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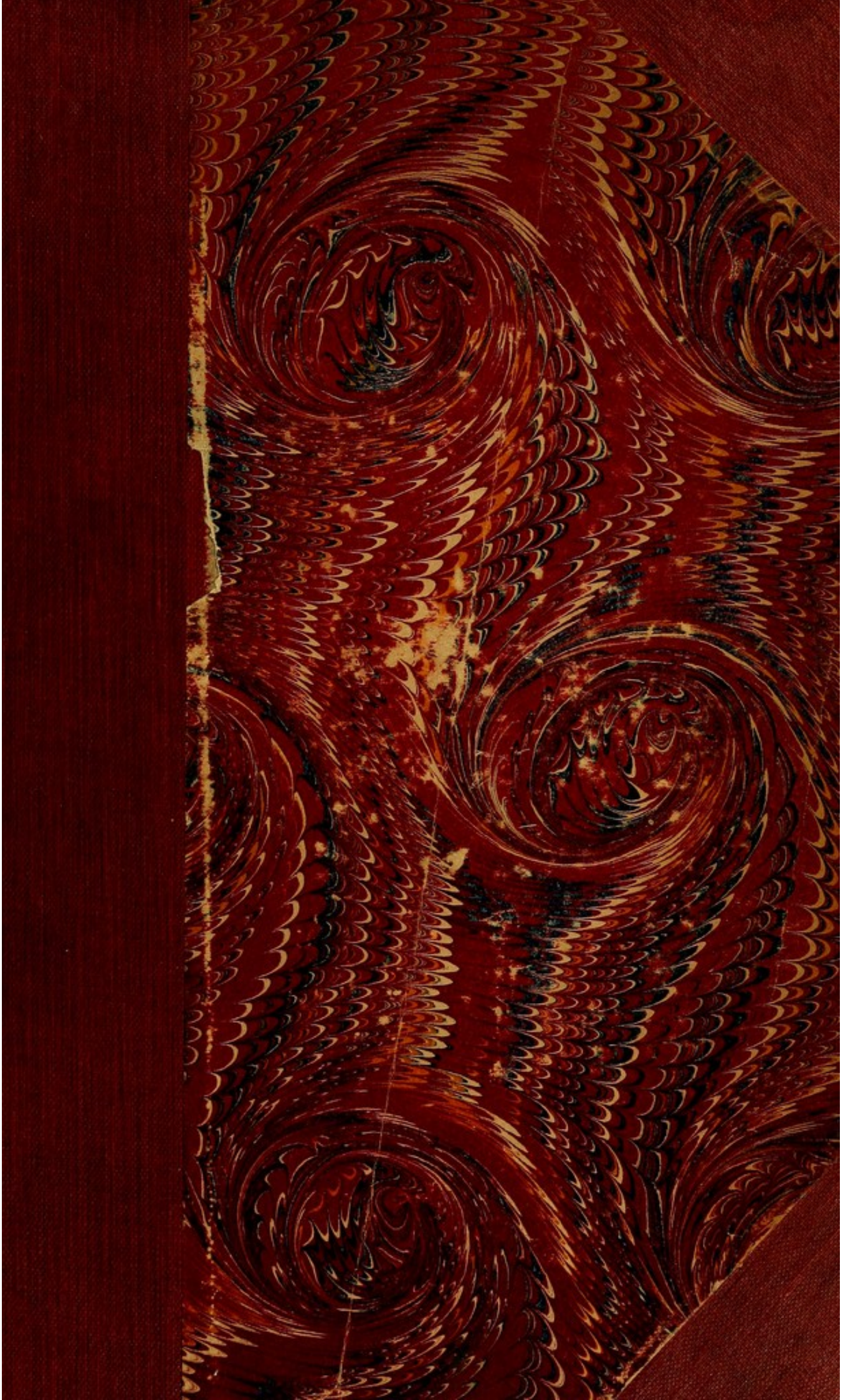

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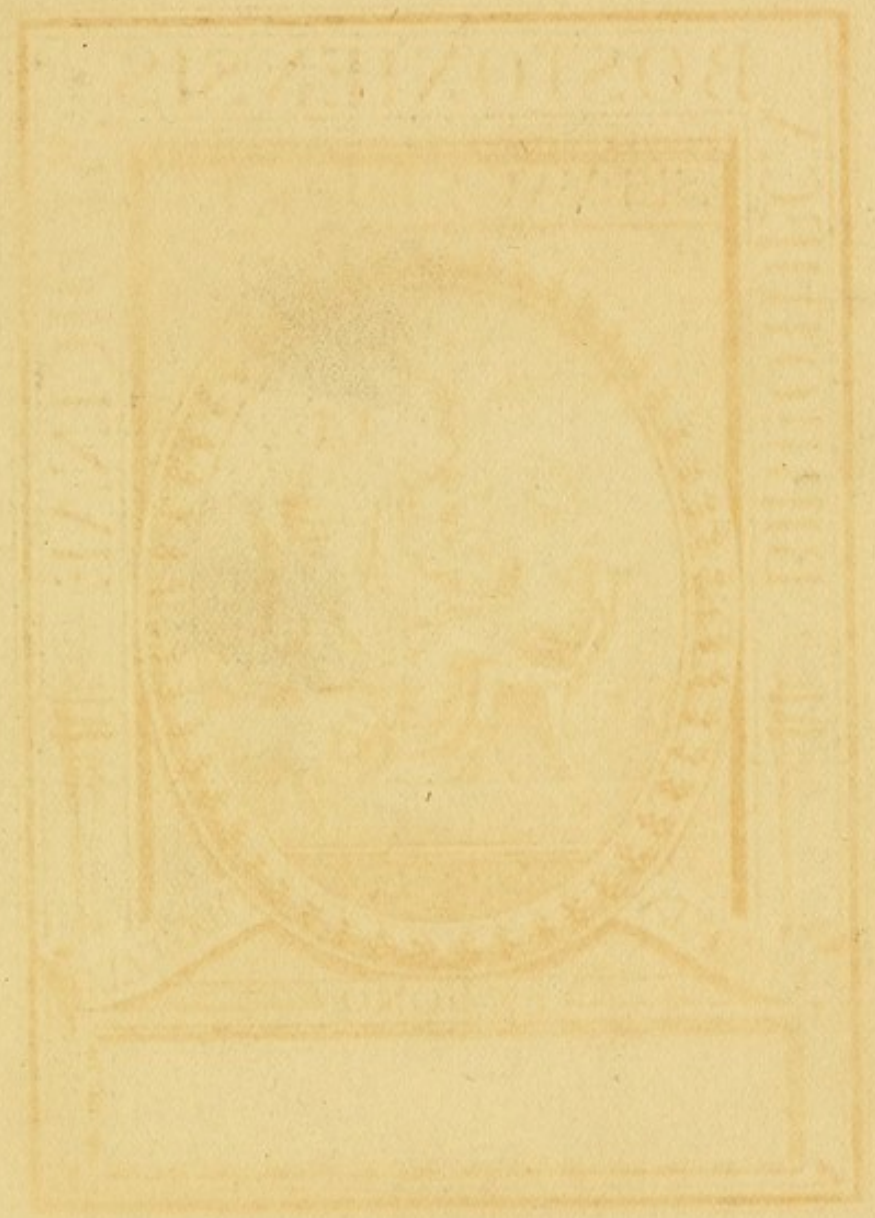

58TH CONGRESS, 3d Session. } SENATE. { DOCUMENT No. 187.

MAN AND ABNORMAL MAN,

INCLUDING

A STUDY OF CHILDREN,

IN CONNECTION WITH

BILLS TO ESTABLISH LABORATORIES UNDER FEDERAL AND STATE GOVERNMENTS FOR THE STUDY OF THE CRIMINAL, PAUPER, AND DEFECTIVE CLASSES,

WITH

BIBLIOGRAPHIES.

BY

ARTHUR MACDONALD.

FEBRUARY 23, 1905.—Presented by Mr. MONEY, and ordered to be printed as one document.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1905.

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GOVERNMENT PUBLICATIONS ON PATHO-SOCIAL, EDUCATIONAL AND PSYCHO-PHYSICAL SUBJECTS.

By THE AUTHOR.

ABNORMAL MAN, being essays on education and crime, criminal sociology, criminal hypnotism, alcoholism, insanity, and genius, with digests of literature and a bibliography. 1893. Published by United States Bureau of Education. Washington, D. C. 445 pages. 8°. 2d edition, 1895. Price, 25 cents.

EDUCATION AND PATHO-SOCIAL STUDIES, including an investigation of the murderer "H." (Holmes); reports on psychological, criminological, and demographical congresses in Europe; London slums and General Booth's Salvation Army movement. Reprint from Annual Report of United States Commissioner of Education for 1893–94. 57 pages. 8°. Washington, D. C., 1896. Price, 5 cents.

EXPERIMENTAL STUDY OF CHILDREN, including anthropometrical and psycho-physical measurements of Washington school children; measurements of school children in United States and Europe; description of instruments of precision in the laboratory of the Bureau of Education; child study in the United States; and a bibliography. Reprint from Annual Report of United States Commissioner of Education for 1897–98. 325 pages. 8°. Washington, D. C., 1899. Price, 20 cents.

LABORATORY FOR THE STUDY OF THE CRIMINAL, PAUPER, AND DEFECTIVE CLASSES, treating especially of criminology, with a bibliography of genius, insanity, idiocy, alcoholism, pauperism, and crime. Hearing before the Committee on the Judiciary of the United States House of Representatives. 309 pages. 8°. Government Printing Office. Washington, D. C., 1902. Price, 15 cents.

A PLAN FOR THE STUDY OF MAN, with reference to bills to establish a laboratory for the study of the criminal, pauper, and defective classes, treating especially of hypnotism, with a bibliography of child study. Senate Document No. 400, Fifty-seventh Congress, first session. 166 pages. 8°. Government Printing Office. Washington, D. C., 1902. Price, 5 cents.

This and the two following documents might be obtained gratis on application to any United States Senator.

STATISTICS OF CRIME, SUICIDE, AND INSANITY, and other forms of abnormality in different countries of the world, in connection with bills to establish a laboratory, etc. Senate Document No. 12, Fifty-eighth Congress, special session. 195 pages. 8°. Government Printing Office. Washington, D. C., 1903. Price, 10 cents.

MAN AND ABNORMAL MAN, including the study of children, in connection with bills to establish laboratories under Federal and State governments for the study of the criminal, pauper, and defective classes, with bibliographies. Senate Document No. 187, Fifty-eighth Congress, third session. 791 pages. 8°. Washington, D. C., 1905. Price, — cents.

This last document (MAN AND ABNORMAL MAN) includes in substance the matter contained in the six Government publications enumerated above.

These publications might be obtained at the prices given above by writing to The Superintendent of Documents, Washington, D. C.

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PREFACE.

This work is a reprint of portions of the following Government publications:

1. Abnormal Man.
2. Education and Patho-social Studies.
3. Experimental Study of Children.
4. Hearing on the bill (H. R. 14798) to establish a laboratory, etc.
5. Senate Document No. 400, Fifty-seventh Congress, first session.
6. Statistics of Crime, Suicide, and Insanity, etc. Senate Document No. 12, Fifty-eighth Congress, special session.

Most of these publications are out of print. The principal portions have been selected. The reader, therefore, will have the above six publications combined in one.

PRACTICAL REASONS WHY BOTH FEDERAL AND STATE GOVERNMENTS SHOULD ESTABLISH LABORATORIES FOR THE STUDY OF THE CRIMINAL, PAUPER, AND DEFECTIVE CLASSES:

1. The main purpose of the work is to study the causes of crime, pauperism, defectiveness, and other forms of abnormality, with a view to lessening or preventing them, such study to be conducted by the best methods known to science and sociology.

2. The work is absolutely nonpolitical and fundamentally humanitarian.

3. The Government pays out hundreds of thousands of dollars for the erection of monuments and for the study of rocks, plants, and animals. It would seem proper that it pay out a few thousand dollars to study in a rigid, scientific way its greatest enemies—the criminal and other abnormal classes.

4. The abnormal classes cost governments more than one-third of their total expenses, yet they give little or nothing for scientific investigation of the causes of the evils involving this enormous expense, with a view to lessening this expense by lessening these evils.

5. In addition to the general scope of the work, a few things might be mentioned desirable to find out:

(*a*) What physical and mental characteristics may be common to reformatory inmates and unruly children in schools.

(*b*) What physical characteristics may be common to the feeble-minded and dull children in schools.

(*c*) The physical and mental differences between habitual criminals and criminals in general.

Such knowledge would make it possible to know about children in advance and better protect them from evils. In the case of the criminals, such knowledge in advance would enable us better to protect the community.

6. Exhaustive study of single typical criminals is valuable, because they represent a large number.

7. The more exact knowledge we have of inmates the better we can manage them in the institutions. Such work will bring more men of education and training in the service.

8. As most the inmates of reformatories and prisons are normal, any knowledge gained about them will be useful to the community at large. Any system of training or education that will help inmates of penal institutions to become good citizens is needed in the community at large.

9. Proper and full statistics of the abnormal classes would alone justify governments undertaking this work. This requires not only a knowledge of statistics, but a first-hand knowledge of the subject-matter; the statistics must be interpreted. A pile of bricks don't make a house. This is the main reason so many statistics are useless.

10. The work naturally falls under Government control, as the institutions for the abnormal classes are already under such control. The university can not properly do such work, requiring the study of large numbers which are necessary for safe conclusions; nor can private endowment gather matter easily of a more or less confidential nature from public institutions.

11. As this subject requires extensive knowledge of different specialties, legislators can not be expected to give the necessary time to a clear understanding of the subject. They must therefore trust, to a large extent, to professional men and specialists who deal with branches of the work first-hand.[a] A large number of indorsements, therefore, is proper and required. Ninety learned bodies, numbering some 50,000 professional men and specialists in medicine, law, religion, and science, have indorsed the work.[a]

12. The verdict of official statistics of leading countries is, that within the last thirty years crime, suicide, insanity, and other forms of abnormality have been increasing relatively to population.[b]

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[a] See pages 551–554.

[b] See pages 439–441.

BILLS UNDER FEDERAL AND STATE GOVERNMENT.

[S. 2951, Fifty-eighth Congress, second session.]

IN THE SENATE OF THE UNITED STATES, JANUARY 4, 1904.

Mr. CLARK of Wyoming introduced the following bill; which was read twice and referred to the Committee on the Judiciary.

A BILL To establish a laboratory for the study of the criminal, pauper, and defective classes.[a]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established in the Department of Justice a laboratory for the study of the abnormal classes, and the work shall include not only laboratory investigations but also the collection of sociological and pathological data, especially such as may be found in institutions for the criminal, pauper, and defective classes, and generally in hospitals and schools. Said laboratory and work shall be in charge of a director, who shall be appointed by the President, and shall receive a salary of three thousand dollars per annum. He shall make a report once a year, directed to the Attorney-General, which, with the approval of that officer, shall be published. For the proper equipment of said laboratory, and the rental, if necessary, of a suitable room therefor, there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of five thousand dollars, or so much thereof as may be required.

[State of New York. No. 426. Int. 383.]

IN SENATE, FEBRUARY 16, 1904.

Introduced by Mr. BARNES; read twice and ordered printed, and when printed to be committed to the committee on finance.

AN ACT To establish a laboratory for the study of the criminal, pauper, and defective classes.

The people of the State of New York, represented in senate and assembly, do enact as follows:

SECTION 1. There is hereby established in the office of the state commission of prisons a laboratory for the study of the abnormal classes, and the work shall include not only laboratory investigations, but also the collection of sociological and pathological data, especially such as may be found in institutions for the criminal, pauper, and defective classes, and generally in hospitals and schools. The labor and work shall be under the charge of a director, who shall be appointed by the governor, and receive a salary of three thousand dollars per annum. Such director shall, on or before January first, in each year, make a report to the attorney-general covering his work and the result of his investigations for the preceding year, which report, or any part thereof, the attorney-general may cause to be published as a part of his annual report.

SEC. 2. The sum of five thousand dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the treasury not otherwise appropriated, for the proper equipment of and carrying on the work of the laboratory hereby established.

SEC. 3. This act shall take effect immediately.

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[a] Same bill, H. R. 10011, was introduced by Hon. David A. De Armond, of the United States House of Representatives, January 14, 1904.

[State of Missouri, forty-third general assembly. House bill No. 514.]

FEBRUARY 6, 1905.

Introduced by Mr. HARRINGTON; read first time and 500 copies ordered printed.

AN ACT To establish a laboratory for the study of criminal, pauper, and defective classes.

Be it enacted by the general assembly of the State of Missouri, as follows:

SECTION 1. There is hereby established in the office of the warden of the Missouri Penitentiary a laboratory for the study of the abnormal classes in said penitentiary, and the work shall include not only laboratory investigations, but also the collection of sociological and pathological data, especially such as may be found in institutions for the criminal, pauper, and defective classes, and generally in hospitals and schools. The labor and work shall be under the charge of a director, who shall be appointed by the governor and receive a salary of three thousand dollars per annum. Said director shall, on or before January first of each year, make a report to the inspectors of the penitentiary embracing the work and the result of his investigations for the preceding year, which report, with current annual report, the inspectors of the penitentiary shall cause to be published when they make their biennial report to the general assembly, as required by law.

SEC. 2. It being necessary that this laboratory hereby established should at once be put in operation creates an emergency within the meaning of the constitution; therefore, this act shall take effect and be in force from and after its passage.

[Oregon legislature, twenty-third regular session. Senate bill No 145.]

JANUARY 23, 1905.

Introduced by Senator BROWNELL (by request) and read first time.

A BILL For an act to establish a laboratory for the study of criminal, pauper, and defective classes.

Be it enacted by the people of the State of Oregon:

SECTION 1. That there is hereby established in the office of the superintendent of the penitentiary a laboratory for the study of the abnormal classes, and the work shall include not only the laboratory investigations, but also the collection of sociological and pathological data, especially such as may be found in institutions for the criminal, pauper, and defective classes, and generally in hospitals and schools. The labor and work shall be under the charge of a director, who shall be appointed by the governor and receive a salary of fifteen hundred dollars per annum. Such director shall, on or before January 1 in each year, make a report to the superintendent of the penitentiary covering his work and the result of his investigations for the preceding year, which report, or any part thereof, the superintendent of the penitentiary may cause to be published as a part of his annual report.

SEC. 2. The sum of three thousand dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the treasury not otherwise appropriated, for the salary of the director, equipment of, and carrying on the work of the laboratory hereby established.

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.

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

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, 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, 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

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 inves-

tigation 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.

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[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 74–116.

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.			Physiological.							Educational.																								Nationality.				
			Maximum length of head.	Maximum width of head.	Cephalic index.	Least sensibility to locality (æsthesiometer).		Strength of grasp (dynamometer).		Least sensibility to heat (thermæsthesiometer).		Least sensibility to pressure, right wrist (baræsthesiometer).	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.	American nationality.	American mixed.	German.	Irish.	Other nationalities.
						Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	Left wrist.																																	
1	2	3	4	4a	4b	5	5a	6	6a	7	7a	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
		Y. Mo.				Mm	Mm	Kg.	Kg.	°R.	°R.																																	
1	1	6 0	180	149	82.7	14	14	8	11	5.75	4	2	..	...	b	...	...	...	...	...	...	...	...	...	...	b	...	b	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...
2	1	6 5	170	134	78.6	23	27	4	7	.75	2	10	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
3	1	6 5	170	136	80	15	15	7	7	4	5	10	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
4	1	6 6	170	134	78.6	15	13	7	7	1.50	2	5	..	...	b	...	...	...	...	...	...	...	...	...	...	...	...	....	...	b	b	...	...	...	...	b	b	...	×	...	...	...	...
5	1	6 10	181	138	76.2	12	11	10	9	3.50	2	2	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
6	2	7	170	137	80.5	....	14	10	11	4.50	1	10	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	b	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...
7	2	7 9	176	133	75.5	13	15	11	11	.75	2	2	..	...	d	...	...	...	a	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
8	3	8	178	140	78.6	12	10	9	9	5	4.50	2	..	...	b	...	...	b	b	...	...	...	...	...	...	...	...	....	...	...	...	a	...	...	...	...	b	...	...	...	×	...	...	...
9	3	8 1	175	145	82.9	14	16	10	9	1.50	1.25	1	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	b	...	...	...	...	b	...	...	...	...	...	...	...
10	3	8 3	175	139	79.4	12	17	11	10	1	2	5	..	...	b	...	...	...	b	...	b	...	...	...	...	b	...	....	...	b	...	b	...	...	...	...	...	...	b	...	...	...	...	...
11	1	8 4	177	130	73.4	10	12	8	8	2.50	1.25	2	..	...	b	...	...	...	...	...	...	...	...	...	...	...	...	....	...	...	...	b	...	...	...	...	b	b	...	×	...	...	...	...
12	3	8 5	184	146	79.3	15	12	9	9	5	3	2	..	...	b	...	...	...	b	...	b	...	...	...	...	...	...	....	...	b	...	...	...	...	...	...	b	...	b	×	...	...	...	...
13	1	8 7	171	143	83.5	27	20	8	7	2	.....	12	..	...	b	...	...	...	b	...	...	...	...	...	...	b	..	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
14	2	8 9	181	150	82.8	11	12	12	11	4	5	10	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
15	1	8 10	185	139	75.1	20	20	15	12	.50	1	1	..	...	b	...	...	...	...	...	...	...	...	...	...	...	...	....	...	a	...	b	...	...	...	...	b	b	...	×	...	...	...	...
16	3	8 11	180	141	78.3	12	9	15	14	1.50	2	1	..	...	b	...	...	...	a	b	...	...	...	...	...	b	...	....	...	a	...	a	...	...	...	...	b	...	b	×	...	...	...	...
17	3	9	174	138	79.3	22	18	10	11	7.50	7.50	5	..	...	b	...	...	b	b	...	...	...	...	...	...	...	...	....	...	...	...	b	...	..	...	...	a	...	a	×	...	...	...	...
18	3	9	188	148	78.6	15	15	16	14	4.50	3	2	..	...	b	...	...	b	a	...	...	...	...	...	...	...	...	....	...	...	...	...	...	...	...	...	b	...	b	×	...	...	...	...
19	3	9	173	141	81.5	15	19	13	12	5	1	3	..	...	b	...	...	...	b	...	...	..	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	...	...	...	...	...
20	4	9	173	141	81.5	17	13	12	13	3.50	1.50	8	b	...	..	...	...	...	...	...	...	...	...	...	...	...	...	....	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...
21	3	9	178	143	80.3	23	19	14	11	1	2	2	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	...	...	...	...
22	2	9 1	172	134	77.9	20	15	16	14	2	2	1	b	...	..	...	...	...	...	...	...	...	...	...	...	...	...	....	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...
23	2	9 3	186	136	73.1	10	9	11	10	.12	.12	1	..	...	b	...	...	...	b	...	...	...	...	...	...	...	...	....	...	...	...	b	...	...	...	...	b	...	b	×	...	...	...	...
24	3	9 4	180	140	77.7	15	13	13	11	3	3.50	1	..	...	b	...	...	...	b	...	...	...	...	...	...	b	...	....	...	b	...	...	...	...	...	...	b	...	...	×	..	...	...	...
25	2	9 7	176	143	81.2	16	15	11	10	3	3	50-58	..	...	b	...	...	...	a	...	...	...	...	...	...	...	...	....	...	b	...	a	...	...	...	...	a	b	b	...	En	...	...	...

| | | |

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.

