1,570	845	832	188	184	148	146	129	126	78.59	78.99
16	1,658	1,584	862	847	191	184	149	144	130	126	77.81	78.48
17	1,685	1,594	885	852	189	185	150	146	131	127	78.34	78.50
18	1,700	1,591	889	851	192	186	151	147	134	129	78.88	79.36
19	1,713	1,593	896	851	192	183	150	145	133	129	78.33	79.68
20	1,739	1,590	898	853	195	182	152	147	136	129	77.88	79.41
21	1,705	1,592	887	853	192	186	153	145	138	129	79.29	78.36

[1] H. Fassbender in Zeitschrift für Geburtshülfe und Gynäkologie; Vol. III, p. 286. Stuttgart, 1878.

TABLE No. 11—Continued.

Age.	Relative breadth of face to length of head.		Relative breadth of face to breadth of head.		Relative sitting height to stature.		Relative length of head to stature.		Average weight (pounds avoirdupois).	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
5	64.51	64.27	80.95	80.92	55.24	55.27	16.0	16.2	42.63	39.36
6	63.90	64.98	80.97	81.86	55.20	55.66	15.9	15.6	46.04	43.70
7	64.08	65.60	80.82	82.03	54.68	54.63	15.3	14.9	49.37	47.96
8	64.44	65.95	80.91	82.44	54.05	53.94	14.6	14.5	53.64	51.50
9	65.34	66.61	82.10	83.58	53.60	53.50	14.2	13.9	59.81	57.37
10	65.87	66.65	82.71	83.35	53.52	53.37	13.7	13.4	66.51	63.52
11	66.08	67.17	83.67	83.73	52.42	52.93	13.3	13.0	71.00	69.94
12	66.14	68.12	83.60	85.67	52.26	52.42	12.8	12.4	78.75	79.74
13	66.88	67.77	84.30	85.35	51.87	52.53	12.6	12.2	86.13	87.66
14	67.21	68.40	85.56	86.56	51.83	52.70	12.3	11.9	98.18	99.10
15	68.15	68.65	87.21	86.80	51.77	52.98	11.6	11.8	112.21	105.00
16	68.37	68.76	87.29	87.63	51.99	53.30	11.5	11.7	123.56	109.00
17	68.83	68.59	87.94	87.32	52.52	53.52	11.4	11.6	132.91	115.00
18	69.30	69.38	88.38	87.75	52.23	53.60	11.3	11.7	133.17	120.00
19	68.95	70.34	88.28	88.37	52.36	53.71	11.2	11.6	142.62	118.25
20	69.82	69.58	89.61	87.71	51.90	53.73	11.3	11.7	....	119.75
21	71.96	69.28	90.77	88.64	52.99	53.75	11.3	11.6	....	118.12

Table No. 11 gives the observations made in the Worcester primary, high, normal, and two private schools. The number of individuals measured was 3,250, the ages ranging from 5 to 21 years. There were different nationalities; about 66 per cent were native American, 20 per cent Irish, 7 per cent English and Scotch, and 6 per cent of various nationalities.

We present in substance the results as given by Dr. West.

LENGTH OF HEAD.

In the measurements of the head the girls were less than the boys in length of head throughout the whole period of growth, and consequently throughout life. The difference in length, however, varies considerably from year to year, being, for example, 3 millimeters at the ages of 11, 12, and 13, and rising as high as 6 millimeters before and 7 millimeters after that age. The annual increase is very irregular, periods of growth sometimes alternating with a cessation of growth.

In girls the greatest length of head is reached at about the beginning of the eighteenth year; in boys the head continues to grow until at least the age of 21. The period of greatest annual variation in increase seems to be before the eleventh or twelfth year in girls, and after this age in boys.

BREADTH OF HEAD.

The breadth of head presents, like the length, periods of alternate growth and cessation of growth. The girls' width of head is less than that of the boys', but the difference is less about the eleventh year; from this age until the fourteenth year the development is parallel; then the difference increases. The age of maximum width in girls is about 17, in boys not until 21.

GROWTH OF FACE OF GIRLS.

There seem to be three distinct periods in the growth of the female face, the first ending about the seventh year and the third beginning about the fifteenth year. There is an abrupt transition from the types of one period to those of the succeeding. There is a sudden shooting up of the widths to almost adult dimensions at about the age of 8 or 9, offset by the equally sudden disappearance of the distinctively childish characteristics at the age of 11. These peculiarities appear also at the ages of 12 and 14, suggesting the very slow growth of some children until the ages of 8 and 14 respectively are reached, and then a very rapid development of each individual to her proper position in the series. Axel Key found the same to be true as to the total height of Swedish children.

In the second period very many of the forms are already adult. From the fifth to the tenth year, inclusive, the growth is somewhat slow, about 6.5 millimeters in all, but for the next four years, the period of adolescence, the growth is 6.2 millimeters. From the fourteenth year on there is very little advance, the maximum seeming to be reached at about 128 millimeters in the twentieth year. Comparing this growth with that of the male face, it is found that the male face, with perhaps a single exception, is larger for the same period of life and for the same years, growing more rapidly and growing later in life. Taking all the cases after 20, the advance is far beyond the breadth attained at 19, rising to about 138 millimeters. At about 9 years the two types approach very near, and as found in the case of height by Bowditch in Boston and Peckham in Milwaukee, the female face may for a short period become the broader; but, according to Dr. West, further investigation is necessary to determine this point. The present investigation by him was made on 2,500 persons of both sexes.

There are four points to be noted. First, the time of growth in the diameters of the heads and faces of girls is shorter than in the case of boys. Second, up to about the twelfth year these diameters grow more rapidly in girls than boys, while after this age the opposite is the case. Third, by an apparently sudden rise in the annual rate of growth in the girls, their diameters approach much more nearly those of the boys during the eleventh, twelfth, and thirteenth years. Finally, the average annual rate of growth in the diameters of the girls' heads and faces is nearly uniform during the two periods before and after the eleventh to the thirteenth years. In the case of boys it is considerably greater, actually and relatively, after than before. Between the fifth and eighteenth years the length of head of boys increases 16 millimeters; in the same period the breadth of head increases 11 millimeters and the width of face 18.5 millimeters. The corresponding measurements in the case of girls increase 12, 8, and 17 millimeters, respectively, for the same period of time. A comparison of the annual increments of the length of head and of the breadth of head seem almost to suggest an alternation in growth between the two diameters. This is further suggested by the alternate rising and falling of the cephalic index.

THE CEPHALIC INDEX.

Although the cephalic index is quite irregular in its annual stages, yet there is a certain general regularity, showing three periods, to wit, from the fifth to the eleventh, the eleventh to the sixteenth, and the sixteenth year on, in girls; from the fifth to the tenth, the tenth to the thirteenth, and from the thirteenth to the eighteenth in boys. The cephalic index for girls is for the period of growth higher than that of boys, except at about the ages of 9 and 10.

RELATION OF BREADTH OF FACE TO BREADTH AND LENGTH OF HEAD.

The breadth of face grows much more rapidly in proportion to the growth of the head in breadth and length. In proportion to the length of head the width of head and face of girls is generally greater than that of boys.

STATURE.

At 5 years of age the boys are taller than the girls; but the girls appear to equal them at the seventh year, and continue thus up to and including the ninth year, after which the boys rise again above the girls for two years. At about 12 years the girls suddenly become taller than the boys, continuing until the fifteenth year, when the boys finally regain their superiority in stature. After the age of 17 there seems to be very little, if any, increase in the stature of girls, while the boys are still growing vigorously at 18.

WEIGHT.

Weight, stature, and sitting height are somewhat parallel, but with minor differences. In weight, the girls seem to reach their maximum average at 17, the boys continuing to increase in average weight until a much later period in life.

SITTING HEIGHT.

Sitting height is in general parallel to stature in rate of growth. In the eleventh year, nearly a year earlier than in the case of stature, the girls exceed the boys, who do not regain their superiority until the fifteenth year, about half a year later than in the case of stature.

The greater part of the growth in stature, up to the twelfth year in the case of girls and until the fifteenth year in boys, is made in the lower limbs, while after these ages it is made in the trunk. Except for about two years throughout the period from 5 to 18 the limbs grow more rapidly than the trunk in boys, while in the case of girls the period of great comparative growth is divided nearly equally between the extremities and the trunk. Except from about the seventh to the tenth year the trunk is proportionally longer in girls than in boys; after the thirteenth year the difference is much more marked.

As before shown, the diameters of head and face in girls grow more rapidly than in boys up to 12 years; less rapidly after that age.

By comparison it will be seen that in stature and sitting height the annual rate of increase for girls is considerably less after 12 years than before. The boys maintain the same rate throughout. The results show that women reach maturity before men, except as to weight; girls complete their growth by the eighteenth year.

COMPARISON OF LENGTH OF HEAD TO STATURE.

Until the fifteenth year the length of head of girls is less in proportion to their stature than is that of boys to their stature. At 15 the ratio of the boys' length of head to their stature suddenly drops, while that of the girls gradually rises, indicating that in the adult the heads of women are proportionately longer than those of men. This is also true of the width of head and the width of face.

MEASUREMENTS IN THE PUBLIC SCHOOLS OF IOWA CITY AND OTHER PLACES.

Dr. J. Allen Gilbert, of the University of Iowa, in his researches on school children in Iowa City and other places finds the following results (about 100 of each age were tested):

PAIN THRESHOLD.[1]

The results show a gradual decrease of sensibility to pressure as a rule from 6 to 19, boys being less sensitive than girls throughout. Girls reach nearly the minimum of sensibility at 13. At this age the boys begin to show the most rapid falling off of sensitiveness to pressure, so that up to the age of 14 the difference is nearly the same for both sexes, the average difference being about 4 kilograms, but subsequent to this time the difference increases until 19, when there is a difference of more than a kilogram between the sexes.

Pain tests for boys at 15 reach 820 grams pressure, the lowest mean variation being 330 grams at the age of 16 for girls. Age produces a gradual and for the most part regular decrease in the sensibility, but the mean variations are not so regular, but vary from age to age, there being apparently no law, except that the mean variation is less for girls than for boys, which is to be expected, as the threshold for pain is lower for girls than for boys.

---

[1] Pain threshold may be defined as the point where pain begins to be felt.

WRIST LIFT.

Increase in strength is very regular and marked throughout the development of the child, but having the same marked dividing point in the rapidity of development at the age of 14 for both sexes, boys beginning their most rapid increase at that point, while girls begin slightly to retard their rate of development. Boys have a greater strength at all ages, but the difference is not so marked till 14, and at age 19 a boy lifts about twice what a girl does. At 6 the difference is only 0.5 kilogram, at 14, 3.5, and at 19, 13 kilograms. The mean variation begins to increase at the same age at which there is a change in rapidity of growth for both sexes. The mean variation is less for girls than for boys, largely because the girls have less strength.

LIFT WITH ARMS.

The results of this test follow about the same law as in the wrist lift.

ESTIMATION OF LENGTH BY ARM MOVEMENT.

Accuracy in judging space by movements of the arm increases with age. There is an underestimation of distance translated from the sense of sight to the muscle sense. Boys are less accurate than girls from age 6 to 10; then the reverse is the case till age 19, boys becoming more accurate than girls. The time element is probably the cause of underestimating distance. The eye makes a rapid sweep in judging of distance, while the arm is gradual in its change of position. The mean variation decreases with age, with no indication of difference between sexes.

ESTIMATION OF LENGTH BY SIGHT.

To find at what age children begin to make accurate estimates of special dimensions was one of the main aims of this test. This ability increases very rapidly from 6 to 11, and more rapidly with boys than with girls. Boys are more accurate than girls, with the exception of the ages 6 and 14. At age 6 the child estimates the line at about one-fifth its real length, making it 10.7 centimeters when it is 50.8 centimeters long. The child does not seem to have a proper conception of the matter until 9 or 10 years of age, girls having accurate judgment about two years later than boys. Up to the age of 15 distance is always judged shorter than it really is; after this age it is estimated longer than it really is, the most accurate age being between 15 and 16. However, the line is judged larger and longer as age advances. The reason for this, perhaps, is that the older the person the more careful he is to divide the space in equal parts with the eye rather than looking at it as a whole; filled space is overestimated. The mean variation decreases for both boys and girls, that of the boys being greater than that of the girls previous to age 9 and less subsequent to that age.

LUNG CAPACITY.

Boys have a larger lung capacity than girls at all ages. The difference is not so large from 6 to 13, but subsequently the difference between the sexes increases very rapidly. At 6 the boys have an advantage of 65.7 cubic centimeters; at 13, 283.6 centimeters, while at 19 the boys exceed the girls by 1,610.5 cubic centimeters. Here, as in the lifting tests, the girls reach their maximum at about 13, while at this age the most rapid growth for boys begins.

WEIGHT.

The weights were taken to an accuracy of two ounces. The general law is shown in all previous measurements of children, viz: Before the age of 11 boys are heavier than girls; from between 11 and 12 to between 13 and 14 the order is reversed and girls are heavier than boys; after this time the order is again reversed and boys are heavier. Girls grow most rapidly from 10 to 15, boys from 12 to 17.

The mean variations are largest in the period of fastest growth, increasing up to puberty and decreasing after that. Previous to age 11 the mean variation is about the same for both sexes. During the period in which girls are heavier than boys the mean variation is larger for the girls, the reverse being the case when the boys become heavier.

HEIGHT.

The same general rule applies to the growth of both sexes as in weight. Boys are taller than girls till between 10 and 11 years; the girls then become taller till about 14, when the boys again lead. Girls advance more slowly after 15 than before that age. The mean variations, in a general way, follow the same law as in weight, increasing till after the period of most rapid growth and then decreasing as rapidly as they increased.

VOLUNTARY MOTOR ABILITY.

The number of taps made in five seconds is given. For the first three years the girls tap faster than the boys, but from then till 19 the boys excel the girls. There is a gradual increase in rapidity of tapping for both sexes from age 6 to 19, showing an increase of about 15 taps in five seconds, the boys of 6 years tapping 22 times, while the boys of 19 tap 36.7 times in five seconds. Mean variations for voluntary motor ability increase greatly just previous to the change of growth for both sexes, reaching the maximum at age 10 for girls and at 13 for boys. Mean variations for fatigue also point to irregularity at this period.

FATIGUE.

Fatigue was expressed in per cent of loss in rapidity of tapping. This was calculated after tapping for forty-five seconds. The per cent of loss in rate of tapping decreases with age, girls not losing as much as boys.

PULSE.

With exception of age 6, the boys' pulse is slower than the girls' until between 10 and 11; faster from then till between 13 and 14, and then slower again from 14 on. There is an increase of pulse during the age of puberty in both sexes, being more marked in boys than girls.

TESTS AS RELATED TO MENTAL ABILITY.

There is in most of the tests very little evidence of any direct relation between mental ability and acuteness in the tests, yet in some there is sufficient relation for special mention. In estimation of length by sight, except at ages 9 and 13, the bright subjects make a more accurate estimate than the dull ones. Between 15 and 16 the dull suddenly change from an underestimation to an overestimation of true length. After age 14 the bright show nearly absolute accuracy, the average and dull ones being most accurate at about 15 years of age.

In graded weight there seems to be no constant relation between physical development and mental ability. From 10 to 14 there is a marked difference, the dull children being much heavier, while at other ages there is no definite indication. In respect to height there is no constant relation with mental ability. The same is true of lung capacity until age 10 to 15, when the duller children have the largest capacity, but after 15 the distinction disappears.

In voluntary motor ability, with the exceptions of ages 10 and 17, the bright children tap faster than the dull ones, the difference being very marked. The bright lose more in their rate of tapping by the fatigue induced.

SENSITIVE TO COLOR DIFFERENCES.

Ability to distinguish different shades of the same color increases with age. As a rule at 7 marked irregularities occur in all the curves which require mental action or discrimination. The average is slightly in favor of the girls. The boys excel the girls at 6, but at 17 the girls take the lead. With the boys 22.3 per cent failed to discriminate at all; in the case of the girls only 18.7 per cent failed, so the final balance is in favor of the girls.

FORCE OF SUGGESTION.

In this experiment large and small blocks were compared, being exactly alike in weight. Owing to this difference in size the child's judgment as to what the blocks would weigh by muscle sense was so influenced by suggestion from the eye as to what their relative weight should be if judged from sight that at 6, for example, they thought there was a difference of 42 grams between them. At 7 they were influenced more by the suggestion of sight than at 6, making a difference of 45 grams between the blocks. The influence of suggestion gradually increased, reaching its maximum at 9, where the average child thought there was a difference of 50 grams, which is almost as much as the weight of the blocks themselves; that is, 55 grams. From 9 to 17 the influence of suggestion gradually decreased, the muscle sense becoming more corrective of the suggestion given by sight. On the whole, variation decreases with advance in age.

REACTION TIME.[1]

The time of simple reaction decreases with age. Boys and girls at 6 when averaged together react in 29.5 hundredths of a second. This decreases to age 12, when the time is 18.7 hundredths of a second. From 12 to 13 no increase is made; from 13 there is a gradual increase until 16, when the reaction time is 15.5 hundredths of a second. Boys are quicker than girls throughout.

As to mental ability, bright children react much more quickly than dull. The average reaction time of all ages for bright children was 20.7 hundredths of a second; for average children 21.03 hundredths, and for dull children 22.4 hundredths of a second.

REACTION TIME WITH DISCRIMINATION AND CHOICE.

The length of time required decreased with advance in age, while ability increased. This is the case with other mental tests.

In girls development between 6 and 7 is for some reason arrested, but boys suffer no retardation. Starting at 53.5 hundredths of a second, they continually increase from 6 till 13. From 13 to 14 they suffer slight loss, after which they gain till 17, losing a little from 15 to 16. At 17 the time required for boys is 30.5 hundredths of second.

From 6 to 7 girls increase the time from 51 to 52.8 hundredths of a second. After 7 they increase in ability very rapidly till 12, where the length of time is 37 hundredths of a second. From 12 to 13 they lose much, requiring at 13 41.5 hundredths of a second, which is no better than they required at 10. After 13 they increase rapidly, with a small loss from 15 to 16, similar to the loss of the boys at that age.

Boys are superior to the girls in this test. The average for all the boys of all ages is 39.8 hundredths of a second, and that of the girls is 41 hundredths of a second.

General comparison of sex shows the boys to be superior.

[1] Reaction time is the time between the application of a stimulus and the resultant reaction.

GENERAL RELATIONS AND COMPARISONS.

Marked changes in the development of the child are found about the age at which the change of growth occurs; that is, from 12 to 16, the most striking results being at about 14. Many variations are comparatively regular for the two sexes until about the age of 14. The change in variation is largely due to change of growth at this age. Girls complete to a great extent their development a year or two before the time the boys have just begun their most rapid period of growth.

In pain threshold, arm lift, wrist lift, and lung capacity the girls reach their maximum at 14. Comparing these tests with those taken at New Haven, it seems probable that a girl has largely completed her physical development before the age of 14 or 15. Comparing New Haven school children with those in Iowa City, in lung capacity, the Iowa children excel at all ages. In height they are about the same at the age of 6, but at 17 the boys of Iowa are 2.6 centimeters and the girls 2.2 centimeters taller than those of New Haven. In weight, at age 6 New Haven boys and girls are, respectively, 2 and 4.2 pounds heavier than the Iowa children, but at age 17 the Iowa boys and girls are 12.3 and 2.6 pounds heavier. This is probably due to the difference in environment. Boston and Milwaukee school children are still lighter and shorter than either New Haven or Iowa school children.

Comparing weight and height with mental ability the results are negative.

Graded weight, lung capacity, and wrist lift follow approximately the same law.

Researches on New Haven School Children.

Dr. J. A. Gilbert, in his researches on New Haven school children, gives the following results:

MUSCLE SENSE.

By muscle sense is meant sensitiveness to weight. There is a gradual increase in ability to discriminate between weights from the ages 6 to 13. At 6, the worst year for discrimination, the least perceptible difference was 14.8 grams, with 38 per cent of nondiscrimination; at 13 years, only 5.4 grams, with 2 per cent of nondiscrimination. At 6 there is a large difference of 3.8 grams in discriminative ability in favor of boys. At 7 they have the same ability with the girls. From 13 to 17 the boys excel again. In general the superiority of boys increases with age.

The curves for discrimination and mean variation agree in general; thus, when power of discrimination decreases, variation decreases for the corresponding period.

Marked changes in the curve for variation represent changes in growth.

RELATION OF THE DIFFERENT TESTS.

Weight and height conform almost exactly to the same rules. In both very slight differences exist between boys and girls until puberty.

After 12 girls gain very little in lung capacity, while the boys do not begin their real growth till 14. Not only the physical curves, but those representing the mental aspects show that the turning point in life comes later for boys than for girls. The three physical curves correspond generally; variation increases with advance in years; mean variations change with the change of rate in growth. The mean variations in the physical curves for boys and girls are largest during the years from 12 to 15.

The mental curves show an increase in ability with advance in years, with the exception of the test on the force of suggestion.

The curves in voluntary motor ability and fatigue are closely related to those for weight and height.

The effect of puberty is very marked in the muscle sense, but affects least of all the discrimination of color differences.

Tests, where quickness and accuracy of action are involved, are affected in a most marked way by puberty, making it probable that puberty has a greater effect on the mental than even on the physical nature of man. This effect is much greater on girls than on boys.

In comparing graded reaction with discrimination and choice, it is found that the bright and dull act with the same rapidity between 11 and 12, just before puberty, but after that age the dull are much slower than the bright. By a general comparison it seems that all children are of about equal ability at age 11.

In general, the brighter the child the more accurate his sense of time.

In comparing results with Bowditch, of Boston, and Peckham, of Milwaukee, New Haven children are shown to be the heaviest and the tallest. This may be due to the small proportion of foreigners included in the results, for Bowditch has shown that American-born children are taller and heavier than foreign-born children. There is agreement as to the relation of growth of different ages.

Kansas City, Mo., School Children.

Superintendent J. M. Greenwood, of the Kansas City schools, finds that girls, especially those in the high school, learn more rapidly than boys; they stand usually much higher in their classes. He thinks this is due to the fact that girls cease to grow more rapidly at an earlier age than boys, and their systems have attained, as it were, a higher degree of solidity than the boys of corresponding age.

Table No. 12.

WHITE CHILDREN (1890).

Boys.				Girls.			
Number.	Age.	Average height.	Average weight.	Number.	Age.	Average height.	Average weight.
	Years.	*Inches.*	*Pounds.*		*Years.*	*Inches.*	*Pounds.*
349	10	52	67.5	400	10	51.68	65.92
395	11	53	70.96	411	11	52.7	66.2
408	12	56	78.28	469	12	54.015	80.64
293	13	56.6	87.45	311	13	57.43	91.72
347	14	58.6	93.45	366	14	60.31	100.1
133	15	62.4	111.27	313	15	62.04	109.36
129	16	63.93	119	186	16	62.52	111.16
77	17	64.8	126.6	87	17	62.9	117.11
24	18	66.66	136.83	52	18	63.29	118.92
				24	19	64.2	120.25

COLORED CHILDREN (1890).

28	10	51	72.7	30	10	49.8	74.56
36	11	53.36	78.25	52	11	52.8	79.85
44	12	53.73	83	61	12	54	82.83
51	13	56	89	62	13	56.85	97.145
29	14	58.88	93.55	44	14	58.75	103.83
33	15	61	112.3	46	15	61.54	110.13
9	16	64.44	121.1	32	16	62.8	117
5	17	65	130	12	17	66	128

In the tables above the pupils were measured with shoes off and weighed without their wraps.

The results in Greenwood's table show that at 10 there is a little difference between the height and weight of boys, but between 11 and 12 the girls grow more rapidly than boys, usually till 14 or 15, and then the boys go ahead again.

Greenwood says that from an educational point of view there are periods in a child's life when growth is greatest. At these times the vital functions are the most active in making accumulations for the future wants of the body; at this time the educational stress upon the system should be the least possible. Here, owing to superabundance of inertia, both teacher and parent are most likely to find fault. Excessive study, overstrain, late hours, loss of sleep, may destroy the most vigorous constitutions or sow the seeds of weakness throughout life.

GROWTH OF UNITED STATES NAVAL CADETS.

Dr. Beyer, in his study of the growth of United States naval cadets, makes the following observations (see table below):

From the great preponderance of blue eyes and light brown hair in the naval cadets it is safe to consider the great majority of them as belonging to the Teutonic races.

The fact that cadets come from all parts of the United States gives to the measurements a more national character. A large percentage of the measurements were continued from year to year.

An examination of the tables shows:

Weight.—There is an almost steady increase from the fifteenth to the twenty-third year, amounting in all to 37 pounds, the annual increase declining as age advances.

Height.—The greatest increase in height is between 15 and 16 years of age, after which the annual increase rapidly declines, growth being distinctly retarded at about 18; then another marked increase occurs, which closes at 21; a third increase leads to final growth.

Sitting height.—Increase in sitting height comes to a close at 19 years of age.

Circumference of chest.—This becomes highest at 17, which it attains at rapidly advancing rates; after 19 it is steadily advancing, but only by small fractions of an inch.

Lung capacity.—It reaches its maximum at 19 and continues steady or varies only slightly.

Waist.—Here there is a continued increase up to 23, remaining, however, stationary from 19 to 21, and after this it increases most rapidly.

Span of arms.—Its greatest increase is between 15 and 16, then it increases slowly but steadily until the twenty-third year.

Vision.—It is significant that both right and left vision show a positive increase up to the nineteenth and twentieth years. This fact seems important, in apparently demonstrating that the course of study at the Naval School and the strain upon the eyes does not in itself diminish the degree of distance vision in an otherwise normal eye, but that on the contrary it is advantageous in slightly increasing the visual range. Beyer thinks that the slight decrease in distance vision at 23 would indicate that the requirements of those at sea result in undue strain.

Hearing.—This is affected quite perceptibly, but in a contrary direction from sight. There is a gradual but steady decrease for both ears, which the occupation of naval cadets would lead one to expect.

Beyer agrees with Bowditch that the period of accelerated growth is prepubertal in time. Beyer thinks it natural that the fullest maturity should be followed by a period of retarded growth, which is shown in his figures for annual growth.

Tall boys are much more likely to have completed their growth at an earlier age than short boys. Also short boys not only grow more rapidly and more extensively than tall boys, but also continue to grow up to a later age than tall boys, who complete their development in height first.

Height once attained is not so easily lost, but weight and strength are easily lost as well as quickly regained. It would seem also that the ratio between growth in height and chest girth is different for short boys from that for tall boys.

TABLE No. 13.—*Measurements of United States naval cadets (Beyer), giving averages.*

Age at nearest birthday.	Number of observations.	Weight.		Height.						Circumference of chest.		Lung capacity.		Waist.	
				Standing.		Sitting.		Perineal.							
		Kilos.	*Lbs.*	*Cm.*	*In.*	*Cm.*	*In.*	*Cm.*	*In.*	*Cm.*	*In.*	*Liters*	*Cu.in.*	*Cm.*	*In.*
15 ...	132	48.53	107	162.05	63.8	84.58	33.3	81.28	32	77.47	30.5	2.998	183	63.75	25.09
16 ...	395	53.01	118	167.45	65.93	86.48	34.5	83.82	33.2	80.51	31.67	3.293	201	66.04	26
17 ...	722	56.70	125	170.30	67.05	88.90	35	86.36	34	82.55	32.5	3.555	217	69.59	27.36
18 ...	841	60.55	133.4	170.71	67.29	90.79	35.75	87.36	34.6	85.09	33.46	3.702	226	70.80	27.9
19 ...	750	63.36	139.7	172.46	67.90	91.56	36.50	91.80	35.9	88.90	35	3.932	240	72.61	28.6
20 ...	645	64.05	141.2	174.11	68.55	89.10	35.77	88.90	35	87.12	34.3	3.915	239	72.64	28.62
21 ...	493	63.40	140	174.22	68.6	91.44	36	86.36	34	87.12	34.3	3.948	241	72.89	28.68
22 ...	328	64.09	141.3	173.86	68.45	91.44	36	88.90	35	87.20	34.35	4.030	246	73.15	28.8
23 ...	232	65.31	144	174.29	68.62	91.44	36	88.90	35	88.39	34.8	3.964	242	74.16	29.2

Age at nearest birthday.	Number of observations.	Span of arms.		Vision.				Hearing.				Squeeze.			
				Right eye.		Left eye.		Right ear.		Left ear.		Right hand.		Left hand.	
		Cm.	*In.*	*Met.*	*Feet.*	*Met.*	*Feet.*	*Met.*	*Feet.*	*Met.*	*Feet.*	*Kilos.*	*Lbs.*	*Kilos.*	*Lbs.*
15 ...	132	162.30	63.9	7.314	24	7.314	24	12.192	40	12.192	40	27.66	61	27.21	60
16 ...	395	170.94	67.33	7.332	24.6	7.559	24.8	11.978	39.3	12.192	40	32.43	71.5	31.75	70
17 ...	722	172.72	68	7.742	25.4	7.620	25	11.887	39	12.009	39.4	35.127	77.47	34.74	76.6
18 ...	841	175.84	69.25	7.711	25.3	7.528	24.7	11.826	38.8	11.978	39.3	36.74	81	36.28	80
19 ...	750	178.05	70.12	7.711	25.3	7.681	25.24	11.887	39	12.039	39.5	38.55	85	37.64	83
20 ...	645	178.05	70.1	7.345	24.1	7.925	26	11.643	38.2	11.826	38.8	39.46	87	38.55	85
21 ...	493	179.83	70.67	7.437	24.38	7.620	25	11.887	39	11.582	38	39.91	88	39.61	87.4
22 ...	328	178.30	70.2	7.498	24.6	7.406	24.34	11.217	36.8	11.338	37.2	39.23	86.5	38.91	85.8
23 ...	232	180.34	71	6.888	22.6	7.010	23	11.427	37.5	11.368	37.3	39.28	86.6	38.42	84.7

MEASUREMENTS OF TRUANTS.

Table No. 14 gives data collected by Kline to ascertain whether the physical condition of truants will account for their truancy. The results from this and other tables show that the mean heights, weights, and girths of chest of the truants are less than those of the public-school boys in every instance except at age 10, when they are equal in weight and height. The public-school boys gained more in height and less in weight than the truants.

TABLE No. 14.—*Growth of chest and ratio of weight to chest of Worcester public-school boys and truant schoolboys.*

[By L. W. Kline, of Massachusetts.][1]

Age.	Boys in public schools.			Boys in truant schools.		
	Number of observations.	Mean girth.	Ratio of weight to girth.	Number of observations.	Mean girth.	Ratio of weight to girth.
		Inches.			*Inches.*	
9	68	23.48	2.65	18	23.28	2.43
10	82	24.30	2.63	23	24.27	2.61
11	109	25.34	2.83	31	24.92	2.73
12	119	26.28	2.36	46	25.80	2.80
13	111	27.28	3.04	49	26.72	3.04
14	81	28.55	3.26	25	27.80	3.21
15	36	29.90	3.51	10	28.84	3.29

[1] Pedagogical Seminary, January, 1898.

TABLE No. 15.—*Average mean weights and heights (in slippers), rate of increase, etc., of public-school boys of Worcester, Mass., and truant schoolboys of Massachusetts.*

[By L. W. Kline.][1]

Age.	Weights.								Heights.									
	Boys in public schools.				Boys in truant schools.				Boys in public schools.					Boys in truant schools.				
	Number of observations.	Average weight.	Mean weight.	Rate of increase.	Number of observations.	Average weight.	Mean weight.	Rate of increase.	Number of observations.	Average height.	Mean height.	Rate of increase.	Ratio of mean weight to mean height.	Number of observations.	Average height.	Mean height.	Rate of increase.	Ratio of mean weight to mean height.
Years.		*Lbs.*	*Lbs.*			*Lbs.*	*Lbs.*			*In.*	*In.*				*In.*	*In.*		
9	68	62.10	61.43		18	57.73	56.75		68	50.91	50.81		1.20	18	49.42	49.49		1.14
10	82	65.56	63.50	2.07	23	64.75	63.51	6.75	82	52.03	52.25	1.44	1.21	23	51.77	52.25	2.76	1.21
11	109	71.43	72	8.50	35	69.85	68.25	4.70	109	54.20	54.25	2	1.32	35	52.61	53	.75	1.28
12	120	77.27	76	4	50	74.55	72.37	4.12	120	55.79	55.37	1.12	1.37	50	53.99	53.62	.62	1.34
13	112	87.49	83.12	7.12	55	83.30	80.25	7.88	112	57.04	57.25	1.88	1.45	55	55.71	56	2.38	1.44
14	84	93.98	93.25	10.13	26	85.98	89.50	8.25	84	60	59.87	2.62	1.55	26	57.45	58.50	2.50	1.54
15	37	105.24	105	11.75	11	94	95	5.50	37	62.21	62	2.13	1.69	11	57.72	58.50		1.62
Total.	612	......	......	.....	218	.....	.....	.....	612	.....	.....	.....	.....	218	.....	.....	.....	....

[1] The Pedagogical Seminary, January, 1898.

MEASUREMENTS OF PAIN ON CHILDREN IN PUBLIC AND PRIVATE SCHOOLS, ETC.[1]

The following tables (I–VIII) give in grams the average least sensibility to pain (by pressure) on the temples. The measurements were made under the direction of the author.[2]

TABLE I.—*Measurements of all persons (girls and women) of every division, arranged according to ages. Whole number, 899.*

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
10	91	1,926	1,750
11	111	2,129	1,969
12	131	1,854	1,705
13	123	1,877	1,881
14	92	1,878	1,858
15	80	1,926	1,837
16	75	2,102	1,661
17	64	2,119	2,130
18	34	2,154	2,072
19	31	2,610	2,458
20–30	30	1,912	1,743
30–40	18	2,035	2,097
40–50	13	2,179	2,088
50 on	6	2,225	2,141

[1] A paper read by the author before the American Psychological Association, December 30, 1898. See Psych. Rev., March, 1899.

[2] The algometer used is described on page 1155.

TABLE II.—*Girls in private schools.*

[Measured by A. B. Jones and A. E. Palmer.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
10	5	648	604
11	4	725	580
12	3	466	433
13	13	729	713
14	7	801	828
15	20	842	793
16	18	955	1,008
17	14	1,318	1,353
18	9	1,250	1,238
19	3	900	900

TABLE III.—*Girls in public schools of Saginaw, Mich.*

[Measured by A. Carman.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
10	86	2,001	1,817
11	107	2,182	2,021
12	128	1,887	1,807
13	110	2,013	2,019
14	85	1,990	1,944
15	60	2,288	2.185
16	57	2,463	2,394
17	48	2,373	2,382
18	25	2,480	2,374
19	20	2,885	2,632

TABLE IV.—*Boys in public schools of Saginaw, Mich.*

[Measured by A. Carman.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
10	98	2,233	2,102
11	105	2,241	2,314
12	120	2,393	2,363
13	150	2,507	2,444
14	98	2,638	2,529
15	83	2,780	2,621
16	54	2,782	2,682
17	34	2,990	2,959
18	15	3,000	2,807

TABLE V.—*University women.*

[Measured by F. A. Kellor and Emily Dunning.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
17-20	19	2,306	2,201
21-32	14	2,103	1,935
....	33	2,220	2,088

TABLE VI.—*Washerwomen.*

[Measured by A. O. Moore.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
25-39	8	3,129	3,200
40-55	6	3,000	2,950
....	14	3,073	3,092

TABLE VII.—*Business women.*

[Measured by A. O. Moore.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
30-40	5	1,260	1,271
45-60	4	1,587	1,450
....	9	1,405	1,350

TABLE VIII.—*Self-educated women.*

[Measured by A. MacDonald.]

Nearest ages in years.	Number of persons.	Right temple.	Left temple.
21-36	13	1,150	1,119
41-53	11	1,475	1,365
....	24	1,299	1,233

CONCLUSIONS.

1. In general (Table I), the sensibility to pain decreases as age increases. The left temple is more sensitive than the right. This accords with former experiments (see below), that the left hand is more sensitive to pain than the right hand. There is an increase of obtuseness to pain from ages 10 to 11; then a decrease from 11 to 12; then an increase from 12 to 13. From 13 to 17, while the right temple increases in obtuseness, the left temple increases in acuteness. This is in the post-pubertal period. There is a general variation, which experiments on larger numbers might modify (Table I).

2. Girls in private schools (Table II), who are generally of wealthy parents, are much more sensitive to pain than girls in the public schools (Table III). It would appear that refinements and luxuries tend to increase sensitiveness to pain. The hardihood which the great majority must experience seems advantageous. This also accords with our previous measurements (see below), that the nonlaboring classes are more sensitive to pain than the laboring classes.[1]

3. University women (Table V) are more sensitive than washerwomen (Table VI), but less sensitive than business women (Table VII). There seems to be no necessary relation between intellectual development and pain sensitiveness. Obtuseness to pain seems to be due more to hardihood in early life.

4. Self-educated women (Table VIII), who are not trained in universities, are more sensitive than business women. Giving, then, the divisions in the order of their acuteness to the sense of pain, they would stand as follows: (1) Girls of the wealthy

[1] By "laboring classes" are meant artisans and unskilled laborers. "Nonlaboring classes" refer to professional and mercantile men.

classes; (2) self-educated women; (3) business women; (4) university women; (5) washerwomen. The greater sensitiveness of self-educated women as compared with university women may be due to the overtaxing of the nervous system of the former in their unequal struggle after knowledge.

5. The girls in the public schools (Table III) are more sensitive at all ages than the boys (Table IV). This agrees with the results of our previous measurements, that women are more sensitive to pain than men.

These measurements of least disagreeableness, or of threshold of pain, are approximate measurements of the combination of nerve, feeling, and idea.

RESULTS OF PREVIOUS EXPERIMENTS[1] (1,412 PERSONS).

Women are more sensitive to pain than men.

American professional men are more sensitive to pain than American business men, and also more sensitive than both English and German professional men. The laboring classes are much less sensitive to pain than the nonlaboring classes.

The women of the poorer classes are much less sensitive to pain than those in more comfortable conditions.

Young men of the wealthy classes are much more sensitive to pain than men of the working classes.

Young women of the wealthy classes are much more sensitive to pain than young men of the wealthy classes. As to pain, it is true in general that women are more sensitive than men, but it does not necessarily follow that women can not endure more pain than men.

The left hand is more sensitive to pain than the right hand.

CHILDREN IN PUBLIC SCHOOLS OF SAGINAW, MICH.

MEASUREMENTS OF PAIN IN RELATION TO AGE, SEX, ORDER OF BIRTH, AND MENTAL ABILITY.

These measurements of least sensibility to pain were made on 1,507 public-school children in Saginaw, Mich., by Miss Ada Carman.

The instruments used were the author's temple algometer and Collin's hand dynamometer, described in the section on instruments.

Before the experiments were made the pupils answered the following questions in writing:

Name, age, sex, order of birth; first, second, or later born; color of hair, color of eyes, left-handed, near or far sighted, nationality of father, nationality of mother, occupation of father, occupation of mother, education of father, education of mother.

When a pupil could not answer any question he was helped by his teacher or by the experimenter. At least 25 per cent did not know the color of their hair, and at least 50 per cent did not know the color of their eyes.

Most of the children were of foreign parentage and of the laboring classes, by which is meant artisans and unskilled laborers.

The tables give in grams the average least sensibility to pain by pressure on the temples, and in kilograms the average greatest strength by grasp of hands.

---

[1] In previous experiments the author employed Cattell's hand algometer. Psychological Review, March, 1895 and 1896.

TABLE I.—*Boys.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	96	2,253	2,191	16	14
11	104	2,359	2,337	19	15
12	123	2,359	2,337	21	18
13	152	2,447	2,432	22	20
14	101	2,629	2,523	26	23
15	79	2,738	2,656	30	27
16	53	2,824	2,700	35	30
17	33	3,036	3,023	40	35
18	15	3,267	3,077	42	38
Total	756	2,493	2,466	24	21

TABLE II.—*Girls.*

Nearest age, in years.	Number of persons	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	86	1,874	1,827	11	10
11	102	2,107	1,983	13	12
12	132	1,873	1,788	15	14
13	107	2,017	1,997	18	16
14	84	1,955	1,961	20	17
15	82	2,218	2,165	21	18
16	66	2,433	2,283	21	18
17	48	2,360	2,330	23	22
18	25	2,478	2,374	24	22
19	19	2,937	2,705	23	20
Total	751	2,097	2,030	17	16

TABLE III.—*Boys first born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	20	2,180	2,178	15	12
11	40	2,420	2,363	18	16
12	31	2,421	2,390	21	18
13	55	2,537	2,461	22	20
14	25	2,390	2,208	27	23
15	23	2,354	2,189	29	26
16	20	2,845	2,603	38	33
17	8	3,288	3,163	43	37
18	4	3,575	3,275	40	37
Total	226	2,506	2,405	24	21

TABLE IV.—*Girls first born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	29	2,167	2,193	11	10
11	21	2,136	2,133	13	12
12	36	1,956	1,815	15	14
13	29	2,174	2,140	18	16
14	24	1,973	1,985	20	16
15	23	2,203	1,963	22	19
16	24	2,369	2,169	20	17
17	18	2,344	2,386	23	21
18	7	2,236	2,086	20	20
19	4	2,825	3,125	22	19
Total	215	2,163	2,096	17	16

TABLE V.—*Boys second born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	28	2,102	2,009	16	14
11	15	2,520	2,570	18	16
12	28	2,218	2,115	21	19
13	31	2,442	2,490	23	21
14	28	2,702	2,613	25	23
15	15	3,000	2,847	31	27
16	15	2,723	2,708	31	28
17	8	3,050	3,500	38	35
18	4	3,213	3,113	40	33
Total	172	2,519	2,489	24	21

TABLE VI.—*Girls second born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	28	1,746	1,714	11	10
11	35	2,120	1,929	13	11
12	32	1,652	1,633	15	13
13	24	1,948	2,023	17	15
14	18	2,194	2,142	20	17
15	19	2,258	2,289	23	19
16	16	2,572	2,397	20	19
17	9	2,183	2,211	21	22
18	2	3,225	3,150	28	21
19	6	3,100	2,717	21	21
Total	189	2,069	2,008	17	15

TABLE VII.—*Boys later born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	48	2, 372	2, 302	16	14
11	49	2, 260	2, 245	18	15
12	64	2, 374	2, 409	20	17
13	66	2, 375	2, 381	23	20
14	48	2, 711	2, 635	26	23
15	41	2, 857	2, 840	30	25
16	18	2, 881	2, 803	33	29
17	17	2, 912	2, 732	39	35
18	7	3, 121	2, 943	45	42
Total	358	2, 527	2, 493	24	21

TABLE VIII.—*Girls later born.*

Nearest age, in years.	Number of persons.	Average least sensibility to pain (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
10	29	1, 703	1, 534	11	11
11	46	2, 084	1, 957	13	12
12	64	1, 938	1, 843	15	13
13	54	1, 964	1, 908	18	16
14	42	1, 843	1, 869	19	17
15	40	2, 208	2, 221	20	17
16	26	2, 406	2, 317	21	19
17	21	2, 498	2, 333	24	23
18	16	2, 491	2, 403	25	24
19	9	2, 878	2, 511	24	21
Total	347	2, 080	1, 998	18	16

TABLE IX.

	Number of persons.	Average least sensibility (in grams).		Average strength of grasp (in kilograms).	
		Right temple.	Left temple.	Right hand.	Left hand.
Dark boys	356	2, 462	2, 408	25	22
Light boys	400	2, 570	2, 518	23	20
Dark girls	402	2, 113	1, 840	18	16
Light girls	349	2, 884	2, 022	17	15

TABLE X.

	Average least sensibility (in grams).		Average strength of grasp (in kilograms).	
	Right temple.	Left temple.	Right hand.	Left hand.
Bright	1, 737	1, 736	16	13
Dull	2, 094	1, 868	13	12

The following is a summary of the foregoing tables: With both boys and girls sensitiveness to pain decreases as age increases, and the left temple is more sensitive than the right (Tables I and II).

Girls are more sensitive and have less strength at all ages than boys (Tables I and II).

In boys, sensitiveness to pain decreases in order of birth (Tables III-V); with girls the reverse seems to be true (Tables VI-VIII.)

Boys with light hair and eyes are less sensitive and less strong than boys with dark hair and eyes. Girls with light hair and eyes are less sensitive to pain than girls with dark hair and eyes; they are also less strong (Table IX).

Bright boys are more sensitive to pain than dull boys and are stronger (Table X); the same is true as to girls.

IV.—MEASUREMENTS OF SCHOOL CHILDREN OF EUROPE.

The purpose of this part, as of part III, is to give in brief the results of studies upon children in Europe. For more detailed information the reader should consult the original articles.

Human Growth in English Towns.

According to John Yeats Peckham, of England, there were very few more persons in 1851, living in rural districts in the United Kingdom, than there were in 1801. There were on an average in 1851 in city districts 5.2 persons to an acre; in the rural districts, 5.3 acres to a person; in the one, 3,337 persons to the square mile; in the other, 120 only. As the inhabitants of cities become more and more numerous and influential, they must ultimately shape the future of any country. Peckham says that infancy and age, with all their ills, detract, economically speaking, from the effectiveness of life and add to its burdens. Thus, the population was more youthful than it should be by the natural standard. The inference is, therefore, that the youthful element may preponderate whether it be wisely progressive or rashly precipitate. Dr. Lankaster, when investigating in the South Kensington Museum, said that healthy men ought to weigh an additional 5 pounds for every inch in height beyond 61 inches, at which height they ought to weigh 120 pounds less one-seventeenth of that gross weight for clothing.

According to Liharzik growth is regular, and all deviation tends to produce disease, as disease also produces deviation. A large head is frequently accompanied with a contracted chest; here mental action may be slow—probably from deficient supply of purified blood. Boys of small frames often have rather large heads and are deficient in repose of character. City-bred children are usually more vivacious, but have less power of endurance (Liharzik) than children reared in the country.

Examination of Heights, Weights, etc., of Human Beings in the British Empire.

In the report of the anthropometric committee of the British Association for the Advancement of Science in 1880, are given the results of observations in over 50,000 individuals. In Table 1 below is shown how growth degenerates as we go lower in the social scale; there is a difference of 5 inches in average statures between the best and worst nurtured classes in the community.

There is a constant but more or less uneven growth in height, weight, chest girth, and strength of arm, increasing annually up to 16 or 17, and then rapidly diminishing. Between 11 and 14 the rate of growth in height is almost uniform. At 15 it begins to advance more rapidly, at 16 still more, at 17 it falls off by more than one-half, and after this decreases rapidly. The same is true in regard to weight, except that the rate begins a year earlier.

The growth of chest girth is uniform up to 13, when it becomes double and then follows nearly the same course as that of height and weight, except that it continues higher at 17 and 18.

The growth of strength is not so regular. It doubles at 13, making no advance at 14, but making a great advance at 15, continuing longer and diminishing more slowly than height and weight.

Color of Eyes and Hair.

Dr. Beddoe in a limited number of observations (1,027 in all) has found much difference between women of 18 to 23 and women over 25 years of age. In men the greatest change takes place from 20 to 23, while in women it is earlier. Green eyes do not occur with black hair, nor do so-called black eyes with the blackest hair, which often accompanies dark-gray eyes. Dark-blue eyes are rare with reddish hair, but often accompany dark or even black hair. A larger number of observations would probably enable young people to be distinguished from adults through the color of eyes and hair.

From this table (No. 1) of Charles Roberts[1] will be seen the relative statures of boys of the age of 11 to 12 years under different social and physical conditions of life. The zigzag line running through the means shows the degradation of stature as the boys are further and further removed from the most favorable conditions of growth.

TABLE 1.

Height.	Total number of observations.	Public schools, country.	Middle-class schools.		Elementary schools.				Military asylums.	Industrial schools.
			Upper towns.	Lower towns.	Agricultural laborers, country.	Artisans, towns.	Factories and workshops.			
							Country.	Towns.		
60 inches	6	2	....	3	....	1	....	....	....	....
59 inches	16	2	3	5	2	2	....	....	1	....
58 inches	35	9	9	8	5	0	2	....	2	....
57 inches	66	11	17	13	4	4	5	5	7	1
56 inches	118	21	23	27	14	4	10	3	15	....
55 inches	230	28	35	57	32	15	13	17	33	....
54 inches	329	33	53	68	47	24	36	20	46	2
53 inches	361	15	55	58	47	26	34	38	84	4
52 inches	441	14	37	61	58	36	52	59	118	6
51 inches	370	6	25	40	36	28	45	57	123	10
50 inches	367	7	23	27	32	17	46	61	143	11
49 inches	252	2	8	20	14	12	31	40	114	11
48 inches	132	....	3	1	7	4	11	20	76	10
47 inches	102	....	3	4	5	7	5	13	59	6
46 inches	22	....	....	....	1	1	3	7	7	3
45 inches	12	....	....	....	....	....	....	1	10	1
44 inches	1	....	....	....	....	....	....	....	0	1
43 inches	1	....	....	....	....	....	....	....	1	....
42 inches	1	....	....	....	....	....	....	....	1	....
Total	2,862	150	294	392	304	181	293	341	840	66
Average height, inches	52.60	54.98	53.85	53.70	53.01	52.60	52.17	51.56	51.20	50.02
Mean height, inches	52.5	55.0	54.0	53.5	53.0	52.5	52.0	51.5	51.0	50.0

Growth of the Sane and Insane.

Dr. Robert Boyd, of England, from examinations of 2,086 persons in an infirmary and 528 insane, gives among other results the following:

The body and internal organs arrive at their full size between 20 and 30 years of age. In children especially the body is attenuated by disease. The average weight of males is greatest from 70 to 80 years, which may be explained from the fact that many die at earlier periods from consumption.

[1] Manual of Anthropometry, London, 1878, page 32.

The mean weight of the male brain was at all periods above that of the female. Boyd thinks this is the probable cause of the large number of stillborn male infants as compared to females, 51 to 32. The highest average weight of brain in both sexes is from ages 14 to 20 years. The next highest was in the males from 30 to 40, and in the females from 20 to 30 years.

GROWTH OF BOYS IN BRESLAU.

Carstädt, of Breslau, gives the results of 4,274 measurements in the following table:

TABLE 2.

Age.	Number of measurements.	Average height.	Growth in—	
			One-half year.	One year.
		Centimeters.	*Centimeters.*	*Centimeters.*
6 years	68	109.3	....	....
6½ years	147	111.8	2.5	
7 years	203	113.8	2.0	4.5
7½ years	199	116.8	3.0	....
8 years	197	118.9	2.1	5.1
8½ years	189	121.6	2.7	....
9 years	174	123.7	2.1	4.8
9½ years	157	126.0	2.3	....
10 years	204	128.5	2.5	4.8
10½ years	232	130.8	2.3	....
11 years	272	133.3	2.5	4.8
11½ years	317	135.6	2.3	....
12 years	298	138.1	2.5	4.8
12½ years	325	140.4	2.3	....
13 years	291	143.3	2.9	5.2
13½ years	274	145.8	2.5	....
14 years	206	149.1	3.3	5.8
14½ years	157	152.3	3.2	....
15 years	125	156.6	4.3	7.5
15½ years	104	159.9	3.3	6.2
16 years	75	162.8	2.9	....
16½ years	60	164.5	1.7	....

In the four years from 8 till 12 the growth is entirely regular, being for each year 4.8 centimeters. The greatest growth is from 14 to 15.

KOTELMANN'S INVESTIGATIONS IN HAMBURG.

In an investigation of the 515 students of the Johannaeum, in Hamburg, published in 1878, Kotelmann makes the following statements:

The students in the gymnasium exceed those in the lower schools in weight and height, more because of unfavorable social conditions of the pupils in these schools. The older the boys the more the muscles of the upper extremities grow as compared with those of the lower, which is explained by the fact that, as they are sitting more, the lower extremities are less active. Thus the muscles of the legs are less contractile as years increase, while the opposite is true with the muscles of the arms. With this is connected the further fact that the strength of the arms increases from year to year with the increase of their circumference, while the strength of the leg as compared with that of the arm is less as age increases.

The development of the superficial facia, which increases with weight of body in the older pupils, is not only greater than in the younger pupils, but increases greatly with the growth of the muscles in the older scholars.

The time of puberty is of the greatest importance for the whole development of the body, since not only the height and weight, but also the muscles and strength of the upper and lower extremities, the chest girth and lung capacity, all at this period increase the most. The only exception is the increase of fat, which is some what irregular at different ages.

The lung capacity increases with age faster than the length of body. Following is the table of Kotelmann:

TABLE 3.

Age, in years.	Length of body.	Lung capacity.	Relation of length of body to lung capacity.
	Centimeters.	*Cubic cm.*	
9 years	128.58	1,771.15	1:13.77
10 years	130.75	1,865.45	1:14.26
11 years	135.06	2,021.66	1:14.22
12 years	139.91	2,177.41	1:15.56
13 years	143.09	2,270.28	1:15.86
14 years	148.88	2,496.15	1:16.76
15 years	154.19	2,757.69	1:17.88
16 years	161.65	3,252.97	1:20.12
17 years	166.90	3,553.72	1:21.29
18 years	168.39	3,686.11	1:21.89
19 years	166.86	3,891.25	1:23.32
20 years	167.19	3.926.92	1:23.48

Wintrich also confirms the conclusions from the above table.

But, on the other hand, the weight of body increases with age faster than the lung capacity, as shown in the table which follows:

TABLE 4.

Age, in years.	Weight of body.	Lung capacity.	Relation of weight of body to lung capacity.
	Kilograms.	*Cubic cm.*	
9	25.55	1,771.15	1:69.32
10	26.89	1,865.45	1:69.37
11	29.22	2,021.66	1:69.18
12	32.34	2,177.41	1:67.51
13	34.01	2,270.28	1:66.75
14	38.96	2,496.15	1:64.07
15	43.65	2,757.69	1:63.18
16	49.33	3,252.97	1:65.94
17	54.03	3,553.72	1:65.77
18	57.34	3,686.11	1:64.28
19	58.76	3,891.25	1:66.22
20	60.40	3,926.92	1:65.01

Vierordt has arrived at similar results by combining the figures of Schnepf for lung capacity with those of Quetelet for weight of body.

CHILDREN OF FREIBERG IN SAXONY AND OF THE WHOLE KINGDOM OF SAXONY.

Drs. Geissler and Uhlitzsch, by comparing their measurements of the school children in Freiberg with those of the Kingdom of Saxony, found that the children in Freiberg are smaller. They found also that in the common schools of Freiberg the children had a higher average height than children of the farmers in the surrounding towns.

There were in all 21,173 children—10,343 boys and 10,830 girls—studied, from 6½ to 14½ years of age.

MEASUREMENTS OF SCHOOL CHILDREN IN GOHLIS-LEIPZIG, SAXONY.

Dr. Paul Hasse in 1889 measured 2,806 school children in Gohlis-Leipzig—1,386 boys and 1,420 girls. The average heights and weights at different ages were as follows:

TABLE 5.

Age.	Height.		Weight.	
	Boys.	Girls.	Boys.	Girls.
	Cm.	*Cm.*	*Pounds.*	*Pounds.*
6-7 years	110.2	109.3	42.7	40.9
7-8 years	114.4	113.7	45.8	44.7
8-9 years	119.4	117.7	49.3	48.1
9-10 years	123.9	124.0	53.4	52.4
10-11 years	129.1	128.6	57.5	57.0
11-12 years	132.4	133.9	61.9	63.2
12-13 years	138.2	139.5	69.1	70.5
13-14 years	140.7	145.1	71.8	77.2
Over 14 years	146.2	149.1	79.8	86.5

The relation between height and weight should be noted. It is well known that they stand in a constant relation to each other. In comparing these with other measurements, the boys are not so large as those measured by Kotelmann in Hamburg or those measured by Bowditch in Boston. The girls are second only to the Boston girls. The children of Gohlis-Leipzig excel in weight and height those in central Russia measured by Erismann, those in Turin measured by Pagliani, those in Poland measured by Landsberger, in Breslau by Carstädt, and in Freiberg by Geissler and Uhlitzsch.

Comparing the poor with the well-to-do classes, the results show that for boys of the same age the height varies from 0.7 to 4 centimeters in favor of the well-to-do classes; for girls it varies from 1.7 to 4.1 centimeters in favor of the well-to-do. The children of the well-to-do classes excel also in weight for the same age; for boys the excess runs from 0.3 to 4.7 pounds; for girls from 1.6 to 4.6 pounds. In general the difference between the classes is not so great as in other places, as in Freiberg and Turin, except in Boston, where the difference between the classes is less marked.

Hasse also gives data concerning the weak or defective children, who generally can not attend school regularly. Such children are usually abnormally developed or have some chronic ailment. In the primary schools 9 per cent belonged to this class. A striking fact is this, that in many cases these children in certain years were over normal; that is, were taller and heavier than other children. This suggests that there is a certain normal relation between mental and physical development, the finding of which is one of the aims of anthropometry.

MEASUREMENTS OF CHILDREN IN LAUSANNE, SWITZERLAND.

In November of each year Dr. Combe measured the children in Lausanne, arranged according to the month in which they were born, giving averages for the month as well as for the year. He found that boys up to 14 and girls up to 11 developed regularly, but from 11 to 14 the girls grew faster. The length of body showed great variations. From the single month's average Combe made the yearly average from 8 to 18. The height of boys corresponding to the years was 117.4, 122.2, 126.9, 131.3, 135.4, 139.8, 144.4, 149, 156, 162, 167; of girls, 116.3, 121.2, 126.1, 131, 136.4, 141.9, 147, 153, 157, 163.

The height of girls up to 11 years is continually less than that of boys; then suddenly it increases and exceeds the boys in the fourteenth year by 1-1.5 centimeters. Then the growth falls back, and that of the boys is greater and continues so.

TALLEST CHILDREN BORN IN SUMMER.

According to Combe (Table No. 6), boys born in the months of September, October, November, December, January, and February are not so tall as those born in the other months. Those born in November are the shortest. Those born in July are the tallest.

TABLE 6.

Age.	Average length of body of boys born in—											
	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
8 years	117.9	118.3	117.6	117.8	116.9	117.3	117.0	118.4	117.3	117.6	116.8	117.0
9 years	122.1	122.6	122.0	123.1	122.0	121.8	121.8	123.6	122.3	122.5	121.3	121.8
10 years	126.3	127.4	126.7	127.6	127.8	126.8	126.6	128.9	126.6	126.9	126.2	126.6
11 years	131.8	131.4	130.7	131.4	131.9	131.6	130.8	133.1	131.4	130.9	130.3	130.8
12 years	135.3	135.5	135.1	135.5	136.4	135.5	134.7	136.9	135.6	135.3	134.9	134.7
13 years	139.5	139.6	139.3	141.3	141.0	139.9	138.6	141.3	140.3	139.4	139.1	138.8
14 years	143.9	144.4	143.9	146.2	145.4	144.6	142.4	146.4	145.3	144.9	143.7	142.2

If we examine the following table (No. 7) of Combe, we will find that girls born in December, January, February, March, April, and May show a less length of body than those born in the other months; those born from June till November are taller. The tallest are born in August.

TABLE 7.

Age.	Average length of body of girls born in—											
	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
8 years	115.8	116.6	116.1	117.7	116.3	117.2	116.6	115.7	116.5	115.7	115.3	116.6
9 years	120.8	121.1	120.9	121.5	121.1	121.7	121.7	120.7	121.3	120.6	121.5	121.2
10 years	125.3	125.7	125.8	126.3	126.0	126.1	126.9	125.6	126.8	124.9	126.5	126.6
11 years	130.2	130.4	130.3	130.5	131.3	130.8	132.6	130.5	132.0	129.4	131.9	131.8
12 years	135.3	134.8	136.1	136.9	136.7	136.2	137.8	135.7	138.1	134.2	137.8	137.0
13 years	140.5	140.6	142.1	142.4	141.8	141.3	142.7	141.9	144.1	140.1	143.6	142.6
14 years	145.3	146.0	147.2	146.8	146.3	145.9	147.8	147.8	149.5	146.0	148.1	148.3

The investigations of Wahl in Denmark and Wretlind in Gotenburg, and especially those of Malling-Hansen in Copenhagen, on the deaf, show that the length of body of boys from March till August increases greatly, but very little from September to February. Malling-Hansen assumes that this is due to the summer vacation; but Combe thinks not, because Wahl has observed the same thing in children under 7 years who had not been at school. Combe thinks it is due to the nature of the child, and is analogous to the influence which the birth-period has upon the length of the body, for in both cases the maximum of body-length is found in the same period, that is from March till August.

But it may be due, as it seems to us, to some extent to economic conditions, for a child born in summer generally has better food and air. As we know, a large number of parents of public-school children are poor; in winter they are forced to economize more on account of expense of heating. They generally live also in small and poorly-ventilated rooms. The influence of such conditions on a very young child would be much more detrimental than when the child is older and better able to resist unfavorable surroundings.

SICKNESS IN SCHOOL.

Combe found sickness in girls existing to some extent to the eleventh year, then it increased faster than in boys up to 15. In the case of girls, sickness depended less on contagious diseases; it was due rather to the want of resistance, etc.

TABLE 8.—*Percentage of sickliness in school children in Copenhagen and Lausanne.*

Age.	Boys.			Girls.		
	Sickly in Copenhagen.	Sickly in Lausanne.	Growth.	Sickly in Copenhagen.	Sickly in Lausanne.	Growth.
	Per cent.	*Per cent.*	*Cm.*	*Per cent.*	*Per cent.*	*Cm.*
6-7 years	48.0			52.0		
7-8 years	50.0			50.0		
8-9 years	48.0	64	4.8	52.0	88	4.9
9-10 years	46.7	43	4.7	53.0	75	4.9
10-11 years	42.5	42	4.4	57.5	60	4.9
11-12 years	39.6	40	4.1	60.4	66	5.4
12-13 years	39.4	33	4.4	60.6	68	5.5
13-14 years	37.3	29	4.6	62.7	61	5.1
14-15 years	42.9	34	7.0	57.1	39	5.0

From the above table (No. 8) of Combe, it will be noted that the girls attend school at the age when they are most disposed to sickliness, as anemia, headache, etc.; while the boys, if they enter into this dangerous period, have left the primary schools. Combe criticises especially any school plan which does not consider this difference between the sexes as contrary to nature, for it makes at this time the same requirements of boys and girls. The girls demand special care during the age of puberty; their tendency to anemia during this period, according to all rules of hygiene, should be combated every way, at home, in regard to air, light, exercise, and nutrition, and especially in school where sufficient air-space, good ventilation, light, and heating are demanded. Girls at this period should not have much housework to do, for it robs them of necessary exercise in the open air.

SIZE OF BODY AND WEIGHT OF SCHOOL CHILDREN IN SAALFELD, GERMANY.

Emil Schmidt, of Leipzig, in 1892, published observations on 9,506 school children in Saalfeld, 4,699 being boys and 4,807 girls.

Comparing these measurements with those in other countries, Schmidt finds that the children in Saalfeld are not so tall for their ages as Boston school children, who from ages 7 to 10 exceeded by 1.3 to 1.9 centimeters; from ages 11 to 14, by 2.2 to 3.1 centimeters.

Compared with the children of the English working classes, the Saalfeld children excel at age 12, by 2 centimeters; at age 13, by 3.2; at age 14, by 1 centimeter.

Danish boys at all ages are taller by 0.1 to 2.7 centimeters than Saalfeld boys. Swedish children are still taller by 1.8 to 6.7 centimeters.

The Turin boys of the well-to-do classes are larger than the boys of Saalfeld, but those of the lower classes are smaller than the boys of Saalfeld. This would indicate in Turin a wider distinction between the classes. The same general comparisons apply to the girls, with a few exceptions.

The investigations of the children of Saalfeld in general confirm the results of previous investigations. Thus it has been found that boys grow more regularly than girls. In Danish and Swedish schools it was shown that girls react more upon outer influences than boys; also that the total growth of girls during school years is greater than that of boys.

Schmidt shows from the following tables that in the city the average size of body during school years is less and the growth is slower than in the country. There is more elasticity in the conditions of the country, which aids the child in overcoming any injurious effect of confinement in school.

TABLE 9.

	City.	Country.
	Cm.	*Cm.*
Length of body in seventh year	109.0	109.6
Length of body in fourteenth year	140.7	143.4
Length of body in twenty-first year	165.3	166.5
Growth from birth until seventh year	59.0	59.6
Growth from seventh till fourteenth year	31.7	33.8

CHILDREN OF POLAND.

The first part of Table No. 10 below is that of Dr. Landsberger, of Poland. From 1880 to 1886 he measured yearly in May 104 children. He lays stress upon the fact that it was always the same children. Many of the children, however, fell out from year to year, from one cause or another. Yet Landsberger says the numbers were large enough at the outset to give the average value.

The children were separated into two classes, the poor and the well-to-do. He made measurements of the liver by percussion, and found that from 6 to 8 in boys the liver to be on an average 10, 10¼ to 10½ centimeters long in the well-to-do classes; in the children of the poorer classes it was less. The liver is from 8.9 to 9.3 per cent the length of the body. Frerichs[1] has found by measurements on the dead, where the length of body was from 100 to 150 centimeters, the liver was 8.3 centimeters, and in boys from 6 to 15 years 6.7 long. Hensen[2] makes the liver of the new-born infant weigh 4.39 per cent and that of the adult 2.77 per cent of the whole weight of the body.

TABLE 10.

	6 years.	7 years.	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	Increase— From 6 to 13 years.	Increase— Per year.
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
Length of body	106.9	112.2	117.3	122.1	125.4	130.0	135.2	139.2	32.3	4.6
Arm reach	106.3	112.5	116.9	122.2	125.0	129.6	135.4	140.5	34.2	4.8
Length of left arm	47.3	49.4	50.2	53.6	54.9	57.0	59.7	62.7	15.4	2.2
Maximum length of head	16.5	16.6	16.7	16.5	17.0	17.1	17.2	17.5	1.0	......
Maximum width of head	13.7	14.5	14.3	14.5	14.5	14.6	14.6	14.5	0.8	......
Height of head	20.7	20.8	20.9	21.2	21.0	21.4	21.3	21.7	1.0	......
Height of face	14.7	14.7	14.9	15.4	15.7	15.6	16.1	16.5	1.8	0.2
Circumference of head	50.9	51.0	51.3	51.7	51.8	51.9	52.3	52.3	1.4	0.2
Circumference of neck	24.9	25.4	26.0	26.3	26.7	27.0	27.9	29.1	4.2	0.6
Circumference of chest	54.8	55.4	58.0	60.2	61.9	63.7	65.0	69.0	14.2	2.0
Length of left arm:										
Quetelet	44.7	47.5	50.2	53.1	55.6	......	60.5	......	*a*15.8	......
Zeising	50.0	......	......	60.4	......	......	61.7	......	*a*11.7	......
Height of head:										
Quetelet	19.5	19.8	20.1	20.3	20.5	......	20.9	......	......	......
Liharzik	*b*20.4	21.0	21.0	21.4	21.7	......	22.2	22.6	......	......
Circumference of head:										
Quetelet	50.8	51.3	51.9	52.3	52.7	......	53.5	......	......	......
Circumference of chest:										
Quetelet	54.3	56.4	58.5	60.6	63.0	......	67.5	......	......	......
Kotelmann	......	......	......	60.7	62.4	63.8	65.8	......	......	......

a From 6 to 12 years. *b* About.

[1] Klinik der Leberkrankheiten, S. 40.

[2] Hermann's Handb. d. Physiologie. Leipzig, 1881, VI, 2.

The difference between the classes is brought out clearly in the following table:

TABLE 11.

Year.	Average height of well-to-do.	Average height of poor classes.
	Centimeters.	*Centimeters.*
1880	108.9	106.1
1881	114.5	111.4
1882	119.6	116.7

Children of the well-to-do classes are stronger and larger when beginning school life, but in spite of their better nourishment do not grow faster than the poorer children. This is not in accord with the conclusion as to Washington school children, but Landsberger measured only 106 children. This points to the great importance of nourishment in the earliest childhood, before school life begins. This will be clear if we examine the following painstaking measurements made by Russow.[1]

TABLE 12.

Year.	Children nursed by mothers.		Children artificially nourished.	
	Weight.	Length.	Weight.	Length.
	Kilograms.	*Centimeters.*	*Kilograms.*	*Centimeters.*
First year	9.9	73	7.4	66
Second year	11.1	83	8.6	75
Third year	12.6	89	10.5	83
Fourth year	14.2	93	12.0	87
Fifth year	15.3	100	13.4	98
Sixth year	17.0	106	15.7	102
Seventh year	18.2	110	15.9	105
Eighth year	20.7	116	18.3	113

From the table below it will be seen that the head in its diameters and circumference grows much more slowly than the body; also that the head seems to be independent of the length of the body in its growth. Thus, let us consider the relation of the length of the head to the length of the body, giving the former in per cent of the latter.

TABLE 13.

	Per cent according to Quetelet.	Per cent according to Liharzik.	Per cent according to Landsberger.
In the new-born child	24.0	24.0	....
In the second year	21.2	17.2	....
In the sixth year	17.0	13.0	15.3
In the seventh year	16.2 }	13.0 }	14.7 }
In the eighth year	15.4 }		14.2 }
In the ninth year	14.8	12.8	13.5
In the tenth year	14.2	12.5	13.5
In the eleventh year	....	12.3	13.1
In the twelfth year	13.3	12.1	12.7
In the thirteenth year	....	11.9	12.5
In the eighteenth year	11.5	11.2	....
In adults	11.3	12.0	....

During school age the maximum width of head increases very little or none at all, but the height of face increases faster than all the other head measurements.

Schaaffhausen in Bonn has shown the importance of the relation between height of face and length of body. His table (No. 14), which follows, gives the heights of head and face in per cent of the length of body.

[1] Jahrb. f. Kinderheilk., XVI, 1-2.

These figures (Table No. 14) agree substantially with Quetelet's, showing the strong growth of the face in school days. In consequence of the great growth of the body, the head is relatively slow in its growth.

The children measured by Landsberger are mostly hyper-brachy-cephalic—that is, the width of head is comparatively very great.

The chest girth increases constantly with the length of the body, and is generally half the length of the body.

TABLE 14.

Age.	Height of head.	Height of face.
	Per cent.	*Per cent.*
6 years	19.3	13.7
7 years	18.5	13.1
8 years	17.8	12.7
9 years	17.3	12.6
10 years	16.7	12.5
11 years	16.4	12.0
12 years	15.7	11.9
13 years	15.5	11.8

INFLUENCE OF UNFAVORABLE CONDITIONS ON THE GROWTH OF CHILDREN.

Influence of unfavorable conditions on the life and physical development of youth is shown in the following table of Pagliani:

TABLE 15.

Number of persons.	Age.	Average weight.	Average height.	Average chest girth.	Average lung capacity.	Average muscular force.
	Years.	*Kilograms.*	*Centimeters.*	*Centimeters.*	*Cubic cm.*	*Kilograms.*
9	10	24.51	126.3	61.0	1,660	66.5
34	11	26.18	128.1	61.2	1,700	68.5
45	12	28.38	132.1	62.8	1,860	79.0
41	13	31.75	137.5	65.2	2,045	95.0
28	14	33.06	140.0	66.4	2,100	105.0
23	15	39.36	148.6	69.5	2,445	118.5
15	16	41.47	151.2	70.3	2,485	121.0
9	17	43.20	151.3	71.6	2,660	136.0
6	18	44.55	154.3	72.6	3,115	142.0
4	19	46.65	156.0	74.2	3,125	150.0

These measurements were made on the inmates of an institution in Italy.

In the following table by Weissenberg the number in some of the groups is not large, but the figures show a general regularity.

TABLE 16.

Age.	Length of body.			Weight of body.			Strength of lift.		
	Poor.	Middle classes.	Wealthy	Poor.	Middle classes.	Wealthy	Poor.	Middle classes.	Wealthy
	Cm.	*Cm.*	*Cm.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*
10 years	124.2	124.7	125.6	25.95	25.69	25.25	36.2	34.6	32.1
11 years	125.9	128.0	131.5	26.99	27.29	27.28	40.1	40.7	40.1
12 years	130.8	134.5	137.8	29.03	30.75	31.97	49.4	54.2	53.2
13 years	133.3	137.7	140.4	32.23	33.34	34.74	54.5	60.8	60.5

TABLE 16—Continued.

Age.	Length of body.			Weight of body.			Strength of lift.		
	Tailor.	Middle class.	Smith.	Tailor.	Middle class.	Smith.	Middle class.	Tailor.	Smith.
	Cm.	Cm.	Cm.	Kilos.	Kilos.	Kilos.	Kilos.	Kilos.	Kilos.
13 years	138.4	137.7	138.4	33.52	33.34	33.68	65.4	60.8	67.0
14 years	144.4	144.8	143.8	37.47	37.89	36.59	80.3	80.1	80.3
15 years	147.7	148.2	145.9	40.07	40.98	40.30	81.9	90.6	89.7
16 years	152.5	155.8	149.7	45.52	46.34	40.87	97.1	107.2	111.7
17 years	160.0	160.1	157.4	50.10	51.40	51.40	98.7	119.9	138.0
18 years	159.0	161.1	161.0	50.76	53.98	52.84	120.8	129.6	136.8
19 years	161.0	164.1	165.0	54.24	56.75	61.50	123.0	143.4	175.0
20 years	164.5	164.0	163.3	54.67	56.60	57.10	124.7	149.9	175.2
21-25 years	162.5	164.8	166.5	55.37	58.51	61.69	132.0	143.7	185.5
26-30 years	162.9	165.9	167.8	56.91	61.69	63.86	126.4	142.8	170.6
31-40 years	162.4	164.3	167.2	58.09	60.45	63.91	105.0	133.0	165.0
41-50 years	164.1	164.2	164.8	59.53	62.92	62.40	97.30	124.5	152.5

The poor are less in height and weight than the wealthy classes. There is a striking offset in the difference in trades on the strength of lift; thus the smiths are much stronger than the tailors.

CHEST GIRTH IN RELATION TO LENGTH OF BODY.

As the development of the body may be expressed in its length, so chest girth can be considered as an expression for the width of the body.

TABLE 17.—*Chest girth in relation to length of body.*

Age.	Average circumference of chest.				Yearly increase.			
	Jews (Weissenberg).	Jews (Sack).	Russians (Sack).	Belgians (Quetelet).	Jews (Weissenberg).	Jews (Sack).	Russians (Sack).	Belgians (Quetelet).
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
5 years	524	....	....	522	....	....	....	....
6 years	560	....	....	543	36	....	....	21
7 years	575	....	....	564	15	....	....	21
8 years	600	....	....	585	25	....	....	21
9 years	618	....	598	608	18	....	....	23
10 years	625	622	624	630	7	....	26	22
11 years	642	622	636	652	17	0	12	22
12 years	660	628	651	675	18	6	15	23
13 years	679	655	671	697	19	27	20	22
14 years	714	677	697	720	35	22	26	23
15 years	737	734	738	742	23	57	41	22
16 years	766	757	774	767	29	23	36	25
17 years	805	784	803	797	39	27	29	30
18 years	819	797	825	821	14	13	22	24
19 years	837	802	842	845	18	5	17	24
20 years	836	808	846	865	—1	6	4	20
21-25 years	850	....	....	882	14	....	....	17
26-30 years	880	....	....	890	30	....	....	8
31-40 years	877	....	....	890	—3	....	....	0
41-50 years	895	....	....	....	18	....	....	....
51-75 years	888	....	....	....	—7	....	....	....

Comparing the foregoing table (No. 17) of chest girths of different nationalities with those of the heights in Table No. 16, Weissenberg says the growth in height does not go parallel with that of the chest. It seems that during puberty the body grows in length at the cost of the chest development. But this unfavorable condition is compensated for after puberty. Since the chest contains the most important organs to life, and since the body during puberty should have the best of care, conditions that affect unfavorably the relation of length of body and chest girth must be avoided. Weissenberg says that from facts already known school life exercises a bad influence in this respect on the development of the body. According to Sack, good food and pure air play the principal rôle. The chest girth increases in relation to the length of body up to about the age of 50. The weight also reaches its maximum about this time. It is a general observation (Weissenberg) that very thin people can become very fleshy in old age, and that marriage has a good influence in this relation. The increase in flesh is specially in the trunk, chest, and abdomen, and thus the chest girth increases. There is also the emphysematous enlargement of the lungs, which is almost normal in old age. This also increases the chest girth.

Influence of Age on Growth of Body.

The position of the extremities is parallel to the length of the body and corresponds in growth. The length of the extremities is about one-half the length of the body. Examining the following table (No. 18) of Weissenberg, it will be seen that, like the whole body, the extremities grow rapidly up to the sixteenth year. Then there is a slow growth to the thirtieth year, when the maximum is reached; then follows a slight retrogression. The increase of the leg in length is in general up to the tenth year less than half of the increase of the length of the body; but in the following year the leg grows faster than the half of the increase of the body in length. This continues up to the seventeenth year. Directly before puberty leg and trunk grow about equally. The increased growth of the whole body during puberty is due especially to the increase in length of leg.

In advanced age the leg shortens somewhat in length, due to the flattening of the instep, weakness in the kneejoints, and sinking of the neck in the femur.

The greatest yearly increase in the length of the foot is in the sixth year, which is striking. In old age foot and hand decrease. This, as in the extremities in general, is probably due to arthritic changes in the joints. Thus in the general shrinking of old age all members of the body take part.

Table 18.—*Growth in length of the extremities (Jews and Belgians together).*

Age.	Average length.				Yearly increase.			
	Arm.	Hand.	Leg.	Foot.	Arm.	Hand.	Leg.	Foot.
	Mm.	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*
5 years	435	116	493	167	....	....	....	....
6 years	466	122	530	182	31	6	37	15
7 years	485	126	552	179	19	7	22	— 3
8 years	502	132	568	189	17	5	16	10
9 years	529	136	601	197	27	7	33	8
10 years	544	140	621	202	15	5	20	5
11 years	565	145	659	211	20	6	38	9
12 years	595	150	698	221	30	6	39	10
13 years	608	156	722	227	13	5	24	6
14 years	647	163	765	237	39	6	43	10
15 years	660	168	785	242	13	5	20	5
16 years	691	176	822	253	31	5	37	11
17 years	722	181	849	257	31	4	27	4
18 years	724	182	847	256	2	4	— 2	— 1
19 years	740	186	862	259	16	3	15	3
20 years	738	184	861	258	— 2	1	— 1	— 1
21-25 years	742	185	865	258	4	1	4	0
26-30 years	751	187	869	263	9	1	4	5
31-40 years	744	185	856	257	— 7	0	—13	— 6
41-50 years	750	186	864	257	6	....	8	0
51-75 years	745	186	860	257	— 5	....	— 4	0

Periods of Growth.

Comparing the results of Weissenberg and others, there are six periods of growth. The first period extends from birth to the sixth or eighth year, and is throughout one of very rapid growth. At the end of this period the body is more than twice as large as it was at birth. It seems that during the fetal life the impulses received mature a number of years after birth. These impulses are of great intensity, as shown from the facts that the foetus at the end of the foetal life is twenty-five hundred times larger than the ovum out of which it has developed.

The second period extends from 11 to 14 years of age and growth is slow.

The third period is from 16 to 17, presenting a sudden advance in growth, which is in relation with the development of puberty.

The fourth period shows a slow growth, extending up to age 30 for length of body; up to age 50 for chest girth. Here growth in the proper sense has ceased.

The fifth period is one of rest, and in normal conditions is from 30 to 50 years of age, and is one of full symmetrical development.

The sixth and last period is characterized by a decrease in all dimensions of the body.

It must be remembered that these periods do not always fall at the same age.

TABLE 19.—*Growth of women of different nationalities.*

Age.	Average length.				Yearly increase in length.			
	1,029 Jews (Weissenburg).	303 Jewesses (Weissenberg).	Swedish women (Key).	Belgians (Quetelet).	Jews (Weissenburg).	Jewesses (Weissenberg).	Swedish women (Key).	Belgians (Quetelet).
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Cm.*
5 years	101.6	99.7	....	97.4	....	....	....	....
6 years	108.6	108.0	....	103.1	7.0	8.3	....	5.7
7 years	112.1	113.5	113.0	108.7	3.5	5.5	....	5.6
8 years	115.6	117.0	116.0	114.2	3.5	3.5	3.0	5.5
9 years	120.2	120.0	123.0	119.6	4.6	3.0	7.0	5.4
10 years	124.7	124.6	127.0	124.9	4.5	4.6	4.0	5.3
11 years	128.0	132.6	132.0	130.1	3.3	8.0	5.0	5.2
12 years	134.5	141.2	137.0	135.2	6.5	8.6	5.0	5.1
13 years	137.7	142.4	143.0	140.0	3.2	1.2	6.0	4.8
14 years	144.8	148.4	148.0	144.6	7.1	6.0	5.0	4.6
15 years	148.2	150.5	153.0	148.8	3.4	2.1	5.0	4.2
16 years	155.8	150.7	157.0	152.1	7.6	.2	4.0	3.3
17 years	160.1	151.6	159.0	154.6	4.3	.9	2.0	2.5
18 years	161.1	154.5	160.0	156.3	1.0	2.9	1.0	1.7
19-20 years	164.0	154.3	160.0	157.4	2.9	—.2	.0	1.1
21-25 years	164.8	154.4	....	157.8	.8	.1	....	.4
26-30 years	165.9	154.9	....	158.0	.11	.5	....	.2
31-40 years	164.3	153.3	....	158.0	—.16	—.16	....	.0

Weissenberg measured 303 girls and women in all, of the age from 5 to 40. The results of these measurements are given in the Table No. 19, above. Woman grows somewhat intensive up to 18; after this, growth is at a minimum. The period of puberty is from 9 to 14 here; the woman is larger than the man from 11 to 15; before this she is a little smaller, but after this time she is much smaller.

Comparing women of other nationalities, the Swedish women are like the Jewish, except that puberty is somewhat later. Key's results agree with those of Weissenberg, while Quetelet finds the women always smaller than the men; but Quetelet used small numbers.

TABLE 20.—*Relation of height to circumference of head and chest girth.*

Number of persons.	Age.	Height.	Weight.	Circumference of head.	Chest girth.
	Years.	*Cm.*	*Pounds.*	*Cm.*	*Cm.*
13	13.39	147.93	76.15	52.84	68.00-72.96
24	14.50	149.21	73.92	53.23	66.52-71.77
20	15.38	163.50	96.20	54.34	73.80-79.20
41	16.43	162.77	100.38	54.34	75.58-81.07
35	17.36	167.93	106.88	54.89	78.57-83.70
26	18.35	171.65	124.46	54.91	80.69-85.98
15	19.40	172.57	122.47	55.48	81.07-86.80
6	20.05	173.97	125.58	56.50	82.66-88.00
342	21.02	168.00	126.12	55.37	86.15-91.45
178	22.22	176.25	146.00	55.91	89.14-94.87

In the table (No. 20) of Franz Daffner[1], it will be seen that the increase of chest girth by inspiration, with the exception of the thirteenth year, averages always a little more than 5 centimeters. The persons measured were 180 cadets from 13 to 20 years of age, and 520 Bavarian soldiers.

Daffner observes that chest girth and circumference of head increase in parallel lines; also with the smallest height falls also the smallest circumference of head, and with the smallest weight the smallest chest girth. It is striking to see that the soldiers from 21 to 22 years of age show an increase over the cadets in all measurements except the head. Daffner says this anomaly is due to the greater mental strain which the cadets undergo, increasing the size of the organ of mind, the brain, and therewith the skull.

Growth of Head, Face, and Nose.

The development of the head of children has been studied but very little. It will be interesting to give some of Weissenberg's measurements of Jewish children. It is to be regretted that the number measured is small, especially of the youngest. The table below, No. 21, is a combination of selected measurements from Weissenberg's tables.

The circumference of head of the new-born child is over 60 per cent of its full length of body when grown. At birth the circumference of head is about three-fourths of the height of the body; when the child is grown it has fallen to only one-third of the height of the body.

As to the shape of the head, it is rounder in childhood, but gradually becomes longer as indicated by the cephalic index. As before indicated,[2] the maximum length grows faster than the maximum width.

Table 21.

	New-born children (3).	5 years old (4).	10 years old (25).	Grown children (100).
	Mm.	*Mm.*	*Mm.*	*Mm.*
Circumference of head	365	504	521	550
Maximum length of head	118	170	175	183
Maximum breadth of head	102	144	147	151
Cephalic index	86.4	84.7	84.0	82.5
Per cent of dolicocephaly				1
Per cent of mesocephaly			12	18
Per cent of brachycephaly	33	50	48	62
Per cent of hyperbrachycephaly	67	50	32	19
Per cent of ultrabrachycephaly			8	
Height of face	60	93	101	119
Bizygomatic diameter	89	113	122	138
Width of nose	19	26	30	34
Height of nose	24	40	47	54
Distance between the eyes	21	27	30	31
Nasal index	79.2	65.0	63.8	63.0
Height of body	520	1,060	1,272	1,651

The height of face (Table 21) during the first five years increases more than the other parts of the head; during the second five years the increase is small, but larger afterwards. The width of face or bizygomatic diameter, though having a smaller increase than the height of face, corresponds to it in its growth. The distance between the eyes increases parallel with the width of head; the increase from birth to adult age is only 10 millimeters; at birth this distance is 68 per cent of its full growth.

The height of nose represents the middle division of the face, which grows the most of all, both in width and height. The nose grows much faster in height than in width; the nasal index decreasing with age.

[1] Arch. f. Anthrop. Bd. XV, S. 121, 1885. [2] See page 1102.

The face may be divided into three parts (Weissenberg): The upper part, from the vertex to the root of the nose; the second or middle part, from the root of the nose to the base of the nose, and the lower part from the base of the nose to the end of the chin.

In duration and quantity of growth these three divisions of the face increase from above to below. The middle division increases the most, and it is the upper jaw that rules the growth of the whole face.

The relatively small increase of head as compared with body may be due to the fact that from the day of birth the child needs its brain and senses as much as when it is grown.

Blond, Brunette, and Mixed Types of Children in Germany.

Out of 6,758,827 school children in Germany[1] Virchow finds, as shown in Table 22, that more than half of the children belong to the mixed type, but more than two-thirds of the rest belong to the blond type.

Table 22.

Type.	Number of children.	Per cent.
Blonde	2,149,027	31.80
Brunette	949,822	14.05
Mixed	3,659,978	54.15
Total	6,758,827	100100

Considering the different colors of hair, as shown in Table 23, we see more than two-thirds of the children have blond hair:

Table 23.

Color of hair.	Number of children.	Per cent.
Blond hair	4,617,546	68.02
Brown hair	1,988,966	29.42
Black hair	133,864	1.98
Red hair	17,499	.25

Color of Eyes, Hair, and Skin of Children in Germany.

White children with blue eyes are the most frequent; they are about one-half as frequent as children with blond hair. Brown eyes constitute the smallest number—not over a fourth of the whole number.

Table 24.

Color of eyes.	Number of children.	Per cent.
Blue eyes	2,673,539	39.55
Brown eyes	1,839,214	27.21
Gray eyes	2,242,702	33.18

As to the color of the skin we find the percentage of white and brown skin as given in Table 25.

[1] Virchow, Arch. f. Anthrop, Bd. XVI, S. 275-475, 1885-86.

TABLE 25.

Color of skin.	Number of children.	Per cent.
White skin	6,184,406	91.50
Brown skin	571,628	8.45

The majority of those with black hair have a brown skin (Table 26).

As we go west and south in Germany the number of blondes lessens. They are the most frequent in the north.

If we take the officials of Germany, who belong to the well-to-do classes, we find the largest number of blondes, being 40 or more per cent, among their children. In the North Friesian Islands the percentage of blondes is 52.81.

Among the children of the Government officials, or the well-to-do classes, less than 10 per cent are brunettes.

In general, there is a relatively greater number of blondes in the country than in the city.

In the mixed type blue eyes are the most influenced.

One-third of all the German school children have gray eyes. Another fact is that blond hair prevails in the mixed combinations, reaching an average of 36.41 per cent.

Those with brown hair, who are not brunettes, are a branch of the brunettes rather than of the blondes. The hair of women seems to turn dark faster than that of men.

TABLE 26.—*Percentages.*

	Blue eyes, blond hair, white skin.	Blue eyes, brown hair, white skin.	Blue eyes, brown hair, brown skin.	Gray eyes, blond hair, white skin.	Gray eyes, brown hair, white skin.	Gray eyes, brown hair, brown skin.	Gray eyes, black hair, brown skin.	Brown eyes, blond hair, white skin.
	1	2	3	4	5	6	7	8
Germany	31.80	6.20	1.41	23.41	7.05	1.91	0.66	13.00
North Friesian Islands	52.81	6.50	.89	23.22	3.33	.59	.13	6.37
Prussia, 4,127,766 persons:								
From 6 to 8 years of age	35.04	5.38	1.00	25.32	5.47	1.28	.37	14.56
Over 8 to 10 years of age	38.33	6.13	1.34	23.79	6.13	1.65	.46	12.49
Over 10 to 12 years of age	34.39	6.48	1.25	24.19	6.73	1.61	.44	11.99
Over 12 to 14 years of age	31.89	5.96	1.00	25.57	7.37	1.44	.37	11.74
To 14 years of age	35.59	6.11	1.27	24.09	6.20	1.58	.45	12.65
Over 14 years of age	26.25	6.32	1.05	24.43	9.63	1.91	.55	10.19

	Brown eyes, brown hair, white skin.	Brown eyes, brown hair, brown skin.	Brown eyes, black hair, brown skin.	Blue eyes, red hair, white skin.	Gray eyes, red hair, white skin.	Brown eyes, red hair, white skin.	Other combinations.	Whole number.
	9	10	11	12	13	14	15	
Germany	9.70	3.14	1.21	0.10	0.07	0.06	0.28	6,758,827
North Friesian Islands	3.29	.93	.55	.46	.09	....	.84	2,369
Prussia, 4,127,766 persons:								
From 6 to 8 years of age	8.32	2.18	.58	.12	.10	.08	.20	546,949
Over 8 to 10 years of age	8.02	2.47	.73	.11	.08	.06	.21	2,156,025
Over 10 to 12 years of age	8.88	2.59	.84	.13	.11	.07	.30	692,839
Over 12 to 14 years of age	10.42	2.69	.91	.13	.11	.07	.33	190,583
To 14 years of age	8.34	2.45	.75	.12	.09	.07	.24	4,070,923
Over 14 years of age	13.01	3.69	1.73	.08	.09	.09	.98	56,843

From an examination of Table 26 it will be seen that the darkening of the hair is very slight in the pure brown type, and in the mixed form with gray eyes it hardly appears, at least during school days. But darkening of the hair is very frequent in the mixed forms with brown eyes, yet it is twice as frequent in the pure blond type, where it reaches the highest per cent.

Hair of Other Nationalities Compared With Hair of Germans.

In comparing the results of observations of school children of other nations the following table is made from Virchow's data. A striking part is the small number of blondes in Switzerland. This may be due to the fact (Virchow) that the country districts were not so thoroughly studied.

Table 27.

Country.	Number of school children.	Blondes.	Bru-nettes.	Blond hair.	Brown and black hair.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Germany	6,758,827	31.80	14.05		
Belgium	608,698		27.50		
Switzerland	405,609	11.10	25.70		
Austria	2,304,501	19.79	23.17	44.97	54.84
Total	10,077,635				

Long Head and Broad Head.