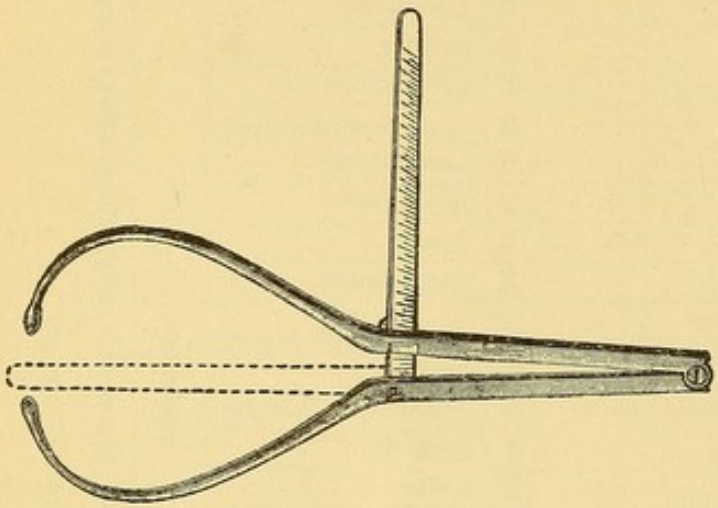


FIG. 1. Callipers (Broca).

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.

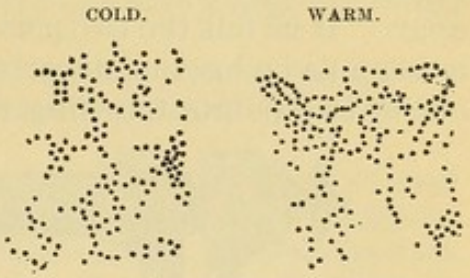


FIG. 2. Temperature spots (Eulenburg).

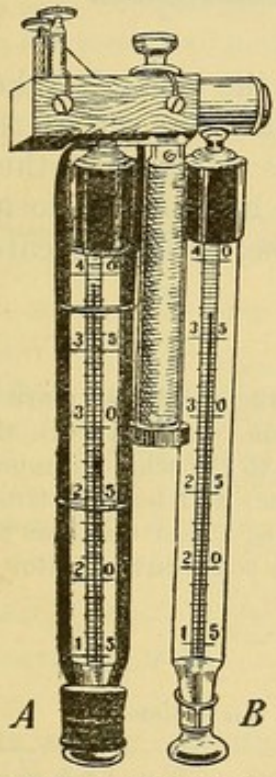


FIG. 3. Thermæsthesiometer.

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.

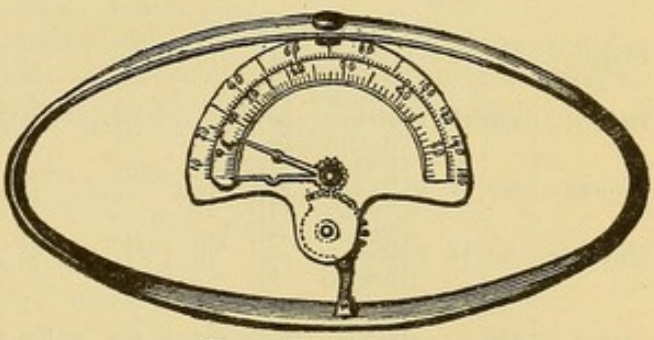


FIG. 4. Dynamometer.

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

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

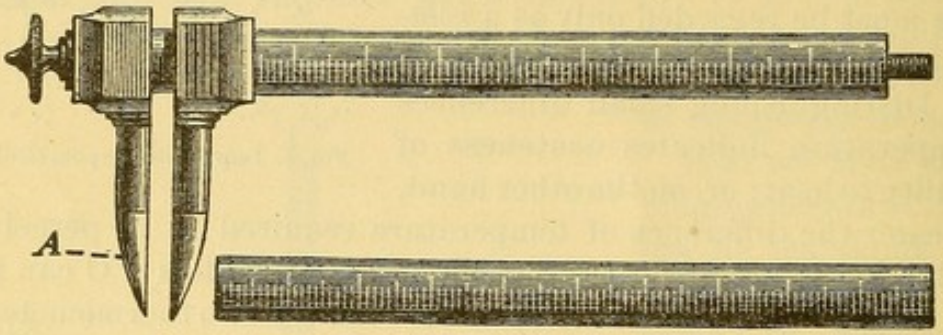


FIG. 5.—Æsthesiometer.

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*		Strength of grasp. *b*		Least sensibility to heat. *b*		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...	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.
All boys:			*Yr.*	*Mo.*	*Pr ct.*	*P.ct.*	*P. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
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	4.96	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.
Nonlaboring classes:		*Yrs. Mo*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	° *R.*	° *R.*
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	28.9	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.
All boys:		*Yr. Mo.*	*Pr. ct.*	*Pr. ct.*	*Pr. ct.*	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	°*R.*	°*R.*
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 H.—*Colored 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.			
		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.		Strength of grasp.		Least sensibility to heat.	
						Right wrist.	Left wrist.	Right hand.	Left hand.	Right wrist.	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 8	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.		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.
		Yrs.	*Mos.*	*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	46.00	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	24.50	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.

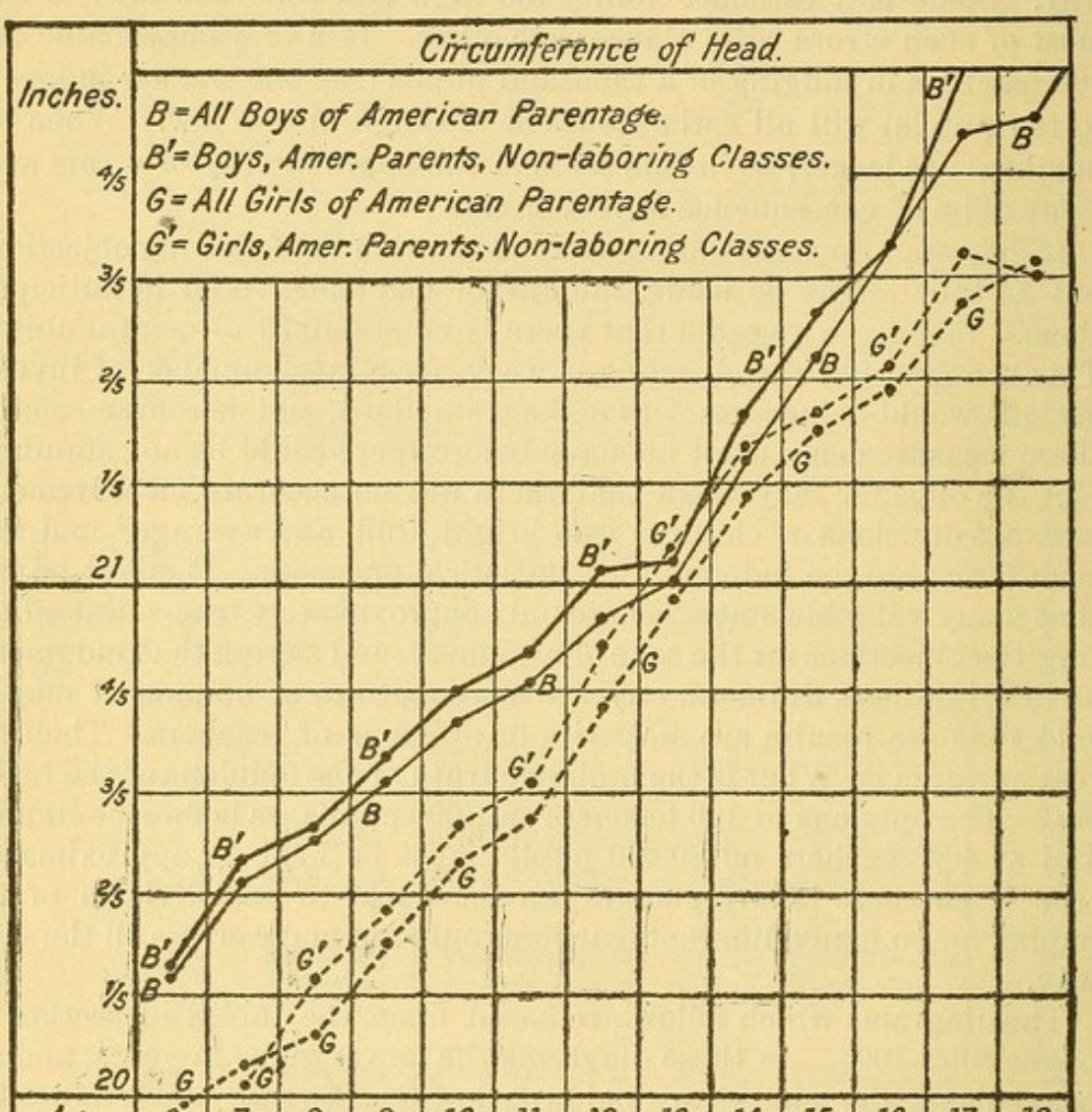
as tests of the senses (as in section A), do not seem to be influenced by age to any such degree as the anatomical.

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.

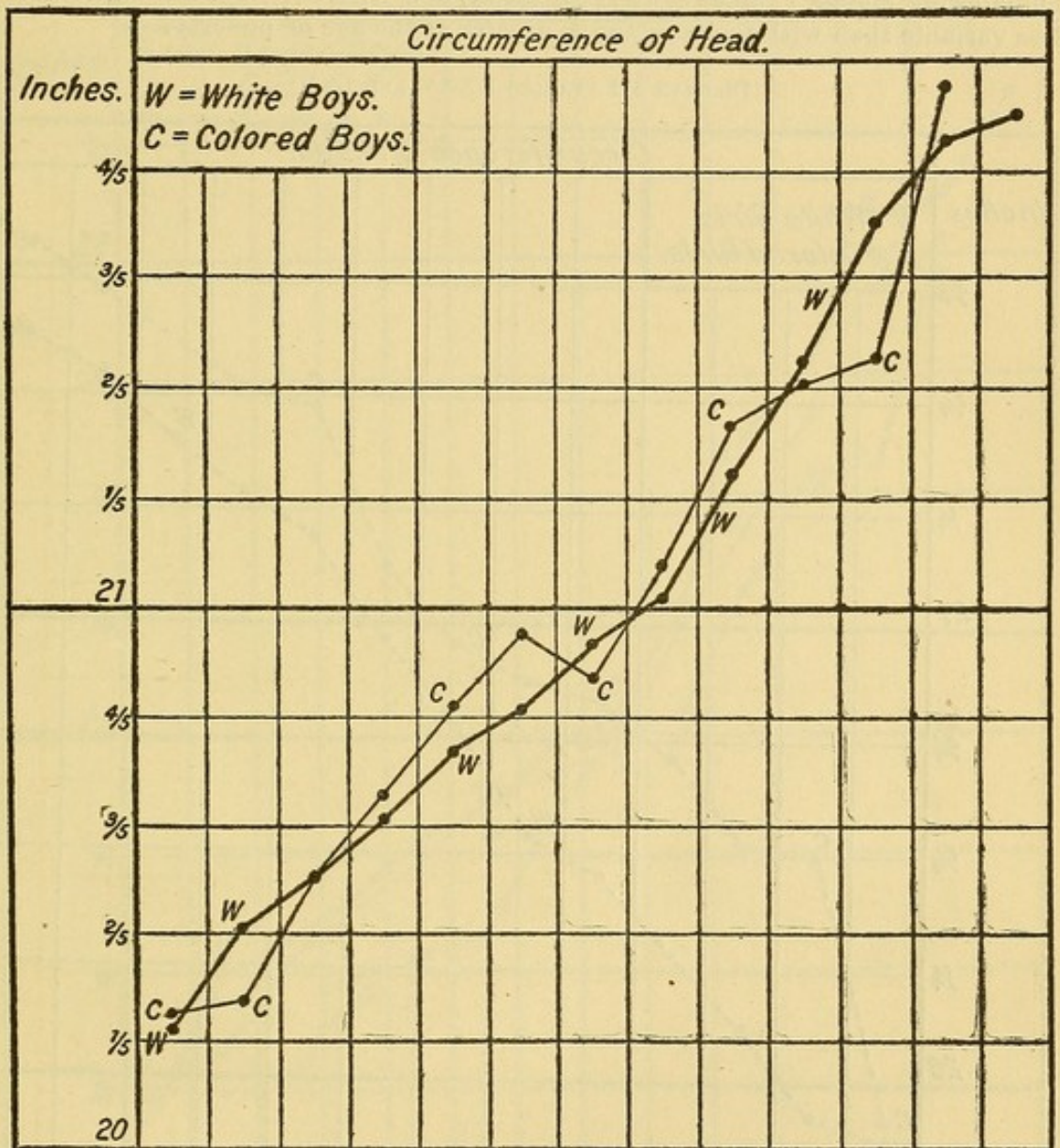


Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of B.	103	404	607	647	703	670	756	687	589	405	267	120	38
No. of B'	27	205	278	313	353	348	394	346	358	259	169	43	
No. of G.	64	375	587	669	737	721	673	706	627	490	325	258	128
No. of G'		162	259	300	351	310	335	342	304	254	195	128	63

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.

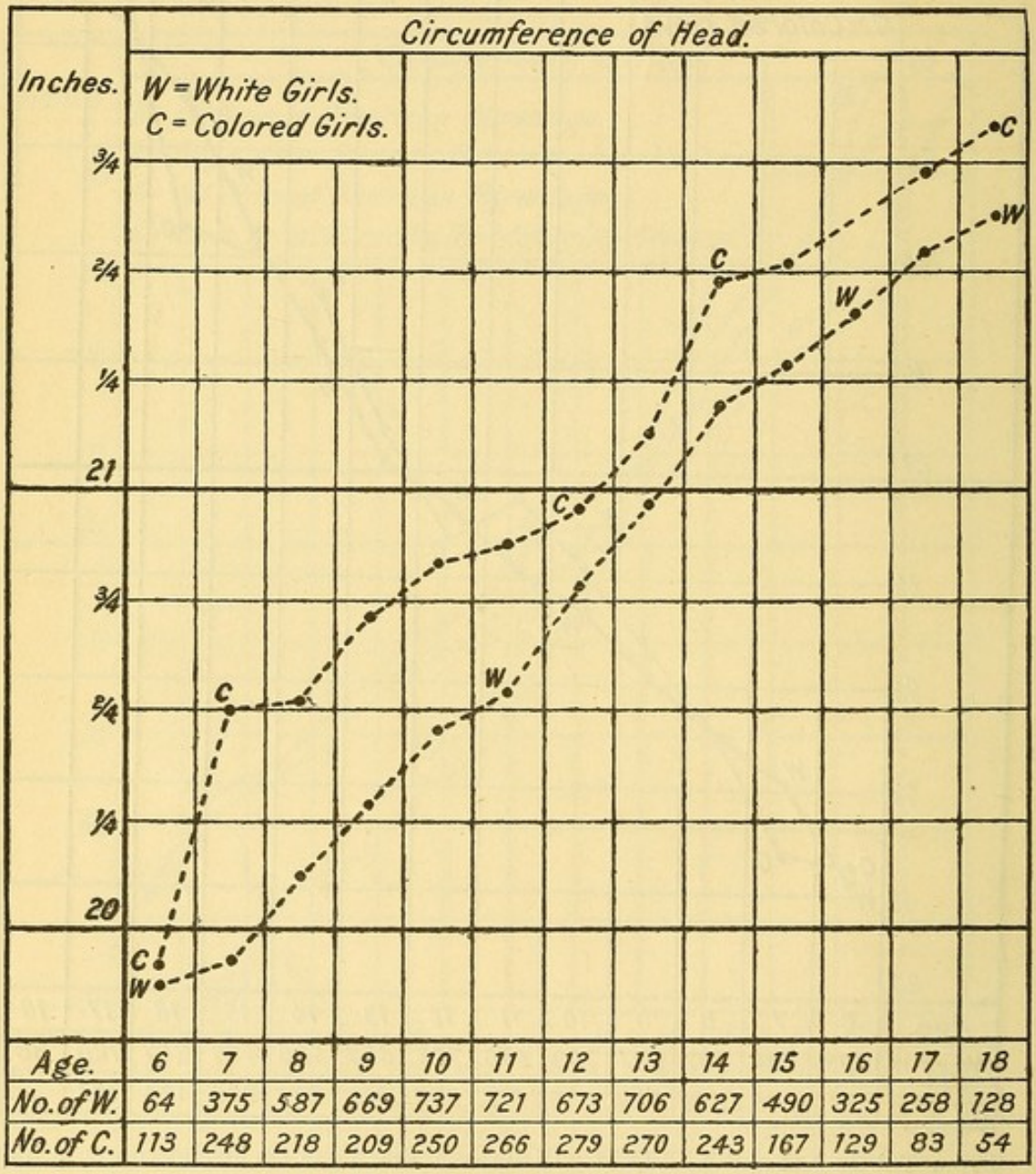
[1] Mixed nationality is synonymous with American and foreign parentage.

[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).



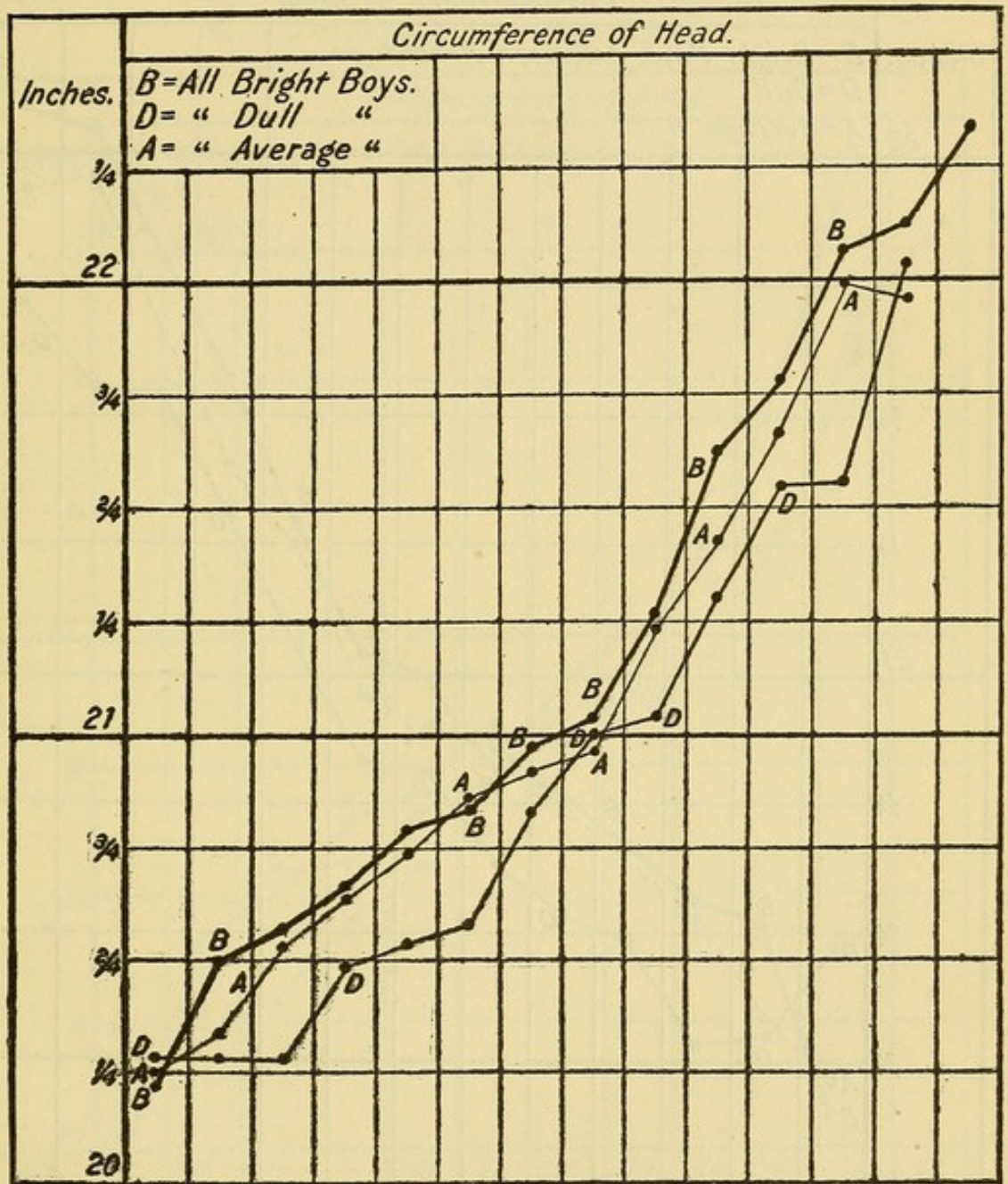
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of W.	64	375	587	669	737	721	673	706	627	490	325	258	128
No. of C.	113	248	218	209	250	266	279	270	243	167	129	83	54

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).



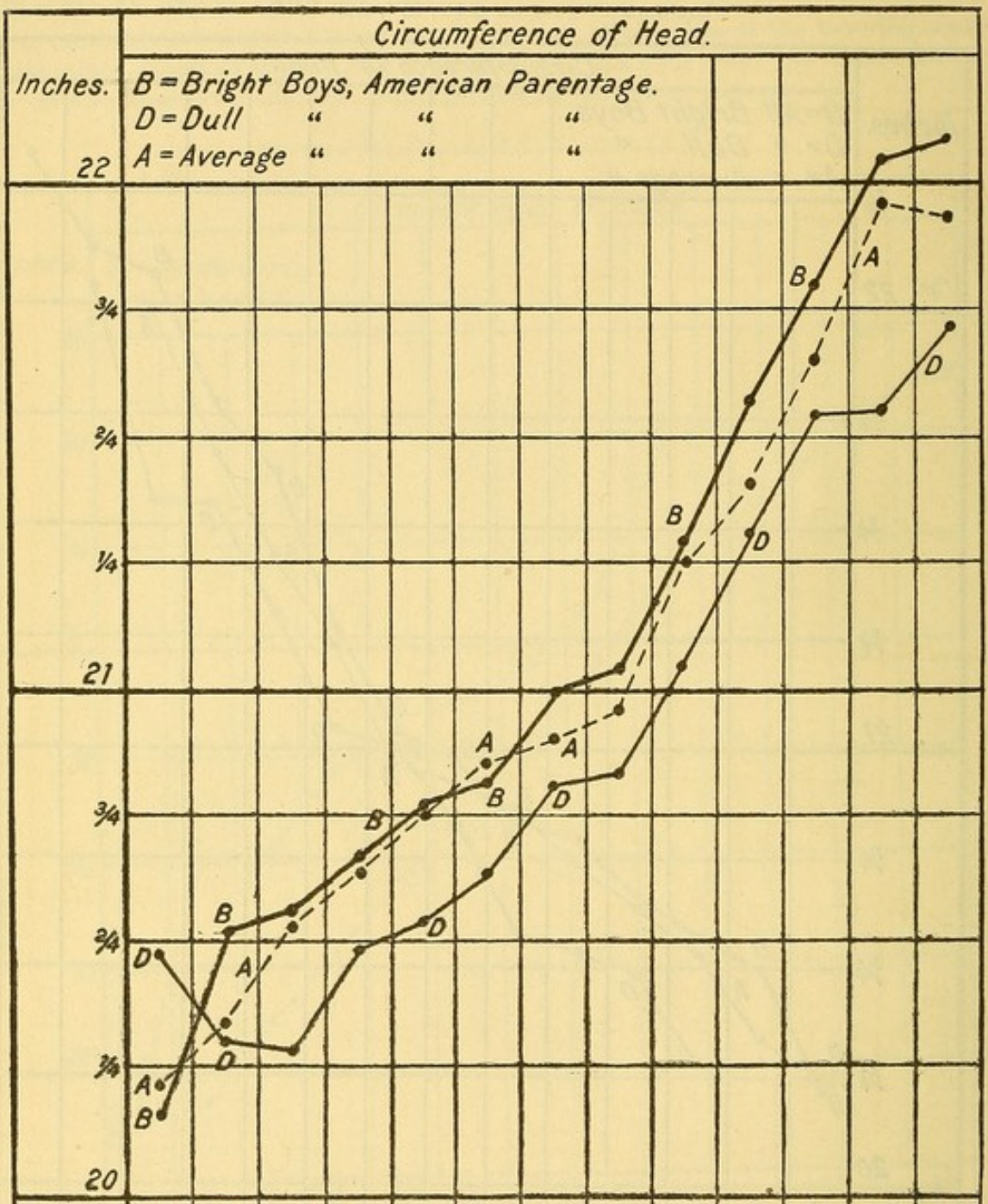
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	19
No. of B.	53	205	320	384	392	322	349	305	227	167	104	35	14	16
No. of D.	39	99	101	102	118	97	128	131	143	116	80	32	4	7
No. of A.	45	199	326	340	355	386	459	421	371	220	144	70	24	9

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 14 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

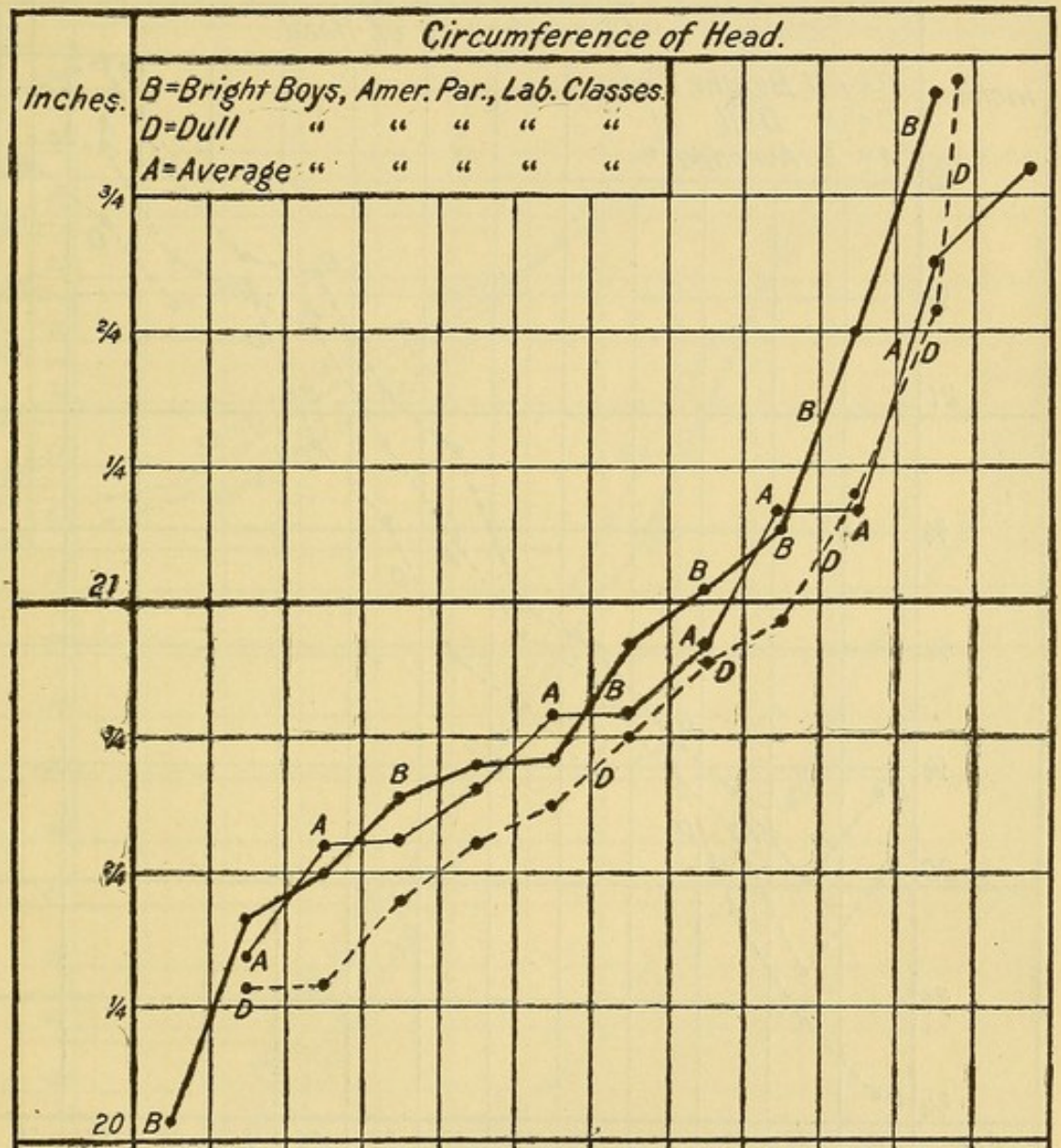
Mental ability.—Diagram IV, below, gives the curves of head circumference in relation to mental ability. There is almost a complete correspondence; that is, as ability increases the circumference of head increases. Thus the bright boys have the largest circumference of head at all ages except at 11. 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	

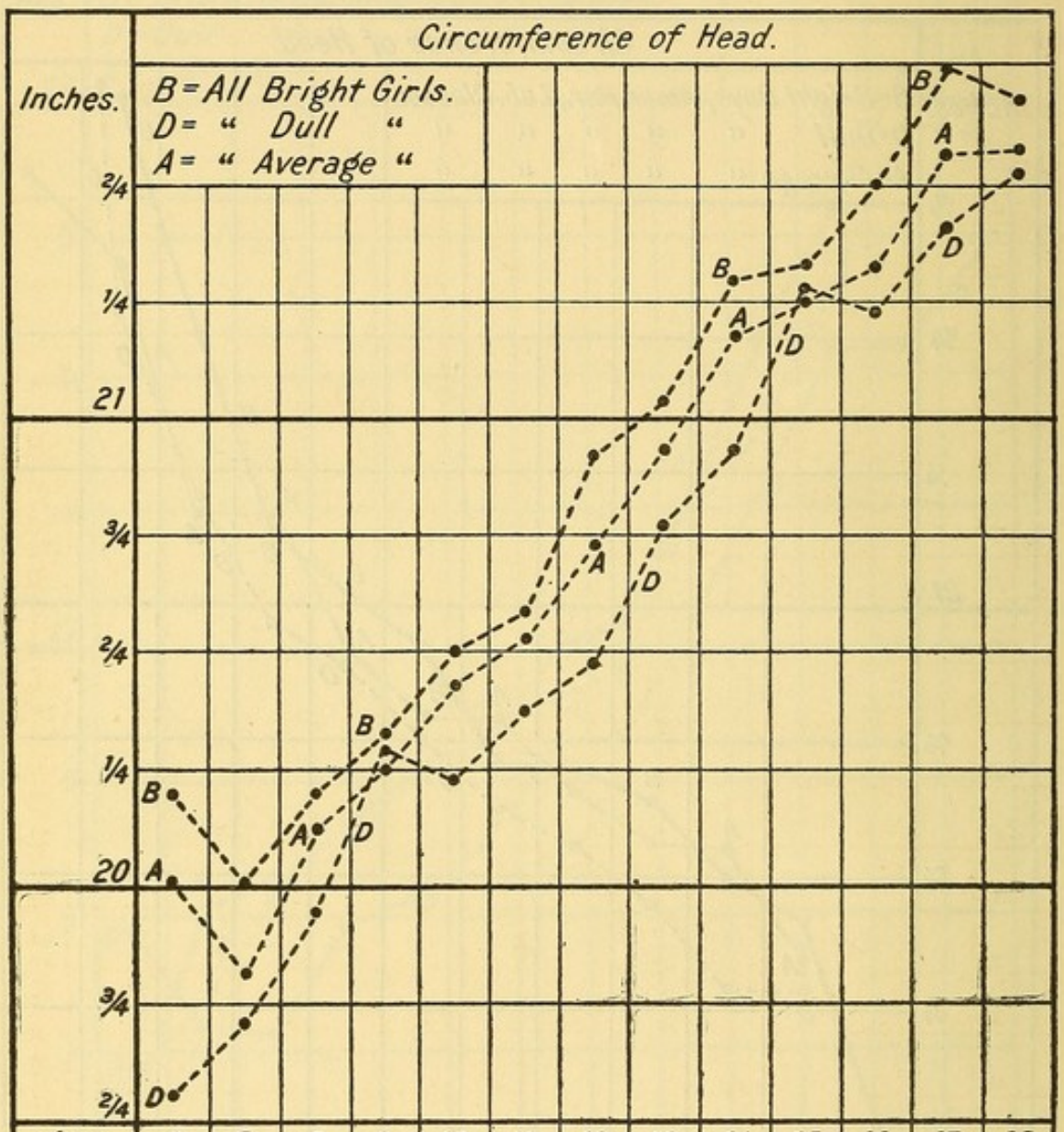
If we proceed still further and eliminate as far as possible sociological condition by dividing the boys of American parentage into laboring and nonlaboring classes (Diagram VI), the general principle still holds, except there is more variation in the curves, due probably to a lessening of the numbers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

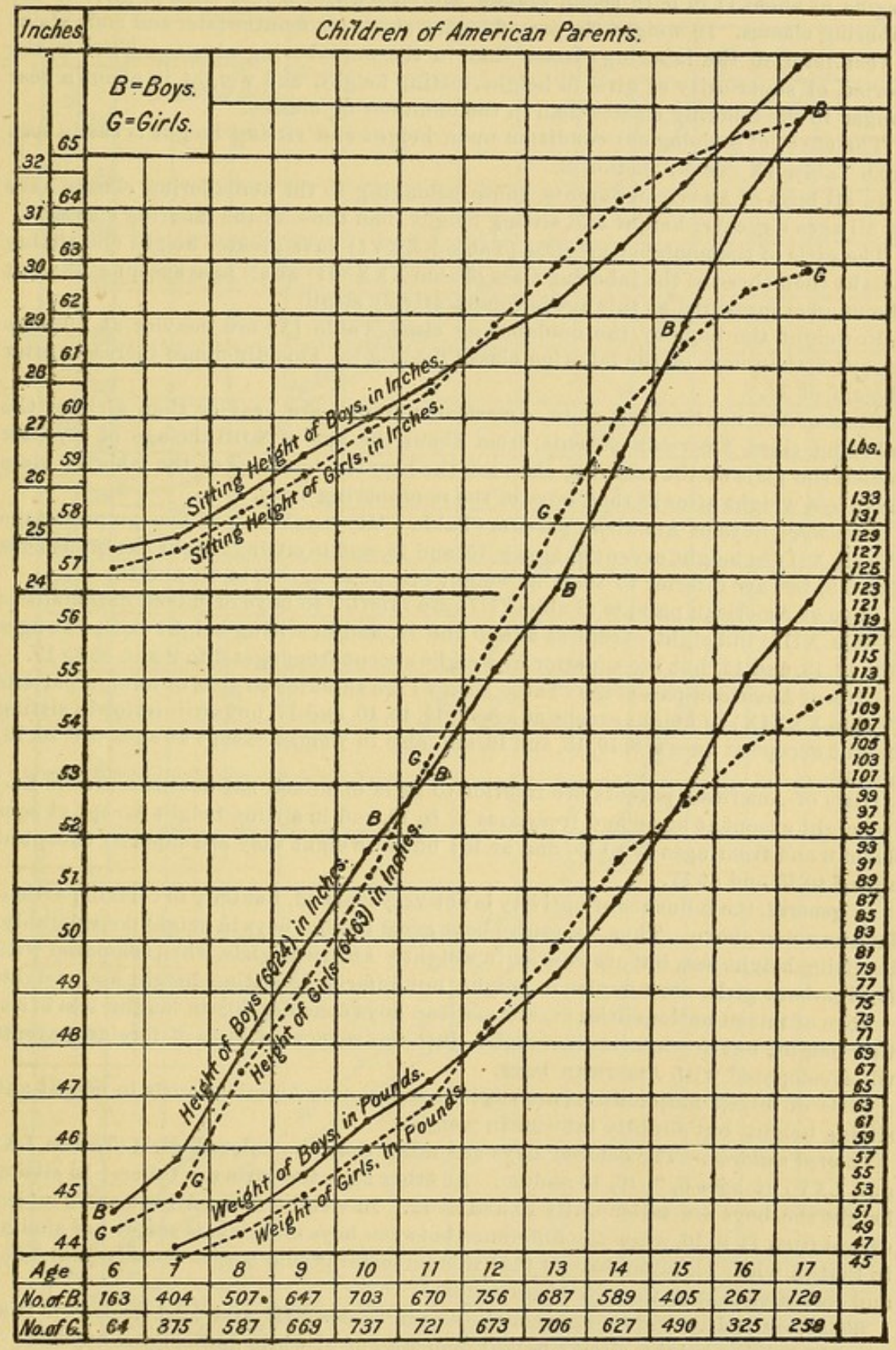
Height, sitting height, and weight.—We give below Diagram VIII (Tables VIII and XXXV), showing curves of height, sitting height, and weight of boys and girls of American parents.

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.

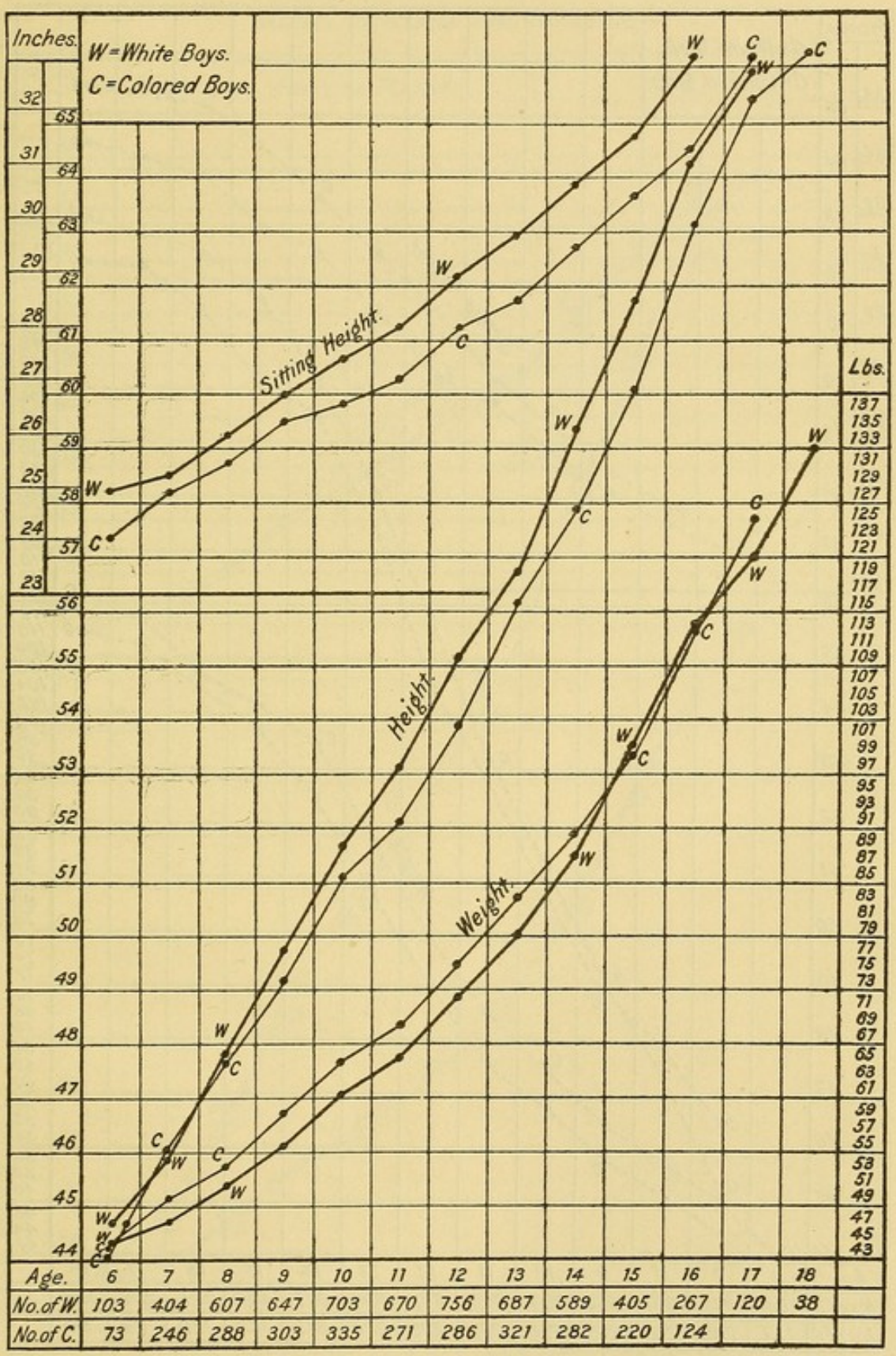
Girls of mixed nationalities are slightly superior to American girls in height and sitting height, but slightly inferior in weight.