About all European peoples show two different forms of head, a long and small and a short and broad head. Formerly in Germany the long head prevailed, being called the Germanic type, but in recent times short, broad heads have increased, till now they constitute the largest number.

Relation of Color of Skin, Hair, and Eyes.

The color of the skin, which stands in a certain relation with color of hair and eyes, is an important characteristic for distinguishing races, but in Germany, as in other European countries, there is no uniform relation. Blond and brown people follow one another in most places, and to-day only a few peoples are wholly blond. It seems as if brunettes were increasing daily. According to Virchow, if it could be shown that the long-headed people were blond and light colored, and the short-headed brunette and dark colored, the course of the mixture and the spread of different peoples (also in prehistoric times) would present valuable information.

There is in typical individuals of a race a more or less constant relation between the colors of the skin, hair, and eyes. Frequently all are dark, often they are all light.

Virchow assumes that since there was never a dark race with light hair, although originally blond hair can become in adult age dark, that those persons who between the ages of 6 and 14 have blond hair should be considered as belonging to a blond race. There is no race of which the skin, hair, or iris is wholly without pigment. Albinism is a pathological condition. No definite lines can be drawn dividing blondes from brunettes. Every individual has a tendency to darker shade.

The majority of children are born with blue eyes, but with very many the blue soon changes into a brown. This change begins in the first week in life; after two years the permanent color is in most cases determined.

The change of color in the hair is much slower. The majority of children have blond hair at birth. It becomes dark gradually, sometimes not till after puberty. The same is generally true of the skin, only the darkening process extends further into later life. In white races elderly people always have a more colored skin than young people; the difference is more of quantity than quality.

Since there is a certain parallelism in the color of skin, hair, and eyes, persons with blue eyes, blond hair, and white skin are called "blondes," those with brown eyes, brown hair, and brown skin "brunettes." But there is a large number of combinations of less significance. The white races especially show great individual variability in combinations. In making these divisions individuals are generally taken between the ages of 20 and 25.

The general results of the investigation in the schools of Germany are confirmed by similar studies in Austria, Belgium, and Switzerland. The number of children is so great (over 10,000,000) that these results must be considered as fairly well established.

MEASUREMENTS OF RUSSIAN CHILDREN.

TABLE 28.

[Vazhnoff's table giving nutrition of poorer classes.]

Age.	Nutrition.													
	Boys.							Girls.						
	Poor.		Medium.		Good.		Total number.	Poor.		Medium.		Good.		Total number.
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	
1 year	51	25	90	44	64	31	205	20	25	30	37	31	38	81
2 years	38	21	68	37	76	42	182	7	15	19	41	20	44	46
3 years	22	20	43	39	45	41	110	2	10	4	21	13	69	19
4 years	7	13	25	47	21	40	53	1	16	4	68	1	16	6
5 years	2	17	4	36	5	47	11	......	......	1	......	2	......	3
6 years	......	......	......	......	1	......	1	......	......	......	......	......	......	......
Total	120	21.3	230	40.9	212	37.7	562	30	19	58	37	67	44	155

TABLE 29.

[In Centimeters.]

Age.	Vazhnoff. *a*				Measurements by other Russians.													
	Boys.		Girls.		Boys.		Girls.		Boys.		Boys.		Boys.		Boys.		Boys.	
	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.	Chest girth.	Yearly in-crease.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
8 years	61.4	....	58.34	....	61.67	....	61	....	61.13	....	62.7	....	....	....	58.99	1.72	57.5	1.5
9 years	62.75	1.35	59.77	1.43	62.6	0.9	61	0	62.84	1.69	64.5	1.8	63.52	....	60.36	1.37	58.5	1.0
10 years	64.27	1.52	61.84	2.07	64.39	1.79	64	3	64.88	2.03	66.5	2.0	63.12	0.6	62.16	1.80	60.9	2.4
11 years	65.5	1.23	61.76	0.08	65.8	1.41	65	2	66.69	1.82	66.5	0.0	63.79	0.67	64.09	1.93	62.2	1.3
12 years	66.62	1.12	....	....	67.4	1.6	67	2	68.71	2.02	66.75	0.25	64.69	0.9	65.01	0.92	63.6	1.4

a Vestnik. obsh. hig., sudeb. i prakt. med., St. Petersb., 1897, XXXIII, No. 2, secs. 32-44.

TABLE 30.

[In centimeters.]

Age.	Vazhnoff. *a*		Measurements by other Russians.													
	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.	Average height.	Yearly in-crease.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7 years	....	....	114.9	....	114.4	....	112.62	....	113.1	....	117.8	....	116	....	....	....
8 years	119.5	....	120.278	5.3	117.7	3.3	117.81	5.19	116.32	3.22	121.5	3.7	121	5	....	....
9 years	123.1	3.6	123.44	3.17	122.0	4.3	121.28	4.72	121.04	4.72	124.7	3.2	124	3	124.48	....
10 years	127.0	3.9	127.03	3.59	126.7	4.7	126.72	5.47	125.91	4.87	128.4	3.7	129	5	127.75	3.27
11 years	130.6	3.6	130.65	3.62	129.3	2.6	130.85	4.10	129.56	3.65	132.7	4.0	133	4	127.95	0.25
12 years	132.8	2.2	134.4	3.8	135.5	4.2	131.71	2.80	134.05	4.49	137.2	4.5	135	2	130.34	2.42
13 years	136.4	3.6	136.54	2.14	136.6	3.1	136.69	2.98	136.95	2.90	137.8	0.6	138	3	135.72	5.35
14 years	....	....	141.00	4.46	....	....	....	....	143.2	6.25	141.7	3.9	....	....	137.75	2.83
Total	562.0	....	947.00	....	754.0	....	542.00	....	630.00	....	332.00	....	622	....	240.00	....

a Vestnik, obsh. hig., sudeb. i prakt. med., St. Petersb., 1897, XXXIII, No. 2, secs. 32-44.

TABLE 31.—*Average height (in inches), in various cities and countries of the world.*

[Tables 31 to 34 inclusive are from Amer. Jour. of Psychol., April, 1898. The columns for Washington (D. C.) school children are added by author.]

Age.	Boston. (Bowditch.) 13,691 boys, 10,904 girls.		St. Louis. (Porter.) 16,295 boys, 18,059 girls; age nearest birthday.		Milwaukee. (G. W. Peckham.) 4,773 boys, 4,891 girls.		Oakland. Number not stated.		Worcester. (West.) 3,250 children.		New Haven. (Gilbert.) About 50 of each sex for each age.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
4½ years	.....	.....	.....	.....	39.98	39.65	.....	.....	.....	.....	.....	.....
5½ years	41.57	41.29	.....	.....	42.28	41.72	.....	.....	43.2	42.3	.....	.....
6½ years	43.75	43.35	42.9	42.4	44.08	43.78	44.1	44.4	44.4	43.8	45.0	44.9
7½ years	45.74	45.52	44.9	44.5	46.09	45.93	45.0	44.9	46.1	46.3	47.1	46.9
8½ years	47.76	47.58	46.9	46.6	48.05	47.59	47.6	46.8	48.2	47.9	48.9	48.4
9½ years	49.69	49.37	49.0	48.7	50.00	49.81	49.3	49.2	50.0	49.8	51.2	50.8
10½ years	51.68	51.34	50.7	50.6	51.85	51.89	51.9	51.5	52.8	52.3	53.0	52.8
11½ years	53.33	53.42	52.7	52.4	53.76	53.5	53.5	53.9	54.6	53.9	55.9	54.6
12½ years	55.1	55.9	54.4	54.8	55.0	56.5	55.1	56.6	56.3	57.0	57.0	57.9
13½ years	57.2	58.2	56.3	57.7	57.5	58.7	56.8	60.0	58.1	58.2	58.8	60.4
14½ years	59.9	59.9	58.3	59.3	59.9	60.5	59.7	61.2	60.7	60.5	59.3	61.4
15½ years	62.3	61.1	61.0	61.0	62.3	61.6	61.8	61.9	63.9	61.8	62.8	62.5
16½ years	65.0	61.6	63.1	62.0	65.1	62.2	64.5	62.7	65.3	62.4	65.7	62.5
17½ years	66.2	61.9	65.0	62.7	66.6	62.9	67.1	62.7	66.3	62.8	67.1	63.6
18½ years	66.7	61.9	.....	62.8	.....	62.5	67.6	63.2	66.9	62.6	.....	.....
19½ years	.....	.....	.....	62.4	.....	.....	.....	.....	67.4	62.7	.....	.....
20½ years	.....	.....	.....	.....	.....	.....	.....	.....	68.5	62.6	.....	.....
21½ years	.....	.....	.....	.....	.....	.....	.....	.....	67.1	62.7	.....	.....

Age.	Iowa. (Gilbert.) About 50 of each sex for each age.		Pennsylvania. (Hall.) 2,434 males (nude).		Moscow. (Erisman.) 3,212 boys, 1,495 girls.		Sweden Commission. (Key.) 15,000 boys, 3,000 girls.		Denmark Commission, (Hertel.) 17,134 boys, 11,250 girls.		England. (Roberts.) Over 10,000 males.		Washington, D. C. White children; 7,953 boys, 8,520 girls. *a*		Washington, D. C. Colored children; 2,899 boys, 2,558 girls. *b*	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
4½ years	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5½ years	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41.2	.....	.....	.....	.....	.....
6½ years	45.0	44.6	.....	.....	.....	.....	45.6	44.5	44.1	44.1	43.2	.....	44.5	44.2	44.2	43.8
7½ years	47.8	46.8	.....	.....	44.1	43.9	47.6	45.7	45.3	45.3	45.0	.....	46.0	45.1	46.1	46.6
8½ years	49.6	49.2	.....	.....	46.4	45.8	49.6	48.4	47.2	47.2	47.0	.....	47.8	47.4	47.7	47.9
9½ years	51.3	51.3	51.2	.....	48.3	47.1	51.6	50.0	49.2	49.2	49.2	.....	49.7	49.1	49.3	49.0
10½ years	53.3	53.0	53.9	.....	51.5	49.2	52.4	52.0	51.2	51.2	50.5	.....	51.7	51.2	51.1	50.8
11½ years	55.2	54.5	55.1	.....	53.4	51.1	53.5	53.9	53.1	52.4	51.5	.....	53.2	53.1	52.1	52.9
12½ years	57.1	58.0	56.7	.....	55.2	52.3	55.1	56.3	54.3	54.3	53.0	.....	55.1	55.8	53.9	54.5
13½ years	58.7	59.2	61.0	.....	57.2	54.5	56.7	58.3	56.3	57.5	55.9	.....	56.8	57.9	56.1	57.4
14½ years	61.7	61.7	62.3	.....	59.1	57.4	58.7	60.2	58.7	59.4	57.8	.....	59.1	69.2	58.0	59.6
15½ years	64.7	63.3	65.3	.....	61.6	.....	61.4	61.8	61.4	60.6	60.7	.....	61.8	61.6	60.1	60.1
16½ years	66.7	63.3	66.5	.....	63.5	.....	63.8	62.6	64.6	62.6	62.9	.....	64.3	62.4	63.1	61.5
17½ years	68.2	64.5	67.1	.....	64.6	.....	65.7	63.0	65.7	.....	64.5	.....	66.0	63.0	.....	62.2
18½ years	68.6	64.6	67.3	.....	.....	.....	66.9	63.0	66.9	.....	65.5	.....	67.1	63.1	.....	62.3
19½ years	69.0	64.6	67.5	.....	.....	.....	67.3	63.8	66.9	.....	66.0	.....	.....	.....	.....	62.7
20½ years	.....	.....	67.6	.....	.....	.....	67.7	63.0	.....	.....	66.3	.....	.....	.....	.....	.....
21½ years	.....	.....	67.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

a See Tables VII and XXXIV, Part II*e*.

b See Tables LXI and LXV, Part II*e*.

TABLE 32.—*Average height (in inches), in various cities and countries of the world.*

[Amer. Jour. Psychol., April, 1898.]

Age.	England. (Anthrop. Com.) Over 30,000 persons.		Belgium. (Quetelet.) Selected 10 of each age and sex.		Turin. (Pagliani.) 1,048 boys, 968 girls.		Lausanne. (Combe.) 6,662 measurements of 2,000 children.		Freiburg. (Geissler-Uhlitzsche.) 10,343 boys, 10,830 girls.		Gohlis. (Geissler.) 1,386 boys, 1,420 girls.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
0 years			19.7	19.4								
1½ years			27.5	27.2								
2½ years			31.1	30.7								
3½ years	36.8	36.2	34.0	33.6	33.9	33.3						
4½ years	38.5	38.3	36.5	36.0	36.2	36.0						
5½ years	41.0	40.6	38.9	38.3	38.2	38.0						
6½ years	44.0	42.9	41.2	40.6	40.7	40.2			42.8	42.5	43.4	43.0
7½ years	46.0	44.5	43.5	42.8	44.3	43.0	46.2	45.8	44.3	44.1	45.0	44.8
8½ years	47.1	46.6	45.7	45.0	46.6	45.5	48.2	47.7	46.3	45.9	47.0	46.3
9½ years	49.7	48.7	48.0	47.1	48.8	47.6	50.0	49.5	48.1	47.8	48.8	48.8
10½ years	51.8	51.1	50.1	49.2	49.8	50.1	51.7	51.6	49.6	49.6	50.8	50.6
11½ years	53.5	53.1	52.2	51.2	50.9	51.7	53.3	53.7	51.4	51.6	52.1	52.7
12½ years	55.0	56.7	54.1	53.2	52.6	53.8	55.0	55.9	53.3	53.3	54.4	54.9
13½ years	56.9	57.8	56.0	55.1	55.0	56.1	56.9	57.9	55.2	55.7	55.4	57.1
14½ years	59.3	59.8	57.8	56.9	57.2	58.9						
15½ years	62.2	60.9	59.6	58.6	59.8	60.1						
16½ years	64.3	61.7	61.2	59.9	62.2	60.6						
17½ years	66.2	62.5	62.8	60.9	63.0	61.0						
18½ years	67.0	62.4	64.2	61.5	63.3	61.0						
19½ years	67.3	62.8	65.2	61.8	63.7							
20½ years	67.5	63.0	65.7	62.0								
21½ years	67.6	63.0										

Age.	Breslau. (Carstädt.) 4,274 measurements of 600 boys.		Posen. (Landsberger.) 37 to 104 boys for 7 years.		Hamburg. (Kotelman.) 515 boys.		Radom. (Suligowski.) 1,133 boys.		Saalfeld. (Schmidt.) 4,699 boys, 4,807 girls.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
0 years										
1½ years										
2½ years										
3½ years										
4½ years										
5½ years										
6½ years	43.0		42.1						43.0	42.7
7½ years	44.8		44.2						45.0	44.9
8½ years	46.8		46.2						47.2	46.6
9½ years	48.7		48.1		50.6		49.6		49.2	48.8
10½ years	50.6		49.4		51.5		51.1		50.5	50.9
11½ years	52.5		51.2		53.2		52.7		52.3	52.6
12½ years	54.4		53.2		55.1		54.1		54.3	54.6
13½ years	56.4		55.1		56.3		56.5		56.0	56.8
14½ years	58.7				58.6		58.7			
15½ years	61.7				60.7		61.5			
16½ years	64.1				63.7		63.5			
17½ years					65.7		65.2			
18½ years					66.3		65.5			
19½ years					65.7		65.3			
20½ years					65.8		66.4			
21½ years							65.7			

TABLE 33.—*Showing the weight (in pounds) at successive ages in different cities and countries.*

[Amer. Jour. Psychol., April, 1898.]

Age.	Boston. (Bowditch.) 13,691 boys, 10,904 girls.		St. Louis. (Porter.) 16,295 boys, 18,059 girls; age nearest birthday.		Milwaukee. (G. W. Peckham.) 4,773 boys, 4,891 girls.		Oakland. Number not stated.		Worcester. (West.) 3,250 children.		New Haven. (Gilbert.) About 50 of each sex for each age.		Iowa. (Gilbert.) About 50 of each sex for each age.		Pennsylvania. (Hall.) 2,434 males (nude).		Sweden Commission. (Key.) 15,000 boys, 3,000 girls.		Denmark Commission. (Hertel.) 17,134 boys, 11,250 girls.		Moscow. (Erismann.) 2,453 boys, 1,495 girls.		Turin. (Pagliani.) 1,048 boys, 968 girls.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
3½ years	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	27.3	24.7
4½ years	......	......	......	......	38.8	36.3	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	29.8	28.9
5½ years	41.1	39.7	......	......	41.1	40.0	......	......	42.63	39.36	......	......	......	......	......	......	......	......	......	......	......	......	33.5	33.1
6½ years	45.2	43.3	43.7	41.7	44.8	43.1	47.6	45.9	46.04	43.70	46.8	44.3	45.9	41.6	......	......	45.2	......	46.3	44.1	44.1	42.8	36.8	36.2
7½ years	49.1	47.5	47.8	45.9	49.1	47.0	50.2	48.1	49.37	47.96	51.2	50.4	51.4	47.4	......	......	50.3	47.6	49.6	47.4	48.5	47.0	42.8	39.0
8½ years	53.9	52.0	52.5	50.5	53.8	50.9	54.2	52.2	53.64	51.50	52.5	53.0	55.0	51.0	......	......	57.8	55.1	52.9	51.8	53.1	48.5	45.6	41.9
9½ years	59.2	57.1	57.5	55.3	59.5	56.4	59.6	58.6	59.81	57.37	60.0	58.8	61.6	58.1	58.4	......	64.6	59.3	57.3	56.2	61.1	56.4	49.4	48.3
10½ years	65.3	62.4	62.4	60.6	65.4	62.4	66.7	63.2	66.51	63.52	68.4	62.7	63.7	62.1	66.1	......	66.8	64.8	62.8	61.7	67.2	60.4	54.7	54.5
11½ years	70.2	68.8	68.3	66.6	70.9	68.8	72.0	69.7	71.00	69.94	70.8	70.0	72.4	60.2	71.7	......	71.0	70.3	68.3	67.2	73.4	66.8	58.6	59.3
12½ years	76.9	78.3	73.9	74.3	76.1	77.8	77.9	78.9	78.75	79.74	82.3	84.5	78.2	79.7	80.5	......	76.1	79.1	73.9	75.0	82.9	80.5	64.6	65.0
13½ years	84.8	88.7	80.7	84.9	84.9	88.0	89.4	90.7	86.13	87.66	88.0	92.0	90.9	94.1	89.7	......	82.9	87.3	80.5	83.8	91.5	89.3	72.8	76.1
14½ years	94.9	98.4	89.1	93.3	95.8	97.6	97.0	98.2	98.18	99.10	91.7	98.0	102.0	99.9	99.6	......	93.3	98.8	89.3	92.6	102.7	94.4	80.7	84.9
15½ years	107.1	106.1	101.9	103.0	109.0	105.9	108.1	108.9	112.2	105.0	110.0	104.0	117.0	111.3	108.7	......	103.2	107.8	102.6	102.6	116.8	99.9	92.2	96.6
16½ years	121.0	112.0	113.8	110.9	122.1	110.6	121.6	109.8	123.6	109.0	127.0	113.0	130.0	111.6	125.7	......	115.3	113.8	116.8	112.4	126.6	101.0	104.1	100.8
17½ years	127.5	115.5	122.8	116.0	130.4	113.3	131.7	117.7	132.9	115.0	130.0	113.7	140.1	121.0	133.8	......	127.0	120.4	126.8	......	132.5	......	116.2	104.7
18½ years	132.6	115.2	......	115.5	137.8	112.5	137.7	118.3	133.2	120.0	......	......	142.6	125.5	138.7	......	135.1	124.1	134.5	......	......	......	118.6	107.1
19½ years	......	......	......	115.1	......	......	......	......	142.6	118.3	......	......	145.5	126.4	140.7	......	139.6	126.6	......	......	......	......	121.3	......
20½ years	......	......	......	118.8	......	......	......	......	......	119.8	......	......	......	......	142.6	......	143.7	127.2	......	......	......	......	......	......
21½ years	......	......	......	......	......	......	......	......	......	......	......	......	......	......	145.1	......	......	......	......	......	......	......	......	......

TABLE 34.—*Weight (in pounds).*

[The last four columns are added by author.]

Age.	Gohlis. (Geissler.) 1,386 boys, 1,420 girls.		Belgium. (Quetelet.) selected 10 of each age and sex.		England. (Roberts.) over 10,000 males.		England. (Anthrop. Com.). Over 30,000 persons.		Denmark. (Vahl.)		Saalfeld. (Schmidt.) 4,699 boys, 4,807 girls.		Radom. (Suligowski.) 1,133 boys.		Japan. (Miwa.) 1,250 boys, 2,800 girls.		Washington, D. C. White children; 7,953 boys, 8,520 girls.		Washington, D. C. Colored children; 2,899 boys, 2,558 girls.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
0 year			6.8	6.6	7.6		7.1	6.9												
1½ years			21.8	19.0																
2½ years			24.3	24.3																
3½ years			27.6	27.3			34.0	31.6		32.3					31.0	29.6				
4½ years			30.9	30.6	41.2		37.3	36.1		35.8					33.0	32.6				
5½ years			35.1	33.7	50.0		40.0	39.2		39.5					36.1	34.3				
6½ years	47.2	45.2	39.2	36.8	54.2		44.4	41.7		41.6	41.9	40.1			37.9	37.0	45.2	43.3	43.4	42.6
7½ years	50.5	49.4	43.4	39.2	56.9		50.0	47.5		48.4	46.7	44.8			41.9	39.4	47.8	45.7	50.1	48.6
8½ years	54.5	54.0	47.6	41.9	59.0		54.9	52.1		53.6	51.1	48.5			44.7	43.2	51.5	49.4	54.0	53.0
9½ years	58.9	57.8	51.8	46.3	62.6		60.4	55.5		59.0	55.8	53.8	55.3		49.3	48.1	56.2	53.7	59.0	56.9
10½ years	63.5	62.8	55.6	50.9	66.3		68.0	62.0		64.9	58.6	58.6	61.8		52.6	52.4	61.5	58.5	65.2	62.9
11½ years	70.5	69.7	59.5	56.2	69.5		72.0	68.1		74.0	65.7	65.0	68.0		57.2	57.6	66.2	64.2	69.4	68.9
12½ years	76.3	77.8	63.9	63.9	73.7		76.7	76.4		80.6	71.0	72.1	73.4		62.1	66.2	72.7	73.2	76.0	77.5
13½ years	79.4	85.1	73.0	71.7	78.3		82.6	87.2		89.8	77.2	80.7	82.1		72.1	73.3	79.4	81.8	83.5	88.4
14½ years			81.8	80.0	84.6		92.0	96.7		101.3	79.8		91.9		83.4	85.6	88.3	93.0	90.9	98.5
15½ years			90.8	88.2	96.8		102.7	106.3		108.6			103.6		99.2	90.9	100.9	100.4	99.4	103.1
16½ years			100.1	95.9	108.7		119.0	113.1		100.9			112.5		100.1	93.3	113.7	105.2	113.4	107.0
17½ years			109.6	103.2	116.4		130.9	115.5					123.4		109.5	99.6	121.2	110.0		113.0
18½ years			118.8	109.8	123.3		137.4	121.1					126.8		108.3	100.8	132.0	111.5		115.0
19½ years			127.0	114.9	128.4		139.6	123.8					127.2		112.1	99.5	132.2			117.7
20½ years			131.2	117.3	130.6		143.3	123.4					130.7		111.9	101.3				
21½ years							145.2	121.8					136.9		112.5					

V.—PSYCHO PHYSICAL AND ANTHROPOMETRICAL INSTRUMENTS OF PRECISION IN THE LABORATORY OF THE BUREAU OF EDUCATION.

INTRODUCTION.

A thorough study of any human being can not be made without instruments of precision. Such an investigation of living man is one of the most recent tendencies of science. It is paradoxical that man is the last object to be thoroughly studied by man. Instruments of precision have been employed more extensively, perhaps, in the study of the abnormal, as illustrated in criminology,[1] but it is time they were used in the investigation of normal man.[2]

An instrumental method of inquiry is a more exact way of ascertaining the effects of mental, moral, and physical forces upon the body, of many of which we are unconscious. The facts thus obtained bear the closest relation to new questions in the development and education of man.

LIMITATION OF THE SENSES.

Science in its efforts to seek the truth has a special difficulty to contend against; it is the defectiveness or limitation of our senses. Instruments of precision are for the purpose of correcting these defects by increasing the scope of the senses, so that, when truth may be found, it may be described more fully and determined more definitely.

In ancient times there were instruments to measure the weight and height, etc., or what is called the static condition. Subsequently dynamic movements, electric currents, variations of temperature, etc., were studied, but our senses were too slow and confused to determine these conditions, so instruments were necessary to measure the very small in time and in motion.

THE GRAPHIC METHOD.

The graphic method was employed to translate those changes of the activity of forces into the language of the changes themselves, which words can not do. Writing consists in signs more or less conventional, but the graphic method is natural; it is a universal language, as expressed in the line or the curve.

Descartes inaugurated the graphic expression of ideas. This method was then soon used to represent diverse variations, as the comparison of economical and social phenomena. Tables were published in England, then in France, showing the curves representing successive variations of population, wealth, agricultural production, etc. Since then this method has been enlarged so as to apply to all sorts of things. It gives clearness and conciseness to its representations.

Instruments of precision through the graphic method furnish a mode of expression and a means of research. Every science accumulates facts and observations and compares them to show the relation of

---

[1] See "Education and Pathosocial Studies," by author, reprint from Reports of the Commissioner of Education, 1889-90 and 1893-94.

[2] See page 991.

cause and effect. Those comparisons are the more important the larger the number of data, but this often gives rise to extreme complexity. The graphic method can reduce these data to a curve that will give clearness and definiteness to their meaning. Nature's processes are often so complex that it is impossible to give attention to many associated phenomena at a time. Instruments of precision with their tracings can record the different movements.

The intention of this chapter is to give a general idea of the more recent instruments of precision,[1] especially those which apply to the nervous system.

Instruments of Precision.

Perhaps one of the most useful and important instruments of precision is the kymographion, which is a sort of typewriter for the laboratory.

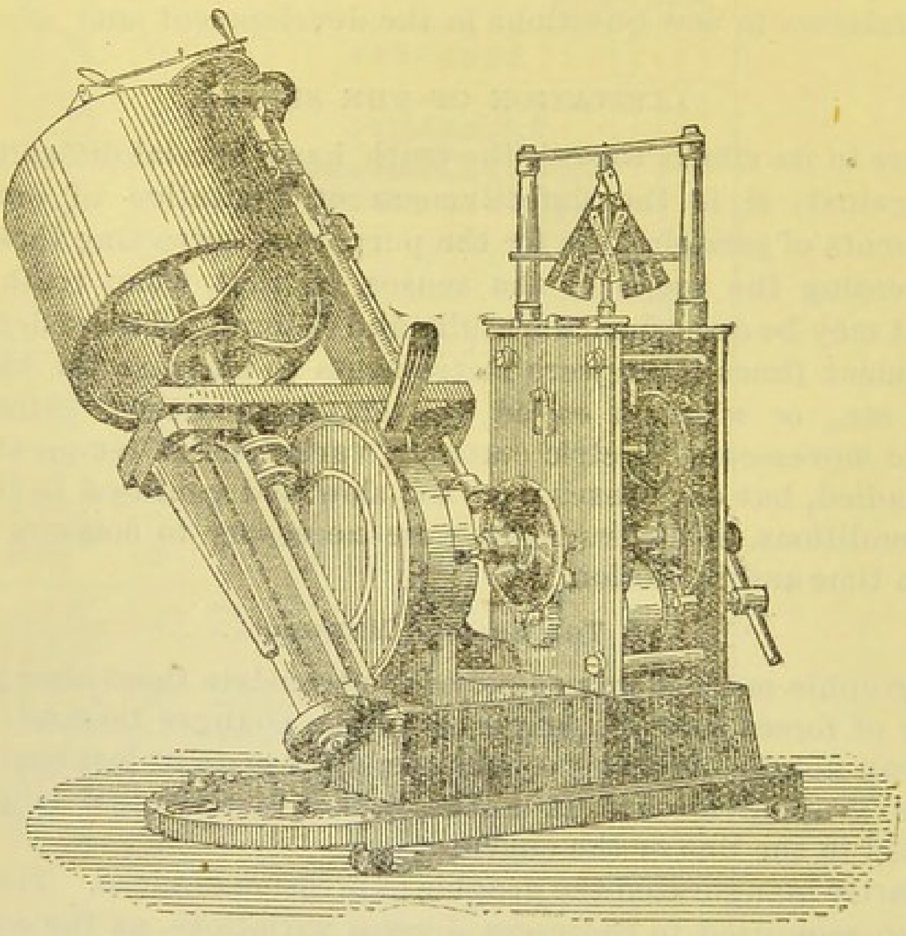


Fig. 1.—Ludwig's kymographion.

The kymographion (fig. 1) is an instrument to furnish uniform motion. It records experiments by movements of a marker or index on smoked paper, which has been wrapped around a revolving cylinder. The kymographion of Ludwig furnishes motion to the cylinder or it may be used as a motor for other light apparatus.

The cylinder is brass and rotates by clockwork. A sheet of glazed paper is wrapped around the cylinder; one end of the paper is gummed and is joined to the other end. The paper is smoked by holding the cylinder over a paraffine lamp, candle, or gas jet. After the tracings are finished the paper is removed from the drum or cylinder and passed through a thin varnish, which when dry makes the tracings permanent. In the most recent form of the instrument, as in the figure, the cylinder can be placed in either a vertical, diagonal, or horizontal position. Any

[1] At the end of this part is a list of instrument makers.

speed between one revolution in five seconds and one in about an hour can be given to the cylinder. The cylinder can be moved along its axis to a distance equal to its length without interrupting its rotation, thus making it possible to record tracings of great length. The adjustments are such that many variations can be given to the speed.

In the use of the kymographion other apparatus is required, such as electrical time-markers (figs. 10 and 11), tuning fork (fig. 6), tambours (figs. 12 and 13), etc. A special leather case was made for the kymographion in the laboratory of the Bureau, so as to make it portable, but one must exercise much care in carrying the instrument. The maker of the kymographion is Petzold,[1] of Leipzig.

THE POLYGRAPH.[2]

The term polygraph is in general a French name for an instrument used for a purpose similar to that of the kymographion or kymograph. The instrument here shown is a portable polygraph of Professor Marey. The cylinder is 180 millimeters

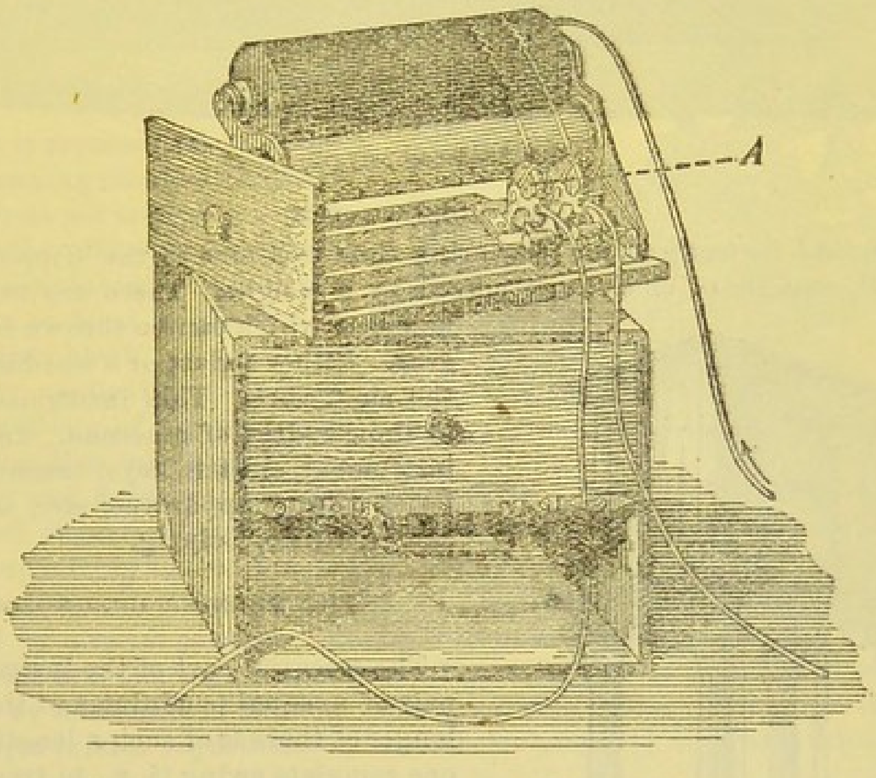


Fig. 2.—The polygraph.

long and 70 millimeters in diameter, and revolves at the rate of 1 centimeter a second. Two tambours, A, are fastened on two rods below, on which they can be moved. Two valves with rubber tubes are fastened to the tambours.[3] There is a place for glazed paper, varnish, etc., in the box. The instrument is easy to carry and convenient for experiments outside of the laboratory.

The cylinder goes by clockwork, which is wound by turning the button at the end. In order to stop the cylinder, one blows into the rubber tube marked with an arrow. To start it again one draws the air out of the tube. To render the cylinder free to revolve, the button to the left is turned to the left. This is necessary to smoke the paper on the cylinder. To connect with the clockwork again the button is turned to the right. The maker is Verdin, of Paris.

The small polygraph (fig. 3.) is a French instrument. The cylinder can be made to revolve, varying at the rate of once in five seconds to once in thirty seconds.

---

[1] See list of instrument makers at end of this chapter.

[2] Marey, Circulation du sang, 2e édition, page 342.

[3] See page 1149–1150.

Different speeds can be obtained by changing the position of the wings (a) of the regulator. The one in the laboratory of this bureau has been made portable by having a case made for it. The maker is Verdin, of Paris.

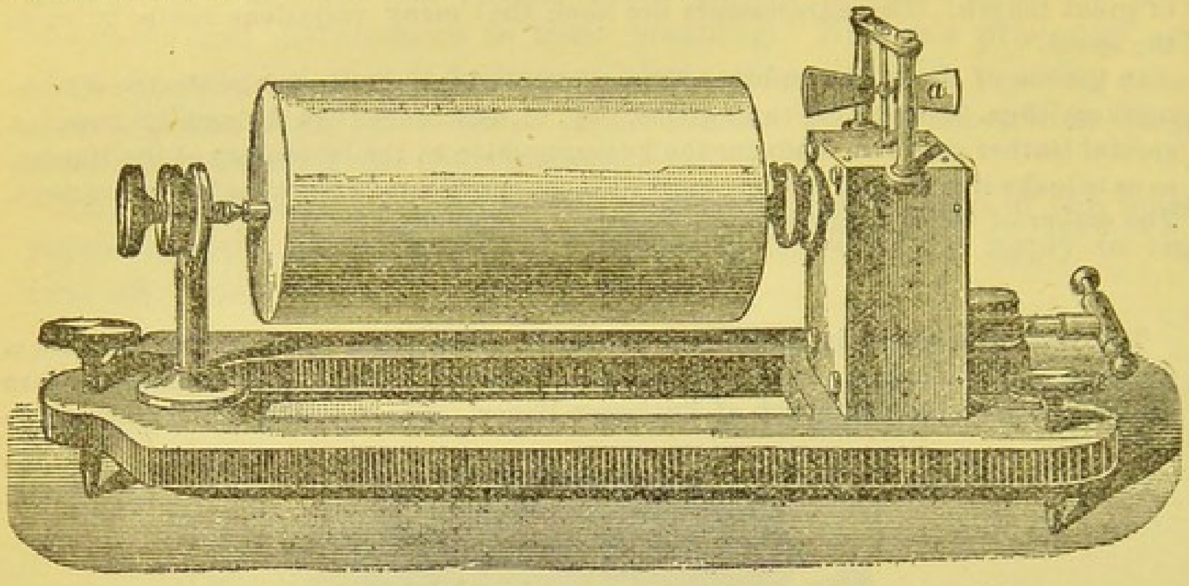


FIG. 3.—Small polygraph.

HIPP-CHRONOSCOPE.

The standard instrument for measuring time relations is the Hipp-Chronoscope (fig. 4). It consists of clockwork moved by a weight. There are two dials, the hands of which can be thrown in and out of gear. Either a glass or a wooden case covers the clockwork. This instrument measures to thousandths of a second. In using this instrument, electric keys, commutators, batteries, testing apparatus, etc., are required. Maker, Krille, Leipzig.

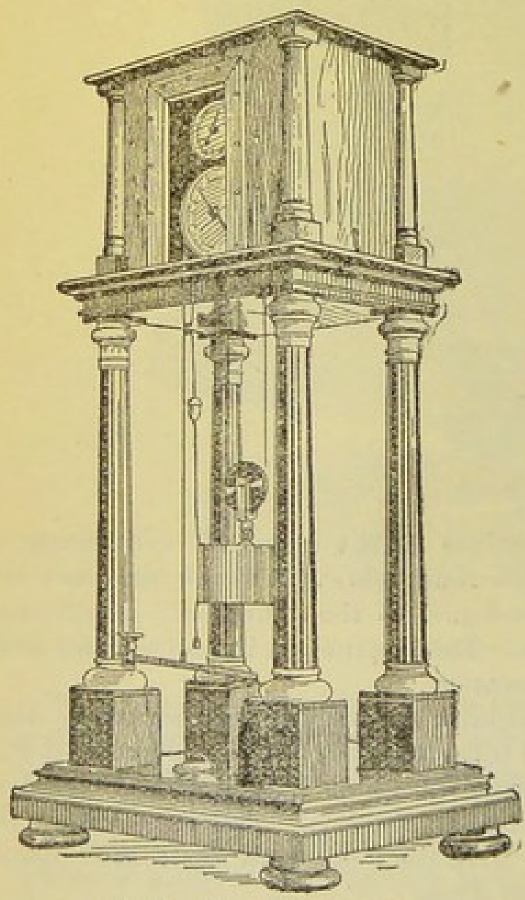


FIG. 4.—Hipp-Chronoscope.

THE VERNIER CHRONOSCOPE.[1]

The essential part of the instrument is the pair of unequal pendulums at the left. The longer of these is of such a length as to make one complete swing (i. e., to traverse its arc and return to the same point) in 0.80 seconds; the shorter makes a complete swing in 0.78 seconds, thus gaining 0.02 seconds at each of its swings, and fixing the unit of measurement of the instrument at one-fiftieth of a second. With these rates, if both pendulums start together, the shorter will gain a whole swing of the longer, and they will be together again after forty of its swings; $0.80 \div 0.02 = 40$. If the shorter starts later than the longer, it will gain, as before, at the rate of one-fiftieth of a second per swing; and in order to know in fiftieths of a second the interval by which it started later, it will only be necessary to count its swings until it catches up; and in general to measure any short interval it will only be necessary to start the longer

[1] Professor Sanford has given a detailed account of his instrument in the American Journal of Psychology, vol. 9, No. 2.

pendulum at the beginning and the shorter at the end, and to count the swings of the shorter up to and including a coincidence. The number counted is the interval expressed in the units of gain—that is, in fiftieths of a second.

The base of the instrument is of cast iron. On one corner of it rises a column 7½ inches high, which, with the little platform supporting the keys, is cast in one piece with the base. From the top of the column an arm extends forward over the base 3½ inches. The pendulums are released from the keys at the right in the cut.

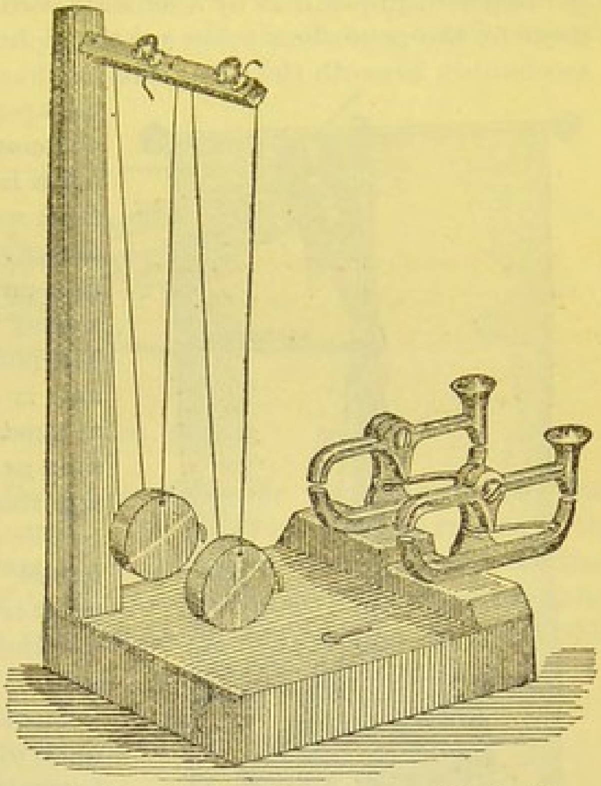


Fig. 5.— Vernier chronoscope. (Sanford.)

While the instrument is primarily intended for demonstration purposes, yet it can be used for research where a unit of one-fiftieth of a second is sufficiently small.

The instrument can be obtained at Clark University, Worcester, Mass.

TUNING-FORK STAND.

In fig. 6 below is represented a tuning-fork stand for making electrical contact 50, 100, or 200 times per second by means of tuning forks the vibrations of which are electrically maintained. Any of the tuning forks can be fixed in the slot in the heavy cast-iron block. A platinum wire *A* projects vertically downward from the lower prong of the fork, and at each vibration dips into a cup containing mercury and completes an electrical circuit. The current thus formed is taken to a small electro-magnet *B* placed between the prongs of the fork. The ebonite block supporting the electro-magnet and the mercury cup can slide along a rod *C* to suit the lengths of the various forks. The level of the mercury in the cup can be adjusted by a screw plunger. The mercury can be kept clean by passing a continuous stream of water over its surface. The supply of water must be taken to the instrument by india-rubber tubing. The amplitude of the vibration of the fork can be varied by a lateral adjustment of the electro-magnet; a vertical adjustment

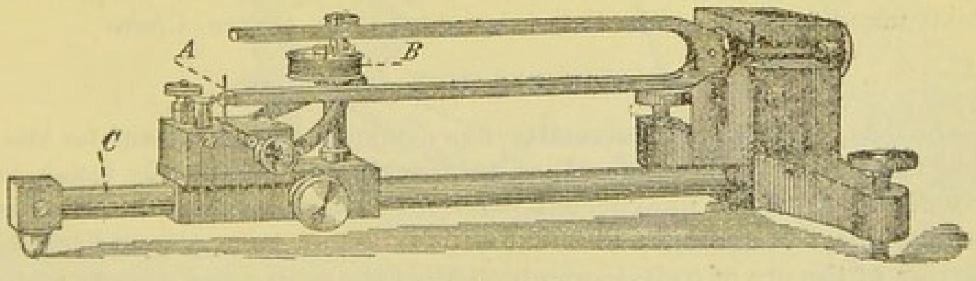


Fig. 6.—Tuning-fork stand.

also allows the electro-magnet to be fixed at an equal distance from each prong of the fork. The feet should stand upon three pieces of india-rubber tubing; when this is done the vibrations transmitted to the table are lessened, and the fork vibrates more readily. Maker: Cambridge Scientific Instrument Company, Cambridge, England.

PENDULUM CHRONOSCOPE.

The pendulum chronoscope, as represented in fig. 7, was designed and constructed by Professor Scripture,[1] of the psycho-physical laboratory of Yale University.

[1] Studies from the Yale psychological laboratory, Vol. III, 1895.

This instrument is designed to meet the following requirements: (1) Accuracy to the thousandth of a second; (2) ease of transportation; (3) readiness of setting up; (4) quickness in reading; (5) availability for many kinds of experiments on time.

The instrument contains a double bob, which is held by a catch at the right-hand side. When this catch is pressed the pendulum starts its swing, soon reaching a light pointer held in position by a delicate spring, which it carries along. At the exact moment the pendulum takes up the pointer it presses a catch which releases the mechanism beneath the base; this mechanism causes a shutter to drop, thus covering an opening in a metal plate at the back of the chronoscope. The person to be experimented upon is seated at the back; a curtain keeps him from seeing anything except the metal plate with the covered opening. He presses a rubber button as soon as he sees the shutter move, and a horizontal bar is released running behind the scale. The pointer swings between this bar and the scale, and is consequently stopped when the bar snaps against the scale. The pointer starts to move as soon as the shutter starts to fall, and consequently any time that elapses thereafter will be indicated by the distance through which the pointer travels before being caught. The connection of the pointer with the pendulum is so delicate that it continues its swing until it is caught on the other side.

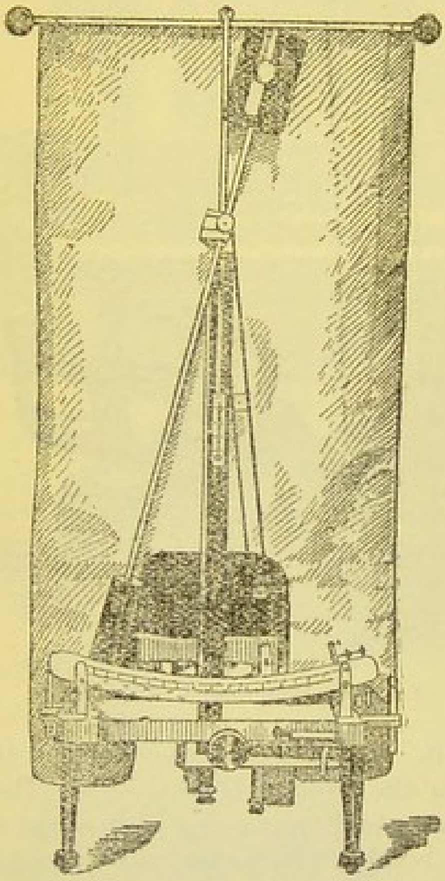


FIG. 7.—Pendulum chronoscope. (Scripture.)

Electrical contacts are arranged so that the units of the scale always indicate the elapsed time between the starting of the shutter and the pressing of the button; that is, all lost time in the action of the mechanism is taken up in the scale, which is marked in hundredths and half-hundredths, which, by the eye, can be easily divided into fifths, thus giving records in thousandths of a second.

For reactions to sound, the shutter is so arranged as to strike with a noise; for reactions to light, colored cards are placed in a holder behind the shutter, or a reflecting surface at this point receives light from the side and sends it through colored glass or gelatin.

The instrument is made at the Yale laboratory, New Haven, Conn.

A LOCATION REACTION APPARATUS.

Professor Fitz, of Harvard University, has designed an instrument for the purpose of testing the power of an individual to quickly and accurately touch an object suddenly disclosed in an unexpected position. The apparatus is so devised as to require the subject to make a movement of the finger from the end of the nose to some portion of the arc of a circle of which he is the center and whose plane is at the level of his elbow. The whole arrangement consists of a location apparatus, error index, pendulum chronoscope, pendulum and index clamp, release, etc.[1]

Three positions, A, B, and C, fig. 8, are selected, so as to give a wide range of movement. The object to be touched is a white spot half an inch in diameter placed at one of the points without the knowledge of the subject. There is a screen in front, which can be arranged to fall so as instantly to disclose the spot. There is a pendulum chronoscope (fig. 9) in connection with this, which measures the interval of time between the falling of the screen and the touching of the white spot. The

[1] For complete description, see Psychological Review, January, 1895.

error of the movement and its direction is determined by the apparatus for that purpose.

The chronoscope (fig. 9) has a balanced pendulum, total length of which is 12 inches, and so weighted that the time of swing is about a second and a half. The pendulum carries a small index that may be clamped instantly in any position on the scale, which is graduated in hundredths of a second by a falling weight. The pendulum is held in preparatory position by means of a hook connected with the

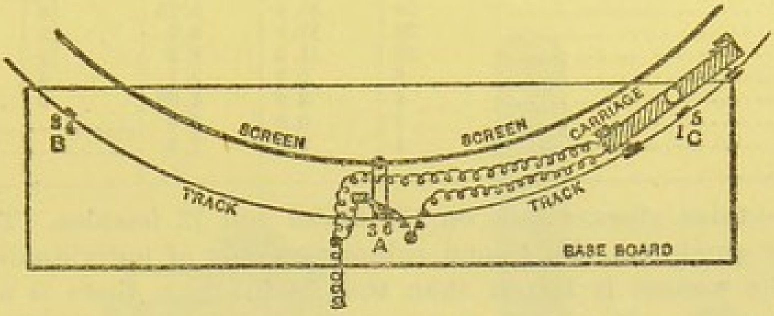


FIG. 8.—Location apparatus. (Fitz.)

armature of an electromagnet. When the screen falls the circuit is broken and the pendulum carrying its index is released. The remaking of the circuit by the touch of the subject's finger releases a clamp and catches the index, so that the time may be read upon the scale. Professor Fitz measured some of the elements making up the differences which exist between individuals in their power to do certain

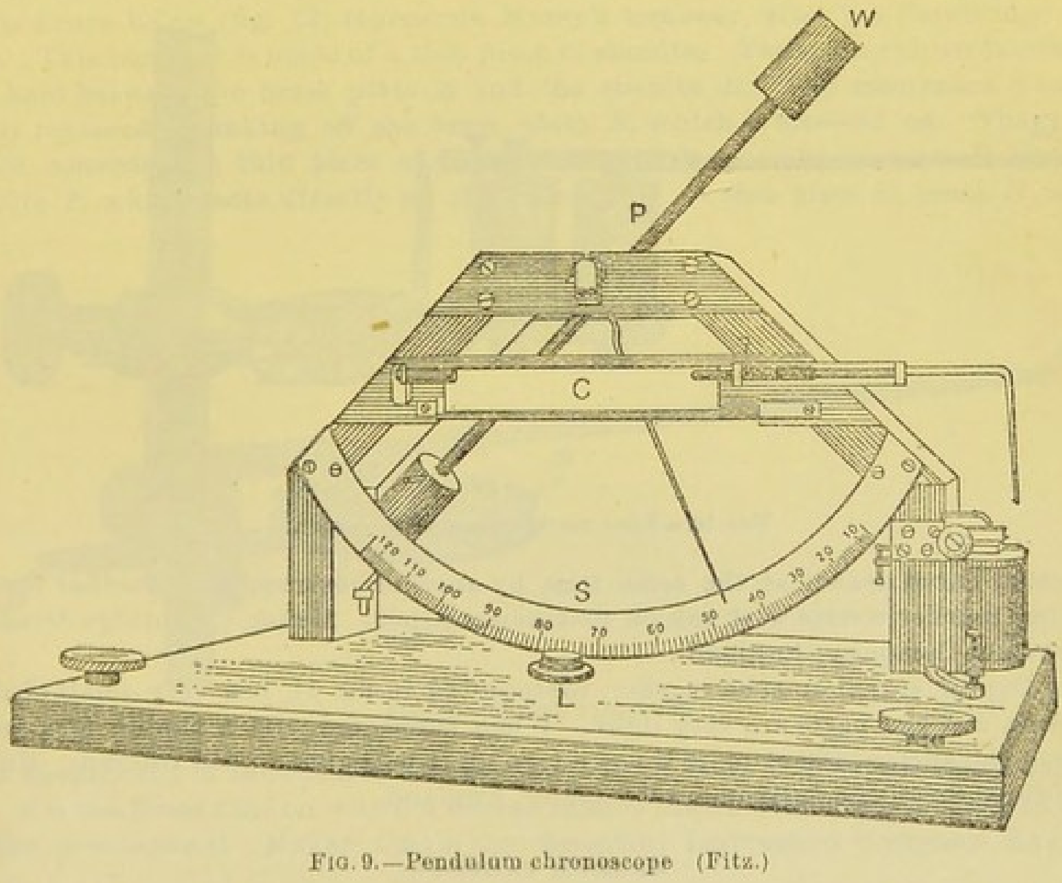


FIG. 9.—Pendulum chronoscope (Fitz.)

things requiring quickness and accuracy. The differences were found to be quite considerable, and there was an apparent lack of coordination between time and error. Those who were quick were not necessarily less accurate than those who were slow. The table which follows gives results suggesting the wide range of individual ability.

TABLE 1.—*Differences in individuals in quickness and accuracy.*

Time in $\frac{1}{100}$ seconds.	Males.			Females.		
	Number of individuals.	Per cent of total.	Average error.	Number of individuals.	Per cent of total.	Average error.
27- 35	11	6.2	11.1	1	1.5	10.0
35- 45	48	22.5	10.05	12	18.0	9.4
45- 55	54	31.0	8.25	18	26.0	7.8
55- 65	29	17.0	9.0	25	35.0	7.2
65- 75	18	11.0	8.2	11	16.0	5.4
75- 85	8	5.0	3.1	4	5.0	4.4
85- 95	4	2.0	4.05	0	....	....
95-105	0	0.0	0.0	....	....	....
105-115	1	6.0	7.8	....	....	....

The table contains observations on 173 males and 72 females. The first column gives limits of quickness, the second column number of individuals, etc. Though the time of the women is longer than that of the men, there is a compensatory increase in accuracy. It may be that everyday activity determines for each individual his range of error, and that time is the main element of variation. (Fitz.)

TIME MARKERS.

The form of time markers (fig. 10) below can be used in connection with an electrically maintained tuning fork of slow vibration. A small electro-magnet moves a lever carrying a writing point A, which marks on the surface of the paper of a recording instrument. It may also be connected with a clock, and used to analyze

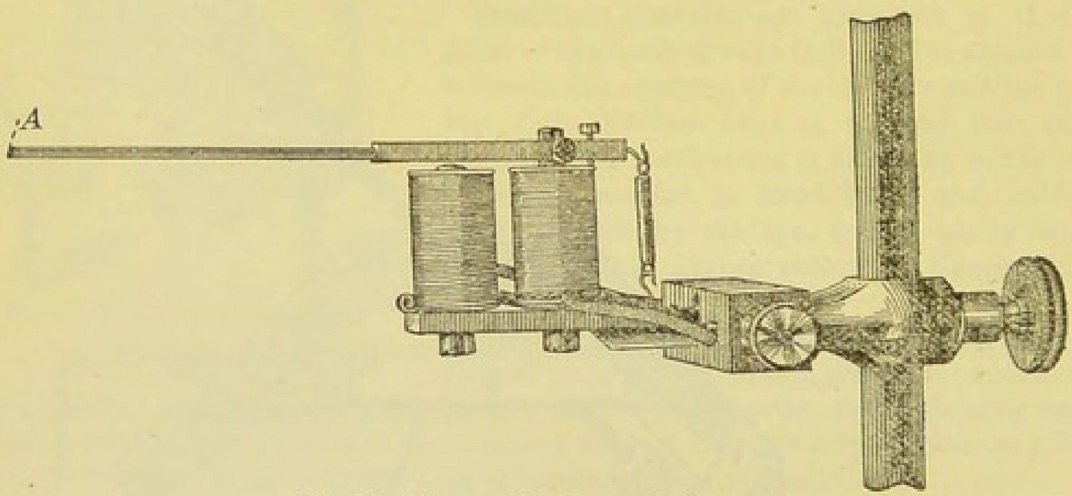


FIG. 10.—Time marker for smoked paper.

any other curve drawn at the same time by another instrument. Another form of the time marker writes with ink on continuous paper. Maker, Cambridge Scientific Instrument Company, England.

The Deprez signal or time marker, represented in fig. 11, has very small electromagnets, and the parts are very light. When connected with a tuning fork interrupting the current 200 or more times a second, it will give a good tracing. Maker, Cambridge Scientific Instrument Company, England.

MAREY'S TAMBOUR.

This is the original pattern of Marey's tambour (fig. 12). The tambour slides up and down a rod R, fastened to a small firm iron stand. An india-rubber membrane, B, is tied over the shallow brass vessel *V*, making an air-tight inclosure. An aluminum plate is fastened to the center of the membrane and is attached to the rod *A*, which writes. This rod can be adjusted in its connection with the brass disk so as to allow its multiplication to be changed. The fulcrum of this rod or lever can be placed horizontally. The principle of the tambour is to record movements which are transmitted to it by means of a tube filled with air. On the iron tube *D* can be fastened a rubber tube conveying the movements of the air to the tambour. When the pressure of the air increases, the rod or marker *A* rises; when the pressure is less, the rod falls. The increase or decrease of pressure is caused by another instrument with which the experiment is being made. Maker, Cambridge Scientific Instrument Company, England.

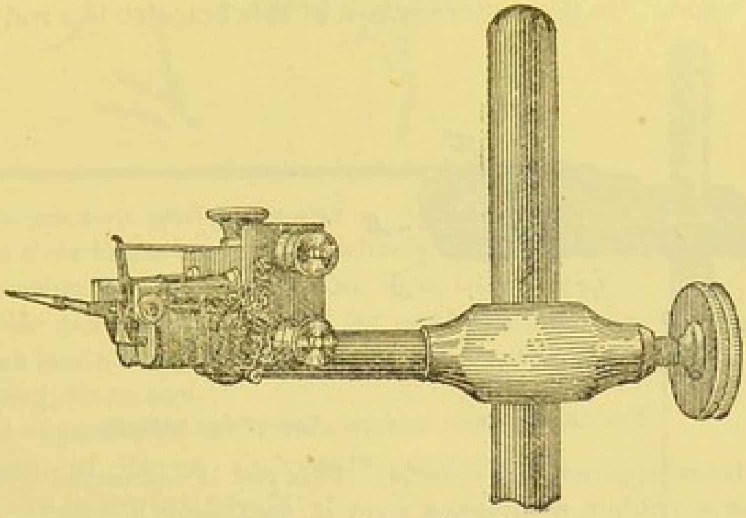


FIG. 11.—Deprez signal.

The figure below (fig. 13) represents Marey's tambour, after the Cambridge pattern. This tambour is made of a thin piece of ebonite. The india-rubber membrane *C* is held between the brass plate *B* and the ebonite *D*. The membrane *C* can be easily replaced by taking off the brass plate *B*, which is screwed on. The rod *E*, which consists of a thin piece of cane, is slipped into a slit in a small block of ebonite *F*, which rests directly on the membrane. A thin piece of brass *H* is put

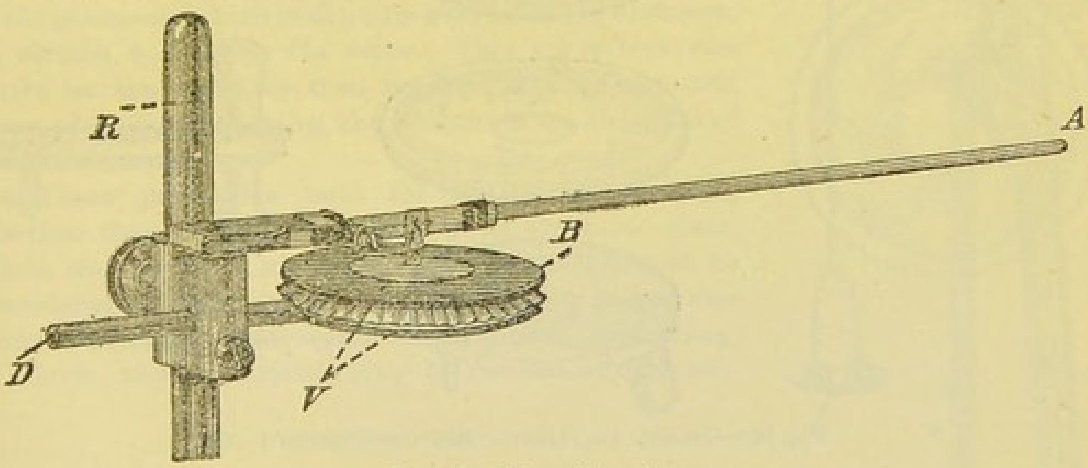


FIG. 12.—Marey's tambour.

into another slit in the ebonite block *F*, and serves as an axis for the rod or marker *E*. *A* is the brass tube on which a rubber tube is drawn conveying the waves of air to the membrane *C*. Maker, Cambridge Scientific Instrument Company, England.

GRAPHIC REGULATOR.

The graphic regulator of Binet & Courtier is designed to eliminate errors from tracings by suppressing oscillations due to the inertia of the marker or pen. In fig. 14 the different parts of the apparatus are represented in their natural size. The maker is Otto Lund, Place de la Sorbonne, Paris.

THE MYOGRAPH.

The myograph is an instrument which shows the differences between muscles in strength, and in the duration and phases of their movements. As the most of life's functions are made known through movements, and as the cause of each movement is generally a muscle, the importance of a knowledge of muscular functions is evident.

The myograph of Marey, in fig. 15, consists of a sort of bracelet made of small strips of wood fastened together by a cord which passes through holes in each end of the strips of wood. On the under surface of this bracelet is a rod with a plate on

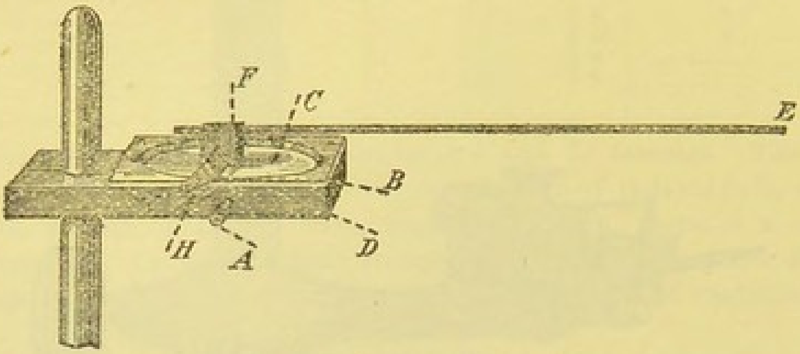


FIG. 13.—Marey's tambour, Cambridge pattern.

the end of it to insert against the muscle. This rod is connected with a brass vessel, A, which has a rubber membrane over it, making it air-tight, and in this way the movements of the muscle are transmitted through the air tube D to a tambour, and thus recorded on a revolving cylinder. The electrical excitation of the muscle comes through the two wires, *b* and *f*. The maker is Verdin, of Paris.

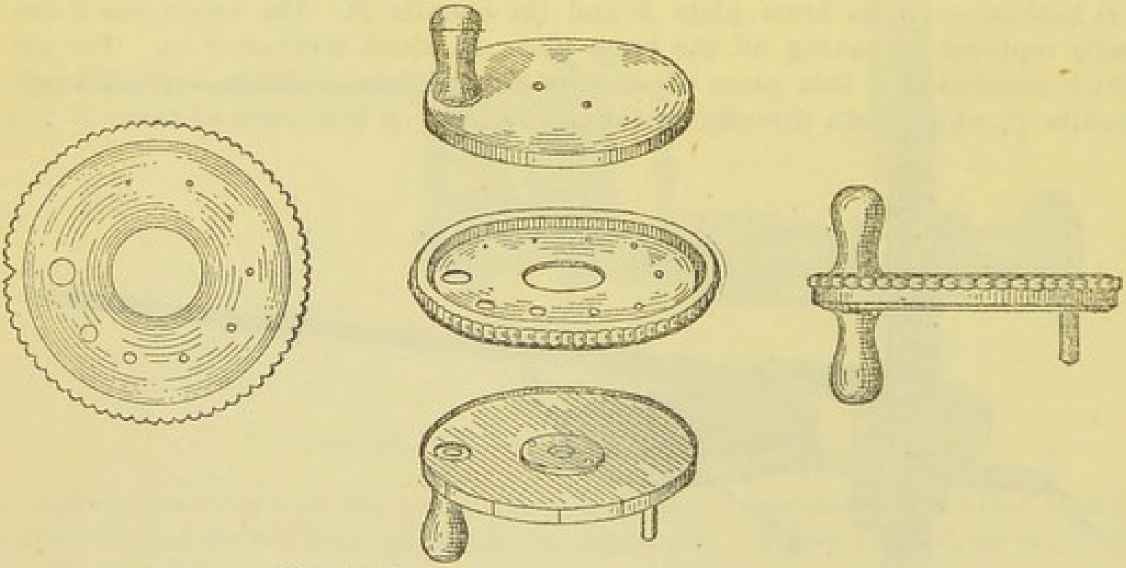


Fig. 14.—Graphic regulator. (Binet & Courtier.)

APPARATUS FOR MUSCULAR SENSE.

The apparatus (fig. 16) for muscular sense is the invention of Professor Münsterberg, of Harvard University. A strong iron rod, C, a little over an inch in diameter, is supported by a heavy iron stand *a* into which the rod C moves up and down, being held at will by the screw *b*. At the end of the rod C is an iron frame which turns upon an axis. This frame has on it two small rails upon which runs lightly a car, *h*, with four small brass wheels. The car is held upon the track at any desired position by a piece of metal, which has upon the end a small wheel running along the under side of a third rail, midway between and a little above the other two rails. An indicator is attached to the car, showing its position upon the scale, which is 900 millimeters long. To the top of the car is attached a short, hollow brass cylinder, *l*, into which the end of the index finger can be inserted and the car set in motion. The limits to the motion of the car can be fixed by two clamps, *m*.

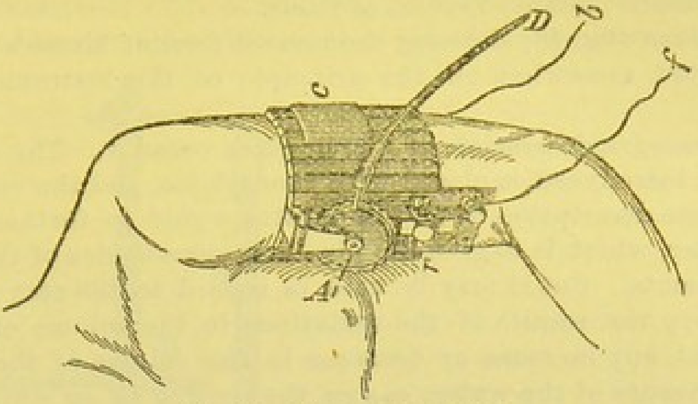


FIG. 15.—Marey's myograph.

and *m'*. There are two pulleys, *n* and *n'*, one at each end of the middle track. A string is drawn over these two pulley wheels and is fastened at one end to the little car and at the other end to a scale pan, *s*, so that the weight of the car can be compensated for or the movement of the car made more difficult or easier. Maker, Elbs, of Freiburg, Germany.

In a series of experiments with this instrument Professor Delabarre, of Brown University, determined, among others, the following points:[1]

1. Those distances are considered equal, the sensible elements of which are considered equal.

2. Therefore everything which unconsciously increases the sensible elements or the strength of the sensations, causes distances to be overestimated, so that a short distance will be felt to be equal to a longer distance.

3. When the person experimented upon is conscious of these causes, which make him overestimate distance, he strives to correct the error. This correction can easily be too great, so that he falls into an opposite error of underestimating the distances on the rails of the instrument.

4. These principles hold for similar movements, whether they occur in succession or at the same time. When they occur in succession another factor must be considered—that is, error in time; for a distance seems longer in memory than when we execute it, providing, of course, any other disturbing factors are eliminated.

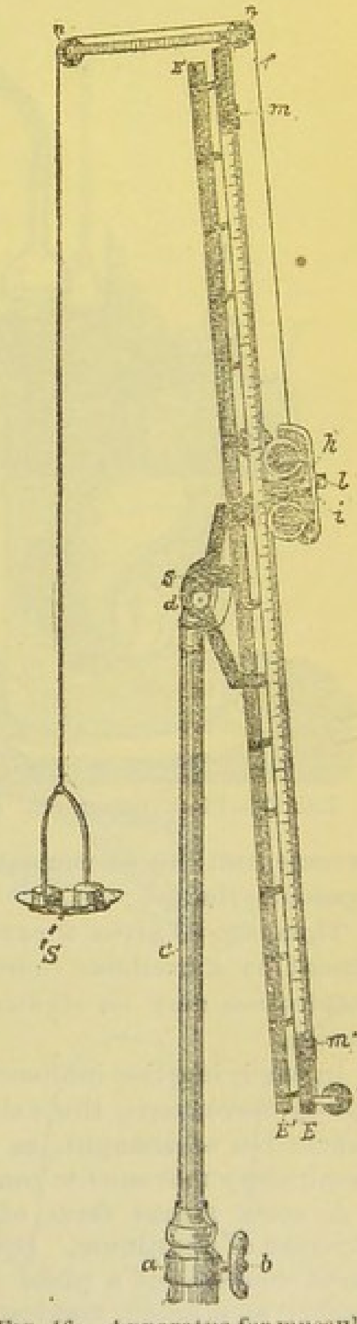


FIG. 16.—Apparatus for muscular sense. (Münsterberg.)

THE PLETHYSMOGRAPH.

This instrument is used to measure the variations in the volume of an organ. One principle upon which this is done is to place the organ in water in an air-tight cylinder and measure the amount of water displaced. Archimedes was the inventor of this method. The apparatus above (fig. 17) is to measure changes in the volume of the hand, a model of François Franck. If to the tube A is fastened a rubber tube, connecting with a tambour, it is evident that when the volume of the hand increases, the surface of the water at B will rise and increase the pressure of the air against the

[1] Delabarre, E. B., Ueber Bewegungsempfindungen, Freiburg, 1891.

membrane of the tambour, making its lever rise, giving an upward curve on a recording instrument. Maker, Verdin, of Paris.

A drawing is given (fig. 18) showing the newest form of Mosso's plethysmograph. This is constructed somewhat on the principle of the instrument (fig. 17) just mentioned.

Mosso's plethysmograph consists of a long glass vessel A. The opening through which the arm is introduced is closed with caoutchouc, and the vessel is filled with water. A complete description of this apparatus would go further than is the purpose of this chapter, which is to give the plan and general idea of the form and application of instruments. But it may be said in regard to the rest of the apparatus employed to convey the results of the variations in the volume of the arm, that it is so adjusted that any increase or decrease in the volume of the arm, and consequently in the pressure of the water, causes the weight H, on which is a marker K, to rise or fall, giving an upward or downward curve on a revolving cylinder.

This instrument has served particularly to determine the amount of blood in the arm. It can be applied to other researches in physiology. By making the glass tube N small, one can see in the tracings of the marker K the pulsations of the heart, the respiratory oscillations, and the undulations of the vessels depending on the vasomotor center.

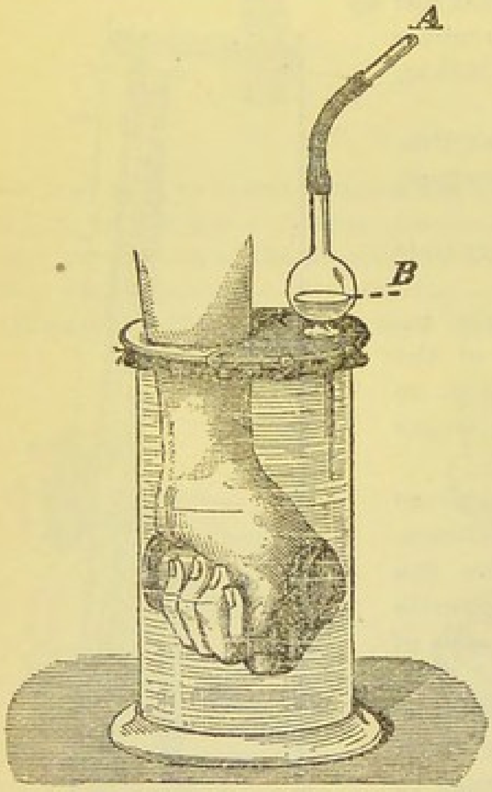


FIG. 17.—Plethysmograph. (Franck.)

In experiments on the action of medicaments in sleep, etc., where it is necessary to measure greater changes of volume in the arm, a larger tube N is used. Maker, Verdin, Paris.

THE PNEUMOGRAPH.

Knowledge as to the movements of the chest in respiration is considered of great importance. The instrument that records these movements is the pneumograph. The one in fig. 19 is after Marey's model. It consists of a flexible brass plate A A, on which are fastened two levers, B and B. The plate A A is placed against the walls of the chest; it is suspended from the neck by cords fastened at D, and it is held against the chest by a cord passing around the body and fastened to both levers B B. A tambour C is so connected with the brass plate A A that any movement of the chest causes the tambour to expand or the reverse, and this movement is carried through the air tube E to a tambour recording upon a cylinder.

Thus, fig. 20 gives a curve of normal respiration, where the rising of the curve traced by a tambour represents inspiration and the falling expiration. Types of respiration may be studied and the effects of disease on movements of the chest shown.

In studying the influence of intellectual and emotional states upon the respiratory movements, the writer, in a series of experiments, found in general that concentration of thought, as in mathematical calculations or in reading, lessens the respiratory movements considerably.

A most recent form of the pneumograph is given in figure 21. It is constructed of aluminum. It is held up partly by a cord around the neck. The instrument consists of a plate A, with two movable basins B B, each covered with a rubber membrane, making the inclosure air-tight. A cord around the body is fastened to a hook in each of the membranes. Two rubber tubes from the membrane join at D, where they can be connected with a tambour, for recording the expansion or contraction of the chest. Maker, Verdin, Paris.

APPRECIATION OF WEIGHT.[1]

The instrument consists of a box containing ten trays which can be easily removed. Each tray contains three weights, identical in size and appearance, but differing in

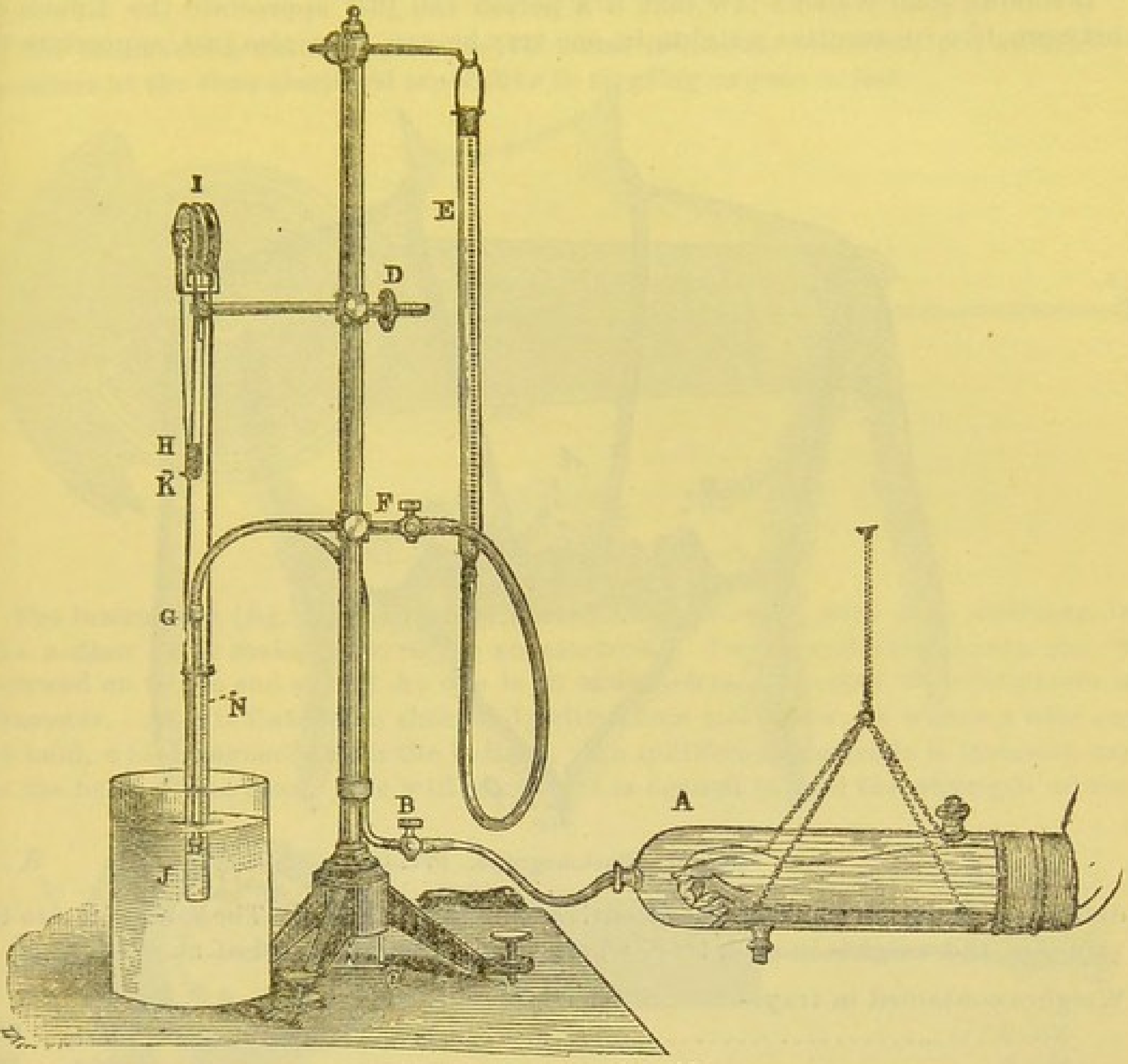


FIG. 18.—Plethysmograph. (Mosso.)

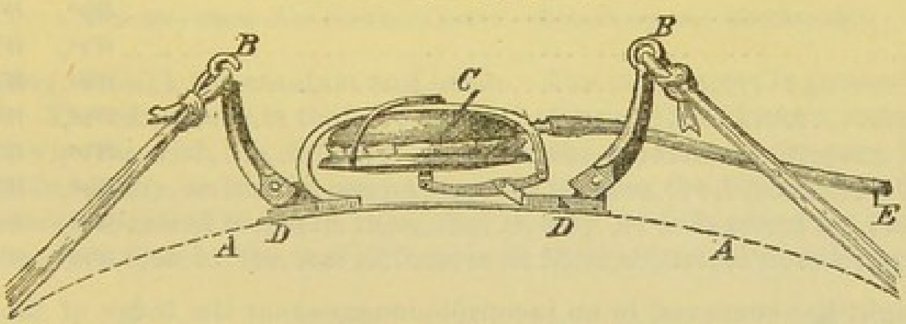


FIG. 19.—Pneumograph. (Marey.)

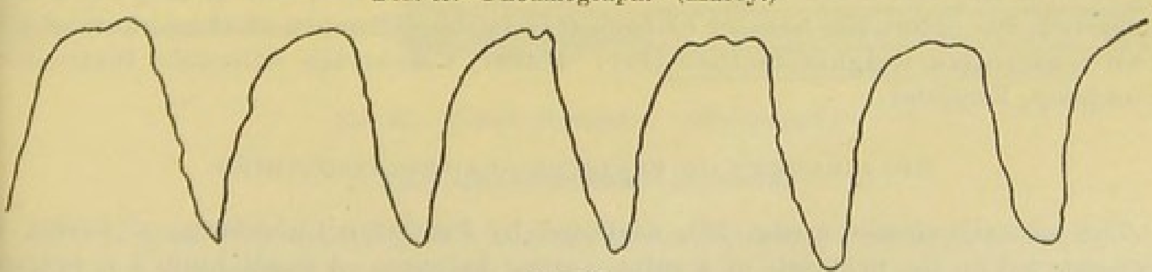


FIG. 20.

[1] See "On apparatus for testing the delicacy of muscular and other senses in different persons," by Francis Galton, F. R. S., Journal of the Anthropological Institute, May, 1883.

weight from each other. The three weights in each tray form a series of gradually increasing weights in geometrical progression and the series in each tray differ in value.

It follows from Weber's law that if a person can just appreciate the differences between two consecutive weights in one tray he can then also just appreciate the

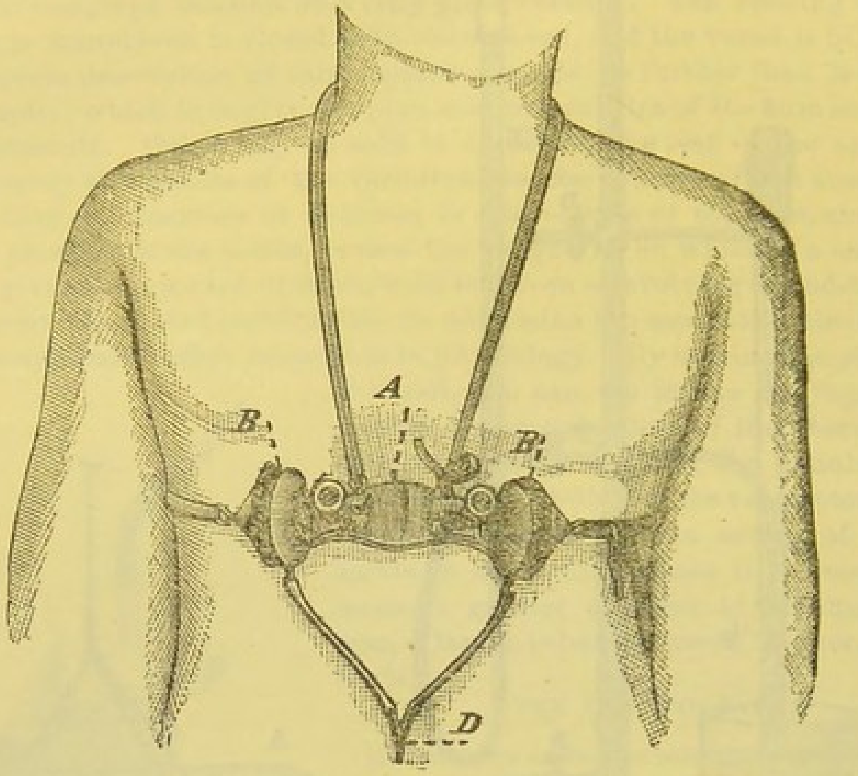


FIG. 21.—Pneumograph. (Verdin.)

difference between the other consecutive pair in that tray. The following are the values of the weights in each tray, where $W=1{,}000$ grains and of $r=1.01$:

Weights contained in tray—

No. 2	Wr^0,	Wr^2,	Wr^4
No. 3	Wr^4,	Wr^7,	Wr^{10}
No. 4	Wr^6,	Wr^{10},	Wr^{14}
No. 5	Wr^4,	Wr^9,	Wr^{14}
No. 6	Wr^0,	Wr^6,	Wr^{12}
No. 7	Wr^0,	Wr^7,	Wr^{14}
No. 8	Wr^2,	Wr^{10},	Wr^{18}
No. 9	Wr^0,	Wr^9,	Wr^{18}
No. 10	Wr^4,	Wr^{14},	Wr^{24}
No. 12	Wr^0,	Wr^{12},	Wr^{24}

Each weight has engraved in an inconspicuous manner the index of the power of r: thus in tray No. 2 the weights have the numbers 0, 2, 4, and in tray No. 3 they have 4, 7, 10. Thus the number of each tray is the difference of the powers of r in two consecutive weights in that tray. Maker, Cambridge Scientific Instrument Company, England.

MEASUREMENT OF PRESSURE—BARÆSTHESIOMETER.

The baræsthesiometer (fig. 22), designed by Professor Eulenburg, of Berlin, is constructed on the principle of a spiral-spring balance. A small knob A is pressed upon the skin gradually. One method is to press until the marker B reaches, say, 50 grams, then the subject closes his eyes and the experimenter gradually increases the pressure. The subject is to indicate as soon as he feels the additional pressure, thus giving his least sensibility to the increase of pressure. The amount is recorded by the hand B. Maker, Hirschmann, Berlin.

BARO-ELECTRO-ÆSTHESIOMETER.

The baro-electro-æsthesiometer, as its name indicates, measures, the amount of pressure at the time electrical sensilility to tingling or pain is felt.

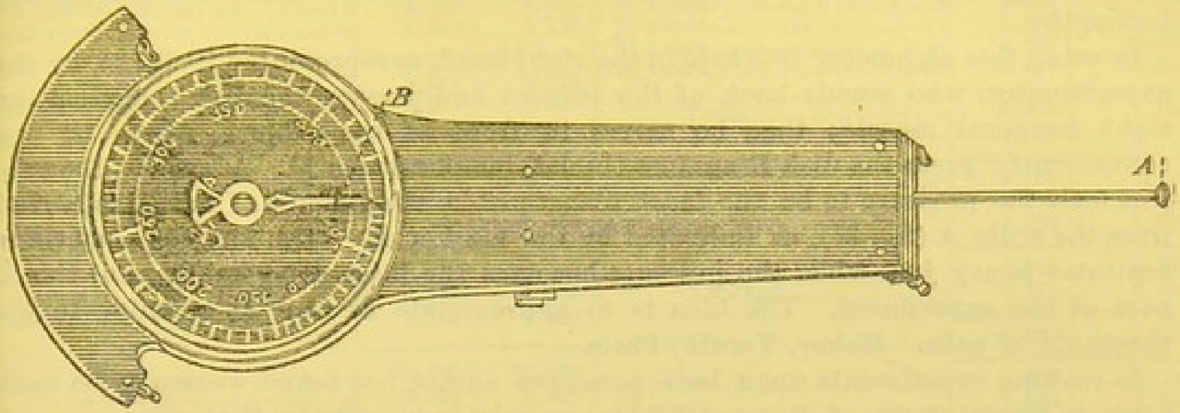


FIG. 22.—Baræsthesiometer. (Eulenburg.)

The instrument (fig. 23) is Eulenburg's baræsthesiometer, with such additions by the author as to make it serve for an electrode. Two round steel knobs can be screwed on to the end of rod A; one is 20 millimeters, the other 35 millimeters in diameter. At B is fastened a short rod, with a hole and screw, by which a wire can be held, which connects with the battery. An indifferent electrode is fastened, say, to the back of the head. We will suppose it is desired to find the strength of cur-

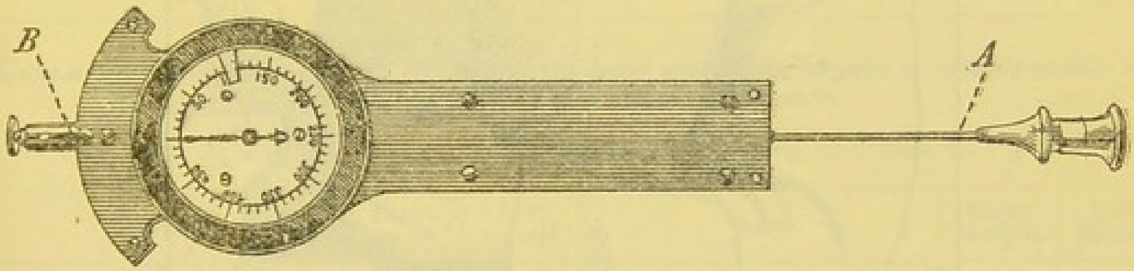


FIG. 23.—*Baro-electro-æsthesiometer.* (Eulenburg and MacDonald.)

rent passing through the cranium and brain. The instrument is pressed against the forehead. The advantage is that the amount of pressure is known and can be kept constant, whereas with the ordinary electrode the amount of pressure is unknown and is liable to vary, so that in comparing two persons the difference in the strength of the current required to make them feel it may be influenced by the amount of pressure, rather than by the real difference in their electrical sensibility.

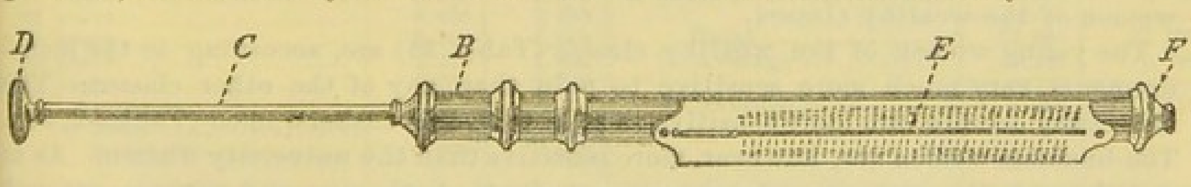


FIG. 24.—Temple algometer. (MacDonald.)

THE MEASUREMENT OF PAIN.

Pain is caused by applying to a sensory nerve a greater stimulation than is normal. The stimulation may be mechanical, electrical, thermal, etc. The measurement of pain can only be approximated, and here there is often difficulty.

The writer has designed a new instrument (fig. 24,) which may be called a temporal or temple algometer.

It measures sensibility to painful or disagreeable impressions caused by pressure, and is generally applied to the temporal muscles. The instrument consists of a brass cylinder B F, with a steel rod C running through one of its ends; this rod is attached to a spring, with a marker E on the scale, measuring pressure from 0 to 4,000 grams.[1] The brass disk D is 15 millimeters in diameter; a piece of flannel is glued to its surface so as to exclude the feeling of the steel when pressed against the skin, thus giving a pure-pressure sensation. The whole instrument is 30 centimeters in length.

In using this algometer it is held in the right hand, as represented in fig. 25, by the experimenter, who stands back of the subject and presses the disk D against the right temporal muscle; then he moves in front of the subject, where he can conveniently press the disk D against the left temporal muscle. As soon as the subject feels the pressure to be the least disagreeable, the amount of pressure is read from the scale A (fig. 24), as indicated by the marker E. The subject sometimes hesitates to say just when the pressure becomes the least disagreeable, but this is part of the experiment. The idea is to approximate as near as possible to the threshold of pain. Maker, Verdin, Paris.

In making experiments upon both sexes the author has found women to be more acute in sensitiveness of disagreeableness or pain from pressure than men.

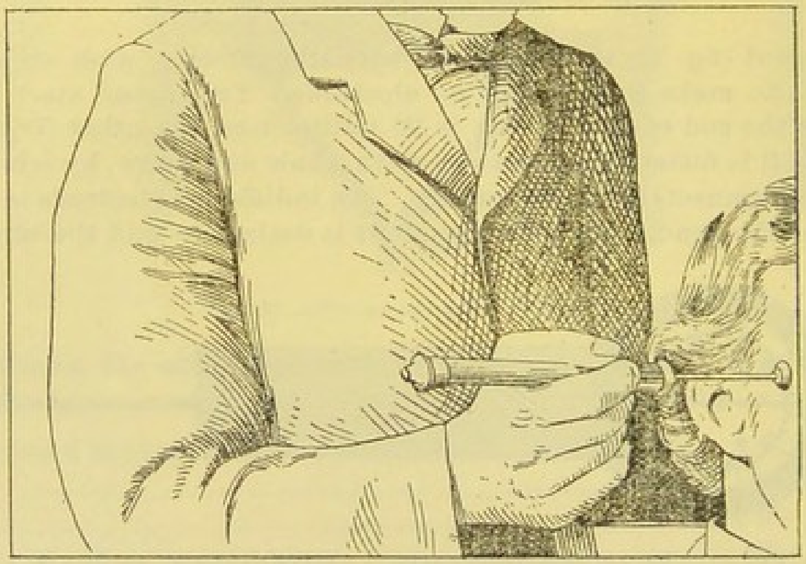


FIG. 25.

In the three following tables (2, 2*a*, 2*b*) are given recent measurements of pain by Misses F. Alice Kellor, Emily Dunning, Alice O. Moore, and Alice E. Palmer. These measurements were made with the author's temple algometer under his direction. Four distinct classes are represented in the tables: University women students, washerwomen, business women, as clerks and stenographers, and young women of the wealthy classes.

The young women of the wealthy classes (Table 2*b*) are, according to the measurements, very much more sensitive to pain than any of the other classes. The university women are more sensitive to pain than the washerwomen (Tables 2, 2*a*). The business women are, however, more sensitive than the university women. As is well known, the majority of university students, both men and women, are not wealthy, but simply in moderate circumstances. It seems that the sociological condition is one of the main factors to affect sensibility to pain.[2]

[1] In experiments upon criminals a pressure of 4,000 grams would in some cases not feel the least disagreeable. A larger form of the instrument is being constructed, so as to measure 8,000 grams pressure.

[2] For further consideration of these measurements see page 1113.

TABLE 2.—*Measurements (in grams) of the least sensibility to pain in university women students, with temple algometer.*

[By F. Alice Kellor and Emily Dunning, of Cornell University.]

Age.	Right temple.	Left temple.
17 years	1,725	1,925
17 years	1,550	1,150
Total	3,275	3,075
Average	1,637	1,537
19 years	2,000	1,750
19 years	2,450	1,950
19 years	2,900	2,550
19 years	2,550	2,700
19 years	2,825	3,000
19 years	3,900	4,000
19 years	2,450	2,950
19 years	1,450	1,950
Total	20,525	20,850
Average	2,565	2,606
20 years	2,325	2,125
20 years	3,400	2,200
20 years	2,800	2,100
20 years	1,600	1,450
20 years	1,350	1,900
20 years	2,925	1,050
20 years	2,325	2,900
20 years	1,750	2,425
20 years	1,550	1,750
Total	20,025	17,900
Average	2,225	1,988
21 years	1,550	1,350
21 years	2,450	1,550
21 years	3,225	2,750
21 years	1,650	1,450
Total	8,875	7,100
Average	2,218	1,775
22 years	2,725	2,400
23 years	2,200	2,400
23 years	1,600	1,350
Total	6,525	6,150
Average	2,175	2,050
25 years	2,650	1,925
27 years	2,500	2,350
27 years	1,850	1,600
Total	4,350	3,950
Average	2,175	1,975
28 years	2,150	2,625
28 years	1,550	2,100
29 years	1,700	1,100
32 years	1,650	2,150
Total	7,050	7,975
Average	1,762	1,993
Average of all	2,220	2,088

TABLE 2*a*.—*Measurements (in grams) of the least sensibility to pain in washerwomen and business women, with temple algometer.*

[By Alice O. Moore, of the Charity Organization Society, of Buffalo, N. Y.]

Age.	Right temple.	Left temple.
WASHERWOMEN. *a*		
25 years	2,750	2,950
31 years	4,500	4,500
31 years	3,500	4,000
32 years	2,150	1,900
35 years	4,000	4,000
36 years	2,300	2,050
37 years	2,700	2,800
39 years	3,134	3,400
40 years	3,900	3,750
41 years	2,900	3,000
42 years	3,450	3,250
45 years	2,950	2,600
49 years	2,250	2,850
55 years	2,550	2,250
Total	43,034	43,300
Average	3,073	3,092
BUSINESS WOMEN (CLERKS, STENOGRAPHERS, ETC.). *b*		
30 years	1,500	1,000
31 years	1,400	1,300
35 years	1,100	1,150
38 years	1,100	1,450
40 years	1,200	1,450
45 years	1,650	1,350
60 years	1,650	1,600
60 years	1,000	850
60 years	2,050	2,000
Total	12,650	12,150
Average	1,405	1,350
Average of all	2,421	2,410

a Average age, 38 years.

b Average age, 44 years.

TABLE 2b.—*Measurements (in grams) of the least sensibility to pain in young women of the well-to-do classes, with temple algometer.*

[By Alice E. Palmer, teacher of mathematics, Pittsburg, Pa.]

Age.	Right temple.	Left temple.
12.8 years	700	650
12.9 years	750	600
12.10 years	650	800
12.11 years	800	850
Total	2, 900	2, 900
Average	725	725
13.2 years	1, 150	1, 200
13.4 years	600	600
13.6 years	750	750
Total	2, 500	2, 550
Average	833	850
14 years	1, 600	1, 550
14.4 years	950	950
14.6 years	700	700
14.7 years	1, 000	950
Total	4, 250	4, 150
Average	1, 062	1, 037
15.1 years	950	950
15.2 years	600	550
15.2 years	1, 700	1, 550
15.3 years	700	650
15.4 years	1, 450	1, 500
15.5 years	950	1, 050
15.5 years	750	800
15.6 years	850	900
15.6 years	600	650
15.6 years	950	950
15.7 years	1, 350	1, 400
15.9 years	750	850
15.9 years	600	800
15.9 years	1, 650	1, 650
Total	13, 850	14, 250
Average	989	1, 017
16.2 years	1, 000	1, 100
16.3 years	1, 000	1, 000
16.3 years	900	1, 100
16.3 years	650	700
16.8 years	950	1, 100
16.9 years	1, 100	950
16.9 years	900	950
16.9 years	1, 000	1, 050
Total	7, 500	7, 950
Average	937	993
17.1 years	750	850
17.1 years	1, 750	1, 550
17.2 years	700	650
17.2 years	1, 500	2, 000
17.4 years	1, 200	1, 150
17.7 years	1, 300	1, 350
17.9 years	1. 700	1, 600
17.9 years	1, 050	1, 000
17.10 years	600	650
Total	10, 550	10, 800
Average	1, 172	1, 200
18 years	850	950
18.2 years	600	600
18.4 years	2, 000	1, 600
18.8 years	1, 050	950
Total	4, 500	4, 100
Average	1, 125	1, 025
19.1 years	800	850
19.2 years	850	900
Total	1, 650	1, 750
Average	825	875

ÆSTHESIOMETER.

The æsthesiometer measures the degree of ability to distinguish points on the skin by the sense of touch. This is called the sense of locality, which varies in acuteness according to the mobility of the part.

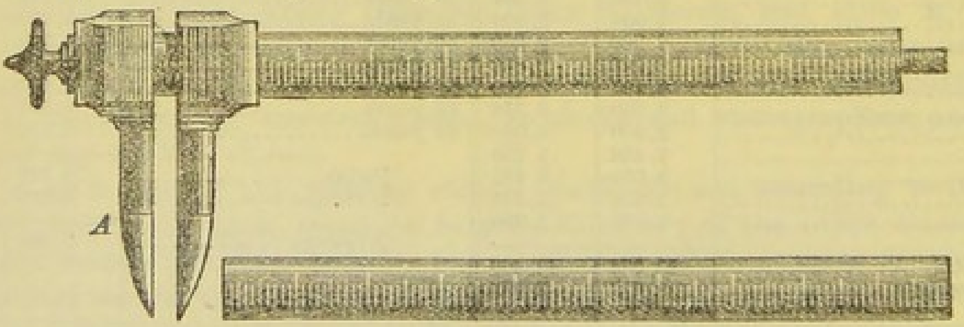


FIG. 26.—Æsthesiometer.

The instrument (fig. 26) consists of a round brass rod on which is a scale. One point A is fastened on the rod, the other point slides on the rod. The subject, with eyes closed, is asked, when the two points are made to gently touch the skin simultaneously, how many points he feels, one or two. When he is in doubt the distance between the two points can be read on the scale. This distance is an approximate measure of his sense of locality on the skin. Maker, Verdin, Paris.

The following table gives the the smallest distance (in millimeters) at which two points can still be distinguished as double by an adult and by a boy 12 years of age:

TABLE 3.

[Physiology, Landois and Sterling, Philadelphia, Pa.]

	Adult.	Boy 12 years old.		Adult.	Boy 12 years old.
Tip of tongue	1.1	1.1	Center of hard palate	13.5	11.3
Third phalanx of finger, volar surface	2-2.3	1.7	Lower third of forearm, volar surface	15.0	....
Red part of the lips	4.5	3.9	In front of the zygoma	15.8	11.3
Second phalanx of finger, volar surface	4-4.5	3.9	Plantar surface of great toe	15.8	9.0
Third phalanx of finger, dorsal surface	6.8	4.5	Inner surface of the lips	20.3	13.5
Tip of nose	6.8	4.5	Behind the zygoma	22.6	15.8
Head of metacarpal bone, volar surface	5-6.8	4.5	Forehead	22.6	18.0
Dorsum and side of tongue, white of the lips, metacarpal part of the thumb	9.0	6.8	Occiput	27.1	22.6
Third phalanx of great toe, plantar surface	11.3	6.8	Back of the hand	31.6	22.6
Second phalanx of fingers, dorsal surface	11.3	9.0	Under the chin	33.8	22.6
Back	11.3	9.0	Vertex	33.8	22.6
Eyelid	11.3	9.0	Knee	36.1	31.6
			Sacrum, gluteal region	44.6	33.8
			Forearm and leg	45.1	33.8
			Neck	54.1	36.1
			Upper arm, thigh, and center of the back	67.7	31.6-40.6

THERMÆSTHESIOMETER.

The thermæsthesiometer (fig. 27), designed by Professor Eulenburg, of Berlin, measures the least sensibility to heat. It consists of two thermometers fastened

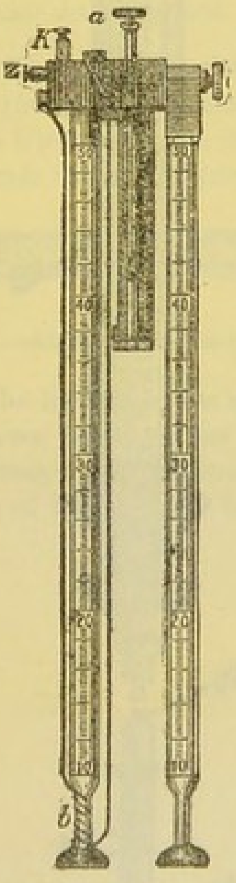


FIG. 27.—Thermæsthesiometer. (Eulenburg.)

together as seen in the figure. There is an electrical arrangement for changing the temperature of one of the thermometers. One thermometer is heated until the

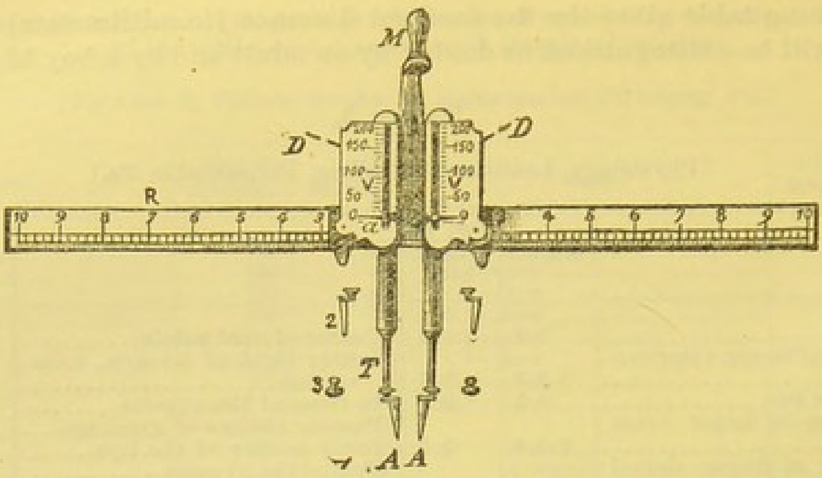


FIG. 28.—Dynamometrical æsthesiometer. (Verdin.)

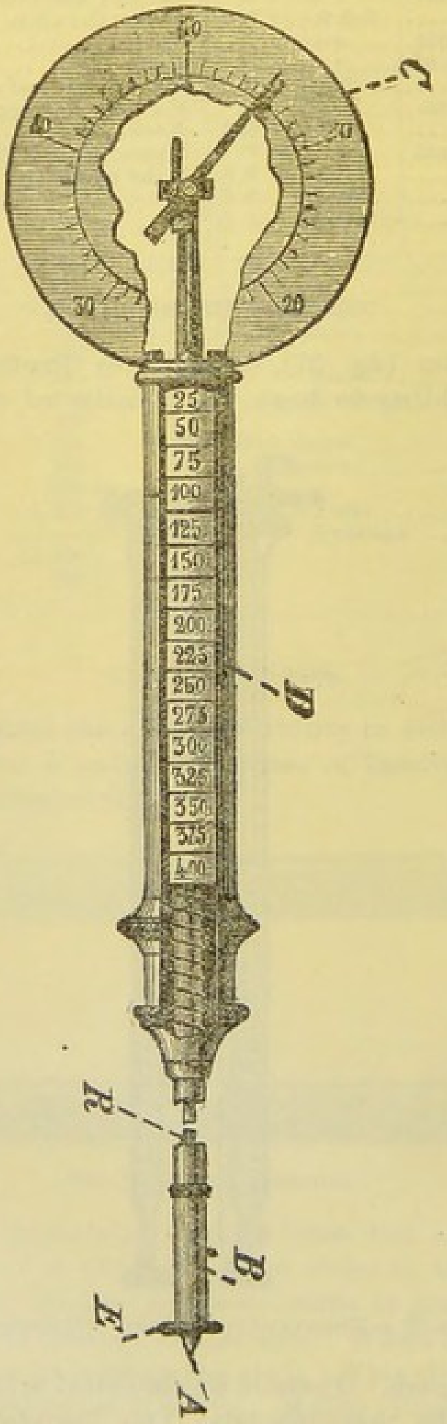


FIG. 29.—Algometer. (Chéron.)

difference from the other is easily perceived; then both are placed upon the skin. The person to be experimented upon is asked to say as soon as the difference between the thermometers becomes imperceptible. The real difference between the thermometers is then read; this is called the least perceptible difference. If for one person this difference is 2° and for another person 3°, then the former is said to be more acute in sensibility to heat by 1°; for small differences are less easily perceived than large differences.

The maker of the form of instrument represented in the figure (27) is Windler, Berlin.

DYNAMOMETRICAL ÆSTHESIOMETER.

In fig. 28, below, is represented a dynamometrical æsthesiometer designed by Charles Verdin. It measures the different degrees of the sensibility to pain by pressure of two points AA, on the skin.

It is composed of a flat steel bar R marked off in centimeters, on the back of which is fastened a handle M. The two scales DD, which measure the amount of pressure of the points AA, are graduated from 0 to 250 grams. They are fastened to the rods with the points at the end and slide along the bar R, so that the points may be at different distances from each other. Maker, Verdin, Paris.

Another algometer (fig. 29) is that of Dr. Chéron. Its purpose is not only to measure how much pressure of the point A on the skin is necessary to produce pain, but also how much the point A penetrates the skin. The amount of pressure is measured on the scale D; the distance the point enters the skin is measured in tenths of millimeters on the circular scale C. A brass tube, B, slides up and down the rod R. This tube is slid down so that its edge, E, is even with the point, A, and is connected by a thin rod, R, with the scale, C, so as to measure the amount of the sinking of the point, A, into the skin as soon as pain is felt. Maker, Verdin, Paris.

HAND ALGOMETER.

The hand algometer in fig. 30 is a design by Professor Cattell, of Columbia University, New York. The body of the instrument is made of gutta-percha. The brass rod A, with a rounded gutta-percha tip at one end, is connected with a spring within the body of the instrument; the scale is in kilograms. The instrument is pressed

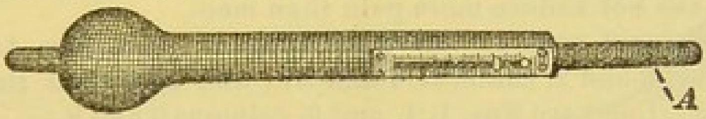


FIG. 30.—Algometer. (Cattell.)

against the palm or other part of the hand, and as soon as the pressure becomes the least painful the amount the pointer indicates on the scale is recorded. Makers, Brown & Getty, Camden, New Jersey. The author has used Cattell's instrument upon 188 persons, testing the palm of both hands for pain, with the results as indicated in Table 4, which follows:

TABLE 4.—*Sensibility to pain by pressure in hands of individuals of different classes, sexes, and nationalities.*[1]

No.	Class.	Total number of persons.	Right hand.			Left hand.		
			Number requiring more pressure in right hand.	Total.	Average.	Number requiring more pressure in left hand.	Total.	Average.
1	2	3	4	5	6	7	8	9
				Kgm.	*Kgm.*			
1	American professional men...	20	14	74.50	3.72	5	65.25	3.26
2	American business men	14	6	85.25	6.08	6	87.75	6.05
3	American women, nonlaboring class..................	27	13	93.25	3.45	6	91.83	3.38
4	English professional men.....	17	9	88.50	5.20	6	87.25	5.13
5	English women, nonlaboring class	7	4	43.00	6.14	2	44.25	6.32
6	German professional men.....	6	5	31.25	5.20	1	29.00	4.83
7	Salvation Army members, London	8	6	73.25	9.15	2	51.00	7.62
8	Slum men in Chapel-Rouge, Paris	9	3	122.50	13.61	2	119.50	13.27
9	Boston army of the unemployed	34	16	332.50	9.77	14	333.75	9.81
10	Women in "Maisons de Tolérance," Paris...............	9	3	82.00	9.00	5	84.25	9.36
11	Epileptic patients, laboring people	3	1	28.00	9.33	1	27.00	9.00
12	Odd ones, men, in Paris.......	7	4	28.25	4.03	3	26.25	3.75
13	Odd ones, men, in different countries	18	10	96.25	5.34	5	89.50	4.97
14	Men in general.................	142	76	1,012.75	7.13	49	979.50	6.89
15	Women in general	46	21	230.50	5.01	15	233.08	5.06

Should these results prove to be generally true by experiments on larger numbers of people, the following statements would be probable:

The majority of people are more sensitive to pain in their left hand. (Only exception is No. 10, columns 4 and 7.)

Women are more sensitive to pain than men. (Nos. 14 and 15, columns 6 and 9.) Exceptions are: compare Nos. 4 and 5, columns 6 and 9. It does not necessarily follow that women can not endure more pain than men.

American professional men are more sensitive to pain than American business men (compare Nos. 1 and 2, columns 6 and 9); and also than English or German professional men. (Compare Nos. 1, 4, and 6, columns 6 and 9.)

The laboring classes are much less sensitive to pain than the nonlaboring classes. (Compare Nos. 1, 2, and 9, columns 6 and 9.)

The women of the lower classes are much less sensitive to pain than those of the higher classes. (Compare Nos. 3, 5, and 10, columns 6 and 9.) In general, the more developed the nervous system the more sensitive it is to pain.

Remark: While the thickness of tissue on the hand has some influence, it has by no means so much as one might suppose, a priori; for many with thin hands require much pressure. (Nos. 5 and 10, columns 6 and 9.)

MUSCLE READING.

Some explanation of muscle reading and like phenomena may be suggested by experiments with the digitalgraph[2] (fig. 31) and the automatograph (fig. 32).

Figure 31 represents an instrument for recording the unconscious movements of the finger, designed by Dr. Delabarre, of Brown University. The movements of the finger are communicated by two chords, A and B, to two rods, V and H, on which can be fastened markers to make tracings upon a revolving cylinder. The rods V

[1] Psychological Review, March, 1895.

[2] We have ventured to name this instrument.

and H are held in a state of tension by rubber bands, which react in such a way as to cause every horizontal or vertical movement of the finger to be recorded. Maker, Verdin, Paris.

THE AUTOMATOGRAPH.

The automatograph (fig. 32) below, designed by Professor Jastrow of the University of Wisconsin, is an instrument for the study of involuntary movements. It

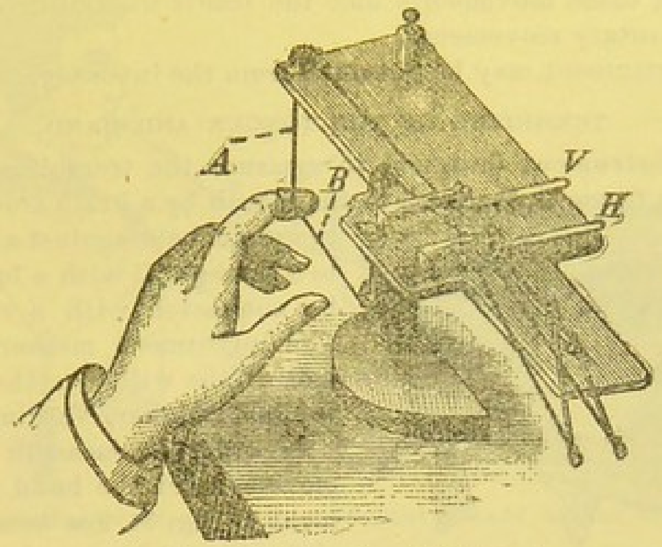


FIG. 31.—Digitalgraph. (Delabarre.)

consists of a wooden frame, B, mounted on three adjustable brass legs, raising it from the table a little, and enabling one to make the plate glass E (15 inches square) exactly level. Three glass balls and polished spheres, three-fourths of an inch in diameter, are placed in triangular form upon the plate glass; a very light crystal plate glass (14 inches square) rests upon these balls. This crystal plate is mounted in a light frame. A piece of paper is placed upon the plate to hide the balls; the ends of the fingers are lightly rested upon this paper. The least movement of the hand

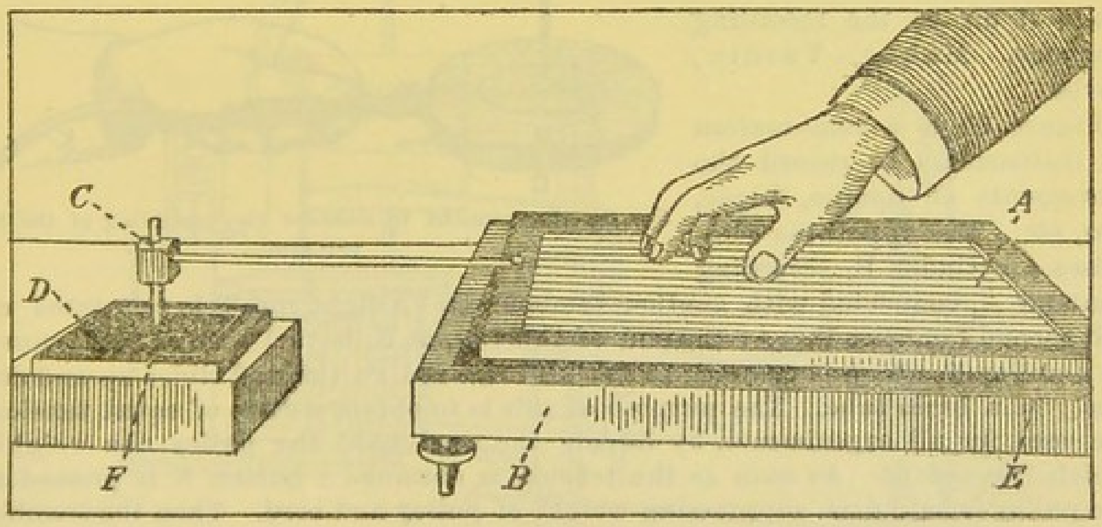


FIG. 32.—Automatograph. (Jastrow.)

slides the upper plate upon the balls. To the light frame of the upper plate A is fastened a small rod 10 inches long, upon the end of which is a cork, C, pierced by a small glass tube. In this tube is a glass rod fitting the tube snugly. The fine point to this rod traces every movement of the hand exactly. A piece of smoked paper, D, is placed over a glass plate to receive the markings of the rod or pointer F. A large screen is used to prevent the subject from seeing the record. The instrument records all movements in the horizontal plane. Jastrow calls it an automatograph, because it records slight involuntary movements. The results of experiments by Jastrow[1] show that the meaning of the movements recorded depends mostly upon the testimony of the subjects. In general the subject becomes aware his hand has moved, but seldom knows the direction; the movements, though always involuntary, are sometimes unconscious. The subject is often surprised at the result. This and the digitalgraph of Delabarre suggest many subtle ways[2] in which by movement we unwittingly give others an idea of what is going on in our minds. Jastrow intentionally simulated these movements and the result was measurably different from the genuine involuntary movements.

Details as to instrument may be obtained from the inventor.

TREMBLING OF THE TONGUE AND HAND.

In fig. 33 is an instrument designed to measure the trembling of the tongue. It consists of a brass frame B, fastened to the mouth by a braid around the head. The tongue is held against a little disk attached to a tambour C with a brass tube A that can be connected with a recording tambour. The instrument measures rather the control of the will over the movements of the tongue. Maker, Verdin, Paris.

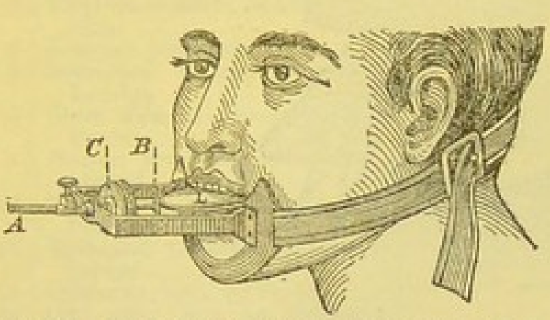


FIG. 33.—Instrument for measuring the trembling of the tongue.

In order to measure the trembling or movement of the hand or arm the instrument in fig. 34 has been devised. It consists of a rubber membrane M, fastened to a small shallow brass basin C, making a tambour. A brass disk D is glued to the membrane M, and on this disk is a brass rod T. Different weights of 5, 10, etc., grams can be screwed upon the rod T. A brass tube passes through the handle, on the end of which can be fastened a rubber tube K, connecting with a recording tambour. Any movement of the hand or arm up and down causes the weight to press upon the membrane M, which sends a wave of air to the recording tambour. Maker, Verdin, Paris.

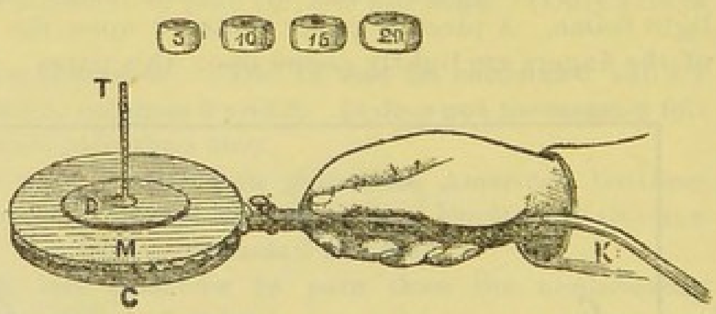


FIG. 34.—Instrument to measure the trembling of the hand and arm.

Figure 35 is a combination of instruments to record the movements of tongue, finger, lips, etc. The apparatus comprises a cylinder E, recording tambour A, connected with another tambour D. A light rod T is connected with this second tambour D. At the end of this rod, at K, is tied a small cord, running on a pulley P, which is fastened to a small brass rod F; this rod slides up and down freely in a brass tube. The purpose of this is to obtain a state of equal tension of the cord for all experiments, by having the cord hold the pulley, the weight of which is constant. As soon as the tension is obtained a button N is pressed and the pulley is held firm, suppressing weight of pulley and cord. Then the trembling of the member is recorded. Maker, Verdin, Paris.

THE PSYCHOGRAPH.

The psychograph is a new apparatus for the study of trembling. The instrument in fig. 36 was designed by Professor Sommer, of Giessen, Germany, and is used for the investigation of the unconscious movements of the hand.

[1] Amer. Jour. Psychology, Vol. IV, 1892, page 398.

[2] As when a company of people place their hands upon a table, and it moves, although none are conscious of pushing it.

There are two special difficulties in studying the trembling of the hand. One is to analyze the movements and distinguish them—that is, each movement in three directions, horizontal from right to left, and forward and backward, and vertical up and down. It is necessary also to lessen friction as much as possible, for recording the slightest movement of the hand. This latter difficulty is overcome by employing systems of levers, reducing the friction to a minimum. It is necessary to connect the hand with the different levers corresponding to the three principal directions, and to record separately the movements of each of these levers. To record these movements on the same cylinder, angular levers must be interposed between the rod upon which the finger rests and the marker on the cylinder. The horizontal movement of the hand is transformed into a vertical movement of the marker. Sommer considers his instrument useful in the study of nervous functional diseases. The curves in fig. 37, below, show the trembling of the hand of a person with paralysis. The first curve indicates horizontal movements forward and backward; the second lateral horizontal movements. The third curve, hand movements up and down. The trembling is quite different in each of the three directions. Maker is Schmidt, of Giessen, Germany.

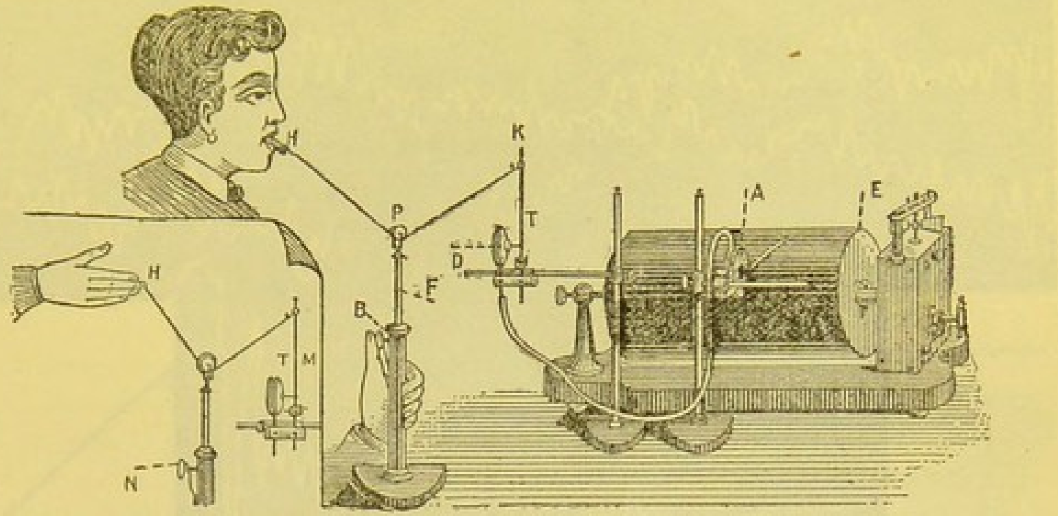


FIG. 35.—Apparatus for measuring the movement of hand, tongue, etc. (Filliatre.)

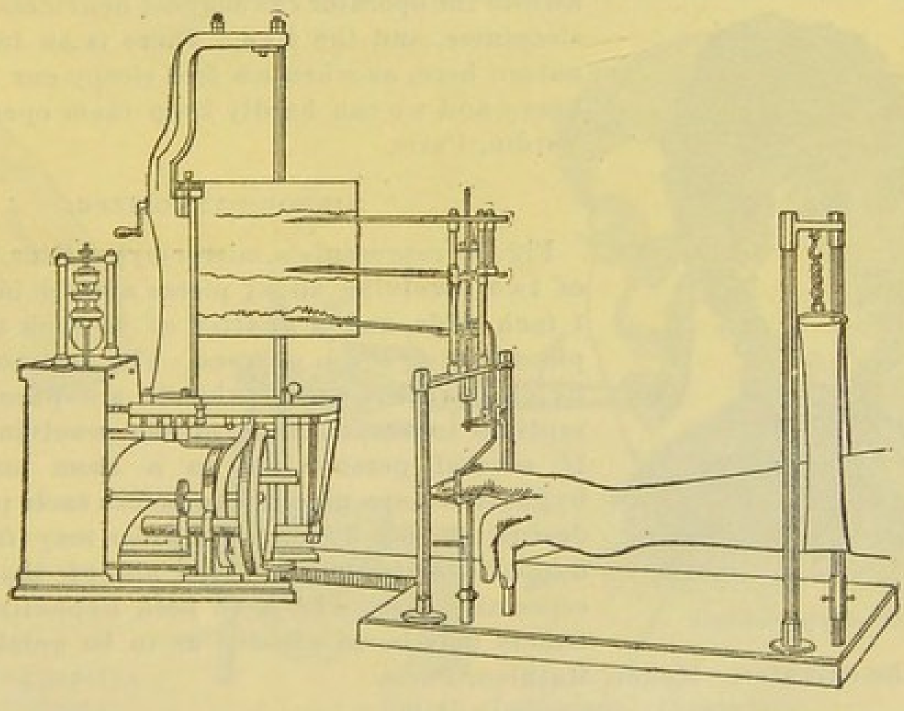


FIG. 36.—Psychograph. (Sommer.)

HYPNOTIC INSTRUMENTS.

Hypnotic instruments are used as aids to the operator in producing hypnotism or suggestions.

The hypnotic ball (fig. 38) has been used at the Hospital Saltpétrière in Paris. It consists of a curved flat piece of metal B, holding a lead wire A, on which is fastened

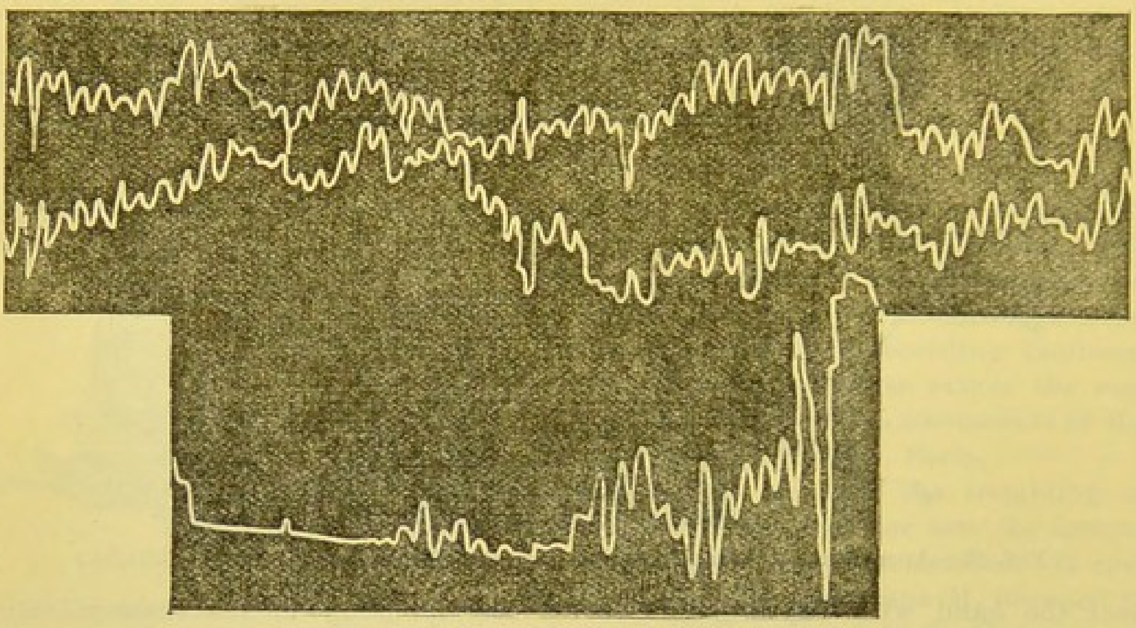


FIG. 37.—Trembling of hand in paralysis.

a nickel ball 15 millimeters in diameter, which can be changed from one position to another by bending the wire. The ball is so placed as to strain the attention; the muscles of the eye are fatigued. After concentrating the eyes upon the ball for awhile the operator can suggest heaviness of eyelids, sleepiness, and the like. There is an imitation of nature here, as when we feel sleepy our eyelids are heavy and we can hardly keep them open. Maker, Verdin, Paris.

FIG. 38.—Hypnotic ball.

MIRROR-HYPNOTIZER.

Fig. 39 represents a mirror-hypnotizer, consisting of two revolving ebony pieces about 8 inches long, 1 inch wide, and a quarter of an inch thick, each piece having seven mirrors. The instrument is run by clockwork. Some subjects are peculiarly susceptible to the dazzling of the revolving mirrors. If several persons are in a room and mirror-hypnotizers are placed one before each person who desires to be hypnotized, some may fall into a hypnotic sleep without the aid of the operator, especially those who have been hypnotized before. Others may be so affected as to be quickly hypnotized by the operator. Maker, Mathieu, Paris.

SUGGESTION BLOCKS.

An experiment with the two round blocks (one 9 centimeters in diameter by 3 centimeters thick, the other 3 centimeters in diameter by 3 centimeters thick), fig. 40, below, will serve as an example of what may be called natural suggestion. The blocks each weigh exactly 55 grams. If held, say between the thumb and second finger of both hands at the same time, or of one hand at successive times, the smaller block will feel the heavier. The blocks at their centers are held between the fingers, so that the special contact of each block with the fingers and thumb is the same. It is perhaps generally true that when objects look alike in every respect, except that

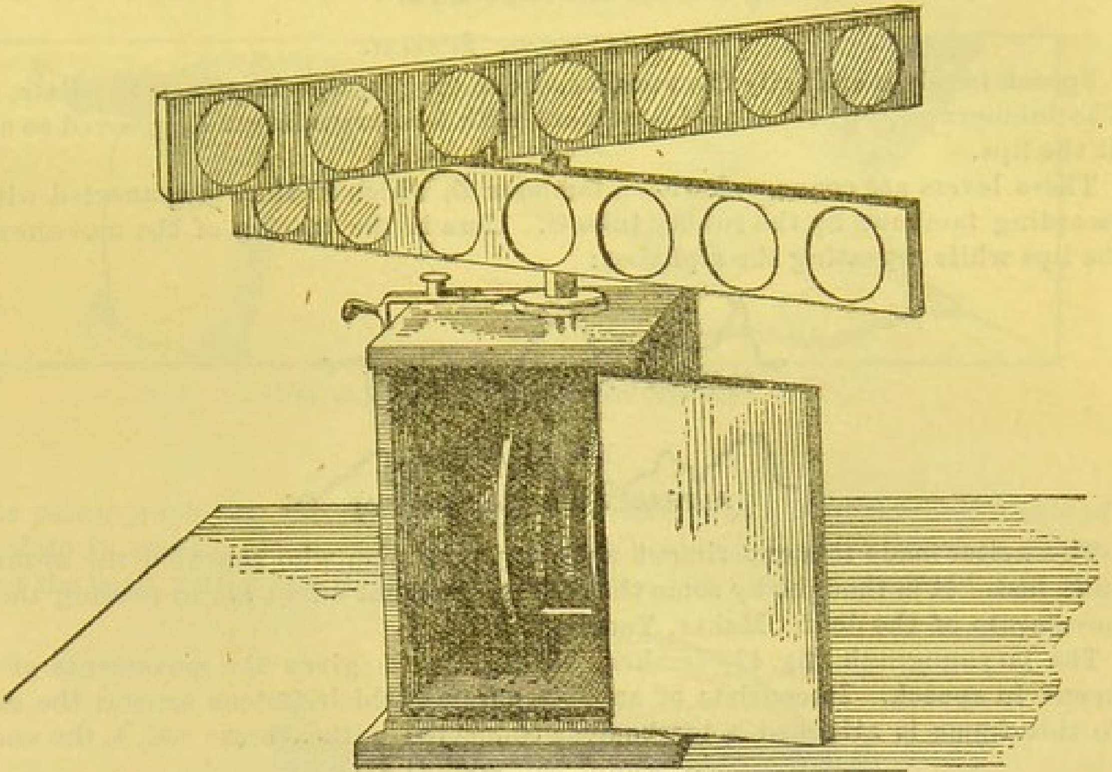


FIG. 39.—Mirror-hypnotizer.

one is larger than the others, we think the largest one to be the heaviest before we lift them. But if upon lifting them the largest one does not feel the heavier, an unconscious counter suggestion seems to make us feel the smallest block heavier; it

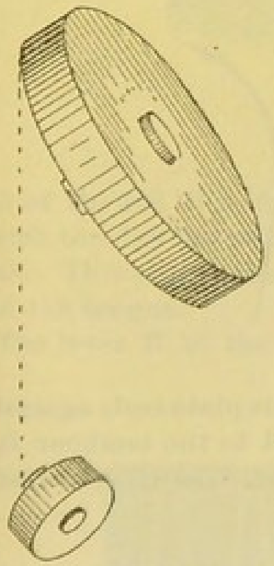


FIG. 40.—Suggestion blocks. (Gilbert.)

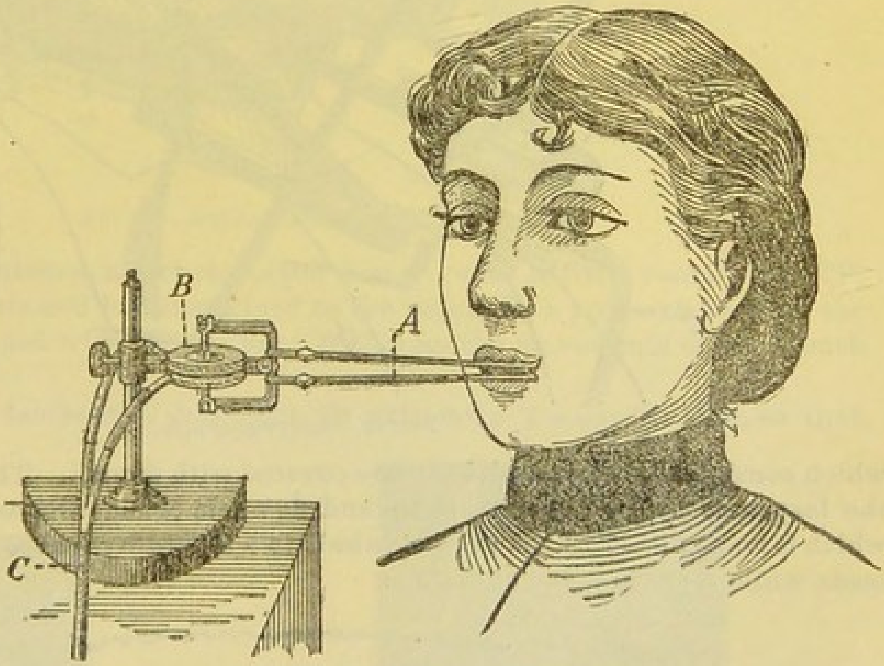


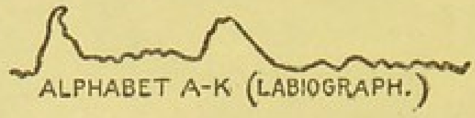
FIG. 41.—Labiograph. (Rousselot.)

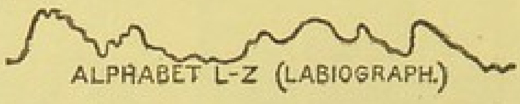
is an illustration of the adage that a pound of lead is heavier than a pound of feathers. As Professor Scripture puts it, it is a "disappointed suggestion of weight." In a series of experiments with different blocks upon New Haven school children, Scripture and Gilbert have shown that suggestibility slowly increases from 6 year to 9 years of age; after 9 years it steadily decreases as the children grow older. The girls were found more susceptible to suggestion than the boys, with the exception of age 9, where both were very susceptible. Dr. Gilbert, of the Yale laboratory, has designed fourteen apparently solid black round blocks, each 6 centimeters in diameter and 3 centimeters thick, having weights of 15, 20, 25, etc., up to and including 80 grams. Maker, Willyoung & Co., Philadelphia, Pa.

MECHANICS OF SPEECH.

Speech involves specially the muscles of the tongue, lips, larynx, soft palate, etc. The labiograph (fig. 41) is an instrument with two brass levers A, grooved so as to fit the lips.

These levers are connected with a tambour B, which in turn is connected with a recording tambour by the rubber tube C. Here is the tracing of the movement of the lips while repeating the alphabet:





The writer made this experiment upon a young man who repeated the alphabet quite fast. It is thought by some that this instrument might aid in reading the lip movements of the deaf. Maker, Verdin, Paris.

The laryngograph (fig. 42) (maker, Verdin, Paris) gives the movements of the larynx in speech. It consists of an ebony frame which fastens around the neck. To this frame is attached a tambour, B, connected with a brass rod, A, the end of

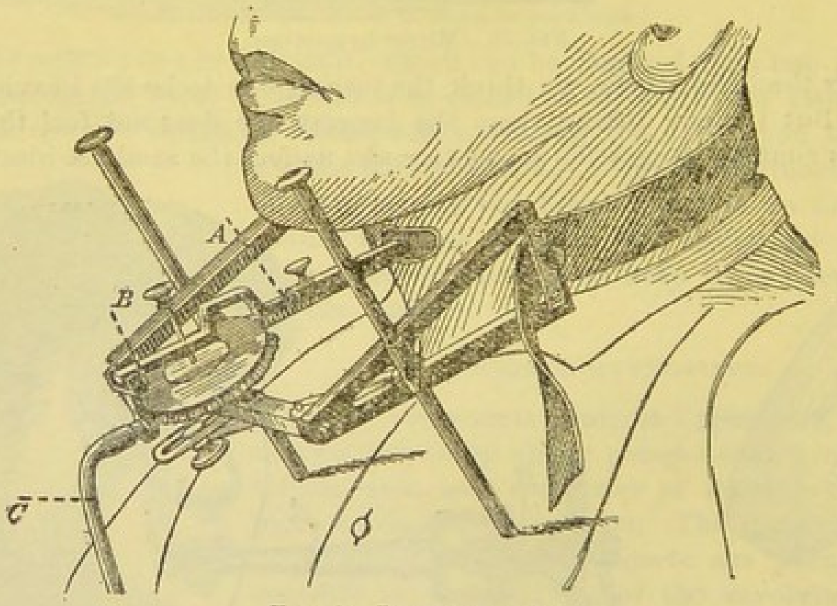
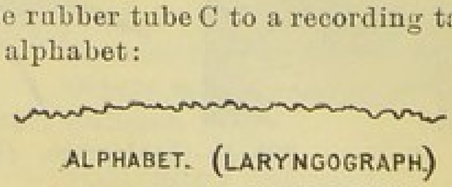


FIG. 42.—Laryngograph.

which consists of a curved nickel plate covered with flannel. This plate rests against the larynx so that its movement up and down is communicated to the tambour B, which is transmitted by the rubber tube C to a recording tambour. Here is a tracing made while repeating the alphabet:



GLOSSO-DYNAMOMETER.

The glosso-dynamometer[1] (fig. 43), as its name indicates, measures the strength of the tongue to resist pressure. It consists of a small brass disk, A, screwed on a steel

[1] Rév. internat. des Sourds-muets, 9e année, février-mars 1894, p. 325.

rod attached to a scale, B. The tongue is stretched out and the subject is asked to resist the pressure of the disk A as much as possible. The scale B indicates the limit of this resistance. Maker, Verdin, Paris.

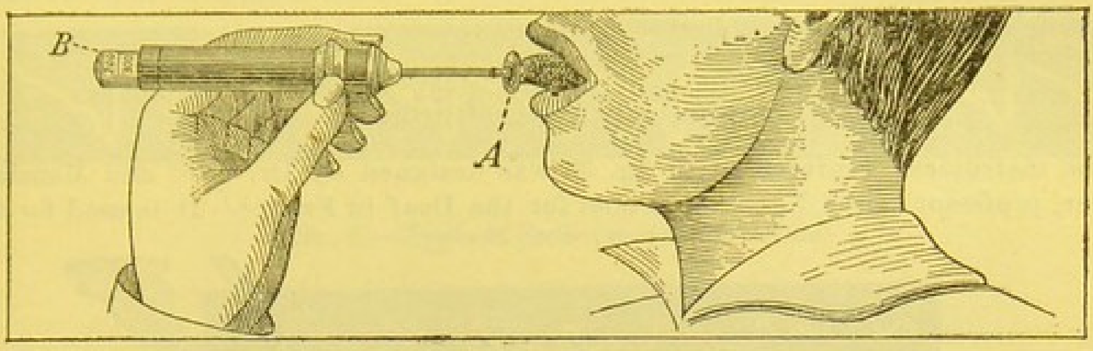


FIG. 43.—Glosso-dynamometer. (Féré.)

PALATOGRAPH.

This palatograph (fig. 44), designed by Dr. Weeks, is to record the movements of the palate in speech. It is composed of the following pieces: A band to fasten around the head, with a rod, H, attached to another rod fixed to the band. At the

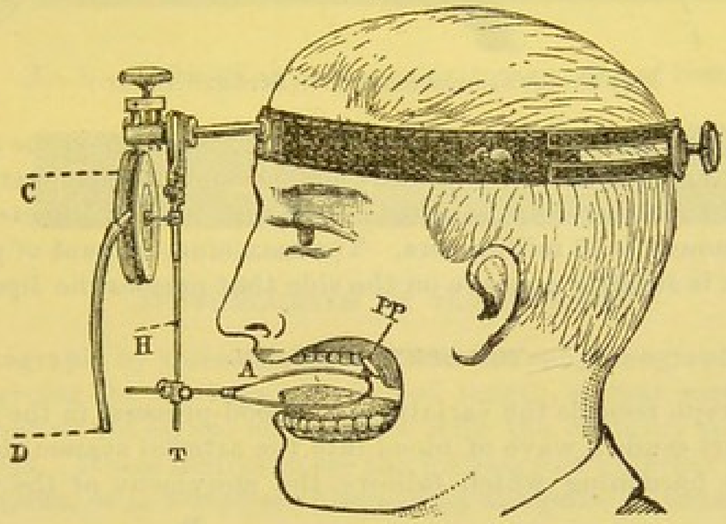


FIG. 44.—Palatograph. (Weeks.)

end of the rod H is fastened a racket-shaped wire, A, with a little round disk, PP, which touches the palate and becomes glued to the palate by a preparation upon the disk. This racket-shaped wire can be kept free from the movements of the mouth and the tongue.

The lever H of the tambour C has near its extremity T a double ring, so that

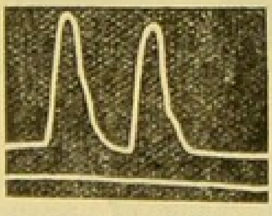


FIG. 45.—No. 1.

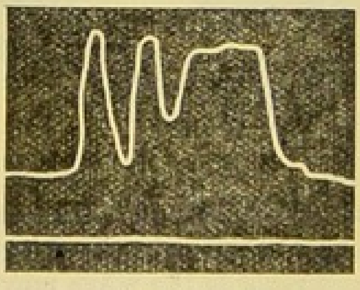


FIG. 45.—No. 2.

the movements of the palate are transferred to the lever or rod H, which in turn communicates them to the tambour to be recorded on a cylinder. Here are two tracings made by Weeks, which read from right to left.

No. 1 represents the movements of the palate, when the French word "fonte" is spoken; the first summit or wave represents the "f," the second summit the "t" in the word "fonte."

No. 2 represents the French word "continuité," where it appears that the nasal syllable "con" requires more movement.

Maker, Verdin, Paris.

THE DYNAMOLABIOMETER.

The instrument represented in fig. 50 was designed by Dr. Féré and Monsieur Boyer, professor at the National School for the Deaf in France. It is used for the

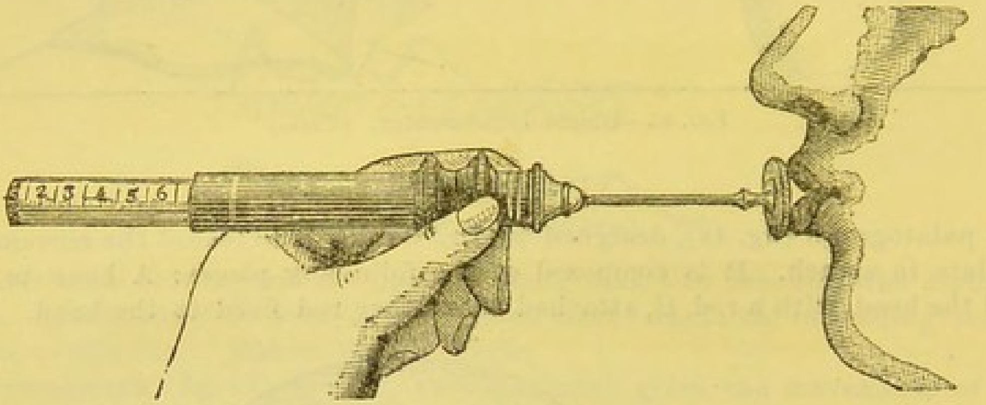


FIG. 50.—Dynamolabiometer. (Féré and Boyer.)

study of the development of the lips of the deaf, and based upon the same principles as that of the sphygmometer in fig. 55, but made somewhat stronger. Total length of instrument is 20 centimeters; diameter of the disk is 40 millimeters; diameter of the body of instrument is 15 millimeters. The maximum amount of pressure is 1,500 grams. The disk is slightly concave on the side that presses the lips. Maker, Verdin, Paris.

THE SPHYGMOGRAPH.

The sphygmograph records the variations of blood-pressure in the arteries. Each time that the heart sends a wave of blood into the arterial system there is produced in each artery a hardening which follows the movement of the wave of blood.

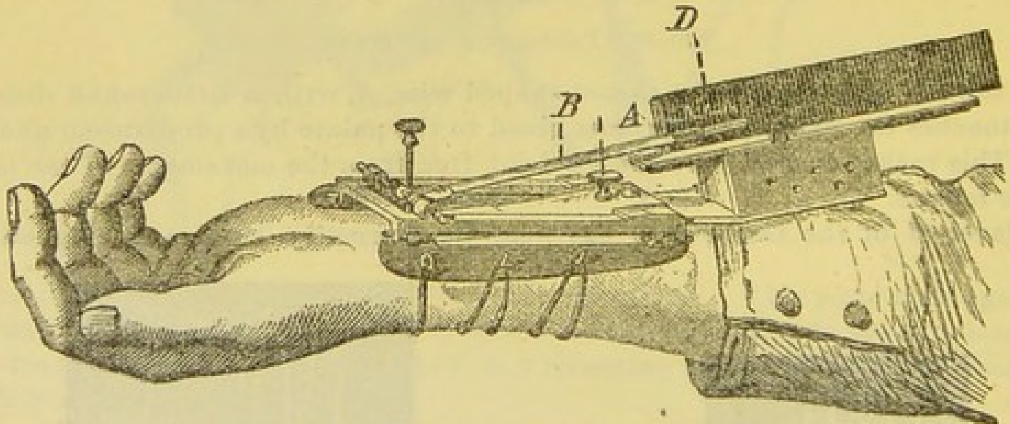
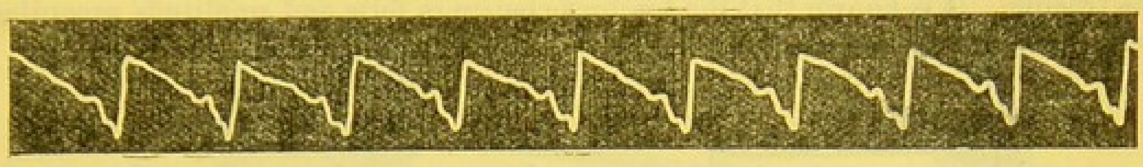


FIG. 51.—Sphygmograph. (Marey.)

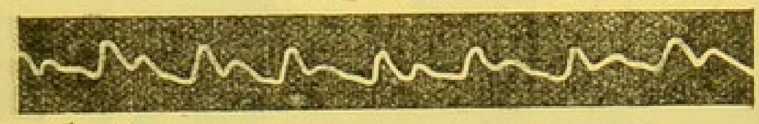
There are two kinds of sphygmographs—the direct and those by transmission. Fig. 51 represents a direct sphygmograph of Marey, which is applied to the exterior of an artery and records the wave movement (hardening, or change of pressure). The direct sphygmograph presses upon the artery by means of a spring, the pressure of which is regulated by a screw A. As the blood-wave comes in the artery the walls of the artery rise and fall, transmitting this movement to the sphygmograph, which movement is recorded by the lever B on the smoked paper D. The arterial wall pressed down by the spring rises, as the blood-wave advances, to the normal diameter.

The radial artery is the one upon which the sphygmograph is usually placed. We give tracings of Marey's sphygmograph: Maker, Verdin, Paris.

No. 1.—Normal pulse.

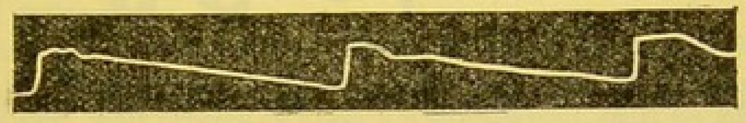


No. 2.—Typhoid fever (period of decline).



No. 4.—Rheumatismal pericarditis with fever.

No. 6.—Pulse of an aged man (extreme rarity of beats).



SPHYGMOGRAPH BY TRANSMISSION.

The sphygmograph by transmission,[1] or indirect sphygmograph (fig. 52), has the advantage of giving the tracings a very good length, so that certain irregularities are recorded that would escape one's notice with the ordinary sphygmograph with its short tracings. If one desires to see the influence of different physiological conditions on the pulse, or to record simultaneously the pulse of several arteries, or the

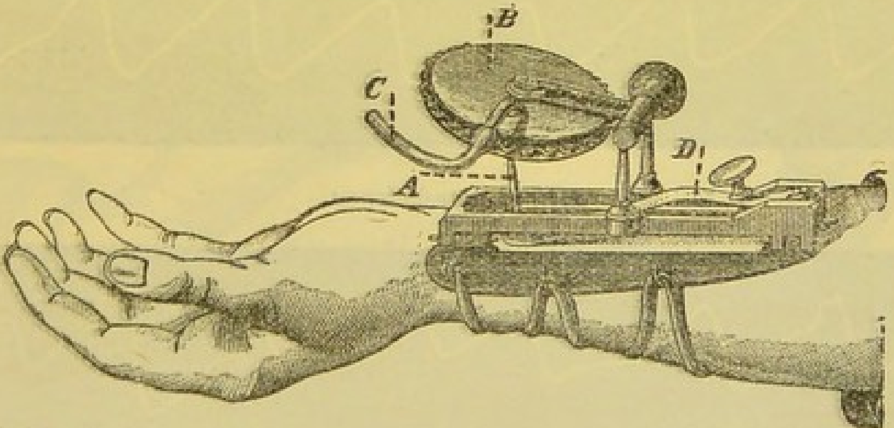


FIG. 52.—Sphygmograph by transmission. (Marey.)

arterial pulse with the pulsation of the heart, the indirect sphygmograph is used. The adjustable steel-rod A rests on the end of the spring D, which is directly over the pulse. The pulse-beat is carried to the tambour B, from which it is carried to some recording tambour, through the rubber tube C. Maker, Verdin, Paris.

[1] Marey. Circulation du sang, 2e édition.

SPHYGMOGRAPH OF PHILADELPHIEN.

The sphygmograph of Monsieur Philadelphien (fig. 53) has the advantage of measuring exactly on the scale 3 the amount of pressure upon the artery in obtaining the tracing. It is known that the tracings change in form and amplitude according to the pressure upon the artery.

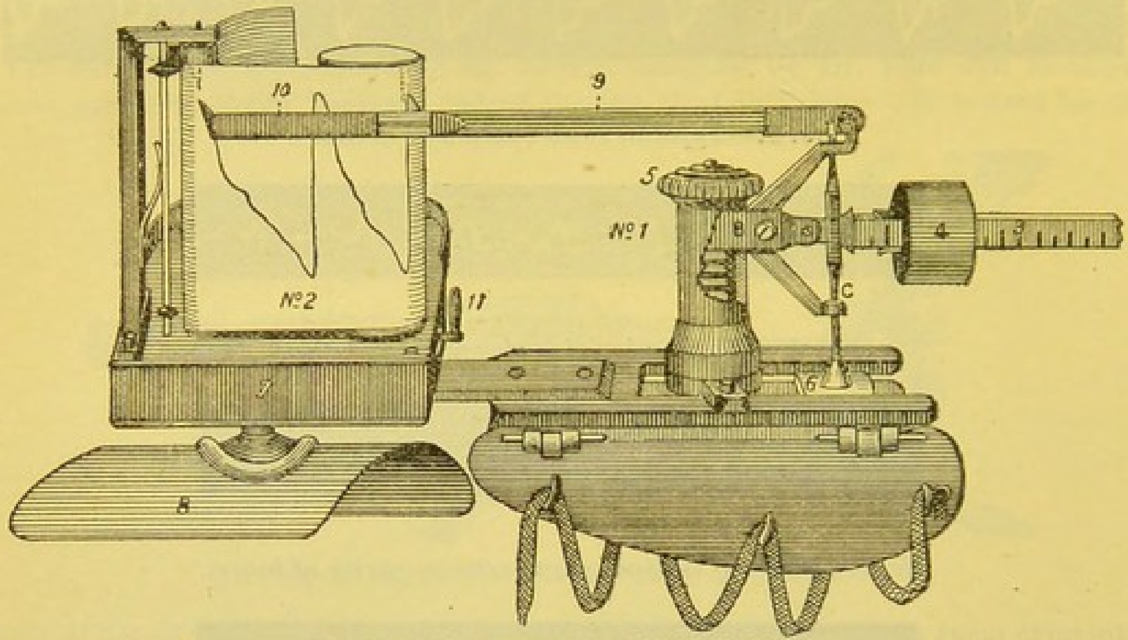
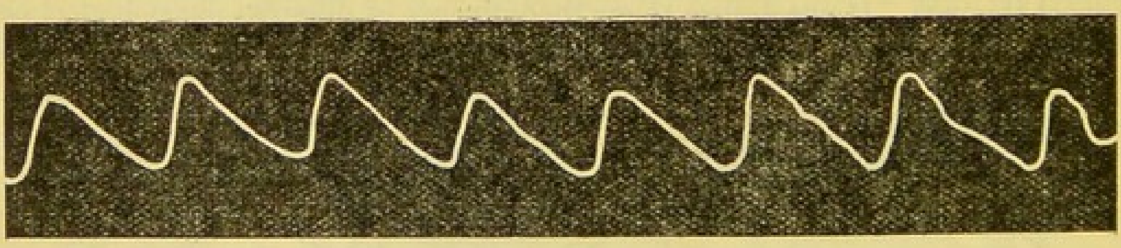


FIG. 53.—Sphygmograph. (Philadelphien.)

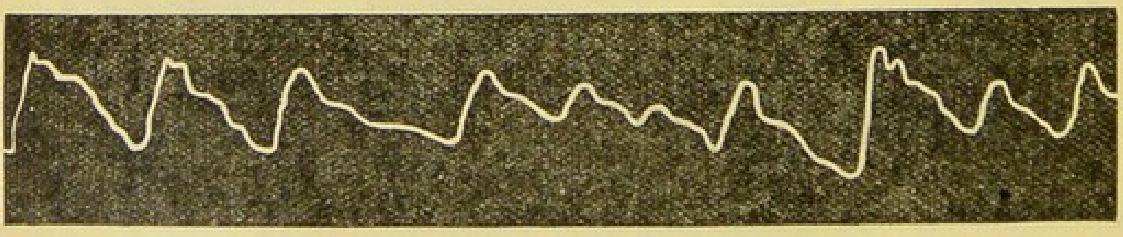
The tracings are made with ink on a band of paper 2, which is a meter long. This instrument permits a number of tracings of variable forms according to the pressure of the ivory plate 6 upon the artery, which is regulated by the weight 4. The screw 5 regulates the plate of ivory 6 in connection with the artery on the marker 10. The handle 11 starts or stops the clockwork 7.

Here are some tracings:

Normal pulse.



Mitral insufficiency.



Maker of instrument: Verdin, Paris.

VON FREY'S SPHYGMOGRAPH.

Von Frey's sphygmograph (fig. 54) has for its purpose to give as true a representation of the arterial pulse as possible and an exact time measurement. It rests upon the steel band A. An ebony oval piece, B, at the end of the steel spring rests upon the artery, connecting directly with the marker D. Another marker for the time can be fastened to the steel box C, which incases the clockwork, which records fifths of a second. Maker: Petzold, Leipzig.

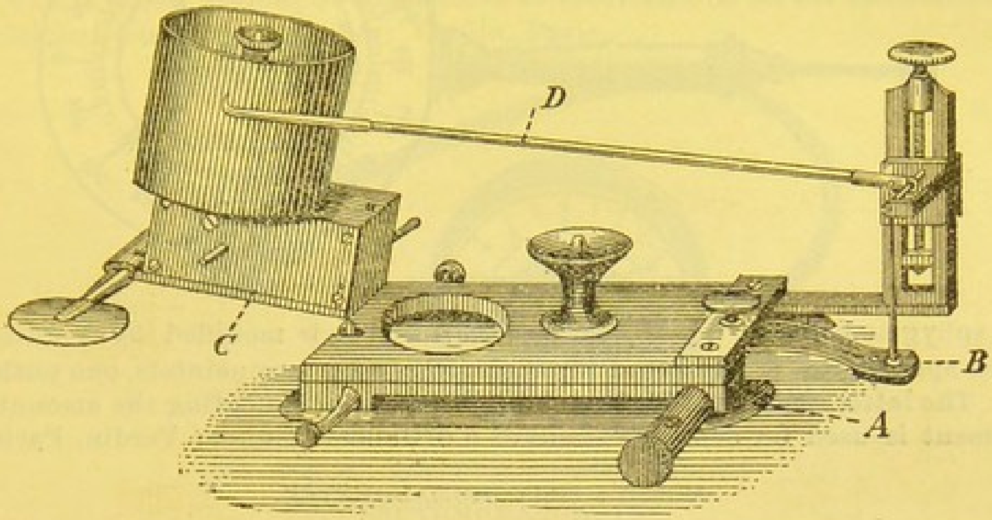


Fig. 54.—Sphygmograph. (Von Frey.)

THE SPHYGMOMETER.

The sphygmometer is employed to measure the amount of pressure necessary to arrest the radial pulse beats.

In Verdin's instrument (fig. 55) the left thumb, B, of the operator rests upon the radial artery of the right hand of the subject. The instrument is held in the right hand of the operator, who presses it upon his thumb nail until no pulse can be felt. Then the amount of pressure is read from the scale S. The instrument consists of

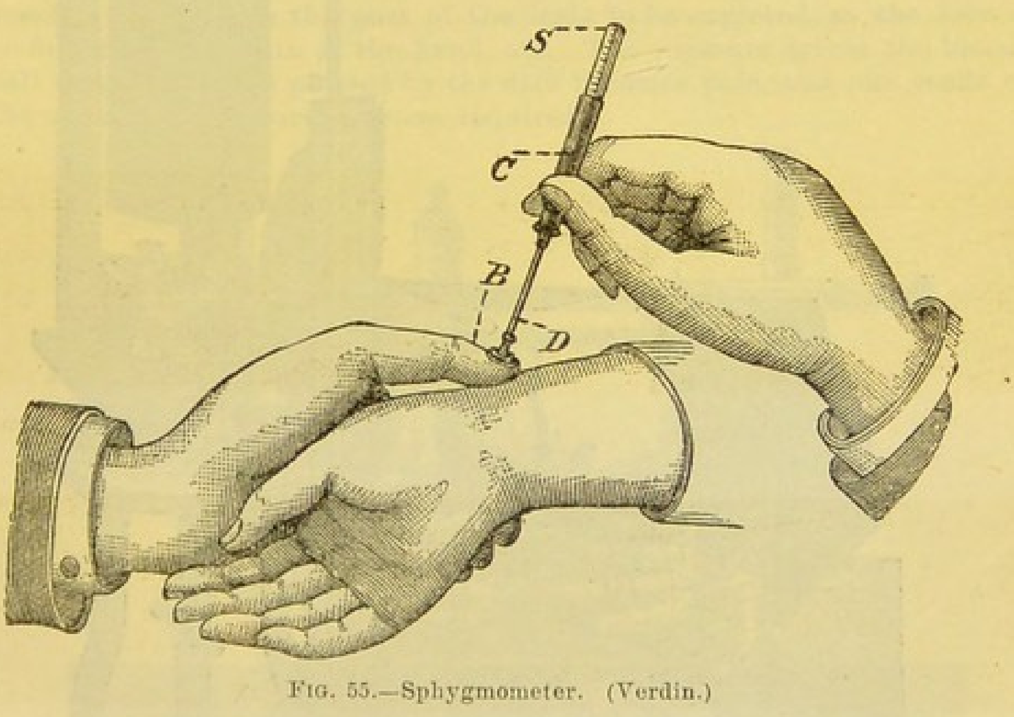


Fig. 55.—Sphygmometer. (Verdin.)

a small cylinder of brass, C, containing a spring acting in connection with the rod D. A brass circular plate three-eighths of an inch in diameter is screwed on to the end of this rod. The instrument is five and a half inches in length.

When the pulse is bounding, or has some intensity, its complete suppression may appear difficult. There are recurrent beats that can give difficulty, but a little practice will overcome these causes of error. Maker and inventor: Verdin, Paris.

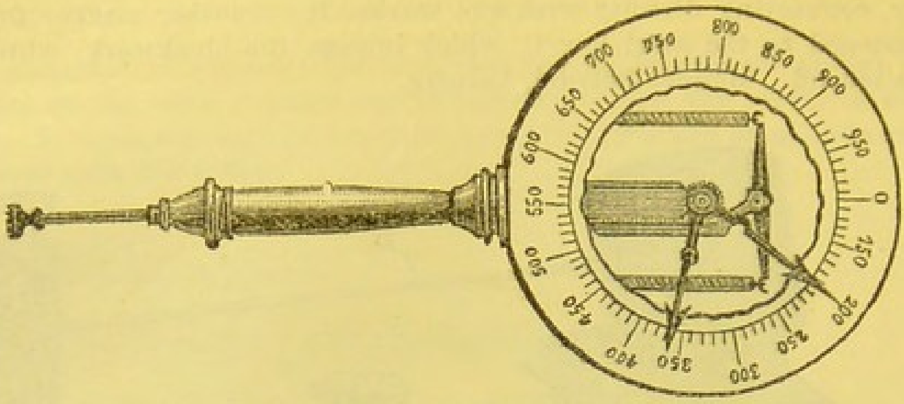


FIG. 56.—Sphygmometer. (Bloch.)

The sphygmometer in fig. 56, designed by Bloch, is modified by Verdin. Two exterior springs are fixed behind the scale; there are two pointers, one pushing the other. The latter remains at highest point of pressure, indicating the amount. This instrument is used for demonstrations at a distance. Maker: Verdin, Paris.

MOSSO'S SPHYGMOMANOMETER.

The sphygmomanometer of Mosso (fig. 57) enables one to record the pulsations of four fingers, which are pushed into rubber tubes E E. The instrument is filled with water, and communicates with the cylinder A, the revolving piston of which regu-

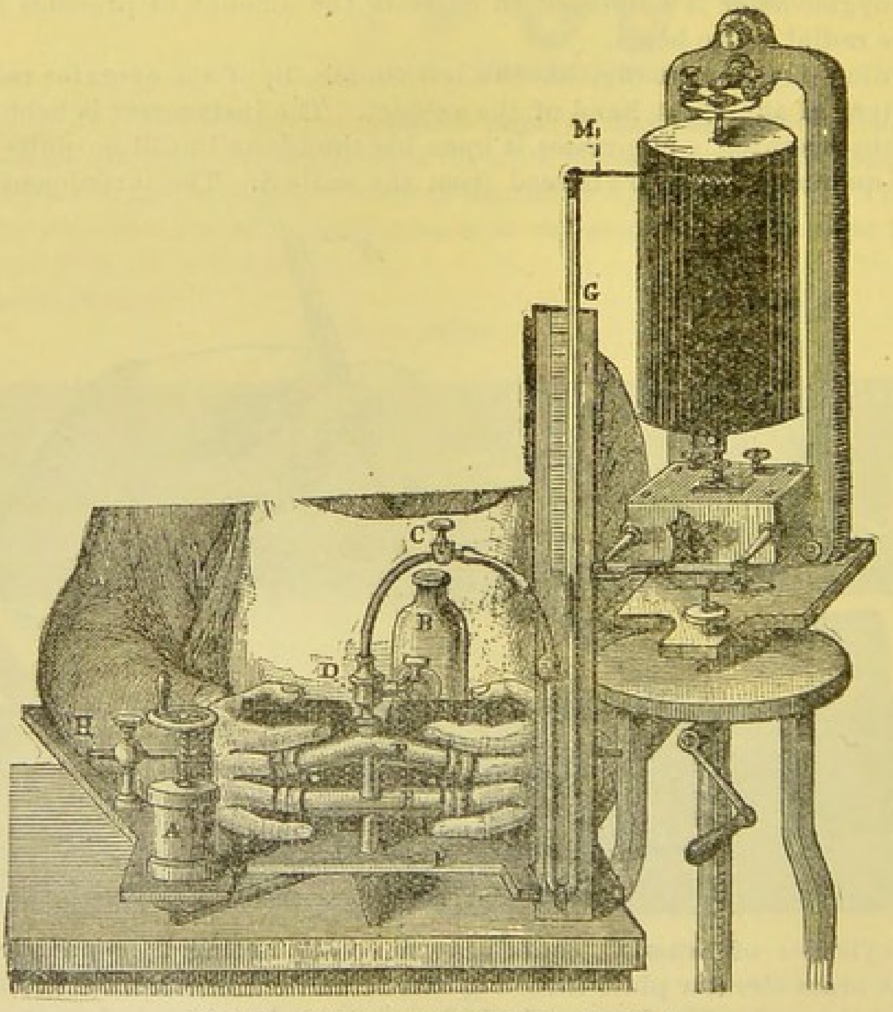


FIG. 57.—Sphygmomanometer. (Mosso.)

lates the pressure of the water. The bottle B receives the water forced out when the fingers are introduced into the tubes E E. A manometer, G, indicates the pressure, and the marker M records the pulse waves on the cylinder.

C is a faucet to let out the air. By means of the manometer G the sphygmograph will record the periodical changes of blood pressure or tension, and their correlation to mental conditions. The instrument can be used instead of the plethysmograph (fig. 18) for research in the circulation of the blood, for the study of the inervations of the blood vessels, of the effects of medicaments on the circulation, and of pathological conditions. Maker: Verdin, Paris.

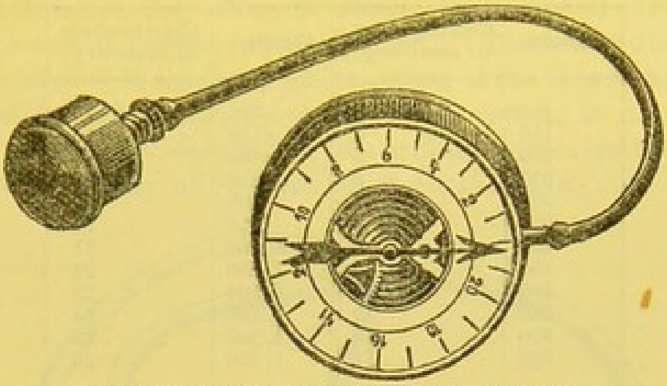


FIG. 58.—Sphygmomanometer. (Basch.)

SPHYGMOMANOMETER.

The sphygmomanometer (fig. 58) measures blood pressure in the arteries. Maker, Windler, Berlin.

ACHROMATOMETER OF BLOCH.

This instrument[2] (fig. 59) is designed to measure the blood pressure in the capillaries. It consists of a rod with spring; at the end of the rod is an iron disk, A.

FIG. 59.—Achromatometer. (Bloch.)

One presses with this disk the part of the body to be explored, as the lobe of the ear, the finger nails, or skin of the hand, etc. The pressure drives the blood from the small vessels, the part pressed by the disk becomes pale, and one reads on the scale the amount of pressure in grams required.

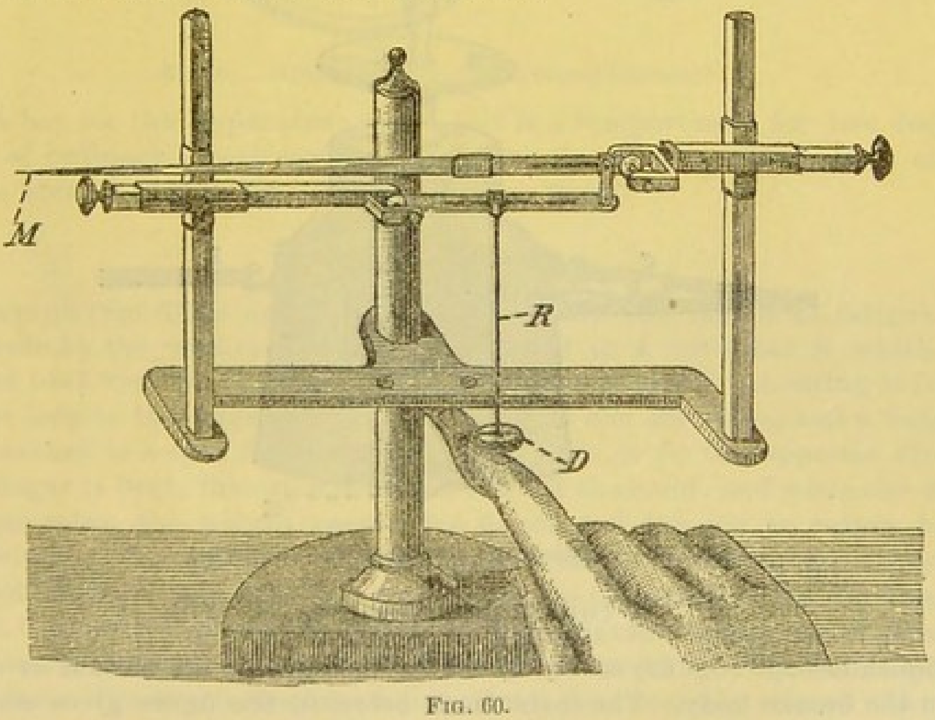


FIG. 60.

Fig. 60 represents an instrument for recording pulsations of the vessels on a circumscribed region of the skin. A disk, D, rests upon the index finger; the disk is

[2] L'Intermédiaire des Biologistes, 5 novembre 1897.

fastened to a small rod, R, communicating with a lever, by means of which the pulsations of the small vessels are recorded by the pointer M. Maker, Verdin, Paris.

Dr. Chéron has prepared the following table, which transforms the results of the sphygmometer into centimeters of mercury.

TABLE 5.

Grams.	Centimeters of mercury.	Grams.	Centimeters of mercury.
100	3	700	15
150	4	*a*750	*a*16
200	5	*a*800	*a*17
250	6	*a*850	*a*18
300	7	900	19
350	8	950	20
400	9	1,000	21
450	10	1,050	22
500	11	1,100	23
550	12	1,150	24
600	13	1,200	25
650	14	1,250	26

a Normal pressure.

THE CARDIOGRAPH.

The heart-beat or cardiac impulse is visible in the fifth left intercostal space, 2 inches below the nipple and 1½ to 1 inch to its sternal side. The cardiograph measures the cardiac impulse. The cardiograph stethoscope (fig. 61), below, consists of a button, B, which by turning increases or decreases the pressure of the knob H, against the walls of the chest. F is a bell-shaped piece of wood forming the stethoscope. D is a ferrule of brass on which is fastened a rubber tube to be introduced into the ear for mono-auricular auscultation. An elastic chord, C E, placed around the body holds the apparatus against the chest. By fastening a rubber tube on A, the heart-beats can be transferred to a recording tambour. Maker, Verdin, Paris.

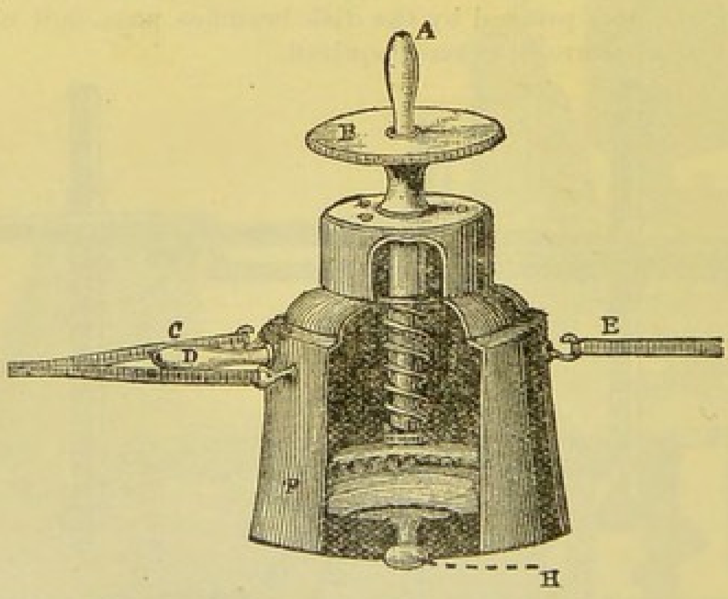


FIG. 61.—Cardiograph stethoscope. (Edgren.)

THE PHONENDOSCOPE.

The phonendoscope (fig. 62) serves to render perceptible all normal or abnormal sounds in the human body. The instrument below in the figure gives more intensity to the sounds than the ordinary stethoscope. It renders perceptible—

1. The sounds of respiration, circulation, and of the digestive organs.
2. The sounds of the muscles, articulations, and bones.

3. The sounds of the capillary circulation (dermatophony).
4. The sounds produced by morbid states and those determining the size, position, or change of position of organs.
5. The sounds of the eye and ear.
6. The sounds of the uterine murmur and fœtal sounds.

The phonendoscope is composed of two ebony disks, one, L, fastened directly to the body of the instrument, the other, G, above, by means of rings. The body of the instrument B is made of copper (nickel-plated). The lower disk serves for auscultation; the upper disk G is thicker; at its center there is an ebony plate C, into which screws the rod A. This disk, by means of the rod A, is used for percussion. The lower disk L of the phonendoscope has two orifices to receive the auricular tubes, on the ends of which are ebony olive-form rings for the ears.

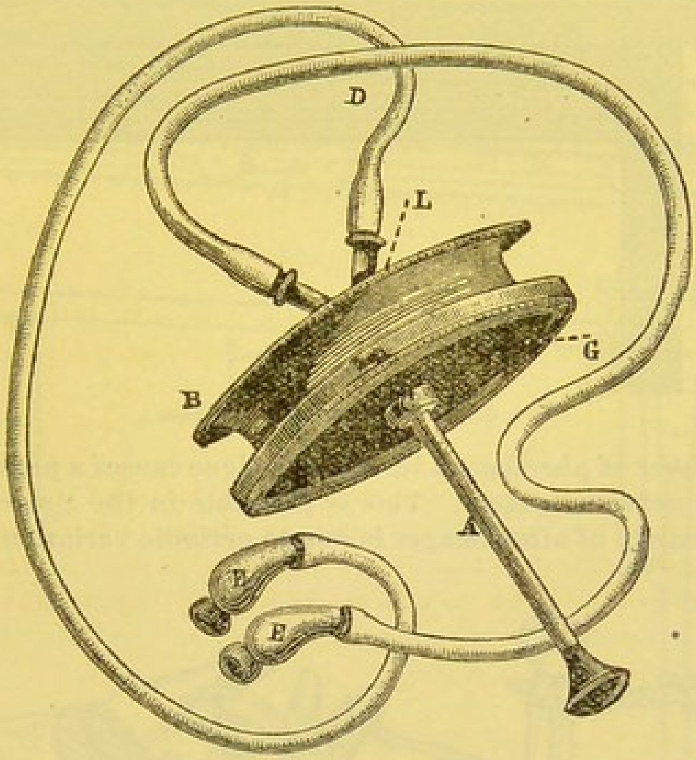


FIG. 62.—Phonendoscope. (Bazzi and Bianchi.)

There is a box for this apparatus; in the box is a compartment for two rods with knobs, one of ordinary length say 55 millimeters, the other 80 millimeters; also two pencils, one blue, the other red. Maker, Verdin, Paris.

THE ERGOGRAPH.

The ergograph (fig. 63) is an apparatus to measure the results of fatigue. The record is made by the marker A, which is attached to a little car B, which slides forward and backward on two parallel horizontal steel rods C. A string is fastened by a leather loop to the finger pulling the car B in one direction, and a weight W, which is attached to a cord fastened to the car, pulls it in the opposite direction. When the finger is bent, the car B is drawn toward the hand; and when the muscles of the finger relax, the weight causes the finger and the car to return to their original position. The marker A records the movements of the car upon a cylinder. The arm and hand are held firm by a special rest, as indicated in the drawing.

Lombard, in a number of experiments with the ergograph upon himself, found that if he voluntarily contracted a muscle frequently and each time raised a weight with his utmost force, the muscle weakened and after a time scarcely stirred the weight. But if now he continued to make this effort, regardless of the results, with all the power of his will, sooner or later the strength of the muscle began to return and to move the weight almost as much as before. Then the strength would gradually cease for a second time; thus an almost complete loss of power to voluntarily contract the muscles, alternated with periods of nearly complete recovery of the strength. This phenomenon, according to Lombard, was due to the results of fatigue, caused probably by changes in the central nervous system. The writer has made some experiments with the ergograph, and his results are similar to those of Lombard.

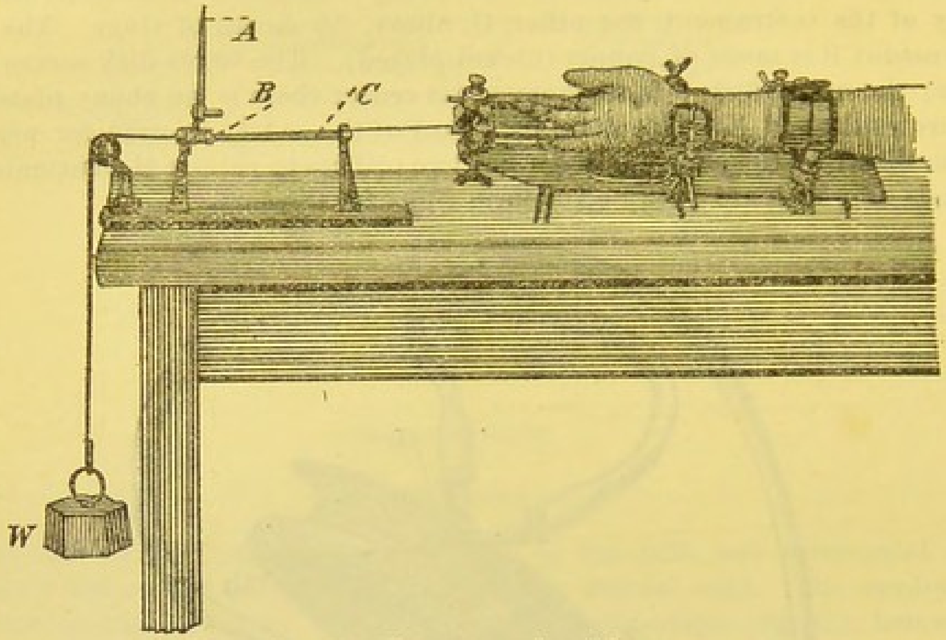


FIG. 63.—The ergograph. (Mosso.)

There are a number of phenomena in which fatigue causes a periodicity depending upon the central nervous system. This is probable in the "second wind" of the athlete. The intensity of after-images is due to periodic variation. Maker, Verdin, Paris.

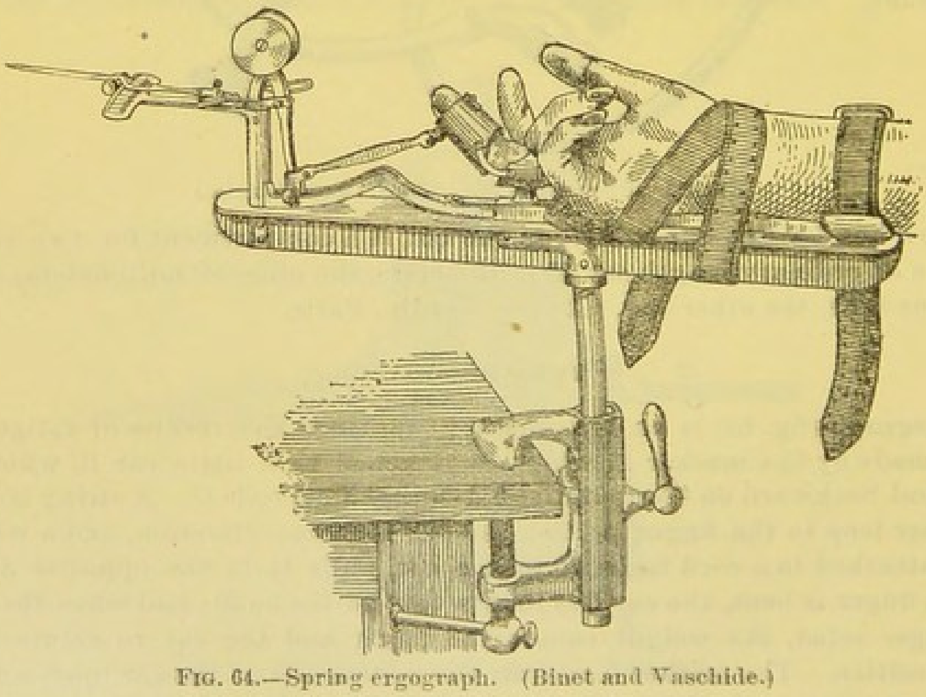


FIG. 64.—Spring ergograph. (Binet and Vaschide.)

SPRING ERGOGRAPH.

Professor Cattell has designed a new ergograph in which a spring dynamometer is substituted for the weight used by Mosso. It is claimed that this has many advantages over the lifted weight used by Mosso. Questions of the relation of muscular to mental fatigue are not only of theoretic interest, but have practical value in schools.

Binet and Vaschide have also made an ergograph[1] (fig. 64), which is a modification of Mosso's ergograph. It consists in the substitution of a spring, as illustrated in the figure, for the weight and in using the middle finger for the experiment. The lever permits one to increase or decrease at will the course of the finger in order to accomplish a certain work, while the force of resistance remains the same. It is possible to modify one single factor in work and the space gone over, and so to study points in the physiology of movement.

THE KINESIMETER.

The kinesimeter is an instrument to measure the sense of movement upon the skin. The apparatus in fig. 65 was designed by Professors Scripture (Yale University) and Titchener (Cornell University).[2]

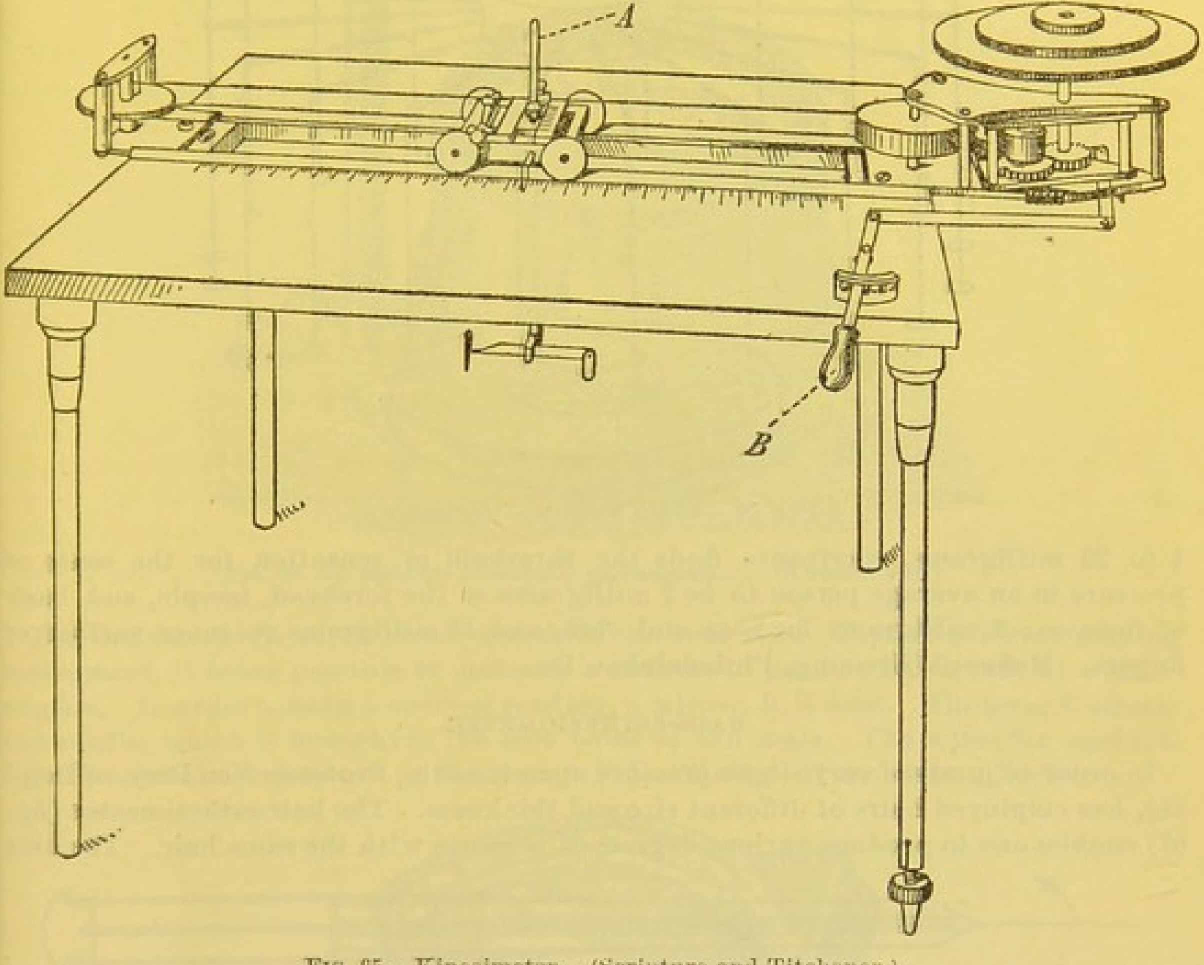


FIG. 65.—Kinesimeter. (Scripture and Titchener.)