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).

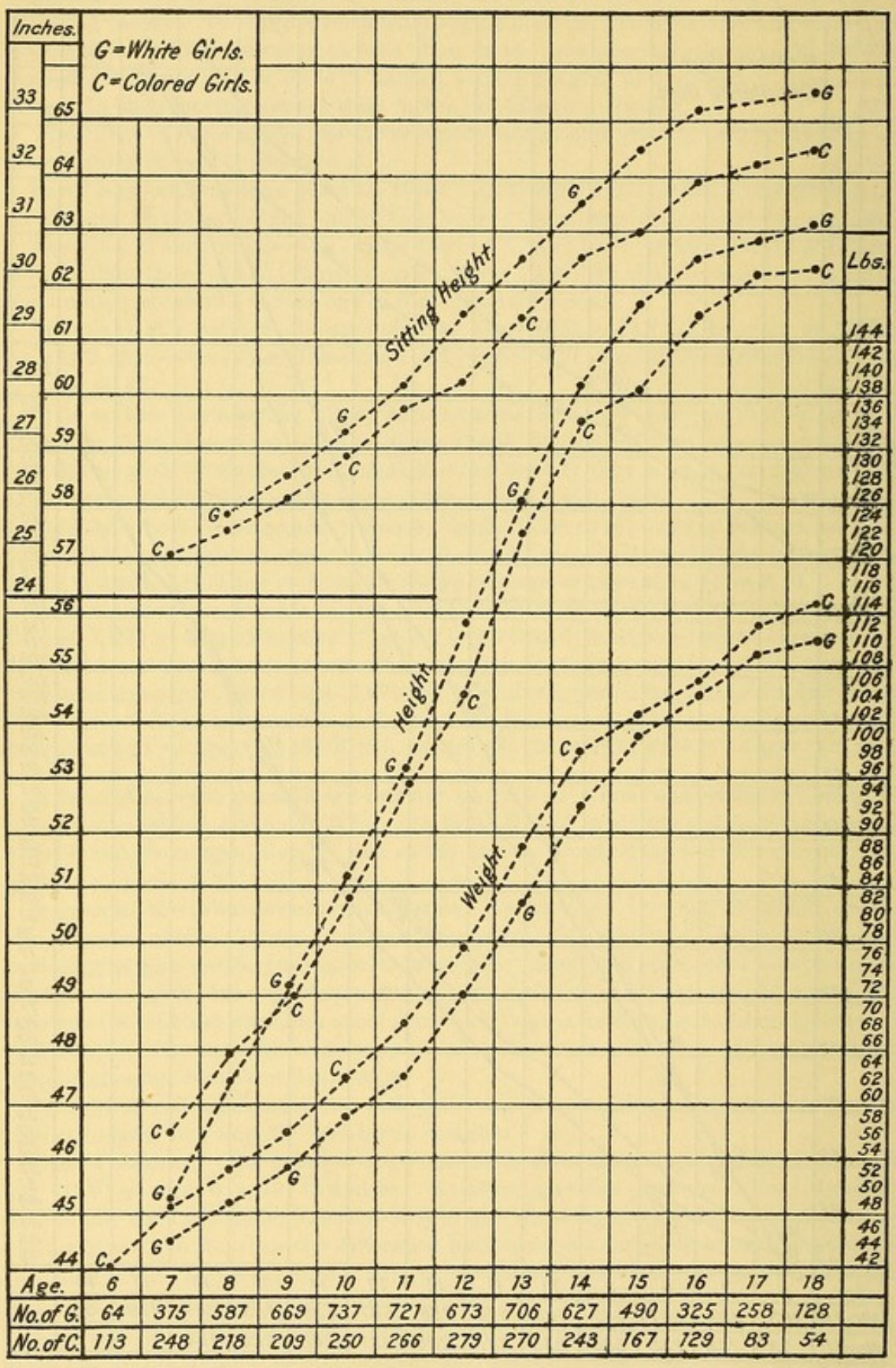


Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	
No. of W.	103	404	607	647	703	670	756	687	589	405	267	120	38	
No. of C.	73	246	288	303	335	271	286	321	282	220	124			

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).



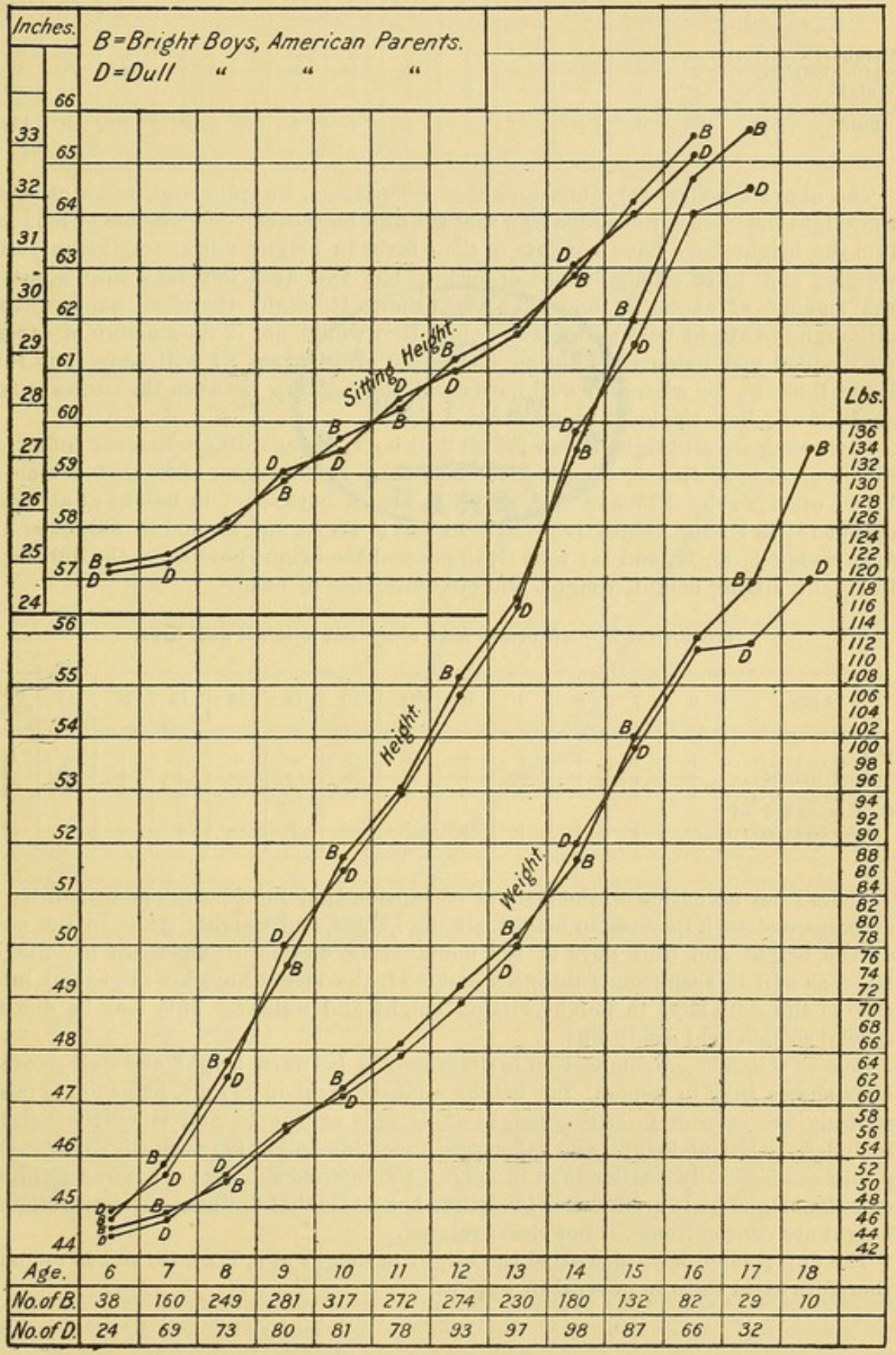
Age.	6	7	8	9	10	11	12	13	14	15	16	17	18
No. of G.	64	375	587	669	737	721	673	706	627	490	325	258	128
No. of C.	113	248	218	209	250	266	279	270	243	167	129	83	54

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).



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.

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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+

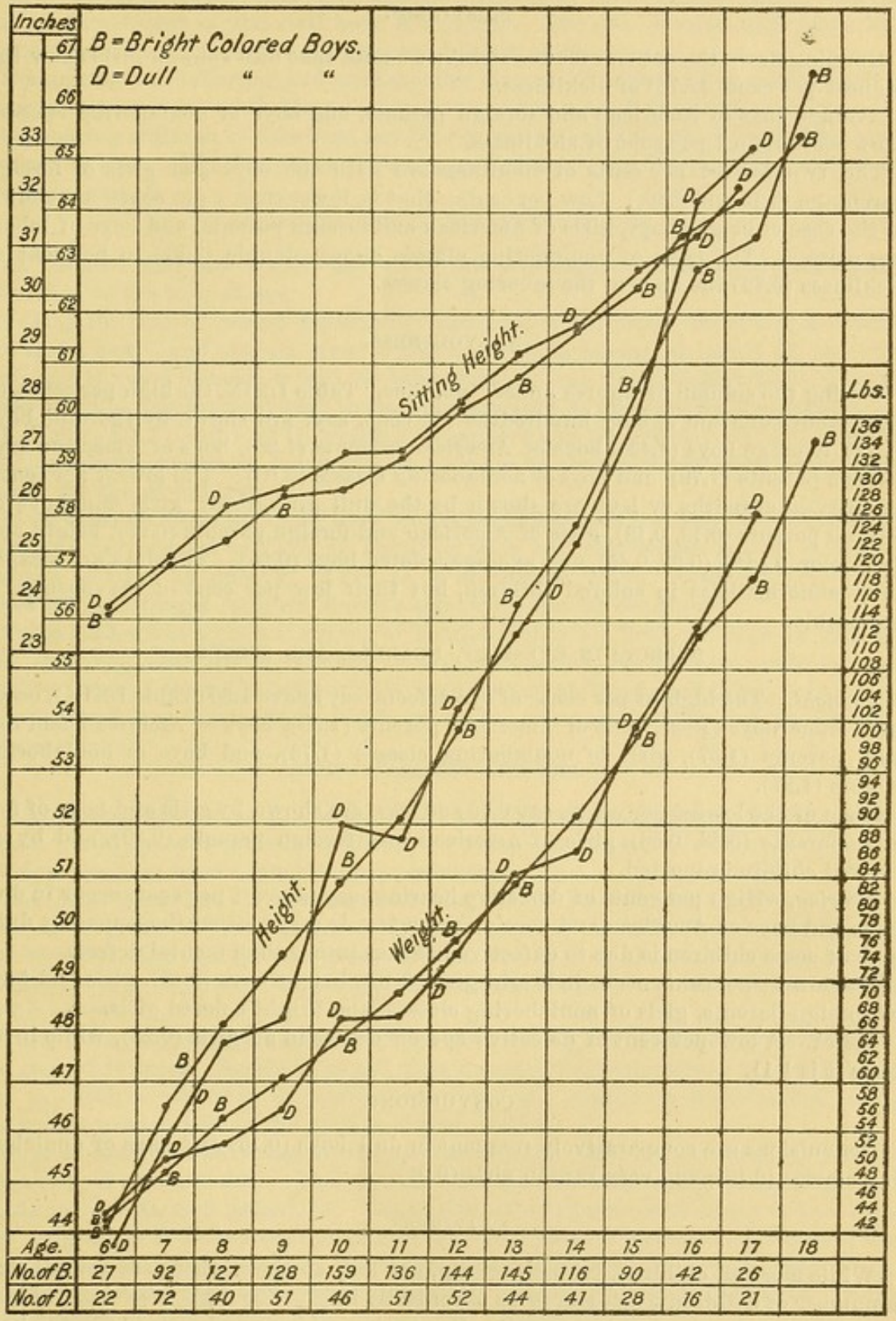
There is an exception to the general conclusion that increase in mental ability is accompanied with increase in height, sitting height, and weight. It is in the case of the bright and dull boys of the nonlaboring classes of American parentage. Here, as will be seen from Tables XX and XXI, the bright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



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.

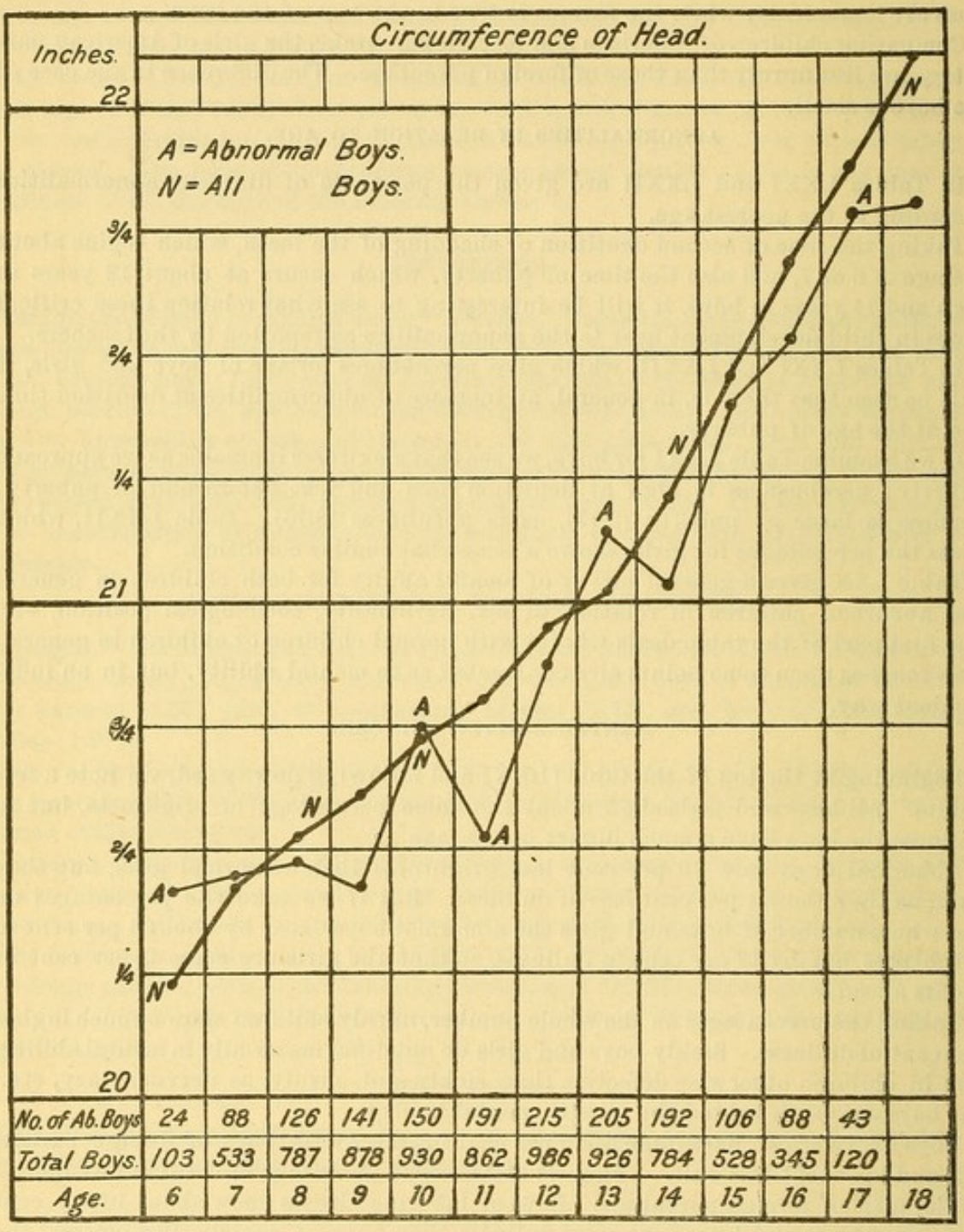
The colored boys show 25 per cent less brightness and 10 per cent less dullness than colored girls. They are therefore only 15 per cent behind, comparatively.

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

ANTHROPOMETRICAL MEASUREMENTS.

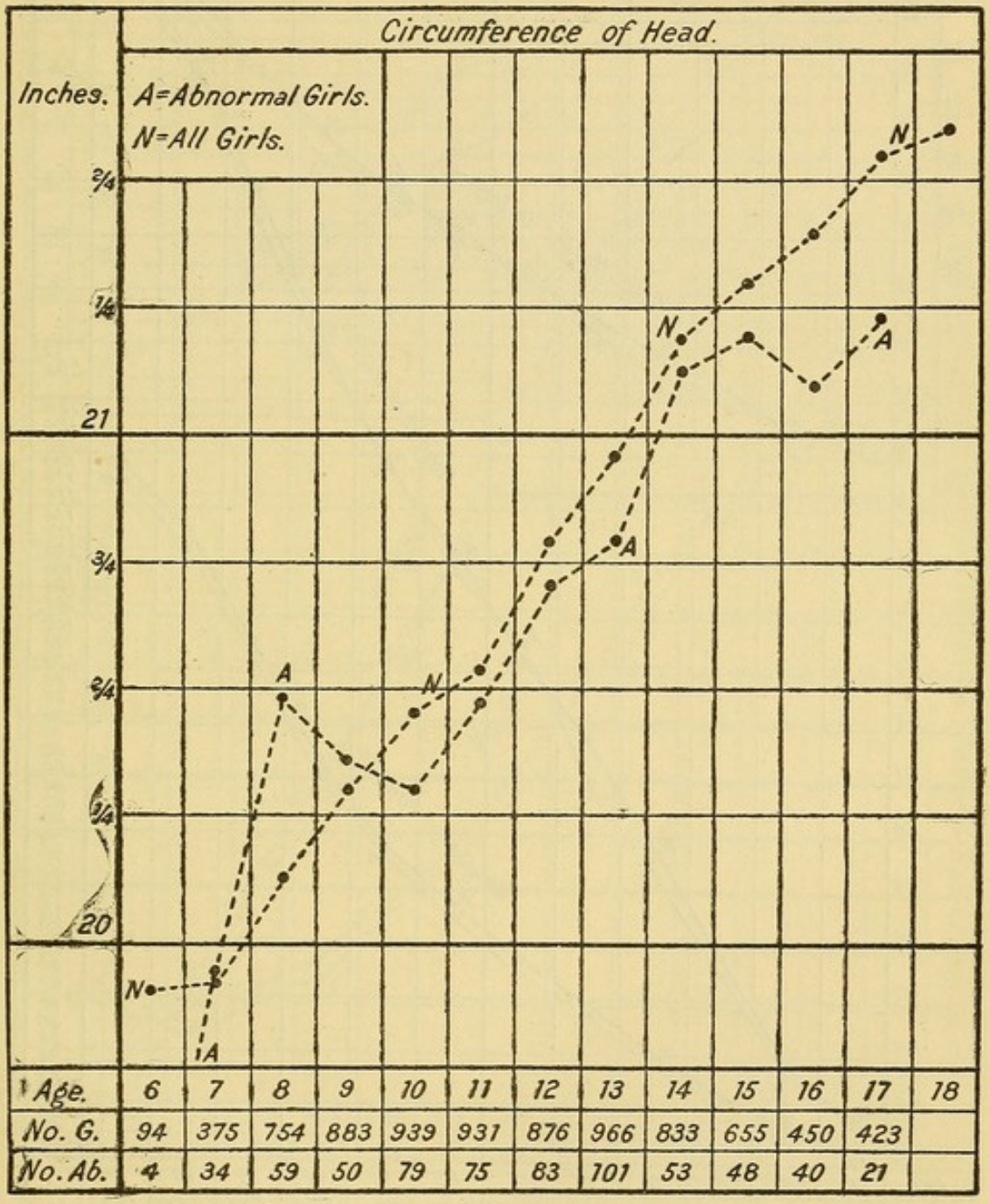
Diagram XIII, based upon Tables VII and LXXIII, indicates that boys in general have a larger head circumference than boys with abnormalities or defects. The same truth applies to the girls, as shown in Diagram XIV, taken from Tables XXXIV

DIAGRAM XIII (TABLES VII AND LXXIII).