The table is of brass casting, the top of which is perfectly smooth. One of the legs has an adjusting screw. The car A is made of brass, nickel-plated; it runs on four wheels, turned on a perfectly true arbor. The bearings are bushings of hardened tool-steel; the holes are ground and lapped, so as to give trueness in running. The wheels are easily taken off their bearings. The horizontal slide of the car, which holds the vertical rod, is easily adjusted. The vertical rod may carry rubber stimulus-point, tube, or whatever is preferred, and is held in position by a brass nut. The rotating power comprises three gears and three friction-rolls. The movement of the car is regulated by a lever. The pressure of the driving-rolls against the principal roll is maintained by two springs, and is adjusted by two nuts on end of a bar connected with the lever. An endless cord propels the car. The instrument is made at the Yale Laboratory, New Haven, Conn.

---

[1] L. Intermédiaire des Biologistes, 5 May, 1898.
[2] American Journal of Psychology, Vol. VI, 1895, page 425.

TOUCH-WEIGHTS.

Touch-weights for finding the threshold of contact with the skin (fig. 66) consist of little disks 3 millimeters in diameter suspended from a fine cocoon-fiber fastened to a wood handle. The handles are stuck into holes in a round block, A, fastened to a pillar and frame. We take out the lightest disk B and let it touch the skin while the subject's eyes are closed; if nothing is felt, the next heavier disk is used, and so on until the least pressure of the disk is felt. The disks weigh from

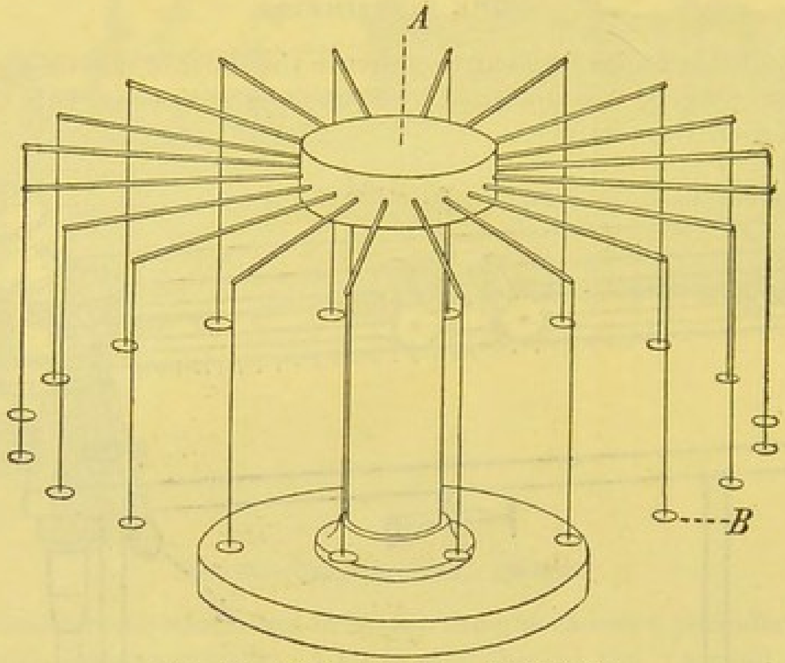


FIG. 66.—Touch-weights. (Scripture.)

1 to 20 milligrams. Scripture finds the threshold of sensation for the sense of pressure in an average person to be 2 milligrams on the forehead, temple, and back of forearm; 5 milligrams for nose and chin, and 15 milligrams on inner surface of fingers. Maker: Willyoung, Philadelphia, Pa.

HAIR-ESTHESIOMETER.

In order to produce very slight pressure upon the skin, Professor Von Frey, of Leipzig, has employed hairs of different size and thickness. The hair-esthesiometer (fig. 67) enables one to produce various degrees of pressure with the same hair. The hair

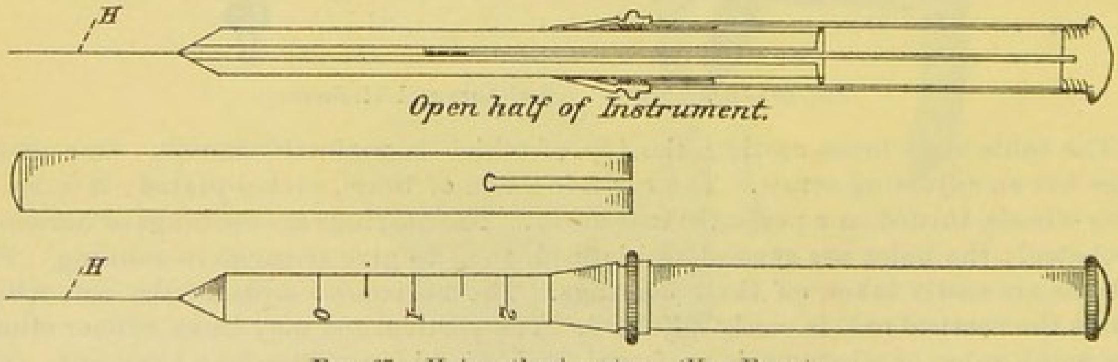


FIG. 67.—Hair-esthesiometer. (Von Frey.)

H is in a capillary tube, and a longer or shorter portion of the hair can be made to come out of the tube; a graduated scale shows the distance or the length the hair projects from the tube. The less the distance the hair projects the greater the pressure exercised by the hair. The hair is pressed vertically against the skin until it bends.[1] The maker of the instrument is Zimmerman, of Leipzig.

[1] Details of the instrument are given by Von Frey in Abhandlungen d. math. physch. Classe d. Königl. Sächs Gesellschf d. Wiss., 1866.

THE GALVANOMETER.

The galvanometer measures the strength of an electric current. The instrument (fig. 68) is used for medico-electrical purposes. It is also employed in scientific investigations, and is then so constructed that the strength of the most delicate current can be measured.

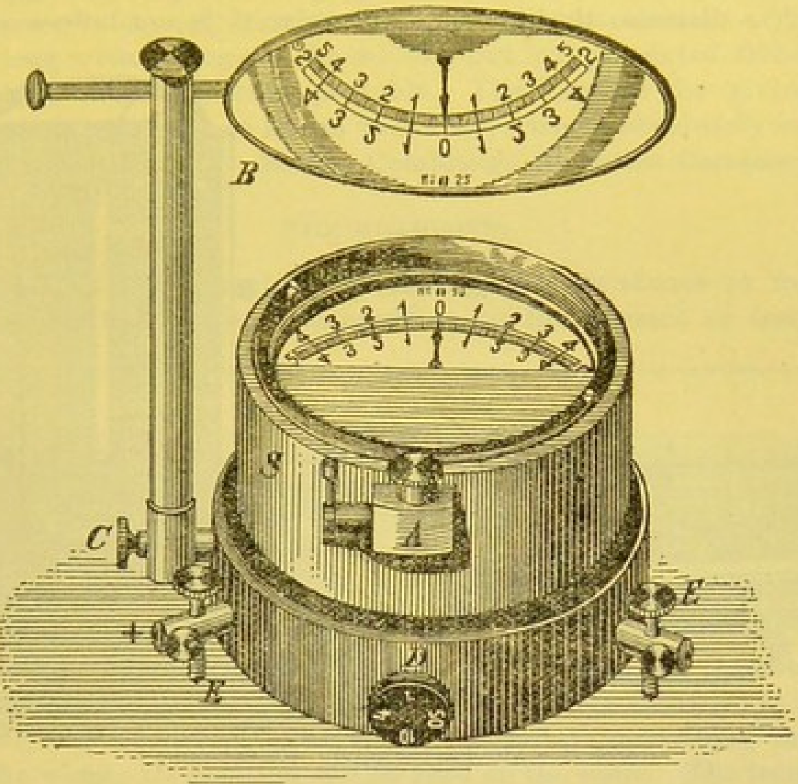


FIG. 68.—A periodic horizontal galvanometer. (Hirschmann.)

The instrument is represented one-third its real size. This is a direct-reading instrument, it being possible to measure a current to one one-hundredth of a milliampère. In order to have a vertical reading, a mirror, B, is used. The lever S arrests the needle, which is brought to the zero point of the scale. The wires for conducting the current are fastened in the clamps E E. Maker: Hirschmann, Berlin.

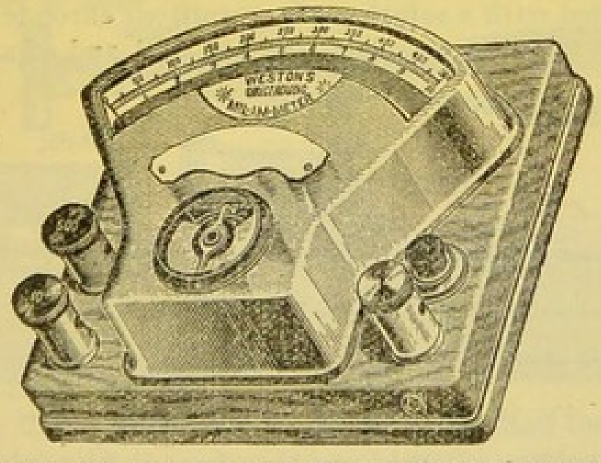


FIG. 69.—Weston's standard direct-reading mil-am-meter.

Fig. 69 represents a convenient form of instrument for measuring delicate currents. It has a scale of double values with ratio of 50. Each division on upper scale values is 5 milliampères; each division on the lower scale values is one-tenth milliampère, readable to one one-hundredth. A change from one scale to the other is made by changing the connection on the left of the instrument from one binding post to the other. Maker: Weston Electric Instrument Company, Newark, N. J.

THE FARADIMETER.

The two instruments just mentioned measure the galvanic or direct current only. The instrument below (fig. 70) is a faradimeter and measures the faradic or indirect current. This form of the instrument is transportable. The case which covers it is 12 centimeters wide, 20 centimeters long, and 29 centimeters high. When in use it is laid on the table, as shown in the drawing. The induction apparatus P S is placed at such a distance that the galvanometer G is not influenced by it. The

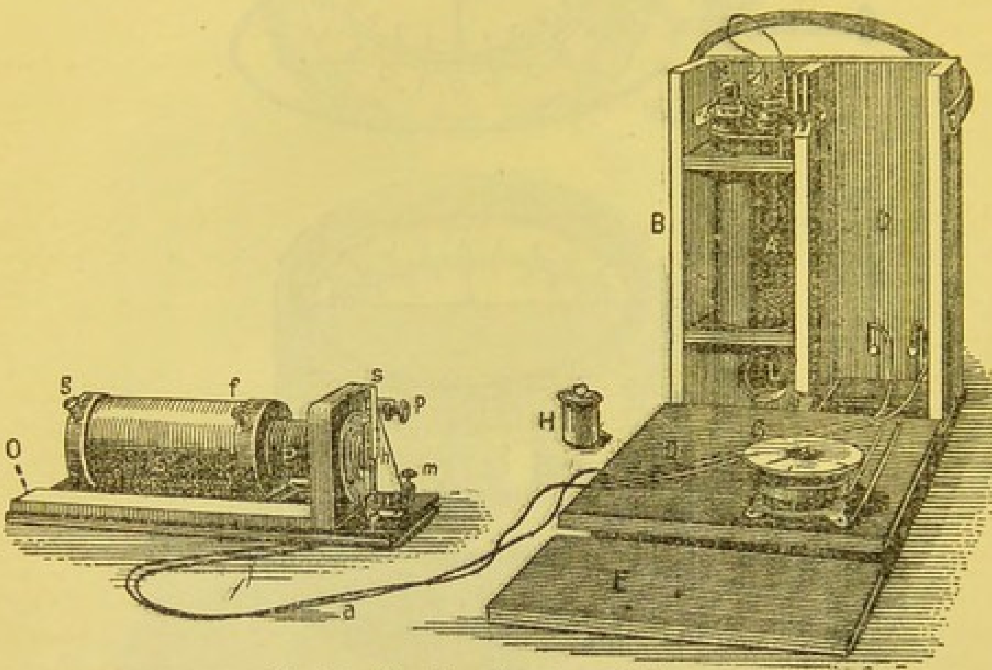


FIG. 70.—The Faradimeter. (Edelmann.)

induction coil P S, by means of wires a, is connected with the battery A for the primary current. The faradimeter is gauged only for a certain intensity of the primary current (O. 4 A) so that the galvanometer G is to measure the strength of this current. The intensity desired is obtained by first placing the galvanometer at zero and then sinking the zinc rod Z into the element A until the needle of the galvanometer reaches the desired intensity on its scale, while the interrupting spring S is pressed tightly against the contact screw p with the finger.

The battery A is filled with a solution of crystallized chromic acid, which consists of water up to about 3 centimeters from the top of A and of a half glassful (H) of

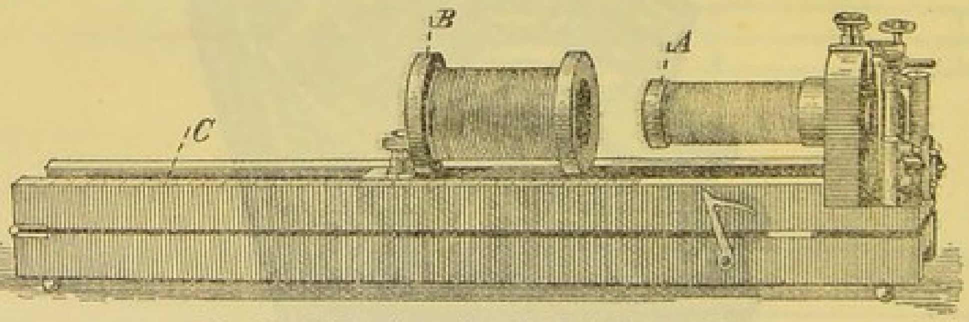


FIG. 71.—Induction coil. (Du Bois-Reymond.)

the acid. When the battery is not in use the zinc rod Z is taken out, washed, and placed in a case at the side of the battery. The chromic acid solution can be left in the battery so long as it furnishes the desired strength of current. When the interrupting spring plays and the primary current is at its normal strength (which from time to time should be tested by pressing the spring against the contact screw p) the secondary induced or indirect current is developed, so that the maximum of any single opening of the induction stroke has the value indicated by the induction coil S by means of the pointer on the scale O. Maker, Edelmann, of Munich.

INDUCTION COIL.

In fig. 71 is represented Du Bois-Reymond's pattern of an induction coil. The primary coil A is fixed at the end of a wooden base board and consists of a coil of thick copper wire wound around a bundle of soft iron wires. The secondary coil B is wound around a wooden reel and slides in a groove in the base-board and can pass over the primary coil, its position being read from a scale, C, in millimeters fixed to the base. The secondary coil consists of about 7,000 convolutions of fine wire. The base is made long with a hinge in the middle, but is represented folded back in the engraving, which makes it more portable. The hammer for giving a series of induced currents is arranged so it can break the current absolutely in the primary coil or can shorten its circuit. Maker, Cambridge Scientific Company, Cambridge, England.

THE RHEOCORD.

The rheocord is an instrument for measuring the resistance or for varying the strength of an electric current, in proportion to the greater or less length of it

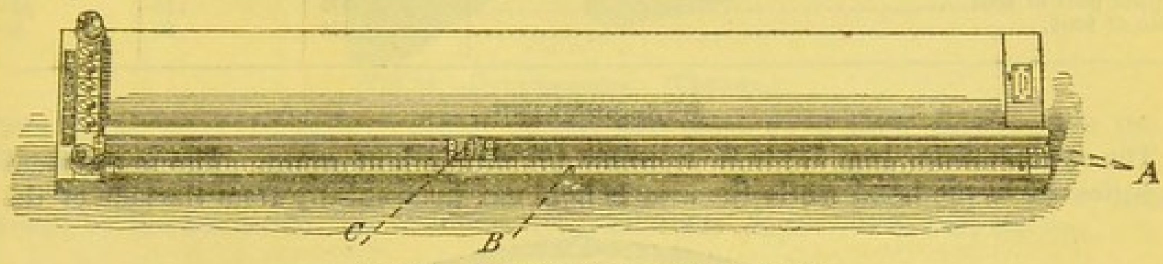


FIG. 72.—Du Bois-Reymond's rheocord.

inserted into the circuit. Du Bois-Reymond's pattern (fig. 72) consists of two platinum wires stretched by the side of a scale B 1 meter long attached to a board. The wires are electrically connected by an ebonite trough, C, containing mercury, which slides along the wires; its position can be read on the scale. The terminals are connected to one end of each of the platinum wires by means of brass plates.

In one of these plates there are five pegs, which can be removed like those of a resistance-box, and various resistances thrown into the circuit; thus when the peg opposite No. 3 is removed, a resistance equal to three times the resistance obtained by sliding the trough to the far end of the scale is thrown into the circuit. In this way the resistance of the rheocord can be gradually increased from zero to a resistance

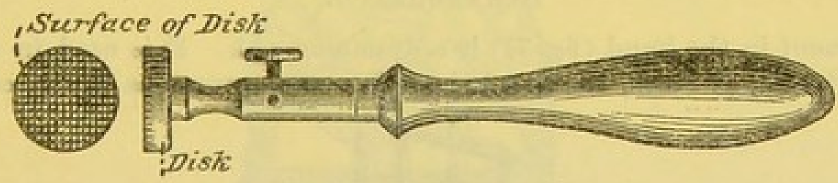


FIG. 73.—Erb's electrode.

equal to 42 meters of the platinum wire. Maker, Cambridge Scientific Instrument Company, Cambridge, England.

THE ELECTRODE.

In investigation with the Faradic or induced current, one of the standard electrodes employed is that of Professor Erb, of Heidelberg.

This electrode (fig. 73) consists of a bundle of more than 400 fine metallic wires,[1] which are inclosed in a hard rubber tube about 2 centimeters in diameter. By means of these 400 fine wires a uniform action upon the numerous nerve ends is obtained, and sources of error from sweat canals and hair follicles are avoided. When the first electrical sensation is felt, after the electrode is placed on the skin, the point on the scale is noted where the marker of the induction coil has reached; the coil is moved on still further until the first feeling of pain occurs, and the point

[1] The maker of this electrode is Hirschmann, of Berlin.

on the scale is noted as being the measure of pain through the Faradic current. In this way Professor Erb has obtained the following table giving average figures for healthy men, and a basis for comparison in pathological conditions:

TABLE 6.—*Electrical sensibility.*

Place of applying electrode.	First sensation with an induction coil at a distance on the scale from—	Feeling of pain with induction coil at a distance on the scale from—	Deflections of the needle with 8 cells and 150 resistance.
Cheeks	200-220	120	26°
Neck	180-200	120	22°
Upper arm	200	120	21°
Forearm	190	115	18°
Palm of hand	175	110	15°
Finger ends	125	90	2°
Abdomen	190	120	20°
Leg	170	110	19°
Upper part of foot	175	110	10°
Sole of foot	110	80	5°

DYNAMOMETER.

The dynamometer (fig. 74) is to measure the strength of grasp. The instrument is squeezed in the hand while the arm is held out horizontally from the side of the

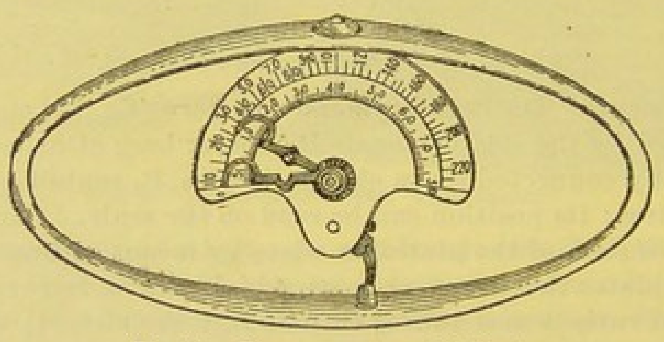


Fig. 74.—Dynamometer. (Collin.)

body. The amount of pressure is read from the scale as indicated by the pointer. Maker, Collin, Paris.

DYNAMOGRAPH.

The instrument in the hand (fig. 75) is a dynamograph. It is used in the laboratory of Salpêtrière, at Paris, to record the different impressions which certain hys-

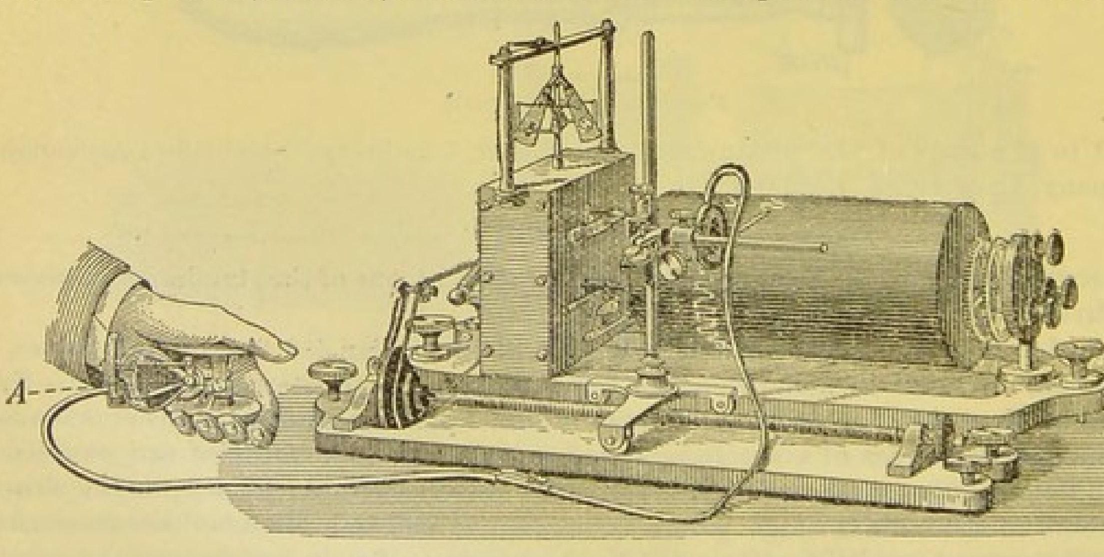


FIG. 75.—Dynamograph. (Duchêne.)

terical subjects experience at the view of a ray of light. It is in reality a dynamometer of Duchêne's, with a tambour, A, attached to it, so that the results may be recorded on a cylinder, as indicated in the cut. The dynamograph is used also to show the effects of sound and color upon strength of grasp. In sound the pitch has effect

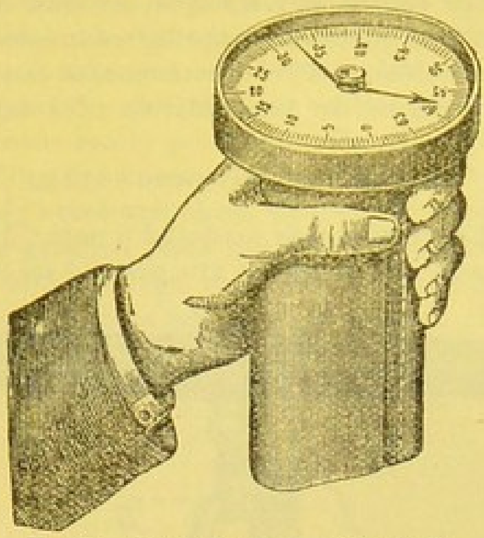


FIG. 76.—Dynamometer. (Ulmann.)

upon the greatest strength of grasp. Smell and taste have their effects upon the strength. Maker, Verdin, Paris.

In fig. 76 is a form of dynamometer that avoids the unpleasant cutting feeling caused by the handles of the ordinary dynamometer. Maker, Windler, Berlin.

DYNAMOMETER OF CHÉRON AND VERDIN.

One of the inconveniences of the ordinary dynamometers is the pain experienced when one tests his strength of grasp five or six times in succession, for the edges of

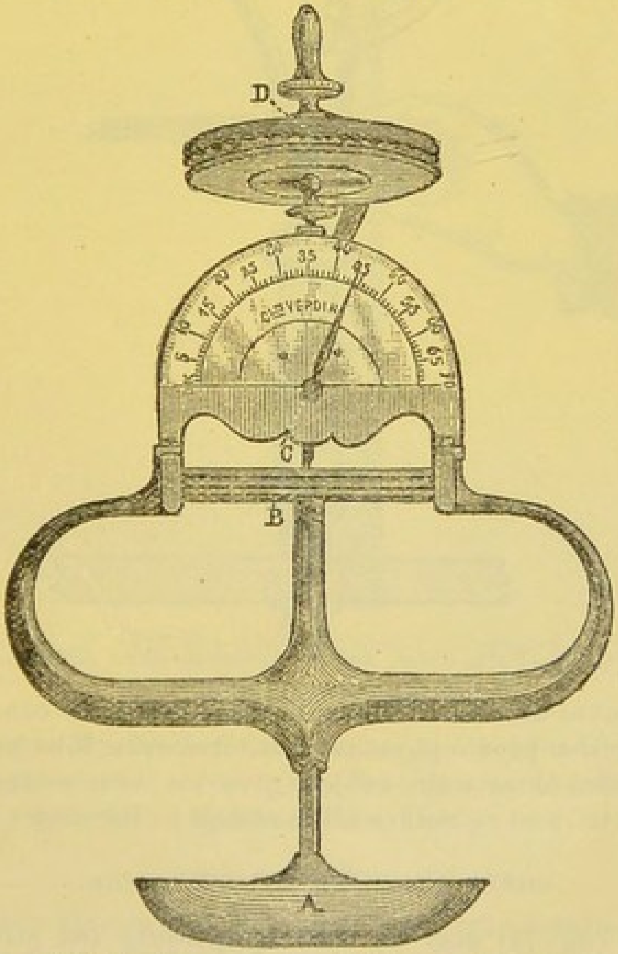


FIG. 77.—Dynamometer of Chéron and Verdin.

the handle produce a cutting sensation, thus rendering the experiments of much less value for comparison.

The dynamometer of Chéron and Verdin (see fig. 77) has been designed to eliminate the inconvenience above mentioned. The fingers are placed upon a handle rounded upon all sides; the palm of the hand rests upon a round oval plate A, serving as a handle, which is fastened to a piston and spring connected by a cogwheel and bar C, with the pointer upon the dial. This dynamometer can be changed to a dynamograph, as indicated in the figure, by the addition of a tambour D. The maker is Verdin, of Paris.

SCRIPTURE'S DYNAMOMETER.

Dr. Scripture, of Yale University, has invented a new "dynamometer and the scale of effort." The thumb and index finger are pressed on small knobs borne by two

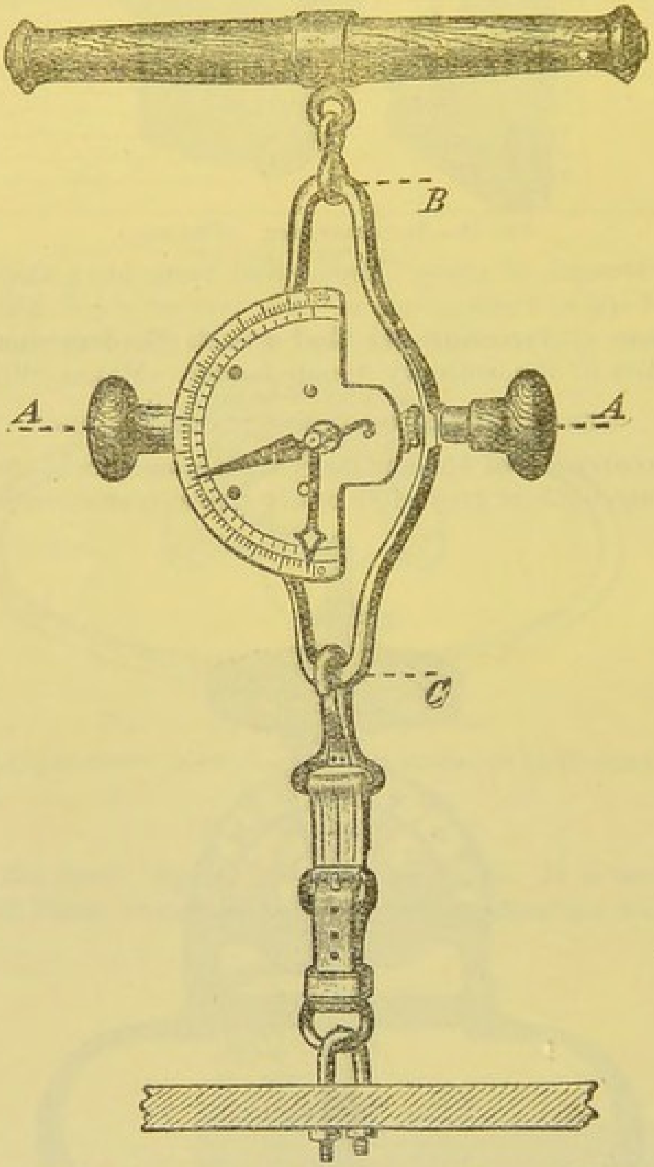


FIG. 78.—Back, chest, and leg dynamometer. (Pfarre.)

steel rods; the amount of movement is small, while the scale can be made very accurate. To transform the psychophysical measurements into purely psychological ones, Scripture proposes to have the subject give his own scales of pressure in the relations of 1, 2, 3, 4, etc., and to reduce all readings to the scale.

CHEST AND BACK DYNAMOMETER.

The dynamometer (fig. 78) may be used to measure the strength of arms and strength of lift. If the handle is unfastened at B and the hook at C from the instrument proper, and with the instrument thus disconnected the two handles A A are pressed against by the hands, the strength of arms and chest can be measured.

With one's elbows extended at the sides until the forearms are on the same horizontal plane, and holding the dynamometer so that the dial will face forward and the indicator point upward, one takes a full breath and pushes hard against the handles A A, allowing the back of the instrument to press on the chest. In measuring the strength of lift the instrument can be attached to the floor, as represented in fig. 78, or to a board, specially designed, on which the subject stands when lifting, thus making the apparatus easily portable. The strength of lift can be taken both with and without bending the knees. In the former instance one stands on the foot rest, with head and body erect and chest thrown forward, bends the knees, sinking down until the handle grasped rests against the thighs, then takes a full breath, lifts hard, principally with the legs, using the hands to hold the handle in place.

In the second instance one does not bend the knees. The handle is grasped with both hands, the body being inclined forward at an angle of 60 degrees, a full breath is taken, and a hard lift is given, mostly with the back. Makers, Tiemann & Co., New York.

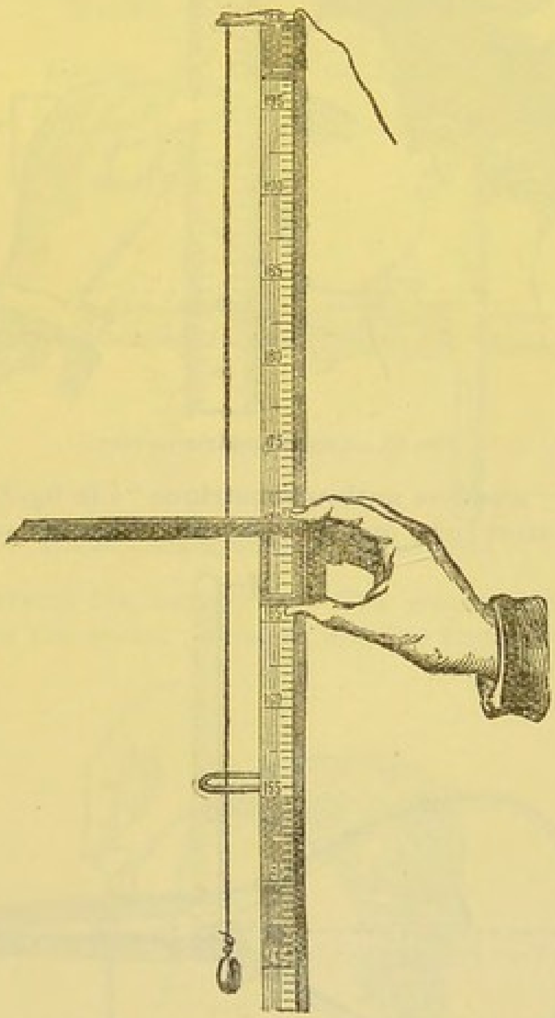


FIG. 79.—Anthropometer. (Topinard.)

THE ANTHROPOMETER.

The anthropometer (fig. 79) is for measuring the height and sitting height. It is divided into four pieces that screw one to the other, so that it can be taken apart and made conveniently portable. Maker, Collin, Paris.

CEPHALOMETRIC SQUARE.

The cephalometric square (fig. 80) is used to make detailed measurements of the projections of the face. Instead of measuring from the ground surface on which the person stands, as in finding the height, the measurement is taken with a square B (fig. 80), on one arm of which is a scale in millimeters. The other arm of the square is held over the vertex as horizontal as possible with the left hand, while with the right hand a three-cornered piece of wood is run up and down the scale, measuring the distance of the projections of the face from the horizontal plane of the vertex. This distance might be measured from the ground, but there is more liability to error, owing to the tense or loose position of the body in standing. Maker, Collin, Paris.

CALIPERS.

The calipers in fig. 81 are used to measure the head, especially its length and width. The instrument represented consists of a scale A, in millimeters, fastened to one arm B, and sliding through the other arm. Maker, Collin, Paris.

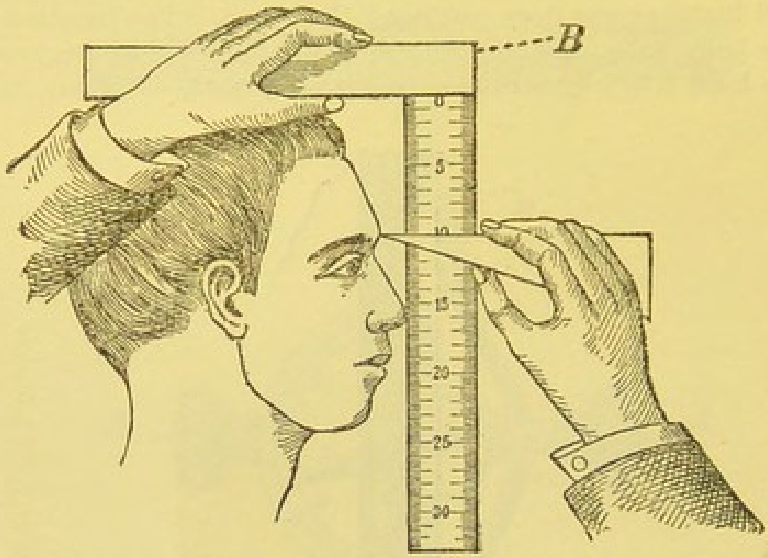


FIG. 80.—Cephalometric square.

The calipers (called "glissière anthropometrique") in fig. 82 are divided into two parts. There are two steel rods, one of which slides on the scale. This instrument

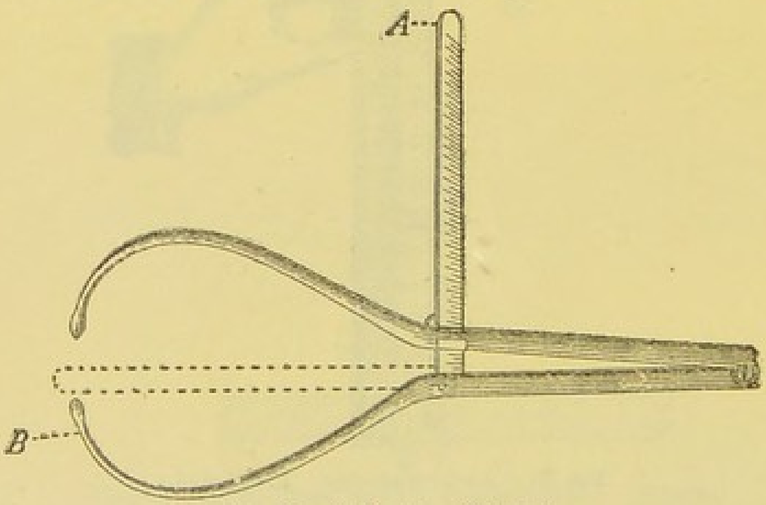


FIG. 81.—Calipers. (Broca.)

is used for direct measurements, as well as for measuring the projections or larger members of the body, such as leg, arm, shoulder, etc. Maker, Collin, Paris.

In fig. 83 are represented small sliding calipers made of steel. They measure very exactly distances between projections of the body and head. Maker, Collin, Paris.

THE GONIOMETER.

The goniometer[1] is an instrument for measuring angles, as of the face or cranium. The one in fig. 84 is the design of Topinard. Broca has also designed a similar

[1] Bull. Soc. d'Anthropologie, 2 sér., tome ix.

goniometer and also a goniometer for the ear; also a profile-klinometer.[1] Maker, Collin, Paris.

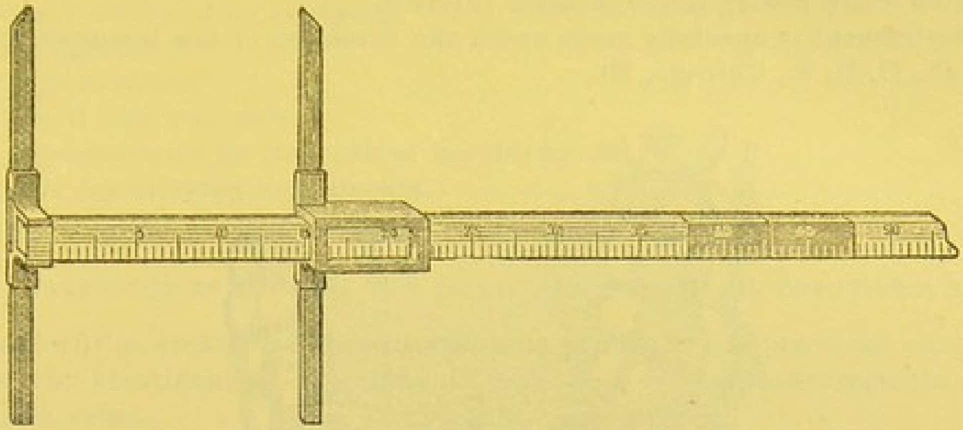


FIG. 82.—Calipers. (Topinard.)[2]

HEIGHT OF VAULT OR PALATE.

In 4,614 measurements Talbot finds the average height of the palate to be 0.58 of

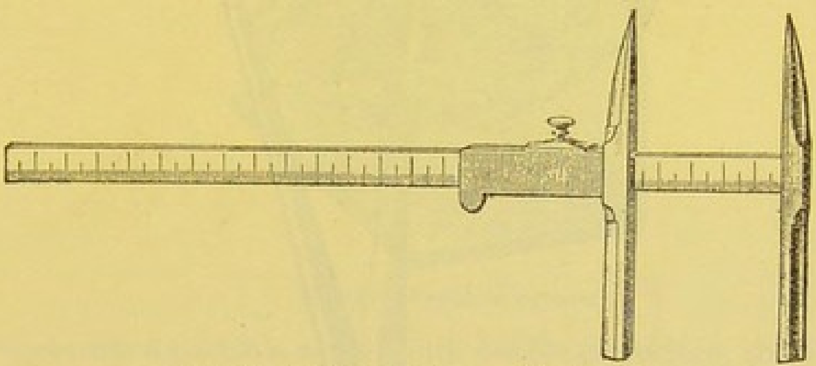


FIG. 83.—Sliding calipers. (Topinard.)

an inch. Fig. 85 illustrates his instrument. The measurement is made from the alveolar border, between the second bicuspid and the first permanent molar, to the

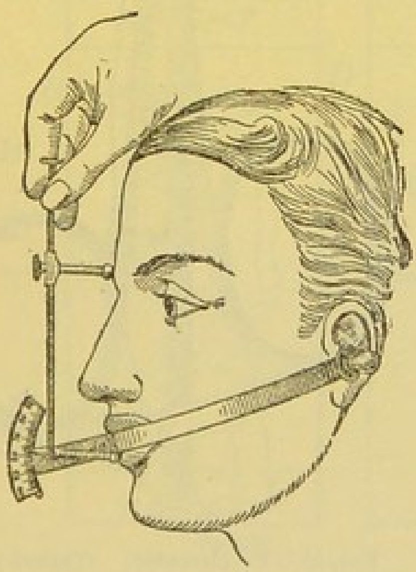


FIG. 84.—Goniometer. (Topinard.)

height of the arch. The cut (fig. 85) shows the position of the instrument when the measurement is made:

---

[1] Schmidt, Emile. Anthropologische Methoden, Leipzig, 1888.
[2] Revue d'Anthrop. 1885, 3 sér. tome viii, page 407.

By turning the steel rod at its end, F, the scale, H (in millimeters), is moved up until it touches the palate, when its height can be read on the scale. The high palate is often found among feeble-minded children.

This instrument is specially made under the direction of the inventor, E. S. Talbot, M. D., D. D. S., Chicago, Ill.

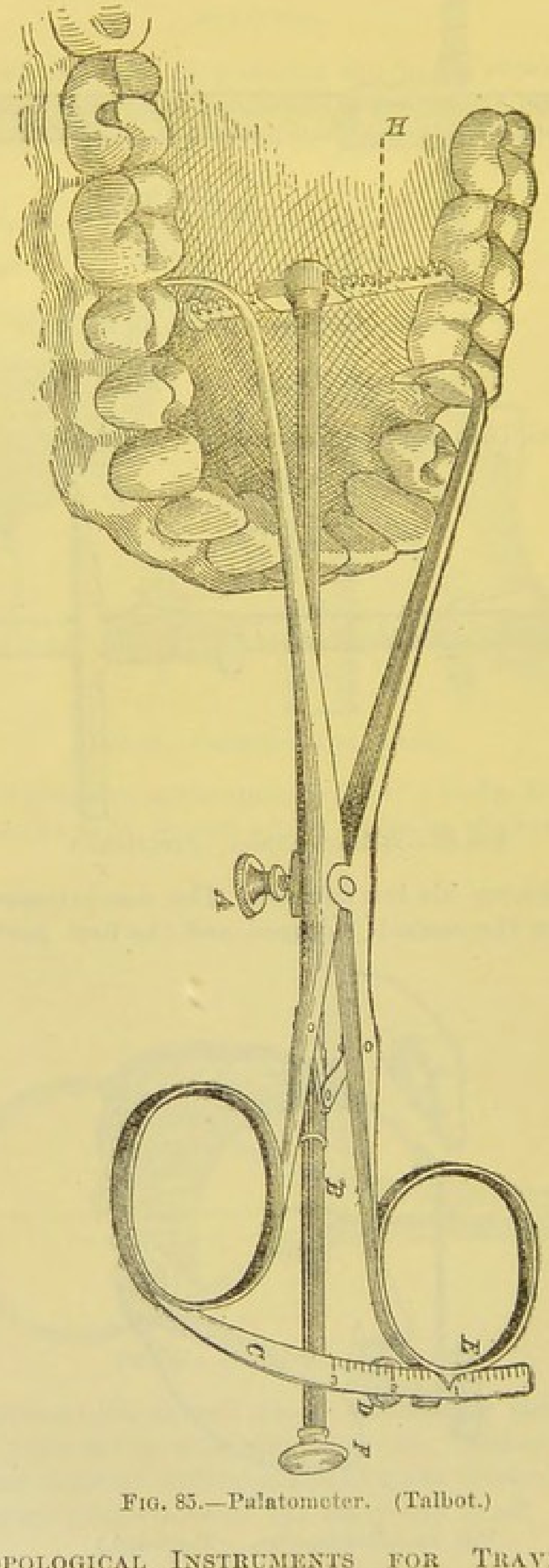


FIG. 85.—Palatometer. (Talbot.)

CASE OF ANTHROPOLOGICAL INSTRUMENTS FOR TRAVELERS, ARRANGED BY TOPINARD.

1. Sliding callipers (fig. 83).
2. Anthropometer (fig. 79).
3. Two special steel squares, used with anthropometer.

4. Cephalometric square (fig. 80) string with plumb.
5. Small wood square.
6. Small steel sliding callipers.
7. Callipers.
8. Tape measure.
9. Pencil with two colors.
10. Dynamometer for strength of hands (fig. 74).
11. Box for carrying instruments.

Maker of case and instruments is Collin, of Paris.

Instruments Used in the Bertillon System of Identification.

The Bertillon system[1] of measurements is primarily for practical purposes—that is, for the identification of criminals, but some of the measurements are also of scientific value.

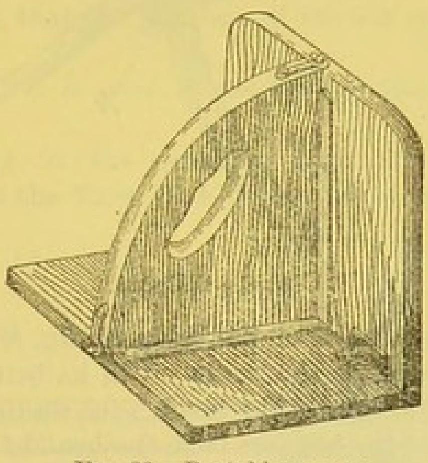


Fig. 86.—Portable square.

Fig. 86 represents a portable square with double projection, and is used in measuring the height and sitting height or trunk, as represented in fig. 87 by B, B. A rule half a meter long,for measuring the sitting height is designated by A. C is a stool used in measuring the trunk. D is a rule for measuring the height.

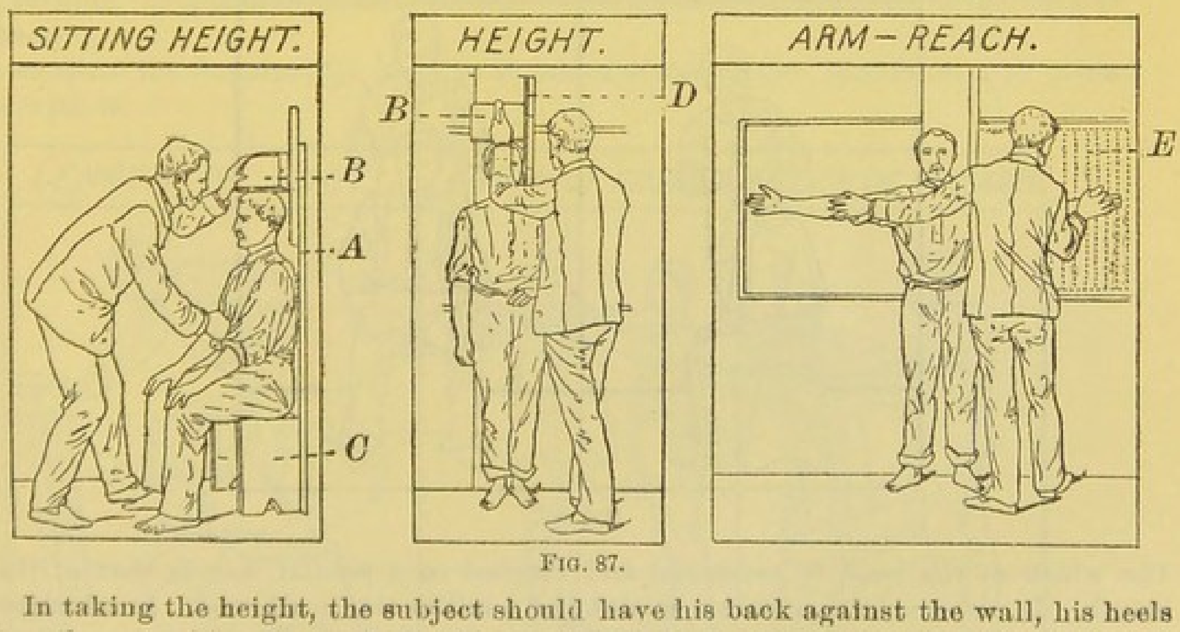


Fig. 87.

In taking the height, the subject should have his back against the wall, his heels together, touching the wall, the knees stiff, the body erect.

In finding the arm reach, the subject has his back to the wall, and extends his

[1] For a detailed account of this system, see The Bertillon System of Identification, published in Chicago, 1896; also Chapter xxviii in Report of Commissioner of Education for 1895-96.

arms horizontally until the tip of his middle finger touches the projection. E represents graduations on paper or oilcloth.

We do not regard this measurement as of great value, because it depends too much upon the will power of the subject to stretch or not to stretch his arms, and therefore may be quite inaccurate. Manouvrier, of the School of Anthropology, of Paris, considers this measurement of very little value.

These calipers are heavier and the ends are more blunt than is the case with calipers in general. They are used for measuring the length and width of head, as

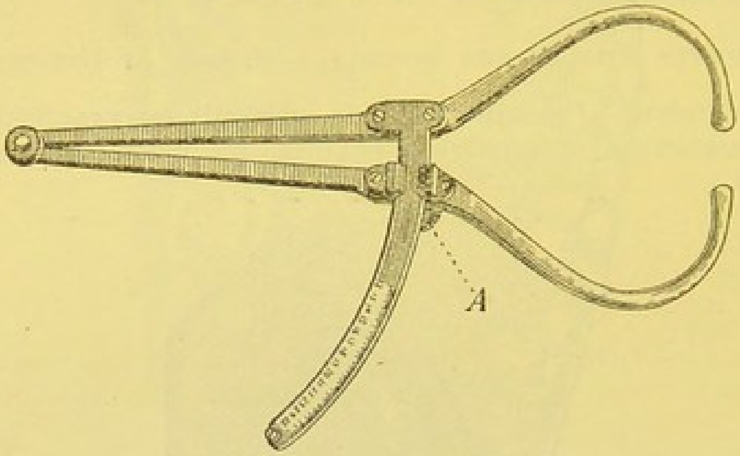


FIG. 88.—Calipers.

represented in fig. 89. The left end of the calipers (fig. 89) is held at the root of the nose; the one measuring watches the scale while he brings the right point of the calipers over the back and middle of the head, thus finding the maximum length of head. The operator removes the calipers from the head of the subject, and by means of a thumbscrew, A (fig. 88), fixes the calipers at the length measured on the scale; then he replaces the calipers upon the head, and tests the accuracy of his measurement by the friction of the right end of the calipers against the back of the head.

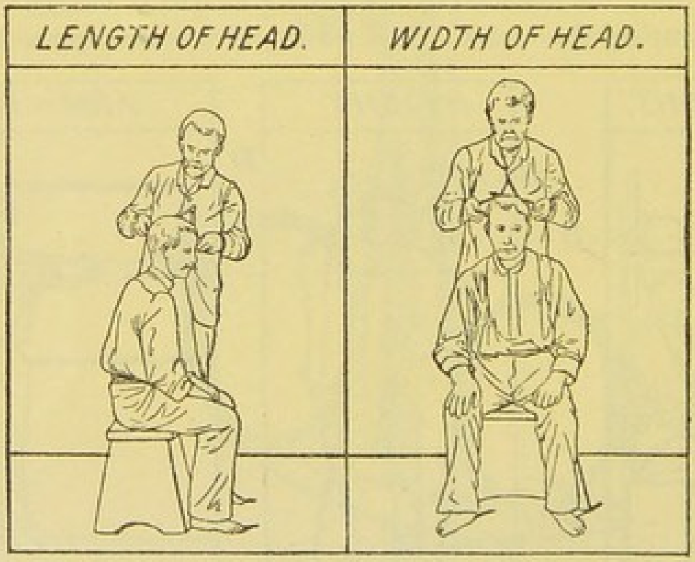


FIG. 89.

The width of the head is measured and verified in a similar way to that of the length. In these measurements a mistake of a millimeter is allowed. In scientific measurements only a half millimeter is allowed.

In measuring the distance between the zygomatic arches (bizygomatic diameter) the same calipers are employed and a similar method as in finding the length and width of head.

In fig. 90 is represented a small caliper rule for measuring the length of the ear. The flat and stationary end A of the instrument is placed so as to just touch the superior border of the ear, and is held still by pressing the left thumb on the end of the stem, resting the other fingers upon the top of the head. The stem of the calipers is held parallel with the axis of the ear, the movable branch is pushed up till it just

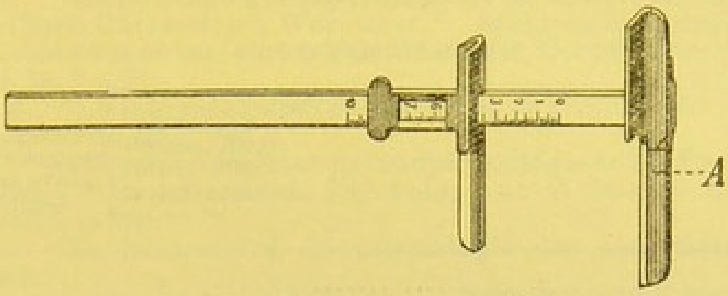


FIG. 90.—Small caliper rule.

touches the inferior extremity of the lobe, when the figure indicated upon the scale is read. Care should be taken that the pavilion of the ear is not depressed by either branch of the calipers.

The large caliper rule (fig. 91) is used in measuring the foot, middle and little fingers and the forearm.

For measuring the foot (fig. 91) the operator, with his subject in the position represented in fig. 92*a*, presses the fixed end of the caliper against the back of the

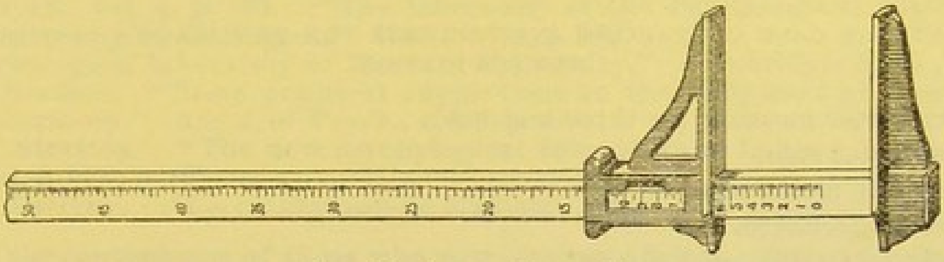


FIG. 91.—Large caliper rule.

heel, then he pushes down the movable end of the caliper until it touches the great toe, reading the distance indicated on the scale.

In measuring the middle finger (fig. 92*b*) the operator places it on the back of the rule, turning the finger to be measured into a position at right angles to the back of the hand.

To measure the forearm (fig. 92*c*) the shoulder of the subject should form an acute angle with it.

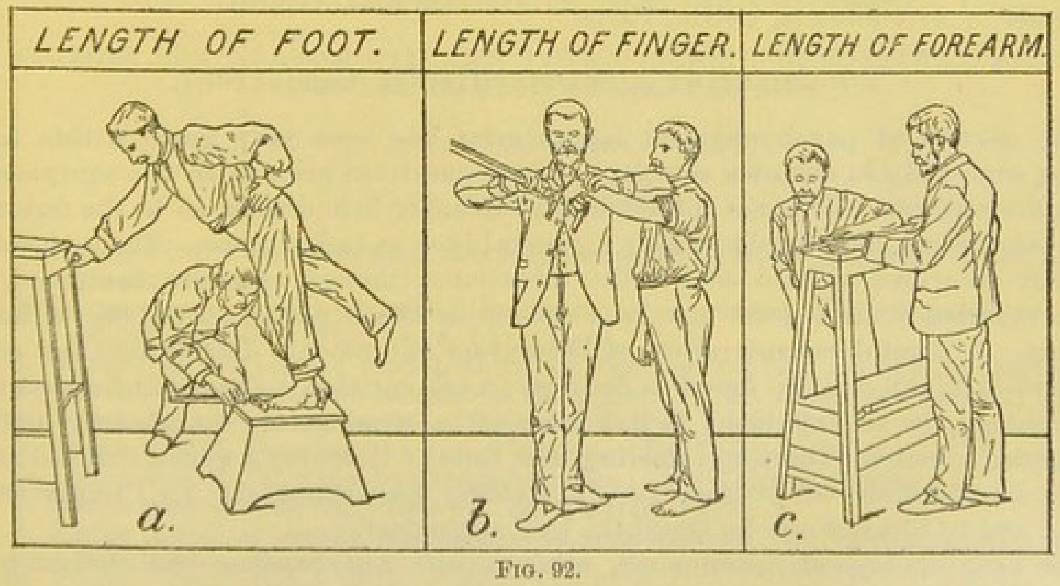


FIG. 92.

It is a common saying that two carpenters never measure a plank exactly the same. If one individual were measured seven times, there would probably be seven signalments, differing by very small quantities. These differences can be ignored until they reach a certain point, after which they destroy the value of the measurement. The following table gives the limits of necessary approximation according to Bertillon:

TABLE 7.[1]

[In millimeters.]

	Approximation theoretically requisite (in + or in —).	Discrepancy beyond which grave error begins.	Mistakes of serious character beyond which non-identity can be declared.
Height	7	15	30
Arm reach	10	20	40
Trunk	7	15	30
Length of head	0.5	1	2
Width of head	0.5	1	2
Length of right ear	1	2	4
Width of right ear	1.5	3	6
Length of left foot	1.5	3	6
Length of left middle finger	0.5	1	2
Length of left little finger	0.75	2	3
Length of left forearm	1.5	3	6

[1] The Bertillon system of identification, p. 24.

PORTABLE CASE CONTAINING INSTRUMENTS FOR BERTILLON'S SYSTEM OF IDENTIFICATION.

1. Two-meter measure (in three sections).
2. One-meter rule.
3. One-half meter rule
4. Double decimeter.
5. Calipers for the head (fig. 88).
6. Sliding calipers for the ear (fig. 90).
7. Sliding calipers for the elbow (fig. 92 c).
8. Directing rod for the ear.
9. Scissors to cut finger nails.
10. Instrument to verify calipers.
11. Roller, tablet, and ink to take finger prints.
12. Signaletic instructions by A. Bertillon, 2 volumes.
13. Box to carry the instruments.

Maker of instruments, Collin, Paris.

EQUIPMENT OF A PSYCHOPHYSICAL LABORATORY.

The growth of psychophysical laboratories has been very great within recent times, especially in our own country. Many questions arise as to the equipment of such laboratories. It is not intended here to enter into details as to the formation of a laboratory, but merely to give a general idea as to its scope. The instruments already described will aid some in this direction, although, as before mentioned, they were selected with regard to recent phases in the experimental study of human beings. A careful consideration of laboratory equipment, description, and use of instruments, etc., will be found in Sanford's work entitled A Course in Experimental Psychology, in an article by E. B. Titchener in Mind, series No. 27, July, 1898; in Scripture's book on Thinking, Feeling, and Doing; in Marey's works, entitled as follows: La Méthode Graphique, La Physiologie Experimentale, La Circulation du Sang, and in Physiologische Graphik, by Langendorf.

For anthropological instruments, etc., consult Anthropologische Methoden, by Schmidt; L'Homme dans la Nature, by Topinard; Grundzüge einer Systematischen Kraniometrie, by Török, and the Bertillon System of Identification.

LITERATURE ON PSYCHOLOGICAL LABORATORIES.[1]

J. M. Baldwin. "The psychological laboratory in the University of Toronto." Science, O. S., vol. 19, 1892, p. 143.
M. Baudouin. "La phychologie expérimentale en Amérique. Le laboratoire et les cours de Clark University à Worcester." Archives de neurologie, vol. 28, No. 89. "Les laboratoires et les cours à Yale, Harvard, Cornell, Pennsylvania," . . . etc. Ibid., vol. 28, No. 93.
W. Bechterew. "Le laboratoire psychophysique de l'université impériale de Kazan." Cong. de Zool. de 1892, vol. 3.
E. Bérillon. "Notice sur l'institut psychophysiologique de Paris." Paris, 1897.
M. W. Calkins. "Experimental Psychology at Wellesley College." Am. J. of Psych., vol. 5, p. 260.
E. Casslant. "Le laboratoire de physiologie des sensations de la Sorbonne." Paris, 1897.
E. B. Delabarre. "Les laboratoires de psychologie en Amérique." L'annee psychologique, vol. 1, p. 209.
T. Flournoy. "Notice sur le laboratoire de psychologie de l'université de Genève." Geneva, 1896.
V. Henri. "Les laboratoires de la psychologie expérimentale en Allemagne." Rev. Phil., vol. 36, Dec., 1893.
J. Jastrow. "The section of psychology." World's Columbian Exposition Official Catalogue. Pt. 12, p. 50.
W. O. Krohn. "Facilities in experimental pyschology in the colleges of the United States." Report of the Commissioner of Education for 1890-91, vol. 2, p. 1139. "Experimental psychology at the various German universities." Am. J. of Psych., vol. 4, p. 585. "The laboratory of the Psychological Institute at the University of Göttingen." Ibid., vol. 5, p. 282.
"Psychological laboratory of Harvard University." Cambridge, Mass., 1893.
E. C. Sanford. "Some practical suggestions on the equipment of a psychological laboratory." Am. J. of Psych., vol. 5, p. 429.
G. M. Stratton. "The new psychological laboratory at Leipzig." Science, N. S., vol. 4, 1896, p. 867.
H. de Varigny. "Le laboratoire de Madison, Wis." Rev. Scient., 1894, p. 624.

For the convenience of those who may desire to know names of instruments for fitting out a psychophysical laboratory, we quote below a catalogue of instruments at the psychological laboratory at Harvard University, prepared by Professor Münsterberg, director of the laboratory.

A laboratory may be used in three general ways—(*a*) for simple demonstration in lecture courses, (*b*) for courses of practical work for beginners, and (*c*) for extensive research work.

CATALOGUE OF THE INSTRUMENTS AND APPARATUS CONTAINED IN THE PSYCHOLOGICAL LABORATORY OF HARVARD UNIVERSITY.

I. OBJECTS FOR ANATOMICAL AND PHYSIOLOGICAL DEMONSTRATIONS OF THE PHYSICAL BASIS OF MENTAL LIFE.

A. BRAIN.

a. HUMAN BRAIN.

1. Large wire model, showing the fibers and the cerebral masses. After Aeby, by Buechi, Bern.
2. Large elastic model, showing the course of the nerve-fibers throughout the encephalic mass. After Luys, by Auzoux, Paris.
3. Natural sized elastic model, showing the nerve-fibers on one hemisphere, and the cerebral ganglion masses on the other. After Luys, by Auzoux, Paris.
4. Natural sized elastic model. By Bock-Steger, Leipzig.
5. Large model, showing the convolutions. By Talrich, Paris.
6. Large model, showing horizontal section. By Talrich, Paris.
7. Large model, seen from below. By Talrich, Paris.
8. Large model of corpus callosum, seen from below. By Talrich, Paris.
9. Large model, showing median section. By Talrich, Paris.
10. Large elastic model of cerebellum and spinal cord. By Auzoux, Paris.

[1] See article in Mind, July, 1898, by Prof. E. B. Titchener, of Cornell University.

11. Vertical section of head. By Bock-Steger, Leipzig.
12. Model of the head of adult male, brain exposed on the side. By Casciani, Dublin.
13. Model of the head of middle-aged female, brain exposed on the side. By Casciani, Dublin.
14. Model of the head of an aged man, brain exposed on the side. By Casciani, Dublin.
15. Model of the head of elderly female, insane, brain exposed on the side. By Casciani, Dublin.
16. Set of fourteen wax models, showing the development of the fetal brain. After Ecker, by Ziegler, Freiburg.
17. Model of the head of a seven months' fetus, brain exposed on the side. By Casciani, Dublin.
18. Model of the head of a child six months old, brain exposed on the side. By Casciani, Dublin.
19. Model of the head of a girl, brain exposed on the side. By Casciani, Dublin.
20. Collection of human brains in alcohol.
21. Collection of charts, showing sections of the brain, and forty-eight stereoscopic views of the central nervous system. After Debierre and Doumer, by Alcan, Paris.

b. VERTEBRATE BRAINS.

22. Set of eight wax models showing the phylogenic development of the brain. After Wiedersheim, by Ziegler, Freiburg.
23. Model of the head of chimpanzee, brain exposed on the side. By Casciani, Dublin.
24. Model of the head of orang-outang, brain exposed on the side. By Casciani, Dublin.
25. Collection of sheep brains in alcohol.
26. Collection of charts showing development of brain, from gymnotus to mammal.

B. SENSE ORGANS AND NERVES.

a. ANATOMICAL DEMONSTRATION.

27. Half skull, with the seven first cerebral nerves in wax. By Tramond, Paris.
28. Large clastic model of eye, divided by a vertical section. By Auzoux, Paris.
29. Large clastic model of eye, showing muscles, nerves, vessels, etc. By Auzoux, Paris.
30. Clastic model of human eye. By Bock-Steger, Leipzig.
31. Small model of entire eye. By Browning, London.
32. Set of 9 wax models of the eye, showing the embryological development of the vertebrate eye. After Manz, by Ziegler, Freiburg.
33. Standard eyes for anthropological comparison. After Galton, by Cambridge Scientific Instrument Company.
34. Large clastic model of the ear, showing the internal, middle, and external ear. By Auzoux, Paris.
35. Large clastic model of the ear, showing especially the internal ear. By Brendel, Berlin.
36. Large collection of histological preparations for microscopical study of brain, sense organs, and muscles. By Bourgogne, Paris; Queen, Philadelphia; Kloenne & Müller, Berlin, etc.
37. Collection of charts and large photographs in frame, showing anatomy of nerves and sense organs.

b. PHYSIOLOGICAL DEMONSTRATION.

38. Artificial eye, consisting of glass water tank, lenses, etc. After Kuehne, by Jung, Heidelberg.
39. Thread model, representing rays of light, and demonstrating effects of astigmatism. After Knapp, by Meyrowitz, New York.
40. Phakoscope, for demonstrating accommodation of lens. After Helmholtz, by Sittel, Heidelberg.
41. Ophthalmotrope, demonstrating movements of the eye, and action of the different muscles which produce them. After Ruete, by Kohl, Chemnitz.
42. Model showing mechanism of the drum and bones of the ear. After Helmholtz, by Jung, Heidelberg.

N. B.—Compare Groups IV. A. B. Microscope, instruments of dissection, etc.

II. APPARATUS FOR STUDYING THE SENSATIONS.

A. HEARING.

43. The harmonical, furnishing 24 overtones of C (66) and the first 16 of C (132). After Ellis, by Moore, London.
44. One large tuning fork, giving from 32 to 48 vibrations. By Koenig, Paris.
45. Set of 12 tuning forks, with resonance boxes, Ut_2, Ut_3, Mi_3, Sol_3, La_3, Ut_4, Mi_4, Sol_4, seventh harmonic of Ut_2, Ut_7, Re_5, Mi_5. By Koenig, Paris.
46. One extra Ut_4 tuning fork and one Ut_4 + four vibrations, with resonance boxes. By Koenig, Paris.
47. Five tuning forks, with resonators, tuned to the characteristic notes of the vowels. After Helmholtz, by Koenig, Paris.
48. Bow for vibrating tuning forks. By Queen, Philadelphia.
49. Series of 10 resonators. After Helmholtz, by Koenig, Paris.
50. Series of 22 steel cylinders, giving notes from Ut_7 to Ut_{10} by stroke of steel hammer. By Koenig, Paris.
51. Apparatus for testing the appreciation of difference in musical pitch. After Galton, by Cambridge Scientific Instrument Company.
52. Large bellows, with regulator and wind chest for 12 pipes. By Koenig, Paris.
53. Nine open wooden pipes, from Ut_2 to Ut_7, to be used with the organ bellows. The Ut_2 duplicated. By Koenig, Paris.
54. Eight stopped pipes, giving the scale from Ut_1 to Ut_4. By Koenig, Paris.
55. Apparatus for studying the nonmusical intervals of sounds between 128 and 256 vibrations (Tonmesser). By Appunn, Hanau.
56. Apparatus for studying the nonmusical intervals of sounds between 256 and 512 vibrations. By Appunn, Hanau.
57. Revolving mirror, manometric capsule, etc., for analyzing manometric flames. By Koenig, Paris.
58. Whistle for determining highest limit of sound. After Galton, by Koenig, Paris.
59. Differential sonometer, with weights. After Marloye, by Koenig, Paris.
60. Toothed wheel. After Savart, by Queen, Philadelphia.
61. Siren and toothed wheels, giving the same notes, with centrifugal machine. By Kohl, Chemnitz.
62. Eight electric bells of various pitches, from 6 to 16 cm. in diameter. By Brock, Cambridge.
63. Two electric bells, single stroke. By Brock, Cambridge.
64. Snappers for giving different qualities of short noises, three telephones, pistols, etc.
65. Large electric phonometer, producing noises of various intensities. After Münsterberg, by Elbs, Freiburg.
66. Small phonometer. Made in the laboratory.
67. Two large boxes for tuning forks impervious to sound, with ear appliances, etc. After Gilman, made in Cambridge.

N. B.—Compare groups—
I. B. Models of ear, etc.
III. A. Registering tuning forks, etc.
III. B. Instruments for localization of sound. Time sense.

B. SIGHT.

68. Large color mixer, with horizontal rotating disks, connected with foot machine. Six dozen colored-paper disks. After Hering, by Rothe, Prag.
69. Apparatus for color sense of the eccentric parts of retina, to be attached to Hering's foot machine. After Hering, by Rothe, Prag.
70. Color mixer, adjustable under rotation. After Pillsbury, by Bradley, Springfield.
71. Large color mixer for four disks, two upon each spindle. After Wundt, by Krille, Leipzig.
72. Set of color disks, 60 cm. in diameter. By Krille, Leipzig.
73. Color mixer. After Galton, by Cambridge Scientific Instrument Company.
74. Two color wheels, with disks. By Milton Bradley Company, Springfield.
75. Newton's disk, 80 cm. in diameter. By Queen, Philadelphia.
76. Apparatus for mixing colors by mirrors and colored glasses. After Hering, by Rothe, Prag.
77. Apparatus for mixing colors by the combination of colored gelatin papers. After Münsterberg, by Elbs, Freiburg.
78. Three boxes for mixing colors by reflection. Made in the laboratory.

79. Simultaneous contrast apparatus, with two prisms for binocular or monocular investigation. After Hering, by Rothe, Prag.
80. Simultaneous contrast apparatus, with colored glasses. After Hering, by Rothe, Prag.
81. Instrument for the recombination of parts of the solar spectrum. By Kohl, Chemnitz.
82. Instruments for successive contrast, irradiation, etc. By Kohl, Chemnitz.
83. Apparatus for color after-images. After Hering, by Rothe, Prag.
84. Chromatoskiameter. After Holmgren, by Rose, Upsala.
85. Apparatus for diagnosing color-blindness. After Hering, by Rothe, Prag.
86. Apparatus for appreciation of color. After Galton, by Cambridge Scientific Instrument Company.
87. Apparatus for testing simulated blindness. After Snellen, by Meyrowitz, New York.
88. Nachet's adjustable trial frame. By Meyrowitz, New York.
89. Two perimeters. After Landholt and Priestly Smith, by Meyrowitz, New York.
90. Two hundred and fifty perimeter charts. By Meyrowitz, New York.
91. Apparatus for testing keenness of eyesight. After Galton, by Cambridge Scientific Instrument Company.
92. Spectroscope. After Vogel, by Schmidt and Haensch, Berlin.
93. Large glass prism, 15 by 10 cm. By Queen, Philadelphia.
94. Two smaller mounted prisms. By Duboscq, Paris.
95. Set of spectacles, with concave, convex, cylindrical, prismatic, and colored glasses. By Miller, Boston.
96. Excelsior lantern. By Queen, Philadelphia.
97. Magic lantern. Stereopticon screens. By Elbs, Freiburg.
98. Gorhams's kaleidoscope top. By Griffin, London.
99. Micrometric shutter for studying minute fields of color. After Münsterberg, by Elbs, Freiburg.
100. Magnifying mirror. By Lloyd, Boston.
101. Set of Geissler tubes.
102. Thirty plates colored glass. By Redding, Baird & Co., Boston.
103. Prismatic spectrum charts in frame. By Prang, Boston.

N. B.—Compare groups—
I. B. Models of eye, etc.
III. A. Apparatus for optical reaction time.
III. B. Apparatus for study of visual space perception, etc.
III. C. Apparatus for study of optical recognition, discrimination, æsthetics.
IV. A. Heliostat, photometer, microscopes, etc., colored papers, etc.

C. DERMAL AND MUSCULAR SENSATIONS.

104. Kinesimeter. After Hall, by Pfeifer, Baltimore.
105. Tube for hot and cold spots.
106. Six æsthesiometric compasses.
107. Set of 200 arrangements for studying number and extension of skin sensations. After Nichols; made in the laboratory.
108. Instrument for studying the fusion of touch sensations. After Krohn; made in Cambridge.
109. Apparatus for testing appreciation of weight. After Galton, by Cambridge Scientific Instrument Company.
110. Dynamometer for showing strength of hands. By Verdin, Paris.
111. Salter's dynamometer for showing strength of hands. By Cambridge Scientific Instrument Company.
112. Salter's dynamometer for showing strength of arms. By Cambridge Scientific Instrument Company.

N. B.—Compare groups—
III. A. Instrument for touch reaction, etc.
III. B. Apparatus for tactual space, movement presentations, etc.
III. C. Ergograph, etc.
IV. Thermometers, atomizer, electric apparatus, etc.

III. APPARATUS FOR STUDYING THE HIGHER PSYCHICAL PROCESSES.

A. TIME MEASUREMENT OF MENTAL ACTS.

113. Kymograph. After Ludwig, by Cambridge Scientific Instrument Company.
114. Revolving drum. By Verdin, Paris.
115. Two electric signals, one with tuning-fork attachment. After Deprez, by Verdin, Paris.
116. Two tambours for giving signals upon revolving drum. After Marey, by Verdin, Paris.

117. Two connected tambours. After Marey, by Verdin, Paris.
118. Large demonstration drums, etc. Made in Cambridge.
119. Electrical tuning fork of 100 vibrations. By Koenig, Paris.
120. Electrical tuning fork of 50 vibrations. By Verdin, Paris.
121. Electrical tuning fork of 10 vibrations. By Verdin, Paris.
122. Registering tuning fork of 50 vibrations to be set in motion by a Bunsen aspirator. After Ewald, by Maier, Strasburg.
123. Four simple writing tuning forks. By Kohl, Chemnitz.
124. Metronome, with electrical connection. After Kronecker, by Verdin, Paris.
125. Hipp's chronoscope, measuring one-thousandth part of a second. By Peyer, Favarger & Co., Neufchatel.
126. Control hammer for Hipp's chronoscope. After Wundt, by Krille, Leipzig.
127. Pendulum instrument for giving rhythmical electric contacts and short optical impressions, and for controlling the chronoscope. After Münsterberg, by Elbs, Freiburg.
128. Chronoscope measuring the hundredth part of a second, by registering the vibrations of a tuning fork. After Ewald, by Maier, Strassburg.
129. Clock measuring the hundredth part of a second, with spring and mechanical starter. After Münsterberg, by Elbs, Freiburg.
130. Stop watch giving only fifths of a second. By Kohl, Chemnitz.
131. Reaction time pendulum. After Galton, by Cambridge Scientific Instrument Company.
132. Machine for measuring reaction time by a falling rod. After Galton, by Cambridge Scientific Instrument Company.
133. Reaction-time instrument with vibrating arm and smoked slide. After Exner, by Heinitz, Wien.
134. Large demonstration-chronoscope. After Wundt, by Krille, Leipzig.
135. Flash-light instrument, with electric contact. After Bowditch, by Marie, Boston.
136. Drop window, for the sudden exposure of colors, numbers, etc. By Elbs, Freiburg.
137. Touch-reaction instrument, with 20 different stimuli. By Elbs, Freiburg.
138. Two telegraph keys, with sounder.
139. Five simple telegraph keys.
140. Electric key. After Ewald, by Maier, Strassburg.
141. Electric key. After Dubois-Reymond, by Cambridge Scientific Instrument Company.
142. Electric key, combined with writing signal. Made in the laboratory.
143. Reaction-key with 50 buttons. After Münsterberg, by Elbs, Freiburg.
144. Chain-reaction instrument for 10 persons, each instrument provided with 5 electric keys and 5 frames. After Münsterberg, by Elbs, Freiburg.
145. Set of 600 disks for the chain-reaction instrument. By Cooperative Association, Cambridge, Mass.

N. B.—Compare groups—
II. A, B, C. Instruments for optical, acoustical, tactual stimulation.
IV. B. Electric apparatus, especially elements, rheochord, commutator, etc

B. PERCEPTION, SPACE, TIME.

146. Instrument for investigating the power of the eye to compare lengths (Augenmassapparat). After Münsterberg, by Elbs, Freiburg.
147. Instrument for the optical reproduction of given lengths. After Münsterberg, by Elbs, Freiburg.
148. Instrument for estimating the divisions of a line. After Galton, by Cambridge Scientific Instrument Company.
149. Instrument for estimating angular divisions. After Galton, by Cambridge Scientific Instrument Company.
150. Wheatstone's stereoscope, with slides. By Queen, Philadelphia.
151. Five hand stereoscopes. By Lloyd, Boston.
152. Stereoscopic pictures. After Kroll, by Voss, Hamburg; and other sets.
153. Twenty tin tubes, and pasteboard tubes for stereoscopic purposes.
154. Pseudoscope. After Ewald, by Maier, Strassburg.
155. Pseudoscope. By Elliott, London.
156. Two human concave masks, illustrating optical illusions.
157. Apparatus for showing appreciation of distance by convergence. Made in the laboratory.
158. Haploscope. Made in the laboratory.
159. Set of charts, with optical illusions.
160. Zoötrope.

161. Stroboscopic rotating disk, with Geissler's tube. After Poggendorff, by Kohl, Chemnitz.
162. Artificial waterfall. After Bowditch; made in the laboratory.
163. Two large instruments for studying the muscle sensations, tactual space, and the presentations of movement. After Münsterberg, by Elbs, Freiburg.
164. Apparatus for studying the perception of the position of the body. After Aubert; made in Cambridge.
165. Apparatus for studying the localization of simultaneous equal or unequal sounds. After Münsterberg, by Elbs, Freiburg.
166. Apparatus with electric contacts for studying the time sense. After Schumann, by Diederichs, Goettingen.
167. Sound hammer for experiments on time sense. By Krille, Leipzig.
168. Metronome, with bell.
169. Set of 24 instruments for studying space sense in coordinated movements of both arms. After Bowditch, by Marie, Boston.
170. Set of balls of the same weight, but of different sizes. By Marie, Boston.

N. B.—Compare groups—
II. A, B, C. Instruments for optical, acoustical, tactual impressions, micrometric shutter, etc.
III. A. Kymograph.

C. ASSOCIATION, ATTENTION, DISCRIMINATION, MEMORY, FEELINGS, EMOTIONS, WILL, ETC.

171. Material for studies in association (400 photographs, picture books, large printed numbers, letters, words, etc.).
172. Eight sets of arrangements for studies in memory. Made in the laboratory.
173. Instrument for studies in association and memory. After Münsterberg, by Elbs, Freiburg.
174. Instrument for studying the complication of perceptions. After Wundt, by Krille, Leipzig.
175. Instrument for the study of the attention, two simultaneous impressions being given to disparate senses. After A. H. Pierce; made in the laboratory.
176. Instantaneous shutter for association experiments. By Elbs, Freiburg.
177. Rotary chair for the study of dizziness, etc. After Münsterberg, by Elbs, Freiburg.
178. Small instrument for studying the movements during the emotions. By Elbs, Freiburg.
179. Large instrument for the study of æsthetic forms and proportions. After Münsterberg and Witmer, by Elbs, Freiburg.
180. Six sets of arrangements for the study of æsthetic combinations of color. Made in the Laboratory.
181. Cercle chromatique de Charles Henry.
182. Ergograph. After Mosso, by Corino, Torino.
183. Ponograph. After Mosso, by Verdin, Paris.
184. Myograph. After Marey, by Verdin, Paris.
185. Sphygmograph. After Marey, by Verdin, Paris.
186. Instrument for registering the pulse of the two carotids at once. After Marey, by Verdin, Paris.
187. Pneumograph. After Marey, by Verdin, Paris.
188. Instrument for studying the time relations of voluntary movements. After Loeb; made in the laboratory.
189. Apparatus for studying unconscious movements.
190. Hypnoscope. After Luys.

N. B.—In this group especially, everything depends upon unlimited combinations of almost all the instruments of the laboratory.

IV. TECHNICAL OUTFIT.

A. OPTICAL AND MEASURING INSTRUMENTS.

191. Two heliostats. By Kohl, Chemnitz.
192. Photometer. After Bunsen and Toepler, by Kohl, Chemnitz.
193. Microscope, with adjustment by graduated micrometer screw, Abbé condenser, iris diaphragm, cylinder diaphragms, double nose piece, objectives, 2, 4, 7, 9, eyepieces, i, iii, iv. By Leitz, Weimar.
194. Microscope. By Hart & Praz, Paris.
195. Small microscope. By Queen, Philadelphia.

196. Photographic camera. By Lerchours, Paris.
197. Large and small reading glasses.
198. Cardboard and gelatin paper of various colors, 200 sheets of colored paper, colored crayons, etc. By Milton Bradley Co., Springfield; Prang, Boston, etc.
199. Large and small finely graded thermometers; six ordinary thermometers.
200. Three aërometers, measuring tubes for liquids, pipettes, etc.
201. Mathematical drawing instruments, protractors, etc.
202. Apothecary scale, with weights. By Whitall & Tatum, Boston.
203. Balance scale, spring letter balance, etc. By Fairbanks, St. Johnsbury.
204. Two sets of brass weights. By Kohl, Chemnitz.
205. Instrument for showing the variations of error from the average. After Bowditch, by Marie, Boston.

N. B.—Compare groups—
II. B. Spectroscope, magic lanterns, etc.
III. A. Chronoscopes, registering tuning forks, etc.

B. ELECTRIC APPARATUS.

206. Eighteen Leclanche cells (Gonda).
207. Three Grenet cells.
208. Sixteen Bunsen cells.
209. Six Grove cells.
210. Large induction coil for producing sparks. By Kohl, Chemnitz.
211. Induction coil. After Dubois-Reymond, by Krüger, Berlin.
212. Electro-magnetic machine. By Smith, New York.
213. Small induction coil, with handles. By Elbs, Freiburg.
214. Large electro-magnet. Made in the laboratory.
215. Rheochords. By Elbs, Freiburg; by Krille, Leipzig, etc.
216. Galvanometer, with mirror, etc. After Nobili, by Kohl, Chemnitz.
217. Compass galvanometer.
218. Commutator for four currents. By Marie, Boston.
219. Two rocking mercury commutators. By Cambridge Scientific Instrument Company.
220. Large set of electrodes, electrical connections, and wires (copper, platina, brass, and iron; coarse and flexible; insulated, etc.).

N. B.—Compare groups—
III. A. Electric chronoscopes, keys, tuning forks, reactors, etc.
IV. C. Mercury, acids, etc.

C. SURGICAL, MECHANICAL, CHEMICAL OUTFIT.

221. Surgical outfit (4 pairs scissors, 17 forceps, 17 scalpels, 15 probes, 6 silver probes, set of saws, scissor pliers, hammers, and chisels for dissecting, set of syringes, camel's-hair brushes, etc.).
222. Glass dissecting slabs.
223. Pigeon holder. After Ewald, by Maier, Strassburg.
224. Arrangement for smoking kymograph papers, and fixing the curves in the shellac bath. Made in the laboratory.
225. Carpenter's bench, with full set of carpenter's tools (vice, scroll saw, etc.).
226. Large grindstone.
227. Collection of metal stands and rods, etc.
228. Holder for prisms. By Kohl, Chemnitz.
229. Universal holder. By Cambridge Scientific Instrument Company.
230. Glass apparatus (tubes, rods, jars, funnels, etc.).
231. Rubber tubes (from 2 to 25 mm. in diameter), rubber bands, rubber atomizers, etc.
232. Porcelain jars, basins, etc.
233. Brass and copper sheets, nails, screws, hooks, pins, corks, straw, wadding, boards, boxes, cloth, linen, etc.
234. Chemical apparatus and reagents.
235. Jar of mercury.
236. Blast lamp and bellows for glass blowing.
237. Bunsen burner.
238. Set of soldering tools.
239. Water motor.
240. Edison mimeograph, copying machine.

MAKERS OF PSYCHO-PHYSICAL AND ANTHROPOLOGICAL INSTRUMENTS.

Anton, Appunn. Hanau, a. M., Germany, 12 Nürnbergerstrasse. Acoustic instruments.
Auzoux. Paris, 2 Rue Antoine-Dubois. Anatomical models (after Luys).
Boekelman, W. A. Utrecht. Kymographion.
Bradley, Milton, Company. Springfield, Mass. Colored paper, etc.
Brendle, R. Berlin, W., 56 Ansbacherstrasse. Anatomical models.
Bristol's Manufacturing Company. Waterbury, Conn. Recording pressure gauge.
Brown and Getty. Point and Erie streets, Camden, N. J. Psychological instruments.
Browning, John. London, W. C., 63 Strand. Optical instruments.
Brunner. Paris, 59 Rue de Vaugirard. Optical instruments.
Buechi, F. Berne, Switzerland, 34 Spitalgasse. Anatomical models.
Cambridge Scientific Instrument Company. Cambridge, England, St. Tibb's Row. Optical acoustics, kymographs, anthropometric apparatus (after Galton).
Carliczek, Ottomar. Chicago, Ill. Electro-medical instruments and their management.
Casciani, L., & Son. Dublin, 32 Wellington Quay. Anatomical models (after Cunningham., etc.).
Central Electric Company. Chicago, Ill. Electrical supplies.
Chicago Laboratory Supply and Scale Co., 39 West Randolph street, Chicago, Ill.
Chloride of Silver Dry Cell Battery Company. Baltimore, Md.
Alvan S. Clark's Sons. Cambridge, Mass., 186 Brookline street. Lenses.
Clay & Torbensen. Camden, N. J., 117 Front street. Instruments of precision.
Collin. Paris, 6 Rue de l'École de Médecine. Surgical outfits and anthropological instruments.
Corino, Luigo. Torino, Italy, 18 Via Po. Instruments of precision (after Mosso).
Dennison. Boston, 18 Franklin street. Letters, numbers, etc.
Deyrolle, Émile. Paris, 46 Rue du Bac. Anatomical models.
Diederichs, C. Goettingen, Germany. Psychological instruments (after Schumann).
Doerffel, P. Berlin, 46 Unter den Linden. Optical instruments.
Dubosco, Theod. et Albert. Paris, 11 Rue des Fossées Saint Jacques. Optical and acoustic instruments.
Ducretet, E. & Lejeune L. Paris, France. Electrical instruments of measurement.
Edelmann, M. Th. München. Physical and physiological instruments.
Elbs, Hermann. Freiburg, Germany, 17 Friedrichstrasse. Psychological instruments (after Münsterberg).
Elliott Bros. London, 449 Strand. Electrical instruments.
Elmer G. Willyoung & Co. Betz Building, Philadelphia, Pa. Psychological apparatus.
Friez, J. P. Baltimore, Md. Meteorological instruments.
Gaiffe, et Cie. Paris, France. Electrical appliances.
Galvano-Faradic Manufacturing Company. New York. Electrical apparatus.
Gerhardt, C. Bonn, Germany, 90 Bornheimerstrasse. Chemical and physical apparatus.
Greeley, E. S., & Co. New York. Electrical supplies and apparatus.
Green, Henry J. Brooklyn, N. Y. Meteorological and scientific instruments.
Groves, W. London, W. C., 89 Bolsover street, Portland place. Electrical apparatus.
Grunow, W., jr. New York, 204 East Forty-third street. Scientific instruments.
Harvey & Peak. London, W. C., 56 Charing Cross road. Optical instruments, etc.
Himmler, O. Berlin, S., 9 Brandenburgstrasse. Optical instruments.
Hirschmann, W. A. Berlin, S., 54 Kommandantenstrasse. Electrical and medical instruments.

Hugershoff, Franz. Leipzig, Turnerstrasse. Physical and chemical apparatus.
Jung, R. Heidelberg, Germany. Physiological instruments (after Helmholtz, Kuehne, Foerster, etc.).
Jung, R. Heidelberg, Germany. Scientific instruments.
Kagenaar, D. B. Utrecht, Holland. Optical and physiological instruments (after Donders, Snellen, Engelmann).
Koenig, Rud. Paris, 27 Quai d'Anjou. Acoustic instruments (after Helmholtz, etc.).
Kohl, Max. Chemnitz i. S., Germany. Physical apparatus.
Krille, Carl. Leipzig, 8 Schulstrasse. Psychological instruments (after Wundt).
Leiter, Josef. Vienna, Austria. Electro-therapeutical and surgical instruments.
Lindenlaub, H. R. Schmiedefeld in Thüringen, Germany. Glass instruments, thermometers, etc.
Luhme, J. F. & Co. (Rohrbeck). Berlin, N. W., 24 Karlstrasse. Glass instruments.
Lund, Otto. 6 Place de la Sorbonne, Paris.
MacAllister, T. H. New York, 49 Nassau street. Optical instruments.
Majer, F. Strassburg, Germany, 10 Kraemergasse. Physiological instruments (after Ewald).
Mariand, L. Paris, France. Surgical, physiological, etc., instruments.
Mathieu, L. Paris, 113 Boulevard St. Germain. Surgical outfit, vivisection, physiological instruments.
Mayfield, J. T. London, E. C., 41 Queen Victoria street. Electrical apparatus.
McIntosh Battery and Optical Company. Chicago, Ill.
Metropolitan Electric Company. Chicago, Ill.
Meyer, J. F. Zuerich, Switzerland. Physiological instruments.
Meyrowitz Bros. New York, 295 Fourth avenue. Optical instruments.
Moore & Moore. London, E. C., 105 Bishopsgate street. Organs, etc.
Muencke, Rob. Berlin, N. W., 58 Luisenstrasse. Physical and chemical apparatus.
Nalder Bros. & Co. London, England. Electrical testing, mathematical, and optical instruments.
Narragansett Machine Company. Providence, R. I. Scientific and gymnastic apparatus.
Patrick, Carter. Philadelphia, Pa., 125 South Second street. Electrical apparatus.
Petzold, Wilh. Leipzig, 13 Bayrischestrasse. Physiological instruments (after von Kries).
Peyer, Favarger & Co. (successor to Hipp). Neufchatel, Switzerland. Chronoscopes, etc.
Pfeifer, Adam. Baltimore, Johns Hopkins University. Psychological instruments (after G. Stanley Hall).
Prang Educational Company. Boston, 7 Park street. Colored paper.
Queen, James W., & Co. Philadelphia, Pa., 1010 Chestnut street. Optical and acoustic instruments, anatomical models, etc.
Reiniger, Gerbert & Schall. Erlangen, Bayern, Germany, 3 Schlossplatz. Electrical apparatus.
Richard Kny & Co. New York, 17 Park Place. Anatomical models, imported.
Rose, J. L. Upsala. Physiological instruments (after Holmgren).
Rothe, Rud. Wenzelsbad, Austria. Kymographs and optical instruments (after Hering).
Runne, Fr. Basel, Switzerland, 41 Steinenthorstrasse. Chronometers.
Schmidt, Franz, & Haensch. Berlin, S., 4 Stallschreiberstrasse. Optical instruments.
Schmidt. Giessen, Germany.
Siemens & Halske Electric Company. Chicago, Ill. Electrical apparatus.
Stöhrer & Sohn. Leipzig, Germany. Electrical apparatus.
Swinburne & Co. Teddington, England. Electrical apparatus.
Talrich, Jules. Paris, 97 Boulevard St. Germain. Anatomical models.

Tiemann & Co., George. 107 Park Row, New York. Anthropometric instruments.

Vasseur, Tramond. Maison Paris, 9 Rue de l'École de Médecine. Anatomical models.

Verdin, Charles. Paris, 7 Rue Linné. Physiological instruments (after Marey, etc.).

Waite & Bartlett Manufacturing Company. New York. Electro-medical instruments.

Warkentin, G., and Weber, R. Mathematical instruments.

Weisker, Rud. Leipzig. Anatomical models (after Leuckart, His, etc.).

Weston Electrical Instrument Company. Newark, N. J.

Whitall, Tatum & Co. Philadelphia, Pa., 410 Race street. Glassware.

White. Glasgow, 78 Union street. Electrical apparatus.

Windler, H. 3 Dorotheen street, Berlin. Physiological and surgical instruments.

Zeiss. Jena, Germany. Microscopes.

Zentmayer, Jos. Philadelphia, Pa., 209 South Eleventh street. Optical instruments.

Zeigler, Adolph. Freiburg i. B., Germany, Hermannstrasse. Anatomical models (after Ecker, Wiedersheim, Manz).

Zimmermann, L. Heidelberg, Hauptstrasse. Optical and electrical instruments (after Helmholtz, etc.).

CHAPTER XXV.

CHILD STUDY IN THE UNITED STATES.[1]

Child study has a special advantage from the standpoint of utility as well as from that of science; it not only requires rigid investigation, but whatever defect or abnormality may be found in a child is much more easily eliminated or modified than in the case of the adult.

It is often difficult to trace the origin of any movement. Although the initiatory impulse to child study was from the Continent of Europe, yet more perhaps has been done in America in the study of children than in all the rest of the world. It is therefore true that child study owes its development to our own country. Many movements are inaugurated which afterwards languish, either on account of prematureness or from want of insight into their relation to the environment at the time; those who develop and make them useful to civilization receive from society the credit.

There were few scientific observations of child life in America previous to 1880. At about this time Dr. G. Stanley Hall began investigations on this line, and continued his inquiries up to the present time. It is due to him that child study in this country has developed and become of general interest.

In the case of teachers, Dr. Hall's purpose has been gradually to concentrate all psychology, philosophy, and ethics about child study. This is in accordance with the tendencies of evolution in all fields of investigation, and its purpose is to aid in placing educational methods on a more scientific basis. In the words of Dr. Hall himself, the child-study movement is slowly doing a work "for studies of the mind not unlike that which Darwin did for the methods of nature study, or that embryology has done for anatomy, viz, cross sectioning the old methods of analysis and classification of the powers and activities of the adult consciousness by bringing in a genetic method, based not upon abstraction, like Spencer's, but on a copious collection of carefully made and critically sifted objective data."

No endeavor is here made to mention the large number of those who, under the inspiration of Dr. Hall, have contributed to this movement.

We have endeavored to give some of the results of the investigations in brief, others as illustrations of work and method and others in detail, and often in the words of the report. We have selected rather

[1] By Arthur MacDonald, specialist in the Bureau.

those reports which gave data or tables of facts upon which the conclusions were based. It would be premature to judge or make conclusions as to the value of many investigations in the domain of child study, for the subject is in its initiatory stages. It would be a wise person who could tell in advance, in new lines of work, what may be valuable and what may not.

In giving the results of the reports we have followed the chronological order.

CONTENTS OF CHILDREN'S MINDS ON ENTERING SCHOOL.

Under the direction of Dr. G. Stanley Hall,[1] four experienced kindergarten teachers questioned three children at a time in the dressing room of the school. No constraint was used, and, as several hours were needed to finish each set, changes and rests were often required. About sixty teachers besides the four kindergarten teachers made returns from three or more children each.

The tables which follow show the general results for a number of those questions admitting of categorical answers, only negative results being recorded. Subsequently, J. M. Greenwood, school superintendent of Kansas City, Mo., tested 678 children of the lowest primary class, 47 of whom were colored children. The percentages are printed in the last two columns of the tables.

The first (Boston) table is based upon about equal numbers of boys and girls. Children of Irish and American parents greatly predominate. Fourteen per cent of all examined did not know their ages; 6 per cent were four years old, 37 per cent were five, 25 per cent were six, 12 per cent were seven, and 2 per cent were eight years old.

In the second table only columns 2 and 3 are based upon larger numbers. In 34 representative questions out of 49 the boys surpass the girls. The girls excel in answering questions relating to the parts of the body, to home and family life, thunder, rainbow; in knowledge of the square, circle, and triangle, but not in that of the cube, sphere, and pyramid.

Boys seem to be more ignorant than girls of common things right about them, where knowledge is wont to be assumed.

Column 6 shows the advantage of kindergarten children over all others in respect to this kind of knowledge.

From the tables it may be inferred—

I. That there is very little of pedagogic value the knowledge of which it is safe to assume at the beginning of school life.

II. The best preparation parents can give their children for good school training is to make them acquainted with natural objects, especially with sights and sounds of the country, and send them to hygienic rather than to fashionable kindergartens.

III. Any teacher on starting with a new class in a new place should explore the children's minds carefully, to make sure that his efforts are not wholly lost.

IV. The most common concepts are the earliest to be acquired. The natural order in teaching would be, for example, apples first and wheat last. (See first table.)

For 86 per cent of the questions the average intelligence of 36 country children ranks higher than that of the city children. As methods of teaching grow natural, city life seems unnatural. The city child knows a little of many more things, and so is liable to superficiality and has a wider field of error, yet the city child knows more of human nature.

About three-fourths of all the children questioned thought the world a plane, and many described it as round like a dollar.

Wrong things were specified much more readily and by more children than right things, and also in much greater variety. Boys say it is wrong to steal, fight, kick, break windows, get drunk, etc., while girls are more liable to say it is wrong not to comb the hair, to get butter on the dress, climb trees, unfold the hands, etc.

[1] Ped. Seminary, v. 1, 1891, p. 139.

TABLE 1.

Name of the object of conception.	Per cent of children ignorant of it. *a*		
	In Boston.	In Kansas City.	
		White.	Colored.
Beehive	80	59.4	66
Crow	77	47.3	59
Bluebird	72.5		
Ant	65.5	21.5	19.1
Squirrel	63	15	4.2
Snail	62		
Robin	60.5	30.6	10.6
Sparrow	57.5		
Sheep	54	3.5	
Bee	52	7.27	4.2
Frog	50	2.7	
Pig	47.5	1.7	
Chicken	33.5	.5	
Worm	22	.5	
Butterfly	20.5	.5	
Hen	19	.1	
Cow	18.5	5.2	
Growing wheat	92.5	23.4	66
Elm tree	91.5	52.4	89.8
Poplar tree	89		
Willow	89		
Growing oats	87.5		
Oak tree	87	62.2	58.6
Pine	87	65.6	87.2
Maple	83	31.2	80.8
Growing moss	81.5	30.7	42.5
Growing strawberries	78.5	26.5	1.1
Growing clover	74		
Growing beans	71.5		
Growing blueberries	67.5		
Growing blackberries	66		
Growing corn	65.5		
Chestnut tree	64		
Planted a seed	63		
Peaches on a tree	61		
Growing potatoes	61		
Growing buttercups	55.5		
Growing rose	54		
Growing grapes	53		
Growing dandelion	52		
Growing cherries	46		
Growing pears	32		
Growing apples	21		
Where are the child's ribs	90.5	13.6	6.4
Where are the child's lungs	81	26	44.6
Where is the child's heart	80	18.5	18.1
Where is the child's wrist	70.5	3	
Where are ankles	65.5	14.1	
Where is waist	52.5	14	4.2
Where are hips	45	14	4.2
Where are knuckles	36	2.9	8.5
Where are elbows	25	1.5	
Knows right and left hand	21.5	1	10.2
Knows cheek	18	.5	
Knows forehead	15	.5	
Knows throat	13.5	1.1	
Knows knee	7	1.6	
Knows stomach	6	27.2	45.9
Dew	78	39.1	70.2
What season it is	75.5	31.8	56.1
Seen hail	73	13.6	18.1
Seen rainbow	65	10.3	2.1
Seen sunrise	56.5	16.6	
Seen sunset	53.5	19.5	
Seen clouds	35	7.3	
Seen stars	14	3	
Seen moon	7	26	53
Conception of an island	87.5		
Conception of a beach	55.5		
Conception of woods	53.5		
Conception of river	48		
Conception of pond	40		
Conception of hill	28		
Conception of brook	15		

a The Boston children were mainly from 4 to 8 years of age; in Kansas City they were of the lowest primary class.

TABLE 1—Continued.

Name of the object of conception.	Per cent of children ignorant of it.		
	In Boston.	In Kansas City.	
		White.	Colored.
Conception of triangle	92		
Conception of square	56		
Conception of circle	35		
The number five	28.5		
The number four	17		
The number three	8		
Seen watchmaker at work	68	30.1	49.7
Seen file	65	20.8	36.1
Seen plow	64.5	13.9	8.5
Seen spade	62	7.3	15
Seen hoe	61	5	10.6
Seen bricklayer at work	44.5	10.1	2.1
Seen shoemaker at work	25	8.7	
Seen ax	12		
Knows green by name	15		
Knows blue by name	14		
Knows yellow by name	13.5		
Knows red by name	9		
That leathern things come from animals	93.4	50.8	72.3
Maxim or proverb	91.5		
Origin of cotton things	90	35.7	15
What flour is made of	89	34.7	57.4
Ability to knit	88		
What bricks are made of	81.1	33.1	53
Shape of the world	70.3	46	47
Origin of woolen things	69	55	44
Never attended kindergarten	67.5		
Never been in bathing	64.5	13.4	
Can tell no rudiment of a story	58	23.6	12.7
Not know wooden things are from trees	55	19.3	6.4
Origin of butter	50.5	6.7	
Origin of meat (from animals)	48	8.3	12.7
Can not sew	47.5	23.4	
Can not strike a given musical tone	40		
Can not beat time regularly	39		
Have never saved cents at home	36	8.2	12.7
Have never been in the country	35.5	13.1	19
Can repeat no verse	28	20	42.5
Source of milk	20.5	4	

TABLE 2.—(*Boston children*).

Name of the object of conception.	Per cent of ignorance in 150 girls.	Per cent of ignorance in 150 boys.	Per cent of ignorance in 50 Irish children.	Per cent of ignorance in 50 American children.	Per cent of ignorance in 64 kindergarten children.
Beehive	81	75	86	70	61
Ant	59	60	74	38	26
Squirrel	69	50	66	42	43
Snail	69	73	92	72	62
Robin	69	44	64	36	29
Sheep	67	47	62	40	40
Bee	46	32	52	32	26
Frog	53	38	54	35	35
Pig	45	27	38	26	22
Chicken	35	21	32	16	22
Worm	21	17	26	16	9
Butterfly	14	16	26	8	9
Hen	15	14	18	2	14
Cow	18	12	20	6	10
Growing clover	59	68	84	42	29
Growing corn	58	50	60	68	32
Growing potatoes	55	54	62	44	34
Growing buttercup	50	51	66	40	31
Growing rose	48	48	60	42	33
Growing dandelion	44	42	62	34	31
Growing apples	16	16	18	12	5
Ribs	88	92	98	82	68
Ankles	58	52	62	40	38

TABLE 2.—(*Boston children*)—Continued.

Name of the object of conception.	Per cent of ignorance in 150 girls.	Per cent of ignorance in 150 boys.	Per cent of ignorance in 50 Irish children.	Per cent of ignorance in 50 American children.	Per cent of ignorance in 64 kindergarten children.
Waist	53	52	64	32	36
Hips	50	47	72	31	24
Knuckles	27	27	34	12	23
Elbow	19	32	36	16	12
Right from left hand	20	8	14	20	4
Wrist	21	34	44	9	19
Cheek	10	12	14	14	4
Forehead	10	11	12	10	7
Throat	10	18	14	16	14
Knee	4	5	2	10	2
Dew	64	63	92	52	57
What season it is	59	50	68	48	41
Hail	75	61	84	52	53
Rainbow	59	61	70	38	38
Sunrise	71	53	70	36	53
Sunset	47	49	52	32	29
Star	15	10	12	4	7
Island	74	78	84	64	55
Beach	82	49	60	34	32
Woods	46	36	46	32	27
River	38	44	62	12	13
Pond	31	34	42	24	28
Hill	23	22	30	12	19
The number 5	26	16	22	24	12
The number 4	15	10	13	14	7
The number 3	7	6	12	8	0

CHILDREN'S DRAWINGS.

Professor Barnes, of Leland Stanford Junior University, believes that through a child's drawings[1] we can learn something of the way the child thinks and feels.

In order that the drawings should have some common element for comparison, a little poem was selected from Der Struwel-Peter, and was called "Hans Guck-in-die-Luft." The following is the English translation:

STORY OF JOHNNY LOOK-IN-THE-AIR.

As he trudged along to school,
It was always Johnny's rule
To be looking at the sky
And the clouds that floated by;
But what just before him lay,
In his way,
Johnny never thought about;
So that everyone cried out,
"Look at little Johnny there,
Little Johnny Look-in-the-Air."

Running just in Johnny's way,
Came a little dog one day;
Johnny's eyes were still astray
Up on high, in the sky,
And he never heard them cry,
"Johnny, mind, the dog is nigh!"
What happens now?
Bump!
Dump!
Down they fell, with such a thump
Dog and Johnny in a lump!
They almost broke their bones,
So hard they tumbled on the stones.

[1] Ped. Seminary, December, 1893.

Once with head as high as ever,
Johnny walked beside the river;
Johnny watched the swallows trying
Which was cleverest at flying.
Oh! What fun!
Johnny watched the bright, round sun
Going in and coming out;
This was all he thought about.
So he strode on, only think!
To the river's very brink,
Where the bank was high and steep,
And the water very deep;
And the fishes in a row
Stared to see him coming so.

One step more! Oh, sad to tell!
Headlong in poor Johnny fell.
The three little fishes in dismay
Wagg'd their heads and swam away
There lay Johnny on his face,
With his nice red writing case;
But, as they were passing by,
Two strong men had heard him cry;
And with sticks these two strong men
Hook'd poor Johnny out again.
Oh! You should have seen him shiver
When they pulled him from the river.
He was in a sorry plight,
Dripping wet, and such a fright!
Wet all over, everywhere,
Clothes and arms and face and hair;
Johnny never will forget
What it is to be so wet.
And the fishes, one, two, three,
Are coming back again, you see;
Up they came the moment after,
To enjoy the fun and laughter.
Each popped out his little head,
And to tease poor Johnny, said,
"Silly little Johnny, look,
You have lost your writing book!"
Look at them laughing, and do you see
His writing book drifting far to sea?

The children were given paper and pencils, and after writing their names and ages, the teacher read this poem to them. Then they were told to draw one or more pictures from the story, and it was read to them once more. There was no conversation and no other directions were given. The drawing occupied from fifteen minutes to an hour. Results were sent in from 6,393 children. Different ages from 6 to 16 were about equally represented. As many papers came from the city as from the country. Distinct pictures were drawn to the number of 15,218.

Three important scenes stood out above all the rest. They were: Approaching the dog, approaching the river, and the rescue scene. The most frequent picture drawn was Johnny meeting the dog.

Table 3 illustrates these points:

TABLE 3.—*Showing how many children out of 1,000 of each age drew the different scenes.*

Scene and sex.	6 years.	7 years.	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	14 years.	15 years.	16 years.	Over 16 years.
Going to school:												
Boys	84	118	92	82	172	110	165	165	154	116	172	145
Girls	152	174	156	218	172	174	170	208	185	196	109	132
Meeting dog:												
Boys	344	360	588	565	585	645	674	669	731	637	702	623
Girls	384	514	425	607	497	577	588	325	672	699	588	558
Falling over dog:												
Boys	104	154	172	170	230	345	364	406	417	489	496	391
Girls	79	100	134	232	176	244	268	312	329	413	414	367
Approaching river:												
Boys	214	242	262	272	315	326	350	372	451	394	453	580
Girls	128	177	211	355	262	374	381	410	469	524	414	338
Falling into river:												
Boys	97	39	92	137	125	145	204	218	150	175	248	188
Girls	24	55	54	109	130	156	141	189	143	201	87	147
Floating in river:												
Boys	227	220	224	190	215	229	263	187	301	255	270	130
Girls	176	244	179	294	147	197	163	221	269	280	381	235
Being rescued:												
Boys	344	352	422	390	432	491	534	506	520	518	496	406
Girls	225	366	304	383	302	330	388	400	363	413	392	338
Dripping on bank:												
Boys	45	66	115	200	177	189	274	294	275	328	313	145
Girls	134	144	92	196	134	169	194	267	182	270	338	323
Going home:												
Boys	7	4	6	10	25	10	14	5	8	7	21	14
Girls	6	18	6	8	8	36	9	13	3	5	9	12
Added scenes:												
Boys	143	83	44	60	57	56	36	11	8	7	43	87
Girls	164	111	150	42	96	78	48	20	31	42	21	64

The following conclusions, according to Professor Barnes, would seem to be borne out by the study on these pictures:

1. Drawing is for the young child a language, a means of expressing ideas.
2. Children naturally adopt symbols and conventional forms to express what they want to say.
3. The courage to express ideas through drawing increases in California children until they are 13 or 14 years old and then steadily decreases.
4. The child thinks in small units; his intellectual processes are fragmentary and broken.
5. Children like to draw large, distinct figures, expressed with few lines.
6. Children draw full faces until they are 9 years old, and after that profiles.
7. In drawing figures children are most interested in the head; hence they draw single figures facing their left.
8. A child uses color naturally for decorative effect; for the drawings he prefers strong black or white.
9. Children select the dramatic points in a story well, and their pictures are naturally full of movement.
10. In a story a child is most attracted by the scene just preceding the catastrophe.
11. The humane instinct in children is far stronger than the destructive instinct.
12. There is very little difference between the drawings made by the boys and those made by the girls.

THE HEARING OF CHILDREN.

In Table 4 Oscar Chrisman,[1] of Clark University, shows the results of various investigations as to the hearing of school children. In Von Gossler's line, 8, in this table, under "defective hearing," the 2.18 per cent refers to the higher schools

[1] Ped. Seminary, December, 1893.

and the 1.8 per cent to the lower schools. Zhermunski gives results for both whispering obtained in the ordinary way and results from the use of Politzer's acoumeter. W. stands for whispering and P. for Politzer's acoumeter. It is difficult to tell how to classify defective hearing. Schmiegelow makes three classes; he gives (I) for those hearing the ticking of a watch at a distance less than 2 meters, and (II) for those hearing between 2 and 4 meters. The parentheses around the watch distances indicate that though the watch was used the results were given in whispering.

The normal reach of hearing is the distance at which all children are counted as having defective hearing.

TABLE 4.

No.	Name.	Place.	Date.	Number of pupils examined.	Normal reach of hearing. Whisper.	Politzer's acoumeter.	Watch.	Defective hearing. Number.	Percent.
					Meters.	*Meters.*	*Meters.*		
1	Reichard	Riga	1878	1,055			*a* 20 (?)	285	22.275
2	Sexton	New York	1881	570	*b* 12			76	13.33
3	Weil	Stuttgart	1882	5,905	15			1,855	31.22
4	Worrell	Terre Haute	1883	491	*b* 15			125	25.49
5	Gellé	Paris	1883	1,400	8		1.25		20 to 25
6	Moure	Bordeaux	1884	3,588	15			616	17.15
7	Bezold	Munich	1885	1,918	8			495	25.8
8	Von Gossler	Prussia	1885						2.18 1.80
9	Lunin	St. Petersburg	1888	281	16			55	19.5
10	Zhermunski	do	1888	W. 1,897 P. 1,680	16	12		W. 317 P. 222	W. 16.7 P. 13.17
11	Barr	Glasgow	1889	600				166	27.66
12	Schmiegelow	Copenhagen	1889	581	4		*c* 150	I. 35 II. 261 } 296	I. 6.02 II. 44.9 } 50.9

a Inches. *b* Feet. *c* Centimeters.

BIBLIOGRAPHY.[1]

A. Special.

I. *The hearing of young children.*

1. A biographical sketch of an infant. Chas. Darwin. Mind, 1877, Vol. II, p. 285.
2. The first three years of childhood. Bernard Perez. Translation of Alice M. Christie. Syracuse, 1889.
3. The mind of the child. W. Preyer. Translation of H. W. Brown. N. Y., 1888.

II. *The hearing of school children.*

1. Causes of deafness among school children and its influence on education. Samuel Sexton. Circular No. 5. Bureau of Education. Washington, 1881.

   Deafness among school children. J. P. Worrell. Trans. Ind. State Med. Soc., 1883.
2. Defective hearing in school children. The British Medical Journal, 1889, Part I, p. 94; Part II, p. 734. Review of the work of Dr. Thomas Barr.
3. Relevé statistique sur l'audition des écoliers de la ville de Bordeaux. E. J. Moure. Rev. san. de Bordeaux, 1883–84. No. 1, p. 43.

   Sur l'audition à l'école. M. le Dr. Gellé. Rev. d'Hyg., 1885, vol. 7, p. 654.
4. Results of an examination of the ears and hearing of 5,905 school children. E. Weil. Translated by Wm. C. Ayers. Arch. of Otol., 1882, Vol. XI, p. 33.

   Examinations of the auditory organs of school children. Friedrich Bezold. Translated by Isidor Furst. Arch. of Otol., 1885, Vol. XIV, p. 158.

   Circular-Verfügung von 12 Nov., 1885. Von Gossler. Wiese's Sammlung der Verordnungen und Gesetze für die höheren Schulen in Preussen. Erste Abteilung, p. 264. Berlin, 1886.

[1] Ped. Seminary, December, 1893. The literature is given here after the article, instead of in the bibliography at the end, in order to preserve the classification here made.

II. *The hearing of school children*—Continued.

5. Über die Bedeutung eines guten Gehöres für die Schulbildung. W. von Reichard. St. Petersburger Medecinische Wochenschrift. 1878, Vol. III, p. 241.

Results of an investigation of the hearing organs of female students. N. I. Lunin. Vrach, 1888, Vol. IX, pp. 806, 835, and 850.

Investigations of the hearing of children of school age in the St. Petersburg city schools. M. S. Zhermunski. Vrach, 1888, Vol. IX, pp. 741 and 767.

6. Zur Frage der Häufigkeit von Ohrenkrankheiten unter den Schulkindern in Dänemark. E. Schmiegelow. Zeit. für Schulgesund., 1889, p. 443.

III. *Sound blindness.*

J. C. Tarver. London Journal of Education, 1887, n. s. Vol. IX, p. 475.

Sarah E. Wiltse. American Journal of Psychology, 1887–88, Vol. I, p. 702.

IV. *Teaching deaf children to hear.*

Lillie Eginton Warren. New York Medical Record, October 22, 1892, p. 473.

B. General.

On the best mode of testing the hearing of school children, and of providing for the instruction of partially deaf children. Clarence J. Blake. Trans. Int. Med. Cong. Philadelphia, 1876.

School hygiene and schoolhouses. A. G. Young. Seventh Annual Report of State Board of Health of Maine, 1891, p. 128.

Deafness and care of the ears. A. M. Fanning. Pop. Sci. Month., December, 1892, p. 211.

On the necessity of providing for the better education of children with defective hearing in the public schools. Samuel Sexton. Educational exhibits and conventions at the New Orleans Exposition. Part II, p. 291. U. S. Bureau of Education, 1886.

Die Hygiene der Sinne. Paul Mantegazza, Königsberg.

Defective hearing in school children. Note in Pop. Sci. Month., 1883–84, Vol. XXIV, p. 280.

The scientific observation and study of children in schools and in classes into which they may be grouped. Francis Warner. Med. Press and Circ., 1891. Vol. 52, p. 277.

The classification of deaf pupils with a view to improve the facilities for their education. Samuel Sexton. Educational exhibits and conventions at the New Orleans Exposition. Part II, p. 285. U. S. Bureau of Education, 1886.

Die Gesundheitspflege in der Mittelschule. Leo Burgerstein. p. 24. Wien, 1887.

Handbuch der Hygiene. J. Uffelmann. p. 714. Wien und Leipzig, 1890.

Schulgesundheitslehre. Eulenburg und Bach. Berlin, 1891.

C. Two important journals.

I. Zeitschrift für Schulgesundheitspflege.

1888, page 105.—Der Gehörsinn in seinen Beziehungen zur Schule. C. Keller.

1888, page 287.—Die Ärztliche Inspektion der Schulen. Ihre Organisation, ihre Resultate. Victor Desquin.

1889, page 105.—Zhermunski.—Untersuchungen des Gehörs der Kinder schulpflichtigen Alters in den Petersburger Stadtschulen. Review.

1889, page 146.—Mangelhafter Gehörsinn bei Schulkindern in Glasgow. Review of Barr's work.

1889, page 663.—Die Vornahme von Hörprüfungen bei Schulkindern. Review.

1890, page 113.—Gehöruntersuchungen bei Schulkindern in Glasgow. Review of Barr's work.

1890, page 125.—Dr. N. Lunin.—Resultate der Untersuchung des Gehörorgans von Schülerinnen. Review.

II. *Archives of Otology.*[1]

1882, page 172.—Preliminary communications of the results of the examination of the ears of 4,500 school children. E. Weil. Review.

1883, page 344.—Deafness among school children. J. P. Worsell (Worrell). Review.

---

[1] The Archives of Otology and Zeitschrift für Ohrenheilkunde are the same, being published simultaneously in America and Germany. The articles of each are translated for the other. The publication has been as follows:

Archives of Ophthalmology and Otology, 1–7, 1869–78.
Separated into—
Archives of Ophthalmology, vol. 1, 1879.
Archives of Otology, vol. 1, 1879.

Archiv für Augenheilkunde und Ohrenheilkunde, 1–7, 1869–78.
Separated into—
Archiv für Augenheilkunde, vol. 1, 1879.
Zeitschrift für Ohrenheilkunde, vol. 1, 1879.

II. *Archives of Otology*—Continued.
1884, page 200.—Deafness among school children. F. P. Norrell (Worrell). Review.
1887, page 257.—The care of the ears by the school authorities. Dr. C. Keller. Review.
1887, page 257.—Hearing of school children. Dr. E. Schmiegelow. Review.
1890, page 191.—Investigations as to the hearing of school children. Thos. Barr. Review.

Children's Rights as Seen by Themselves.

In order to obtain without prejudice the ideas of children as to their own rights, Margaret E. Schallenberger,[1] of Leland Stanford Junior University, sent out a syllabus to some hundreds of teachers in California. The teachers wrote stories upon the blackboard and the children answered any questions involved, finished incomplete stories, etc. They wrote their opinions as language exercises, having no idea of the use to be made of them. Three thousand papers were sent in. The following is the story:

"Jennie had a beautiful new box of paints; and in the afternoon, while her mother was gone, she painted all the chairs in the parlor, so as to make them look nice for her mother. When her mother came home, Jennie ran to meet her, and said, 'Oh, Mamma, come and see how pretty I have made the parlor;' but her mamma took her paints away and sent her to bed. If you had been her mother, what would you have done or said to Jennie?"

The results from the answers (given below the double rule in the table) were reduced to the number per 1,000 for the whole number examined in each case.

Table 5.

[Raised to standard of 1,000.]

	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.
Age	6 years.		7 years.		8 years.		9 years.		10 years.		11 years.	
Whole number examined	43	32	61	56	112	117	172	151	221	199	515	167
Ignorant	23	0	49	0	74	77	110	52	142	90	161	76
Explained	0	0	0	18	16	17	23	40	77	65	129	53
Don't do it again	23	91	82	89	49	34	41	59	65	70	81	41
Made to promise	0	0	0	18	8	0	6	7	9	0	37	0
Threatened	0	0	0	0	25	17	0	20	26	35	37	35
Scolded	46	45	115	53	100	119	226	73	168	75	161	148
Clean chairs	23	45	16	125	41	68	29	46	95	115	110	112
Confined	93	0	98	107	180	94	139	79	108	75	115	89
Lose meal	70	0	82	71	90	94	128	145	129	140	97	118
Lose paints	232	136	147	125	189	238	203	251	194	290	313	307
Sent to bed	488	273	391	427	418	383	377	429	400	455	340	372
Whipped	512	590	452	409	385	451	452	541	323	480	285	478
Punished	0	0	16	18	41	17	23	33	9	20	46	18
Peculiar punishments	23	91	49	53	16	34	35	40	9	20	64	30

[1] Ped. Seminary, October, 1894.

TABLE 5—Continued.

	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.
Age	12 years.		13 years.		14 years.		15 years.		16 years.	
Whole number examined	204	180	210	160	178	167	154	109	153	135
Ignorant	230	92	287	161	240	236	384	270	358	393
Explained	142	39	263	118	286	153	403	270	494	326
Don't do it again	103	28	75	50	84	130	64	81	78	96
Made to promise	15	0	28	0	17	24	26	9	26	30
Threatened	25	14	42	50	22	65	58	27	46	67
Scolded	152	60	85	143	106	146	122	90	111	59
Clean chairs	137	70	108	167	134	130	109	153	130	96
Confined	98	46	94	56	90	47	64	27	46	7
Lose meal	103	49	71	124	62	71	45	108	33	30
Lose paints	358	238	376	403	246	266	282	261	247	165
Sent to bed	338	210	249	347	263	189	154	207	267	148
Whipped	279	214	235	372	129	242	70	135	52	133
Punished	25	11	5	19	6	12	19	45	33	15
Peculiar punishments	44	46	61	62	68	53	38	72	33	30

Some of the most striking results are the reasons given for punishing Jennie; one is for the sake of revenge, another is to prevent a repetition of the act, and a third is for the purpose of reforming Jennie.

Of 2,000 children six years of age some would explain to Jennie why it was wrong to paint the parlor chairs. The young children think of the results of an action; if it is bad, punishment should follow. But the older children consider the motive that led to the action. The boys show much less mercy than the girls. Out of 1,000 girls six years of age 512 would whip Jennie; out of the same number of boys, 590 would whip her. At sixteen 52 girls and 133 boys would whip her.

Threats and forced promises made very little impression. At six years of age out of 2,000 none would threaten; at twelve years, 39; at fifteen years, 85. Threats probably appeal to children so little on account of their indefiniteness as to time.

MOTOR ABILITY.

The following preliminary study of motor ability was made by J. A. Hancock,[1] of Clark University. The purpose of this study was to find (1) what movements children can make best; (2) to learn something more definite of the relative ability of children and adults, and of the relation between development and decline of motor ability, and (3) to find simple tests for incipient nervous diseases.

In order to carry this study out, the following series of suggestions and questions were used as tests. Two or three pupils were taken at a time.

FIRST SERIES.

1. Ask the child to stand with feet close together and hands at sides. Is there any swaying of the body? Try same with eyes closed. What difference?
2. Have him walk across the room backward with eyes closed. (Keep near him to prevent falling.) Is there any dragging of either foot, walking with feet wide apart, or turning to right or left?
3. Have him try to sit still a half minute exactly. Note all the movements he makes in the effort. Does he hold his breath?
4. Ask him to close his eyes and hold his hands out horizontally with the fingers spread. Is there tremor or twitching of the fingers? Which ones and in what directions? Is it slight or distinct?

[1] Ped. Seminary, October, 1894.

5. Hold your hands above your head out of sight and with palms front. Ask him to do the same. Does he raise them to the same height? Hold them symmetrically? Are the fingers or thumbs spread apart on either hand? Which? Which hand sinks first on a half minute's trial? Hold up your own hands but a moment.

6. Place him 10 feet away. Toss back and forth ten times a ball as large as a tennis ball. How and where does he throw it? How many times does he catch it?

7. Ask the boys to lie down on their backs, if they are willing. How do they get up? Have they difficulty?

8. Ask for the pronunciation of these letters and words and note errors: r, l, s, t, k, d, f, n, v, y, go, which, thin, the, long, show.

9. What signs of mental fatigue have you noticed in him in school work? Has he made any involuntary movements during these tests?

10. Please add any comments or suggestions that may occur to you.

SECOND SERIES.

1. Does the child dress himself? Button his clothing, and fasten hooks and eyes?
2. Can he tie the ends of a string together? In what kind of a knot?
3. Can he thread a needle? How small a one! In which hand does he hold it?
4. Can he interlace slats? Interlace four and six before him. See patterns 1 and 2. Does he even copy the pattern?
5. Can he wind thread on a spool? How does he do it?
6. Can he spin a top made of half a spool or of a button mold? Can he snap a marble?
7. Can he hop on each foot? Stand on tiptoes or heels? Touch his knees or shoes while standing?
8. Place before him pattern number three; give him squares of paper or square blocks; ask him to imitate it. Then show him number four. Does he shift the outer blocks of number three to make the other figure, or does he build anew from the beginning? The patterns may be shown him drawn full size on paper or made of the blocks. If he fails, divide each pattern vertically in the middle; try him and note results.
9. Count and beat time, double, treble, and quadruple. Can he do it? Rapidly?
10. Does he swing his arms or sway his body when walking? Can he march, keeping step as you count time or play for him? Can he run and keep time? Does he, when marching, move the head, eyes, mouth, or tongue?
11. Pat the top of your head and at the same time move the other hand in a circle on the breast. Can he imitate you?
12. Rest your forearms on the table, the hands in an easy position, with the fingers curved and the lower parts of the palms and the tips of the fingers touching the surface of the table. Begin tapping, letting the movements proceed rapidly from the little fingers to the thumbs. Ask him to imitate you. Notice the movements he actually makes. Are they with the hand and arm moving together from the elbow; the whole hand moving from the wrists; all of the fingers moving in unison from the knuckles; or with index fingers alternating with the other three? Reverse the tapping, beginning with the thumbs. Can he imitate you any better? Just what does he do?
13. Can he drive a nail, or hit it squarely after several trials when started for him?
14. Can he roll a hoop? Skate? Turn a somersault, or walk on his hands? (The boy, of course).
15. What movement seems to you the most difficult for children to learn?

The ages of the children tested were five, six, and seven; all were in the first year of school work. An apparatus known as an ataxeograph was employed to study the ability of children to keep quiet.

As the position of the body requires a coordination of a large number of the largest muscles, a test would show something of the control of these muscles. The child stood with feet close together and hands at sides. The child was asked to keep his attention on a distant object, and try to stand still for a minute. The amount of movement was measured; then the child rested for half a minute, and the test was repeated with eyes closed, and the amount of movement or swaying measured. The amount of movement is much greater for children than for men. The rectangles that would just contain the tracings of the instrument in the anterior-posterior and lateral directions were measured and are given in the following tables:

TABLE 6.

Number of persons.	Age in years.	Swaying or movement. Eyes open. Anterior-posterior.	Eyes open. Lateral direction.	Eyes closed. Anterior-posterior.	Eyes closed. Lateral direction.
		Cm.	*Cm.*	*Cm.*	*Cm.*
35 boys	5	5.8000	5.2228	6.6810	5.7675
22 girls	5	5.7773	4.9500	5.5400	5.0954
47 boys	6	5.1148	4.2660	5.6957	5.1637
18 girls	6	5.0611	3.7277	5.6000	4.3333
23 boys	7	4.9608	4.2434	6.0086	5.4521
13 girls	7	3.9538	3.2769	4.8230	3.7615

In studying the movements, we see from Table 6 above that 110 were steadier with the eyes open than with them shut; 48 with eyes closed. As the child was shorter he would sway less than the man.

With eyes open, there was an increase of control in each year. The girls were steadier than the boys.

In order to study the steadiness of shoulder and finger, Jastrow's automatograph[1] was employed.

The averages for both men and children were as follows:

TABLE 7.

Number of persons.	Age in years.	Eyes open. Perpendicular movement.	Eyes open. Lateral movement.	Eyes closed. Perpendicular movement.	Eyes closed. Lateral movement.
		Cm.	*Cm.*	*Cm.*	*Cm.*
25 men	....	.242	.752	.156	1.460
18 boys	5	.816	3.400	1.027	4.916
15 girls	5	.833	3.940	.780	4.706
34 boys	6	1.191	4.258	.805	5.058
12 girls	6	.433	3.883	1.825	4.166
14 boys	7	.500	3.750	.428	5.207
10 girls	7	.410	3.580	.480	3.550

The seventh table shows the relative difference of control in child and man to be greater.

TABLE 8.

Number of persons.	Age in years.	Eyes open. Vertical movement.	Eyes open. Lateral movement.	Eyes closed. Vertical movement.	Eyes closed. Lateral movement.
		Cm.	*Cm.*	*Cm.*	*Cm.*
The men	....	0.0975	0.0911	0.085	0.110
17 boys	5	.985	.532	.794	.680
14 girls	5	.580	.337	.714	.453
32 boys	6	.396	.378	.689	.534
12 girls	6	.394	.319	.535	.395
13 boys	7	.419	.282	.593	.442
8 girls	7	.300	.356	.312	.365

Table 8 above gives the results in testing the control of the entire arm by the tremograph. This instrument multiplies the movement four times; the results are reduced accordingly, and show the same general relations as in the other table.

[1] See paragraph in section on "Instruments of precision," p. 1163.

If reckoning is made in terms of the nearest centimeter, the anterior-posterior swayings of men and children are as follows:

TABLE 9.

	0 centimeter.	1 centimeter.	2 centimeters.	3 centimeters.	4 centimeters.	5 centimeters.	6 centimeters.	7 centimeters.	8 centimeters.	9 centimeters.	10 centimeters.
150 men	1	20	37	48	25	11	9	6	2	1	0
Children ...	0	16	1	11	31	45	35	13	13	7	2

The following table will show the ranges in lateral control for the shoulder:

TABLE 10.

	0.1 centimeter.	0.2 centimeter.	0.3 centimeter.	0.4 centimeter.	0.5 centimeter.	0.6 centimeter.	0.7 centimeter.	0.8 centimeter.	0.9 centimeter.	1 centimeter.	1.5 centimeters.	2 centimeters.
25 men...........................	0	2	3	2	3	2	2	2	2	3	4	0
34 5-yearold boys	1	0	0	1	0	0	0	0	0	0	3	3

	2.5 centimeters.	3 centimeters.	3.5 centimeters.	4 centimeters.	5 centimeters.	5.5 centimeters.	7 centimeters.	7.5 centimeters.	8 centimeters.	8.5 centimeters.	9 centimeters.
25 men	0	0	0	0	0	0	0	0	0	0	0
34 5-year old boys	7	4	1	6	1	1	2	1	1	1	1

THE BOYHOOD OF GREAT MEN.

By a careful study of the early years of great men Mr. A. H. Yoder[1] thinks that a service might be done teachers by increasing the chances of recognizing ability in the schoolroom and in gaining some idea how to treat it. Such a study might be of more value than the study of defectives, because genius and talent can be helped easier than inferiority.

As there should be a careful study of the modes of training dullards, idiots, and defectives, so there should be knowledge as to teaching the best pupils and those of great talent.

The great men studied are modern; they were all born in the last or present centuries, except Newton, Swift, and Voltaire.

PHYSICAL CHARACTERISTICS OF PARENTS.

From a study of the following table Mr. Yoder finds the average age of the parents at the time of birth of the great-man child for thirty-nine fathers and twenty-five mothers is 37.78 years for the former and 29.8 years for the latter. The child born of parents in the prime of physical life probably has the better chance of greatness.

The beauty of the mothers is often spoken about. It would seem that there is an hereditary physical basis for talent at least, and perhaps for genius.

[1] Ped. Seminary, October, 1894.

Explanation of Table II.

The names are arranged according to the order of birth. The date of the first edition of the biography and the date when written in case of autobiography are given. Under "family data" are given, in column 1, first the time exact (Ex.) or approximate (Ap.) of the time between the birth of the great man and the previous child or marriage, and second, the average time between the birth of the children of the same family. Column 2 shows the number for which there are data, and upon which the second set of figures in column 1 is based. Column 3 shows first the number of living children, or those who are old enough to have any influence upon the great man, and second, the number born to the parents of the great man, but does not include half-brothers or half-sisters; these are indicated by X. Y. means "young;" O. S. means "only son;" Y. S. "youngest son." Column 4 shows the age of the father and of the mother at the time of birth of the great man. Under "Education," "Home" refers to education by father, mother, or some one of the family; "Private" to instruction by a private teacher at home or in the house of the instructor.

TABLE 11.

No.	Dates.	Name.	Occupation.	Authority.	Date.	Family data. 1	2	3	4	Education.
						Yrs. Mos.			Years.	
1	1642-1727	Newton	Scientist	Dan Brewster	1833			X. I-I.	36	Day school, academy, Cambridge.
2	1667-1745	Swift	Author	Autobiography John Forster	1727 1876	Ap. 1 0 Ap. 1 0	2	O. S. 2-2		Kilkenny School, University of Dublin.
3	1694-1778	Voltaire	Author	John Morley Jas. Parton	1872 1881	Ap. 5 0 Ex. 2 10	4	4-4	45-33	Home by abbés, Louis le Grand.
4	1703-1758	Edwards	Philosopher	Alex. V. G. Allen Jared Sparks	1889 1837	 Ex. 1 9.5	5	O. S. 5-11	34-31	Home, private, Yale.
5	1706-1790	Franklin	Statesman and scientist.	Autobiography	1771	Ex. 2 1 Ex. 2 2.4	10	Y. S. 8-10	48-38.5	Grammar school, 1 year; writing school, 1 year; self-educated.
6	1709-1784	Johnson	Author	Lieut.-Col. Grant Boswell	1887 1791	Ex. 3 3 Ex. 3 0	2	1-1 1-2	53-40	Private, two grammar schools, Oxford.
7	1732-1799	Washington	Statesman and general.	W. Irving Jared Sparks	1855 1855	Ex. 1 11 Ex. 1 6.5	6	X. 1-6	38-25	Country school, Mr. Williams's School, self-educated.
8	1736-1819	Watt	Inventor	Muirhead Arago	1859 1859			1-2 4-5	37-33	Self-educated, common schools.
9	1737-1794	Gibbon	Historian	Autobiography	1782	 Ex. 1 9.3	6	1-1 1-7	30-27	Private, Westminster, Oxford.
10	1743-1826	Jefferson	Statesman	Autobiography Jas. Parton	1820 1884	Ex. 1 6 Ex. 2 .5	8	O. S. 3-8 3-10	35-23	Day school, private, Mr. Maury's William and Mary.
11	1749-1803	Alfieri	Dramatist	Autobiography	1790			O. S. X. 2-2 2-3	60 Y.	Priests, academy.
12	1749-1832	Goethe	Poet	Düntzer Autobiography	 1811	Ex. 1 1 Ex. 1 9	5	1-2 1-6	39-19	Home, private, Leipsic, Strasbourg.
13	1757-1828	Blake, William	Poet and painter	Ellis and Yeats	1893			2-5		Home, drawing school, self-educated.
14	1757-1804	Hamilton, Alex.	Statesman	John C. Hamilton	1834			Y. S.		Private, grammar school, Columbia.
15	1759-1805	Schiller	Poet	Düntzer	1883	Ap. 2 0 Ex. 3 0.3	3	O. S. 2-6	36-27	Home, private, Duke's School, Stuttgart.
16	1763	Richter	Author	Autobiography	1818	0 10 Ex. 2 3	6	1-4 2-7	36	
17	1769-1852	Wellington, Duke.	General	G. A. Wright	1841			4-9		Private, Eton, Angers.
18	1769-1832	Cuvier	Naturalist	Memoirs by Mrs. Lee	1833	 Ap. 1 4	3	1-2 2-3	54-Y.	Home, elementary Latin, gymnasium, Académie Caroline, Stuttgart.
19	1769-1821	Napoleon	General	Arthur Lévy Henri Taine	1894	 Ex. 1 6.5	13	2-13	23½-19	College of Antem, Brienne, Paris Military School.

20	1771-1832	Scott	Novelist	Autobiography Lockhart	1808 1836	Ex. 2 8 Ex. 1 4.5	9	3-5 10-12	42	Home, Dame, grammar school, Edinburgh.
21	1771-1848	Stephenson	Engineer	Smiles	1858	Ex. 2 3 Ex. 2 6	6	2-6		Self-educated.
22	1782-1852	Webster	Statesman	Autobiography Geo. T. Curtis	1829 1870	Ex. 1 9 Ex. 1 10.2	4	Y. S. 4-5	43-42	Country school, Phillips Exeter, private preparatory, Darmouth.
23	1782-1852	Froebel	Teacher	Autobiography	1827			5-5		Girls' school, private, Jena.
24	1788-1824	Byron	Poet	Th. Moore	1868	Ap. 2 6 Ap. 2 6	1	1-1	37	Day school, private, grammar school.
25	1788-1856	Hamilton, Wm	Philosopher	Memoirs by John Veitch	1869	Ap. 1 10 Ex. 1 6	4	1-2 3-4	30	Home, grammar school, Edinburgh University, Oxford.
26	1792-1822	Shelley	Poet	Prof. Dowden H. S. Galt Wm. Sharp	1888 1887	Ex. 0 10 Ex. 2 0	7	O. S. 1-7	39.5	Private school, Academy, Eton, Oxford.
27	1793-1873	Macready	Actor	Autobiography				1-1 5-8		Elementary school, Rugby.
28	1795-1842	Arnold, Th	Teacher	Memoirs by Stanley	1845			Y. S. 7-		Home, Winchester, Oxford.
29	1795-1871	Dumas, Alex	Dramatist	Fitzgerald	1873			O. S. 2-2	40-Y.	Home, private, apprentice.
30	1803-1882	Emerson	Author and philosopher.	Cabot Holmes	1887 1885	1 9.8 Ex. 1 9.7	8	2-5 3-8	34-38½	Grammar school, Latin school, Harvard.
31	1806-1873	Mill	Philosopher	Autobiography	1873	Ex. 11		1-9	33-24	Home, by father.
32	1807-1882	Garibaldi	General	do	1859	F. sailor. Ap. 3 0 Ex. 6 8	2	2-4 2-5	41-31	Private, self-educated.
33	1807-1882	Longfellow	Poet	Samuel Longfellow F. H. Underwood	1886 1882			2-8	31-29	Public school, private academy, Bowdoin.
34	1809-1865	Lincoln	Statesman	Nicholay and Hay Herndon	1890 1888	Ex. 2 0 Ex. 1 4	2	O. S. 2-2 2-3	31-26	Country school, 1 year; self-educated.
35	1809-1892	Tennyson	Poet	Arthur Waugh	1893	Ap. 1 0		3-12	30-29	Public grammar school, private, home, Cambridge.
36	1809-1882	Darwin	Scientist	Autobiography	1876	Ex. 2 9	5	Y. S. 6-6	43-44	Day school, grammar school, Edinburgh, Cambridge.
37	1809-1849	Poe	Poet	Woodbury	1885	1 10 1 7	3	1-1 2-3	30-30	Private school, England; preparatory school, University of Pennsylvania.
38	1811-1872	Greeley	Editor	Autobiography	1868	1 4 Ex. 1 5	4	1-5 3-7	30-27	Country school and printing office.
39	1812-1870	Dickens	Novelist	Robert Laughton John Forster	1883 18—	Ap. 1 6 2 0	8	2-6 2-8	26	Home, Giles Academy, private.
40	1813-1887	Beecher	Preacher	Lyman Abbott	1883			Ex. 8 9	37-37	Private school, Boston Latin School, preparatory school, Amhurst College.
41	1815	Bismarck	Statesman	Charles Lowe	1886	2 3	4	Y. S. 2-3 4-6	44-25	Boarding school, gymnasium, Göttingen University, Berlin University.
42	1819-1880	George Eliot	Author	J. W. Cross	1885	Ap. 2 6 Ex. 2 3	3	3-3	46	Girls' school, home, Miss Latham's School, Miss Wallington's School, Miss Franklin's School.

TABLE 11—Continued.

No.	Dates.	Name.	Occupation.	Authority.	Date.	Family data. 1	2	3	4	Education.
						Yrs. Mos.			Years.	
43	1819-1891	Lowell	Author	Charles E. Norton Charles Underwood	1894 1882	Ex. 2 4.5	5	6-6	37	Private school, Harvard.
44	1819	Ruskin	do	Autobiography J. M. Mathar	1874 1883			1-1		At home, traveling, Oxford.
45	1819-1875	Kingsley	Author and preacher	Mrs. Kingsley H. C. Ewart	1876 1889			O. S.	37	Private, home, preparatory school, Cambridge.
46	1822	Hale, E. E	do	Autobiography	1887	Ex. 1 7 Ex. 1 10.5	11	4-7 4-11	38	Dame School, public school, Boston Latin, Harvard.
47	1825	Tolstoi	Historian	Autobiographical Sir Grant Duff	1893			4-5		By priests, Saint Nicholas, Issay Seminary.
48	1848-1887	Jefferies	Writer	Autobiographical P. A. Graham	1891			O. S. 1-4 2-5		Printing office, self-educated.
49	1848	Edison	Inventor	Denslow and Parker J. B. McClure	1887 1879			3-3	42.5-37	By mother, public school, two months; self-educated.
50	1859	William II	Statesman	Poultney Bigelow	1892	Ex. 1 0 Ex. 2 4.5	6	1-6	27-18	Public gymnasium, Bonn University.

AVERAGE NUMBER OF CHILDREN.

The average number of children in the family is 6+. This includes all the children born to the parents of the great man, but no half brothers or sisters. The time between the birth of the previous child of the marriage and the great man child is 22.87 months for 26 cases, while the average time between children of the family is 25.36 months for 33 cases. These latter facts seem to illustrate the biological law of judicious use of a function.

POSITION IN THE FAMILY.

By birth, 11 are "only sons" and 16 are youngest sons. The position by birth can be shown by a line, A being the first child, B the middle child, C the youngest child, E the older half, and F the younger half, of the family, as follows:

9	15	4	5	8
A	E	B	F	C

Practically the 50 lived in this position:

19	13	2	5	11
A	E	B	F	C

From these results it will be seen that by birth the chances of greatness are as 24 is to 13 and practically as 32 to 16—that is, as 2 to 1 in favor of a child of the older half of the family. This confirms Galton's opinion.

PHYSICAL HEALTH.

Some biographers seem to have a tendency to contrast mental greatness with physical weakness. This may be due to the persistent idea that the body is inversely as the mind. But ill health is not a condition of greatness.

GENERAL STATEMENTS.

In regard to place of living in childhood, a large number resided in the country.

The influence of poverty on great men is well known.

Great men have strong memories in the lines of their interests, although they may be very absent-minded generally speaking.

A careful study would probably show that in boyhood great men had more imagination than the average child. The popular idea that the great man owes his success to his mother's influence upon his education has at least many exceptions. The men given in the table above did owe much of their education to some one person, but often the mother's place was supplied by that of an aunt or other relative.

It is well known how unreliable are the estimates of the early childhood of great men, but at present there is a more scientific spirit in biographical writing, which, it is hoped, will counteract the usual tendency to exaggeration.

Barnard Club School of Child Study.

The following syllabus for observations of children by the Barnard Club School of Child Study, of Providence, R. I., is given.

The syllabus contains "suggestions for the study of children from the second to the sixth year of school."

SYLLABUS 2.

Introduction.

This simple outline for child study has been prepared with the hope that it may aid primary teachers in coming into closer personal relation with their pupils, and that by the systematic study of a few children they may come to a better knowledge of child life and child nature.

Great delicacy and tact are required, however, in attempting this work, for the child studied must not suspect that he is the object of observation, and whenever direct questions are asked he should feel that they are prompted by friendly interest and not by curiosity.

It is recommended that only a few typical children in each class be studied in detail, but many points may easily be learned with regard to all the children. Walks through the school district will reveal much about their environment. Calls at the homes of the children under special study will bring out still more, while many points may be gained through oral or written exercises, which may be so planned as to come legitimately in the time devoted to language or natural science.

This work should not be taken up simply as an interesting psychological study, but rather approached reverently, remembering that the object sought is a deeper insight into the life and thought of the little child who has been "set in our midst."

BESSIE M. SCHOLFIELD.
RHODA A. ESTEN.

FEBRUARY, 1896.

Name of observer.
Observation. Begun. Ended.
Name of child.
Date of birth.

I. Character of environment.
 1. Parents.
  Nationality.
  Occupation.
  Culture.
 2. Home.
  Location.
  Hygienic conditions.
  Æsthetic influences.
  Religious or moral influences.
 3. Companions.
  Brothers.
  Sisters.
  Playmates.
 4. Playground.
  Street.
  Yard.
  Garden.
  Woods.
  Fields.
 5. Possessions.
  Pets.
  Playthings. Which most prized? Why?
  Books. Which most prized? Why?
  Collections.
 6. Occupation out of school.
  Has the child any regular work to perform?
  What form of play is most enjoyed?

II. Physical characteristics.
 1. Physique: Slight or sturdy, feeble or strong.
 2. Color: Of hair; of eyes; of skin (pale or rosy, sallow or clear).
 3. Health: Excellent, good, poor, fluctuating.
 4. Bodily defects: Deformed or maimed.
 5. Sense defects.
  a. Sight.
  b. Hearing.
 6. Motor ability. Control of body.
  a. Voluntary movements. Direct or aimless, graceful or awkward, quiet or noisy, quick or slow.
  b. Automatic. Unconscious acts accompanying study or recreation.

III. Characteristics of temperament and disposition.
 Excitable or calm.
 Energetic or sluggish.
 Confiding or reticent.
 Sensitive or indifferent.
 Hopeful or sad.
 Yielding or stubborn.
 Timid or courageous.
 Generous or selfish.

IV. Mental characteristics.
1. Perception.
   Color.
   Form.
   Number.
   Pitch.
   Rythm.
   Location.
   } Quick or slow, accurate or inaccurate.
2. Memory.
   Events.
      Distinct or indistinct.
      Accurate or modified by imagination.
   Verbal. Accurate or inaccurate.
3. Imagination.
   Feeble or active.
   Creative or imitative, as shown in play, picture making to stories.
4. Feelings.
   Affections. For people; for animals.
   Fears.
5. Will.
   Power of attention.
   Self-control.
   Impulsive or thoughtful, reflective.
   Power of choice. Prompt or vacillating.
   Obstinate, resolute, or changeable in purpose.
6. Power of observation.
   Accurate or inaccurate.
7. Expression.
   Does the child express his whole thought or only a fragment of it?
   Vocabulary. Large or small.
   Rich or scanty in imagery.
   Is the child predominantly thoughtful, imaginative, emotional, active, or are all three characteristics well balanced?
8. Manners and morals.
   Obedient or disobedient.
   Tidy or untidy.
   Careful or careless.
   Persistent or easily discouraged.
   Polite or rude.
   Truthful or untruthful.
   Humane or cruel.

THE IOWA SOCIETY FOR CHILD STUDY.

Henry Sabin,[1] late State superintendent of public instruction of the State of Iowa, says in a paper to the teachers of that State:

The supreme object of the child's education is the child himself. Books, teachers, courses of study, methods, are but means to an end, and that end is to put the child in complete possession of all his powers, to fit him for the work of life. The new study of practical psychology is intended to acquaint the teacher with the nature of the child. The science is yet in its infancy, but many of the greatest educational minds in the country are working along the lines indicated in this circular.

The first topic investigated by this society was on "eye-mindedness" and "ear-mindedness." It was desired to learn the impressions made upon the ear and eye. Those who remember chiefly through the impressions upon the sense of hearing are called "ear-minded;" of sight, "eye-minded."

EYE-MINDEDNESS AND EAR-MINDEDNESS.

The following is the plan of investigation:

In this line of investigation the comparative value of recollection through impressions made upon the ear and eye is sought. Persons who recall chiefly through impressions made upon the sense of hearing are called ear-minded; those who recall chiefly through impressions made upon the sense of sight are called eye-minded; for example, in spelling, some recall the letters in a word by their sounds, others flash the letters before them in the "mind's eye," and read them as from the printed page. It is thought that the latter, the eye-minded, are the best spellers, and if these investigations point to the same conclusion, steps may be taken to develop eye-mindedness in the poor spellers.

[1] Child Study, April 15, 1895, page 2.

Three sets of tests are to be made: Auditory, visual, and audo-visual. For each test prepare ten series of letters, each series containing ten letters, arranged disconnectedly, after the following manner:

1. l, d, n, r, v, g, b, h, s, m.
2. g, x, k, p, t, a, o, q, j, z, etc.

Provide pupils with pencil and paper. Have pupils place at head of sheet name of city, grade, name of pupil, age, nationality.

I. *Auditory test.*—Pronounce slowly, about one letter a second, and distinctly the first series, ten letters, and then give command to write. Pupils must not be permitted to begin to write until the command is given, and they must write without hesitation all the letters they can, and then stop. Then pronounce the next series in the same way, and so on till the pupils have written the ten series.

II. *Visual test.*—Take the second set and write the first series on the blackboard as promptly as possible and in full view of each pupil; then erase quickly and give the command to write. Pupils write under same limitations as in auditory test. Proceed in same manner with the remaining nine series.

III. *Audo-visual test.*—Take the third set and write on the blackboard, as in the visual test; then have pupils pronounce first series in concert. Erase, and then give command to write. Pupils write under same limitations as in visual test. Proceed in same manner with the remaining nine series.

Write these three tests on the same sheet, using both sides of sheet, if necessary. If there be objections to giving pupils' names, numbers may be used, but designate the sex of the pupils. Place the average standing, or teacher's estimate, in spelling of each pupil, at the top of his paper after these tests have been made. Mark it: "Spelling, —— per cent."

The Illinois Society for Child Study.

The following is a plan for the study of child's motives, suggested by the Illinois Society for child study:

Preconceptions and theories of the observer should not be permitted to manifest themselves to the observed, and thus influence and modify the observations recorded.

PLAN FOR THE STUDY OF CHILD'S MOTIVES

Name of the child. Age in years and months.
Nativity of father. Nativity of mother.
Occupation of father. Of mother.
Occupation of other members of family.
In what does the child take most interest at the present time?
(*a*) In what stories or books?
(*b*) In what games or entertainments?
(*c*) In what occupations?

What is the child's idea of an adult occupation for himself when grown? Reason for choice?

What experience has thus far afforded the child his greatest pleasure or joy in life?

What life experience has occasioned the greatest pain to the child?

Is the child a member of any school at present? Grade? If left wholly to his own choice would the child attend school? What seems to be the child's true motive for his choice?

Do the mere possibilities of extended social life, comradeship, furnish a leading interest in the child's school attendance?

Is there any portion of his school duties which he performs from a sense of the intrinsic charm in the thing done?

What study interests the child most? What is the real motive prompting this interest?

Name in order of relative interest other subjects of the course? (*a*), (*b*), (*c*). What seems the child's real motive why he pursues these subjects?

What portion of his school duties seem least attractive to the child, and why?

Is the child in good general health? What serious sickness, if any, has the child experienced?

Does the child's physical development appear to be normal? State any apparent defects. Are these the result of (*a*) Heredity? (*b*) Out of school environment? (*c*) Faulty school provisions? Does the child's mental development appear to be normal? State any apparent defects. Are these the results of (*d*) Heredity? (*e*) Faulty out of school environment? (*f*) Injurious school methods, etc.?

Observer.
Address.
Date.

CHILDREN'S INTEREST.

In investigations on children's interests Professor Barnes concludes (1) that children are impressed to a very small extent by the visible aspect of things; (2) that their chief interest is in the use of things; (3) that their ideas possess only light abstract characteristics. Edward R. Shaw,[1] of the school of pedagogy, New York University, considers these conclusions as significant since they are at variance with the general practice of teachers in schoolroom work; for to appeal to primary children, in order to get them interested, we must start with the use of objects and gradually lead out from what things can do and what they are made of, to their structure, form, color, etc. In the present investigation by Dr. Shaw the data were gathered from children of a large city. The list of words used was given to children in classes from the second to the sixth school year, inclusive, and was placed before them in the following manner: Each child was directed to write his name, age, and grade at the top of the paper. As each word of the list was spoken and immediately written on the blackboard, the child was to write down as rapidly as possible whatever came into his mind. The work upon one word was completed before the next word was given out. No comments, questions, or suggestions were allowed, so that the pupil might be as unbiased as possible. The object was to see what associations arose in children's minds when the names of the objects in the list were presented.

The list of heads given in the table consists of ten used by Professor Barnes and eight additional ones.

Dr. Shaw collated 59,223 attributes (see Table 12) from 600 pupils, 50 girls and 50 boys of each year of age from 8 years to 13, inclusive. The idea of "use" in Barnes's returns stands 50 per cent as compared to 12 per cent in Shaw's returns. Shaw makes of special importance the difference found in the younger child's interest as compared with the more advanced pupil. The younger child's interest is self-centered—that is, for particular and individual action, as opposed to the older child's recognition of general or universal use. The terms "use," "used," "useful," "good for," "valuable," etc., are frequent with advanced pupils but rare with the younger ones. Barnes's results are almost the exact opposite; yet both investigations point to the conclusion that children's interests lie largely in what an object is good for, or what it can do.

TABLE 12.—*Showing proportion of different attributes by returns from 50 boys and 50 girls of each age from 8 to 13, inclusive.*

[The numbers denote the number of attributes.]

Rank.	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	Totals.	Grand total.
1. Action:								
Boys	931	1,001	1,292	1,619	1,403	1,285	7,531	
Girls	672	646	868	971	1,060	1,117	5,334	12,865
2. Quality:								
Boys	354	392	488	858	958	902	3,952	
Girls	306	322	652	879	1,102	1,272	4,533	8,485
3. Use:								
Boys	272	271	611	686	738	1,052	3,630	
Girls	195	251	347	733	787	1,022	3,335	6,965
4. Structure:								
Boys	415	270	611	472	499	577	2,544	
Girls	480	312	307	450	474	682	2,705	5,249
5. Substance:								
Boys	127	145	332	446	516	677	2,243	
Girls	190	270	282	424	686	767	2,619	4,862

[1] Child Study Monthly, July-August, 1896.

TABLE 12.—*Showing proportion of different attributes by returns from 50 boys and 50 girls of each age from 8 to 13, inclusive*—Continued.

Rank.	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	Totals.	Grand total.
6. Sentence making:								
Boys	473	568	251	331	241	208	2,072	
Girls	538	248	373	366	172	131	1,828	3,900
7. Place:								
Boys	170	171	277	347	344	373	1,682	
Girls	149	137	258	318	403	392	1,657	3,339
8. Possession:								
Boys	251	265	316	255	300	198	1,585	
Girls	300	286	431	313	193	192	1,715	3,300
9. Color:								
Boys	48	51	85	138	153	130	605	
Girls	140	103	239	192	232	262	1,168	1,773
10. Quantity or number:								
Boys	154	119	124	198	93	198	886	
Girls	208	101	110	115	133	187	854	1,740
11. Larger term:								
Boys	32	34	66	99	145	168	544	
Girls	22	63	83	146	194	229	737	1,281
12. Associated object:								
Boys	111	78	82	129	70	121	591	
Girls	107	72	144	139	87	127	696	1,287
13. Smaller class:								
Boys	12	45	43	78	100	116	394	
Girls	11	47	55	79	140	157	489	883
14. Like or dislike:								
Boys	60	49	67	56	69	45	346	
Girls	62	52	104	79	63	87	447	793
15. Time or occasion:								
Boys	14	26	62	65	52	90	309	
Girls	39	32	48	85	118	131	453	762
16. Form:								
Boys	21	29	28	67	61	69	275	
Girls	68	61	42	57	60	122	410	685
17. Similar object:								
Boys	8	12	33	28	22	26	129	
Girls	4	6	17	33	92	68	220	349
Unclassified:								
Boys	21	40	75	63	104	61	364	
Girls	42	21	50	64	85	99	361	725
Total	7,007	6,596	8,953	10,278	11,949	13,340	....	59,223

Total number of attributes, boys 29,682
Total number of attributes, girls 29,541

MEMORY IN SCHOOL CHILDREN.

Experiments[1] were made by John C. Shaw, of Clark University, to test the memory of children at different periods of school life and to determine what appeals to their senses and sympathies at different ages. To make the test, the story below, written by Dr. Hall, was used. The results are shown in Table 13.

This table gives the number of times each term of the story was remembered in the different grades. The first six columns give the grades, and the numbers are based upon 100 papers, 50 from boys and 50 from girls. The story contains 324 words and is divided into 152 parts. It was sought to have as many terms as there were distinct facts or ideas. The story was read to the pupils; they were told it would take three minutes to read it; that it was a memory test, and that they should write all they could remember of the story after it had been read.

Table 13 shows the memory for the terms of this story as a function of the age and grade of pupil.

[1] The Pedagogical Seminary, October, 1896.

TABLE 13.

The story.	Third grade.	Fifth grade.	Seventh grade.	Ninth grade.	Second year, high school.	Fourth year, high school.	Seventh grade (self-reading).	University.	Miss Aiken's school.	Average for first six columns.
James	85	76	90	91	93	93	92	75	93	88
Mack,	27	56	80	81	93	89	92	85	93	71
ten years old,	20	20	28	58	68	69	50	50	57	43
a farmer's son,	17	28	40	54	55	55	70	60	52	41
dreamed	70	85	89	87	84	84	87	65	100	83
that his father	79	90	92	85	94	78	92	85	93	86
and mother	89	97	95	95	93	91	94	90	100	93
died	92	97	99	96	95	93	98	95	100	95
very poor,	19	22	25	30	28	40	40	30	47	27
and left him nothing	76	96	93	98	87	88	83	80	100	90
but 37 cents,	35	78	93	89	80	85	76	75	87	78
a loaf of bread,	73	93	96	95	99	97	96	90	100	89
and a Bible.	64	78	94	94	95	93	96	90	100	83
The day after the funeral	29	36	50	57	50	48	58	45	43	45
he had	13	37	38	23	31	30	46	25	47	28
to take these,	6	15	21	29	28	27	14	25	20	21
leave	21	34	40	36	35	30	62	45	27	32
his home	18	24	32	29	26	24	54	50	23	27
and his school,	13	15	16	15	17	20	38	15	10	16
and go out alone	21	43	48	42	68	48	36	35	53	46
into the wide world.	26	55	57	62	68	60	46	45	67	52
It was Sunday,	10	10	23	33	32	32	16	20	30	23
and a lame,	10	15	12	21	29	24	10	15	33	18
crooked,	10	10	23	29	31	39	20	35	47	23
little	3	3	5	9	13	15	12	35	37	7
old	41	66	84	74	85	59	74	80	90	67
woman,	58	81	90	91	95	92	94	90	93	84
with a red	20	20	24	40	37	43	34	40	63	30
shawl	23	21	24	45	35	46	34	30	57	32
on her head, said,	14	18	19	34	21	29	18	15	37	22
"Please give me your Bible.'	44	73	87	81	85	79	88	65	71	77
He did.	41	70	90	88	90	89	84	70	80	76
Soon he met	21	39	56	44	62	39	48	45	50	43
three	21	34	39	38	42	26	30	30	37	34
boys	33	72	78	73	66	59	78	35	70	63
who looked	22	52	58	61	59	46	72	7	70	49
so hungrily	22	54	68	83	77	66	72	50	77	61
at his bread	9	35	33	30	53	30	40	25	50	31
(so) that	1	16	18	20	27	24	20	25	33	15
he gave it.	49	78	89	93	90	89	82	80	100	74
Then came	0	3	1	1	3	0	0	0	7	1
a ragged	10	5	18	27	23	18	6	10	23	16
black	8	12	12	26	22	24	14	15	17	17
beggar,	20	42	44	50	57	67	44	60	57	48
with a stub	1	3	3	18	14	14	10	10	17	8
pipe,	5	4	7	21	21	15	10	25	20	12
one	6	20	34	29	39	27	18	15	20	27
leg,	7	24	38	34	43	33	22	40	37	31
and a crutch,	10	18	32	30	20	31	20	25	23	23
and into his hat	23	40	37	36	36	34	32	30	70	34
James	4	5	16	15	5	9	0	15	30	9
dropped	10	27	28	21	29	21	28	15	50	20
all	8	19	17	27	32	27	14	10	43	21
his money.	45	80	92	86	90	80	82	70	90	90
To a blind	10	24	34	33	27	26	16	20	43	25
schoolmate,	11	21	26	36	43	36	18	40	53	28
with no cap,	19	31	43	44	46	37	58	35	50	36
James	1	4	8	10	7	4	0	5	7	5
gave his.	13	44	62	70	70	66	66	65	80	55
To a half-	8	26	37	27	18	18	14	10	47	22
naked,	10	28	36	27	23	20	16	10	53	23
sickly	0	0	5	3	5	2	12	0	7	2
fiddler	3	17	25	28	27	17	48	15	23	19
boy,	17	41	48	37	36	30	46	30	50	35
with a lean	2	10	17	26	24	18	20	15	37	15
monkey,	5	19	29	38	29	23	40	20	50	24
he gave	21	50	79	76	77	78	64	80	97	62
his coat	23	48	76	75	75	79	58	75	87	62
and pants.	19	60	73	71	74	75	54	70	80	62
At night,	7	21	33	28	29	32	28	25	23	26
in a wood,	44	80	89	96	96	91	86	100	93	82
he found	29	48	62	78	80	82	58	75	73	63
a lost	6	18	10	11	8	7	8	5	13	10
baby,	57	88	100	99	99	96	86	95	100	90
naked,	18	50	64	64	68	57	48	70	77	53
crying;	15	23	25	26	26	18	30	30	13	21
and as it was dark	4	8	13	24	25	30	10	15	87	17
took off	28	49	68	58	63	57	34	65	90	55

TABLE 13—Continued.

The story.	Third grade.	Fifth grade.	Seventh grade.	Ninth grade.	Second year, high school.	Fourth year, high school.	Seventh grade (self-reading).	University.	Miss Aiken's school.	Average for first six columns.
his last	27	57	78	75	81	71	62	80	80	64
garment	30	74	83	77	93	73	64	80	87	70
to wrap around it.	40	62	81	83	79	77	60	75	93	79
Made a	28	58	72	77	65	64	58	50	71	60
big	1	2	3	11	4	16	3	5	13	5
bed	30	60	73	77	68	65	58	55	80	62
of oak	11	37	37	59	40	45	30	15	50	37
leaves,	33	62	79	84	76	76	68	70	90	68
crept in	26	51	67	72	76	64	40	75	90	59
with the baby	22	42	45	49	48	40	26	40	57	41
and hugged it	18	35	53	69	78	63	32	65	87	51
to keep it warm.	14	41	63	75	81	65	32	60	80	54
Then, as he lay	1	3	4	11	11	9	2	5	17	6
looking up	9	22	31	33	44	34	20	40	60	30
into the sky,	7	17	26	24	44	26	18	30	50	24
he said,	4	25	43	36	36	28	18	35	53	28
"Dear	3	16	18	22	35	30	16	35	50	22
God,	13	30	51	46	56	43	32	45	70	37
what can I do	12	27	52	53	49	46	32	50	70	41
more?"	4	22	50	45	58	43	20	50	70	38
It was just the perfect	0	0	0	(3)	11	2	0	0	13	2
hush	0	0	9	16	25	22	0	25	20	11
of midnight,	0	3	18	16	30	25	4	35	23	15
save	0	0	10	12	20	16	0	25	23	9
the hoot of an owl	4	3	12	15	21	15	6	35	17	6
and the distant	1	2	5	5	7	5	0	5	10	4
bark of a dog.	7	3	8	7	12	8	4	15	20	7
Just then	0	6	4	14	11	8	0	10	13	7
the moon	12	22	22	38	43	42	24	60	43	31
peeped out	11	20	21	31	31	33	18	55	43	26
behind	2	11	13	27	22	25	8	25	27	17
a pinkish	3	15	13	22	29	31	10	0	57	18
cloud	10	25	29	40	47	47	22	50	67	33
and right under it	0	3	3	12	14	12	4	55	30	7
appeared	1	3	7	15	41	31	4	15	30	17
an angel	12	44	54	62	58	56	46	60	60	51
child	0	3	1	2	13	13	0	30	17	5
which he thought	17	38	41	49	51	56	52	60	70	41
was his dead	4	20	28	29	36	51	26	55	67	25
sister	16	43	55	59	70	73	54	65	80	52
Mabel's	7	25	33	34	56	53	28	25	53	34
face	5	15	26	31	35	43	24	30	33	26
smiling.	2	6	3	5	9	8	10	0	17	5
There seemed	0	1	0	1	4	2	0	0	3	1
a sweet	0	1	0	5	3	6	0	0	10	2
perfume,	0	3	2	9	9	6	0	5	20	4
an hand	2	13	15	20	21	14	8	25	27	14
touched	8	18	19	27	28	24	20	25	37	21
his head	7	15	12	18	20	20	18	20	27	21
and a gentle	0	1	0	5	1	3	0	0	0	1
voice	4	9	10	27	25	33	10	35	40	18
from the cloud said	1	2	3	4	9	9	4	5	10	4
"This is the Christ	12	28	42	59	57	76	36	85	77	45
child."	11	20	39	51	48	72	30	85	77	40
James	0	4	15	20	21	26	4	35	23	14
awoke.	19	62	77	84	88	90	56	90	67	70
It was Christmas	31	56	62	69	74	74	72	60	80	61
morning,	19	37	57	64	51	77	48	60	90	50
and by his bed	2	29	32	51	63	70	22	60	80	40
Santa Claus	33	36	52	57	40	48	50	50	67	44
had put	21	25	34	46	35	39	38	40	57	33
a silver dollar,	22	56	72	76	76	74	52	60	83	63
a box of candy,	29	31	55	46	42	40	48	20	43	40
a bottle	10	18	21	19	26	32	28	25	30	21
of cologne,	8	9	13	16	26	31	26	20	27	19
a music box,	7	27	21	24	34	21	16	20	30	22
a loaf	9	14	13	13	30	25	16	20	20	25
of frosted cake,	19	42	50	57	66	54	36	45	77	47
a fur	1	8	20	33	35	33	2	20	43	23
tippet	4	14	31	40	42	38	12	35	50	28
and a gilt Bible	26	51	68	62	67	67	52	55	93	55
full	0	3	6	12	16	21	0	0	37	10
of colored	7	6	17	20	26	24	10	10	43	16
pictures.	8	12	20	22	26	28	14	10	47	18
Total for whole story	2,655	4,693	6,005	6,408	6,871	6,493	5,122	6,048	7,812	5,526

One of the facts brought out was the early age at which children reach their maximum memory power. The boys in the second year of the high school remembered 43 per cent, which was the highest for boys.

To study the strength of memory as a function of the place of the words in the story it was divided into three equal parts, and the total number of words remembered in each part by the different grades calculated; the results are shown in the first three lines of Table 14, below. The story was again divided into eight equal parts and the total number of terms remembered in each of these parts by the different grades calculated. The results are given in the lower part of Table 14; the last vertical column of figures gives the average per cent of terms remembered in each part of the story by all grades. The line of figures at the bottom of the table shows the per cent of the whole story remembered by the grades under which the numbers are written. A considerable number remembered the first part of the story quite well, but very little in the latter part, showing the influence of fatigue. The high per cents for Miss Aiken's school may be due to special training.

TABLE 14.

Part.	Third grade.		Fifth grade.		Seventh grade.		Ninth grade.		Second year, high school.		Fourth year, high school.		Seventh grade (self-reading).		Miss Aiken's school.	University.	Average per cent remembered by all grades.
	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.			
I	731	708	1, 042	1, 014	1, 293	1, 208	1 282	1, 328	1, 412	1, 296	1, 851	1, 187	1, 202	1, 166	1, 425	1, 134	46
II	407	375	855	824	1, 197	1, 050	1, 149	1, 195	1, 242	1, 194	1, 194	973	814	898	1, 461	1, 035	38
III	258	186	540	418	730	527	861	693	939	788	1, 048	740	596	446	1, 020	855	27
I	432	414	511	526	625	599	625	617	665	595	643	589	614	656	642	562	61
II	236	213	394	355	503	425	495	473	546	502	517	404	534	380	556	397	45
III	118	130	241	232	304	295	303	364	343	324	309	311	256	248	391	273	29
IV	173	131	332	343	455	423	428	462	443	428	428	383	356	426	505	397	40
V	168	178	376	344	500	439	501	515	520	519	518	405	334	292	647	448	44
VI	52	50	135	104	229	152	267	212	324	270	324	187	130	134	318	283	21
VII	63	33	169	96	214	131	256	199	272	255	348	240	202	136	344	292	21
VIII	155	120	279	257	400	321	427	374	480	385	506	380	288	240	538	350	36
Per cent remembered by grades.	18	17	32	30	43	37	44	42	47	43	47	38	36	33	52	39½	37

The following table shows what appeals most and what least to memory. It gives the number of pupils who remember the terms mentioned:

TABLE 15.

	Third grade.		Fifth grade.		Seventh grade.		Ninth grade.		Second year, high school.		Fourth year, high school.		Seventh grade (self-reading).		University.	Miss Aiken's school.
	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.		
															Per ct	*Per ct*
James	44	41	41	35	45	45	47	44	48	45	45	48	44	48	75	93
Mack	11	16	28	28	42	38	43	38	46	47	42	47	46	46	85	93
dreamed	34	36	46'	39	46	43	43	44	41	43	45	39	48	48	65	10
that his father	41	38	44	46	46	46	41	44	46	48	40	38	48	44	85	93
and mother	45	44	49	48	48	47	47	48	47	46	48	43	48	46	90	100
died	47	45	49	48	49	50	49	47	47	48	48	45	50	48	95	100
and left him	40	36	50	46	45	48	49	49	46	41	43	45	42	44	80	100
37 cents	16	19	38	40	46	47	43	46	45	44	42	43	38	38	75	87
a loaf bread	37	36	48	45	48	48	47	48	49	50	47	50	50	46	90	100

TABLE 15—Continued.

	Third grade.		Fifth grade.		Seventh grade.		Ninth grade.		Second year, high school.		Fourth year, high school.		Seventh grade (self-reading).		University.	Miss Aiken's school.
	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.		
															Per ct	Per ct
and a Bible.	35	29	42	36	49	45	48	46	50	45	46	47	50	46	90	100
woman	31	27	45	36	48	42	47	44	49	46	47	45	48	46	90	93
"Please give me your Bible."	26	18	39	34	47	40	42	39	44	41	41	38	48	40	65	71
He did.	22	19	37	33	47	43	46	42	49	41	43	46	44	40	70	80
he gave it. (bread.)	23	26	38	40	47	42	45	48	46	44	44	45	44	38	80	100
his money.	24	21	40	40	47	45	45	41	45	45	45	44	38	44	70	90
baby	31	26	43	45	50	50	49	50	50	49	50	46	42	44	95	100
very poor	9	10	16	6	15	10	15	15	17	11	24	16	22	18	30	47
crying	9	6	11	12	13	12	15	11	14	12	12	6	10	20	30	13
It was Christmas	18	13	32	24	33	29	35	34	38	36	36	38	36	36	60	80
Santa Claus	18	15	14	22	23	29	34	23	21	19	25	23	36	14	50	67
box of candy	16	13	17	14	26	29	21	25	24	18	24	16	32	16	20	43
James (dropped)	2	2	2	3	9	7	6	9	3	2	6	3	....	....	15	30
lost	3	3	8	10	2	8	4	7	6	2	3	4	6	2	5	13
the hoot of an owl	3	1	2	1	8	4	8	7	14	7	11	4	6	....	5	10
bark of a dog,	2	5	2	1	6	2	4	3	8	4	5	3	4	....	15	20
smiling.	2	...	3	3	3	...	1	4	4	5	5	3	4	6	......	17
Then came	...	...	2	1	...	1	....	1	3	....	....	....	....	....	......	7
James (gave his cap).	1	...	3	1	5	3	2	8	4	3	....	4	....	....	5	7
sickly	...	...	...	...	3	2	....	3	1	4	2	....	4	8	......	7
Then as he lay	...	1	2	1	3	1	6	5	6	5	4	5	....	2	5	17
It was just the perfect	...	...	...	...	...	...	2	1	9	2	1	1	....	....	......	13
and the distant	...	1	2	...	3	2	3	2	4	3	5	....	....	....	5	10
There seemed	...	...	1	...	...	...	....	1	3	1	....	2	....	....	......	3
a sweet	...	...	...	1	...	...	3	2	1	2	4	2	....	....	......	10
perfume	...	...	2	1	1	1	6	3	4	5	4	2	....	....	5	20
and a gentle	...	...	1	...	...	...	5	....	....	1	2	1	....	....	......	......
from the cloud	1	...	1	1	1	2	3	1	2	7	5	4	2	2	5	10
37 cents	16	19	38	40	46	47	43	46	45	44	42	43	38	37	75	87
	24	21	10	8	4	3	5	4	4	3	4	3	10	6	15	13
dropped	7	3	14	13	15	13	15	6	11	18	9	12	14	14	15	50
	17	18	26	26	31	29	30	35	33	28	32	30	16	16	45	20

Among other things it is interesting to notice that the four terms, "mother," "died," "and left him," and "baby," were the only terms remembered by 90 per cent. Table 15 is on basis of 50, but last two columns have 100 for basis. "Christmas," "Santa Claus," and "box of candy," though near end of story, are remembered very well. "37 cents" and "dropped" have each two rows of figures; one gives number who remembered, the other the number who substituted synonym.

CONCLUSIONS.

For a story like the one employed, and under the conditions described above, the maximum memory power is reached at a relatively early age. The boys in the third grade remembered only 17 per cent of the story. In the ninth grade they remembered 42 per cent, and in the high school about 40 per cent. From this it seems that memory power for the boys culminates about the beginning of the high-school period. The girls made a rapid increase from 18 per cent in the third grade to 43 per cent in the seventh grade and 47 per cent in the high school.

The office of a term in the sentence, and the number of like terms employed determined how well a given term was remembered. It may be said that sentences as wholes were remembered inversely in proportion to their length and the number of nonessentials contained. Of the sixteen terms remembered by 75 per cent, eleven are in the first three sentences, and not one in the last half of the story, Table 13. About two-thirds of the forty-one terms remembered by 50 per cent are in the first half of the story. The decline of memory for the successive parts of the story is shown by the per cents for the three-part division of the story, Table 14. They are, successively, 46, 38, and 27. A four-part division would give 52, 34, 32, and 28. Much of the falling off is doubtless due to fatigue, but some of it is due to changes in subject-matter, as can be seen in Table 13, where sudden variations are found in the amount remembered. A decline in memory from the first to the last of the story was found in all grades, but the rate of decline was not the same in all.

The growth of memory is more rapid in the case of girls than boys, and here the figures suggest a coincidence with the general law, that the rapid development incident to puberty occurs earlier in girls than in boys. No other appreciable difference between the memory of boys and that of girls is apparent, except that the girls remembered 4 per cent more of the story than the boys, and the girls in higher grades showed a better retaining power for the latter part of the story.

It is surprising how few remembered some terms in a sentence, while other terms in the same sentence were remembered by a large number. There seemed to be marked similarity of apperception in all the different grades; for any term remembered by a large or small number in one grade was remembered by approximately the same number in every other grade. No part of the story nor any term other than those elsewhere mentioned made a noticeable appeal to any grade which did not in like manner appeal to all the other grades.

DRAWINGS BY FIRST-GRADE PUPILS.

Frank S. Bogardus[1] remarks that drawings by first-grade pupils may be made the index of the childrens' mental characteristics.

He used drawing as a test of perceptive imagination and memory in a class of 18 pupils, from five to seven years of age, in the primary department of a normal training school. The class had been in school seven months. The method of testing was as follows:

1. *In perception.*—The object was placed before the child, and after making any kind of examination of it he wished he drew it, the object remaining before him.

2. *In memory.*—The object was placed before the children as a class. The examiner called their attention to certain characteristics, so as to be sure that they all had the same material to remember, and then removed the object and had it drawn as remembered.

3. *In imagination.*—The child was told to make up a story about a boy and a dog or any familiar animal, and then to make a picture of it.

In no instance did two children draw at the same table.

The grading was done in the following manner:

1. *In perception.*—The examiner counted up the number of different elements found in each set of drawings, and, taking that as the standard, compared each individual drawing with it, making the number of different elements or the amount of detail the decisive factor.

2. *In memory.*—The method of grading was essentially the same as in perception, except that the number of elements pointed out by the examiner was taken as the standard.

3. *In imagination.*—The greatest number of different elements found in any one drawing was used as the standard.

In this way statistics more or less truly indicative of the comparative powers of the children in perception, memory, and imagination were secured.

From the study of these statistics the following facts were noticed:

1. In thirteen of the eighteen cases there seemed to be a distinct relationship between the grades in perception, memory, and imagination, the greatest variation in any one case being a difference of 12 per cent between perception and imagination.

2. The highest average made by any one pupil was 82 per cent, the lowest 38 per cent.

The average of the whole class on perception was 59⅔ per cent; on memory, 59⅓ per cent, and in imagination 60 per cent.

4. The various averages of the individuals afforded a means by which they were ranked. The opinions of the teachers of these children agreed with the order in which they were ranked in all but three or four cases out of the eighteen.

Now comes the question of the application of these statistics to the needs of the individual child. Suppose that the drawing examiner finds that James has an average in perception of 15 per cent. He apprises the science teacher of that fact, and she immediately understands the cause of his poor work and sets about correcting it; or the examiner finds that Mary has a low average in memory. He notifies Mary's arithmetic and reading teachers, and they see that what Mary needs is drill in grasping and holding ideas. If John's imaginative powers are found to be less than the average of his class, his reading teacher must pay particular attention to securing an instantaneous response with a mental picture to an external suggestion.

In short, the system serves to establish the standard of the mental powers of the class, to detect the exact place of each child's development that is exaggerated or minimized, and in that way suggests a particular way in which each child must be treated according to his individuality.

---

[1] Transactions of the Illinois Society for Child Study, 1896.

TABLE 16.—*Showing the results of the term's work in studying the children through the drawings they made.*

	Perception.	Memory.	Imagination.	Average.	Rank.
Claire	80	83	84	82	1
Clyde	52	41	41	44	16
Edith	57	85	59	67	7
Elmer	56	59	68	54	11
Henrietta	55	51	92	66	8
Leverett	75	85	84	81	2
Mary	77	69	74	73	4
Raymond	71	70	63	68	6
Stephen	80	68	76	72	5
Thurman	77	69	76	74	3
Claude	61	39	62	54	11
Earl	60	55	41	52	12
Effie	43	38	35	38	17
Fred	61	34	40	45	15
Ralph	50	49	51	50	13
Thornton	59	66	38	55	10
Walter	65	53	55	58	9
Mildred	58	50	32	47	14
Average	$59\frac{2}{3}$	$59\frac{1}{3}$	60	....	....

THE SUGGESTIBILITY OF CHILDREN.

Suggestibility may be regarded as a normal condition of mind. In the following study of suggestibility of children Maurice M. Small[1], fellow in Clark University, aims to show some of the results of psychic activity, intentionally induced by indirect methods, and also to indicate in the records of imitative acts, which are simply the motor expression of a mental state of which suggestion is the cause. In one section of the inquiry is given a record of experimental work; in a second section a classification of 4,335 cases of personal experience furnished by educators, pupils, and parents, and in a third section some inferences from the data.

[1] Ped. Seminary, December, 1896.

ILLUSIONS OF PERFUMES.

In testing for illusion of perfume, the means used were a Newman spray tube, some distilled water, and faintly perfumed cards, one of which was placed in the hands of the teacher, while another was given to the pupil, who was asked to come to the desk and see whether the card was perfumed or not; but he was charged not to give judgment until asked.

After a moment the pupils were asked about walks in search of flowers last spring; why children liked flowers, etc. Then they were asked whether they thought they could tell if the odor of any flower were in the room. Labeled bottles of perfumery were next placed on the teacher's table, and the experimenter took the atomizer and told the pupils he was about to make a spray in the room, that if anyone was sure that he could smell perfume, he should raise his hand at once. A generous spray was then made in two or three places in the room. The pupils wrote the name of the spray that was suggested to them.

Table 17, which follows, shows the result in 540 cases. The letters S, F, N. S, O, and GC, at the head of the columns stand, respectively, for "strong," "faint," "not sure," "no perfume," and "given card."

TABLE 17.

Grade.	Perfume.						No perfume.		
	S.	S.	F.	F.	N. S.	N. S.	O.	O.	G. C.
		Per ct.		*Per ct.*		*Per ct.*		*Per ct.*	
I	93	98	....	....	....	....	2	2	1
II	62	95	....	....	....	....	3	5	1
III	55	83	....	....	....	....	11	17	1
IV	55	63	11	13	....	....	19	23	4
V	20	50	8	20	....	....	12	30	2
VI	19	27	7	9	10	14	35	50	3
VII	4	13	....	....	....	....	27	87	1
VIII	....	....	....	....	23	67	11	33	2
High	....	....	25	47	....	....	28	53	4
Total	308	51	....	33	....	....	148	....	19

Average per cent of illusion, 73.

The results given show higher percentages of illusion in older pupils in the case of individual tests.

ILLUSIONS OF TASTE.

In the tests for illusions of taste, salt, sugar, and quinine were used. The results are given in Table 18.

TABLE 18.

Grade.	Number of pupils.	Very sweet.	Little sweet.	Total sweet.	Did not taste sweet.	Error.	Total did not taste sweet.	Did not try.
				Per cent.			*Per cent.*	
I	94	76	16	98	....	....	....	2
II	70	47	16	90	4	....	6	3
III	64	24	33	89	7	....	11	....
IV	87	18	47	74	3	17	23	2
Total	315	165	112	88	....	31	10	7

Individual tests were made for illusions of taste, motion, heat, and cold touch. In Table 19, below, letter R means that an illusion was produced in the description of the five preceding divisions; O, indicates "no illusion;" RR, very marked illusion; J, jerked hand from table; S, scratched hand; "soda," tastes like soda; Il. O. S., illusion without stimulation; T, illusion after stimulation; W, illusion of heat waves. In the results under "Motion," the leaders mark cases in which the camel[1] was brought to move parallel with the line of vision as well as at right angles to that line.

TABLE 19.