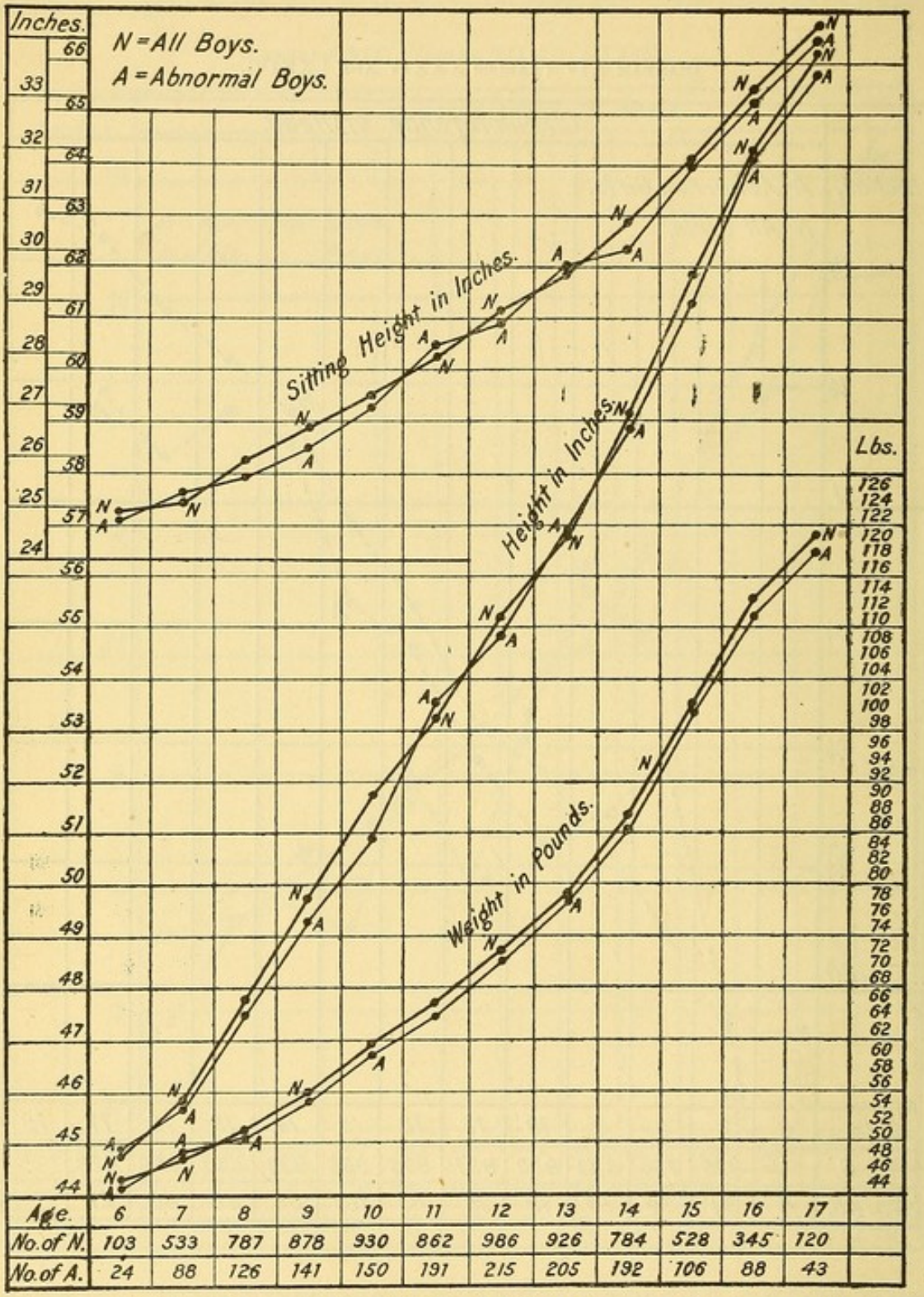
and LXXIV. Although the number of boys with abnormalities is over twice as large as that of girls with abnormalities, yet the curve for the boys is more variable. We have already seen that the boys also vary more in mental ability.

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	120
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).

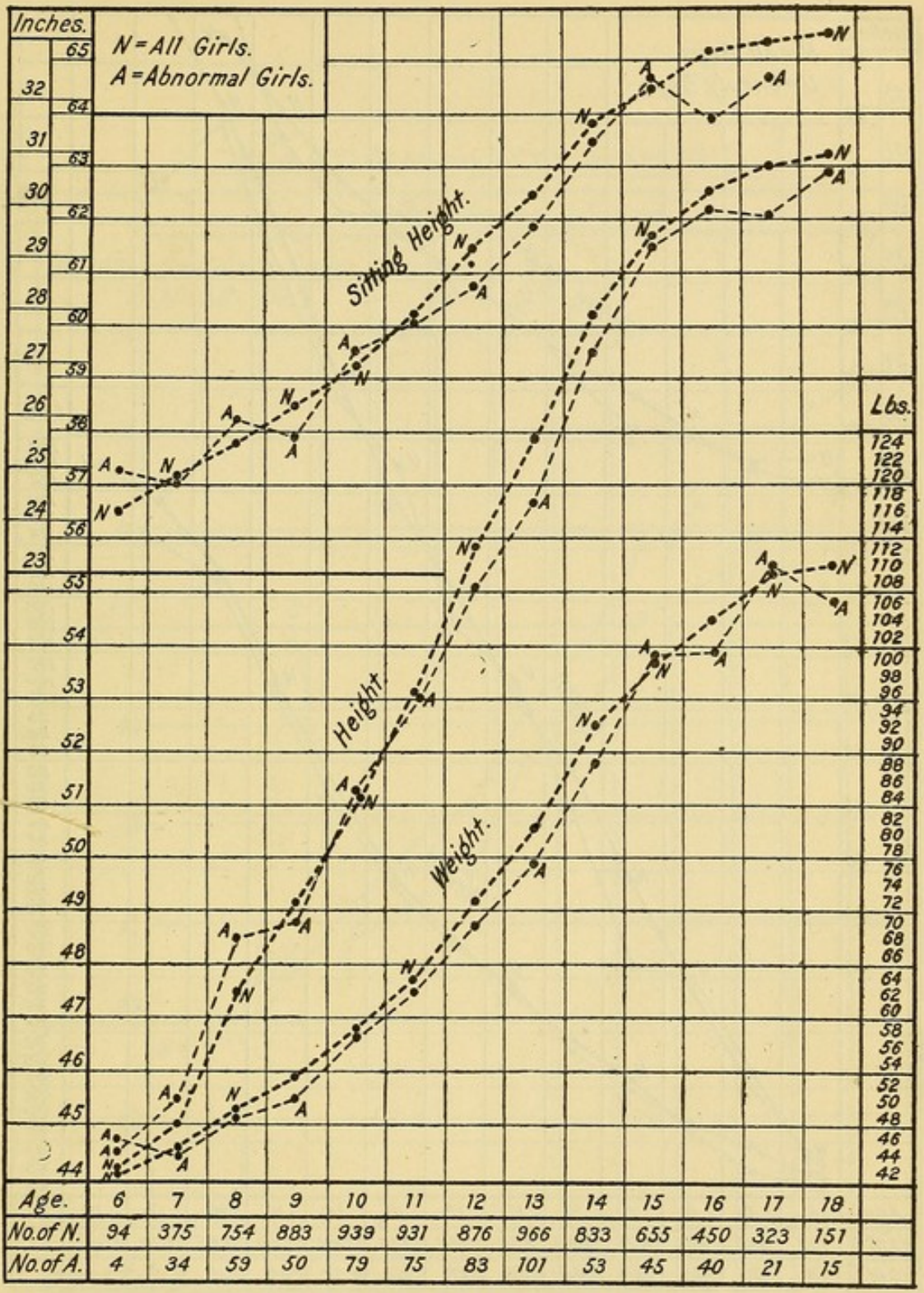
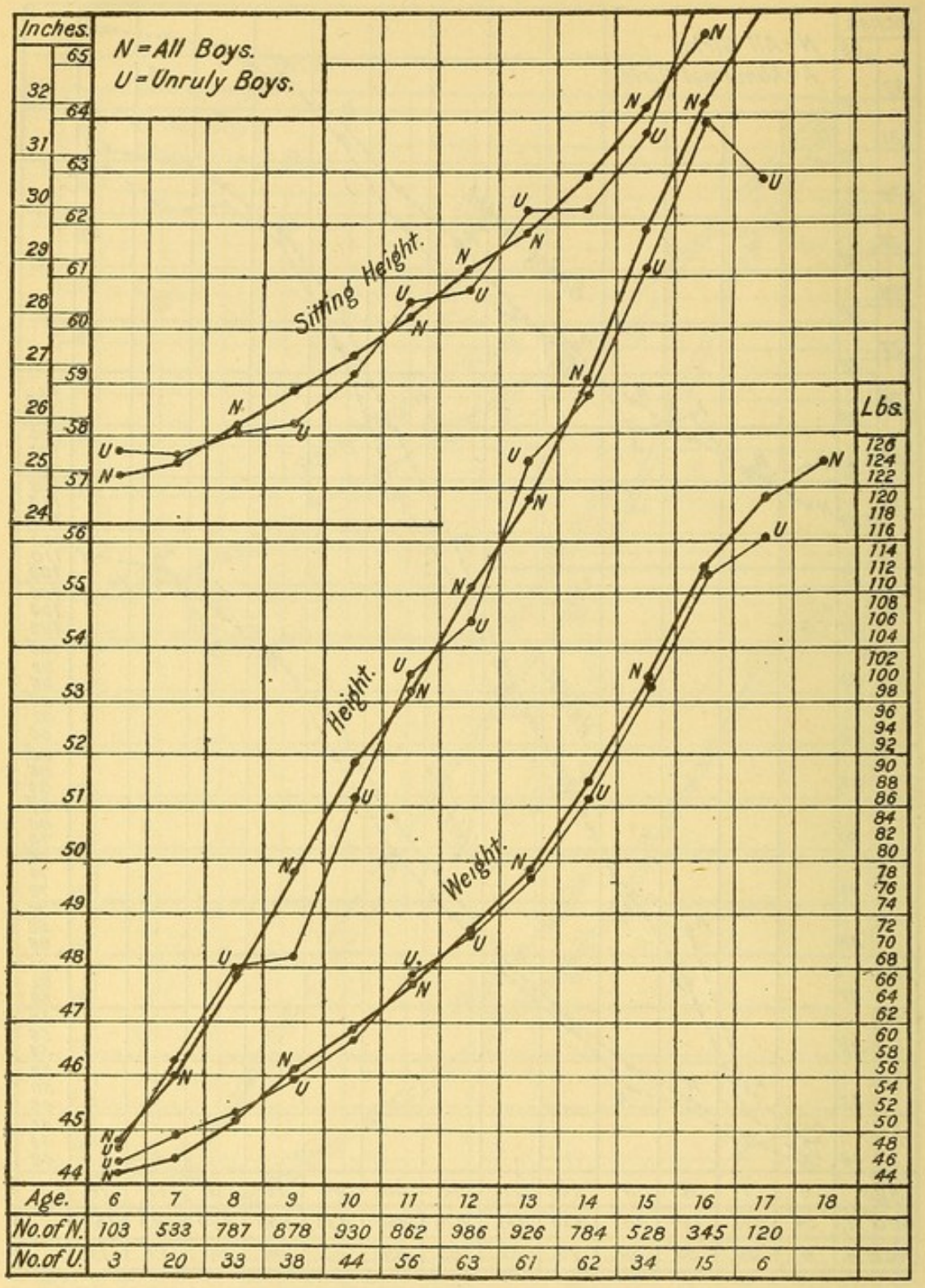


Diagram XVI, based upon Tables XXXIV and LXXIV, shows the girls with abnormalities to have less height, sitting height, and weight than girls in general, as is true in the case of boys, only the differences are more marked in the case of the girls.

UNRULY CHILDREN.

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

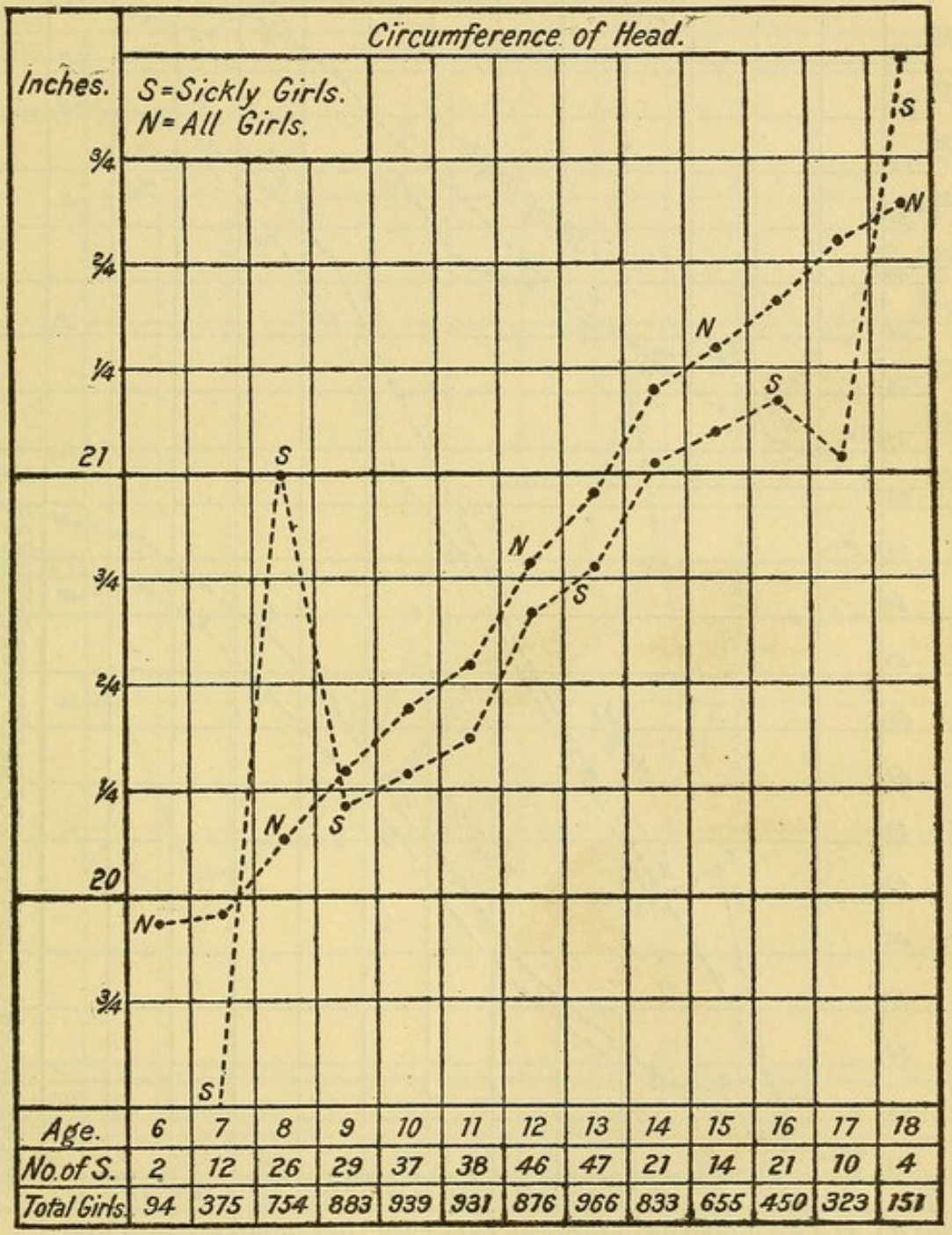
DIAGRAM XVII (TABLES VII AND LXXV).



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	

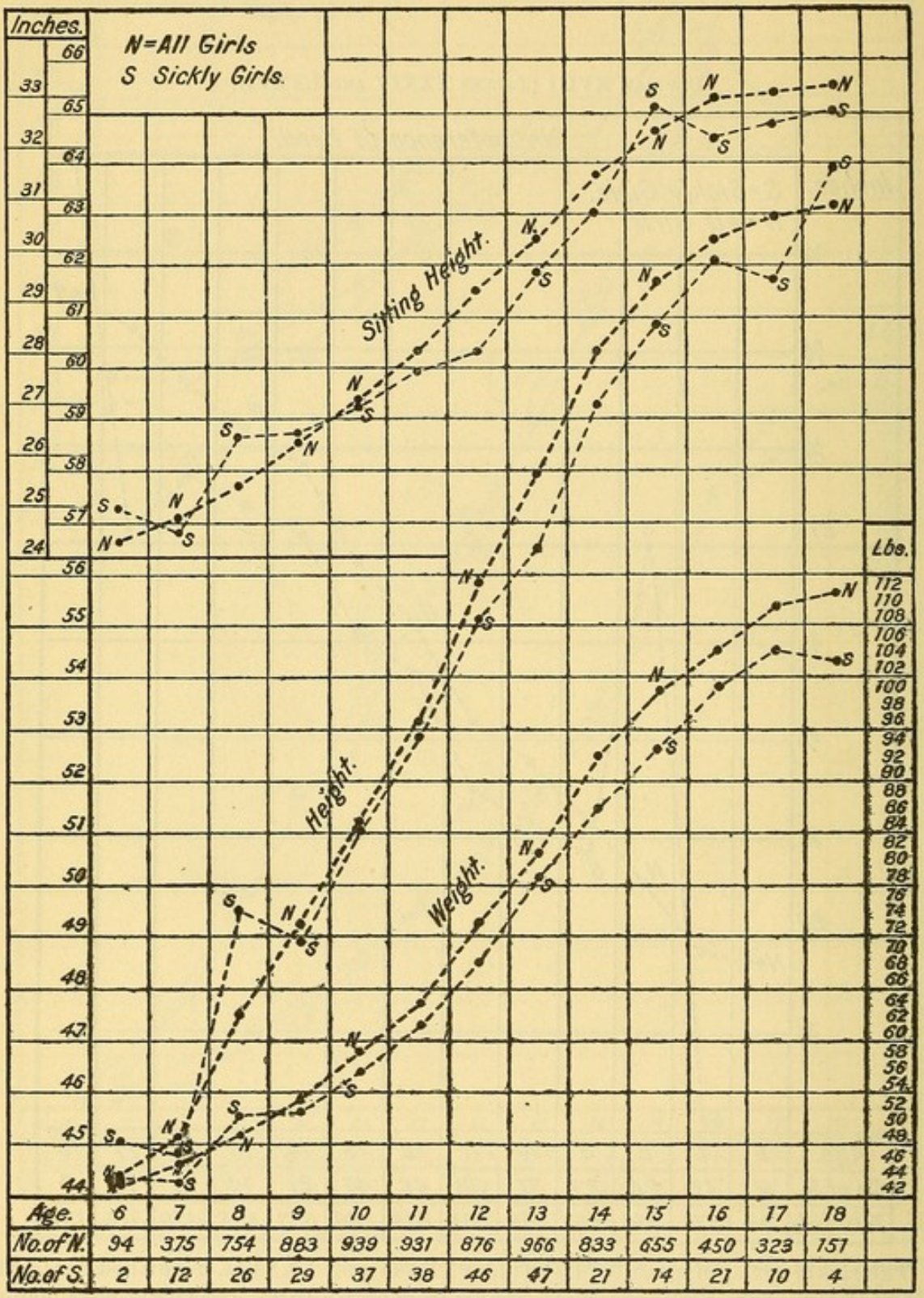
If we compare unruly boys with all boys, Diagram XVII, Tables VII and LXXV, we find the unruly boys to have less height, sitting height, and weight. There is considerable variation in the curves until age 14 in the height, and age 13 in the weight. Normal boys excel at later ages.

DIAGRAM XVIII (TABLES XXXIV AND LXXVI).



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.

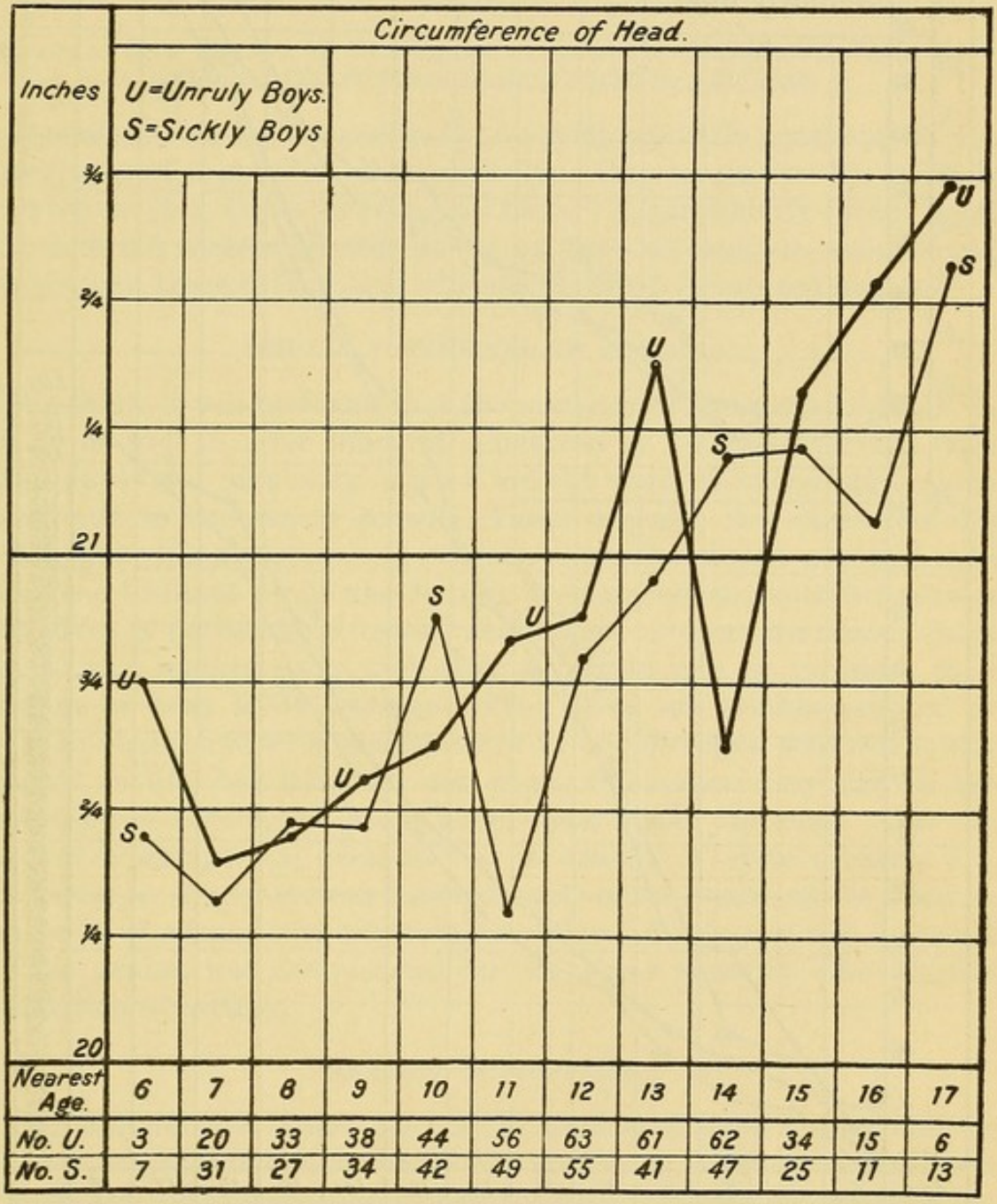
DIAGRAM XIX (TABLES XXXIV AND LXXVI).



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).

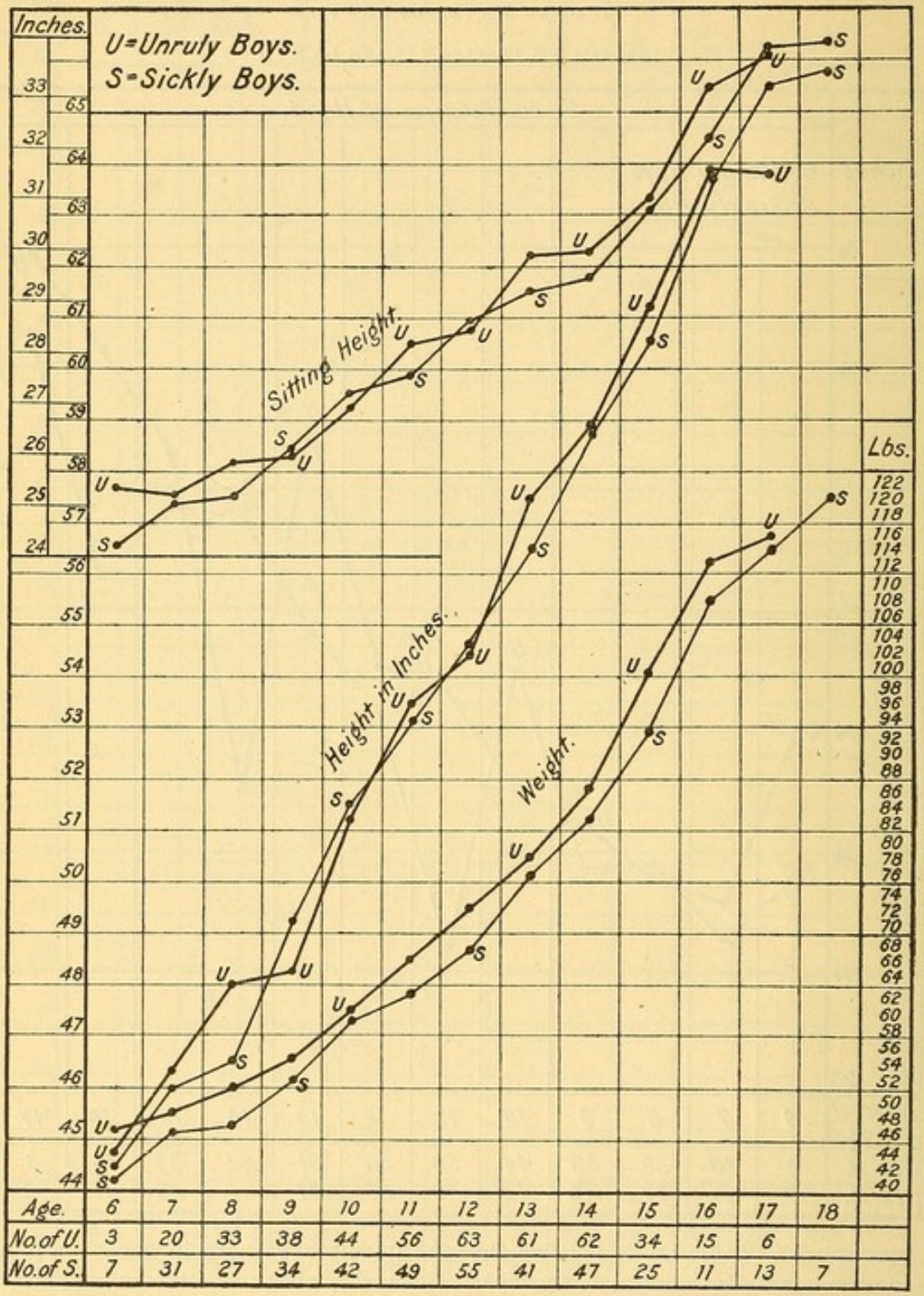
DIAGRAM XX (TABLES VII AND LXXV.)



Nearest Age.	6	7	8	9	10	11	12	13	14	15	16	17
No. U.	3	20	33	38	44	56	63	61	62	34	15	6
No. S.	7	31	27	34	42	49	55	41	47	25	11	13

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).



Age.	6	7	8	9	10	11	12	13	14	15	16	17	18	
No. of U.	3	20	33	38	44	56	63	61	62	34	15	6		
No. of S.	7	31	27	34	42	49	55	41	47	25	11	13	7	

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*		10		11		15		16		21		22		24		25		26		28		34		35		36	
		All studies.		Algebra.		Arithmetic.		Drawing.		Geography.		History.		Language and English.		Manual labor—sewing.		Mathematics. *c*		Music.		Penmanship.		Reading.		Science—botany.		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	49	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	159	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.	9 All studies.	10 Algebra.	11 Arithmetic.	15 Drawing.	16 Geography.	21 History.	22 Language and English.	24 Manual labor and sewing.
Boys, American parents, compared with girls, 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 Mathematics.	26 Music.	28 Penmanship.	34 Reading.	35 Science and botany.	36 Spelling.	37 Total. 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.				Mental divisions.	9	10	11	15	16	21	22	24	26	28	34	35	36
From—		To—			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 ..	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).

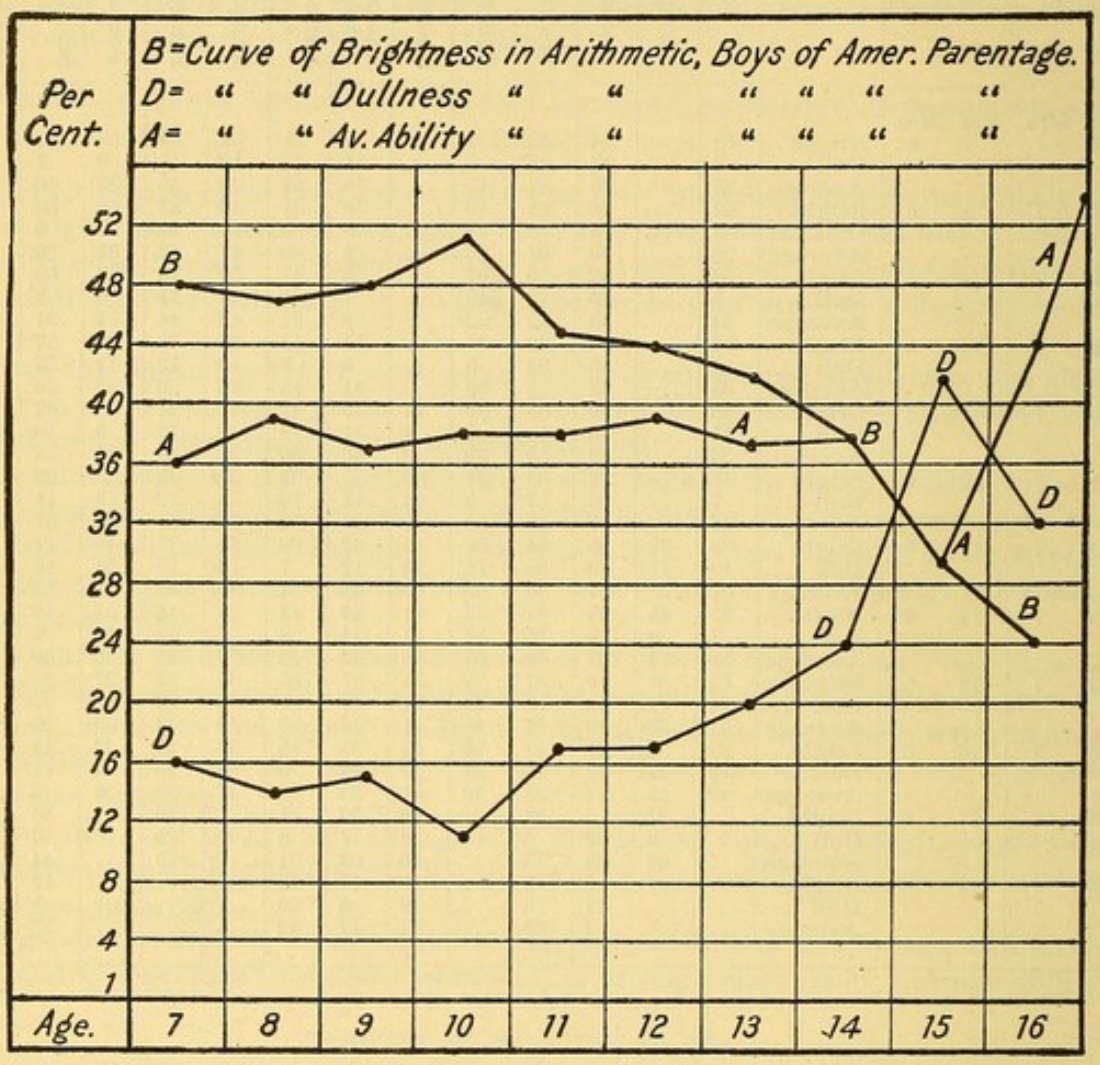


Diagram I illustrates how in arithmetic, for example, brightness decreases with age, while dullness increases.

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

BOYS—AMERICAN PARENTAGE.

Limit of age.				Mental divisions.	9	10	11	15	16	21	22	24	26	28	34	35	36
From—		To—			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.

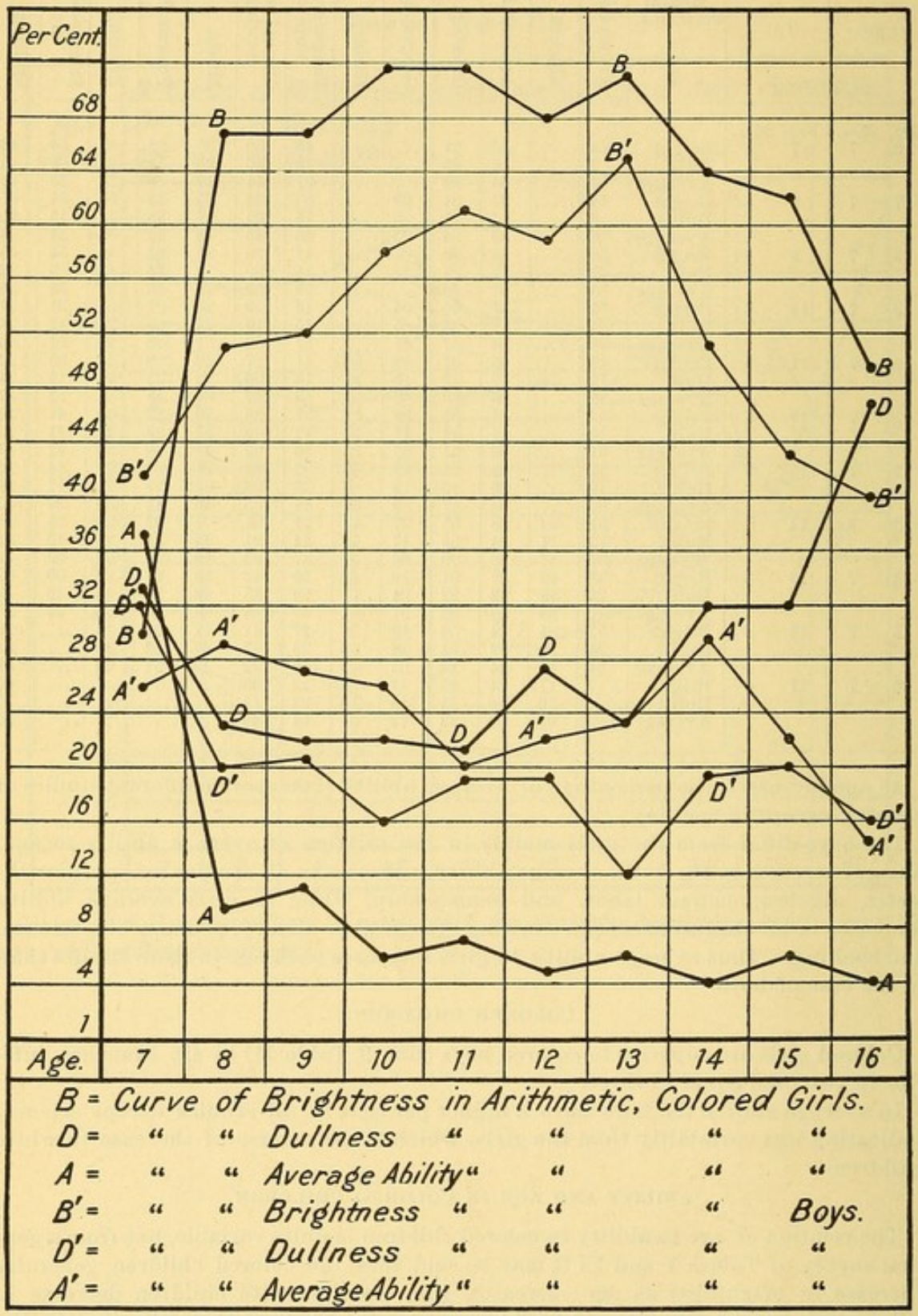
The relation of age to ability in colored children is quite variable, but from a general survey of Tables V and VI it may be said that the colored children generally increase in brightness as age increases, whereas the white children decrease in brightness as age increases. It would seem that the cause 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 Ia (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	26
				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.				Mental division.	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.*											
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	4,959.08	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	20.5
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	33.03	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	3	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	544.47	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	5,459.03	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	....	799 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,?55.81	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.				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	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.				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	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.				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	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	87.61	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	220.99	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.				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	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.				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	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.				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	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.				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	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	720.33	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	749.37	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	659.75	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	6,679.22	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	1,468.87	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	201.60	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	20.58
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	6,518.00	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	20.46
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	805.90	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	27.99	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 3	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	25.24
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.		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	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.		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	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.	Sickly.		Nervous.		Defective in—						Convulsions.		Lazy.		Unruly.	
						Eyesight.		Hearing.		Speech.							
	Total.	Total.	Per ct.	Total.	Per ct.	Total.	Per ct.	Total.	Per ct.	Total.	Per ct.	Total.	Per ct.	Total.	Per ct.	Total.	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	2,899	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.	
						Eyesight.		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—						Convulsions.		Lazy.		Unruly.	
						Eyesight.		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	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.				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	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	151.00	21.57
				389	...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....

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

BOYS 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	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.				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	.....	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.

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 birthday.	Number of observations.	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.

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[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.

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[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	39.64	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]

Boys in public schools.				Boys in truant schools.		
Age.	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 pages 177–178.

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.

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[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	2,849	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 ænemia, 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 ænemia 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 124.

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.	Brunettes.	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 increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.	Chest girth.	Yearly increase.
	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 increase.	Average height.	Yearly increase.	Average height.	Yearly increase.	Average height.	Yearly increase.	Average heigh t.	Yearly increase.	Average height.	Yearly increase.	Average height.	Yearly increase.	Average height.	Yearly increase.
	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., S t. 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.		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.	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	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41.2	.....	.....	.....	.....	.....
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	45.0	44.6	.....	.....	.....	.....	45.6	44.5	44.1	44.1	43.2	.....	44.5	44.2	44.2	43.8
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	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	47.76	47.58	46.9	46.6	48.05	47.59	47.6	46.8	48.2	47.9	48.9	48.4	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	49.69	49.37	49.0	48.7	50.00	49.81	49.3	49.2	50.0	49.8	51.2	50.8	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	51.68	51.34	50.7	50.6	51.85	51.89	51.9	51.5	52.8	52.3	53.0	52.8	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	53.33	53.42	52.7	52.4	53.76	53.5	53.5	53.9	54.6	53.9	55.9	54.6	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	55.1	55.9	54.4	54.8	55.0	56.5	55.1	56.6	56.3	57.0	57.0	57.9	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	57.2	58.2	56.3	57.7	57.5	58.7	56.8	60.0	58.1	58.2	58.8	60.4	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	59.9	59.9	58.3	59 3	59.9	60.5	59.7	61.2	60.7	60.5	59.3	61.4	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	62.3	61.1	61.0	61.0	62.3	61.6	61.8	61.9	63.9	61.8	62.8	62.5	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	65.0	61.6	63.1	62.0	65.1	62.2	64.5	62.7	65.3	62.4	65.7	62.5	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	66.2	61.9	65.0	62.7	66.6	62.9	67.1	62.7	66.3	62.8	67.1	63.6	68.2	64.5	67.1	.....	64.6	.....	65.7	63.0	65.7	.....	64.5	.....	66.0	63.0	.....	62.2
18½ years	66.7	61.9	.....	62.8	.....	62.5	67.6	63.2	66.9	62.6	.....	.....	68.6	64.6	67.3	.....	.....	.....	66.9	63.0	66.9	.....	65.5	.....	67.1	63.1	.....	62.3
19½ years	.....	.....	.....	62.4	.....	.....	.....	.....	67.4	62.7	.....	.....	69.0	64.6	67.5	.....	.....	.....	67.3	63.8	66.9	.....	66.0	.....	.....	.....	.....	62.7
20½ years	.....	.....	.....	.....	.....	.....	.....	.....	68.5	62.6	.....	.....	.....	.....	67.6	.....	.....	.....	67.7	63.0	.....	.....	66.3	.....	.....	.....	.....	.....
21½ years	.....	.....	.....	.....	.....	.....	.....	.....	67.1	62.7	.....	.....	.....	.....	67.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

a See Tables VII and XXXIV, Part II*c*.

b See Tables LXI and LXV, Part II*c*.

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.		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.	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	43.0	.....	42.1	.....	.....	.....	.....	.....	43.0	42.7
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	44.8	.....	44.2	.....	.....	.....	.....	.....	45.0	44.9
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	46.8	.....	46.2	.....	.....	.....	.....	.....	47.2	46.6
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	48.7	.....	48.1	.....	50.6	.....	49.6	.....	49.2	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	50.6	.....	49.4	.....	51.5	.....	51.1	.....	50.5	50.9
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	52.5	.....	51.2	.....	53.2	.....	52.7	.....	52.3	52.6
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	54.4	.....	53.2	.....	55.1	.....	54.1	.....	54.3	54.6
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	56.4	.....	55.1	.....	56.3	.....	56.5	.....	56.0	56.8
14½ years	59.3	59.8	57.8	56.9	57.2	58.9	.....	.....	.....	.....	.....	.....	58.7	.....	.....	.....	58.6	.....	58.7	.....	.....	.....
15½ years	62.2	60.9	59.6	58.6	59.8	60.1	.....	.....	.....	.....	.....	.....	61.7	.....	.....	.....	60.7	.....	61.5	.....	.....	.....
16½ years	64.3	61.7	61.2	59.9	62.2	60.6	.....	.....	.....	.....	.....	.....	64.1	.....	.....	.....	63.7	.....	63.5	.....	.....	.....
17½ years	66.2	62.5	62.8	60.9	63.0	61.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65.7	.....	65.2	.....	.....	.....
18½ years	67.0	62.4	64.2	61.5	63.3	61.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66.3	.....	65.5	.....	.....	.....
19½ years	67.3	62.8	65.2	61.8	63.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65.7	.....	65.3	.....	.....	.....
20½ years	67.5	63.0	65.7	62.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65.8	.....	66.4	.....	.....	.....
21½ years	67.6	63.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	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	69.2	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.		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	.....	136.9	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, but it is time they were used in the investigation of normal man.[1]

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 page 13.

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.