Subject.	Sex.	Sweet.	Salt.	Bitter.	Motion.	Heat.	Cold.	Il. O. S.	Il. T.	Waves.
W—n	M.	R.	O.	R.	R.	RR.	R.	O.	O.	O.
S—n	F.	R.	O.	R.	R.	R.	R.	O.	RR.	O.
L—r	M.	O.	R.	R.	R.	R.	R.	O.	O.	R.
A—s	F.	R.	R.	R.	R.	R.	R.	O.	R.	R.
C—n	F.	R.	R.	R.	R.	RR.	R.	O.	R.	R.
T—e	M.	R.	R.	R.	O.	R.	O.	O.	R.	R.
S—n	M.	R.	R.	R.	O.	R.	R.	O.	R.	R.
S—r	M.	R.	R.	R.	OO.	R.	R.	R.	R.	R.
F—x	M.	R.	R.	R.	R.	R.	R.	R.	R.	R.
S—e	M.	R.	R.	R.	R.	O.	R.	O.	R.	R.
O—d	M.	O.	R.	R.	OO.	RJ.	R.	R.	R.	R.
G—n	F.	R.	O.	R.	R.	O.	R.	O.	RR.	R.
F—e	F.	R.	R.	O.	R.	R.	R.	RS.	R.	R.
I	M.	O.	R.	R.	....	RR.	RR.	R.	R.	R.
II	F.	O.	R.	O.	....	RR.	RR.	R.	O.	R.
III	M.	R.	R.	O.	....	R.	R.	O.	R.	R.
IV	F.	R.	R.	Soda.	....	R.	R.	O.	R.	R.
V	M.	R.	O.	R.	....	R.	R.	O.	R.	R.
VI	F.	R.	R.	R.	....	R.	R.	O.	R.	R.
VII	F.	R.	R.	R.	....	R.	R.	O.	RS.	....
VIII	M.	R.	R.	R.	....	RR.	RR.	R.	RR.	....

[1] Mentioned in the experiment.

INFERENCES AND APPLICATIONS.

The aim of this study, as a whole, has been to present data bearing on the suggestibility of normal children. A careful study of the records seems to indicate, according to Dr. Small, that in healthy children suggestibility is—

1. A universal condition.
2. High in degree.
3. Largely within the control of any one who knows the working of the child mind.

No thoughtful educator can fail to make from the same records a multitude of inferences related to every department of instruction. Among these inferences, some of the more important are:

1. The necessity of removing from the public schools stutterers, emotional prodigals, and nervous defectives.
2. The need of care that the teaching force is large enough to prevent teachers from breaking down because of overwork.
3. The prominence of the motor element in learning and the importance of calling it into play in teaching.
4. Ground for urging a fuller and higher use of the dramatic instinct in the class room.

If it should seem at first that giving play to the impulse for dramatic action is likely to make pupils stagy and artificial, it will be remembered that the danger lies in too little freedom for dramatic expression. The amateur only is stagy; the actor who knows the stage reflects from the footlights nothing but perfect human naturalness.

Of course it is necessary to guard against the dangerous element in plays of the circus group; this is easily done by learning the actual source of the danger and diverting the attention to something safe that will cause the same flow of spirits and awaken a sense of power and superiority. One of the best ways for securing this result would be to induce boys and girls to invent new games calling for suppleness, strength, skill, and competition, to supplement those now in use and the courses in manual and industrial training.

5. A possible use of the social instinct as it crops out in school fads to awaken interest in studies like history, literature, and science.
6. The danger in leaving children too much alone, and the necessity of closer companionship with children on the part of parents and teachers.
7. In suggestion as children use it, a hint at the natural method of child discipline.
8. The strong influence of the attitude of the teacher upon the tastes and ideals of the pupil.
9. That although a bright teacher may interest pupils in a study, large sympathies, personal interest in the pupil, and ability to appreciate the good in him, are necessary to awaken purpose and develop strong character.

A Study of Dolls.

It may be asked, What is the real source of the many instincts that are expressed in doll play, its form among savage races, whether it is related to idolatry, and, if so, how? The study of dolls by A. C. Ellis and G. Stanley Hall calls attention to the importance of a neglected but rich field of investigation.

The following questionaire was circulated by Miss S. E. Wiltse among some 800 teachers and parents:

The data desired are juvenile feelings, acts, or thoughts toward any object which represents a baby or a child.

1. Describe your dolls and get children to do the same—whether of wax, rags, paper, pasteboard, rubber china, wood, stone, etc.—and give instances where clothespins, nails, bottles, vegetables, sticks, flowers, keys, button hooks, etc., have been regarded as dolls in any respect or in any degree.
2. Feeding: What foods, liquid or solid, and how are they given? Describe imaginary foods, dishes, spoons, and other utensils. Is there any regularity or system in feeding, and are hunger, starvation, food preferences, or growth imagined?
3. Medicines, diseases: What diseases, pains, symptoms, are imagined? How is sympathy shown? What drugs are given? How, and with what conceptions? Imaginary doll doctors, their visits and functions. Surgical operations, etc.
4. What constitutes the death of a doll? Funeral services, and burial of dolls. When lost or crushed do children assume a future life for the doll, and does this assuage their grief?
5. Give details of psychic acts and qualities ascribed to dolls, and show how real, how treated, etc., are their feelings of cold, fatigue, anger, pain, jealousy, love,

hate, goodness and badness, modesty, tidiness, etc. Is any individuality or moral or other characters consistently and persistently ascribed to dolls?

6. Dolls' names: Are they of real persons; and if so, is there any resemblance, real or fancied?

7. Accessories and furnishings, toilet articles, clothes, beds, tables, and dishes, trunks, fashion and its changes, toys for the doll, etc: How far in fact are these carried, and how far should they be? What dangers, if any, here?

8. Doll families, and the relationship of the members; doll schools, doll parties, balls, entertainments, weddings.

9. Doll discipline, hygiene, and regimen: What toilet and what rewards and punishments are usual, and what moral qualities are aimed at?

10. Dolls' sleep: How are they put to sleep? What are the favorite lullabies, and does the doll's sleep keep the children good and quiet?

11. Dress: What is the influence of dolls upon the children? Can taste in dress, tidiness, thoroughness in making their clothes, or other moral qualities be cultivated? How does the material of which the doll is made and the degree of lifelike perfection react on the child? Is there regularity and persistency in the care of dolls? Is imagination best stimulated by rude dolls, which can be more freely and roughly used? Are children better morally, religiously, socially, or better prepared for parenthood and domestic life by them? How can the educational value of dolls be better brought out?

The above points are intended to be merely suggestive, and are, of course, far more comprehensive than any returns are expected to be.

Read this syllabus and write down with accuracy any facts which memory or observation may suggest, carefully specifying age, sex, and nationality.

Or, if practical, question children, or, if in a normal school, let teachers take this syllabus as a lesson on the blackboard in the psychology of childhood, and each record memory or observation.

Returns addressed as below will be carefully edited, credited, printed.

G. Stanley Hall.

Clark University,
Worcester, Mass., November, 1894.

The returns from the above questionaire were of various degrees of merit. Ninety-four boys are reported on; the rest are girls. The majority of all were written by young girls and women, between 14 and 24.

Mr. A. C. Ellis issued the following supplementary syllabus:

"Will each person receiving this kindly answer, briefly, on this paper and return it to the address below? State age and sex."

1. Did you ever play with dolls? 2. Did you especially enjoy it? 3. About what age did you begin and stop? (Age in figures.) 4. Did you ever play with paper dolls? 5. At what age did you begin and stop? 6. Did paper dolls dull your interest for other dolls? 7. Did you ever play with anything else as a doll, such as a cat, pillow, vegetable, stick, clothespin, etc., either dressed or without dress? 8. Did you enjoy this as much as your real dolls? 9. Had you plenty of child companions? 10. Did you prefer playing with dolls alone or with other children? 11. Did you prefer old and well-used or new dolls? 12. Between the ages of 1 and 6 did you prefer large or small dolls? 13. From 1 to 5 did you prefer your doll to be, and be dressed, as a baby, child, or adult? 14. Between 5 and 10 did you prefer baby, child, or adult? 15. Between 10 and 15 did you prefer baby, child, or adult? 16. Did your love of dolls grow out of love for a real baby? 17. When you stopped playing dolls was it because your love was transferred to a real baby? 18. Why did you stop playing dolls? 19. Describe your favorite doll, or any other, if you had no favorite. 20. How did you chiefly punish dolls when you were under 6? 21. How when older? 22. At what age did you first play that dolls died? 23. Did you ever try to feed dolls? 24. Did you ever think your dolls were hungry? 25. Did you ever think your dolls were sick? 26. Did you ever think your dolls were cold, tired, hungry, good, bad, jealous, loving you, hating anyone? 27. Which of the following ways of playing with dolls were your favorites: (1) Dressing and washing or sewing for dolls; (2) feeding; (3) nursing; (4) funerals or burials; (5) doll parties, weddings, or schools; (6) punishing; (7) putting to sleep; (8) making imaginary companions of your dolls to talk with and tell your secrets, or to build air castles with? 28. Do you know a mother now very fond of her children who was not fond of dolls as a girl? 29. Do you know of a woman who was very fond of dolls, but is not now very fond of children?

A. Caswell Ellis.

Clark University,
Worcester, Mass., June 1, 1896.

The results of the first syllabus show that of 845 children with 989 preferences, between the ages of 3 and 12, 191 preferred wax dolls, 163 paper dolls, 153 china dolls, 144 rag dolls, 116 bisque dolls, 83 china and cloth dolls, 69 rubber dolls, etc.

Doll substitutes illustrate animistic fancy. In answer to the first syllabus, pillows were treated as dolls by 39 children, sticks by 29, bottles by 24, dogs by 18, etc.

In reply to the supplementary questions, out of 579 children 57 had used a cat as a doll, 41 clothespins, 26 sticks, etc. Only 26 of all these were boys.

The following psychic qualities are ascribed to dolls in the order of frequency of their recurrence, the figures indicating the number of cases: Good, 97; cold, 51; jealous, 46; bad, 45; angry, 38; naughty, 36, etc.

Out of 579 answers to the supplementary syllabus, question 26 shows the following results: 230 children thought their dolls good, 202 thought they felt cold, 85 that they could love, etc.

We must refer the reader to the original article for returns as to: Dolls' food and feeding; sleep; sickness; death, funeral, and burial of dolls; dolls' names; discipline; hygiene and toilet; dolls' families, schools, parties, weddings, etc.

The educational value of dolls is very great; the doll habits of each child should be studied, if we are to understand the child.

In the table which follows, the figures of the upper horizontal line indicate the questions as they are numbered in the syllabus of Mr. Ellis. Under each special series the upper figure designates the affirmative answers; the lower, the negative answers. For example, of the 12 kindergarten boys below 6 years of age, 11 had played with dolls and 1 had not.

TABLE 21.

	1	2	3	4	5	6	7	8	9	10	11	12	16	17	22	23	24	25	26	28	29
12 boys below 6, kindergarten practice school, Boston	11	9	4	9	4	5	...	2	4	...	1	6	...	...	3—	4	4	2	...	...	...
	1	3	5	3	....	3	7	1	5	3	5	2	...	...	....	6	6	10	6	...	...
12 girls below 6, Boston practice school	11	11	.....	11	....	3	...	3	4	1	...	7	...	...	3—	8	9	5	1	...	...
	1	1	.....	1	....	7	5	3	3	7	7	2	...	...	....	3	2	6	2	...	...
44 boys below 6, Worcester	35	28	2.8	22	3.3	7	5	4	29	13	5	21	6	1	8—	18	17	15	1	...	...
	9	8	4.5	14	4.3	14	21	6	6	18	24	8	5	1	4.1	10	13	14	4	...	...
48 girls below 6, Worcester	48	46	2.6	37	3.11	8	12	12	38	9	3	29	2	...	4.8	34	30	23	5	...	...
	..	2	.....	11	....	24	8	18	5	35	39	11	8	...	....	8	12	18	3	...	...
50 girls, 6 to 12, Worcester	50	50	.....	45	....	7	26	25	47	10	12	42	25	3	....	47	38	40	...	...	...
	..	...	.....	2	....	38	13	13	3	40	18	7	21	4	....	3	12	10	...	...	...
50 boys, 6 to 12, Worcester	42	27	.....	30	....	12	6	10	36	20	20	28	19	11	....	19	18	22	...	...	...
	8	13	.....	14	....	18	12	15	12	22	21	17	22	14	....	23	24	20	...	...	...
50 girls, 6 to 12, Boston primary school	49	46	.....	43	....	7	18	27	40	12	9	29	22	2	....	42	31	35	...	...	...
	1	3	.....	4	....	38	8	15	9	36	39	18	17	1	....	5	16	12	...	...	...
50 boys, 6 to 12, Boston primary school	34	32	.....	22	....	5	9	12	26	9	9	18	16	3	....	24	21	21	...	...	...
	10	4	.....	14	....	13	16	8	10	23	23	12	13	5	....	11	14	14	...	...	...
97 high-school girls, Worcester	97	80	.....	89	....	31	36	31	82	15	26	62	11	12	....	82	60	69	...	...	...
	..	17	.....	8	....	40	26	41	14	78	60	23	81	84	....	15	34	23	...	...	...
5 blind boys, average age 5.2	3	3	.....	1	....	...	1	3	3	2	...	2	...	...	1—	3	3	3	3	...	...
	2	2	10	4	....	4	3	1	2	1	2	1	2	...	5	...	...	...	...	...	...
4 blind girls, average age 6.3	4	4	1	3	....	...	2	2	4	3	1	2	...	...	3—	4	4	4	2	...	...
	..	...	14	1	....	3	2	2	...	1	3	...	2	...	5	...	...	...	...	1	1
45 feeble-minded girls	45	42	3.6	22	....	3	12	8	10	18	5	1	...	...	18+	24	31	35	28	...	...
	..	3		18	11	10	7	21	1	26	33	1	6	4	15—	7	10	6	...	...	...
16 foreign girls	16	15	2.7	9	5.5	2	10	10	16	4	4	13	6	1	42—	13	10	11	...	...	3
	..	1	9.5	6	8.2	5	2	4	...	12	12	2	9	8	5.5	5	6	5	...	4	1
10 foreign boys	10	8	2.9	6	4.6	...	2	3	9	2	3	9	8	1	5—	8	9	6	...	1	...
	..	2	6	4	7.8	5	1	6	1	8	7	...	2	2	5.8	1	1	10	1	1	2
37 eighth-grade grammar boys	27	24	4.9	29	2.11	26	1	30	32	11	11	18	29	...	3.5	33	31	26	2	...	...
	10	9	7	9	7	6	...	7	5	25	24	18	6	...	....	4	6	10	4	...	...
11 boys, 17 to 19, average Horace Mann School for Deaf and Dumb	6	4	3	4	4.6	1	5	1	3	3	1	3	2	...	2—	4	2	3	5	1	...
	5	7	5.2	2	7	3	1	2	3	3	5	3	...	1	4.3	1	4	3	1	...	...
38 girls, average 13 to 19, Horace Mann School for Deaf and Dumb	38	36	3.4	26	4.1	7	15	7	31	9	7	20	7	3	12—	31	21	26	20	...	1
	..	2	12	11	12.9	19	15	16	5	26	29	14	12	14	7	6	15	11	10	9	9
Averages	526	465	3 +	408	3.9	122	160	190	414	141	117	310	153	37	....	398	339	352	67	2	4
	47	77	8.1+	126	8.3	252	147	179	84	364	351	139	206	138	....	108	175	172	31	15	13

Under three is averaged the age of beginning and stopping doll play, placing the former over the latter; thus for 44 Worcester boys below six years, the average age of beginning doll play was two years and eight months, and the average age of ceasing was four years and five months. The same method is followed in column 5. For question 7 the upper number designates whether children played with anything else as if it were a doll. For question 10 the upper figure designates alone, the lower with others. For question 11 also the order of words in the syllabus is followed, the upper figure designating old, the lower new, and in question 12 the upper figure designates the preference for large and the lower small dolls. In 22 the minus sign means never played that dolls died, while the other figures designate the average age in years and months when death was played. In question 26 the upper figure designates the number of those who ascribed any one or more of the psychic qualities named in the question to doll, and the lower number designates the number of those who assigned none, leaving it to the supplementary table to show the relative frequency of each of the qualities.

From above table it appears that of average city-school children below six years, 82 per cent of boys and 98 per cent of girls have played dolls; between six and twelve years, 76 per cent of boys and 99 per cent of girls; of high-school girls, 100 per cent.

Those confessing that they ever specially enjoyed doll play are: Below six years, 77 per cent of boys, 95 per cent of girls; between six and twelve years, 78 per cent of boys, 97 per cent of girls; of high-school girls, 82 per cent.

Those ever having used substitutes are: Below six years, 15 per cent of boys, 48 per cent of girls; between six and twelve years, 35 per cent of boys, 68 per cent of girls; of high-school girls, 58 per cent. Thus girls appear to lead the boys in every grade. Nearly 50 per cent of the girls, and a little less of the boys, answering in all grades, said they loved the substitutes as much as real dolls.

Paper dolls had been used by 73 per cent of those below six years, by 80 per cent between six and twelve years, by 92 per cent of high-school girls. Interest in other dolls was thought dulled by paper dolls by 34 per cent of boys and 26 per cent of girls below six, 35 per cent of boys, and 15 per cent of girls between six and twelve, 44 per cent of high-school girls.

Of all kinds of children—blind, deaf, foreign, etc.—only 17 per cent speak of lack of child companionship, and 72 per cent prefer playing dolls in company; 38 per cent say that love of dolls grew out of love of real baby, and 13 per cent transferred their doll love to babies; 79 per cent had tried to feed dolls; 66 per cent have thought dolls hungry; 68 per cent have ascribed to dolls some of the psychic qualities mentioned; 67 per cent have thought them sick.

BIBLIOGRAPHY.

Beauregard, M. Ollivier. Bulletin de la Société d'Anthropologie, Paris, No. 10, Dec., 1894.

Griffis, W. E. Transactions of the Asiatic Society of Japan. Vol. 11, pp. 132-3. London, 1882. Games and sports of Japanese children.

Schmid, Dr. K. A. Encyklopædie des gesammten Erziehungs- und Unterrichtswesens. 111, Goethes-Kindheit.

Lazarus, Dr. M. Ueber die Reize des Spiels.

Von Victor Blütgen. "Der Zinn Soldat," "Oesterreichischer Jugendfreund," "Die Alte Standuhr."

Chambers' Journal, Nov. 12, 1831. Doll philosophy, Feb., 1888.

St. Nicholas, August, 1888, Sept., 1881. How to make dolls of corn husks and flowers. Consult index for other references.

Low, Francis H. Queen Victoria's dolls. London, 1894.

Fournier, Édouard. Histoire des jouets et des jeux d'enfants. Paris, 1889.

Twenty-sixth Report of the Pedagogical Museum, St. Petersburg, 1888-89, contains reports on the toy exhibitions there.

Schlegel, Dr. Gustav, in the T'oung Pao, Vol. VII, No. 1, 1896.

Fewkes, J. Walter. Dolls of the Tusayan Indians. Archiv für Ethnographie, Vol. VII, pp. 45-73.

L'Évolution de l'enfant. Compayré. Paris, 1893. Chapter on Les jeux (273).

Studies of Childhood. Sully. New York, 1896. See index for many references, especially account of George Sand's doll experience.

Conversations littéraires et morales. H. Rigault. Nouvelle édition, 1882, p. 5.

The Child and Childhood in Folk-Thought. A. F. Chamberlain. New York and London, 1896.

Psicologia del Bambino. Lombroso, p. 126.
Histoire de ma vie. George Sand.
L'Art et la poésie chez l'enfant. Pérez, p. 28.
Origin of Civilization. Sir John Lubbock. Appendix, p. 521.
Buch der Kindheit. Goltz.
Les jouets d'enfants. H. Rigault, 1858. (He says: "La Prusse est décidément la première puissance militaire pour les soldats de plomb!")

MEMORY TESTS ON WHITE AND COLORED CHILDREN.

Mr. George R. Stetson made a study upon 500 black and 500 white children in the Washington public schools. He recited to some 20 to 40 children at a time one of four simple verses, written for children by Eugene Field. After explaining the difficult words, the children were required to recite the same verse in concert, twice repeating. Each child was afterwards asked in private to repeat the verse. The degree of proficiency in memory was noted. The verses used were the following:

I.

"Give me my bow," said Robin Hood,
"An arrow give to me,
And where 'tis shot, mark thou that spot,
For there my grave shall be."

"I once knew all the birds that came
And nested in our orchard trees;
For every flower I had a name,
My friends were woodchucks, toads, and bees."

"One night a tiny dewdrop fell
Into the bosom of a rose;
'Dear little one, I love thee well,
Be ever here thy sweet repose.'"

"'My shepherd is the Lord my God.
There is no want I know;
His flock He leads in verdant meads
Where tranquil waters flow.'"

The 1,000 examined were of the fourth and fifth grades. The average age of the whites was 11 years; of the blacks, 12.57 years. The blacks excelled the whites in their power of memory retention, exceeding them by 18 per cent. A general correspondence was found between their memory averages and their scholarships as recorded by the teachers; yet the memory rank of the blacks exceeded their rank in studies more than did that of the whites exceed their study rank; yet the blacks appeared to be inferior in intellect. In both cases there was a better knowledge of signs and symbols used than of the things signified.

CHILDREN'S ATTITUDE TOWARD GHOSTS.

As a basis for the following study of Louise Maitland[1], reminiscent papers of 171 university students were used.

The memories of ghosts are generally vague and difficult of analysis. The purpose of this inquiry is to find how far children believe in ghosts and whether this fear plays a conspicuous part in their lives, and to see what remedy may be suggested, if one is needed.

Table 22, which follows, shows the results:

TABLE 22.

Number of papers	171
Number of statements collated	795

[1] Studies in Education, V, November, 1896.

I.—*Attitude of writer, 164.*

1. Formal statements concerning belief, 122.

Disbelieved	41	Believed, but questioned	9
Believed	35	Disbelieved, but questioned	9
Believed something else	21	Disbelieved, but feared	7

2. Formal statements concerning remembrance, 25.

No remembrance	17	Vague remembrance	8

3. Formal statements concerning importance, 17.

Not important in childhood	15	Important in childhood	2

II.—*Personal reaction aroused, 95.*

Was afraid	42	Was not afraid	5
Fascinated	17	Was afraid to tell	3
Feared something else	13	Enjoyed	2
Fear lingered	11	Wanted to run away	2

III.—*Sources of information, 110.*

1. Social, 77.		2. Solitary, 33.	
Children	26	Stories read	22
Stories told	24	Pictures	9
Servants	18	Imagination	2
School	4		
Games	3		
Parents	2		

IV.—*Educational influences exerted, 43.*

1. Disbelief taught, 41.		2. Belief taught, 2.	
Parents	21	Parents	2
Miscellaneous	18		
Teacher	2		

V.—*Age, 44.*

1. Definite statements	18	2. Indefinite statements	26

VI.—*Conception of ghosts, 339.*

1. Appearance of, 158.

Clothed in white	50
Like human figure	19
Shadowy	17
Like dead persons	14
With long arms or hands	11
Like skeletons	8
Vague	7
With sepulchral voice	6
Without substance	5
Luminous	5
Black	4
Like animals	4
Like fairies or spirits	4
With lurid, hollow eyes	4

2. Power of ghosts, 82.

Catch, chase	26

2. Power of ghosts, 82—Continued.

Cause fright	20
Glide swiftly	15
Appear and disappear	9
Do all sorts of mysterious things	5
Foretell death	4
Injure	3

3. Time of appearance, 55.

In the dark and when alone	36
Night	14
Twilight	5

4. Places where they may be expected, 44.

Graveyards	19
Lonely places	9
Bedrooms and attics	8
Haunted house	8

According to Louise Maitland, it is difficult to attach any real importance to the formal statements of the writers as to their belief or disbelief as children in ghosts.

The more or less vivid descriptions of fear in ninety-three cases are the most important features of the study.

In reply to the question, "Is there a stage in the development of children when they are prone to believe in and be frightened by debasing superstitions?" Miss Maitland finds:

First, that such a stage is clearly suggested; for while 58 did not believe or remember, 56 believed in ghosts or something similar, and 33 are doubtful as to what they did believe.

Of the 171 writers, 34 per cent presumably had no fear, since they either disbelieved in ghosts or had no fear of them. Of the 66 per cent remaining, 60 per cent mention fear, showing that fear almost universally accompanies the belief in ghosts.

One remedy is distinctly pointed out by the 41 writers who say that disbelief was taught to them. A study of the sources of information affords us another hint. Since we can not altogether prevent our children from hearing these superstitions from people who more or less believe in them, it would be a wise precaution to let them hear the truth at the same time. But more important perhaps than this is the suggestion contained in that part of these papers concerning a belief in other spirits, viz: That we may substitute harmless or even ennobling fancies in place of the baser sort.

Peculiar and Exceptional Children.

Dr. Bohannon, of Clark University, gives the results of reports from 1,045 peculiar or exceptional childred—613 girls and 432 boys. These reports come from answers to the following syllabus:[1]

If you desire to receive the syllabi of this school year, to cooperate in collecting data, and to receive the final reports of the work, you are hereby respectfully invited:

First. To think over your own childhood and consider if you were a striking illustration of any of the following types; and if so, describe your case.

Second. Consider if you have any friends who would come into any of the classes below, and ask them to describe their own case.

Third. If you have children of your own, or if you are a teacher, if any of your pupils, past or present, are strikingly exceptional, describe them.

Fourth. If you are a college or normal instructor, explain very fully what is wanted, and ask each pupil to describe one or more such cases in a composition, essay, or a theme in psychology.

Fifth. State the salient points concerning any exceptional children you ever read of, whether fact or fiction, referring to the source if you can.

The following are types suggested to select from, but any others will be welcome:

1. *Physical.*—Exceptional beauty or ugliness; largeness or smallness; any bodily deformity; conspicuous scars or traumatic lesions; defects of sense or limb, as dimness of vision or slightly under normal hearing, weakness of spine, legs, or arms, etc.; exceptional strength, agility, clumsiness or deftness, or gifts of sense; any other marked physical peculiarity.

2. *Psychical.*—A child of exceptional courage or timidity; cleanliness or dirtiness; order or disorder; obedience or disobedience; truth telling or lying; cruelty or sympathy; selfishness or generosity; loquacity or silence; frankness or secretiveness; buoyancy or despondency; daintiness or gluttony; a blasé or otherwise spoiled child; a doubter, investigator, or critic; a buffoon; a restless, fickle scatter-brain or a tenacious child; an ugly and ill-tempered child; a careless, easy-going or a fastidious child; an inquisitive, imaginative, or poetic child; a teaser or hector; a nervous child; a querulent, whining child; a dignified and self-poised child, or one who acts habitually with abandon.

It is not a description of one or more of the above traits that is wanted, but an account of one or more individual cases where one trait or group of traits is so marked as to color the entire character of the child, to be known to all who see much of it, to therefore bear on the child's future career.

Note in each case, if you can, whether the trait is hereditary; in which parent, how far back can it be traced, and how marked was it in the ancestry? To this point the greatest importance is attached, and it should receive special attention.

Give, briefly, specific acts or instances of the manifestation of the trait.

[1] The Pedagogical Seminary, Vol. IV, No. 1, October, 1896.

State how each case has been treated at home and in school, and how you think it should be.

Always describe each case with the greatest conciseness and with the greatest fidelity to fact.

Always state age, sex, nationality, complexion, and temperament.

Always write on but one side of your paper.

Begin every new case on a new page.

Write at the head of the first page of each case one or more words designating the type, as a dirty child, a precocious child, etc.

There are 43 types of individuals of various ages represented in the answers, but nearly all are below the period of early manhood or womanhood.

In giving a statistical analysis of the results, the types were divided into three groups based on the worth to the individual of the various peculiarities—(1) the advantageous, (2) the neutral, and (3) the disadvantageous peculiarities.

In the advantageous peculiarities are found the tall, heavy, stout, strong, agile, deft, beautiful, clean, generous, sympathetic, buoyant, orderly, obedient, courageous, and those having keen sense powers.

In the neutral peculiarities are found the buffoons, frank, loquacious, imaginative, inquisitive, dignified, teasers, silent, and the dainty.

To the disadvantageous peculiarities belong the dirty, ill-tempered, small, timid, whining, disorderly, disobedient, cruel, gluttonous, selfish, those with sense defects, bodily weakness, ugly, nervous, deformed, spoiled, birth-marked, liars, clumsy.

From Table 23 it will be seen that the advantageous peculiarities are inherited more than twice as much (0.629) as the disadvantageous (0.281).

TABLE 23.

	Inherited.			From father.			From mother.			From both parents.			Not inherited.			No information.			Total number of each type.
	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	
Tall	7	12	19	1	2	3	3	1	4	2	5	7	....	....	....	....	1	1	20
Heavy	13	37	50	5	10	15	6	17	23	2	7	9	....	4	4	6	18	24	78
Stout	3	4	7	1	2	3	...	2	2	2	...	2	....	1	1	2	....	2	10
Strong	6	4	10	2	3	5	...	1	1	3	...	3	....	2	2	5	3	8	20
Agile	10	5	15	2	3	5	...	2	2	4	...	4	1	....	1	5	2	7	23
Deft	4	1	5	2	...	2	1	1	2	...	...	....	2	2	4	1	2	3	12
Keen senses and mental precocity.	5	5	10	2	2	4	4	....	4	...	...	....	1	3	4	4	4	8	22
Beauty	10	42	52	5	8	13	3	18	21	1	7	8	....	10	10	9	4	13	75
Clean	10	30	40	2	7	9	4	14	18	4	8	12	....	3	3	3	10	13	56
Generous	5	6	11	1	2	3	1	1	2	3	3	6	2	3	5	2	2	4	20
Sympathetic	8	12	20	...	3	3	5	6	11	3	3	6	....	....	....	4	9	13	33
Buoyant	2	3	5	2	2	4	...	....	....	...	1	1	2	1	3	1	1	2	10
Courageous	4	2	6	2	...	2	1	1	2	1	...	1	2	3	5	3	4	7	18
Orderly	4	12	16	1	2	3	1	6	7	2	5	7	1	2	3	3	1	4	23
Obedient	....	4	4	...	1	1	...	1	1	...	2	2	....	....	....	1	2	3	7
Total	91	179	270	28	47	75	29	71	100	27	41	68	11	34	45	49	63	112	427
Buffoons	4	1	5	3	...	3	1	....	1	...	...	....	....	1	1	5	....	5	11
Frank	2	4	6	...	...	....	2	....	2	2	...	2	....	....	....	2	1	3	9
Loquacious	6	7	13	2	5	7	5	....	5	...	...	...	....	....	....	4	6	10	23
Inquisitive	4	5	9	1	1	2	...	4	4	2	...	2	1	4	5	4	3	7	21
Dignified	2	4	6	1	2	3	...	....	....	1	1	2	1	2	3	1	3	4	13
Silent	2	9	11	1	7	8	...	2	2	1	...	1	1	4	5	2	5	7	23
Imaginative	1	....	1	...	1	1	...	....	....	...	...	....	2	5	7	2	1	3	11
Dainty	5	1	6	1	1	2	2	....	2	2	...	2	1	1	2	....	7	7	15
Total	26	31	57	9	17	26	10	6	16	8	1	9	6	17	23	20	26	46	126
Small	9	15	24	4	1	5	4	7	11	...	3	3	7	34	41	....	1	1	66
Deformed	4	4	8	1	...	1	1	2	3	...	...	....	22	17	39	11	4	15	62
Ugly	5	10	15	2	1	3	...	7	7	...	3	3	....	2	2	....	....	....	17
Nervous	2	4	6	1	...	1	1	4	5	...	...	....	2	6	8	3	11	14	28
Birthmarks	1	2	3	1	1	2	...	1	1	...	...	....	9	17	26	7	10	17	46
Clumsy	3	3	6	1	1	2	1	2	3	1	...	1	2	2	4	2	1	3	13
Bodily weakness	1	....	1	...	1	1	...	....	....	...	...	....	....	....	....	5	....	5	6
Mental, sense, and speech defect	4	4	8	2	1	3	1	2	3	...	...	....	11	8	19	2	5	7	34

TABLE 23—Continued.

	Inherited.			From father.			From mother.			From both parents.			Not inherited.			No information.			Total number of each type.
	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	Boys.	Girls.	Both.	
Dirty	7	3	10	...	...	...	6	3	9	...	...	...	7	4	11	8	1	9	30
Temper	8	4	12	4	...	4	4	4	8	1	...	1	2	...	2	4	6	10	24
Timid	1	5	6	...	1	1	...	4	4	...	...	...	5	7	12	6	8	14	32
Whining	...	1	1	...	...	...	...	...	...	...	1	1	1	4	5	...	1	1	7
Disorderly	1	1	2	...	1	1	...	...	...	...	...	...	3	...	3	...	2	2	7
Disobedient	5	3	8	1	...	1	3	2	5	2	2	4	3	1	4	6	1	7	19
Cruel	4	...	4	3	...	3	...	...	...	...	...	...	10	2	12	6	2	8	24
Selfish	1	4	5	...	1	1	1	...	1	...	...	...	3	2	5	1	2	2	12
Gluttony	2	1	3	...	2	2	...	...	...	...	1	1	1	...	1	...	...	1	5
Spoiled	2	2	4	2	...	2	...	4	4	1	...	1	7	5	12	...	...	...	16
Total	60	66	126	22	11	33	22	42	64	5	10	15	95	111	206	61	55	116	448
Total, three groups	177	276	453	59	75	134	61	119	180	40	52	92	112	162	274	130	144	274	1,001

	Inherited.	Not inherited.	No information.	Total.	Percentage which inherits.	Percentage which does not inherit.	Percentage of no information.	Number inheriting from father.	Number inheriting from mother.	Number inheriting from both parents.	Total.	Percentage from father.	Percentage from mother.	Percentage from both.
Group 1.														
Boys	91	11	49	151	.602	.074	.331	28	29	27	84	.184	.192	.178
Girls	179	34	63	278	.643	.122	.233	47	71	41	159	.169	.255	.147
Both	270	45	112	427	.629	.104	.265	75	100	68	243	.174	.233	.158
Group 2.														
Boys	26	6	20	52	.500	.115	.384	9	10	8	27	.172	.192	.153
Girls	31	17	26	74	.424	.219	.354	17	6	1	24	.232	.083	.013
Both	57	23	46	126	.456	.176	.368	26	16	9	51	.208	.128	.072
Group 3.														
Boys	60	95	61	215	.278	.437	.283	22	22	5	49	.102	.102	.023
Girls	66	111	55	232	.284	.478	.238	11	42	10	63	.047	.181	.043
Both	126	206	116	448	.281	.457	.258	33	64	15	112	.073	.142	.033
Totals of groups 1, 2, and 3.														
Boys	177	111	130	418	.423	.265	.311	59	61	40	160	.141	.145	.095
Girls	276	161	146	583	.473	.293	.250	75	119	52	246	.125	.204	.089
Both	453	272	276	1,001	.452	.271	.275	134	180	92	408	.133	.178	.091
Group 4. [a]														
Boys	64	4	27	95	.673	.042	.284	19	16	15	50	.200	.168	.147
Girls	110	20	36	166	.668	.120	.228	30	41	21	92	.180	.247	.125
Both	174	24	63	261	.666	.091	.241	49	57	36	142	.187	.218	.137
Group 5.														
Boys	24	53	28	105	.227	.504	.262	12	9	.....	21	.114	.085	......
Girls	40	84	31	155	.258	.541	.200	5	23	7	35	.032	.141	.043
Both	64	137	59	260	.246	.526	.226	17	32	7	56	.065	.123	.027

[a] Groups 4 and 5 are obtained, as elsewhere mentioned, from groups 1 and 3 by omitting from 1 all but the large, the heavy, the tall, the strong, the agile, and the beautiful, and by omitting from 3 all but the ugly, the deformed, the nervous, the birth-marked, the small, the bodily weak, and those having sense or mental defects.

YOUTHFUL DEGENERACY.

According to Professor Lancaster, degeneration is "a gradual change of the structure in which the organism becomes adapted to less varied and less complex conditions of life." In applying this term to man, Morel considers degeneration as a "morbid deviation from an original type."

In the following investigation of degeneracy, G. E. Dawson,[1] Fellow in Clark University, gives the results of an examination of 60 juvenile delinquents. There were two groups, comprising 26 boys with an average age of 16 years. They were selected by the authorities of the institution as specimens of the following classes of offenders: Thieves, incendiaries, assaulters, sexual offenders, and general incorrigibles.

In the following tables, 24, 25, 26, 27, and 28, are given the results of Dawson's investigation.

TABLE 24.—*Showing the vitality of 52 juvenile delinquents, compared with normal averages at same age.*

	Groups.	
	Boys.	Girls.
Number of cases	26	26
Average age	15	16
Height:		
Average ... centimeters..	150	150.6
Normal average (same age) *a* ... do....	159.9	156.7
Inferior to normal average by from 1 to 28 centimeters ... per cent..	92	86
Same as normal average ... do....	00	00
Superior to normal average by from 1 to 9 centimeters ... do....	8	14
Weight:		
Average ... kilograms..	44.33	51.79
Normal average (same age) *a* ... do....	50.26	51.24
Inferior to normal average by 1 to 22 kilograms ... per cent..	84	37
Same as normal average ... do....	4	4
Superior to normal average by 1 to 13 kilograms ... do....	12	59
Mean chest girth:		
Average chest girth ... centimeters..	74.8	73
Normal average (same age) *b* ... do....	76.56	78.85
Inferior to normal average by 1 to 15 centimeters ... per cent..	70	73
Same as normal average ... do....	4	16
Superior to normal average by 1 to 15 centimeters ... do....	26	11
Mean strength of grip:		
Average mean strength of grip ... kilograms..	25.05	19.95
Normal average (same age) ... do....	25.32	20.82
Inferior to normal average by 1.32 to 11.82 kilograms ... per cent..	56	56
Same as normal average ... do....	4	00
Superior to normal average by 1.18 to 15.18 kilograms ... do....	40	44
Mean reaction to pain:		
Average ... kilograms..	5.89	4.94
Normal average (same age) ... do....	9.62	6.58
Less sensitive than normal average ... per cent..	4	12
Same as normal average ... do....	4	8
More sensitive than normal average ... do....	92	80

a Bowditch's Tables of Boston children: Twenty-second Annual Report, State Board of Health, Massachusetts.

b Porter's Tables of St. Louis children: Transactions of the Academy of Science of St. Louis, Vol. VI, No. 12.

[1] Ped. Seminary, December, 1896.

TABLE 25.—*Showing circumference of head and cephalic and facial indices, compared with normal standards.*

	Groups.	
	Boys.	Girls.
Number of cases	26	26
Average age	15	16
Circumference:		
Average horizontal circumference .... centimeters..	53.2	51.9
Normal average (same age) *a* .... do....	54.7	52.5
Smaller than normal average by 1.7 to 5.2 centimeters .... per cent..	64	40
Same as normal average .... do....	27	48
Larger than normal average by 1.3 to 4.3 centimeters .... do....	9	12
Cephalic index:		
Average index	80.01	81
Normal average (same age) *b*	80.01	79.72
Lower than normal average .... per cent..	50	27
Same as normal average .... do....	23	8
Higher than normal average .... do....	27	65
Dolichocephalic .... do....	8	00
Mesocephalic .... do....	42	32
Brachycephalic .... do....	50	68
Facial index:		
Average index	76.35	76.98
Normal average (same age) *b*	73.62	73.44
Lower than normal average by 1.17 to 11.27 per cent .... per cent..	24	8
Same as normal average .... do....	8	8
Higher than normal average by 1.10 to 9.18 per cent .... do....	68	84
Exceptionally narrow face (below 66) .... do....	8	4
Exceptionally broad face (above 77) .... do....	40	44

a Quetelet's Anthropometric Tables.
b Computed from Porter's Tables of Measurements of St. Louis children.

TABLE 26.—*Showing stigmata according to types of delinquency; also in comparison with normal standards. a*

	Theft.		Unchastity.		Assault.		Incendiarism.		General incorrigibility.		Totals for boys.	Totals for girls.	Per cent of delinquent boys having stigmata.	Per cent of normal men having stigmata.	Per cent of delinquent girls having stigmata.	Per cent of normal women having stigmata.
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.						
Number of observations	10	4	5	10	2	0	3	0	6	12	26	26	......	......	......	.....
Plagiocephali	3	1	1	1	0	0	0	0	2	3	6	5	23.0	20.0	19.2	17.2
Platycephali	1	0	1	2	0	0	0	0	0	0	2	2	7.7	15.0	7.7	0.1
Scaphocephali	1	0	0	0	0	0	0	0	0	0	1	0	3.8	6.0	0.0	0.0
Hydrocephali	1	0	0	0	0	0	0	0	0	0	1	0	3.8	......	0.0	.....
Asymmetrical face	3	1	1	6	0	0	2	0	2	4	8	11	30.8	6.0	42.3	0.1
Prognathous jaws	1	0	1	3	0	0	1	0	0	5	3	8	11.5	34.0	30.8	10.0
Large lower jaw	2	1	2	1	2	0	0	0	1	2	7	4	26.9	29.0	15.4	6.5
Precocious wrinkles	1	0	1	0	0	0	0	0	0	0	2	0	7.7	......	0.0	.....
Bad eruptions	0	0	3	0	1	0	0	0	0	0	4	0	15.4	......	0.0	.....
Large birthmarks	1	0	0	0	0	0	0	0	0	0	1	0	3.8	......	0.0	.....
Asymmetrical ears	3	0	0	2	0	0	2	0	2	1	7	3	26.9	......	11.5	.....
Protruding ears	4	0	3	0	0	0	0	0	2	0	9	0	34.6	......	0.0	.....
Deformed palate	4	1	2	4	1	0	0	0	3	4	10	9	38.6	*b*19.0	34.6	*b*19.0
Asymmetrical arms	4	1	2	5	1	0	1	0	2	5	10	11	38.6	......	42.3	.....
Web feet	0	0	0	0	0	0	0	0	1	0	1	0	3.8	......	0.0	.....
"Pigeon-breast"	0	....	0	....	0	0	1	0	2	....	3	....	11.5	......	......	.....
Total stigmata	29	5	17	24	5	0	6	0	17	24	74	53	......	......	......	.....
Number per child	2.9	1.2	3.4	2.4	2.5	0	2	0	2.8	2	29	2	......	......	......	.....

a Lombroso: *L'Homme Criminel*, 2d French ed., p. 170.
b Clouston: *Neuroses of Development.*

TABLE 27.—*Showing sensory and mental reactions, as compared with normal standards.*

	Groups.	
	Boys.	Girls.
Number of cases	26	26
Average age	15	16
SENSORY.		
Sight:		
Per cent defective among delinquent children	32	20
Per cent defective among normal children *a*	18	24
Hearing:		
Per cent defective among delinquent children	28	24
Per cent defective among normal children *b*	22.25	21.77
Touch:		
Average among delinquents ... millimeters	2.4	2.3
Normal average *c* ... do	2.2	2
Per cent having delicate touch, 1.5 or less	12	0
Same as normal average ... per cent	32	44
Per cent having very dull touch, 3 or more	32	32
MENTAL.		
Attention:		
Delinquent average	78	80
Normal average *d*	*e* 100	100
Per cent superior to normal average	24	26
Per cent inferior to normal average	76	74
Memory:		
Delinquent average	99	91
Normal average *d*	100	100
Per cent superior to normal average	64	36
Per cent inferior to normal average	36	64
Association:		
Delinquent average	44	113
Normal average *d*	100	100
Per cent superior to normal average	17	56
Per cent inferior to normal average	83	44

a Dr. G. M. West's tests of Worcester school children.—Am. Journal of Psychology, Vol. IV. Ninth grade pupils are taken as the standard.

b Reichard. Summarized by Oscar Chrisman, Pedagogical Seminary, Vol. II.

c Marro, Lombroso, and others.

d From tests of Worcester school children, made by Dawson.

e In each case the average of normal children is taken as 100, and the delinquent average is reckoned upon that basis.

TABLE 28.—*Showing parentage, surroundings, etc.*

	Boys.	Girls.		Boys.	Girls.
PARENTAGE.			PARENTAGE—continued.		
Nationality:			Intemperate:		
Irish	14	1	Father	15	10
American	3	9	Mother	6	2
French Canadian	4	6	Both	5	2
Negro	......	5			
Swedes	......	2	SURROUNDINGS.		
Jews	1	1			
English	1	......	Poor home	15	12
Scotch	1	......	No home	6	8
Russian	......	1	Belong to families in which there are		
Unknown	2	1	delinquents	6	5
Occupation:			Poor educational advantages	18	22
Laborers	16	12	Bad associates	26	25
Peddlers	2	......			
Clerk	1	1	HABITS, ETC.		
Merchant	......	1			
None	3	6	No occupation (idle)	23	20
Unknown	4	6	Drink intoxicants of various kinds	4	3
Religion:			Use tobacco, especially cigarettes	23	......
Catholic	19	9	Frequent houses of prostitution	......	4
Protestant	4	9	Night walkers	......	9
Hebrew	1	1	Been under arrest before present		
None	......	3	confinement	17	6
Unknown	2	4			

INTERPRETATION OF DEGENERACY.

Dawson believes that the foregoing study of delinquent children has demonstrated a general deviation from the physically and intellectually normal type. A deviation from the morally normal type has, of course, under the circumstances, been assumed. The salient points of inferiority may be finally summarized as follows:

1. There was a tendency to shorter statures, lighter weight, diminished strength in the muscles of the hands, and greater sensitiveness to pain.
2. There was a tendency toward smaller heads, broader heads, and broader faces, the type being, in general, that of lower races or of the infantile period of our own race.
3. There were more physical anomalies than are found among normal persons, mainly in the direction of asymmetrical heads and faces, and deformed palates.
4. There were more defects in sight and hearing, and a greater dullness in the sense of touch, than are found among normal persons.
5. The intellectual reactions were, in general, inferior to the normal. More specifically this was the case in attention, memory, and association.

CONCLUSION.

In concluding, Dawson thinks that the degeneracy found in these delinquent children must be interpreted mainly as the result of two forces: (1) a degenerative process at work in the drunken stock from which the children are descended; and (2) bad surroundings which have developed the process already inherited. Dawson says: "Their parents have undergone modification in the direction of a less perfect physical structure and less highly developed physical powers. They have deviated, morbidly, from the type of their race and civilization."

THE FIRST FIVE HUNDRED DAYS OF A CHILD'S LIFE.[1]

The child whose history is here recorded was born of American parents while residing in Zurich, Switzerland. The father's ancestry is purely American, while the mother's is purely English. On the paternal side the families were agricultural, on the maternal mechanical. The grandparents were of good health. The parents are physically strong and of sanguine temperament; both had university education, and were teachers before and after marriage.

The child at birth was physically strong. His mother was his only nurse and constant companion. During the first sixteen months she was not absent from him more than half a dozen times during his waking hours. All the observations were made by his mother, Mrs. Winfield S. Hall. All the measurements were taken by his father, Dr. Winfield S. Hall.

Table 29 gives a list of twenty-five measurements. The observations were made at the end of each month during the first year.

TABLE 29.

Measurements.	Age in months.													
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	15.	18.
Weight........kilograms..	3.95	4.52	5.0	5.40	5.90	6.48	7.5	8.30	9.15	10.0	10.4	10.5	11.1	11.2
Height.......centimeters..	51.5	56.0	60.5	64.3	65.3	67.1	69.3	70.0	72.0	72.7	73.5	74.5	77.5	83.0
Sitting..........do....	36 0	37.0	40.0	40.5	40.5	42.0	44.2	45.0	45.0	45.0	45.6	46.0	46.0	48.0
Knee............do....	14.0	15.0	15.0	15.5	16.0	16.7	17.0	17.5	19.5	19.5	19.5	19.7	21.0	22.0
Girth:														
Head............do....	38.5	39.9	40.4	41.5	42.7	43.3	14.1	45.0	45.5	46.4	47.3	47.5	48.3	49.0
Neck............do....	19.7	20.5	20.5	21.6	22.1	22.4	23.0	23.0	23.0	23.5	24.0	24.0	24.2	24.5
Chest...........do....	35.7	36.6	37.8	39.5	43.0	43.0	45.0	47.0	47.0	47.5	48.0	49.3	49.3	51.3
Chest at ninth rib ....centimeters..	35.2	37.2	38.0	40.0	42.4	43.5	45.2	47.0	47.0	47.8	48.5	49.5	49.5	52.0
Abdomen.......do....	36.0	37.7	38.6	39.0	40.6	44.5	46.0	47.5	48.0	49.0	50.0	50.0	50.0	50.0
Hips............do....	29.5	32.5	32.6	36.4	37.4	38.7	39.0	42.0	43.0	45.0	46.0	46.0	47.0	48.8
Upper arm......do....	10.3	10.7	11.8	12.0	13.0	13.0	13.6	14.5	15.5	15.6	15.7	15.8	16.7	16.3
Elbow...........do....	10.0	10.9	11.0	11.0	11.6	12.7	13.0	13.2	14.0	14.0	14.0	14.3	15.0	14.5

[1] The Child Study Monthly, November, 1896.

TABLE 29—Continued.

Measurements.	Age in months.													
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	15.	18.
Girth—Continued.														
Forearm . centimeters.	10.3	10.8	10.8	11.9	12.0	12.7	13.3	13.5	14.0	14.0	14.0	14.7	15.7	15.5
Wrist ....do....	7.5	7.9	7.9	8.3	9.0	9.5	9.7	9.7	9.8	9.9	10.0	10.8	11.5	11.0
Thigh ....do....	16.0	18.9	20.6	20.7	21.8	22.0	23.2	25.0	26.0	26.3	26.5	27.5	28.3	27.5
Knee ....do....	13.0	13.2	14.6	14.6	15.9	16.5	18.3	18.5	19.0	19.0	19.2	20.5	20.5	20.5
Calf ....do....	12.2	12.4	13.8	14.0	15.1	15.7	16.9	18.0	18.0	18.2	18.5	19.3	20.2	19.8
Ankle ....do....	9.0	9.4	9.8	10.0	11.2	11.4	12.1	12.3	12.5	12.8	13.2	13.3	13.7	13.9
Length:														
Head ....do....	13.0	13.5	13.7	13.9	15.2	16.0	16.0	16.0	16.2	16.2	16.3	16.5	17.0	17.2
Shoulder to elbow ....centimeters..	10.6	11.0	11.4	12.0	12.1	13.0	13.5	13.7	13.7	14.4	15.0	15.5	15.8	16.5
Elbow to tip....do....	14.0	15.3	15.4	16.0	17.0	17.3	17.5	17.8	19.0	19.0	19.0	19.3	21.0	21.4
Foot ....do....	8.1	8.6	8.6	9.0	9.1	9.5	10.2	10.3	10.4	10.4	10.5	11.2	11.7	12.6
Breadth:														
Head ....do....	10.0	11.0	11.3	11.5	11.7	12.5	12.5	13.0	13.3	13.3	13.3	13.3	13.3	13.3
Shoulders ......do....	12.5	13.5	14.5	15.0	17.2	17.7	19.0	19.5	19.5	20.0	20.4	20.4	20.5	20.7
Hips ....do....	10.5	11.5	11.5	12.5	13.0	13.5	14.0	15.0	16.0	16.0	16.0	16.0	16.0	16.0

TABLE 30.—*Data to use in a preliminary investigation of the question of changes in proportions of the body during infancy and early childhood.*

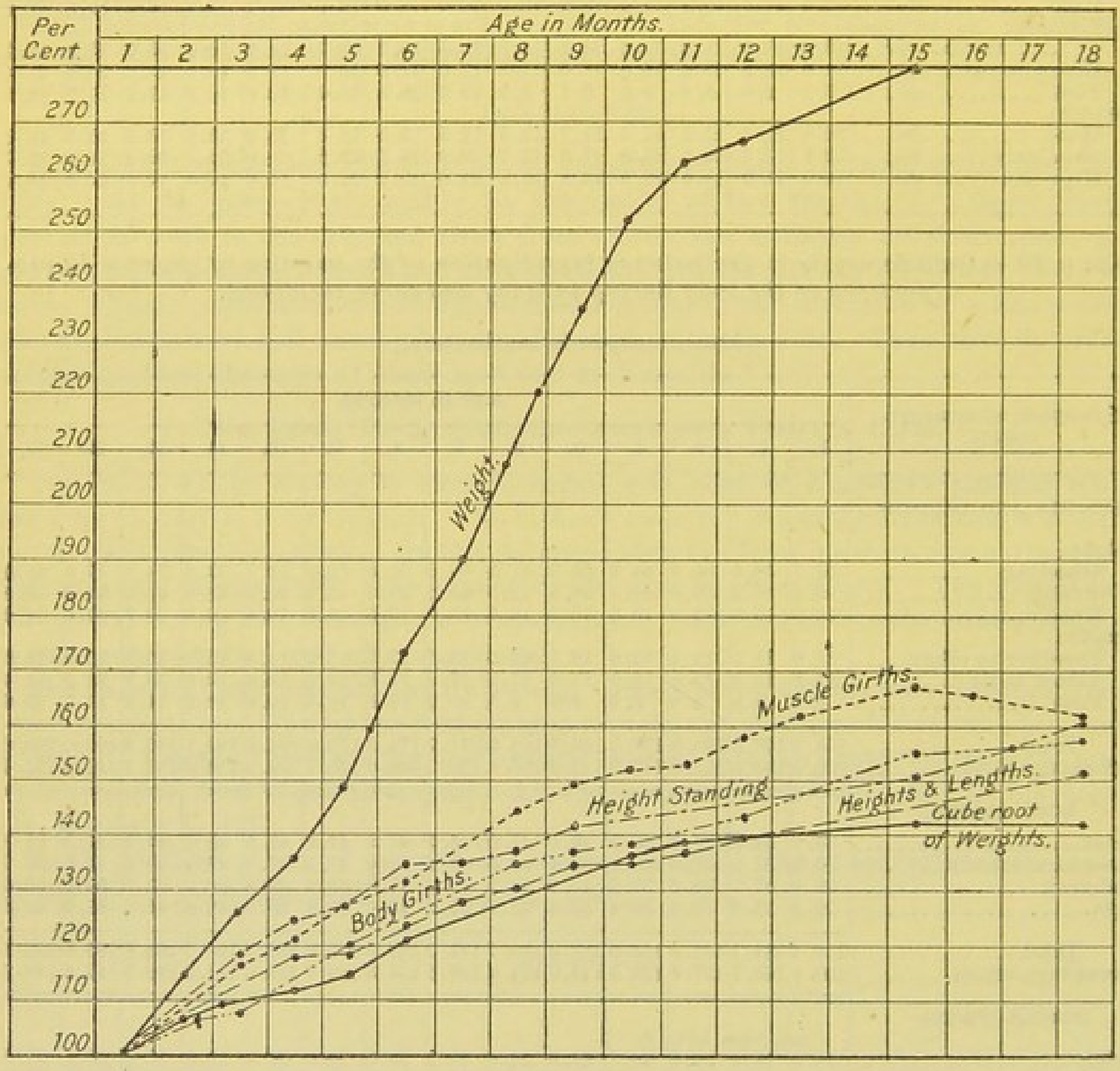
[Measurements in centimeters.]

Grouping of measurements.	Age in months.													
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	15.	18.
WEIGHTS AND LENGTHS.														
Height:														
Standing	51.5	56.0	60.5	64.3	65.3	67.1	69.3	70.0	72.0	72.7	73.5	74.5	77.5	83.0
Sitting	36.0	37.0	40.0	40.5	40.5	42.0	44.2	45.0	45.0	45.0	45.6	46.0	46.0	48.0
Knee	14.0	15.0	15.0	15.5	16.0	16.7	17.0	17.5	19.5	19.5	19.5	19.7	21.0	22.0
Length:														
Shoulder to elbow	10.6	11.0	11.4	12.0	12.1	13.0	13.5	13.7	13.7	14.4	15.0	15.5	15.8	16.5
Elbow to tip	14.0	15.3	15.4	16.0	17.0	17.3	17.5	17.8	19.0	19.0	19.0	19.3	21.0	21.4
Foot	8.1	8.6	8.6	9.0	9.1	9.5	10.2	10.3	10.4	10.4	10.5	11.2	11.7	12.6
Total	134.2	142.9	150.9	157.3	160.0	165.6	171.7	174.3	179.6	181.0	183.1	186.2	193.0	203.6
Percentage series.........	100.0	106.5	112.5	117.2	119.2	123.4	128.0	130.0	133.7	134.9	136.5	138.7	143.8	151.4
BODY GIRTHS.														
Chest	35.7	36.6	37.8	39.5	43.0	43.0	45.0	47.0	47.0	47.5	48.0	49.3	49.3	51.3
Chest at ninth rib	35.2	37.2	38.0	40.0	42.4	43.5	45.2	47.0	47.0	47.8	48.5	49.5	49.5	52.0
Abdomen	36.0	37.7	38.6	39.0	40.6	44.5	46.0	47.5	48.0	49.0	50.0	50.0	50.0	50.0
Hips	29.5	32.6	32.6	36.4	37.4	38.7	39.0	42.0	43.0	45.0	46.0	46.0	47.0	48.8
Total	136.4	144.1	147.0	154.9	163.4	169.7	175.2	183.5	185.0	189.3	192.5	194.8	195.8	202.1
Percentage series.........	100.0	105.7	107.8	113.5	119.8	124.4	128.5	134.5	135.7	138.8	141.2	142.8	143.6	148.2
MUSCLE GIRTHS.														
Thigh	16.0	18.9	20.6	20.7	21.8	22.0	23.2	25.0	26.0	26.3	26.5	27.5	28.3	27.5
Calf	12.2	12.4	13.8	14.0	15.1	15.7	16.9	18.0	18.0	18.2	18.5	19.3	20.2	19.8
Upper arm	10.3	10.7	11.8	12.0	13.0	13.0	13.6	14.5	15.5	15.6	15.7	15.8	16.7	16.3
Forearm	10.3	10.8	10.8	11.9	12.0	12.7	13.3	13.5	14.0	14.0	14.0	14.7	15.7	15.5
Total	48.8	52.8	57.0	58.6	61.9	63.4	67.0	71.0	73.5	74.1	74.7	77.3	80.9	79.1
Percentage series.........	100.0	108.2	116.5	120.1	126.9	130.0	137.3	145.5	149.8	151.9	153.0	158.4	165.7	162.1
Height standing: Percentage series	100.0	108.7	117.5	124.1	126.8	130.2	134.6	136.0	139.8	141.2	142.7	144.7	150.5	161.2
Weight: Percentage series	100.0	114.7	126.6	136.7	149.3	173.2	191.6	210.1	231.6	253.1	263.2	266.1	281.0	281.0
Cube root of weight: Percentage series	100.0	104.7	108.2	111.0	114.3	120.1	124.1	128.1	132.3	136.3	138.1	138.6	141.1	141.1

LAWS OF GROWTH.

1. The wave theory of growth, already demonstrated for children and youths of school age, is well illustrated in the course of any curve on the plate. The curve for muscle girths, for example, presents crests, at 3, 5, 8, and 15 months, and indicates periods of accelerated growth from the first to third month, fourth to fifth month, sixth to eighth month, and eleventh to fifteenth month; and periods of retarded growth, from third to fourth month, fifth to sixth month, eighth to eleventh month, and fifteenth to eighteenth month, or four periods of accelerated growth, followed by a like number of periods of retarded growth.

Showing course of increase in lengths, girths, and weights.



All the other curves show waves, though in a less marked degree than in the one just cited.

2. To test the relations of vertical to lateral dimensions—as cited above, under "a law of proportion of the human body"—is the principal purpose of this investigation.

Of the six curves traced, two represent vertical dimensions, heights and lengths, and heights standing; two represent lateral dimensions—body girths and muscle girths, while two represent mass—weight and cube root of weight. If the theory of the reciprocal relation of vertical and lateral dimensions is tenable, then we should expect: (1) That related curves will be parallel. (2) That in two reciprocal curves the periods of acceleration in one curve correspond with the periods of retardation in the other.

Now, the curves representing height standing and heights and lengths are related curves, because both represent vertical dimensions. If one follows their course from the first to the eighteenth month, one will find that they are remarkably parallel, i. e., that a period of acceleration in one corresponds to a period of acceleration in the other.

Let us inspect the other pair of related curves which represent lateral dimensions, i. e., the curves of muscle girths and of body girths.

Attention has already been called to the fact that the crests of the muscle girth curves occur in the third, fifth, eighth, and fifteenth months. Inspection of the body girths curve shows that its crests occur in the second, fifth, eighth, and fifteenth months. The slight discrepancy is of less moment than the lack of parallelism between the curves between fifteenth and eighteenth months. One curve shows a marked retardation of the rate of increase of the muscle girths, while the other shows only a slight retardation of the rate of increase of body girths. But this difference is easily accounted for. Between the fifteenth and eighteenth months the child suffered from a moderately severe attack of whooping cough. There was no increase in weight during these three months, but there was considerable increase in height and lengths. This combination must be accompanied by a decrease in girths. Now, a decrease in girth of arm or leg would signify a consumption of reserve fat, while a decrease of chest and abdomen measurements might signify a decrease in the rate of growth, or even of the nutrition and efficiency of the vital organs lodged in the body cavities. One would expect that if the girths must decrease, the muscle girths would be first to suffer. The chart shows that such is the case, and the loss of weight through consumption of fat from arms and legs, was compensated by the increase in the length of arms and legs. We are more than justified in affirming the conclusion that related curves are parallel, or we may formulate the following laws of growth:

(*a*) The vertebral column and all of the long bones of the body are subjected to simultaneous accelerations and retardations of growth.

(*b*) The girths of the body and of the arms and legs are subjected to simultaneous acceleration and retardation of growth.

(*c*) The acceleration and retardation of growth are more sharply accentuated in the muscle girths than in the body girths.

Let us now examine the tenableness of the second *a priori* proposition, that "in two reciprocal curves the periods of acceleration in one curve correspond with the periods of retardation in the other." Any curve representing vertical dimensions is reciprocal to any curve representing lateral dimensions. One may make four combinations of reciprocal curves: (1) Muscle girth is reciprocal to height standing, and (2) to heights and lengths; (3) body girths is reciprocal to height standing, and (4) to heights and lengths. The proportion may be most concisely and effectually tested by tabulating the position of the crests of the waves of growth:

Location of crests of reciprocal curves.

	Months.							
Muscle girths	3	......	5	......	8	......	15	......
Height standing	......	4	......	7	......	9	......	18
Body girths	2	......	5	......	8	......	15	......
Heights and lengths	......	4	......	7	......	9	......	18

The scarcely noticeable crest at the twelfth month in height standing and in related curve, heighths and lengths, may be omitted from the table, though its presence is rather confirmatory. This table, according to Hall, demonstrates beyond a reasonable doubt that in any pair of reciprocal curves the crests of one alternate in time with the crests of the other; or that the periods of accelerated growth in one dimension of the body alternate with periods of accelerated growth in the other dimensions. To the laws of growth formulated above we may add the following:

(*d*) When the vertebral column and all of the long bones of the body are undergoing an acceleration of their rate of growth, the body girths and muscle girths are undergoing a retardation of their rate of growth.

(*e*) Conversely, when the lateral dimensions of the body are undergoing an acceleration, the vertical dimension undergoes a retardation of its rate of growth.

But what is the relation of weight (rather the cube root of weight) to these linear dimensions? It is evident that the weight can not vary with the vertical dimension of a body when the lateral dimensions are varying at a rate different from that of the vertical dimension, though in the same direction. The weight of a body of varying dimensions varies as the product of the dimensions. In a graphic representation the curve of the cube root of the weight would be parallel to a curve representing the mean between reciprocal curves. If, for example, one traces a curve which is mean between muscle girths and height standing, this curve will represent the product of the lateral by the vertical dimensions. This curve presents a remarkable parallelism to the curve representing the cube root of the weight.

To the laws of growth formulated above we may add:

(*f*) The weight varies as the product of the vertical and lateral dimensions.

(*g*) The curve representing weight presents less marked waves than do the curves representing vertical or lateral dimensions.

SENSES.

The perception of light is the first step in the development of the sense of sight.

The perception of the light reflected from bright-colored objects is the second step in the development of sight.

The gradual development of the power of directing the eyes upon objects (fixation) indicates the course of the development of the visual perception of objects, because fixation of the eyes is, in all animals capable of binocular vision, accomplished by an associated coordination of the voluntary muscles which direct the eyes and of the involuntary ciliary muscles which cause the focussing of the rays of light upon the retina. The coordination just cited is inherent; there is therefore no reasonable doubt that the formation of a clear image of an object upon the retina is coincident with the convergence of the eyes upon the object. The physical perception of objects can not precede the formation of their image upon the retina—i. e. can not precede fixation of the eyes upon objects

The time when visual perception becomes relatively clear precedes the following of moving objects by the eyes, because this act is a voluntary one, and the child can not will to follow the motions of an object which it does not perceive.

Having established these two propositions, visual perception can not precede fixation; visual perception must precede the following of moving objects by the eyes, it remains only to establish the dates when these two things were observed, and we shall have the limits between which visual perceptions of objects developed.

Fixation is definitely observed first on the twenty-eighth day.

Voluntarily following a moving object was first noted on the thirty-second day.

Therefore, in this child, a clear visual perception of objects was established in the fifth week.

The differentiation and recognition of form begins earlier and develops much more rapidly than the differentiation and recognition of color.

Sensitiveness to vibrations of the air was manifested on the first day.

Differentiation of the character of sounds, whether agreeable or otherwise, precedes the recognition of sounds.

The attention is held much more closely when two senses are affected than when only one is affected.

EMOTIONS.

Fear and anger, the animal emotions, were very early exhibited.

Affection and sympathy, the higher emotions, were much later developed.

Compassion, one of the highest emotions, did not appear until near the close of the five hundred days.

Fear being in every case allayed or dispelled, came to be seldom exhibited.

Outbursts of anger, being in no case allowed to avail anything, were very infrequent.

Sympathy and affection, being always encouraged, grew rapidly and became habitual.

There is a striking correspondence, in order of events and coincidence of time, between observations in Preyer's child and this child, given in the following table:

TABLE 31.

Observations.	Baby Preyer.		Baby Hall.	
	Week.	Day.	Week.	Day.
The child sees his own image in the mirror	17	113	17	112
The child laughs at his image in the mirror	17	116	17	113
The child looks at an image and then turns to find the real object	21	....	24	167
The child grasps at his image in the mirror	35	....	34	235
The child looks at his image, then turns the mirror to find the child	57	....	49	343
The child licks his image	61	....	61	420
The child makes grimaces as he looks into the mirror	67	....	62	428

INTELLECT.

In Baby Hall the powers of the intellect appeared in the following order: Attention (32), memory (34), volition (52), somatic consciousness (69), persistence (119), imitation (220), representative imitation (283), egoism proper (254), reason (287), active imagination (427).

Attention, memory, volition, and somatic consciousness, the powers which are shared by the lower animals, were first developed.

Persistence, imitation, egoism proper, and representative imagination, which are shared by the higher animals, were not developed.

Active imagination and reason, the essentially human powers, were last developed.

In the child's relations with the mirror he first simply looked at his reflection, as birds do. He next showed fear of it, as do many of the higher animals. He then grasped at it with his hands, as cats strike at reflections with the paw. Later he looked behind the glass to find the object, as cats and monkeys have been known to do. But on the four hundred and twentieth day he deliberately turned the glass at different angles to obtain required reflections, an intelligence not possessed by any animal other than man.

A definite idea of number, as far as two, had been developed by the sixty-ninth week.

CONCLUSIONS AS TO LANGUAGE.

The first language of the child was the primitive language of the species and consisted of sounds and signs. This language expressed elementary physical needs, and the lower order of psychical states—emotions. Every expression of this language would be perfectly understood by every adult member of the species.

The second language of the child—that of the first three months of articulate speech (two hundred and twenty-third day to three hundred and fourteenth day)—was an interjectional, onomatopoetic race-language. Of the vocabulary of this language, 83 per cent consisted of words having duplicated syllables, 33 per cent consisted of interjections, and 33 per cent of onomatopoetic words. With the exception of the word "kitty," acquired on the last day of the period, the whole vocabulary would probably be intelligible, when used by a child, to any adult member of the teutonic branch of the race.

The third language of the child was the vernacular language of the mother. The vowel sounds were introduced in the following order: i, o͞o, ä, ĭ, ē, ŏ, o͝o, ă, ō, ā, á, ĕ, oi, ow, ū. The consonant sounds were introduced in the following order: b, p, t, k, sh, g, d, m, s, z, n, y, r, f, ch, l, ng, w, j. The consonant sounds not used were: v, th, (asp.), th (voc.), wh, and zh.

During the eighth, ninth, tenth, and eleventh months there were more vowels than consonants in use. During the twelfth and thirteenth months there were as many consonants as vowels in use. During the remaining time the consonants were more numerous than the vowels.

As to frequency of use in new syllables the vowels take the following order: ē, ĭ, ă, ō, ŭ, ī, o͞o, ā, á, ä, ĕ, ŏ, a, o͝o, oi, ū.

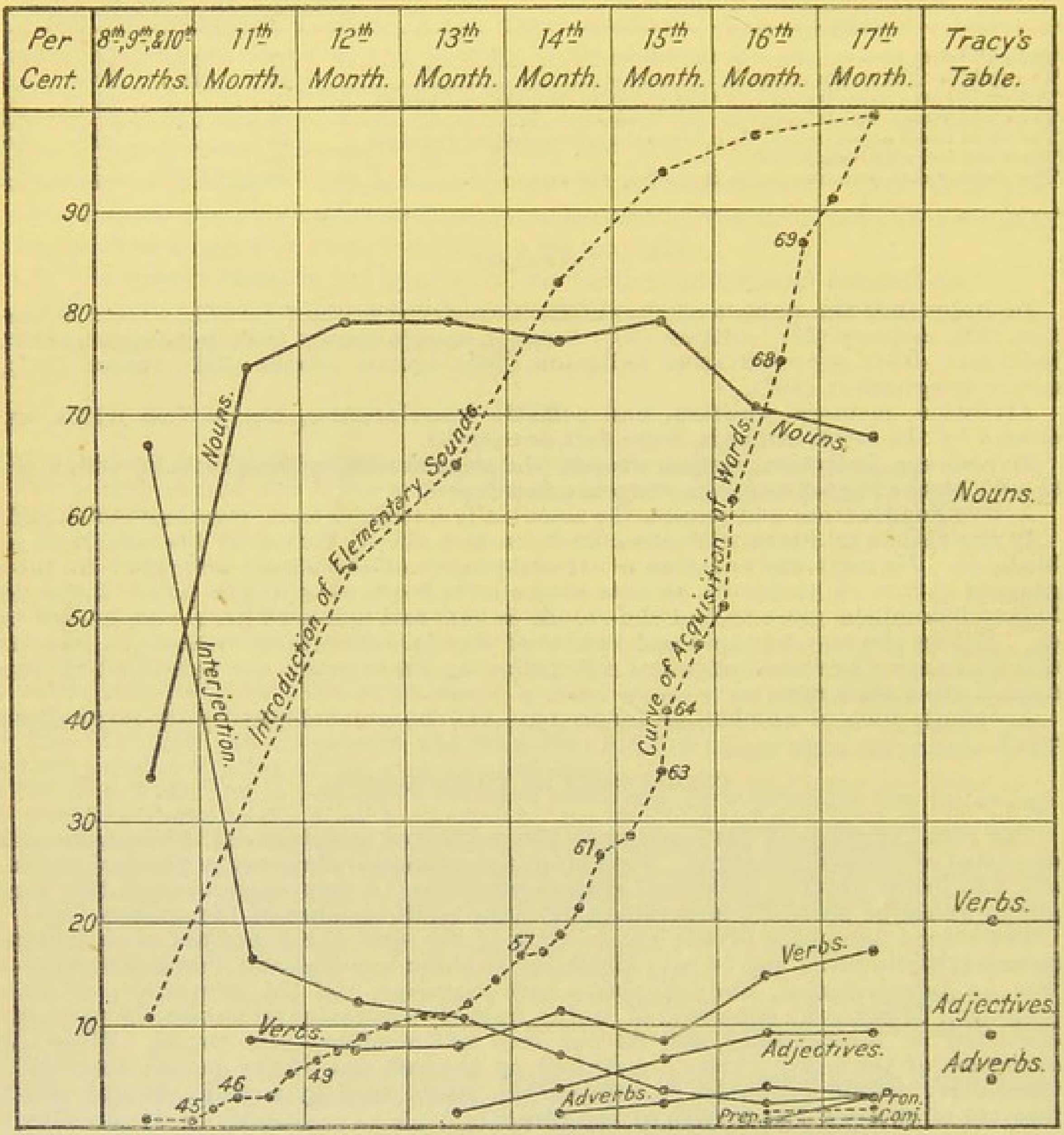
As to frequency of use in new syllables the consonants take the following order: b, n, t, k, p, m, w, d, v, f, s, sh, h, g, ng, z, r, l, ch, j.

As to frequency of use as initial sounds the letters take the following order: b, k, p, t, f, d, m, h, n, g, y, s, sh, ä, ŭ, ch, ī, ō, á, ē, r, ă, ŏ, j, ū.

Elementary sounds were acquired rapidly during the eighth to fourteenth months and slowly during the remaining part of the period.

Words were acquired slowly during the eighth to fourteenth months and rapidly in the fifteenth, sixteenth, and seventeenth months. The rate of development of this child's language has undergone alternating accelerations and retardations. The accelerations are graphically expressed in the wave crests in the curve of acquisition. (See chart.)

Chart showing the acquisition of words and their grammatical distribution.



From the beginning of the eleventh month to the five hundredth day there are nearly seven (6⅝) lunar months. During this period there were seven crests in the curve of acquisition of words. The seven periods of acceleration are so distributed as to fall one within each lunar month.

TABLE 32.—*Showing the acquisition of words and their grammatical distribution.*

	Eighth, ninth, and tenth months.			Eleventh month.			Twelfth month.			Thirteenth month.		
	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.
Vocabulary	3	3	100	9	12	100	12	24	100	14	38	100
Interjections	2	2	66	......	2	16.6	1	3	12.5	1	4	10.5
Nouns	1	1	33	8	9	75	10	19	79.2	11	30	79
Verbs	......	......	......	1	1	8.3	1	2	8.3	1	3	7.9
Adjectives	......	......	......	......	......	......	......	......	......	1	1	2.6
Adverbs	......	......	......	......	......	......	......	......	......	......	......	......
Prepositions	......	......	......	......	......	......	......	......	......	......	......	......
Pronouns	......	......	......	......	......	......	......	......	......	......	......	......
Conjunctions	......	......	......	......	......	......	......	......	......	......	......	......

	Fourteenth month.			Fifteenth month.			Sixteenth month.			Seventeenth month.		
	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.	Words acquired.	Total to date.	Per cent.
Vocabulary	20	58	100	48	106	100	93	199	100	33	232	100
Interjections	......	4	6.9	......	4	3.7	......	4	2	1	5	2.2
Nouns	14	44	76	40	84	79.3	57	141	71	15	156	67.2
Verbs	3	6	10.3	2	8	7.5	20	28	14	9	37	16
Adjectives	2	3	5.1	4	7	6.7	10	17	8.5	3	20	8.6
Adverbs	1	1	1.7	2	3	2.8	2	5	2.5	......	5	2.2
Prepositions	......	......	......	......	......	......	1	1	.5	4	5	2.2
Pronouns	......	......	......	......	......	......	2	2	1	1	3	1.3
Conjunctions	......	......	......	......	......	......	1	1	.5	......	1	.4

CHILDREN'S PURPOSES.

In order to learn something of children's interests in plants, Katherine A. Chandler,[1] of Leland Stanford, jr., University, California, sent out the following test to several public schools: "John's father gave him a piece of ground for a garden, and said he might plant three plants. Guess what he planted. Why?"

The answers returned show clearly the children's motives in planting, and are considered from that standpoint. There were received from the boys 232 papers, and from the girls 260 papers, the authors all ranging in ages from 8 to 15 years. The papers came from both city and farming districts.

The papers were collected under two main heads, "materialistic" and "æsthetic" according to the children's purposes in planting. Materialistic included all food products; æsthetic included plants esteemed for their flowers. The term garden may have increased the "materialists" among the country children, suggesting spring preparation for vegetables.

The boys show a strongly increasing idea of the value of material things, 50 per cent at 8 years becoming 75 per cent at 15.

The girls show less interest in material things, 46 per cent at 8 years reaching 56 per cent at 15, due perhaps to the fact that boys are given to understand that they must earn their living, making them more on the lookout for the value of things.

Æsthetic purposes are just the reverse of materialistic. While 50 per cent of the boys at 8 plant for the sake of flowers, only 25 per cent at 15 express a desire for the beautiful. At all ages, the girls are stronger in admiring the æsthetic; 54 per cent at 8 years decreasing only to 44 per cent at 15.

[1] Child Study Monthly, September, 1897.

TABLE 33.—*Materialistic.*

[The numbers indicate per cent; blanks indicate no per cent.]

	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	14 years.	15 years.
Food for persons:								
Boys	40	53	63	64	59	32	42	62
Girls	60	27	50	30	29	54	35	29
Food for animals:								
Boys	20	....	7	6	4	15	4	15
Girls	....	5	2	9	4	5	6	12
Sell vegetables, fruits, or flowers:								
Boys	....	....	7	11	16	43	58	31
Girls	20	5	2	9	18	32	41	47
Help parent:								
Boys	....	....	....	....	2	2	4	....
Girls	....	....	7	9	6	....	....	6
Give away:								
Boys	....	....	....	6	2	9	....	8
Girls	....	5	2	7	4	5	12	12
Miscellaneous:								
Boys	20	7	3	2	6	9	12	23
Girls	....	5	7	4	6	5	3	18

Under the six groupings in the above table the boys show more interest in food products; more of them than the girls give reasons for choosing certain vegetables.

TABLE 34.—*Æsthetical.*

[Numbers indicate per cent; blanks indicate no per cent.]

	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	14 years.	15 years.
Liked flowers:								
Boys	40	27	17	11	4	2	4	....
Girls	20	27	17	15	22	5	6	18
Beauty:								
Boys	....	33	17	21	18	17	12	23
Girls	....	32	28	30	18	17	21	24
Fragrance:								
Boys	20	7	7	11	14	4	4	8
Girls	....	23	7	10	8	10	9	12
Others liked them:								
Boys	....	....	3	....	....	4	4	....
Girls	....	14	9	4	12	2	3	18
Give away:								
Boys		....	....	6	6	6	8	....
Girls	....	14	4	7	2	12	24	6
Miscellaneous:								
Boys	....	....	3	....	14	11	4	23
Girls	20	18	17	17	12	15	15	18

Under the six groupings of æsthetical purpose in Table 34, "beauty" has the greatest number of admirers. Color is the only element of beauty mentioned.

TABLE 35.—*Altruistic.*

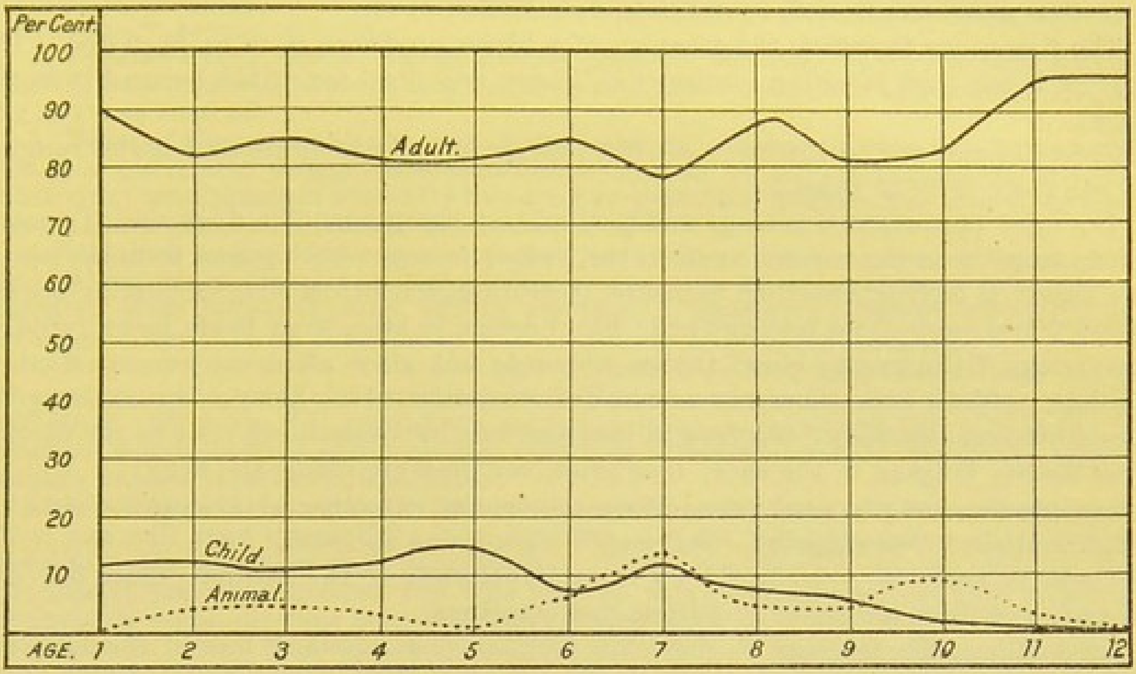
[Numbers indicate per cent; blanks indicate no per cent.]

	8 years.	9 years.	10 years.	11 years.	12 years.	13 years.	14 years.	15 years.
Massing of altruistic elements:								
Boys	20	....	10	13	14	36	20	10
Girls	....	36	33	28	28	24	68	53

Combining the "food for animals," "help parents," and "give away" of the æsthetic group, we have Table 35, above, giving the altruistic purpose. This is much stronger in the girls than the boys.

Imitation in Children.

By working over the results of E. H. Russell's book on imitation, Caroline Frear[1] gives results showing the trends and age tendencies in imitation by children. The following chart shows whom the child imitates:



There is a small per cent of imitation of things, as an engine. As will be seen, imitation of adults is much in excess of imitation of other children or animals. The imitation of adults increases with years. In another chart Miss Frear shows three kinds of imitative activity: Direct, playing, and imitation with an anxious purpose. Direct imitating is more immediate, is impulsive. Playing imitation is dramatic, like playing horse; it increases with age, while direct imitation decreases.

In another chart is shown with whom the child plays. The tendency to play with the adult is noteworthy during the first year, after which for two or three years he is satisfied to play with himself. Then this decreases, and play with other children increases rapidly as the social instinct develops. In other charts it is shown what children imitate, as action, speech, or sound. The preponderance of imitation of action over that of speech is shown in early years. Speech develops in connection with action.

Blushing.

The following data as to blushing are given by G. E. Partridge,[1] of Clark University. A syllabus sent out by Dr. Hall had, among other questions, these:

How do you know you are going to blush? Where is it first felt? Do you feel it in hands, arms, limbs, neck, chest?

Are there attendant tweaks, tingles, twinges, or other sensations elsewhere, or any reactions of pallor or chill?

Describe spontaneous flashes in any part of the body as when alone.

Teasing to make others blush.

Describe your own blushing habits and those of your friends.

The results upon which the study is based came from the State Normal School at Trenton, N. J.

Blushing is distinguished from flushing; blushing is use for the phenomenon as observed in others. There are 120 cases (36 males, 84 females) of blushing. The age is given in 60 cases: 2, six years; 2, nine; 4, ten; 5, eleven; 8, twelve; 2, thirteen; 2, fourteen; 11, fifteen; 8, sixteen; 7, seventeen; 8, eighteen; 3, nineteen.

---

[1]The Ped. Seminary, April, 1897.

There appears to be no uniformity in manner of blushing; in some it appears in a small spot and spreads in all directions, or spreads upward only; in some downward, appearing on the neck last.

The causes of blushing were teasing (usually about the other sex), 32; told to blush, or not to, or told that they are blushing, 18; reciting, 13; spoken to, 8; looked at, 6; a certain name mentioned, 5; talking, 4; mistake, 4, etc.

The frequency in which the mention of a blush produces it is to be noted. The fear of being seen blushing increases it, hence one does not blush so readily in the dark.

Flushing was felt in 134 cases, all but four or five of which are of females ranging in age from 17 to 22 years.

The most important warnings and preliminary symptoms of a flush are: Tremors, a "feeling" near the waist; weak in the limbs; tremor which passes from the feet to the head; a feeling, swelling, pressure, trembling, warmth, a weight, beating in the chest, warm wave from feet upward; heart seems to stop, then beats more rapidly; quivering of the heart; blood rushes upward; hot glow all over; nervous flush or feeling; cold all over, then very warm; feel uncomfortable; dizzy; "quickening" of blood all over the body; tingling in toes and fingers; something rises in the throat; eyes smart; ringing in the ears; face prickles; pressure inside the head.

Symptoms most physical were self-consciousness; "feeling as if being looked at;" "feel foolish;" "confused;" "feel as if I were going to blush."

There is more in a blush than a mere hyperæmia of the surface; there is a disturbance of the vaso-motor functions and emotions.

In flushing, the feelings, flashes, and tremors pass upward, but in blushing the actual redness has no definite course of spreading. Paget, a distinguished gynecologist, in making notes for Darwin in regard to the extent of blushing, showed that actual redness is confined to face and neck, occasionally appearing in the hands.

As to diffused waves and flashes, an increased flow of blood to the brain is accompanied by arterial contraction in other parts of the body; then, as the blush subsides, there is a redistribution of blood in the surface of other parts of the body, with tingling, prickling, and often sweating.

In regard to reactions, chill is mentioned 27 times; prespiration, 8; weakness, 8; pallor, 7; headache, 3, etc.

Campbell thinks that nine-tenths of all blushes are from a feeling of shyness, and that they are unnatural and morbid. But an infant does not blush; he may turn red from anger or other causes. It is not until the age of 3 or 4 that children begin to blush; still, children much younger than 3 exhibit shyness. Most evidence seems to show that fear underlies most of blushing; the presence of the feeling of dread, the palpitation of the heart, the impulse to escape or to hide, and the shock tend to confirm this view.

Blushing increases at puberty; it is much more common among girls than boys; with women than men, and remains to a greater age in women, as Darwin has shown. Blushing seems to be a relic of ancestral sex fear.

A Study of Fears.

This study of fears, by President G. Stanley Hall,[1] is based upon the returns in answer to the following syllabus:

SYLLABUS.

1. Fears of celestial phenomena, as, e. g., of winds, storms, thunder and lightning, heavenly bodies, meteors, sky falling, cloud, mist, fog, and cloud forms; end of the world and attendant phenomena; night and darkness, eclipse; moon breaking; that the sun may not rise; peculiar sky colors, northern lights, excessive heat and cold, loss of orientation and points of compass.

2. Special inanimate objects, as fire and conflagration; water, drowning, and washing or being washed; punishment and its instruments, and things and places associated with it; falling and of high places; uncanny places, as caves, ravines, gorges,

[1] A study of fears, reprinted from the American Journal of Psychology, Vol. VIII, No. 2.

forest gloom, high hills and solitude generally, and getting lost or shut up; guns and weapons; points, sharp edges, very narrow or wide open spaces; dirt on garments or skin, and contact generally; vehicles and riding.

3. Living things, self-moving things generally; big eyes, mouth, teeth; dog, cat, snakes, pigs, rats and mice, spiders, bugs and beetles, toads, etc.; sight of blood, robbers and burglars, strangers, society and bashfulness; fear of being laughed at, talked of, or being ridiculous; shyness of opposite sex; fear of fighting; cowardice, poltroonery, suspiciousness.

4. Disease, dying, death; loss of friends, position, fortune, beauty, or of health generally; heart disease, cancers, fits, consumption, starvation, fear of prevalent diseases, or of those read of.

5. Fears of the supernatural, e. g., ghosts, spirits, witches, fairies, dragons, or mythological monsters; dream fears, conscience fears, as of having committed unpardonable sins; punishments specially incurred or sent from heaven, loss of soul and next-world fears generally, fears of sin or impurity.

6. Describe any sudden experience you have felt or observed, and whether involving only distinct surprise or being intense enough to cause real shock, start, or astonishment, with details of cause, effects, and their permanence; terrors, without danger or cause other than an hereditary or a traumatic disposition to timidity.

7. In each case state order and age of fears, how long they lasted, how intense they were, what acts they prompted, and educational good or bad effects; was sleep affected? State specific symptoms, starting, paleness or sweat, urinations, rigidity, cramps, horripilations and "creepy, crawling" feelings, nausea, weakness, fainting, flight; causes, treatment, and cures.

This syllabus is drawn up by the undersigned, and is sent to you with the request that you will read it carefully item by item, and (1) jot down at once in the easiest form of notes whatever each paragraph or phrase recalls of your own childish fears; (2) that if you are a parent you will add to this any observations this paper may suggest or recall on your own children (it may aid you if you keep a "life book" or memoranda in any form about them); (3) that if you are a teacher, you will read this paper to your class, write it on the board, or give it to individual pupils (of upper grammar or high school grades) and ask them to write as an exercise in composition (setting apart an hour, or asking for out-of-school work) an account of their own early or present fears; (4) if you are a normal-school principal or teacher of psychology, you may connect it with the class work in the study of feelings or emotions; (5) if you are a principal or superintendent, you can assign the work to some teacher or advanced pupil to collect the data. All returns may be anonymous if preferred, but age, sex, and nationality must be stated in every case.

Returns may be sent direct to the undersigned, or, if preferred, may be studied by you, and will make the best of material for a lesson in psychology, for a discussion in a meeting of teachers or mothers, or an address, or an article for the press. When you are entirely done with the material thus gathered and used, send it to the undersigned.

G. Stanley Hall.

The data for the first tabulation consisted of the records of the chief fears of 1,701 people, mostly under 23 years of age, gathered in different places, and 386 supplementary reports.

The 1,701 persons described 6,456 fears, which are grouped as follows, according to the objects feared:

Table 36.

Celestial phenomena.		Darkness	432
Thunder and lightning	603	Ghosts	203
High wind	143	Dream fears	109
Cyclones	67	Solitude	55
Clouds and their forms	44	Total	799
Meteors	34	Animals:	
Northern lights	25	Reptiles	483
Comets	18	Domestic animals	268
Fog	16	Wild animals	206
Storms	14	Insects	203
Eclipses	14	Rats and mice	196
Extreme hot weather	10	Cats and dogs	79
Extreme cold weather	8	Birds	51
Total	996	Total	1,486

TABLE 36—Continued.

Fire	365	Strange persons	436
Water	205	Robbers	153
Drowning	57	Total	589
Total	627	Death	299
		Disease	241
		Total	540

It appears from Table 36 that thunderstorms are feared the most; then reptiles follow; then strangers and darkness very close; then fire, death, and domestic animals, etc.

Selecting from the returns the 1,106 well-described fears of 500 boys and the 1,765 fears of 500 girls on the 28 topics, we have Table 37, which follows, showing the effect of sex:

TABLE 37.

	Males.	Females.		Males.	Females.
Thunder and lightning	155	230	Blood	14	44
Persons	129	190	Heights	43	40
Reptiles	123	180	Self-consciousness	28	40
Darkness	130	171	Noises	10	36
Death	74	102	Buried alive	5	32
Domestic animals	57	96	Imaginary things	23	24
Rats and mice	13	75	Drowning	19	20
Insects	52	74	Clouds	4	15
Ghosts	44	72	Solitude	4	15
Wind	35	61	Places	2	14
End of world	11	53	Meteors	6	12
Water	62	53	Shyness	9	8
Robbers	32	48	Fairies		7
Mechanism	31	47	Ridicule	1	6

It will be seen from the above table that out of 500 girls 230 report fear of thunder and lightning, while the same number of boys report this fear but 155 times. In fear of the end of the world, rats and mice, blood, and being buried alive girls lead boys; but boys excel girls only in fears of water, height, and shyness. Each of the boys has 2.21 fears; each of the girls has 3.55 fears.