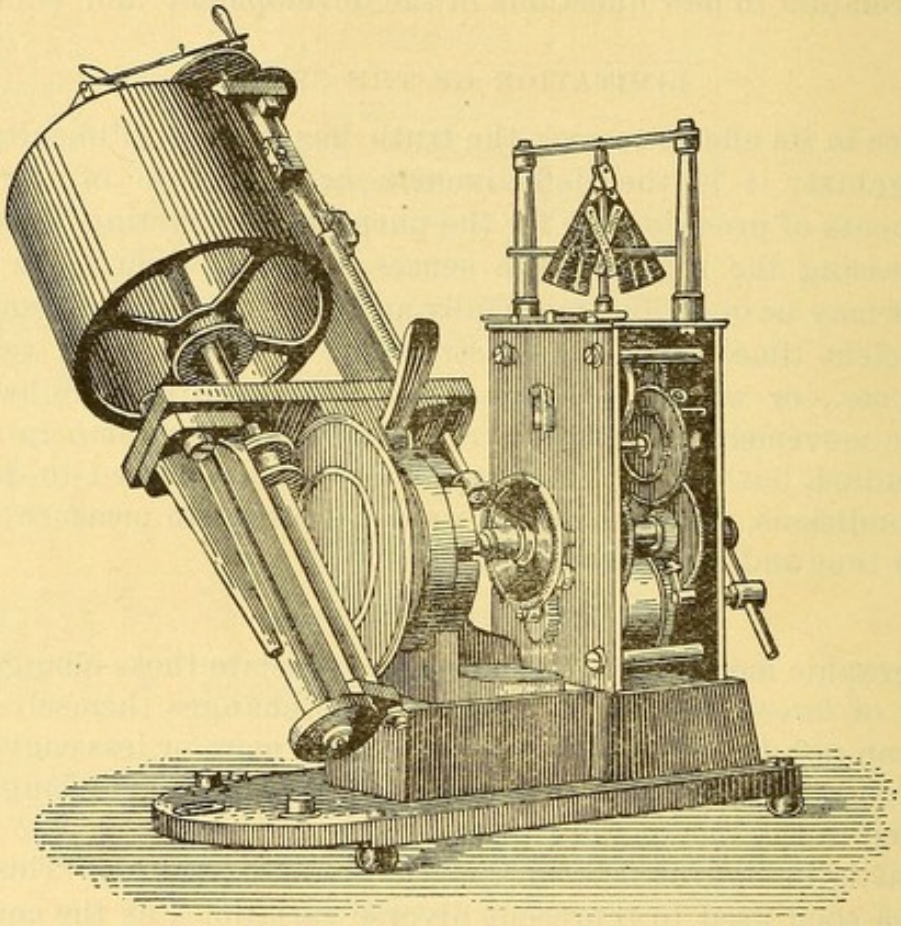

Fig. 1.—Ludwig's kymographion.

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

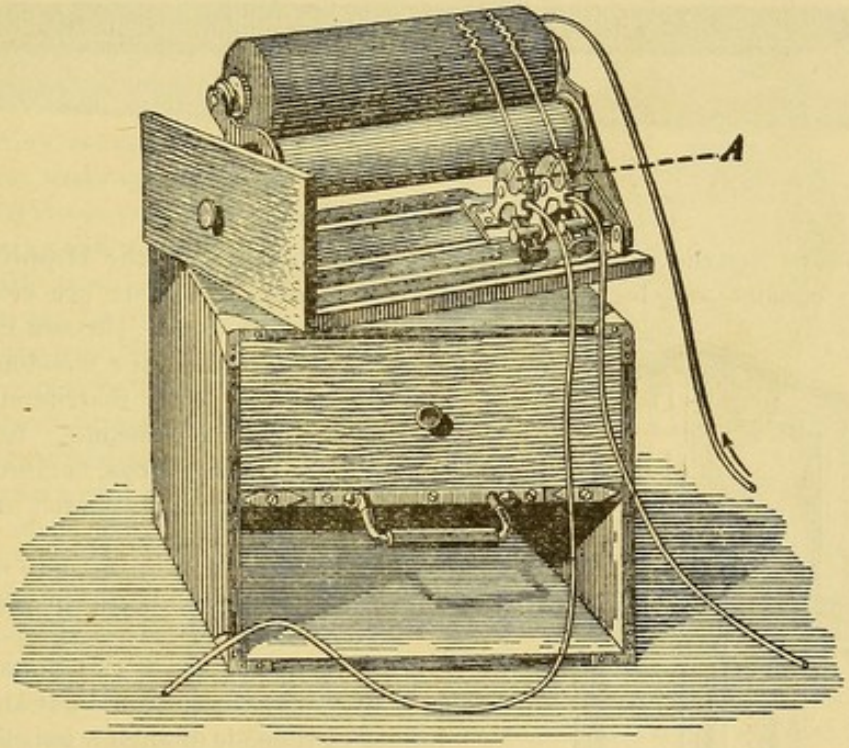

FIG. 2.—The polygraph.

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.

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[1] See list of instrument makers at end of this chapter.

[2] Marey, Circulation du sang, 2e édition, page 342.

[3] See pages 171–172.

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.

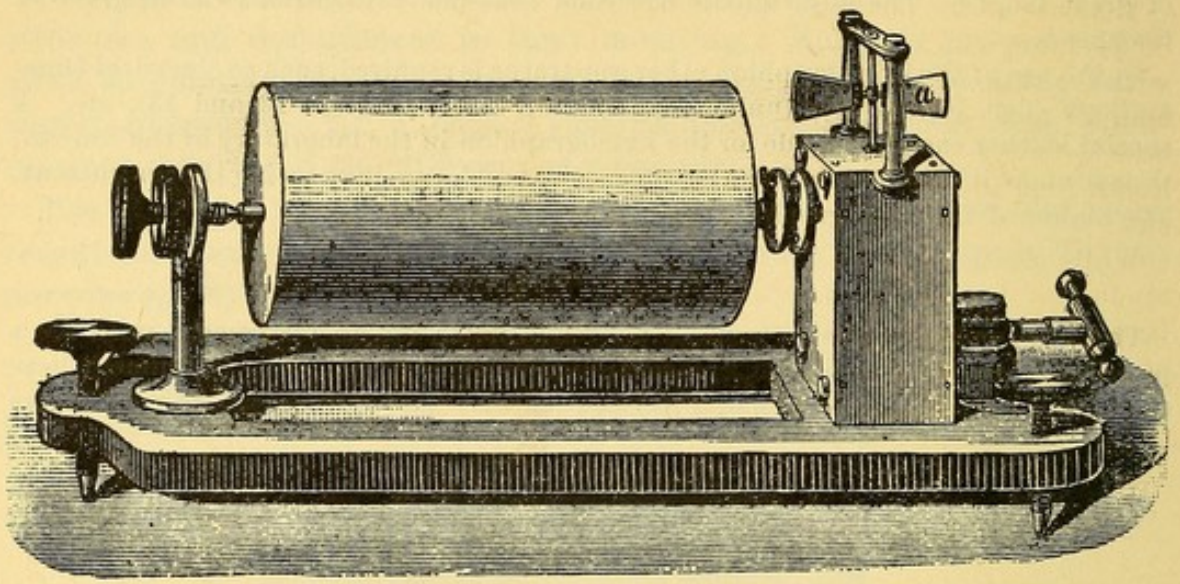

FIG. 3.—Small polygraph.

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.

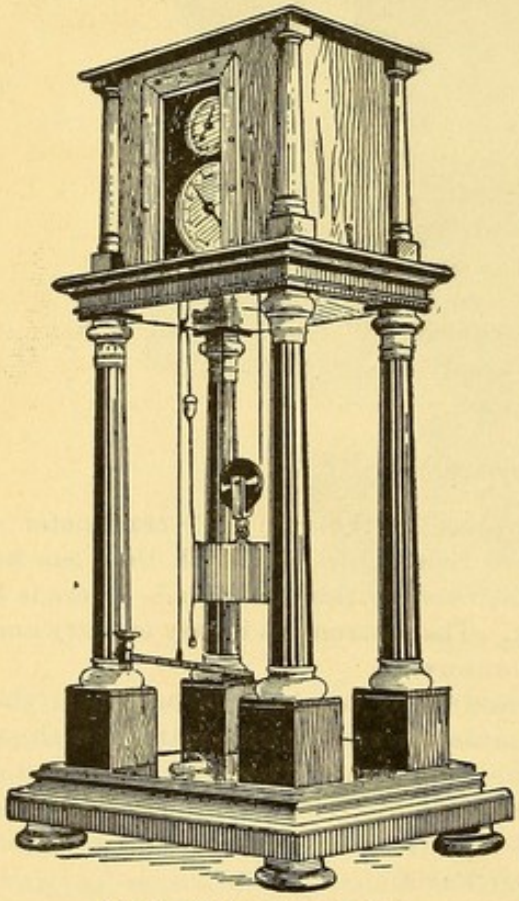

FIG. 4.—Hipp-Chronoscope.

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—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 7¼ 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 3¼ inches. The pendulums are released from the keys at the right in the cut.

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.

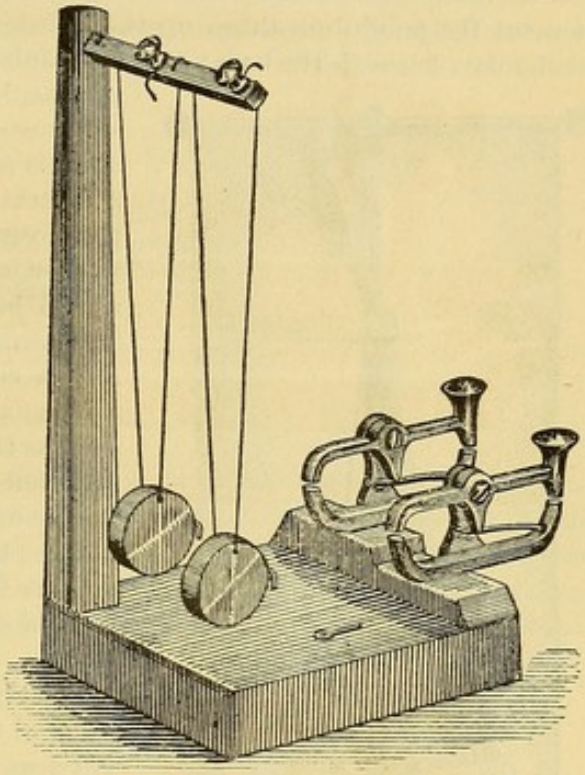

FIG. 5.— Vernier chronoscope. (Sanford.)

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

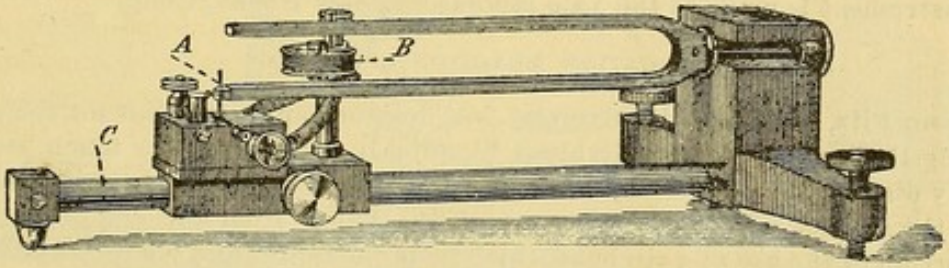

FIG. 6.—Tuning-fork stand.

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.

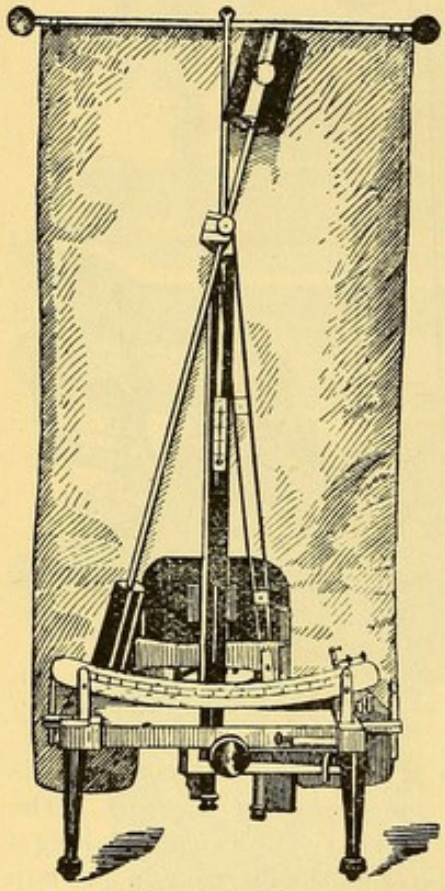

FIG. 7.—Pendulum chronoscope. (Scripture.)

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

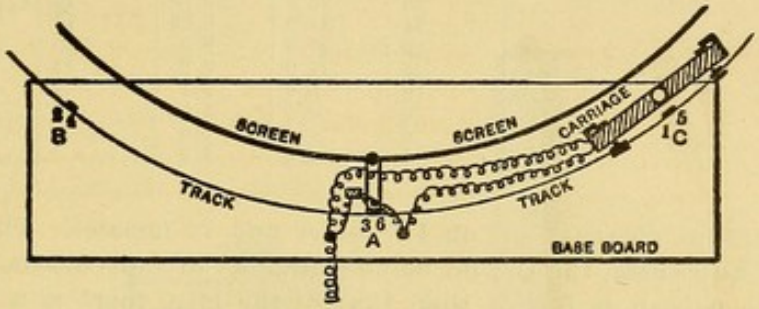

FIG. 8.—Location apparatus. (Fitz.)

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

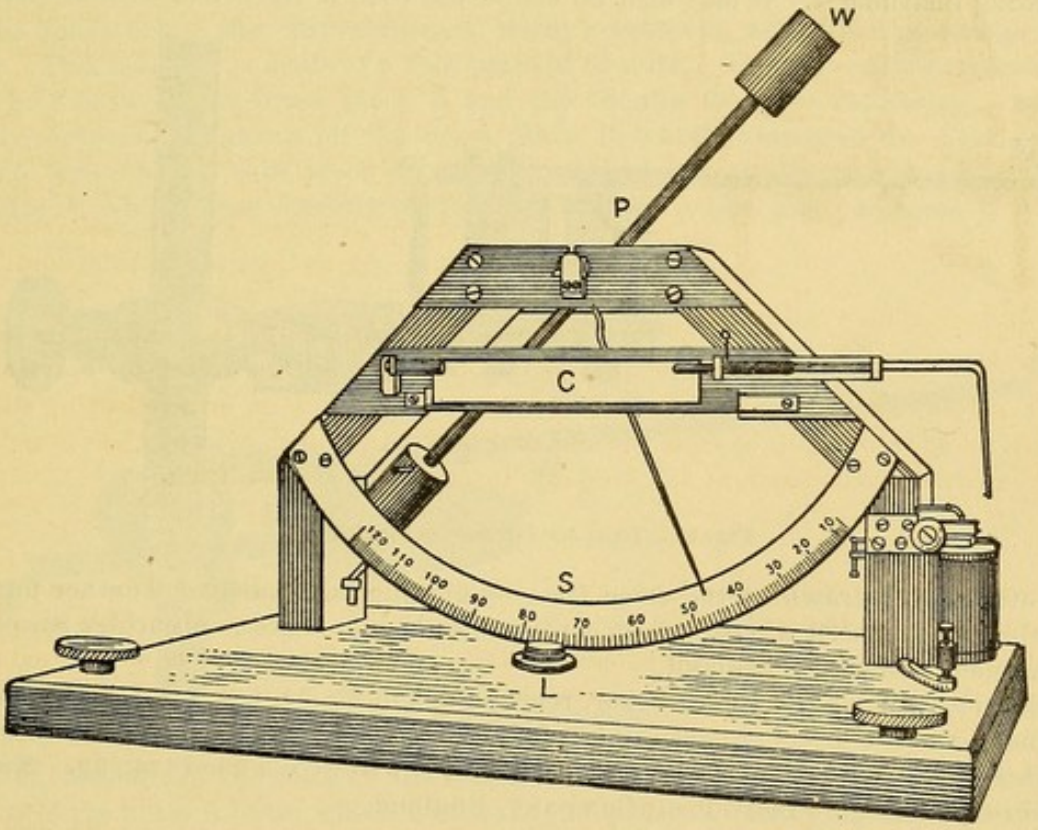

FIG. 9.—Pendulum chronoscope (Fitz.)

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

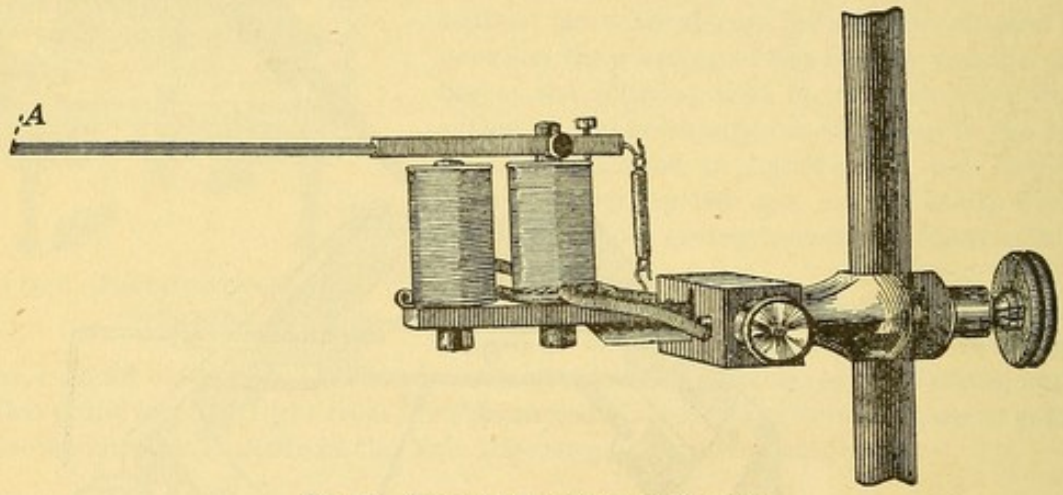

FIG. 10.—Time marker for smoked paper.

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 electro-magnets, 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.

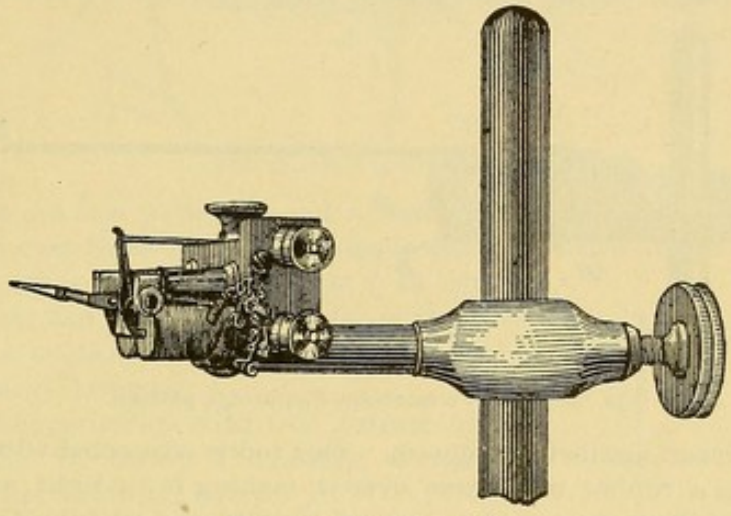

FIG. 11.—Deprez signal.

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

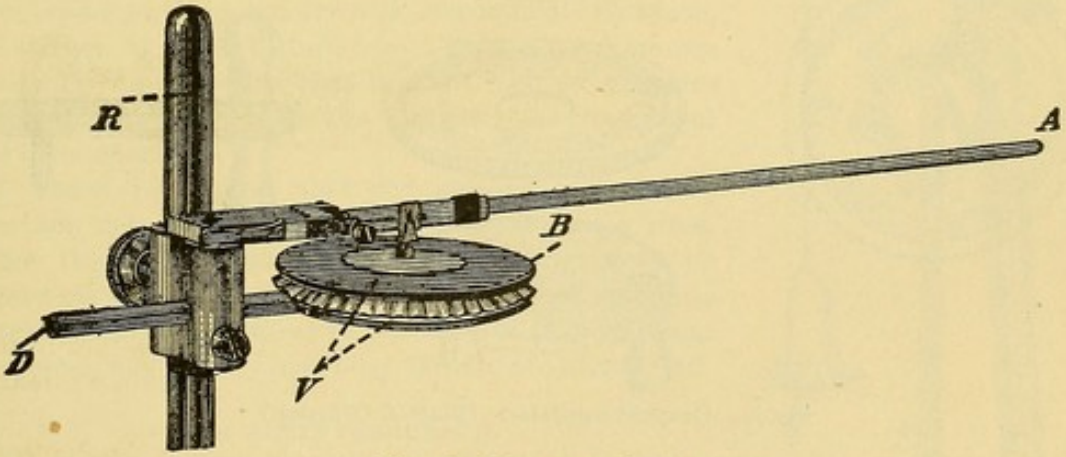

FIG. 12.—Marey's tambour.

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

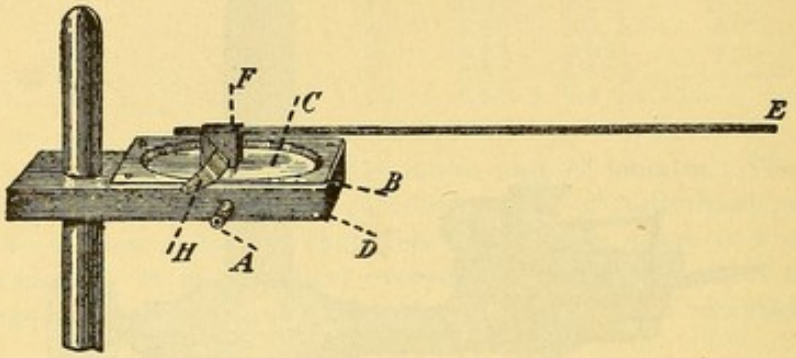

FIG. 13.—Marey's tambour, Cambridge pattern.