From all the returns 516 boys, with 1,521 fears, and 671 girls, with 3,101 fears, were selected according to age as follows:

TABLE 38.

Age.	Number of males.	Average.	Number of females.	Average.
0-4	36	1.76	74	4.89
4-7	144	1.54	176	2.44
7-11	104	3.56	227	4.34
11-15	140	3.69	127	6.22
15-18	72	2.40	38	10.67
18-26	50	2.55	29	4.31
Total	524	(2.94) 2.58	671	(4.62) 5.46

There are 36 boys in Table 38, 4 years of age, who report 1.76 fears each, while 74 girls of the same age average 4.89 fears each. All the boys record 2.94 and all the girls 4.62 fears each.

The fears of the boys increase from 7 to 15, and then decline, while those of the girls increase more steadily from 4 to 18.

The following fears show decline with advancing maturity in both sexes: Meteors, clouds, blood, end of world, being kidnaped, fairies, loss of orientation, shyness of strangers; but the following fears seem to increase: Thunder and lightning, reptiles, robbers, self-consciousness, machinery.

While many special fears decline and others increase with age, many infantile fears remain through life.

CLASS PUNISHMENT.

As a test of children's ideas of class punishment, the following story was given under direction of Caroline Frear[1] to 1,914 children: "One day the teacher left the room and while she was gone several children in the room began to make a noise. The teacher heard the noise as she was coming back, but did not know which children were out of order, and none of the class would tell her. So she kept the whole class after school. Was the punishment just or unjust, and why?" There were 968 boys and 946 girls ranging in age from 7 to 16 years. Each age for each sex was collected separately. The papers were collected under the headings "just" and "unjust", and subheadings for the reasons why just or unjust.

Eighty-two per cent of all the children considered the punishment just, 17 per cent unjust, and 1 per cent gave qualified answers.

The per cent of those regarding the punishment just decreases very slightly with age, as the following chart shows. The per cent of those regarding it unjust increases very slightly, but through all ages the proportion of those regarding it just exceeds the others very much.

The following figures show the age tendency in groupings:

	7 to 9 years.	10 to 12 years.	13 to 16 years.
	Per cent.	*Per cent.*	*Per cent.*
Just	88	83	79
Unjust	12	17	21

This may show tendencies, decreasing with age, on the part of children to accept as just their accustomed experience.

The per cents for the reasons under "just" are made out on the number of "just" papers, not on the whole number of papers, and the same is true for the reasons under "unjust."

Forty-seven of those who considered the punishment just gave as the reason that the class would not tell or ought to tell who the guilty were. The statement "ought to tell" increases with years.

The table which follows shows the relative appealing power, with the reasons given, for the justice of the punishment powers at different years. Age tendencies are noticeable.

TABLE 39.—*Reasons for justice of punishment.*

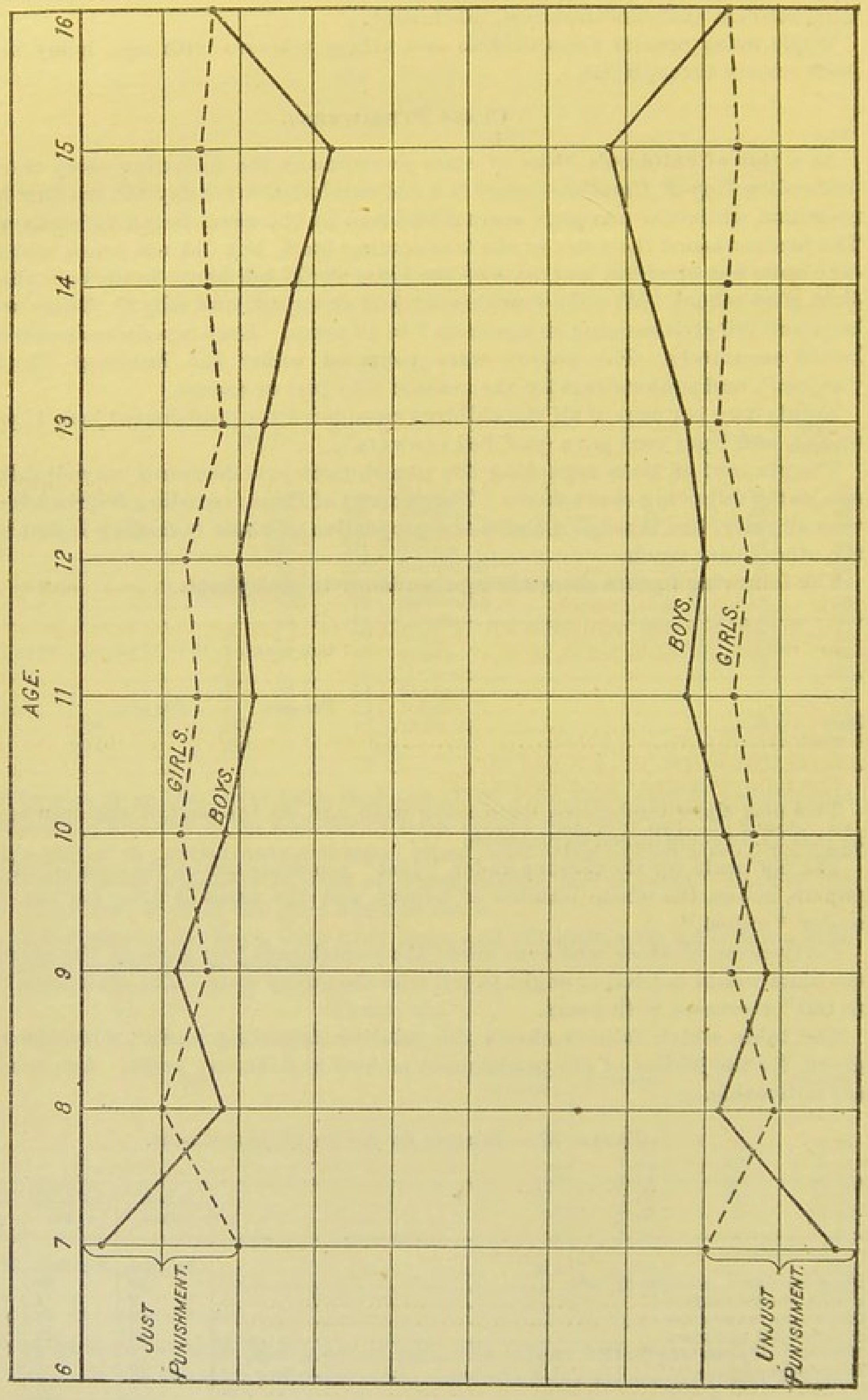
	7 to 9 years.	10 to 12 years.	13 to 16 years.
	Per cent.	*Per cent.*	*Per cent.*
Class wouldn't, or ought to, tell	39	50	59
Guilty should confess	2	4	7
Class was out of order	25	17	11
Teacher did not know	12	10	10
Sure way of punishing guilty	1	4	8
Prevent repetition	2	4	7
To find out the guilty	1	3	7
No reason	23	12	4

[1] Studies in Education, IX, March, 1897.

CLASS PUNISHMENT.

Upper lines, just.
Under lines, unjust.

Boys ——
Girls ......



Following are the conclusions:

(*a*) Children accept in early years arbitrary punishment enforced by authority. They submit to such punishment less readily as age increases.

(*b*) Children have an increasing sense of their value as individuals, and increasingly demand the protection of their individual rights.

(*c*) At the same time they have an increasing sense of social responsibility in the honest exposure of guilt.

The above conclusions seem to justify the following pedagogical application: Class punishment should be used less with older than with younger children. Its use, even with younger children, is questionable, since a considerable number of these react strongly against it.

The following additional conclusions bear on the general subject of punishment, and confirm what other studies have already asserted:

In early years the sense of justice is based on feeling and on faith in authority. As age increases it is based on reason and understanding.

Young children regard punishment as a means of balancing accounts with the offense. Its purpose as a social protective measure—a preventive of further trouble—is understood better as age increases.

Moral Education.

In order to study moral education from the side of introspection, a syllabus of twelve sections was sent out by President G. Stanley Hall. The returns from this syllabus have been worked out and presented by J. R. Street,[1] fellow in Clark University. The replies to the first five sections were of such a nature that only general results are given.

QUESTIONS.

1. What punishments or rewards have you ever had that did you good or harm? State the case and its results.

Of the 183 persons reporting 104 give instances of punishment, 66 speak of being benefited and 38 as being injured by the punishment.

Conscience cases.

SEC. III. State a few conscience cases in yourself or others, describing the circumstances that helped or confused them.

The following cases were presented:

Studying on Sunday, 7; dancing, 4; working on Sunday, 3; reading fiction on Sunday, 3; card playing, 2; theater going, 2; Sunday excursions, 2; waltzing with young men, 2; plagiarism, 2; Christian activity, 1; Sunday traveling, 1; betting, 1; confession of misdeeds, 1; boating on Sunday, 1; party going, 1; alcoholic drinking, 1; attending social entertainments, 1.

There was nothing to show that conscience plays any great factor in life before the age of 9, and very little mention was made of it before 13. The cases, however, are altogether too few to make any generalized conclusion concerning the age at which conscience becomes a potent element in the individual, yet it may be premised that it does not reveal its existence at as early an age as many would believe. The writer knows a child in whom it was abnormally developed at the age of 3. Impulse governs most of the activities of early childhood.

Direct moral education.

SEC. IV. What has been the effect on yourself or others of direct moral inculcation, whether at home in the form of a plain talk, a good dressing down, or advice not sought, or preaching in and out of the pulpit, and school or college instruction in morals? What book, system, or idea in each have been morally helpful?

The returns are filled with such statements as "Preaching or advice unsought has never done me good; suggestion has."

* * * * * * *

The boys were almost unanimous in commending the effects of a good plain talk, and none had a word to say against a good dressing down. Many spoke very gratefully for having had punishment in due season. It does seem that there comes a period in the existence of many a youth when he conceives the idea that he is lord of creation and his future usefulness as a member of society depends upon the thorough eradication of this disease of his system by the faithful and energetic administration of birch tonic.

---

[1] Ped. Seminary, July, 1897.

Direct religious inculcation.

SEC. V. What has been the effect of direct religious inculcation and what changes of religious views have affected your moral conduct, your conscience, and sense of right? Have liberalizing theological opinions made you better or worse, and how?

Sixty-eight returns were received to this section.

* * * * * * *

Of those reporting, 50 say they were benefited by direct religious inculcation, 5 that they were injured, while 3 say they were affected in no way; 10 mentioned example with some precept.

Proper books seem to play an important function in religious education.

Very few mentioned liberalizing theological opinions (8), and they put an interpretation on these words that is not usual. The returns clearly point to the important duty of parents and friends to give proper religious instruction at a very early age.

Influence of teacher.

SEC. VI. Reflect which teacher or teachers from kindergarten to college, or professional school, or in Sunday school you have liked best and been influenced most by, and then try to state wherein the influence was felt. What qualities impressed you most, and how? i. e., account, if you can, for the exceptional influence of that particular teacher. Was it generally felt, or peculiar to you and your set? Was it connected with dress, manner, voice, good looks, religious activity or piety, bearing, learning, etc., and how did each salient quality affect you?

This question was answered by 23 boys and 160 girls. As few gave the exact time of the influence, no table can be prepared which might go to show the age at which the young are most susceptible to impressions from the teacher.

An endeavor has also been made to discover whether male teachers exert a greater influence over boys than do female teachers, and vice versa for the girls, but with the exception of the general impression one gets from the returns the attempt has not been fruitful.

From the showing of the table and the testimony of the writers it is safe to conclude that there is an unconscious educative force emanating from the teacher's personality, and so operating upon the pupil as to become a powerful formative agent in the development of his character.

Second. This force, being unconscious in its origin and in its attracting and transforming effect upon the plastic nature of the young, has its origin in what the teacher is rather than in what he says.

Third. It is a significant fact that 149 out of a possible 183 mention the manner of the teacher as exerting such an influence over their natures. It has been said of more than one man—as of the Earl of Chatham—that "everybody felt there was something finer in the man than anything he ever said." It is this very something in the teacher that will go down deeper than his words and either purify or befoul the springs of action in his pupils.

TABLE 40.

Point of influence (by 160 girls).	Sex of teacher.		Total.	Point of influence (by 23 boys).	Sex of teacher.		Total.
	Male.	Female.			Male.	Female.	
Manner	14	114	128	Manner	7	14	21
Religion	5	55	60	Personal interest	5	4	9
Precepts	16	33	49	Religious	0	8	8
Learning	12	41	53	Good looks	1	6	7
Voice	5	47	51	Learning	2	4	6
Life	9	35	44	Voice	0	6	6
Personal interest	3	39	42	Precepts	5	0	5
Good looks	5	33	38	Life	1	3	4
Dress	3	34	37	Love for truth	3	0	3
Love for study	4	17	21	Interest in teaching	1	2	3
Bearing	3	22	25	Patience and justice	1	2	3
Interest in teaching	2	14	16	Language	2	0	2
Language	4	10	14	Self-control	1	0	1
Patience and justice	4	10	14	Bearing	0	1	1
Self-control	2	9	11	Dress	0	0	0
Love for truth	0	3	3	Love for study	......	......	......
Praise	1	3	4	Praise	......	......	......
Conscientiousness	0	3	3	Conscientiousness	......	......	......
Musical ability	0	2	2	Music	......	......	......

Fourth. It is worthy of note that what attracts the pupil is the externals. Voice, dress, good looks, manners, religious activity far overtop the deeper moral elements; but these would be of but little avail did not a teacher possess a personality whereby love, obedience, and respect may be inspired. Teacher's life and actions must harmonize. Example and precept are yokefellows, and children are intensely keen in observing any disparity between them. The teacher's personality determines his worth and moral influence. He who would rule the little child and mold him into pure, noble, useful manhood must himself be a model of virtue. How pertinent is the question, Is not a teacher born rather than made?

Fifth. The difference in the general character of the replies given by the boys from those of the girls suggests one of two things: Either the boys do not possess the power of introspection to the same degree as do girls, or else they seriously suffer by passing the period of early youth wholly under the influence of female teachers. As boys detest effeminate qualities in boys, there can not be in the female teacher as in the male the same inspiration and incitement to develop the manly virtues.

Sixth. Far more powerful than ethical handbooks is moral life.

Influence of companions.

SEC. VII. What playmates, intimate cronies, or friendships have you had that affected your moral nature for good or for bad? Describe concisely each such person physically and psychically. What temperament and what were the qualities that especially influenced you, and how? What is your own temperament?

* * * * * * *

Nearly 200 replies were given to this part of the questionnaire. They furnish some interesting material concerning the manner in which social environment operates.

The good results produced by companionship are: Kindness and sympathy, girls, 32—boys, 6; manners, 30—6; self-control, 20—5; Christian virtues, 20—4; religious influence, 22—1; disposition improved, 15—8; consideration of others, 19—4; sense of truth, 14—3; æsthetic tastes, 15—2; studiousness, 12—2; ambition, 10—2; judiciousness, 9—3; determination to overcome obstacles, 5—4; truer views of life, 6—1; greater love for parents, 3—0.

The evil effects were shown in: General conduct, 15—14; general morals, 20—6; untruthfulness, 15—4; evil thoughts, 12—5; boisterous and rough, 10—4; selfishness, 10—2; disobedient, 5—3; swearing, 4—4; neglectful of duty, 5—2; irreligious, 5—1; slang, 3—3; smoking, 0—4; temper, 2—1; neglectful of home, 2—0; love of dress, 2—0; sarcastic, 1—0; stealing, 1—0.

An interesting table was obtained which went to show that the age at which these external influences are most felt is from 10 to 15 years. The curve reaches its highest point at puberty. The potency of companionship for good or evil is further shown by the fact that only 10 returns refused to acknowledge themselves in any way indebted to their associates for good or evil. It is safe to conclude that social milieu is a moral factor second only to that of the home.

Only 6 girls were influenced by boy companions, 5 for good and 1 for evil. Three boys were affected by girls, 1 for good and 2 for evil. Two girls speak of being influenced for good by making some lads their companions and trying to reform them.

This practice can not be too severely condemned. The wail of many a broken-hearted wife and of social castaways is: "I thought I could reform him." Parents should never be so indiscreet as to permit their sons and daughters to undertake such doubtful tasks. The intense subtility and efficiency of suggestion has been fully shown by Mr. M. H. Small. (See Ped. Sem., Vol. IV, No. 2.)

An effort was made to discover the part played by temperament in these associations, but here the answers were too confused to admit of any satisfactory interpretation; 46 were attracted by persons of the opposite disposition, 43 by similar, 50 gave no clue, and 50 confused the matter.

Ethical relations with parents.

SEC. VIII. What were your ethical relations with your parents? What kind of personal influence emanated from your father and from your mother? What in their example and in their precepts affected you? Give incidents and details.

* * * * * * *

The ethical relations with parents, with two exceptions, were always described as of a pleasant and helpful nature. The intimacy existing between mother and child seemed to be more marked, even among the boys, than that between father and son, or daughter. This, however, is due chiefly to the external business relation of the father, which occupied his time and attention. The following tables show the manner and relation of the parental influence:

Fathers: Christian consistency, 31—0; hatred of falsehood, 22—4; generosity, 19—1; honesty, 15—4; kindness, 12—2; justice, 10—0; forgiving spirit, 9—0; hatred of gossip, 9—0; unselfishness, 7—0; Sabbath observance, 3—3; hatred of swearing, 2—3; perseverance, 4—0; patience, 4—0; abstinence from tobacco, 1—2; mental tastes, 3—0; self-respect, 3—0; decision of character, 3—0; temperance, 0—3; control of temper, 2—0; gratitude, 2—0; reading habit, 2—0; reverence and respect, 1—1; obedience, 0—2; skeptical ideas, 1—0; frugality, 0—1.

Mothers: Christian virtues, 70—6; unselfishness, 24—2; morals, 17—3; manners, 18—2; sympathy, 18—0; the golden rule, 18—0; obedience, 12—4; liberality, 14—1; affection, 12—1; hatred of falsehood, 9—4; good disposition, 11—1; little confidences, 10—1; æsthetic tastes, 11—0; patience, 10—0; kindness, 8—1; honesty, 1—3; reverence and respect, 2—0; perseverance, 2—0; sobriety, 0—2; hatred of swearing, 0—2; love for animals, 1—0; good temper, 1—0; purity, 0—1; industry, 0—1; Bible reading, 0—1; Sabbath observance, 0—1.

From these tables it is safe to conclude that there does not exist that difference in moral influence of the parents due to sex that so many are inclined to believe. Nearly all the fundamental constituents of noble character are found in each, and there is no just reason to doubt that the influence of the father would be equally as potent as that of the mother did he enjoy the same protracted home relations as does the mother.

Second. Moral training is not the establishment of mere moral habits, as the ethical people advocate, but is the unfolding and widening of the deeper instincts, particularly the emotions, and has its roots in the religious sentiments that so early pervade child life. Wordsworth truly says: "Heaven lies about us in our infancy." The parent stands in such relation to the child as to enable him to seize upon the deed germ and so nurture it that it will produce the beautiful plant of a pure, noble character.

Third. Possessing as they do the ear, the heart, and the sympathy of the child, parents have it within their power to develop the child into almost whatever they may wish. Hence if they would but get back to the Hebrew conception of the family, and would devote themselves as diligently to the nurture of their children as they do now to the ways of fashionable and business life, or, better still, with all the solicitousness that they exercise in the rearing of their horses and dogs, the problem of the moral regeneration of the race would be most thoroughly solved.

Adult influence.

SEC. IX. Have other persons than the above influenced your life much, or have you had special attractions or repulsions to individuals, either older or younger, of the same or opposite sex, or to whom you were inclined to go for counsel and conference in confidential matters? Describe the influence of such association.

* * * * * * *

The number who answered the question is exceedingly limited—55 in all.

Four boys were attracted by males older than themselves, and 7 were drawn to elderly females. The reasons given for this friendship were in the case of the males, intellectual endowments and practical experience; in the case of the females, kindness, manners, Christian virtues, opposition to evil.

Twelve females were attracted by males older than themselves, and 32 by females. The reasons given for forming the friendship with the males are: Goodness of character, 4; sympathy, 3; gifts, 2; ministerial attraction, 2; interest in my studies, 1. With the females: Christian character, 16; blood relations (grandma and auntie), 9; manners, 4; kindness, 3; cheerfulness, 2; learning, 2.

Eleven girls speak of making younger boys their companions, and 2 report the same of younger girls.

No very definite results concerning the effect of these associations were obtained, but the following were clearly mentioned: Intellectual stimulus, 4; manner of life changed, 3; kindlier nature, 3; sunnier disposition, 2; better manners, 2; religious views strengthened, 2; acquired a contempt for religion, 2; became a total abstainer, 1; truer conceptions of womanhood, 1; learned to follow the lead of elders, 1; developed my temper, 1; clearer sense of right and wrong, 1; greater care in choosing companions, 1; learned to swear, 1; to smoke, 1.

Twenty-one cases of repulsion are mentioned, with its reasons assigned. The repulsion in almost every case began with sight and was persistent. The causes given are: Self-assertion, 4; manners, 3; style of dress, 3; actions, 3; personal appearance, 1; physical deformity, 1; awe, 1; lack of regard for others, 1; too newsy, 1.

The most striking point brought out in this section is the great influence character has in bringing into association the youth and the aged. Men of giant intellect are passed by, while the kind, generous, pious colored washerwoman wins the heart of the lad, and with her sympathy and interest binds him to her and leads him into paths of rectitude.

Second. The evidence is very clear that wherever such friendship was formed it has been beneficial, only two instances being given to the contrary. From this we may conclude that if parents have neither the time nor the disposition to become the companions and guides of their offspring, they can do the child no better service than to encourage him to form a close friendship with some pure soul who is interested in the elevation of humanity.

It is interesting to compare the influence of the preceding four classes. The teacher seems to stimulate the accessories of character, such as manners, sense of social and civil relationships, ambition, tastes, etc. The parent develops the fundamentals, such as sympathy, reverence, love, sense of truth, justice, mercy, kindness, meekness, patience, etc.

Companions develop the social qualities, and afford practical application of the teachings of the home and school, and prepare the boy or girl for the further duties of citizenship by cultivating the sense of independence, individuality, altruism, etc.

The influence exerted by the fourth is rather of an advisory nature. Many of them, however, become ideals to the young, and thus stimulate healthy growth.

In the present constitution of social life these four factors will operate in either a beneficial or injurious manner upon the growing boy and girl. It becomes the parents' therefore, to see, first, that their own life and home are right, then to guard their child from undue contamination from a corrupted milieu. This can be accomplished, not by building a wall around the child, but by erecting a wall within him, which must be razed before the enemy can take possession. In other words, get the child interested in the useful and the beautiful, so that the obscene and degrading will have no attraction for him.

Children have certain inalienable rights which fatherhood and motherhood must recognize. They have a right to stand first in the affections, the interest, and the endeavors of the parent; they have a right to all that is good and noble and encouraging in the parent life; they have a right to find their home the most pleasant spot on earth; they have a right to all the means of refinement that lie within the limits of the parents' purse; they have a right to proper food and clothing for the body, but equally as great a right to mental and moral nourishment, that neither body nor soul may be atrophied; they have a right to have the laws of their development, both physiological and psychical, well understood and held sacred by those in authority over them; they have a right to have their better nature so strengthened that when the seeds of evil speech and evil action fall upon their life they will take no deep and abiding root, because the soil is already occupied by flowers and the fruits of better hopes.

Games.

SEC. X. What games have you preferred and what has been their influence in developing manliness or womanliness, sense of justice and fair play, honesty, perseverance, hardihood, physical strength, and what recreations do you prefer, and why? What is their effect?

* * * * * * *

The following list shows the games played by the girls:

Hide and seek, 56; croquet, 43; tag, 41; tennis, 36; checkers, 23; parchesi, 22; authors, 10; dolls, 18; house, 17; cards 16; baseball, 15; blind man's buff, 15; pigs in clover, 12; prisoner's base, 12; jackstones, 11; jumping rope, 9; halma, 9; dominoes, 9; I spy, 6; chess, 5; duck on the rock, 5; fox and geese, 5; hopscotch, tiddledy winks, 5; school, 5; messenger boy, 4; old maid, 4; euchre, 4; pussy wants a corner, 4; hoop rolling, 3; drop the handkerchief, puzzles, whist, marbles, solitaire, kick the wicket, football, 3 each; anagrams, Antony over, colors, shuttlecock, battledore, basketball, pull away, horse, jackstraws, casino, seesaw, mumblety peg, bluebird, ambassadors, robbers, lotto, black bear. 2 each; beanbag, fish pond, twenty questions, hearts, color of the bird, come to supper, dog on wood, crack the whip, charades, sense steps, hide the thimble, puzzle fifteen, kick the can, red soldier cap, cribbage, bowling, London bridge is falling down, Jacob and Rachel, hare and hounds, my ship's arrived, bright idea, spider and the fly, Louisa, wild horse, golden pavement, consequences, snap, hunt the slipper, kick the stick, geography cards, dice, Peter Coddle's dinner party, putting together our country, princess and captain, tenpins, gymnasium, cars, cross and wood, can can, old witch, running on cans, walking on stilts, backgammon, crisscross, here we go round the mulberry tree, tollgate, giants, Copenhagen, needle's eye, word making, catch, jack-a-bow, innocence abroad, go bang, mother goose, catch fish, circus, church, babmintor, Indians, and guessing games.

Games by the boys are: Baseball, 14; football, 9; checkers, 8; cards, 7; tennis, 6; marbles, 4; tag, 4; croquet, 4; bowling, 3; hide and seek, 3; dominoes, 2; pool, 2; tiger, 1; blind man's buff, jumping rope, little old man, mossy, shinny, hide the thimble, forfeits, parchesi, chess, tit-tat-toe, quoits, billiards.

In regard to the moral import of games, the following classification shows the way they are viewed by the boys and girls:

Womanliness.—Dolls, 17; house, 12; school, 3.

Manliness.—Ball, 12 (football 6, baseball 6); tennis, 1; cricket, 1.

Mental power.—Authors, 5; checkers, 3; music, 2; chess, 1; cards, 1; parchesi, 1; charades, 1; ball, 1; my ship's come home, 1; anagrams, 1; putting our country together, 1.

Perseverance.—Pigs in clover, 9; parchesi, 9; tennis, 9; checkers, 8; ball, 8; croquet, 5; halma, 5; cards, 5; puzzles, 5; hide and seek, 5; I spy, 2; authors, 2; tag, 2; chess, 2; tiddledy winks, 2; black bear, 1; robber, puss in corner, backgammon, crisscross, anagrams, solitaire, duck on rock, the spider and the fly, messenger force, jacks, 1 each.

Justice and fair play.—Croquet, 22; hide and seek, 18; cards, 14; checkers, 12; ball, 12; authors, 7; tag, 6; parchesi, 6; tennis, 6; halma, 4; blind man's buff, 4; I spy, 3; jacks, 3; prisoner's base, 2; hunt the slipper, black bear, puss in corner, backgammon, crisscross, tollgate, puzzles, bowling, dominoes, hopscotch, ambassodor, bright idea, Indians, tenpins, lotto, chess, innocence abroad, messenger force, quoits, 1 each.

Honesty.—Croquet, 19; hide and seek, 18; cards, 12; checkers, 11; parchesi, 7; ball, 7; authors, 6; blind man's buff, 5; jacks, 5; tennis, 4; I spy, 3; tag, 2; halma, 2; prisoner's base, 2; hunt the slipper, black bear, puss in corner, tollgate, fish pond, seven steps, colors, hopscotch, chess, tiddledy winks, innocence abroad, go bang, 1 each.

Cheating.—Cards, 4; checkers, 1; croquet, 1; dominoes, 1.

The recreations mentioned by the girls are: Walking, 35; rowing, 35; reading, 33; skating, 32; dancing, 31; driving, 25; bicycling, 20; riding, 14; music, 14; swimming, 4; coasting, 3; sailing, 3; talking, 3; rambling in the woods, 3; theater, 2; fancywork, 2; springboard, 1; billiards, 1; tennis, 1; Indian clubs, 1; day dreaming, 1.

By the boys: Bicycling, 7; swimming, 7; skating, 4; riding, 3; gymnastics, 3; fishing, 2; strolling in the woods, 2; walking, 2; reading, 2; rowing, 2; hunting, 1; sailing, 1; driving, 1; music, 1; bowling, 1; dancing, 1.

The reason assigned for the choice of a certain recreation was, in almost every instance, "for physical development."

A number of other reasons, however, were assigned, such as—

Dancing.—Mere pleasure, develops the rhythmic sense, makes one graceful, enlivens the spirits, gives pleasant associations.

Theater going.—Pleasure, mental improvement, develops the sympathetic side.

Music.—Brings rest and makes one more cheerful, stirs one's deeper nature, produces a feeling of sublimity, develops the æsthetic side.

Fishing.—Develops patience and perseverance.

Bowling.—Produces physical strength and control of muscular power.

Bicycling.—For physical development, gives a sense of freedom and of independence, a great brightener of spirits. The motion is fascinating, pleasure, power to travel.

Rowing.—Physical strength, restful.

Skating.—Physical development, sense of freedom, hardihood, produces a better mood.

Bathing.—Pleasure.

Reading.—Takes my attention from my studies, develops sympathy, improves the mind, corrects one's views of life, pleasure; one said: "makes me unsociable and selfish."

Riding.—Physical health, restful, brings one into contact with nature, revives drooping spirits.

Walking.—Health, communion with nature, spiritual uplift, produces a better mood, pleasure.

It will at once be seen that the great incentive to recreation is the necessity of outdoor exercise for health. The choice, however, is chiefly determined by the pleasure produced. The majority of returns state that they saw no particular moral worth in their pastimes. There is no doubt, however, that even these may be made the means of strengthening the moral sense, and the writers are of the opinion that unconsciously, from those avocations, there has accrued to all those reporting some moral wealth.

The returns give clear evidence in regard to the educative value of plays. By them there is developed justice, moderation, self-control, truthfulness, loyalty, brotherly love, courage, perseverance, resolution, perception, prudence, forbearance, sympathy, a training of hand, eye, limb, and of the faculties of judgment. Provision should be made for a child to express and develop his own inner life through this spontaneous and pleasurable means. All writers on education have recognized the value of play. An article by Mr. Johnson, on "Education by plays and games," is found in the Pedagogical Seminary, Vol. III, No. 1, while President Hall's Story of a Sand Pile is a classic.

Reading, etc.

SEC. XI. What studies, subjects, or lines of reading, or intellectual interest have affected you for good or for bad, and how? Did mathematics deeply impress you with universal law, astronomy with sublimity and reverence, chemistry with the order of the infinitesimal, botany and zoology with the miraculous nature and persistence of life? Have you experienced special interest in any line of study; and if so, can you tell what it is about it that attracts you, and how it has affected you for good? Can you describe or account for any aversion you have felt for any special study?

The following table shows the subjects which seemed to have exerted a good influence upon the student: Psychology, 23; literature, 18; history, 17; geography 5; mathematics, 3; botany, 2; zoology, 2; grammar, 1; drawing, 1; manual training, 2; mechanical drawing, 1; physiology, 1.

The subjects that have had an evil effect are: Manual training, 4; physiology, 2; psychology, 1; literature, 1. Novel reading is also mentioned by 1.

In reply to the question, Did mathematics impress you with natural law? 24 girls and 2 boys answered yes, and 49 girls and 4 boys no.

Did astronomy with sublimity and reverence? Yes, 44 girls, 2 boys; no, 2 girls.

Did chemistry with the order of the infinitesimal? Yes, 17 girls, 1 boy; no, 3 girls.

Did botany and zoology with the miraculous nature and persistence of life? Yes, 70 girls, 5 boys; no, 5 girls.

The subjects in which special interest was taken are: Mathematics, 28; literature, 23; history, 23; psychology, 20; botany, 16; zoology, 11; geography, 10; drawing, 5; grammar, 3; music, 3; physics, 3; poetry, 2; manual training, 2; physiology, 1.

Special aversion was felt for the following subjects, and the reasons assigned were (1) they were poorly taught, (2) the learner had no gift along that line: Manual training, 16; mathematics, 12; grammar; 11; history, 10; geography, 5; latin, 5; algebra, 4; rhetoric, 3; geometry, 1; spelling, 1; physiology, 1; drawing, 1; arithmetic, 1.

GENERAL CONCLUSIONS.

It would be the height of pedantry to build any elaborate system of moral pedagogy on such a limited supply of data. Neither would it be wise to indulge in any metaphysical speculations, as the material is at best one sided. Before any satisfactory conclusions can be drawn a study must be made of persons whose conduct might be designated as moral laxity, a study similar to the one presented by Mr. Geo. Dawson in the Pedagogical Seminary for December, 1896.[2]

Five important facts or principles are clearly suggested by the above material.

First. Moral action in early period of life, and even in early manhood and womanhood, is a matter of imitation and suggestion rather than of intellect. The great rôle played by suggestion has been shown by Mr. M. H. Small.[1]

Second. Though children are born with the sense of the oughtness out of which the moral nature grows, yet this would avail nothing did not parents furnish the growing boy or girl with clear conceptions of the moral content of life, i. e., instruct him or her thoroughly in all the principles that teach duty to God and man.

Third. It is very evident that much of the moral excellence of the character of many of those reporting is due in large measure to the hereditary influence that gathered round them at their birth. Blood does count for something with a vengeance.

The work of Mr. Dawson, above referred to, goes to show that of the 52 moral delinquents personally studied by him the most of them "had parents that were intemperate, improvident, or criminal." When bad environment had joined hands with this bad heredity nothing short of a miracle could stay the influences that were driving these same boys and girls to the reformatories.

The point is (*a*) "The heredity of the child should be as carefully studied as the strain of the cattle with which the farmer would stock his acres, and any physical weakness or tendency to evil in his ancestry should be made known to him in order that he may be on his guard lest the enemy that lurks in ambuscade in his very veins may attack him unawares; (*b*) The forces of environment should be so controlled as to destroy as far as possible any hereditary taint and at the same time strengthen and develop any predispositions to moral rectitude and manliness of life."

Fourth. The supreme aim of the parent and the teacher should be to establish definite, strong, correct habits. True morality consists as much in doing as in being. Habits are the induced states of mind or body by means of which the latent power is transformed into an effective process, and becomes active rather than passive.

[1] "The suggestibility of children." Pedagogical Seminary, Vol. IV, No. 2. See p. 1310.

[2] See p. 1321.

Their importance is recognized in the mechanical world. The intellectual and moral spheres have indeed been slow to acknowledge their worth. Manual habits enable the mechanic to produce the finished article; moral habits the boy or girl to maintain a blameless character under every circumstance of life. Sound knowledge of moral truth is good, but sound habits of moral action are better.

It is perhaps universally true that parents have devoted themselves assiduously to the instruction of their sons and daughters rather than to the establishment of habits. The natural and most effective means has thus been neglected.

Fifth. The last stage is the purification of the child's taste. All children are born with impulses and desires which are capable of unlimited education. In the early years of youth they are the controlling factors of the child. Intelligence and conscience assert their sway later. Not only are there natural tastes, but there are acquired ones. The latter are much more numerous, and are the direct production of environment. According as one's tastes are pure and noble so will be the life. Much can be done to surround the growing soul with such influences as will make for strong, vigorous, noble manhood or womanhood.

Sixth. For the evolution of the ethical consciousness nothing is perhaps better than the arousing of the religious sentiments.

Seventh. He who would lead must walk in the way himself.

Eighth. Love and faith are worth more than knowledge or specific forms of government.

Eye Defects in Students and Children.

Professor Swift,[1] of State Normal School of Stevens Point, Wis., gives the condition of eyes in young people engaged in study. The tests were made by Dr. Alcorn. They were (1) the ordinary tests of each eye for vision; (2) the card test for astigmatism; (3) the Maddox multiple rod test for muscle trouble; and (4) the diagnosing errors of refraction by means of the ophthalmoscope. The one undergoing examination was 20 feet from the test chart. The type used was Hermann Snellen's. The type which a normal eye should read at a distance of 20 feet was 9 millimeters square. This represents normal vision and is designated by twenty-twentieths. Over 300 of different ages were examined.

Table 41 shows that the percentage of pupils with normal vision in both eyes is much greater in the grammar grades than in the normal department. There seems to be a steady decrease in the acuteness of vision of pupils from the lower grades to the higher. About 50 per cent of the pupils have at least one eye whose vision is not normal.

Table 41.

Vision.	Normal department.	Grammar department.	Intermediate and primary department.
	Per cent.	*Per cent.*	*Per cent.*
Twenty-twentieths or better	14.39	21.42	19.04
Twenty-thirtieths or better, but not so good as twenty-twentieths	51.75	54.76	57.14
Twenty-fortieths or better, but not so good as twenty-thirtieths	12.06	9.52	14.28
Twenty-sixtieths or better, but not so good as twenty-fortieths	7.78	9.52	2.38
Twenty-eightieths or better, but not so good as twenty-sixtieths	2.72	2.38	0.00
Twenty one-hundred-and-twentieths or better, but not so good as twenty-eightieths	2.72	2.38	4.76
Twenty two-hundredths or better, but not so good as twenty one-hundred-and-twentieths	4.28	0.00	2.38
Below twenty two-hundredths	4.28	0.00	0.00

As a normal eye reads a letter 9 millimeters square at a distance of 20 feet, the twenty-thirtieths type is 13 millimeters square, the twenty-fortieths 18 millimeters, twenty-sixtieths 26 millimeters, twenty-sixtieths 26 millimeters, twenty-eightieths 35 millimeters, twenty one-hundred-and-twentieths 52 millimeters, and twenty two-hundredths 87 millimeters square.

[1] Pedagogical Seminary, Vol. V, No. 2, October, 1897.

PRACTICAL ASPECTS OF CHILDREN'S INTERESTS.

In order to gain some criterion of the value of educational work by ascertaining the attitude of children toward the different subjects of the curriculum, Dr. Joseph S. Taylor,[1] principal of a public school of New York, had the following four questions submitted to the pupils:

"1. What subject or subjects did you particularly like in your last class?

"2. Why did you take them?

"3. What subject or subjects did you particularly dislike?

"4. Why?"

If it be admitted that a suitable subject properly taught should interest a child, it would seem that where interest is wanting the fault must be either in the course of study or in the teaching, or in both. Such was the point of view of Dr. Taylor in making this investigation.

The number of pupils examined was about 1,000, but only 756 papers were available. The results were tabulated by ages, grades, subjects, and classes. In Tables 42 and 43 are given the results by age and grade.

Two more investigations were undertaken, aggregating with the former study returns from 2,137 pupils. In Tables 44 to 47 are found the results of these studies. No children below the third grade were examined. Table 42 shows an increased interest of the pupils as they advance in age and grade; this is in a boys' school of New York. But in Table 44, representing a mixed school, there is a noted decline of interest, beginning at age 13, for both boys and girls. This seems to be due to the teaching in the fifth grade. In preceding grade 60 per cent of the girls liked arithmetic, here only 20 per cent.

In the following tables the figures at the top represent the ages of the pupils and the grades from which they had been promoted ten weeks before. The next row of figures shows the number of pupils examined in each age and grade. All other figures are percentages, showing what proportion of pupils like or dislike the several subjects of study.

TABLE 42.—*Likes and dislikes—New York boys' school.*

LIKES.

	Age.										Grade.						Total.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8	
Number examined	2	16	72	140	175	179	114	45	9	4	75	320	198	94	32	37	756
Music	0	0	1	3	1	1	0	0	0	0	0	2	0	6	7	0	1
Writing	0	19	5	6	9	13	16	42	33	3	22	6	10	24	50	14	12
Arithmetic	0	32	27	29	28	36	54	44	56	00	44	29	29	56	78	49	36
Drawing	0	6	40	19	18	29	37	44	22	100	8	24	24	23	59	48	25
Nature study	0	0	3	6	5	11	11	10	56	0	0	0	13	19	75	72	9
Reading	0	50	27	21	34	23	31	31	33	0	47	29	25	24	22	30	28
Spelling	0	19	42	22	27	34	46	40	44	0	27	30	35	31	69	68	31
Grammar or languages	0	3	2	4	7	10	16	31	28	0	0	5	18	51	56	46	10
Geography	0	50	26	33	26	29	28	40	33	3	32	19	23	35	9	59	27
History	50	19	42	45	38	37	53	58	67	0	0	44	41	56	65	68	43
Average	5	20	21	19	19	22	29	34	37	10	18	19	22	32	42	45	22

[1] Pedagogical Seminary, April, 1898, p. 497.

TABLE 43.

DISLIKES.

	Age.										Grade.						Total.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8	
Number examined	2	16	72	140	175	179	114	45	9	4	75	320	198	94	32	37	756
Music	0	0	5	0	0	10	0	2	0	0	0	7	3	23	3	0	6
Writing	0	6	9	5	6	9	0	0	0	0	12	10	2	4	0	6	7
Arithmetic	0	87	36	23	14	21	0	4	0	0	25	22	15	6	6	0	18
Drawing	0	12	11	12	9	6	0	9	11	0	14	8	7	8		16	9
Nature study	0	0	4	2	0	3	4	2	0	0	0	2	2	7	9	0	2
Reading	0	25	5	4	4	0	0	2	0	0	2	6	4	0	0	4	4
Spelling	100	31	15	5	9	0	0	11	0	0	24	10	4	3	0	8	8
Grammar or languages	0	13	3	0	7	6	5	12	16	0	2	10	15	10	14	26	7
Geography	0	12	12	12	14	21	14	11	0	50	12	20	10	6	9	8	10
History	0	0	3	0	2	0	4	9	11	25	3	0	2	12	12	10	3
Average	5	19	10	6	7	8	3	6	4	7	9	9	6	8	6	8	7

TABLE 44.—*Likes.—New York mixed schools.*

GIRLS.

	Age.										Grade.						Total girls.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8	
Number examined	1	10	29	58	74	107	100	49	27	4	58	125	104	109	63	0	459
Music	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Writing *a*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arithmetic	100	40	48	43	61	39	56	35	37	0	52	60	20	55	44	0	43
Drawing	100	30	10	3	11	8	9	25	4	25	21	10	3	6	3	0	10
Nature study	0	0	3	5	4	6	8	4	7	0	0	4	6	7	10	0	5
Reading	100	30	14	10	5	7	5	10	4	0	12	9	11	5	2	0	8
Spelling	100	20	24	43	22	26	23	24	18	0	34	42	18	15	17	0	26
Grammar or languages	0	10	0	3	12	13	9	37	19	100	2	6	7	28	41	0	16
Geography	0	0	17	26	42	25	15	10	18	0	12	40	21	19	5	0	23
History	0	20	20	41	46	26	26	22	4	25	0	44	23	25	16	0	26
Average	44	15	15	19	23	16	14	19	12	17	15	24	12	18	15	0	17

TABLE 45.

BOYS.

	Age.										Grade.						Total boys.	Total boys and girls.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8		
Number examined	2	9	28	61	79	90	70	46	8	2	52	103	108	98	34	0	395	854
Music	0	0	0	2	0	0	0	0	0	0	2	0	0	4	0	0	0	0
Writing *a*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arithmetic	0	11	36	48	44	50	43	41	62	50	29	38	23	47	68	0	45	45
Drawing	0	0	18	12	12	7	3	2	25	0	13	8	10	4	10	0	8	9
Nature study	0	0	4	2	1	2	4	9	25	0	0	2	4	3	15	0	4	5
Reading	0	0	18	18	9	4	4	0	0	0	21	11	5	3	0	0	8	8
Spelling	100	33	36	23	20	16	14	11	0	0	33	22	34	4	15	0	19	23
Grammar or languages	0	0	0	3	4	20	15	25	13	0	2	8	7	31	76	0	18	17
Geography	50	22	43	43	41	13	35	9	13	0	38	41	29	10	32	0	29	26
History	0	44	48	46	71	38	51	37	62	0	46	64	55	39	18	0	49	38
Average	17	12	23	22	23	17	19	15	21	6	18	22	17	17	26	0	20	19

a Not reported.

TABLE 46.—*Dislikes.—New York mixed schools.*

GIRLS.

	Age.										Grade.						Total girls.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8	
Number examined	1	10	29	58	74	107	100	49	27	4	58	125	104	109	63	0	459
Music	0	0	0	2	1	0	0	0	0	0	0	0	2	0	0	0	0
Writing *a*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	......
Arithmetic	0	40	10	26	13	7	6	8	15	0	21	9	13	6	14	0	12
Drawing	0	10	7	7	2	4	2	2	0	0	7	5	4	1	0	0	3
Nature study	0	0	17	22	19	38	26	20	15	0	9	20	46	28	6	0	25
Reading	0	30	10	8	4	3	1	2	0	0	12	7	2	0	2	0	4
Spelling	0	0	10	8	9	3	4	8	0	0	9	9	7	0	5	0	6
Grammar or languages	0	0	11	14	9	15	13	20	4	50	7	13	13	13	21	0	13
Geography	100	20	28	29	22	27	10	26	22	25	33	27	14	15	21	0	21
History	100	10	17	12	5	9	18	12	11	25	14	13	13	9	14	0	12
Average	22	12	13	14	9	12	9	11	6	11	12	12	13	8	10	0	11

TABLE 47.

BOYS.

	Age.										Grade.						Total girls	Total girls and boys.
	8	9	10	11	12	13	14	15	16	17	3	4	5	6	7	8		
Number examined	2	9	28	61	79	90	70	46	8	2	52	103	108	98	34	0	395	854
Music	0	0	3	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0
Writing *a*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arithmetic	100	33	39	21	25	9	18	11	25	0	33	22	16	6	12	0	19	15
Drawing	0	0	11	10	3	7	3	0	0	0	12	3	6	0	9	0	5	4
Nature study	0	0	18	13	19	13	20	13	13	50	4	26	10	16	15	0	15	20
Reading	0	11	0	2	1	0	1	0	0	0	6	1	0	0	0	0	1	3
Spelling	0	11	4	5	9	7	0	0	0	0	10	8	5	0	0	0	5	5
Grammar or languages	50	0	18	21	32	27	33	30	50	0	6	19	40	35	33	0	27	20
Geography	50	11	7	3	11	8	7	4	0	0	6	12	8	15	0	0	7	15
History	0	0	4	18	8	11	6	15	13	0	15	9	6	14	6	0	10	11
Average	22	7	12	10	12	9	10	8	11	6	9	11	5	7	8	.0	10	10

a Not reported.

ONLY CHILDREN.[1]

Out of the 1,001 individuals described, 46 were named as "only children," though none of the questions in the syllabus asked about such children. This suggested further questions, and Dr. Bohannon[2] gives the results of a special study of 481 children, based upon answers to the questions in the following syllabus:

Give age, sex, nationality, and describe the temperament, complexion, and general health of the child briefly. Has he brothers and sisters dead? If so, how many? Is he the first born? How long did the others live? Does the child go to school? Regularly? Commenced, at what age? Get along well with other children and in work? How much time does he spend in play? The favorite games? What plays at home? What are the child's best traits? Worst traits? Is he precocious or dull? Has he any mental or physical defects? Name them. What subjects best in? What poorest in? What has been the home and school treatment? What treatment do you recommend?

Age of parents at birth of child. How long had they been married at the birth of child? Are the parents still living? Health, habits, occupations, temperaments,

[1] This refers to instances where there is only one child in each family.

[2] Ped. Seminary, v. 5, No. 4, April, 1898.

and position in life. How many brothers and sisters had they? Do they (brothers and sisters) have good health? In so far as above questions apply, describe twins, the only boy, the only girl, and the youngest child in families.

State anything else you may think to be due to the fact that they are the only child, only boy, only girl, the youngest child, or twins.

(Clark University, Worcester, Mass., March 30, 1896.)

Of the children, 381 are only[1] children, 54 are only boys or only girls, 32 are the youngest children, and 12 are twins.

The average age of 134 girls is $12\frac{4}{9}$ years, of 86 boys it is $11\frac{2}{3}$ years, and for the 292 of both sexes it is 12. 2 years.

Out of 240, 190 were said to be American, 8 German, 5 English, 2 Jewish, 2 Scotch, etc. There were 50 of non-American parentage, 17 of whom are the results of marriages between persons of different nationalities or races.

Those with good health number 162, with fair health 98, and bad health 96.

The temperaments of parents are described as "nervous" in 134 out of 259 cases.

SUMMARY OF POINTS.

These only children are unmistakably below the average in health and vitality.

Mental and physical defects of a grave character are much more common among them than among children generally.

The average length of time between marriages of the parents and births of the children is so great as to suggest a pronounced degree of relative sterility in the stock. This is much more strongly shown in the mothers than in the fathers.

The average age of the parents at the birth of girls is considerably greater than it is at birth of boys.

A greater proportion of the girls than of the boys have only-child mothers, while on the other hand a greater propoition of the boys than of the girls have only-child fathers.

Nervous disorders seem to be unusually common in the families.

These children appear to enter school later than other children, and to be less regular in their attendance.

Their success in school work is below the average.

Not so large a proportion as of other children enter the public school.

They do not join in games so rapidly or often as do other children of corresponding ages. They prefer quieter forms of amusement.

Many of them have imaginary companions.

Very many manifest a decided preference for older associates, while not a few select younger companions, and often from the other sex.

A large number of them do not have as good command of themselves socially as does the average child. Their social relations are therefore more frequently characterized by friction.

Peculiarities in these children seem to be more pronounced than in others.

Precocity appears to be the most prominent trait.

Selfishness is the most frequently named of the worst traits, while affection is most often named among the best traits.

As a rule the home treatment had been that of unthinking indulgence, which generally develops in a child the habit of expecting concessions on all sides, and corresponding unwillingness on his own part to make them to others. A right appreciation of the conditions with which the child must be concerned outside the family life requires that he be given ample opportunity for companionship with children of corresponding ages.

BIBLIOGRAPHY OF CHILD STUDY.[2]

In addition to the titles taken from various works, the bibliography consists of selections from the following bibliographies: Bibliography of Child Study, by Louis N. Wilson; titles relating to the anthropometry of children in a preliminary report on Anthropometry in the United States, by Dr. Edward M. Hartwell; psychological indexes of The Psychological Review; Bibliographie der psycho-physiologischen

[1] This refers to instances where there is only one child in each family.

[2] The author was assisted much in the preparation of this bibliography by his mother, Mrs. Angus MacDonald.

Literatur in "Zeitschrift für Psychologie und Physiologie der Sinnesorgane," and the Index Catalogue of the Library of the Surgeon-General's Office.

There are a few small and special bibliographies given. It was thought best to have these after the special articles to which they refer, and also to preserve the classification made by their authors. (See pp. 1288 and 1315.)

ADLER, H. Serious answers to children's questions. Intern. J. of Ethics, July, 1898.

Ages, heights, weights, and chest measurements of all recruits finally approved for service during the year. Army M. Dep. Rep. 1895. London, 1896, XXXVII, 30-34.

AIKINS, H. A. The field of pedagogy. Western Reserve Univ. Bull., 1897, III, 15-21.

ALEXANDER, H. C. B. Training and environment as correctives of degeneracy, as illustrated by J. M. W. Turner and Margaret Fuller. Repr. from Medicine, 1896, pp. 26.

ALLEN, Mrs. J. G. Child study and religious education. Child Study Monthly, October, 1896, vol. 2, pp. 289-293.

——— Child study from the mother's standpoint. Rochester, N. Y., 1896, pp. 36.

ALLEN, Mary Wood. Child study in the home. A series of articles in the North Western Monthly, Lincoln, Nebr. First article, September, 1897, vol. 8, 128-130.

ALLEN, N. Physical culture in Amherst College. 8vo. Lowell, 1869.

ALLPORT, FRANK. Tests for defective vision in school children. Ed. Rev., N. Y., Sept., 1897, 150-159.

——— (same with additions) in: Cong. period internat. d. sc. méd. Compt. rend., 1884. Copenh., 1886, III, Sect. de pédiat., 120-125.

AMMON, OTTO. Die natürliche Auslese beim Menschen; auf Grund d. Ergebnisse d. anthrop. Untersuchungen d. Wehrpflichtigen in Baden, etc. Jena, 1893.

ANDREAE, C. Ueber die Faulheit. Dtsch. Blätter f. erz. Unterr., 1896, XXIII, Nos. 1, 3-6.

ANFOSSO, L. Conestà nei bambini -arch. di psichiat, etc. Torina, 1897, XVIII, 531-537.

ARNOLD, SARAH L. A phase of child study. Jour. Ed. (New Eng. and Nat.) 40: 219.

ARON, E. Plethysmographische Untersuchungen d. Athembewegungen d. Menschen. Arch. f. path-Anat., etc., Berlin, 1893, CXXXII, 408-427.

ASCHAFFENBURG, G. Welchen Nutzen kann die experimentelle Psychologie der Pädagogik bringen? Kinderfehler. (Ztsch. f. Pädag., Pathol. u. Ther.), 1896, I, 37-41.

ATKINSON, F. W. Child study in secondary schools. School Review, Sept., 1897, vol. 5, 213-281; 461-466.

AUBRY, P. À propos de l'anthropométrie et d'une récente interpellation, etc. Arch. d'anthrop. crim., Lyon et Paris, 1897, XII, 289-292.

ANGERSTEIN, W. Das Massverhältniss des menschlichen Körpers und das Wachsthum des Knaben. Köln, 1865.

BABANASJANTZ, Z. K vopr. o vese i dline donoshen. novorozhden. (Weight and size of new-born infants at term.) Nauch. Besedy vrach. zakavkazsk. Poival. Inst., Tiflis, 1886, I, 121-152.

BABCOCK, W. H. Games of Washington children. Am. Anthropologist, July, 1888, vol. I, 243-284.

BAGINSKY, AD. Handbuch der Schulhygiene. Berlin, 1877.

BAKER, SMITH. Fatigue in school children. Educa. Rev., Jan., 1898, 34-39.

BALDWIN, J. MARK. Bashfulness in children. Ed. Rev., N. Y., Dec., 1894, vol. 8, 434-441.

——— Differences in pupils from the teacher's point of view. Inland Educ., 1896, II, 126-129, III, 232-235.

——— New method of child study. Science, 21: 213.

——— Mental development in the child and the race. Methods and processes. First ed.; second ed. corrected. New York and London. Macmillan. pp. xvi+496.

BALDWIN, J. MARK. Die Entwickelung des Geistes beim Kinde und bei der Rasse. Deutsch, nach der 3ten Ausgabe. Berlin, 1898. P. 470.

BARNES, EARL. Feelings and ideas of sex in children. Ped. Sem., March, 1893, vol. 2, 199-203.

——— A study on children's drawings. Ped. Sem., 2:455.

——— Theological life of a California child. Ped. Sem., 2:442.

——— Studies on education. Leland Stanford Univ., 1896, pp. 40.

——— Children's imaginary companions.

——— Punishment as seen by children. Pedag. Sem., 3, 235-245.

——— Punishment for weak time sense. Trans., 3, Soc. for Child-Study, I, (3), 35-39.

BARNES, J. S. Examination of the eyes of school children as a hygienic measure. Pacific Rec. Med. and Surg., 1896-97, XI, 116.

BARTHOLOMAI, F. Psycholologische Statistik. Allg. Schulzeitung, 1871. Anfänge des Tastens, Sehens und Hörens des Kindes (nach Sigismund-Fröbel). Jahrb. d. Vereins f. wissenschaftl. Pädag. IV.

BARTHOLOMAI u. SCHWABE. Der Vorstellungskreis der Berliner Kinder, beim Eintritt in die Schule. Berl. Städt. Jahrb., 1879.

BARUS, ANNIE H. The history of a child's passion. The Woman's Anthropological Soc., Washington, D. C., March 2, 1895, pp. 8.

——— Methods and difficulties of child-study. Forum, September, 1895, vol. 30, 113-119.

BAUMANN, J. Ueber Willens- und Charakterbildung auf physiologisch-psychologischer Grundlage (Samml. v. Abh. aus d. Geb. d. päd. Psych.). Berlin, 1897. pp. 86.

BAXTER, J. H. Statistics, medical and anthropological, of the Provost-Marshal-General's Bureau, derived from records of the examination for the military service in the armies of the United States during the late war of the rebellion of over a million recruits, drafted men, substitutes, and enrolled men. Compiled under direction of the Secretary of War. 2 vols., 4to. Washington, D. C., 1875.

BEARD, G. M. English and American physique. North American Review, New York, 1879, CXXXIX, 588-603.

BEAUDOUIN. Pesées quotidiennes et alimentation d'un enfant né avant terme. Normande méd. Rouen, 1888, IV, 234-236.

BÉCIGNEUL, J. Étude de psycho-physiologie sur le développement des facultés intellectuelles chez l'enfant. Ann. de Philos. Chrét., 1897, XXV, 370-384, 535-543.

BEDDOE, JOHN. Physical characteristics of the Jewish race. 16 pp. London, 1861.

BEEBE, J. E. The motor and sensory child. Child Study Monthly, 1897, III, 14-25.

BEHNKE, E., and BROWN, L. The child's voice: its treatment with regard to after development. A. N. Marquis & Co., Chicago, 1885.

BEMIES, C. O. Two pedagogical laws. Child Study Monthly, 1897, II, 609-617.

BENTLEY, ELLA HART. Sex differences that have been brought out by child study. Northwestern Monthly, Lincoln, Nebr., November, 1897, vol. 8, pp. 257-261.

BERGMANN, H. Statistische Erhebungen. H. Böhlau, Weimar, 1891, pp. 23.

BERGSTRÖM, JOHN A. An experimental study of some of the conditions of mental activity. Am. Jour. of Psych., January, 1894, vol. 6, 247-274.

BERGEN, F. D. Notes on the theological development of a child. Arena, 19: 254-266.

BERNARD, P. Considérations médico-légales sur la taille et le poids depuis la naissance jusqu'à l'âge adulte. Arch. de l'anthrop. crim., Paris, 1887, II, 213-225.

BERTILLON, A. Signaletic instructions, including the theory and practice of anthropometrical identification. The Werner Company, Chicago, 1896.

BERTILLON, J. La taille en France. Rev. scient., Paris, 1885, XXXVI, 481-488.

BENEKE. Ueber die Bedeutung regelmässiger Messungen der Körperlänge des Menschen während des Wachsthums. Memorabilien, Heidbr., 1877, XXII, 464-468.

BEYER, H. G. The influence of exercise on growth. Jour. Exper. Med., 1896, I, 546-558.

——— The growth of United States naval cadets. Reprint from Proceed. of U. S. N. Inst., vol. XXI, No. 2, 1895.

BEZOLD, F. Schuluntersuchung über das kindliche Gehör-organ. Wiesbaden. J. F. Bergmann, 1896.

BIDERT, T. Zur Beurtheilung der Wägungsresultate bei Säuglingen. Jahrb. f. Kinderh., Leipzig, 1882, n. f. XIX, 275-291.

BINET, A., and HENRI, V. De la suggestibilité naturelle chez les enfants. Rev. Phil. XXXVIII, 337-347.

——— Developpement de la mémoire visuelle des enfants. (Trav. du lab. de psych. phys.) Rev. Philos. XXXVII, 348-350. (See also in Rev. Générale des Sciences.)

——— La peur chez les enfants. (Trav. du Lab. de psychol. physiol. de Paris.) Année Psychol., 1896, II, 223-254.

——— La précocité intellectuelle dans la famille Pascal. Arch. Méd. d'Angers., 1897, I, 377-384.

——— Perceptions d'enfants. Revue Philosophique, Dec., 1890, vol. 30, 582-611.

——— Recherches sur les mouvements chez quelques jeunes enfants. Revue Philosophique, March, 1890, vol. 29, 297-309.

——— La perception des longueurs et des nombres chez quelques petits enfants. Revue Philosophique, July, 1890, vol. 30, 68-81.

——— La mesure des illusions visuelles chez les enfants. Revue Philosophique, July, 1895, vol. 40, 11-25.

BIRD, Fr. Ueber die relativen Massverhältnisse des menschlichen Körpers. Ztsch. f. Anthrop., Leipzig, 1823. 330-369.

B. J. Statistique anthropométrique et médicale des élèves des écoles primaires de Bruxelles. Ann. de démog. internat., Paris, 1879, III, 221-226.

BOAS, F. Anthropological investigations in schools. Pedagogical Seminary, Worcester, Mass., 1891, I, 225-228; also in Science, New York, 1891, XVII, 351-352.

——— Physical characteristics of the Indians of the North Pacific coast. American Anthropologist, 1891, IV, 25-32.

——— The correlation of anatomical or physiological measurements. Am. Anthropologist, July, 1894, vol. 7, 313-324.

——— Zur Anthropologie der Nordamerikanische Indianer. Verhandlungen der Berliner Anthropologischen Gesellschaft, 1895, 367-411.

——— Theory of Anthropometry. Am. Statist. Assoc., 353-569.

——— The growth of children. Science, New York, 1892, XIX, 250. Criticism on Dr. William Townsend Porter's investigation of the growth of the school children of St. Louis. Science, New York and Lancaster, Pa., 1895, n. s., I, 225-230.

——— Growth of first-born children. Science, April 12, 1895.

——— The limitations of the comparative method of anthropology. Science, December 18, 1896, n. s., vol. 4, 901-908.

——— Growth of Toronto children. Rep. Brit. Ass. Adv. Sci., 1897. London, 1898, 443-449.

——— Observations on physical characteristics of children, etc., taken at Aberdeen on Banffshire and in the Island of Lewis. Rep. Brit. Ass. Adv. Sci., 1897. London, 1898, 506.

BOEHME, F. M. Deutsches Kinderlied und Kinderspiel, Leipzig, 1897.

BOHANNON, E. W. A study of peculiar and exceptional children. Pedag. Sem., 1896, IV, 3-60.

BRINTON, D. G. External mensuration of the human subject. Medical and Surgical Reporter, Philadelphia, 1869, XX, 1-2.

BOLTON, H. C. The counting-out rhymes of children. Jour. Am. Folk-Lore, April and June, 1888.

BOLTON, T. L. The growth of memory in school children. Am. Jour. Psych., 1892, IV, 189-192; 362-380.

BONOMI, JOSEPH. The proportions of the human figure. Ed. 5, London, 1880.

BOONE, RICHARD G. Child traits in the adult. Inland Educator, September, 1895, vol. 1, 65-68.

BORRI, L. La dimensione della ossa lunghe degli arti del feto nell' ultimo trimestre della vita endouterina considerata in rapporto con la lunghezza totale del corpo. Sperimentale. Sez. clin., Firenze, 1895, XLIX, 302-307.

BOUCHUT, E. Accrescimento dei bambini e cambiamento di nutrice per l' uso del pesa-bambini. (Transl. by G. Somma.) Arch. di patol. inf. Napoli, 1884, II, 116-119.

BOULTON, P. Some anthropometrical observations. Brit. Med. Jour., London, 1876, I, 280-282.

BOURGERY. Sur les rapports de la structure avec la capacité fonctionelle des poumons à diverse âges. Compt. rend. 1843, XVI, 184.

BOWDITCH, H. P. The growth of children. Tenth annual report of the State Board of Health of Mass. Boston, 1879, vol. 10, 33-62.

——— Relation between growth and disease. Trans. of the Am. Med. Ass'n, 1881.

——— The growth of children, studied by Galton's method of percentile grades. Report of Board of Health, Mass. 1889-90, Boston, 1891, XXII, 479-522.

——— Physique of women in Massachusetts. Report of Board of Health. Boston, 1890.

BOWLES, MARY E. Emotions of deaf children compared with emotions of hearing children. Ped. Sem., October, 1895, vol. 3, 330-334.

BOYD, A. K. H. Concerning the sorrows of childhood. At. Mo., vol. IX.

BOYD, ROBERT. Table of weights of the human body and internal organs in the sane and insane, etc. Phil., Trans., London, 1861, CLI, 241-262.

BRAMHALL, MAE ST. JOHN. The wee ones of Japan. Harper and Brothers, N. Y., 1894, pp. 137.

BREWER, W. H. The instinctive interest of children in bear and wolf stories. Proc. Am. Ass'n Adv. Sci., Salem, Mass., 1894, vol. 42, 309-311.

British Medical Association. Report of committee on the mental and physical condition of children. Brit. Med. Jour., London, 1895, II, 213.

BRODEUR, C. C. Child study in Westfield and vicinity. Jour. Educ., 47:3.

BROWN, E. E. Notes on children's drawings. Univ. of Cal. Stud., vol. II, No. 1, Berkeley, Cal., 1897, pp. 75.

BROWN, H. W. Some records of the thoughts and reasonings of children. Ped. Sem. December, 1893, vol. 2, 358-396.

BRUNS, L. Die Hysterie im Kindesalter. Sammlung zwangloser Abhandlungen aus dem Gebiet der Nerven-und Geisteskrankheiten. Bd. I, heft 5 und 6, Halle, 1897.

BRYAN, W. L. Suggestions on the study of children. Rep. Commis'r Educ., 1893-94, Washington, 1896, 450-456.

——— On the development of motor ability. Am. Jour. of Psych., Worcester, 1892, V, 125-204, 3 charts.

BUCHHORN, J. Kinderspiele und Kinderliede von Niederrhein, Urquell, Leiden, 1897, n. F., i, 334-344.

BUCKMAN, S. S. The speech of children. Nineteenth Century, 1897, LXI, 793-807.

——— Babies and monkeys. Nineteenth Century, London, November, 1894, vol. 36, 727-743. Also in Pop. Sci. Mo., January, 1895, vol. 46, 371-388.

BURDETTE, ROBERT J., and others. Before he is twenty. Five perplexing phases of the boy question considered by Robert J. Burdette, Frances Hodgson Burnett, Edward W. Bok, Mrs. Burton Harrison, and Mrs. Lyman Abbott. Fleming H. Revell Co., N. Y., 1894, pp. 104.

BURK, FREDERIC L. Teasing and bullying. Ped. Sem., April, 1897, vol. 4, 336-371.

——— Growth of children in height and weight. Am. Jour. Psych., 1897-98, IX, 253-326.

BURNETT, FRANCES H. The one I know best of all. A memory of the mind of a child. Charles Scribner's Sons, N. Y., 1893, pp. 325.

BURNHAM, WM. H. Child study and anthropology. Ped. Sem., 2:265.

——— The study of adolescence. Ped. Sem., June, 1891.

——— Observation of children at the Worcester Normal School. Ped. Sem., June, 1891.

——— Outlines of school hygiene. Ped. Sem., June, 1892.

——— A scheme of classification for child study. Ped. Sem., March, 1893.

——— Individual differences in the imagination of children. Ped. Sem., March, 1893.

——— Motor ability in children; development and training. 64th Annual Meeting Am. Inst. of Instruction, Bethlehem, N. H., July 9-12, 1894. Am. Inst. of Instruction, Boston, 1894, 127-140. Discussion of same, 140-150.

——— Child study as the basis of pedagogy. Add. and Proc. of the N. E. A., Chicago, July 25-28, 1893. Pub. by the Ass'n, N. Y., 1895, 718-720.

——— Bibliographical notes to lectures in school hygiene. Worcester, Mass., 1897, pp. 11.

——— Suggestions from the psychology of adolescence. School Review, Chicago, December, 1897.

BUTLER, N. M. Is there a new education? Ed. Rev., N. Y., January, 1896, vol. 11, 58-71.

——— The meaning of infancy and education. Ed. Rev., N. Y., January 1897, vol. 13, 58-75.

CALKINS, M. W. The religious consciousness of children. New World, 1896, V, 705-718.

——— Wellesley College Psychological Studies. Ped. Sem. III, 319-341.

CAMERER, W. Untersuchungen über Massenwachsthum und Längenwachsthum der Kinder. Jahrb. f. Kinderh., Leipzig, 1893, XXXVI, 249-293.

——— Beiträge zur Physiology des Säuglings. Ztschr. f. Biol., München u. Leipzig, 1896, n. f., XV, 521-534.

——— Correspondenzbl. d. Württenberg. ärztlichen Vereins, Jahrg., 1876, Nr. 11.

CARLIER, G. Recherches autropométriques sur la croissance, etc. (10,497 observations, etc.). Mem. Soc. d'anthrop. de Paris, 1889-93, 2 s., IV, 265-346.

CARMAN, ADA. Measurements of pain, etc., on school children in Saginaw, Mich., Amer. Jour. Psych., April, 1899.

CARROLL, C. F. Childhood and education. Educ., 1896, XVII, 79-87; 149-158.

CARSTÄDT, F. Ueber das Wachstum der Knaben, etc. Ztschr. f. Schulgsndhtspflg., Hamburg, 1888, 65-69.

CARTER, MARION H. Educational paper dolls. The Jour. of Ped., April, 1898.

——— The kindergarten child. Atlantic Mo., March, 1899.

CARTER, R. BRUDENELL. Report on the vision of children attending elementary schools in London. Eyre and Spottiswoode, London, 1896, pp. 16.

CATTELL, JAMES McK. Tests of the senses and faculties. Ed. Rev., N. Y., March, 1893, vol. 5, 257-265.

CHAILLE, S. E. Infants: their chronological progress. New Orleans Medical and Surgical Journal, 1886-87, n. s., XIV, 893-912.

CHAMBERLAIN, A. F. Notes on Indian child language. Am. Anthropologist, July, 1890, vol. 3, 237-241: July, 1893, vol. 6, 321-322.

——— The Child and Childhood in Folk-Thought. New York and London, Macmillan & Co., 1896, pp. x + 464.

CHAMPNEYS, F. H. Notes on an infant. Mind, Jan., 1881, vol. 16, 104-107.

CHANDLER, K. A. Children's purposes. Child Study Mo., 1897, III, 130-139. Child Study, Reports and discussion, Trans. Ill. Soc. Child Study, 1897, II, 7-14, 28-67, 77-80, 136-174, 198-200.

CHANNING, WALTER. The importance of physical training in childhood. Ed. Rev., N. Y., October, 1895, vol. 10.

——— The significance of palatal deformities in idiots. Jour. of Mental Science, London, January, 1897, vol. 43, 72-84.

CHAPIN, H. D. Child study in the hospital: a record of 600 cases. Forum, 17:125.

——— Contents of children's minds. Science, 10: 304.

——— A plan of infantile measurements. Med. Rec., N. Y., 1894, XLVI, 629-651.

CHARMEIL. Hygiène alimentaire du nouveau-né. Nord. Méd., Lille, 1896, III, 121-126, 129.

CHERVIN, A. Anthropométrie militaire. Jour. soc. de statist. de Paris, 1896, 8 s., IV, 364-371.

Child Study Monthly (Krohn and Bayliss, editors). Published by the Werner Company, Chicago, Ill.

Child Study Congress in New York City. Catholic World, 66: 689-698.

CHRISMAN, OSCAR. Children's secret language. Child Study Mo., 1896, II, 202-211.

——— Paidologie. (Dissert.). Jena, B. Vopelius, 1896, pp. 96.

——— Child Study; a new department of education. Forum, XVI, 728-736.

——— How a story affected a child. Child Study Mo., April, 1897, vol. 2, 650-661.

——— The hearing of children. Ped. Sem., 1893, II, 397.

——— One year with a little girl. Educ. Rev., IX, 52-71.

——— Paidology, the science of the child. Educ. Rev., March, 1898.

——— Secret language of childhood. Cent. Mag., May, 1898.

CHRISTOPHER, W. S. Three crises in child life. Child Study Mo., December, 1897, vol. 3, 324-335.

CLAPP, H. L. Scientific method with children. Pop. Sci. Mo., XLIV., 57.

——— The educative value of children's questioning. Pop. Sci. Mo., 1896, XLIV, 799-809.

CLARK, J. S. Some observations on children's drawing. Educ. Rev., 1897, XIII, 76-82.

CLARUS, ALBRECHT. Ueber Aphasie bei Kindern. Teubner, Leipzig, 1874, pp. 32.

CLOUSTON, T. S. Developmental insanities and psychoses. The delirium and night terrors of children. The insanities of puberty and adolescence. Tuke's Dictionary of Psy. Med., Vol. I, 357-371.

——— The neuroses of development. (Morison Lectures for 1890.) Oliver and Boyd, Edinburg, pp. 138.

——— The growth and development of a child in body and mind. Edinb. Health Soc. Health Lect., 1884, 4. s., 21-48.

COHN, H. The hygiene of the eye in schools. An English translation. Ed. by W. P. Turnbull. Simpkin, Marshall & Co., London, 1886, pp. 236.

——— Lehrbuch der Hygiene des Auges. Urban und Schwarzenberg, Wien und Leipzig, 1892, pp. 855.

COLOZZA, G. A. Il giuoco nella psicologia e nella pedagogia. G. B. Paravin. Pp. 282.

COMBE, J. Körperlänge und Wachsthum der Volksschulkinder in Lausanne. Zeitschr. f. Schulgesundheitspflege. Heft 11, 1896.

——— Les maladies de croissance. (Extrait des Archives générales de médecine.) Asselin et Houzeau, Paris, 1890, pp. 42.

COMPAYRÉ, G. L'Evolution intellectuelle et morale de l'enfant. Hachette et Cie. Paris, 1893, pp. 371.

——— The intellectual and moral development of the child. Trans. by Mary E. Wilson. Int. Ed. Series, vol. 35, D. Appleton & Co., N. Y., 1896, pp. 298.

——— Lo svol giamento intellettuale e morale del Bambino. Trad. d A. Valdanini. Rome, 1897.

CREDARO AND MARTINAZZOLI. Dizionario illustrato di Pedagogia, Fasc, 28. Milan, Vallardi, 1896.

CULIN, S. Street games of Brooklyn. Jour. Am. Folk-Lore, July-Sept., 1891, vol. 6, 205; 4, 221-237.

——— Exhibit of games in the Columbian Exhibition. Jour. Am. Folk-Lore, July-Sept., 1893, vol. 6, 205-227.

CUNNUNGHAM, J. B. Abnormal children. Sch. Jour. (N. Y.), 48:667.

DANA, C. L. On the growth of the infant. Quart. Bull. Clin. Soc. N. Y. Post Grad. Med. Sch., 1886-87, II, 27-29.

DAFFNER, FRANZ. Ueber Grösse, Gewicht, Kopf- und Brustumfang beim männlichen Individuum vom 13, bis 22 Lebensjahre, etc. Arch. f. Anthrop., Bd. XV. S. 121, 1885.

——— Das Wachstum des Menschen. Antropologische studie. W. Engelmann, Leipzig, 1897, pp. 129.

——— Vergleichende Untersuchungen über die Entwickelung der Körpergrösse und des Kopfumfanges. Arch. f. Anthrop. Brnschwg., 1883-84, XV, 37-44.

DANIEBEKOFF, A. Materiali k voprosu o viesie i obyomie golovnovo i spinnovo mozga dietei oboyevo pola v vozraste nizhe goda. (Weight and volume of brain and spinal cord of children of both sexes under 1 year of age.) 8°. St. Petersburg, 1885.

DARRAH, E. M. Study of children's ideals. Pop. Sci. Mo., 53:88-98.

DARWIN, CHARLES. Biographical sketch of an infant. Mind, July, 1877, vol. 2, 285-294.

DAUBES, M. GUYOT. Variations in Human Stature. Pop. Sci. Mo., Vol. XXXI.

DAVID, J. W. Über die Schwankungen in der geistigen Entwickelung des Kindes. 3ter Internationaler Congress für Psychologie in München, 1896. München, 1897, 449-453.

DAWSON, GEO. E. A study in youthful degeneracy. Ped. Sem., December, 1896.

DEFERT, L. L'enfant et l'adolescent dans la société moderne. Paris, 1897, xix + 221.

DELAND, MARGARET. The story of a child. Boston, 1892.

DELPEACH, A. La période preputère. Presse Méd., Paris, 1898, II, 89-93.

DENCKER, ROBERT. Das Kind und die geschlechtliche Entwickelung. Leipzig, 1898.

DENTIO, F. Registro antropo-psicologia per determinare la teoria positiva del influenza della scuola sviluppo fisico e psichico degli educandi. Foggia.

DEWEY, JOHN. The chaos in moral training. Pop. Science Mo., XLV, 433-443.

——— Galton's statistical methods. Amer. Statis. Assoc.

——— The interpretative side of child study. Trans. Ill. Soc. for Child Study, 1897, II, 17-27.

——— The psychological aspect of the school curriculum. Educ. Rev., 1897, XIII, 356-369.

——— The psychology of infant language. Pyschol. Rev., I, 63-66.

DEXTER, T. F. G. and GARLICK, A. H. Psychology in the school room. London, 1898, Longmans, 422 pp. 8°.

DICKSON, S. H. Statistics of height and weight in the South. Charleston Medical Journal and Review, 1857, XII, 607-613.

——— Statistics of height and weight. American Journal of Medical Sciences. Philadelphia, 1866, n. s., LII, 373-380.

DIK, A. Materiali k izsledovaniyu roste, viesa, okruzhnosti grudi i zhiznennoi yomkosti liskhkickh detskavo i yunoshesk, vozrastov. (Examination of stature, weight, circumference of chest, vital capacity of lungs in children and young people.) Voyenno-med. J. St. Petersburg, 1883, CXLVI, pt. 2, 223; 363, 14 tab.

DOBODCHIKOFF, K. K. Narod. schkoly Romanov-Borisoglebskavo uyezda i ich ucheniki. (Public schools of Romanov-Borisogleb district and their pupils.) (Anthropometry.) Vestnik. obsh, hig., sudeb. i prakt. med., St. Petersburg, 1890, VIII, pt. 1, 1-35.

DONKIN, H. BRYAN. The diseases of childhood (Medical). Charles Griffin & Co., London, 1893, pp. 433.

DORSEY, J. O. Games of the Teton Dakota children. Am. Anthropologist, October, 1891, vol. 4, 329-344.

DOWNS, J. LANGDON. On some of the mental affections of childhood and youth. J. and Churchill, London, 1887, pp. 307.

DRESSLAR, F. B. Fatigue. Ped. Sem., June, 1892, vol. 2, 102-106.

——— Studies in the psychology of touch. Am. Jour. of Psychology, June, 1894, vol. 6, 313-368.

DUDREWICZ, L. Pomiary antropolog. dzieci Warszawskich. (Anthropological measurements of children in Warsaw.) Zbiór. wiad. do antrop. . . . Akad. Umiej. w Krakow, 1882, VI, pt. 2, 3-23.

EATON, SUSIE W. Children's stories. Ped. Sem., October, 1895.

EBBINGHAUS, H. Ueber eine neue Methode zur Prüfung geistiger Fähigkeiten und ihre Anwendung bei Schulkindern. Zeitschr. f. Psych. u. Phys.d.Sinnesorgane. XIII. Heft. 6.

EBER, H. Zur Kritik der Kinderpsychologie, mit Rücksicht auf neuere Arbeiten. Philos. Stud., 1896, XII, 587-628.

ECKER, A. Zur Statistik der Körpergrösse im Grossherzogthum Baden. Arch. f. Anthr. 1876, Bd. X., S. 257.

EGGER, M. E. Observations et réflexions sur le développement de l'intelligence et du langage chez les enfants. A. Picard, Paris, 1887, pp. 102.

ELLIS, A. C., and HALL, G. S. A study of dolls. Ped. Sem., 1896, IV, 129-175.

ELLIS, HAVELOCK. Notes on statistics of growth of boys and girls. In "Man and Woman," London, 32-38.

EMMINGHAUS, H. Die psychischen Störungen des Kindes alters. (Reprint from Handb. d. Kinderkrankheiten.) H. Laupp. Tübingen, 1887, pp. 293.

ENEBUSKE, C. J. An anthropometrical study of the effects of gymnastic training on American women. Papers on Anthropometry, 47-57.

———. Diagram of working capacity and resistance as manifest in gymnasium exercises. Report Tenth Annual Meeting A. A. A. E., 1895, 11-18.

———. Pedigogical gymnastics. Am. Physical Ed. Rev., June, 1897, vol. 2, 81-88.

———. Some measurable results of Swedish pedagogical gymnastics. Proc. Amer. Asso. for Advancement of Phys. Ed., 1892, Springfield, Mass., 1893, VII, 207-235, 8 tables in text.

Enquête sur le caractère des enfants. (Questionnaire.) Rev. Philos. XXXVII, 344-346.

ERISMANN. Untersuchungen über die körperliche Entwickelung der Fabrikarbeiter in Zentralrussland (100,000.) Tübingen, 1889.

EULENBURG u. BACH. Schulgesundheitslehre. Das Schulhaus und das Unterrichswesen vom hygienischen Standpunkte. J. J. Heines, Berlin, 1891, pp. 636.

FACKENTHAL, K. The emotional life of children. (Wellesley Coll. Psychol. Stud.) Pedag. Sem., III, 319-330.

FAHNER. Das Kind und der Schultisch. Zürich, 1865, pp. 64.

FARAGÓ, G. E. Az ujszülott gyermekek néhány reflexe. (Some reflections on newborn children, as to weight.) Gyógyászat, Budapest, 1887, XXVII, 205.

FARGE. Un point d'anthropologie. La circumference horizontale maximum. 12°. Angers, 1882.

FARR, WILLIAM, et al. Table showing the relative statures of boys at the age of 11 to 12 years under different social and physical conditions of life. Rep. Brit. Ass. Adv. Sci., Lond., 1880, I, 127.

FÉRÉ, Ch. Note sur le rapport de la longueur du tronc à la taille. Anthropologie Paris, 1893, IV, 697.

FERGUS, W. E., and RODWELL, G. F. On a series of measurements for statistical purposes recently made at Marlborough College. J. Anthrop. Inst., Lond., 1874-5, IV, 126-130, 1 pl. Also (Rev.): J. Anthrop. Inst., Lond., 1874-5, IV, 130-135.

FETZER. Ueber den Einfluss des Militärdienstes auf die Körperentwickelung. Stuttgart, 1879.

FEWKES, J. W. Dolls of the Tusayan Indians. Intern. Arch. f. Ethnographie, 1894, vol. 7, 45-73.

FISHER, D. W. The mind of a child. Presb. and Ref. Rev., VI, 86-97.

FITZ, George W. A study of types of respiratory movements. Jour. of Experimental Med., N. Y., November, 1896, Vol. I, 677-692. Reprint, pp. 16.

——— A study of measurements in curvature of the spine. Am. Phys. Ed. Rev., Boston, September, 1897, vol. 2, 185-187.

——— Play as a factor in development. Am. Phys. Ed. Rev., Boston, December, 1897, vol. 2, 209-215.

——— The hygiene of instruction in elementary schools. Am. Phys. Educ. Rev., Vol. III, No. 4, 1898; also reprint.

FLETCHER, ALICE C. Glimpses of child life among the Omaha Indians. Jour. Am. Folk-Lore, July-September, 1888, Vol. I, 115-123.

FLETCHER, R. Human proportion in art and anthropometry. A lecture delivered at the National Museum, Washington, D. C. Cambridge, 1883. M. King. 37 pp., 4 pl. 8vo.

FLEXNER, A. The religious training of children. Int. J. of Eth., 1897, VII, 314-327.

FLOWER, B. O. The right of the child and heredity. Arena, XIII, 243-262.

FOLTZ, O. Die Phantasie in ihrem Verhältnis zu den höheren Geistesthätigkeiten. Deutsche Blätter f. Erz. Unterr., 1896, XXIII, 401-495, 409-413.

FORNELLI, N. Sulla interpretazione psicologica del giuoco. Riv. It. di Fil., X (1), 55-66.

FOTHERGILL, J. M. The physiologist in the household. Part I. Adolescence. Bailliere, Tindall and Cox, London, 1880, pp. 24.

FOUGERAY, HAMON DU, et COUÉTOUX, L. Manuel pratique des méthodes d'enseignement spéciales aux enfants anormaux (sourds-muets, aveugles, idiots, bègues, etc.), méthodes statistiques, institutions, législation, etc. Préface du Dr. Bourneville. F. Alcan, Paris, 1896, pp. 288.

FREAR, CAROLINE. Imitation. A study based on E. H. Russell's observations. Ped. Sem., April, 1897, Vol. 4, 382-386.

FREE, H. Der Tastsinn und seine Bedeutung für den Unterricht und die Entwickelung des Kindes. Aus d. Schule für d. Schule, 1897, IX, d.

FRIEDRICH, JOHANN. Untersuchungen über die Einflüsse der Arbeitsdauer und der Arbeitspaussen auf die geistige Leistungsfähigkeit der Schulkinder. Zeitschr. f. Psych. u. Phys. d. Sinnesorgane. Bd. XIII, Heft 1 und 2.

FROEBEL, FRIEDRICH. Pedagogics of the kindergarden; or, his ideas concerning the play and playthings of the child. Trans. by Josephine Jarvis. Int. Education Series, vol. 30. D. Appleton and Co., N. Y., 1895, pp. 337 and 13 plates.

FUCHS, A. Die Unruhe. Studie, Einleitung über 'System und Aufgaben der pädagogischen Pathologie.' Beitr. z. pädag. Path., Heft 1. Gütersloh, C. Bertelsmann, 1896, pp. 62.

FULLER, H. D. General care of infant from birth to childhood. Charlotte, N. C. Med. Jour., 1896, VIII, 770-773.

GALBREATH, LOUIS H. Child study in the art of teaching. Jour. Ped., July, 1898.

GALTON, DOUGLAS. Physical condition of school children. Sch. Guardian, March 17, 1894, p. 200.

GALTON, FRANCIS. On the height and weight of boys aged 14 in town and country schools. Nature, London, 1875-76, V, 174-181.

——— Proposal to apply for anthropological statistics from schools. J. Anthrop. Inst., Lond., 1873-74, III, 308-311. On the height and weight of boys aged 14 in town and country schools. Ibid., 1875-76, V, 174-181.

——— Range in height of males at each age and in several classes. Rep. Brit. Ass. Adv. Sci. 1881, London, 1882, LI, 250-254.

——— et al. Table showing the height (length) and weight of infants of both sexes at birth. Rep. Brit. Ass. Adv. Sci., 1883, London, 1884, LIII, 286.

——— Head growth in students at the University of Cambridge. Nature, London, 1888-89, XXXVIII, 14.

——— Remarks on replies by teachers to questions respecting mental fatigue. Jour. Anthrop. Institute, April, 1888, vol. 18, 157-167.

GALTON, FRANCIS. On the principle and methods of assigning marks for bodily efficiency. Nature, October 3, 1889.

——— Useful anthropometry. Proc. Amer. Asso. for Advancement of Phys. Ed., 1891, Ithaca, N. Y., 1891, VI, 51-57.

——— Communication on international anthropometry. Bull. de l'Inst., intern. de statist., Rome, 1892, VI, 1. livr., 10-12.

——— Anthropometrical instruments. Anthrop. J., 16, 2.

——— Anthropometric per-centiles. Nature, vol. 31, 223.

GARBINI, ADRIANO. Educazione fisica del bambino. Verona, 1889, pp. 212.

——— Evoluzione della voce nella infanzia. G. Franchini, Verona, 1892, pp. 53.

——— Evoluzione del senso cromatico nei bambini. Verona, 1894.

——— Evoluzione del senso olfattivo nella Infanzia. Archivio per l'Antrop. e la Etnol. Firenze, 1896, vol. 26, 239-286.

GARDNER, A. K. Our children; their physical and mental development. 8°. Hartford, Conn., 1872.

GAUDENZI, C. Un appareil rapide de craniographie exacte. 8°. Bologne, 1892.

GAYLEY, JULIA G. The classics for children. Ped. Sem., Oct., 1895. Vol. 3, 342-346.

GEISSLER und UHLITZSCH. Die Grössenverhältnisse der Schulkinder im Schulinspectionsbezirk Freiberg. Zeitschr. d. K. sächs. statist. Bureaus, XXXIV, Jahrg., 1888, Heft 1 und 2, S. 30.

GEISSLER, A. Messungen von Schulkindern in Gohlis-Leipzig. Ztschr. f. Schulgsudhtspflg., Hamb., u. Leipz., 1892, V., 249-253.

GELMINI, A. Il fenomeno psicolog. della bugia specie nella educazione del fanciullo. Riv. di Pedag., I, 342-350 and 396-408.

——— Studi psicologici ed educativi sul fanciullo. Torino, 1886. 16°. pp. 151.

GELPKE, THEODOR. Die Augen der Elementarschüler und Elementarschülerinnen der Haupt- und Residenzstadt Karlsruhe. Eine statistische Untersuchung. H. Laupp, Tübingen, 1891, pp. 136.

GENZMER, ALFRED. Untersuchungen über die Sinneswahrnehmungen des neugeborenen Menschen. Halle, 1882, pp. 28.

GIHON, A. L. A study of adolescent growth, based on the physical examination of 4,961 naval cadets and 2,058 naval apprentices. Report of the Surgeon-General United States Navy, Washington, D. C., 1880, 15-44.

——— Physical measurements. Wood's Reference Hand-book of the Medical Sciences. Wm. Wood & Co., N. Y., 1887, vol. 5, 667-673.

GILBERT, J. A. Experiments on the musical sensitiveness of school children. Studies from the Yale Psy. Lab., October, 1893, vol. I, 80-87.

——— Researches on the mental and physical development of school children. Studies from the Yale Psy. Lab., November, 1894, vol. 2, 40-100.

——— Researches upon school children and college students. Univ. of Iowa. Studies in Psychology. Iowa City, Iowa, 1897, Vol. I, 1-39.

GÖHLERT, J. V. Untersuchungen über die Augen- und Haarfarbe der Schulkinder in der Steiermark. Statist. Monatsschr, Jahr. IV, S. 40.

GÖLTZ, B. Buch der Kindheit. (Selbstbiographie.) O. Janke, Berlin, 1847, 4th ed., pp. 532.

GOMME, ALICE B. Children's singing games, with the tunes to which they are sung.

——— The international games of England, Scotland, and Ireland, with tunes, singing rhymes, and method of playing according to the variants extant and recorded in different parts of the Kingdom. London, 1894, Vol. I, pp. 453.

GOULD, G. M. Child fetiches. Ped. Sem., 1897-98, V. 421-425.

GRATSÏANOFF, N. A. Materïalê dlya izucheniya fizicheskavo razvitiya dïetetskavo, etc. (Data for the study of physical development in childhood, etc.) 8°. St. Petersburg, 1889.

GREENLEAF, DR. New table of physical proportions. Baltimore Underwriter, 1890, XLIII, 303.

GREENWOOD, J. M. On children's vocabularies. Annual Report of the Kansas City Public Schools. Kansas City, Mo., 1887, 52–65.

——— Heights and weights of children. Public Health Asso. Report, 1891. Concord, N. H., 1892, XVII, 199–204.

GRIESBACH, H. Energetik und Hygiene des Nerven-Systems in der Schule. R. Oldenbourg. München und Leipzig, 1895, pp. 97.

GRIMARD, ED. L'enfant; son passé, son avenir. Hetzel et Cie., Paris, pp. 388.

GROHMANN, J. C. A. Ideen zu einer Geschichte der Entwickelung des kindlichen Alters. Psychologische Untersuchungen. 1817, p. 420.

GROSZMANN, M. P. E. A working system of child study for schools. C. W. Bardeen, Syracuse, N. Y., 1897, pp. 70.

GUILLAUME, L. Die Gesundheitspflege in den Schulen. Aarau, 1865.

GULICK, L. Manual for physical measurements, in connection with the Y. M. C. Association gymnasium records. New York, 1892.

——— The value of percentile grades. Quarterly of Amer. Statistical Asso. Boston, 1893, n. s., XXI–XXII, 321–331.

——— Psychological, pedagogical and religious aspects of group names. Ped Sem., March, 1899.

GUTTZEIT, JOHANNES. Grundzüge einer Gesundheitspflege der Kindesseele. W. Besser, Leipzig, 1895, pp. 80.

GUTZMAN, H. Sprechgeschicklichkeit und Sprechlust im Kindesalter. Monatsschr. f. d. ges. Sprachheilk., p. 81.

——— Des Kindes Sprache und Sprachfehler. Gesundheitslehre der Sprache für Eltern. Leipzig, 1894, pp. 264.

HALL, G. STANLEY. The moral and religious training of children. Princeton Review, Jan., 1882, vol. 10, 26–48.

——— The education of the will. Princeton Review, November, 1882, vol. 10, pp. 306–325. Reprinted in Ped. Sem., June, 1892, vol. 2, 72–89.

——— Contents of children's minds on entering school. Princeton Review, May, 1883, vol. 11, 249–272. Reprinted by E. L. Kellogg & Co., N. Y.

——— The study of children. (Privately printed.) N. Somerville, Mass., 1883, pp. 13.

——— Overpressure in schools. Nation, October 22, 1885, vol. 41, 338–339.

——— The story of a sand pile. Scribner's Magazine, June, 1888, vol. 3, 690–696. Reprinted by E. L. Kellogg & Co., N. Y., 1897, pp. 20.

——— Children's lies. Am. Jour. of Psy., Jan., 1890, vol. 3, 59–70. Ped. Sem., June, 1891, vol. 1, 211–218.

——— Boy life in a Massachusetts country town thirty years ago. Proc. Am. Antiq. Soc., Worcester, Mass., October 21, 1890, n. s., vol. 7, 107–128.

——— Notes on the study of infants. Ped. Sem., June, 1891, vol. 1, 127–138.

——— The moral and religious training of children and adolescents. Ped. Sem., June, 1891, vol. 1, 196–210.

——— Health of school children as affected by school buildings. Report of the Proc. of the Dept. of Supt. held in Brooklyn, N. Y., Feb., 1892, 163–172.

——— Child study as a basis for psychology and psychological teaching. Rep. Commissioner of Ed., 1892–93, Washington, D. C., 1895, vol. 1, 357–358; 367–370.

——— Topical syllabi for child study. Child Study Mo., I, 177–182. J. of Educ. 1895, 24, 108, 224. Trans. Ill. Soc. for Ch. Study, I, 40–52.

——— Generalizations and directions for child study. North Western Journal of Ed., July, 1896, vol. 7, p. 8.

——— The methods, status, and prospects of the child study of to-day. Transac. Ill. Soc. Child Study, 1897, II, 178–191.

——— First five hundred days of a child's life. (333.) Child Study Mo., 1897, II, 458–473, 522–537, 586–698.

——— A study of fears. Am. Jour. Psy., Jan., 1897, vol. 8, 147–249.

——— Child study the basis of exact education. Forum, 16: 429.

HALL, G. STANLEY. Research the vital spirit of training. Forum, XVII, 558-570.

——— Topical syllabi, 1894-95: I. Anger; II. Dolls; III. Crying and laughing; IV. Toys and playthings; V. Folk-lore among children; VI. Early forms of vocal expression; VII. The early sense of self; VIII. Fears in childhood and youth; IX. Some common traits and habits; X. Some common automatisms, nerve signs, etc.; XI. Feeling for objects of inanimate nature; XII. Feeling for objects of animate nature; XIII. Children's appetites and foods; XIV. Affection and its opposite states in children; XV. Moral and religious experiences. 1895-96: I. Peculiar and exceptional children, with E. W. Bohannon; II. Moral defects and perversions, with G. E. Dawson; III. The beginnings of reading and writing, with Dr. H. T. Lukens; IV. Thoughts and feelings about old age, disease, and death, with C. A. Scott; V. Moral education, with N. P. Avery; VI. Studies of school reading matter, with J. C. Shaw; VII. Courses of study in elementary grammar and high schools, with T. R. Crosswell; VIII. Early musical manifestations, with Florence Marsh; IX. Fancy, imagination, reverie, with E. H. Lindley; X. Tickling, fun, wit, humor, laughing, with Dr. Arthur Allin; XI. Suggestion and imitation, with M. H. Small; XII. Religious experience, with E. E. Starbuck; XIII. Kindergarten, with Miss Anna E. Bryan and Miss Lucy Wheelock; XIV. Habits, instincts, etc., in animals, with Dr. R. R. Gurley; XV. Number and mathematics, with D. E. Phillips; XVI. The only child in the family, with E. W. Bohannon. 1896-97: Degrees of certainty and conviction in children, with Maurice H. Small; II. Sabbath and worship in general, with J. P. Hylan; III. Migrations, tramps, truancy, running away, etc., *vs.* love of home, with L. W. Kline; IV. Adolescence, and its phenomena in body and mind, with E. G. Lancaster; V. Examinations and recitations, with John C. Shaw; VI. Stillness, solitude, restlessness, with H. S. Curtis; VII. The psychology of health and disease, with Henry H. Goddard; VIII. Spontaneously invented toys and amusements, with T. R. Crosswell; IX. Hymns and sacred music, with Rev. T. R. Peede; X. Puzzles and their psychology, with Ernest H. Lindley; XI. The sermon, with Rev. Alva R. Scott; XII. Special traits, as indices of character and as mediating likes and dislikes, with E. W. Bohannon; XIII. Reverie and allied phenomena, with G. E. Partridge; XIV. The psychology of health and disease, with H. H. Goddard. 1897-98: I. Immortality, with J. Richard Street; II. Psychology of ownership *vs.* loss, with Linus W. Kline; III. Memory, with F. W. Colegrove; IV. Humorous and cranky side in education, with L. W. Kline; V. The psychology of shorthand writing, with J. O. Quantz; VI. The teaching instinct, with D. E. Phillips; VII. Home and school punishments and penalties, with Charles H. Sears; VIII. Straightness and uprightness of body, by G. Stanley Hall; IX. Conventionality, with Albert Schinz; X. Local voluntary association among teachers, with Henry D. Sheldon; XI. Motor education, with E. W. Bohannon; XII. Heat and cold, by G. Stanley Hall; XIII. Training of teachers, with W. G. Chambers; XIV. Educational ideals, with Lewis Edwin York; XV. Water psychoses, with Frederick E. Bolton; XVI. The institutional activities of children, with Henry D. Sheldon; XVII. Obedience and obstinacy, with Tilmon Jenkins; XVIII. The sense of honor among children, with Robert Clark.

HALL, Mrs. W. S. First five hundred days of a child's life. Child Study Monthly, November, December, 1896, January, February, March, 1897, vol. 2, 330, 394, 458, 522, 586, and 650.

HALLECK, REUBEN P. The bearings of the laws of cerebral development and modification on child study. Proc. N. E. A., 1897, 833-843.

HANCOCK, J. A. Children's ability to reason. Educ. Rev., 1896, XII, 261-268.

——— A preliminary study of motor ability. Ped. Sem., October, 1894, vol. 3, 9-29.

HANCOCK, J. A. The relation of strength to flexibility in the hands of men and children. Ped. Sem., October, 1895, vol. 3, 308-313.

——— Mental differences of school children. Proc. N. E. A., 1897, 851-859.

HANNAK, EM. Handbuch der Pädagogik. Vienna, Pichler, 1896.

HARBOUR, J. L. Sensitive children. Harp. Bazar, December, 1898.

HARRIS, WM. T. Imitative faculty in education. Pub. Sch. Jour. (Bloomington, Ill.), 14:301.

HARRISON, ELIZABETH. A study of child nature from the kindergarten standpoint. Kindergarten College, Chicago, 1891, pp. 207.

HARRISON, M. M. Children's sense of fear. Arena, 1896, XVI, 960-969.

HART, W. R. Children's choice of pictures. Northwestern Jour. Educ., 1896, VII, 24-29.

HARTLAND, E. S. The science of fairy tales. An inquiry into fairy mythology. London, 1891, pp. 372.

HARTMANN, BERTHOLD. Die Analyse des kindlichen Gedankenkreises als die naturgemässe Grundlage des ersten Schulunterrichts. Hermann Graser, Annaberg, 1890, pp. 116.

HARTWELL, EDWARD. Anthropometry in the U. S. Am. Statis. Asso., 3:554.

——— On the physiology of exercise. Boston Med. and Surg. Jour., March 31 and April 7, 1887, vol. 116, 297-302; 321-324.

——— Application of the laws of physical training to the prevention and cure of stuttering. Proc. of the Intern. Cong. of Ed., Chicago, 1893. Proc. N. E. A., 1893, 739-749.

——— Report of the director of physical training, Boston Normal Schools. School Document, No. 8, Boston, 1894, pp. 151.

——— Report of the director of physical training. Reprinted from School Document, No. 4, Boston, 1895, pp. 82.

——— Bowditch's law of growth and what it teaches. Reprinted from the Tenth Annual Proc. of the Am. Ass'n for the Adv. of Physical Ed., Côncord, N. H., 1896, pp. 8.

——— Physical training, its function and place in education. American Physical Ed. Rev., Boston, Sept., 1897, vol. 2, 133-151.

HARVEY, P. F. Anthropometry in army practice. Med. Standard, Chicago, 1896, XVIII, 245-248.

HASKELL, Miss E. M. Child observations. Boston, Heath & Co., 1896.

——— Imitation in children. Ped. Sem., III, 30-47.

HASSE, PAUL. Die Ueberbürdung unserer Jugend auf den höheren Lehranstalten mit Arbeit im Zusammenhange mit der Entstehung von Geistesstörungen. F. Vieweg u. Sohn. Braunschweig, 1880, pp. 92.

HELLWIG, BERNHARD. Die vier Temperamente bei Kindern. Ihre Aeusserung und Behandlung in Erziehung und Schule. J. Esser, Paderhorn, 1888.

HEMMEN, N. Das Stottern. Statistik, Folgen, Abhülfe. Ein Bêitrag zur Heilpädagogik. St. Paulus-Gesellschaft. Luxemburg, 1890, pp. 56.

HENRI, V. Enquête sur les premiers souvenirs de l'enfance. Rev. Philos., XXXIX.

——— Our earliest memories. (Quest.) Am. J. Psychol., 1896, VII, 303-304.

HERRAINZ, D. Gregorio. Tratado de antropologia y pedagogia. Madrid, 1896, pp. 564.

HERRICK, C. L. Notes on child's experience. J. of Comp. Neurol., V.

HERRICK, MARY A. Children's drawings. Ped. Sem., October, 1895, vol. 3, 338-330.

HERTEL, ALEX. Neuere Untersuchungen über den allgemeinen Gesundheitszustand der Schüler und Schülerinnen. Zeitschr. f. Schulgshpflg. I Jahrg., 1888, Nr. 6 und 7, S. 167 and 201.

HESSE, W. Bestimmungen des Gewichtes und Messungen der Körperlänge bei einem Kinde im ersten und zweiten Lebensjahre. Arch. f. Gynaek, Berlin, 1881, XVII, 150-152.

HEYDNER, G. Beiträge zur Kenntnis des kindlichen Seelenlebens. Leipzig, Richter, 1894, pp. 96.

HINDS, CLARA B. Child growth. Woman's Anthropological Society, Washington, D. C., 1896. 8°, Washington, 1886.

HITCHCOCK, E., Jr. Physical measurements, fallacies, and errors. Proc. Amer. Assoc. for Advancement of Phys. Ed., 1887. Brooklyn, N. Y., 1887, III, 35-42.

——— A synoptic exhibit of 15,000 physical examinations. Made on male college students. Ithaca, N. Y., 1890.

HITCHCOCK, E. Comparative study of measurements of male and female students at Amherst, Mount Holyoke, and Wellesley colleges, U. S. A. Physique. London, 1891, I. 90-94. Also in Proc. Amer. Assoc. for Advancement of Phys. Ed., Ithaca, N. Y., 1891, VI., 37-42.

——— The results of anthropometry as derived from the measurements of the students in Amherst College. Amherst, Mass., 1892. 7 pp. 6 tables. 8vo.

HITCHCOCK, E., and SEELYE, H. H. An anthropometric manual, giving the average and mean physical measurements and tests of male college students, and modes of securing them. Prepared from the Records of the Department of Physical Education and Hygiene in Amherst College during the years 1861-62 and 1887-88, inclusive. 2d ed. Amherst, Mass., 1889. J. E. Williams. 37 pp. 1 table. 8vo.

HOFMANN, L. Würdigung der Bildungselemente, welche im vorschulpflichtigen Alter bestimmend auf die Seele des Kindes einwirken. Pädagog. Bl., 1896, 48-60.

HOHMANN, Die Grundlinien des Seelenlebens, dargestellt unter steter Berücksichtigung der Schulpraxis. Pädag. Bl., 1896, 501-528.

——— Die Pflege der Phantasie in unseren Schulen. Rhein. Blätter f. Erziehung u. Unt., LXVIII, 229-242.

HOGAN, LOUISE E. The study of a child. New York, 1898.

HOLDEN, EDWARD S. On the vocabularies of children under two years of age. Trans. Am. Philol. Asso., 1877, 58-68. Reprint. Case, Lockwood & Brainard Co., Hartford, Conn., 1878.

——— Observations on infants. Trans. Am. Philol. Soc., 1875-77. Bulletin, Philosoph. Soc., Washington, Appendix, VI.

HOLMES, BAYARD. A study of child growth, being a review of the work of Dr. Wm. T. Porter, of St. Louis. N. Y. Med. Jour., October 6, 1894, vol. 60, 417-423.

HOLMES, GEORGE K. A plea for the average. Amer. Statis. Ass'n, No. 16.

HOLMES, MARION E. The fatigue of a school hour. Ped. Sem., October, 1895, vol. 3, 213-234.

HOLT, L. EMMETT. The care and feeding of children. A catechism for the use of mothers and children's nurses. D. Appleton & Co., N. Y., 1894, pp. 66.

HOWARD, F. E. The child voice. Proc. N. E. A., 1897, 784-790.

HOWELLS, W. D. A boy's town. Harper & Bros., N. Y., pp. 247.

HRDLIKA, A. F. A few words about anthropometry. Am. Jour. Insan., N. Y., 1897, LIII, 521-533.

——— Physical differences between white and colored children. Amer. Anthrop., Washington, 1898, XI, 347-350.

HUDSON, G. H. Phenomena of child growth in education. Educa., 14:466.

HUGHES, JAMES L. Educational value of play. Ed. Rev., N. Y., Nov., 1894, vol. 8, 327-336.

HUMPHREYS, MILTON W. A contribution to infantile linguistics. Trans. Am. Philol. Ass'n, 1880. Case, Lockwood & Brainard Co., Hartford, Conn., 1880, vol. 11, 5-17.

HURD, HENRY M. Some mental disorders of childhood and youth. Boston Med. and Surg. Jour., Sept. 20, 1894, vol. 131, 281-285. Reprint. The Friedenwald Co., Baltimore, 1895, pp. 16.

HURD, KATE C. On Anthropometry. Times and register. New York and Philadelphia, 1890, VII, 506-511.

——— Some of Galton's tests concerning the origin of human faculty. Proc. Amer. Asso. for Advancement of Phys. Ed., 1891. Ithaca, N. Y., 1891, VI, 80-96.

HURLL, ESTELLE M. Child life in art. Joseph Knight Co., Boston, 1895, pp. 176.

IKOW, C. Neue Beiträge zur Anthropologie der Juden. Archr. f. Anthrop., Bd. XV.

JACKSON, W. J., Jr. Graphic methods in anthropometry. Physical Education, Springfield, Mass., 1893, II, 89-94.

JACOBI, MARY P. Applications of psychology to education. Ed. Rev., N. Y., June, 1891, vol. 2, 1-27.

——— Physiological notes on primary education and the study of language. New York and London, 1889. 8°. pp. 120.

JAHN, M. Psychologie als Grundwisseuschaft der Pädagogik. 2 ed. Leipzig, Dürr, 1897, vii+, 413.

JAMES, WILLIAM. Imitation. The principles of psychology, vol. 2. New York, 1890, 408-409.

JANOVSKI, M. V. (Measurement of circumference of the breast as method of ascertaining virility and vigor of recruits.) Russk. Med. St. Petersburg, 1893, XVII, 343:359.

JASTROW, JOSEPH. The psychological study of children. Ed. Rev., N. Y., March, 1891, vol. 1, 253-264.

——— The statistical study of mental development. Trans. Ill. Soc. Child Study, 1897, II, 100-108.

JEFFREYS, B. JOY. Color-blindness; its dangers and its detection. Houghton, Osgood & Co., Boston, 1879, pp. 312.

——— Report of the examination of 27,927 school children for color-blindness. School Document No. 13. Rockwell & Churchill, Boston, 1880, pp. 9.

JOHNSON, G. E. Contribution to the psychology and pedagogy of feeble-minded children. Pedag. Sem., III, 246-301.

——— Education by plays and games. Ped. Sem., III, 97-135.

JOHNSON, JOHN, Jr. Rudimentary society among boys. Johns Hopkins Univ. Studies in Historical and Political Science, 2d Series, No. 11. Baltimore, 1884, pp, 56. Reprint of same. McDonogh, Md., 1893, pp. 66.

——— The savagery of boyhood. Pop. Sci. Mo., October, 1897, vol. 31, 796-800.

JUST, KARL. Der Wechsel der Stimmung in Gemütsleben des Kindes. Jahrbuch des Vereins für wissenschaftl. Pädag. Dresden, 1894, vol. 26, 201-210.

KAFEMANN, R. Schuluntersuchungen des kindlichen Nasen-und Rachenraumes. Kafemann, Danzig, 1890, pp. 29.

KEBER, A. Zur Philosophie der Kindersprache. Gereimtes und Ungereimtes. Halle, 1868, pp. 132.

KELLER, R. Pädagogisch-psychometrische Studien. Biol. Centralbl., 1897, XVII, 440-46A.

KELLOGG, J. H. Physical chart, arranged from results obtained in testing the strength of individual groups of muscles in 200 men, ages 18-30 years, by means of Dr. Kellogg's mercurial dynamometer. Battle Creek, Mich., 1893.

KENNEDY, H. P. Effect of high-school work upon girls during adolescence. Pedag. Sem., 1896, III, 469-482.

KEY, AXEL. School life in relation to growth and health. Stockholm, 1890.

——— Die Pubertätsentwickelung. Verhandl. des X. Internat. Med. Cong., 1890. Berlin, 1891, vol. 1, 66-130.

KIEFER, KONRAD. Die Natur des Kindes hinsichtlich seiner sittlichen und intellektuellen Anlage. F. Reinboth, Leipzig, 1897, pp. 73.

KIME, R. R. Some practical thoughts on the development of the human race and obstetric nursing. Atlanta Med. and S. J., 1897-98, n. s., XIV, 8-19.

KIRKPATRICK, E. A. An experimental study of memory. Psychol. Rev., November, 1894, vol. 1, 602-609.

KLINE, L. W. Truancy as related to the migratory instinct. Ped. Sem., Jan., 1898, 381-420.

KOCH, J. L. A. Psychopathische Minderwertigkeiten. Otto Maier, Ravensburg, 1893, pp. 427.

KÖLLE, K. Der Sprechunterricht bei geistig zurückgebliebenen Kindern. Zürich, A. Müller, 1896, pp. 44.

KNEIPP, S. The care of children in sickness and in health. London, 1897.

KOLLER. Die Schulbankfrage in Zürich. Deutsch. Viertjhsschrf. f. öffentliche Gesundhtspfl. Bd. 17.

KOSMOWSKI, W. O wzroście i wadze dzieci klas biednych w Warszawie (de la grandeur et du poids des enfants de pauvres classes à Varsovie). Medycyna, Warszawa, 1894, XXII, 105; 125; 153; 173.

KOTELMANN, LUDWIG. Die Körperverhältnisse der Gelehrtenschüler des Johanneums in Hamburg. Ztsch. d. Königl. Preus. statist. Bureaus, 1879.

——— Ueber Schulgesundheitspflege. Handb. d. Erz. u. Unterr. f. höhere Schulen. München, 1895, Band. 2. Abt., 225-395.

KÖZLE, J. F. G. Die pädagogische Pathologie in der Erziehungskunde des 19ten Jahrhunderts. Gütersloh, 1893.

KRATZ, H. E. Characteristics of the best teachers as recognized by children. Ped. Sem., 1896, III, 413-418.

KRAUSS, W. C. An instrument for measuring the strength of the limbs; pedodynamometer. J. Nerv. and Ment. Dis., N. Y., 1893, XX, 689-691.

——— A new pedodynamometer. New York Med. J., 1893, LVIII, 217.

——— Schädel-Capacität. Verhandl. d. Berl. Gesellsch. f. Anthrop., 1896, 614.

KROHN, W O. The most critical period of school life. Child Study Mo., June, 1895, vol. 1, 33-44.

——— Nervous diseases of school children. Child Study Mo., 1896, I, 354-368.

——— Child study in schools for feeble-minded children. Child Study Mo., I, 75-79.

——— Practical child study: How to begin. Child Study Mo., I, 161-176.

KRONER, TRAUGOTT. Ueber die Sinnesempfindungen der Neugeborenen. Grass, Barth & Co., Breslau, 1882, pp. 14.

KUSSMAUL, ADOLF. Untersuchungen über das Seelenleben des neugeborenen Menschen. 2 Auff., A. Moser, Tubingen, 1884, pp. 32.

——— Ueber die Sinnesempfindungen des Neugeborenen. Breslau, 1882.

——— Untersuchungen über das Seelenleben des neugeborenen Menschen. Leipzig, 1859, pp. 40.

LADD, GEO. T. Development of attention in infancy. Childhood, 2:197.

LANGE V. Om en hyppig forekommende Aarsag til Birns, etc. (On a frequent cause of slow and defective development of children.) 8°. Kjbenhavn, 1892.

LAGNEAU, G. Sur l'anthropométrie militaire de M. le Dr. Livi (Rap.). Bull. Acad. de méd., Paris, 1896, 3. s., XXXV, 378-382.

LAING, M. E. Child study; a teacher's record of her pupils. Forum, XVII, 340-344.

LANCASTER, E. G. The psychology and pedagogy of adolescence. Ped. Sem., 1897, V, 61-128.

LANDSBERGER. Das Wachsthum der Knaben vom 6. bis zum 16. Lebensjahre. Zeitschr. f. Schulgsnhtspflege. 1 year 1888, Nr. 3, 65 to 69.

LANE, W. A. Some of the laws which influence the growth of the child. Tr. VII. Internat. Cong. Hyg. and Demog., 1891. London, 1892, IV, 103-109.

LANG, A. Genius in children. North Amer. Rev., Jan., 1897, 32-37.

(VON) LANGE, EMIL. Die normale Körpergrösse des Menschen von der Geburt bis zum 25. Lebensjahre nebst Erläuterungen über Wesen und Zweck der Skala-Messtabelle zum Gebrauche in Familie, Schule und Erziehungs-Anstalten. J. F. Lehmann, München, 1896, pp. 38.

LAPPARENT, A. DE. Le rôle du dessin dans l'éducation moderne. Le Corresp., 1897, n. s., LXIX, 856-867.

LASTSHENKOFF, P. [Anthropometry of medical students] Vestnik obsh. hig., etc. St. Petersburg, 1897, XXXIII, No. 10, 2 sect., 412-430.

LE BON, G. Les bases psychologiques du dressage. Rev. Philos., XXXV II, 596-610.
LECLÈRE, A. Une expérience pedagogique. Rev. Univ., 1897, VI, 23-27.
LEE, C. A. A table showing the physical characteristics of the members of the United States Senate. First session Thirty-ninth Congress. Buffalo Medical and Surgical Journal, 1866-67, VI, 390-396.
LESSHALT, P. De l'éducation de l'enfant dans la famille et de sa signification. A. Schulz, Paris, 1894, pp. 268.
LETOURNEAU, C. Passé, présent et avenir de l'education. Rev. Mens. de l'École d'anth., 1896, VI, 129-148.
LEVRAT, F. M. P., aîné. De l'influence de l'allaitement maternel et de l'éducation en commun sur le dévéloppement des facultés physiques, morales, etc., de l'enfant. 8°. Lyon, 1843.
LIEBRECHT. Auge und Ohr als Vermittler des Weltbildes und in ihren Beziehungen zum Schulleben. Elberfeld, 1897, pp. 23.
LINCOLN, D. F. Anthropometry individualized. Reprinted from Mind and Body, May, 1896, pp. 8.
——— The motor element in education. Am. Physical Ed. Rev., June, 1897, vol. 2, 65-72.
LINDLEY, E. H. A preliminary study of motor phenomena of mental effort. Am. Jour. Psy., July, 1896, vol. 7, pp. 491-517.
——— A study of puzzles with special reference to the psychology of mental adaptation. Am. Jour. Psy., July, 1897, vol. 8, 431-493.
LINDLEY, E. H., and PARTRIDGE, G. E. Some mental automatisms. Ped. Sem., July, 1897, vol. 5, 41-60.
LION, H. Les livres de MM. Compayré et Perez sur l'Education de l'Enfant. Rev. Int. de l'Enseingn, XXIX, 458-469.
LÖBISCH, J. E. Entwickelungsgeschichte der Seele des Kindes. Haas, Wien, 1851, pp. 134.
LÖFFLER, HELENE. Mutter und Kind. Rathgeber für die Wochen und Kinderstube. Hoffmann und Ohnstein, Leipzig, 1882, pp. 221.
LOMBROSO, C., e CARRARA, M. Contributo all antropologia dei Dinka. Arch. di psichiat., Torino, 1896, XVII, 349-363.
LOMBROSO, P. L'instinct de la conservation chez les enfants. Rev. Philos., 1896, XIII, 379-390.
——— Psicologia infantile. Riv. di Pedag., I, 159-172.
——— Saggi di psichologia del bambino. Turin-Rome, Roux., 12-234.
LORD, FRANCES and EMILY. Mother's songs, games, and stories. (Froebel's Mutter- und Kose-Lieder), W. Rice, London, 1890. Text, pp. 212. Music, pp. 75.
LOREY, C. Ueber Gewicht and Mass normal entwickelter Kinder in den ersten Lebensjahren. (Vorschlag zu Sammelbeobachtungen.) Jahrb. f. Kinderh., Leipz., 1887-8, XXVII, 339.
LOTI, PIERRE. The romance of a child. Translated by Mary L. Watkins. Rand, McNally & Co., Chicago, 1891, pp. 179.
LOUCH, M. A laboratory for child study. J. of Educ., 1895, 21-24, 208-211.
——— Difference between children and grown-up people from the child's standpoint. Ped. Sem., 1897, V, 129-135.
LOW, FRANCES H. The street games of children. Strand Mag. London.
LOWDEN, T. S. The first half-year of a child's life. (Thesis.) Wooster (Ohio) Herald Printing Co., pp. 30.
——— Pedagogical inferences from child study. Educ., 1897, XVIII, 45-49, 112-336, 171-179.
LUCKEY, G. W. A. Comparative observations on the indirect color range of children, adults, and adults trained in color. Am. Jour. of Psychology, January, 1895, vol. 6, 489-504.
——— Children's interests. Northwestern Monthly. Lincoln, Nebr., vol. 7, pp. 67, 96, 133, 156, 221, 245, 306, and 335.
——— The best works on child study. Northwestern J. of Educ., 1896, VII, 48-52.

LUCKEY, G. W. A. Child study in its effects upon the teacher. Child Study Mo., 1896, I, 230-247.
——— Lines of child study for the teacher. Educ. Rev., 1897, XIV, 340-347.
——— and others. A brief survey of child study. Northwestern J. of Educ., 1896, VII, 2-8.
LUKENS, HERMAN T. Preliminary report on the learning of language. Ped. Sem., June, 1896, vol. 3, 424-460.
——— A study of children's drawings in the early years. Ped. Sem., October, 1896 vol. 4, 79-110.
——— Child study for superintendents. Ed. Rev., N. Y., February, 1897, vol. 13, 105-120.
MACAULAY, T. B. Weight and longevity. Amer. Statis. Asso. No. 14.
MACDONALD, ARTHUR. Public school children; measurements now being made to determine their physical condition. Verhandl. d. Berl. Gesellsch. f. Anthrop., 1893, 355-357.
——— Measurements of pain. Psych. Rev., March, 1899.
MAITLAND, L. M. What children draw to please themselves. Inland Educator, I, 77-81.
MAJER, J. I. and KOPERNICKER, J. Charakterystyka fizyczna ludności Galicy jskiéj, Krakow, I. Heft, 1876.
MALLING-HANSEN, R. Perioden im Gewichte der Kinder und in der Sonnenwärme. Fragment III, A. and III, B. Kopenhagen, 1886.
MANGASARIAN, M. The punishment of children. Int. Jour. of Ethics, IV, 493-498.
MANOUVRIER, L. Commission chargée d'examiner le projet d'une statistique anthropologique à faire dans les écoles primaires de la ville de Paris. Bull. Soc. d'anthrop. de Par., 1884, 3s., VII, 572-579.
——— La période de croissand d'un nain. J. de clin. et de therap. inf., Paris, 1897, V, 1009-1012.
MANTEGAZZA, P. L'antropologia nell' insegnamento universitario e l'antropometria nella scuola. Arch. per l'antrop., Firenze, 1892, XXII, 185-190.
MANTON, W. P. The development of the young child with reference to exercise. Educ., 1896, XVII, 138-148.
MARENHOLTZ-BÜLOW (Baroness). The child and child nature. 5th ed. Sonnenschein & Co., London, 1890, pp. 186.
MARFAN. La vie infantile et ses périodes. Semanine méd., Paris, 1896, XVI, 469-471.
MARINA, G. Ricerche antropologiche ed etnografiche sui ragazzi. Turin, Bocca, 1896, pp. 90.
MARPILLERO, G. De idee della vita e della morte nei bambini. Riv. Ital. di Filos., 1897, XII (I), 316-353.
MARRO, ANTONIO. La puertà studiata nell' uomo e nella donna in rapporto all' antropologia, alla psichiatria, alla pedagogia ed alla sociologia. Fratelli Bocca, Torino, 1898, pp. 507.
MARSH, HARRIET A. Child's study in the mothers' club. Robt. Smith Printing Co., Lansing, Mich., 1896, pp. 31.
——— A new aspect of child study. Ped. Sem., July, 1897, vol. 5, 136-145.
MARSHALL, D. T. Secret language of children. Note, Science, XXIII, 39.
MARTEL, M. A. C. P. Étude des influences exercées sur le développement de l'enfant par les maladies infectieuses de la mère pendant la grossesse. 8°. Paris, 1896.
MARTIN, R. De l'influence des altérations du placenta sur la developpement du fœtus et sur la senté du nouveau-né, etc. J. de Med. de Paris, 1896, 2 s., VIII, 123-125.
MARTINEZ, VARGAS A. Pedimetría y pedibarometría; crecimento en la infancia. Gac. méd., Mexico, 1890, XXV, 301-325, 3 pl.
MARTY. Professions et développement physique, etc. Ann. d'hyg., Paris, 1897, 3 s., XXXVII, 305-333.

MATIEGKA. Ueber die Beziehungen zwischen Körperbeschaffenheit u. geistiger Thätigkeit bei Schulkindern. Mitth. d. anthrop. Gesellschaft in Wien, 1898, XXXVIII, 122-126.

MATVEYEVA, VIERA G. Fezicheskoye, etc. (Physical devolopment of the children of St. Petersburg public schools.) Vrach. St. Petersb., 1895, XVI, 918, 941.

MAYR, G. Die bayerische Jugend nach Farbe der Augen, der Haare und der Haut. Ztschr. f. das Königl. bayerische statist. Bureau, 1875, Heft 4.

MCMURRY, L. B. Child study through the medium of the parent. Trans. Ill. Soc. for Child Study, I (3), 22-26.

MEINHOLD, F. L. Hagedorn's Gedanken von sittlicher und geistlicher Bildung. Diss. Leipzig, pp. 42.

MELINAUD, C. Pourquoi rougit-on? Rev. des deux mondes. Paris, 1893, CXIX, 631-646.

MEREZHKOVSKI (K.). O zadach. i metod. izslied. fizichesk. razvit. dietei. (Problems and methods of examining the physical development of children.) Med. pedagog. Vestnik St. Petersb., 1886, II, no. 1, 63-97; no. 2, 53-76. Also reprint.

MEYER, A. Suggestions to those beginning the systematic observation of children. Child Study Monthly, June, 1895, vol. 1, 45-49.

——— On the observation of mental abnormalities in school children. Child Study Mo., May, 1895, Vol. I, 1-12.

MEYER, BERTHA. The child physically and mentally. Trans. by F. Salomon. M. L. Holbrook & Co., N. Y., 1893, pp. 105.

MINARD, C. W. Child study in Maywood. Trans. Ill. Soc. for Child Study, I (3), 15-21.

MIKHAÏLOFF, I. K voprosu, etc. (On the physical development of children.) Protok, Zasaid. Obsh. vrach. g. Viatki, 1888-89, No. 1, 2, 10.

MIWA, N. Honbanjin, etc. (Investigation upon the body weight of Japanese at Jiku.) Ztschr. d. Tokio med. Gesellsch., 1893, V, VII, No. 9, 10-18.

——— Child study and school discipline. Ed. Rev., N. Y., December, 1897, vol. 14, 451-456.

——— Class responsibility. N. Y. Teachers Quarterly, N. Y., December, 1897, Vol. I, 316-318.

——— Bibliography of education. Int. Education Series, vol. 42. D. Appleton & Co., N. Y., 1897, pp. 202.

——— Historic sense of children. Jour. of Ed., Boston, June 24, 1897, vol. 45, 4[illegible]6-407.

——— The social sense in childhood. Jour. of Ed., Boston, November 18, 1897, vol. 46, 291-292.

MONROE, W. S. Feeble-minded children in the public school. An address read and reprinted from the Proc. of Assn. of Med. Officers of Am. Institutions at Fort Wayne, Ind., May, 1894. Westfield, Mass., 1897, pp. 11.

——— Comenius' school of infancy. An essay on the education of youth during the first six years. D. C. Heath & Co., Boston, 1896, pp. 99.

——— Vacational interests of children. Education, Jan., 1898, 259-264.

——— The money sense of children. Ped. Sem., March, 1899.

MONTI. Uebersichtliche Zuzammenstellung der Wachstumverhältnisse der Kinder. Arch. f. Kinderh., Stuttgart, 1888-89, X, 401-429.

MOON, S. B. Measurements of the boys of the McDonogh School for the years 1881-1891, arranged in order of height, summed and averaged; also a percentile table for 115 boys 13-14 years of age. McDonogh, Maryland, 1892, 46 pp. 4°.

MOORE, K. C. The mental development of a child. Psych. Rev. Monograph Supp. No. 3, October, 1896. The Macmillan Co., N. Y., pp. 150.

MORRISON, W. D. Juvenile offenders. D. Appleton & Co., N. Y., 1897, pp. 317.

MORSE, J. F. Studies in the Moral Development of Children. (Quest.) Science, 1896, N. S., III, 669-671. Child Study Mo., II, 44-48.

MORSE, W. H. The baby's growth. Virginia Med. Monthly, Richmond, 1886-87, XIII, 392-395.

MOSHER, ELIZA M. Habitual postures of school children. Ed. Rev., N. Y., November, 1892, 339-349.

MOSSO, A. Die körperliche Erziehung des Jugend. Transl. by J. Glinzer. Hamburg, L. Voss, 1896, 2:513.

——— Fatigue cérébrale chez les enfants. Rev. Péd. Belge, August 15, 1894, pp. 309.

MOTET, AUGUSTE. Les faux témoignages des enfants devant la justice. Baillière et fils, Paris, 1887, pp. 20.

MOULTON, A. R. Body weight and mental improvement. Am. Jour. of Insanity, October, 1894, vol. 51, 209-220.

MULFORD, HENRY J. The throat of the child. Ed. Rev., N. Y., March, 1897, vol. 13, 261-272.

MUFFAUG, H. Études d'anthroposociologie. Écoliers et paysaus de St. Brieve, Paris, 1897.

MÜLLER, GEORGE. Spinal curvature and awkward deportment; their causes and prevention in children. English edition. The Scientific Press, Ltd., 428 Strand, London, 1894, pp. 88.

MUMFORD, ALFRED A. Survival movements of human infancy. Substance of an address given before the Manchester branch of the British Association for Child Study, March 2, 1897. Brain, London, Autumn, 1897, No. 79, vol. 20, 290-307.

MUNRO, Mary F. Three years in the life of a child. Educ. Rev., Nov., 1898, 367-377.

MUNZ, B. La logique de l'enfant. Transl. par A. Keller. Rev. Philos., 1896 ,XLII, 46-54.

——— Die Logik des Kindes. Nord u. Süd., LXII, No. 216.

MURRAY, J. CLARK. The education of the will. Ed. Rev., N. Y., June, 1891, vol. 2, 57-68.

NASON, C. D. Some biological aspects of child study. Educ., 1897, XVIII, 229-234.

NESTEROFF, W. Ueber die physische Entwickelung der Schulkinder und die körperlichen Uebungen in den Schulen. Ztschr. f. Schulgsndthtspflg. Hamburg u. Leipzig, 1896, IX, 129-139.

NEWELL, W. W. Games and songs of American children. Harper & Bros., N. Y., 1884, pp. 242.

NICHOLS, H. Psychology and education. The citizen, I, 229-232.

NICOLAY, FERNAND. Les enfants mal élevés. . Étude psychologique. Perrin et Cie., Paris, 1890, pp. 530.

OBICI, G. Picole anime. Boll.d.manie. prov. di Ferrara, 1896. No. 5 and 6, 1-7.

——— Observations on phisical characteristics of children and adults taken at Aberdeen in Banffshire, and in the island of Lewis. Rep. Brit. Ass. Adv. Sci., 1897, London, 1898, LXVII, 506.

ODELGA, A. Ueber kinderpsychologie. Bl. f. Taubet. Bild. Berlin, 1898, XI, 24-26.

OGSTON, F. jr. On the average length and weight of mature newborn Scotch children. Edinb. M. J., 1880-81, XXVI, 603-615.

OLDHAM, A. The laws of attention and interest applied to education. Journ. of Education, 1894, 616-618.

OLTUSZEWSKI. Die geistige und sprachliche Entwickelung des Kindes. Med.-pädagog. Monattschr., Berlin, 1896, 197; 257.

OPPENHEIM, N. Why children lie. Pop. Sci. Mo., XLVII, 382-387.

———The development of the child. London and New York, 1898, pp. viii—296.

ORCHANSKY, J. Studies on heredity. St. Petersburg, 1894.

OSBORN, F. W. The ethical contents of children's minds. Educ. Rev., VIII, 143-146.

O'SHEA, M. V. Physical training in the public schools. Atlantic Monthly, February, 1895, vol. 75, 246-254.

——— Method and scope of child study for teachers in service. Child Study Monthly, November, 1895, Vol. I, 129-134.

O'Shea, M. V. Child study. Chautauquan, June, 1896, vol. 23, 302-307.
——— The training of childhood. Outlook, May 15, 1897, vol. 56, 164-167.
——— Interests in childhood. Child Study Monthly, October, 1896, vol. 2, 266-278.
——— When character is formed. Pop. Sci. Mo., September, 1897, vol. 51, 648-662.
——— Some aspects of drawing. Ed. Rev., N. Y., October, 1897, vol. 14, 263-284.
——— The purpose, scope, and method of child study. Jour. of Pedag., Syracuse, N. Y., December, 1897, Vol. II, 9-23.
——— Psychology for normal schools. Educ., XVI, 193-201.
——— The purpose, scope, and method of child study. Jour. Pedag., January, 1898.
——— and others. Some syllabi prepared in the School of Pedagogy, Buffalo, N. Y. Child Study Monthly, 1896, I, 320-324.
Ostermann, W. Das interesse. Oldenburg, Schulzesche Hofbuchhandlung, pp. IV+92.
Ottolenghi, S. La sensibilità e l'età. Arch. di psichiat, Torino, 1895, vol. 16, 540-551.
Ouroussov, Mary (Princess). Education from the cradle. Translated by Mrs. E. Fielding. George Bell & Sons, London, 1890, pp. 168.
Pagliani, F. Sopra alcune dimensioni del corpo dei neonati ed alcuni rapporti fra esse e la mortalità infantile. Pediatria, Napoli, 1895, III, 225, 279, 353; 1896, IV, 18, 41.
Pagliani, L. Lo sviluppo umano per età, sesso, condizione sociale ed etnica. Milano, 1879.
Pagliani. Untersuchungen zur Naturlehre der Menschen und der Thiere. XII, 89 pp.
Patrick, G. T. W. The memory in education. Ed. Rev., N. Y., December, 1892, vol. 4, 463-474.
——— Is child study practicable for the teacher? Proceedings of the N. E. A., Denver, Colo., 1895, 904-906.
——— Fatigue in school children: A review of the experiments of Fredrich and Ebbinghaus. Studies in psychology, Iowa City, Iowa, 1897.
Paulsen, Ed. Ueber die Singstimme der Kinder. Archive für Physiologie, August, 1895, vol. 61, 407-426.
Paulsen, F. The evolution of the educational ideal. Forum, 1897, XXIII, pp. 598-608, 672-685.
Payne, B. The child study of Froebel. Ill. Soc. Child Study, 1897, II, 115-125.
Payot, J. L'éducation de la volonté. Paris, F. Alcan, XII+276.
Pearson, K. Growth of St. Louis children. Nature, vol. 51, p. 145.
Peckham, George W. The growth of children. Report of Wisconsin Board of Health, 1881, 28-73.
——— Various observations on growth. Ibid., 1882, 185-188.
Peckham, Grace. Infancy in the city. Pop. Sci. Mo., March, 1886, vol. 28, pp. 683.
Peckham, John Yates. On human growth in towns. Trans. Nat. Asso. for the Promotion of Soc. Sci., Edinburg, 1863, 536.
Percy, J. F. Causes of deafness in school children and its influence upon education. Child Study Monthly, October, 1895, vol. 1, 97-109.
Perez, B. L'éducation morale dès le berceau. F. Alcan, Paris, 1888, pp. 320.
——— The first three years of childhood. Ed. and trans. by Alice M. Cristie. With an introduction by James Sully. C. W. Bardeen, Syracuse, N. Y., 1889, pp. 294.
——— Le caractère de l'enfant à l'homme. F. Alcan, Paris, 1892, pp. 308.
——— L'enfant de trois à sept. ans. 3e édition revue et augmentée d'un supplément, F. Alcan, Paris, 1894, pp. 330.
——— Le développement des idées abstraites chez l'enfant. Rev. Philos., XL., 449-467.

PERKINS, F. B. Childhood; a study. Atlantic Monthly, vol. 18, 385-395.

Periodicals on children: Babyhood. Devoted to the care of infants and young children. 8°. New York.—Boletin del dispensario y hospital de niños pobres de Barcelona. Revista quincenal. Barcelona.—Centralblatt für Kinderheilkunde (monthly). Leipzig.—Childhood. A monthly magazine for parents of all that concerns the welfare of the child. 8°. New York.—Child Study Monthly. Chicago, Ill.—Dietskaya meditsina, etc. (Medicine of children. Journal dedicated to internal diseases of child age.) 8°. Moskva.—Gesunde Kinder. Monatsblätter für naturgemässe Kinderpflege in Gesundheit und Krankheit. 8°. Magdeburg.—Gesunde Kinder (fortnightly). 8°. Hamm i. W.—Journal de clinique et de thérapeutique infantiles (weekly). Paris.—Der Kinder-Arzt. Zeitschrift für Kinderheilkunde (monthly). 8°. Berlin u. Neuwied.—La médecine infantile (monthly). 8°. Paris.—Pediatrics. A semimonthly journal devoted to diseases of infants and children. New York and London.—Pedagogical Seminary (published quarterly). Worcester, Mass.—La pratique de la médecine infantile (monthly). 8°. Paris.—Revista de enfermedades de la infancia. 8°. Barcelona.

PETERSSON, O. V. Om vigtsförhållandena hos späda barn under första lefnadsåret. (Relative weight of infants under 1 year of age.) Upsala Läkaref. Förh., 1882-83, XVIII, 1-31.

——— Ytterligare om vigtsförhållandena hos späda barn under första lefnadsåret. (Relations of weight of children in first year of age.) Ibid., 1887-88, XXIII, 399-411.

PFEIFFER, E. Bemerkungen betreffend Wachsthum und Körperwägungen der Säuglinge. Jahrb. f. Kinderh., Leipzig, 1882, n. f., XIX, 142-147.

PHILLIPS, D. E. The teaching instinct. Ped. Sem., March, 1899.

PIERCE, JOHN M. Interest of the child in physical training. Am. Physical Ed. Rev., March, 1897, vol. 2, 19-21.

PINARD, A. À propos du développement de l'enfant. Rev. Scient., Paris, 1896, 4 s., V., 109-111.

PLOSS, H. Das kleine Kind vom Tragbett bis zum ersten Schritt. Ueber das Legen, Tragen und Wiegen, Gehen, Stehen und Sitzen der kleinen Kinder bei verschiedenen Völkern der Erde. L. Fernau, Leipzig, 1881, pp. 121.

——— Das Kind in Brauch und Sitte der Völker. Anthropologische Studien, Leipzig, 1884, 2 vols., 394, 478.

PLUMMER, E. M. Toys and games for children among the ancient Hellenes. Am. Phys. Educ. Rev., Cambridge, 1898, III, 157-169.

POLL, H. Ein neuer Apparat zur Bestimming der Schädel-Capacität. Verhandl. d. Berl. Gesellsch. f. Anthrop., 1896, 615-620.

POLLOCK, F. An infant's progress in language. Mind, July, 1878, vol. 3, 392-401.

PORTER, W. T. On the application to individual school children of the mean values derived from anthropological measurements by the generalizing method. Pub. Am. Statist. Assn. Boston, 1892-93, n. s., III, 576-587.

——— The growth of St. Louis children, Trans. Acad. Sci. St. Louis, St. Louis, Mo., 1894, VI, 263-380. Also (rev.), New York Med. Jour., 1894, LX, 417-423.

——— Physical basis of precocity and dullness. Trans. Acad. Sci. St. Louis, St. Louis, Mo., 1893-94, VI, No. 7, 160-181.

——— Use of anthropometrical measurements in schools. Educa. Rev., XI, 126.

——— The relation between growth of children and their deviation from the physical type of their sex and age. Trans. Acad. Sci. St. Louis, St. Louis, Mo., 1893, VI, 233-250.

——— Ueber Untersuchungen der Schulkinder auf die Physischen Grundlagen ihrer geistigen Entwickelung. Read in Berliner Gessellschaft für Anthropologie, Ethnologie, and Urgeschichte, July 15, 1893.

POTEL, MAURICE. De l'accroissement en poids des enfants nés avant terme. Soc. d'Ed. Scient., Paris, 1895, pp. 40.

POULSSON, EMILIE. Finger plays for nursery and kindergarten. (18 plays with music.) D. Lothrop Co., Boston, Mass., 1893.

POWELL, F. M. Backward and mentally deficient children. Child Study Monthly, March, 1896, I, 290-395.

PRÉVOST, M. Jeunes filles de main. Rev. Encyclop. V, (I), 77-78.

PREYER, W. Die geistige Entwickelung in der ersten Kindheit. Union, Stuttgart, 1893, pp. 201.

——— Die Seele des Kindes, Beobachtungen uber die geistige Entwickelung des Menschen in den ersten Lebensjahren. Vierte Aufl. L. Fernau, Leipzig, 1895, pp. 412.

——— Die Psychologie des Kindes. III. Int. Congr. f. Psychol., 1897, 80-94.

——— Farbenunterscheidung und Abstraktion in der ersten Kindheit. Ztsch. f. Psychol., 1897, XIV, 321-328.

——— La psychologie de l'enfant. Rev. Scient., 1896, 4e S, VI, 616-622.

——— Psychogenesis. Jour. Spec. Philos., April, 1881.

——— The development of the intellect. Observations concerning the mental development of the human being in the first years of life. (Part II of "The mind of the child.") Tr. from the German by H. W. Brown, New York, 1890. 41+317 pp. 12° (International Educational Series, ed. by Wm. T. Harris, Vol. IX.)

——— The senses and the will. (Part I of "The mind of the child.") Tr. by H. W. Brown, New York, 1890. 25+346 pp. 12°. (International Educational Series, ed. by Wm. T. Harris, Vol. VII.)

——— Mental development in the child. Tr. from the German by H. W. Brown. (Intern. Ed. Series, ed. by Wm. T. Harris, Vol. XXIV.) New York, 1893. 12°. pp. 170.

PRIOR, MARY D. Notes on the first three years of a child. Ped. Sem., October, 1895. Vol. 3, 349-341.

Proceedings of the International Congress of Education at the World's Columbian Exposition. New York, National Educational Association.

PROUDFOOT, A. H. A mother's ideals. A kindergarten mother's conception of family life. Pub. by the author, 1400 Auditorium, Chicago, 1897, pp. 270.

QUETELET, A. Essai de physique sociale. Paris, 1835, 2 vols.

QUEYRAT, F. L'imagination et ses variétés chez l'enfant. F. Alcan, Paris, 1893, pp. 162.

RÆHLMANN, E. Physiologisch-psychologische Studien über die Entwickelung der Gesichtswahrnehmungen bei Kindern und bei operierten Blindgeborenen. Zeits. f. Psychologie und Physiologie der Sinnesorgane, February, 1891, vol. 2, 53-96.

RANKE. Körpergrösse in Bayern. Beiträge zur Anthropologie Bayerns. Bd. IV.

RASSIER, M. Valeur du témoignage des enfants en justice. Lyons, 1893, pp. 88.

RAUDNITZ. Prager medicinische Wochenschrift, 1892, No. 2, 7, und 8.

RÉGIS. Précocité psychique rare chez un enfant de deux ans et demi. Mém. Bull. Soc. d. Méde. d. Bordeaux, 1897, 186-195.

RENKAUF, A. Abnorme Kinder und ihre Pflege. H. Beyer u. Söhne, Langensalza, 1893, pp. 19.

Review of recent literature on child psychology. Psychol. Rev. I., 182-184; 425-428.

RIBOT, THOMAS. General ideas of infants and deaf mutes. Open Court, March, 1899, 164-175.

RICCARDI, A. Antropologia e pedagogia. Parte Prima. Introduzione ad una scienza della educazione (Osservazioni psicologiche; ricerche statistiche; misure antropologiche, ecc.). Modena, 1892, pp. 172.

RICCARDI, P. Note antropologiche fatte ad alcuni giovani della Casa di custodia in Bologna. Arch. di psichiat., etc. Torino, 1882, III, 151-156.

RICCI, CORRADO, L'arte dei bambini. N. Zanichelli, Bologna, 1887, pp. 84.

RICE, J. M. How shall the child be taught? Forum, 1896, XXII, 385-395.

——— Economy of time in teaching. Forum, 1897, XXII, 706-712.

RICHTER, GUSTAV. Unterricht und geistige Ermüdung. Eine schulmännische Würdigung der Schrift Kraepelins "Ueber geistige Arbeit." Lehrproben und Lehrgänge, Halle A. S., October, 1895, Heft 45, 1-37.

RISLEY, S. D. Defective vision in school children. Ed. Rev., N. Y., April, 1892, vol. 3, 348-354.

ROBERTS, CHARLES. A manual of anthropometry. London (J. A. Churchill).

——— Anthropometry as applied to social and economic questions. Humanitarian, III, 422, VIII, 639.

——— Bodily deformities in girlhood. Pop. Sci. Mo., Vol. XXII.

ROBINSON, L. The primitive child. North Am. Rev., CLIX, 467-478.

——— Darwinism in the nursery. 19th Century, November, 1891, vol. 30, 831-842.

——— Infantile atavism. Brit. Med. Jour., December 5, 1891, II, 1226-1227.

ROGO, PRIETO C. Paralelos entre los niños de las altas esferas sociales y los niños pobres. Boll. d. Dispens. y Hosp. de niños pobres de Barcelona, 1895, V, 444, 465.

ROLLET, E. Ueber den Einfluss der Körperlage auf die Ergebnisse der Brustuntersuchung. Deutsches Archiv. für kl. med. Bd. XIX, 1877, s. 284.

ROMANES, G. J. Psychological development in children. Nature, 26: 497.

ROWE, S. H. Child study: highest phase. Education, June, 1898.

ROYCE, JOSIAH. Mental defect and disorder from the teacher's point of view. Ed. Rev., N. Y., October, November, December, 1893, vol. 6, 209-222; 322-331; 449-463.

——— The imitative functions and their place in human nature. Century Magazine, May, 1894, vol. 48, (n. s., vol. 26), 137-145.

RUMA, R. Antropomet. materiali dija opredielenija, phizich. razvitija uchashichsja. (Anthropometry; school children.) Sborn. sochin. po sudebnoi med., St. Petersburg, 1880, III, pt. 2, 95-131.

RUNGE, M. Der erste Schrei und der erste Athemzug. Berl. Klin. Wochenschrf., XXXII, 5.

RUSCHENBERGER, W. S. W. Contributions to the statistics of human growth. Amer. Jour. Med. Sci., Philadelphia, 1867, n. s. LIII, 67-70.

RUSSEL, E. H. Observation and experiment essential in pedagogical inqniry. The Academy, Syracuse, N. Y., September, 1889, vol. 4, 336-348.

——— Blanks for the study of children. State Normal School, Worcester Mass.

——— Exceptional children in school. Ed. Rev., N. Y., December, 1893, vol. 6, 431-442.

RYERSON, G. S. Defective vision in the public schools. (Results of examination of 5,253 children in Toronto. Paper read March 22, 1890.) Trans. Canadian Inst., 1889-90. Toronto, 1891. vol. 1, 26-27.

——— Study of children at the State Normal School, Worcester, Mass., Pedagog. Sem. I, 243.

SACHS, B. A treatise on the nervous diseases of children, for physicians and students. Baillière, Tindall & Cox, London, 1885, pp. 666.

SACK. Physical development of the children in the middle schools of Moscow. 1892.

SALISBURY, A. A child's vocabulary. Educ. Rev., VII, 289-290.

SANFORD, E. C. Notes on studies of the language of children. Ped. Sem., 1: 257.

SANZ DEL RIO. Psicología del niño. Boletin de la Institución libre de Enseñanza, 1893, 17-19 (No. 383), (and a former article in No. 372).

SARGENT, D. A. Report on anthropometric measurements. A schedule of measurements with directions for making them. Presented by a committee of the A. A. A. P. E., through its chairman, Dr. Sargent, and adopted by the association, November 26, 1886. Proceedings American Association for Advancement of Physical Education, 1886. Brooklyn, N. Y., 1886. II, 6-15.

SARGENT, D. A. Anthropometric apparatus, with directions for measuring and testing the principal physical characteristics of the human body. Cambridge, Mass., 1887. 8°.

——— The physical proportions of the typical man. Scribner's Magazine, July, 1887. II., 3-17. Illustrated.

——— The physical development of women. Scribner's Magazine, February, 1889, V. 172-185.

——— The physical characteristics of the athlete. Ibid. November, 1887. II, 541-561. Illustrated.

——— Strength tests and strong men at Harvard. J. Bost. Soc. Med. Sci., 1896-97. No. 13.

SCHAAFHAUSEN, H. Ueber die Urform des menschlichen Schädels. Bonn, 1868.

SCHAEFER, F. Arbeitskraft und Schule. Leipsig and Frankfort a. M. 1897.

SCHAEFFER, O. Ueber die Schwankungsbreite der Gewichtsverhältnisse von Säuglingen in den ersten 14 Lebenstagen, etc. Arch. f. Gynaek. Berlin, 1896, LII, 282-313.

SCHALLENBERGER, MARGARET E. A study of children's rights as seen by themselves. Ped. Sem., October, 1894, vol. 3, 87-96.

——— Professor Baldwin's method of studying the color perception of children. Am. J. Psychol., 1897, VIII, 560-576.

SCHECHTER, S. The child in Jewish literature. Jewish Quarterly, vol. 2, London, 1889.

SCHERER, F. Die Respiration des Neugeborenen und Säuglings; experimentelle Studie. Jahrb. f. Kinderh., Leipzig, 1896, XLIII, 471-497.

SCHERZER, K. und SCHWARZ, E. On measurements as a diagnostic means of distinguishing the human races. 1858. (Printed for private circulation.)

SCHILLER, H. Der Stundenplan. (Samml. v. Abh. päd. Psych. u. Phys., I.) Berlin, Reuther u Reichard, 1897, pp. 65.

SCHINZ, A. La moralité de l'enfant. Rev. phil., Paris, 1898, XLV, 259-295.

SCHMID-MONNARD. Ueber den Einfluss der Jahreszeit und der Schule auf das Wachsthum der Kinder. Verhandl. d. Versamml. d. Gesellsch. für Kinderh. Deutsch. Naturf., 1894.

SCHMIDT, E. Die Körpergrösse und das Gewicht der Schulkinder des Kreises Saalfeld (Herzogthum Meiningen). Arch. f. Anthrop. Brnschwg., 1892-93, XXI, 385-434.

SCHNEPF. Influence de l'âge sur la capacité vitale des poumons. Gazette médicale de Paris. Nr. 21, 25, 39, 1857.

SCHOLZ, FRIEDRICH. Die Charakterfehler des Kindes. Eine Erziehungslehre für Haus und Schule. E. H. Mayer, Leipzig, 1891, pp. 233.

SCHULTZ, G. Bericht über die Messungen an Individuen von verschiedenen Nationen. Bull. d. I. classe physico-mathématique de l'académie imperiale des sciences de St. Pétersbourg, IV, 1845.

——— Some new anthropometrical data. Yale Med. Jour., New Haven, 1895-96, II, 149.

SCHUSCHNY, HEINRICH. Ueber die Nervosität der Schuljugend. Jena, G. Fischer. pp. 31.

SCHUYTEN, C. Influence des variations de la température atmosphérique sur l'attention volontaire des élèves. Recherches expérimentales faites dans les écoles primaires d'Anvers, 1895-1896. Bull. de l'Acad. Roy des Sciences, des Lettres et des Beaux-Arts de Belgique, Bruxelles, 1896. 3e série, vol. 52, 315-326, with two plates.

SCOTT, COLIN A. The psychology of puberty and adolescence. Proc. N. E. A., 1897, 843-851.

SCOVIL, ELIZABETH F. The care of children. H. Altemus Phila., 1895, pp. 348.

SCRIPTURE, E. W. Tests on school children. Ed. Rev., N. Y., January, 1893, vol. 5, 52-61.

SCRIPTURE, E. W. Untersuchungen über die geistige Entwickelung der Schulkinder. Ztsch. f. Psychol., 1896, X, 161-182.
——— Aims and status of child study. Educ. Rev., VIII, 236-239.
——— An observation of the terminal verb in infant speech. Science, XXIII, 62.
——— Notes on Dr. Gilbert's article. Studies, Yale Psych. Lab., II.
——— New materials for color teaching. Educ. Rev., VII, 382-383.
——— and SMITH, T. L. and BROWN, E. M. On the education of muscular control and power. Studies, Yale Psych. Lab., II.

SCUDDER, H. M. Childhood in literature and art, with some observations on literature for children. Houghton, Mifflin & Co., Boston, 1894, pp. 245.

SEARCH, P. W. The Holyoke school children's Christmas annual, 1897. A budget of Christmas stories by real boys and girls. The first Christmas annual of the boys and the girls of the Holyoke schools. Holyoke, Mass., 1897, pp. 96.

SEARS, CHARLES H. Home and school punishments. Ped. Sem., March, 1899.

SEAVER, E. P. Truants and incorrigibles. Ed. Rev., N. Y., May, 1894, vol. 7, 423-438.

SEAVER, J. W. Anthropometry and physical examination. In practical use in connection with gymnasium work and physical education. New Haven, 1896, 127 pp.
——— Same, new anthropometrical data. Yale Med. Jour., New Haven, 1895-96, II, 149.

SEAVER, W. A. Giants and dwarfs. Harper's, XXXIX.

Secretion of milk in the breast of infants. Brit. Med. Jour., London, 1897, I, 29.

SEGA, V. Sulle misure anthropometriche secóndo il metodo del De Giovanni. Raccoglitore med., 1896, 5. s., XXII, 26-32.

SEGUIN, Edward. Rapports et mémoires sur l' éducation des enfants normaux. Paris, F. Alcan.
——— Idiocy and its treatment by the physiological method. Wm. Wood & Co., N. Y., 1866, pp. 457.
——— Prenatal and infantile culture. Pop. Sci. Mo., November, 1876, vol. 10, 38-43.
——— The psycho-physiological training of an idiotic hand. Archives of Medicine, N. Y., 1879, vol. 2, 149-156, with plate.
——— The psycho-physiological training of an idiotic eye. Archives of Medicine, December, 1880, vol. 4, 217-233, with 2 plates.

SEIGERT, G. Problematische Kindernaturen. Leipzig, 1889.

SELIGMÜLLER, ADOLPH. Wie bewahren wir uns und unsere Kinder vor Nervenleiden. Eduard Trewendt, Breslau, 1891, pp. 60.

SEMMIG, HERMANN. Das Kind, Tagebuch eines Vaters. 2te Aufl. Hartung und Sohn. Rudolstadt, 1876, 240.

SERGI, Professor. An anthropological cabinet for pedagogic purposes. Education, September, 1896.

SERGI, GIUSEPPE. Un primo passoalla pedagogía scientifica e la carta biografia Enrico Trevisini, Milano, pp. 35.
——— I tramonti cerebrali e la prima educazione. Riv. di Sociol., II, 561-565.

SHAW, EDWARD R. Vertical script and proper desks as related to education. Proc. Am. Assoc. Adv. of Phys. Ed., 10th Ann. Meeting, April, 1895, Concord, N. H., 1896, 110-123.
——— Some observations upon teaching children to write. Child Study Monthly, February, 1896, Vol. I, 226-229.
——— The employment of motor activities in teaching. Pop. Sci. Mo., 1896, L., 56-66.
——— A comparative study on children's interests. Child Study Mo., 1896, II, 152-167.

SHAW, JOHN C. A test of memory in school children. Ped. Sem., Oct., 1896, vol. 4, 61-78.

SHAW, JOHN C. What children like to read. W. Va. School Journal, Charleston, W. Va., October, 1897, 17, 5-6.

SHINN, MILICENT W. The visible world of a little child. The Univ. of Cal. Mag., March, 1893, vol. 1, 13-18.

——— The baby's mind: A study for college women. A paper presented to the Asso. of Collegiate Alumnæ, October 27, 1894. Series 2, No. 52 pp. 11.

——— Notes on the development of a child. Part II. The Univ. of California, Berkeley, Cal., 89-178.

SHUKOVSKI, I. O vzvîeshivanii grudnikh dîeteî, kak mîerilîe ikh vozrastania. (On weighing infants at breast as an indication of their growth.) Sborn. sochin. po sudebnoi med., St. Petersburg, 1880, ii, pt. 1, 71-98.

SHUTTLEWORTH, G. E. Mentally Deficient Children. London, 1895.

SIEGERT, GUSTAV. Die Periodicität in der Entwickelung der Kindesnatur. Voigtländer, Leipzig.

——— Problem der Kinderselbstmorde. Voigtländer, Leipzig.

SHUFELDT, R. W. Thirty-five hundred comparative observations on the pulse, respiration, and temperatures of children. New York Med. Jour., 1891, LIV, 258-263.

SIGISMUND, BERTHOLD. Kind und Welt. Vätern, Müttern und Kinderfreunden gewidmet. Die fünf ersten Perioden des Kindesalters. F. Vieweg u. Sohn, Braunschweig, 1896, pp. 221.

——— Kind und Welt: Für Eltern und Lehrer, sowie für Freunde der Psychologie mit Einleitung und Anmerkungen neu herausgegeben von Chr. Ufer. F. Vieweg u. Braunschweig, 1897, pp. 199.

SIKORSKI, M. L'évolution psychique de l'enfant. Rev. Phil., Mar. and May, 1885.

——— Du développement du langage chez les enfants. Archives de Neurologie, November, 1883, vol. 6, 319-336.

SIMONOVITCH, J. Stravenie periodov individualnavo, etc. (Comparisons of periods of development of the child with the epochs of human development.) 8°. St. Petersburg, 1884.

SIMPSON, WALTER G. A chronicle of infant development and characteristics. Jour. of Mental Science, July, October, 1893, vol. 39, 378-389, 498-505.

SKINNER, W. H. The Poetic Impulse in Children. Northwestern Jour. of Educ., 1896, VII, 14-15.

SLACK, H. W. Mirror writing and left-handedness.

SMALL, MAURICE H. The suggestibility of children. Ped. Sem., December, 1896, vol. 4, 176-220.

SMEDLEY, F. W. A report of the sensory and motor abilities of the pupils of the Chicago University primary school, etc., Trans. Ill. Soc. Child Study, 1897, II, 85-90.

SMITH, ANNA TOLMAN. A study in race psychology. Pop. Sci. Mo., January, 1897.

SMITH, CHARLOTTE. Mental evolution and physical development. Med. Mag., London, 1892-93, I, 929-943.

——— Four true stories of life and adventure. (Stories of Columbus, Capt. John Smith, Miles Standish, and Benjamin Franklin, written by children.) W. B. Harison, New York, 1897, pp. 106.

SMORODINTSCEFF, A. I. Kvoprosu, etc. (Sur le développement physique des enfants fréquentant les écoles.) Zapiski Uralsk. Med. Obsh. Vg. Ekaterinburge. Perm., 1894, III, pt. 2, 31, 68.

SNITKIN, M. Nablyud. nad koleban. viesa novoroshden. dietei v prodol. pervavo miesiatsa ich zhizni. (Researches on fluctuations of weight of infants during first month of life.) Med. otchet Imp. St. Petersburg Vosp. Doma, 1873, 154-178, 1 tab. Materialy dlîa izuchen. rosta dietei pervych nedel zhizni. (. . . investigation of growth of infants in first week of life.) Ibid., 1877, 184-210.

SOAMES, H. A. The scientific measurement of children. 16°. London, 1891.

Societies relating to children (transactions of): American Pediatric Society, Philadelphia, 1888.—Bernard Club School of Child Study, Providence, R. I.—Congrès périodique de gynécologie, d'obstétrique et de paediatrie. 1re session, Bordeaux, août 1895. Mémoires et discussions. 8°. Paris, 1896.—Congreso higiénico-pédagógico. Memorias del primer . . . reunio en la ciudad de México el año de 1882. 8°. Mexico, 1883.—Congreso pediatrico italiano. Atti del . . . tenuto in Roma nei giorni 16-19 ottobre, 1890. 8°. Napoli, 1891.—Gesellschaft für Kinderheilkunde. Versammlungen der . . . in der pädiatrischen Section auf den Versammlungen deutscher Naturforscher und Aerzte. 8°. 1884-1897.—Illinois Society for Child Study, Chicago, Ill.—Iowa Society for Child Study (circulars of information), Des Moines, Iowa.—Nederlandsche Verenigung voor Paediatrie. Voordrachten. Utrecht, 1893.—Obshtshestvo Dĭetskikh Vrachei. (Society of Pediatricians . . . Memoirs.) 8°. St. Petersburg, 1887-1896.—Obshtshestvo Dĭetskikh Vrachei, etc. (Society of Pediatricians at the Imperial University at Moscow. Memoirs . . . with supplements of the proceedings of the society.) 8°. Moskva, 1892-1894.—Società filojatrica in Firenze. Statuto sociale approvato nell' adunanza del 22 dicembre, 1878. 8°. Firenze, 1889.

SOLDEVILLA, CARRERA M. La infancia y la criminalidad. Lerida, 1897, pp. 240.

SOUTHARD, W. F. The development of the child as modified by the condition of his eyes. Refractionist, Boston, 1896-97, III, 129-144.

SPENCER, A. G. What state and society owe to children. Lend a Hand, XIV, 34.

SPITZNER. Geistige Ueberanstrengung in den Schulen. Dtsch. Vierteljahrschr. f. Gesundheitspflege, p. 272.

SPOENDLI, H. Die Schädeldurchmesser des Neugebornen und ihre Bedeutung. 8°. Zürich, 1857.

STAPLETON, J. K. Study of boys entering the adolescent period of life. Series of articles in the Northwestern Monthly, Lincoln, Nebr., begun in the issue for November, 1897, vol. 8, 248-250.

STAGE, G. G. Ueber Körperwägungen während der Dentitionsperiode. Jahrb. f. Kinderh., Leipzig, 1883, n. f., xx, 425-438.

STENZL, ANTON. Ansteckende Kinderkrankheiten. Belehrung über deren Erkentniss nebst einem Anhang über Diätetik und Prophylaxis. Karl Graeser, Wien, 1883, pp. 39.

STEPHENSON, W. On the rate of growth of children. Transactions IX Internat. Med. Cong., Washington 1887, III, 446-452.

——— On the relation of weight to height and the rate of growth in man. Lancet, London, 1888, II, 560-564.

STETSON, G. R. Some memory tests of whites and blacks. Psych. Review, N. Y., and London, 1897, IV, 285-289.

STEVENSON, R. L. Child's play. Virginibus Puerisque. C. Kegan Paul & Co., London, 1881, 237-260.

——— A child's garden of verses. Chas. Scribner's Sons, N. Y., 1893, pp. 101.

STIEDA, L. Ein Beitrag zur Anthropologie der Juden. Arch. f. Anthr., Bd. XVX, 1882.

STOCKTON-HOUGH, J. Statistics relating to 700 births occurring in the Philadelphia Hospital (Blockley) between 1865 and 1872. Phila. Med. Times, 1885-86, XVI, 92-94.

STORMENT, E. L. A record of opinion. Child Study Mo., 1897, II, 474-487.

STORY, W. W. The proportions of the human figure, according to a new canon, for practical use, with a critical notice of the canon of polycletus, and of the principal ancient and modern systems. London, 1866. 8°.

STREET, J. R. A study in language teaching. Ped. Sem., April, 1897, vol. 4, 269-293.

——— A study in moral education. Ped. Sem., vol. 5, 5-40.

STRÜMPELL, LUDWIG. Die pädagogische Pathologie oder die Lehre von den Fehlern der Kinder. Versuch einer Grundlegung für gebildete Aeltern, Studirende der Pädagogik, Lehrer, sowie für Schulbehörden und Kinderärzte. Georg Böhme, Leipzig, 1890, pp. 225.

STUMPF, C. À propos d'un enfant prodige. Rev. de'l Hypnot., 1897, XII, 85-87.

——— Un enfant extraordinaire. Rev. Scient., 1897, 4e s., II, 336-338.

SUDBOROUGH, Mrs. G. B. What children imitate. Northwestern Monthly, Lincoln, Nebr., vol. 7, 99, 136, 162, 226, 300, and 332.

SULIGOWSKI, F. Kilka slów o pomiarach antropometrycznych mlodziezy gimnazyum mezkiego w Radomiu. (The anthropometric measurements of pupils in the gymnasium of Radom.) Medycyna, Warszawa, 1887, XV, 512, 528, 544, 559, 641.

SULLEY, J. Babies and science. Cornhill Mag., May, 1881, vol. 43, 539-554.

——— Baby linguistics. Eng. Illustrated Mag., Nov., 1884, vol. 2, 110-118.

——— The service of psychology to education. Ed. Rev., N. Y., Nov., 1892, vol. 4, 313-327.

——— Infant psychology. Jour. of Educ., 1894, 202-204.

——— Studies of childhood. Pop. Sci. Mo., XLV, 323-330, 577-587, 733-742, and XLVI, 86-97.

——— Children's ways. D. Appleton & Co., N. Y., 1897, pp. 193.

——— The child in recent English literature. Fortn. Rev., 1897, n. s., LXI, 218-228.

——— Untersuchungen über die Kindheit. Uebers. v. J. Stimpfl. Leipzig, E. Wunderlich, 1897, pp. 374.

——— The new study of children. Fortn. Rev., n. s., LVII, 723-737.

SWAIN, F. Anthropometric measurements. Proc. Amer. Asso. for Advancement of Phys. Ed., 1887, Brooklyn, N. Y., 1887, III, 43-50.

TALBOT, E. S. Stigmata of degeneracy in American criminal youth. J. Am. Med. Asso., Chicago, 1898, XXX, 849-856.

TALBOT, (Mrs.) E. Papers on infant development. Published by the education department of the American Social Science Association. Boston, 1882, pp. 52.

TARBELL, G. G. On the height, weight, and relative rate of growth of normal and feeble-minded children. Proc. 6th Annual Session, Assn. of Med. Officers, Am. Institutions for Idiotic and Feeble-Minded Persons. J. B. Lippincott & Co., Philadelphia, Pa., 1883, 188-189.

TAROZZI, G. Trattato di pedagogia e morale. Turin, 2 vols., 236, 375.

TAYLOR, H. L. American childhood from a medical standpoint. Am. J. Soc. Sci., November, 45:323.

——— Secret language of children. (Note.) Science, XLIII, 50-51.

TAYLOR, JOHN M. The insane disorders of childhood. Archives of Pediatrics, February, 1894, vol. 2, 100-115.

——— Children of feeble resistance, their care and management. Intern. Med. M.; Phila., 1896, V, 439-464.

TAYLOR, Miss. The show child. Longman's Magazine, December, 1895.

TELFORD-SMITH, T. The scientific study of the mental and physical conditions of childhood. Pediatrics, 1897, II, 317-321.

TETZNER, F. Geschichte der deutschen Bildung und Jugenderziehung von der Urzeit bis zur Errichtung von Stadtschulen. Gütersloh, Bertelsmann, 1897.

TEZYAKOFF, N. Physical development of the public school pupils of Yelisavetgrad county. Vestnik obsh. hig., sudeb. i prakt, 138.

THAMIN, R. De puerorum indole quaedam notantur. Thèse de doctorat, Sorbonne.

Third Annual Congress of the Illinois Society for Child Study. Child Study Mo., 1896, II, 101-125.

THURBER, CHARLES H. Hints on child study. Also study of children's hopes. Rept. of State Supt. Pub. Instruction, Albany, N. Y., 1896, vol. 2, 977-1042.

THURBER, CHARLES H. The relation of child study to Sunday-school work. Northwestern Monthly, September, 1897, vol. 8, 137-141.

TIEDEMANN. Die vier ersten Jahre meiner Kinder. (German original not known, but translated in Jour. Général d'Instruc. Publique, April, 1863; also translated into English by Dr. L. F. Soldan, Syracuse.)

TIEDEMANN, D. Tiedemann's Beobachtungen über die Entwicklung der Seelenthätigkeit bei Kindern. Altenburg, Bonde, 1897, pp. vii+56.

TIRELLI, V. La vitalità dei neonati in rapporto a processi morbosi. Ann. di freniat. Torino, 1897, VII, 82-96.

TITCHENER, E. B. Anthropometry and experimental psychology. Phil. Rev., 2, 187.

TOLDT. Studien über die Anatomie der menschlichen Brustgegend mit Bezug auf die Messung derselben, etc. Stuttgart, 1875.

TOLOSA-LATOUR, M. DE. Necessit des études anthropologiques et anthropométriques, etc. Tr. VII. Intern. Cong. Hyg. and Demog., 1891, London, 1892, IV, 254-265.

TOLSTOI, L. Boyhood, adolescence and youth. Translated by Constantine Popoff. Elliott Stock, London, 1890, pp. 480. American translation by Isabel F. Hapgood. T. Y. Crowell and Co., N. Y., 1886, pp. 244.

TOMPKINS, A. Culture epochs in the child and the race. Child Study Mo., I, 135-139.

TOWNSEND, C. W. Some statistics on weight of infants, sex and fetal heart rate. Boston M. & S. J., 1896, CXXXIV, 484.

Transactions of the Illinois Society for Child Study. Vol. I, No. 2. Handbook. New York and Chicago, Werner Co., pp. 85.

TRACY, F. The psychology of childhood. 2d ed. Boston, Heath & Co., pp. 170.

——— The language of childhood. Am. Jour. Psy., October, 1893, vol. 6, 107-138.

TRÜPER, J. Psychopathische Minderwertigkeiten im Kindesalter. Ein Mahnwort für Eltern, Lehrer und Erzieher. C. Bertelsmann, Gütersloh, 1893, pp. 90.

TSANOFF, STOYAN V. Educational value of the children's playgrounds. A novel plan of character-building. Pub. for the author, 1305 Arch st., Phila., Pa., 1897, pp. 203.

TSAREOSKAYA, E. V. Physical development of pupils of military schools. Russian text Nopr. new-psich. med. Kiew, 1898, III, 109-114.

TUCKER, E. F. Untersuchungen der Augen und Ohren von 1997 Volksschülern. Geschäftsber. d. Centralschulpfl. d. Stadt Zürich im Jahr 1895. Ztsch. f. Schulges.-Pfl., 1896, 601.

——— The child in storyland. Northwestern J. of Educ., 1896, VII, 12-14.

——— The development of the number sense. North Western Monthly, Lincoln, Nebr., vol. 7, 70, 101, 158, 248, 302, and 333.

TUCKER, M. S. Pedonomics. Child Study Monthly, April, 1896, vol. 1, 368-373.

TUCKERMAN, F. Anthropometric data based upon nearly 3,000 measurements taken from students. Amherst, 1888, 1 pl. 8°.

TUKEWELL, GERTRUDE M. The State and its children. London, 1894.

UFER, CHRISTIAN. Geistesstörungen in der Schule. Ein Vortrag, nebst 13 Krankenbildern. J. F. Bergmann, Wiesbaden, 1891, pp. 50.

——— Ueber Sinnestypen und verwandte Erscheinungen. (Heft 3 der Beiträge zur pädagog. Pathopsychologie.) Beyer u. Sohn, Langensalza, 1895, pp. 20.

——— Ueber Handschrift und Individualitat bei Schulkindern. Verhandlungen des 3te Intern. Congress für Psychologie zu München, 1896. J. F. Lehmann, München, 1897, 442-443.

——— Kinderpsychologie. Ency. Handb. d. Pädagogik, von W. Rein. Langensalza, 1897, Band 4, 113-123.

UFFELMANN, JULIUS. Manual of the domestic hygiene of the child. For the use of students, physicians, sanitary officials, teachers and mothers. Edited by Mary Putnam Jacobi, M. D.; translated by Harriot R. Milinowski. G. P. Putnam's Sons, N. Y., 1891, pp. 221.

UHLITZSCH. Anthropometrische Messungen und deren praktischer Wert. Allg. statist. Arch., Tübingen, 1891-92, II, 419-451.

VAHL, M. Mittheilungen über das Gewicht nicht erwachsener Mädchen, 1874-83. 8°. Copenhagen, 1884.

VAN LIEW, C. C. Some educational bearings of the principle of imitation. North Western Monthly, Lincoln, Nebr., December, 1897, vol. 8, 320-327.

——— The child study of Herbart. Trans. Ill. Soc. Child Study, 1897, II, 126-135.

VARRENTRAPP, G. Bericht an die Baudeputation zu Frankfurt am Main zur Beantwortung der Frage über die zweckmässigste Einrichtung der Schulbänke und Schultische, 1887, 4, 16 s. (Rev.). (Contains measurements of 3,459 boys and 2,448 girls.) Deutsche Vrtljschr. f. öff. Gsndhtspflg., Brnschwg., 1872, IV, 298-306.

VAUGHN, MARION. The mother's record of the physical, mental, and moral growth of her child for the first fifteen years. D. Lothrop Co., Boston, Mass., 1882.

VAZHNOFF, K. V. On the physique of pupils in the public schools of Yegoryev county. Ryazan government, in 1895-6. Vestnik obsh. hig., sudeb. i prakt-med., St. Petersburg, 1897, XXXIII, No. 2, 7 sect., 32-44.

VIERORDT, K. Physiologie des Kindesalters in C. Gerhardt's Handbuch der Kinderkrankheiten. Tübingen, 1877, Bd. I, S. 83.

VINAY, C. Psychology of the new-born infant. Med. Week., Paris, 1897, V, 97-101.

VINOGRADOVA-LUKIRSKAYA, L. K voprosu, etc. (Examination of height and weight of girls attending high schools.) Vestnik obsh. hig. sudeb. i prakt. med. St. Petersb., 1894, XXI, 2 sect., 67: 186.

VIRCHOW, R. Gesammtbericht über die Farbe der Haut, der Haare und der Augen der Schulkinder in Deutschland. Arch. f. Anthr., Bd. XVI.

——— Ueber gewisse die Gesundheit benachtheiligende Einflüsse der Schulen. Berlin, 1869.

——— Studi antropologici in servizio della pedagogia. Torino, 1898, pp. 126.

VITALI, V. L'abuse e lo spreco dell' energia intellettuale nelle scuole. Riv. di Sociol., 1896, III, 495-513.

VIURA Y CARRERAS, J. El examen del peso de los niños durante los primeros meses de la infancia, etc. Rev. de cien. méd. Barcelona, 1886, XII, 4-11.

VOIT, C. VON. Ueber die Periodicität im Gewichte der Kinder. München med. Wochenschr., 1886, XXXIII, 129-131.

VORONOFF, N. G. K voprosu o raznitsie nablyudayemoi v narostanii viesa u grudnich dietei s bolshim i malim viesom. (Maximum and minimum weight and growth of infants at the breast.) Med. Obozr., Mosk., 1883, XX, 324-340.

VOSTROVSKY, C. A study of imaginary companions. Educ., XV, 383-398.

VROOMAN, F. B. Child life and the kindergarten. Arena, XIII, 292-302.

Wägungen und Messungen der Kinder. Gartenlaube, Leipzig, 1895, 303.

WALKER, FRANCIS A. Statistics of the colored race in the United States. Amer. Statist. Assn., Nos. 11 and 12.

WARNER, FRANCIS. Recurrent headaches in children. Brain, October, 1880, vol. 3, 309-313. Reprint, W. Clowes & Sons, London, 1880, pp. 5.

——— Physical expression: its modes and principles. Int. Sci. Series, vol. 51. D. Appleton & Co., N. Y., 1886, pp. 372.

——— The anatomy of movement: a treatise on the action of nerve centers and modes of growth. Three lectures delivered at the Royal College of Surgeons. K. Paul, Trench & Co., London, 1887, pp. 135.

——— A method of examining children in schools as to their development and brain condition. Brit. Med. Jour., September 22, 1888, vol. 2 for 1888, pp. 659, 660.

——— Muscular movements in man and their evolution in the infant. Jour. Mental Science, April, 1889, vol. 35, 23-44.

——— A course of lectures on the growth and means of training the mental faculty. Delivered in the Univ. of Cambridge. The Macmillan Co., N. Y., 1890, pp. 222.

WARNER, FRANCIS. An inquiry as to the physical and mental condition of school children. Reprint from the Brit. Med. Jour., March 12-19, 1892. Brit. Med. Assn., London, 1892, pp. 14.

——— Report to the British Medical Association and Charity Organization Society of London, on the physical and mental condition of 50,000 children seen in 106 schools of London. Rep. of the Commissioner of Ed. for 1890-91. Washington, 1894, vol. 2, 1081-1138.

——— Deviations from normal development among 50,000 children. Journal of the Anthrop. Institute. Session June 13, 1893. London, 1894, vol. 23, 206-214.

——— Report on the scientific study of the mental and physical conditions of childhood, with particular reference to children of defective constitution, and with recommendations as to education and training. (The report is based upon the examination of 50,000 children, and of another 50,000 seen in 1892-1894.) Published by the committee, Parkes Museum, Margaret st. W., London, 1895, pp. 117.

——— Mental and physical condition among 50,000 children seen in 1892-1894, and the methods of studying recorded observations, with special reference to the determination of the causes of mental dullness and other defects. J. Roy. Statist. Soc., 1896, LIX, 125-168.

——— The study of children and their school training. The Macmillan Co., N. Y., 1897, pp. 264.

——— The study of children and the school training. London and New York, 1898, pp. xix, 264.

——— Mental and physical deviations from the normal among children in public elementary and other schools. Rep. Brit. Ass. Adv. Sci., 1897. London, 1898, LXVII, 427-439.

WARREN, H. C. Notes on child psychology. Amer. Natural., 1897, XXI, 455-460.

WEISSENBERG, S. Die Cüdrussischen Juden, Ach. f. Anthrop., 1894-95, XXIII, 347, 531.

WEST, G. M. The growth of the breadth of the face. Science, New York, 1891, XVIII, 10-11.

——— Eye-tests on school children. American Journal of Psychology, 1892, IV, 595-596.

——— Worcester (Mass.) school children; the growth of the body, head, and face. Science, New York, 1893, XXI, 2-4.

——— Observations on the relation of physical development to intellectual ability, made on the school children of Toronto, Canada. Science, 1896, n. s., IV, 156-159.

WHITNEY, A. S. Some practical results of child study. Child Study Monthly, May, 1896, vol. 2, 14-21.

WIENER, CHRISTIAN. Das Wachsthum des menschlichen Körpers. Vorträge gehalten im naturwissenchaftlichen Verein zu Karlsruhe. Karlsruhe, 1890, 3-23.

WIGGIN, KATE D. The relation of the kindergarten to the public school. C. A. Murdock & Co., San Francisco, Cal., 1881, pp. 25.

——— Children's rights. A book of nursery logic. Houghton, Mifflin & Co., Boston, Mass., 1893, pp. 235.

WILDER, ALEXANDER. The life of the unborn child. Childhood. February, 1893.

——— The influence of the parents' age upon offspring. Childhood. January, 1894.

WILKINS, W. W. Comparative measurements of the chest. Transactions New Hampshire Medical Society. Manchester, N. H., 1886, 125-130.

WILLIAMS, L. A. How to collect data for studies in genetic psychology. Ped. Sem., 1896, III, 419-423.

WILLIAMS, JOB. Hereditary deafness, a study. Science, Vol. XVII.

WILMARTH, A. W. A report on the examination of 100 brains of feeble-minded children. Alienist and Neurologist, October, 1890, vol. 2, 520–533. Reprint. St. Louis, Mo., 1890, pp. 16.

WILTSE, SARA E. Hearing. Sound blindness. Under "Experimental." Am. Jour. of Psychology, August, 1888, vol. 1, 702–705.

——— Mental imagery of boys. Under "Observations on General Terms," Am. Jour. of Psychology, January, 1890, vol. 3, 144–148.

——— The place of the story in early education, and other essays. Ginn & Co., Boston, 1892, pp. 132.

——— A brave baby. Ginn & Co., Boston, 1894, pp. 142.

——— A preliminary sketch of the history of child study in America. Ped. Sem., October, 1895, vol. 3, 189–212.

——— A preliminary sketch of the history of a child study for the year ending September 1, 1896. Ped. Sem., 1896, IV, 111–125.

WINDLE, B. C. A. Anthropometric work in schools. Med. Mag., London, 1893–94, II, 631–649.

WINSLOW, ANNA GREEN. Diary of Anna Green Winslow, a Boston school girl of 1771. Edited by Alice Morse Earle. Houghton, Mifflin & Co., Boston, 1894, pp. 121.

WITMER, L. Practical work in psychology. Pediatrics. New York and London, 1896, I, 462–471.

WITTSTOCK, A. Das ästhetische Erziehungssystem. Leipzig, Haacke, 1896.

——— Zur Frage der ästhetischen Erziehung. Päd. Arch., 1897, XIX, XXXIX, 45.

WOINARSKI, S. E. A. Z. Some statistics of the length and weight of children born in the Lying-in Hospital, Melbourne, during the first four months of 1879. Austrl. M. J., Melbourne, 1879, n. s., I, 415–420.

WOLGAST, H. Zur Pflege der künstlerischen Bildung. Die Deutsche Schule, 1897, I, 223.

WOLFE, H. K. Historical sketch of child study. Northwestern J. of Educ., 1896, VII, 9–12.

——— Simple observations and experiments. Northwestern J. of Educ., 1896, VII, 36–37.

WOLFF, HERMANN. Ueber das Seelische im Kinde. F. Tempsey, Prag, 1881, pp. 35.

WOLFE, H. K. The color vocabulary of children. Univ. of Nebraska Studies, July, 1890, vol. 1, 205–234.

——— Study of children. Education, Boston, Dec., 1890, vol. 11, 201–207.

——— Common defects of school children. North Western Monthly, Lincoln, Nebr., vol. 7, 22, 69, 137, 161, and 274.

——— Heredity. North Western Monthly, Lincoln, Nebr., October, 1897, vol. 8, 200–205.

WOOD, M. ANNA. Anthropometric table, compiled from the measurements of 1,100 Wellesley College students (female), arranged according to bodily heights. 1890. No imprint.

——— Anthropometric table, arranged after the method of percentile grades, of the measurements of 1,500 Wellesley College students (female). No date; no imprint.

——— Statistical tables concerning the class of 1891 of Wellesley College, numbering 104 women. 16 p. 4°. No imprint.

——— Statistical tables, showing certain measurements of 40 freshmen (female) of Wellesley College, at the beginning (November, 1891) and end (May, 1892) of six months of gymnastic training. 1892, 7 p. 4°. No imprint.

WORRELL, J. P. Deafness among school children. Transactions Ind. State Medical Soc. 33d annual session, Indianapolis, Ind., 1883, 25–33.

WYCKOFF, ADELAIDE E. Infant study in the class room. Ped. Sem., December, 1893, vol. 2, 454–455.

YALE, LEROY M. (Editor.) Nursery problems. Contemp. Pub. Co., New York and Philadelphia, 1893, pp. 274.

YODER, A. H. The story of the boyhood of great men. Ped. Sem., III, 134-156.

ZACHARIAS, O. Ueber Periodicität in der Gewichtszunahme bei Kindern. Monatl. Mitth. a. d. Gesammtgeb. d. Naturw., Berl., 1888-89, VI, 35; 57.

ZANKE. Ueber Messung des Schädelinnerraums. Neurol. Centralbl., Leipzig, 1897, XVI, 488-491.

ZELENSKI, M. Nauch. metod dlĭa opred. znach. vesa tela, kak priznaka zdorovya ili boliez. organ. (Scientific method of ascertaining weight of body (of infants) and its importance in indicating health or diseased organism.) Trudi vtor. syezda russk. vrach. v Mosk., 1887, II, Ped., 18-29.

ZHUKOOSKI, I. O vzvĭeshivanii grudnikh dĭeter, kak mĭerilĭe ikh vozraatania [on weighing infants at breast as an indication of their growth] Sborn. sochin. po sudebnoi med. St. Petersburg, 1880, II, pt. 1, 71-98.

ZURCHER, A. Die Augen der Cantonsschüler, in Bezug auf ihre Refraction untersucht. Mitteil. d. Aargauisch. Naturf. Ges., 1896, Heft 2, Aarau, Sauerländer & Co., 1896.

INDEX (OF SUBJECTS AND NAMES) TO CHAPTERS XXI AND XXV.

157

VITA AUCTORIS.

University of Rochester, N. Y., A. B., 1879; A. M., 1883.

Student of Law, 1879–'80.

Union Theological Seminary, N. Y. City, graduated in 1883.

Harvard University, Post-graduate courses in Philosophy, Metaphysics, and Theology.

Johns Hopkins University, appointed "Fellow in Psychology," 1885.

European Study, 1885–1889:

University of Berlin, Medicine and Experimental Medicine.

University of Leipzig, Psycho-Physics and Medicine.

University of Paris, Clinical and Experimental Medicine.

Universities of Zürich and Vienna, Insanity, Hypnotism, and Criminology.

Clark University, Worcester, Mass., Docent in Criminology, 1889–1891.

United States Bureau of Education, Specialist in Education as related to the Abnormal and Weakling Classes, 1892.