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.

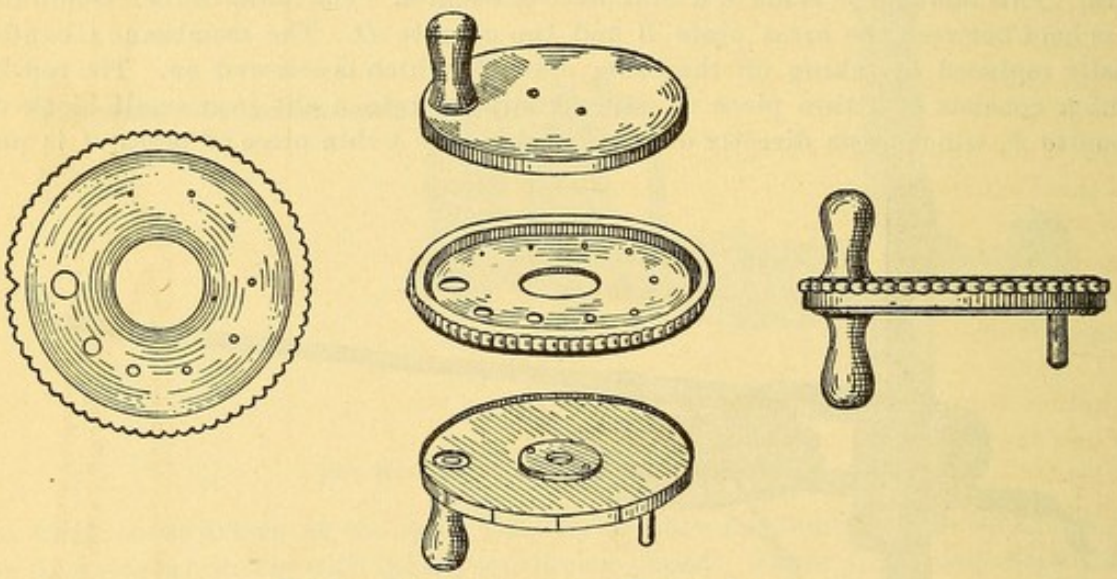

Fig. 14.—Graphic regulator. (Binet & Courtier.)

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*.

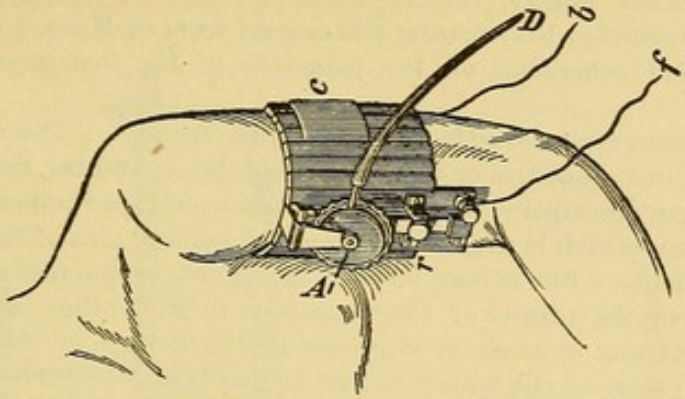

FIG. 15.—Marey's myograph.

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.

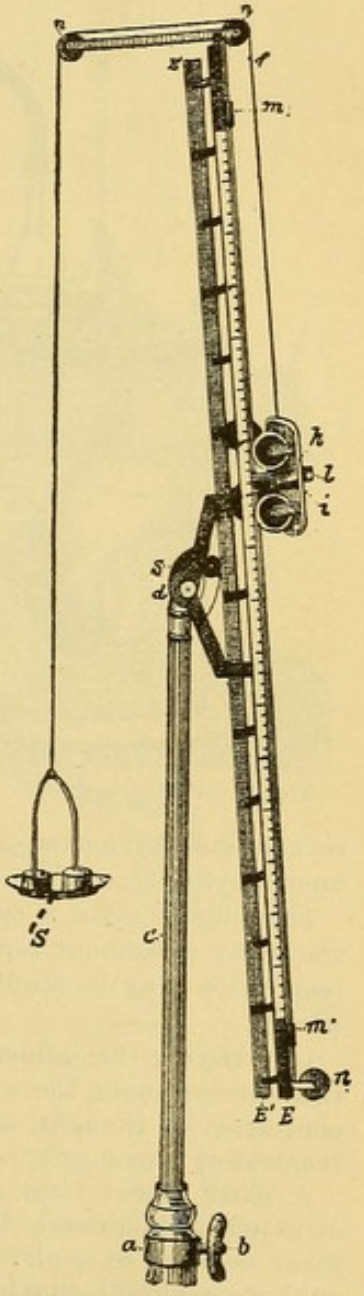

FIG. 16.—Apparatus for muscular sense. (Münsterberg.)

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.

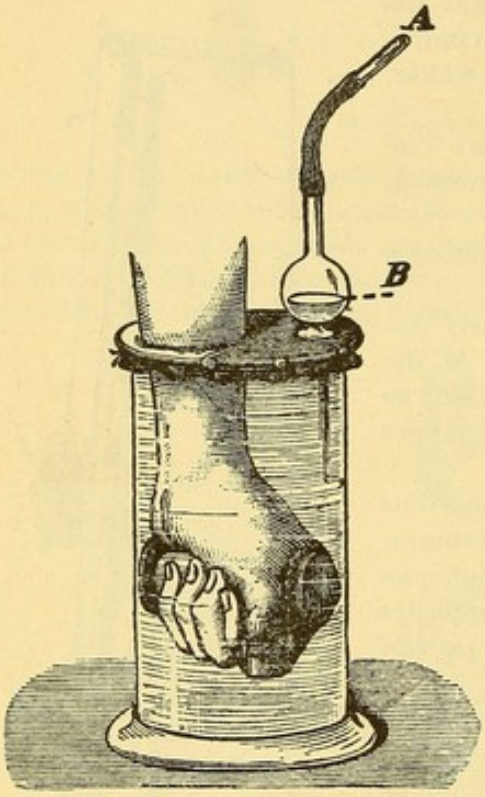

FIG. 17.—Plethysmograph. (Franck.)

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

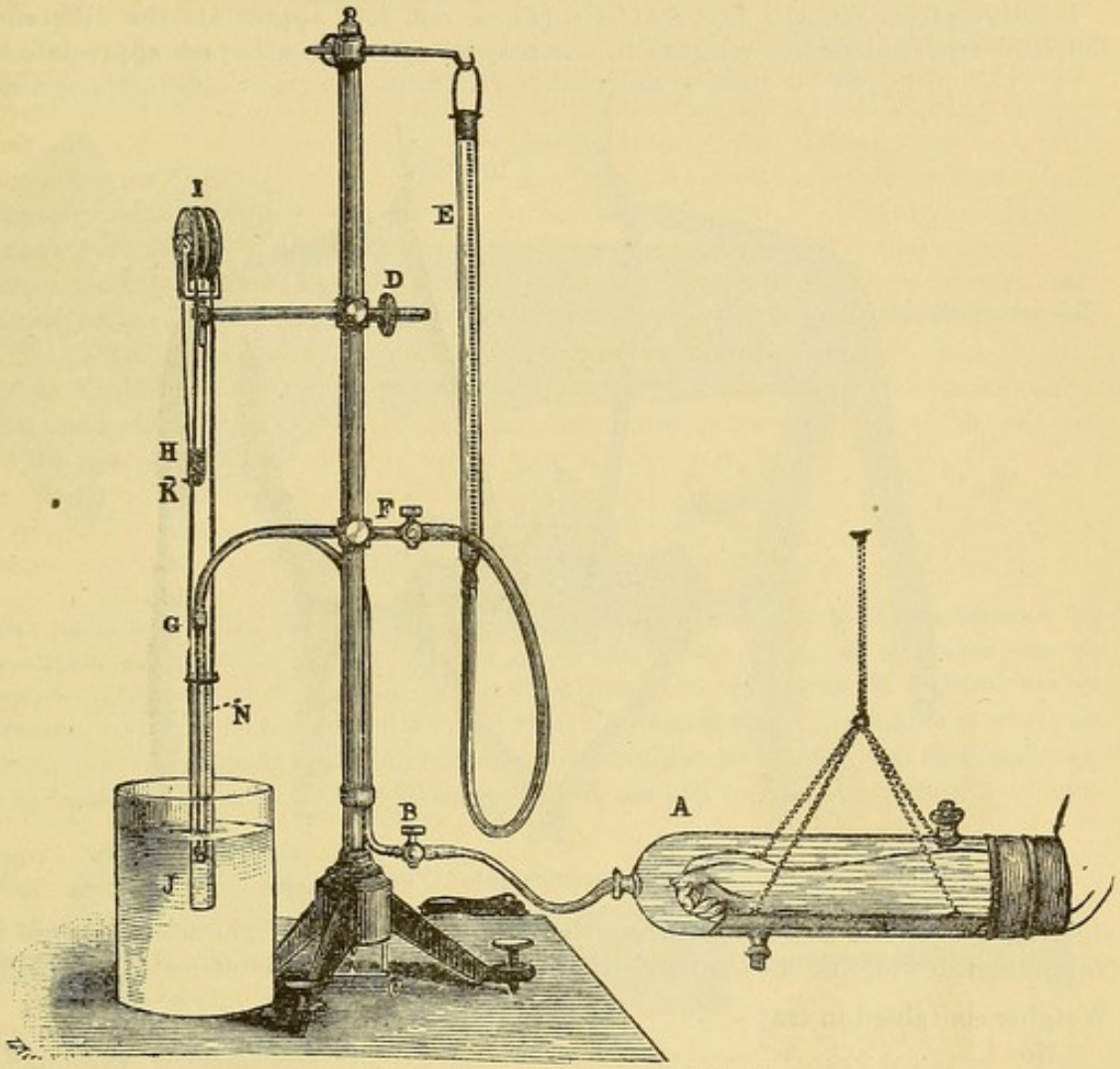

FIG. 18.—Plethysmograph. (Mosso.)

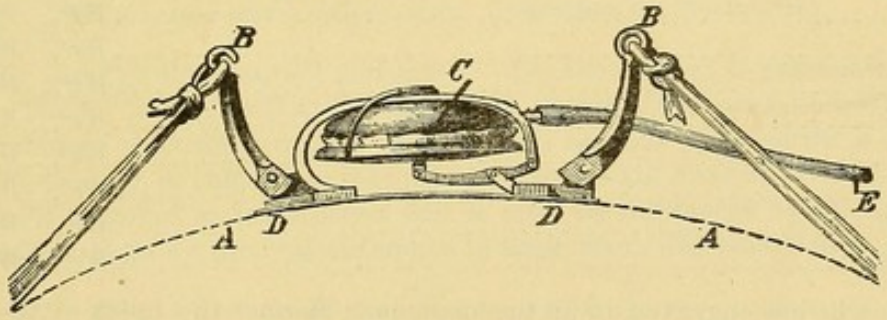

FIG. 19.—Pneumograph. (Marey.)

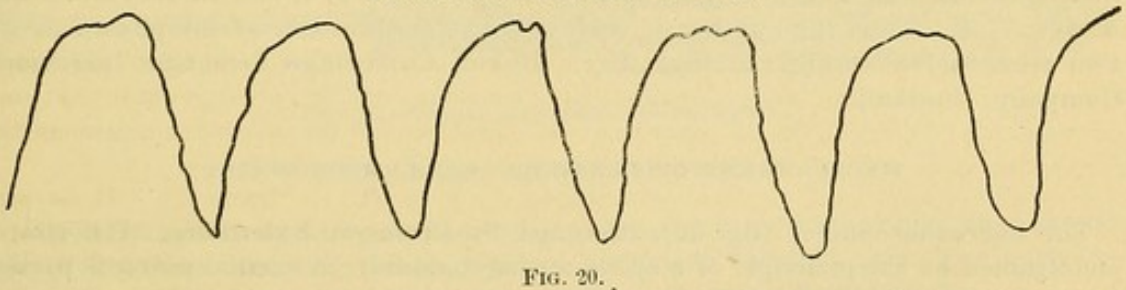

FIG. 20.

[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

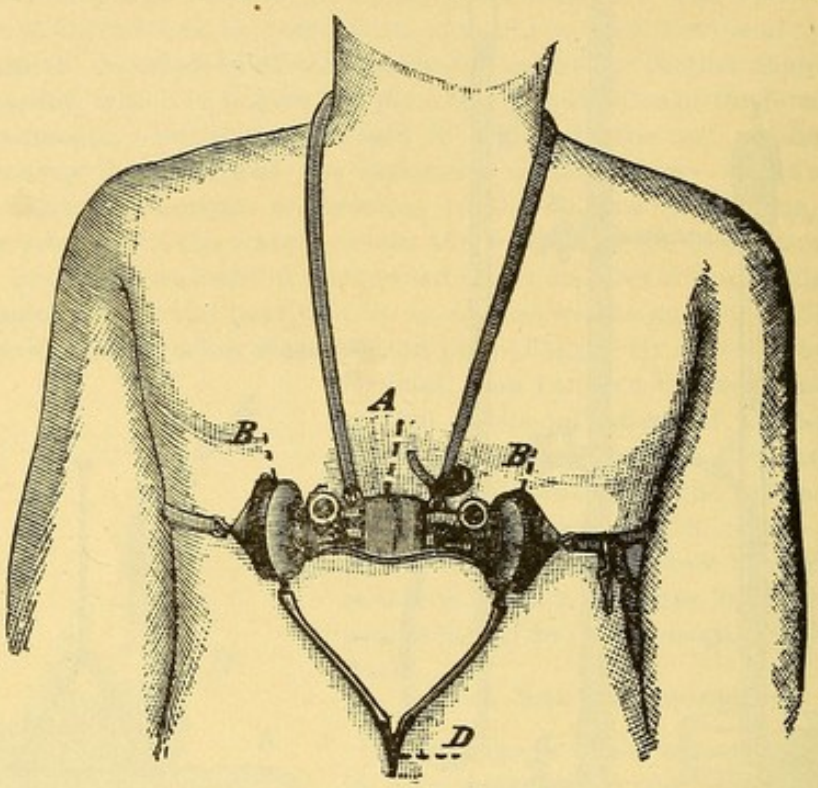

FIG. 21.—Pneumograph. (Verdin.)

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.

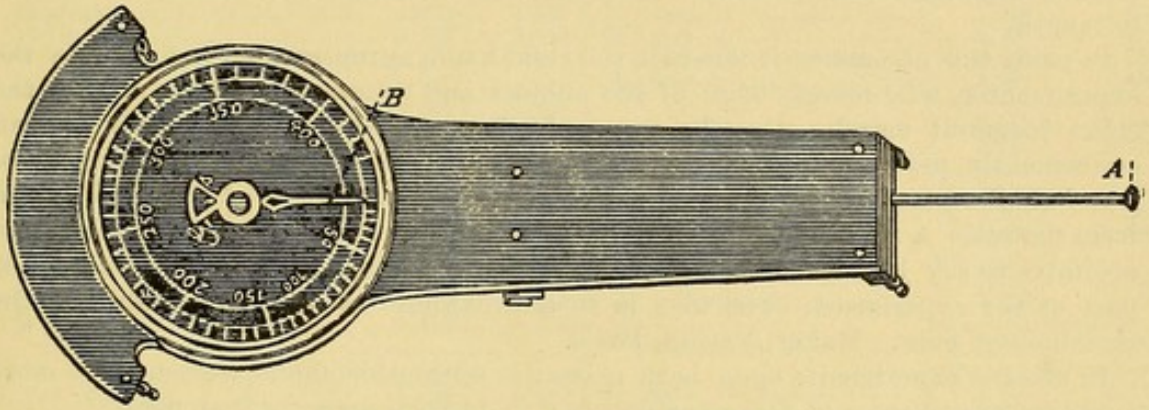

FIG. 22.—Baræsthesiometer. (Eulenburg.)

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-

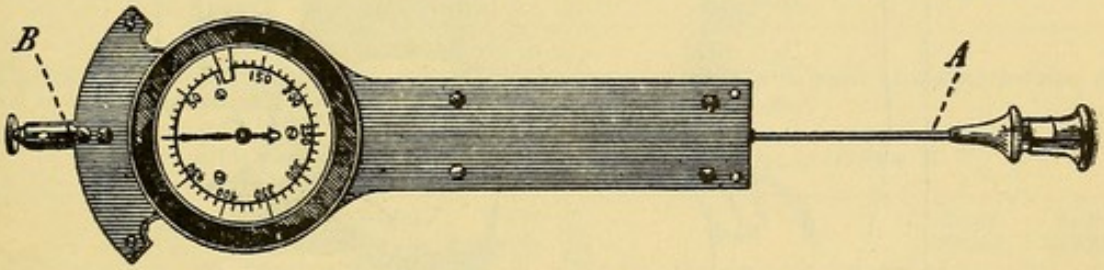

FIG. 23.—*Baro-electro-æsthesiometer.* (Eulenburg and MacDonald.)

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.

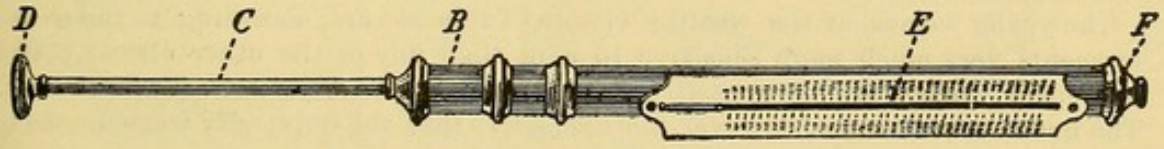

FIG. 24.—Temple algometer. (MacDonald.)

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.

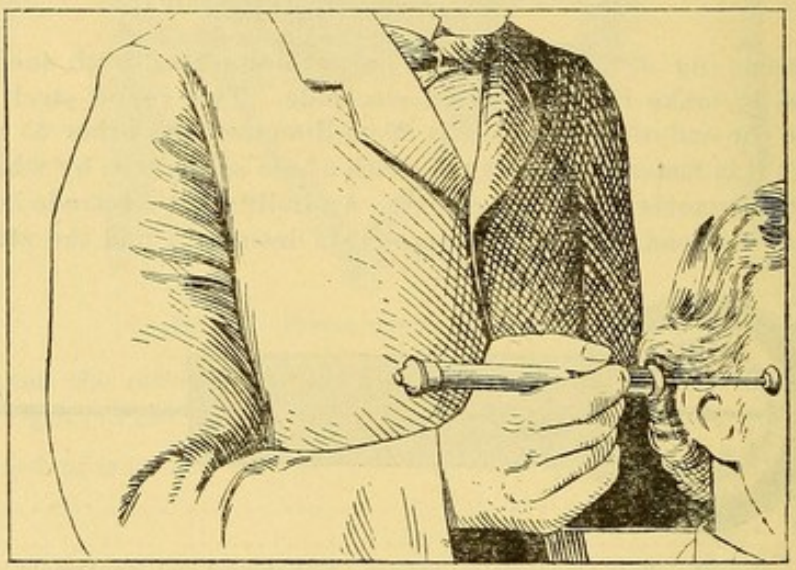

FIG. 25.

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]

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[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 135.

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.	Age.	Right temple.	Left temple.
17 years	1,725	1,925	21 years	1,550	1,350
17 years	1,550	1,150	21 years	2,450	1,550
			21 years	3,225	2,750
Total	3,275	3,075	21 years	1,650	1,450
Average	1,637	1,537	Total	8,875	7,100
			Average	2,218	1,775
19 years	2,000	1,750			
19 years	2,450	1,950	22 years	2,725	2,400
19 years	2,900	2,550	23 years	2,200	2,400
19 years	2,550	2,700	23 years	1,600	1,350
19 years	2,825	3,000			
19 years	3,900	4,000	Total	6,525	6,150
19 years	2,450	2,950	Average	2,175	2,050
19 years	1,450	1,950			
			25 years	2,650	1,925
Total	20,525	20,850			
Average	2,565	2,606	27 years	2,500	2,350
			27 years	1,850	1,600
20 years	2,325	2,125	Total	4,350	3,950
20 years	3,400	2,200	Average	2,175	1,975
20 years	2,800	2,100			
20 years	1,600	1,450	28 years	2,150	2,625
20 years	1,350	1,900	28 years	1,550	2,100
20 years	2,925	1,050	29 years	1,700	1,100
20 years	2,325	2,960	32 years	1,650	2,150
20 years	1,750	2,425			
20 years	1,550	1,750	Total	7,050	7,975
			Average	1,762	1,993
Total	20,025	17,900			
Average	2,225	1,988	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.	Age.	Right temple.	Left. temple.
WASHERWOMEN. *a*			BUSINESS WOMEN (CLERKS, STENOGRAPHERS, ETC.). *b*		
25 years	2,750	2,950			
31 years	4,500	4,500	30 years	1,500	1,000
31 years	3,500	4,000	31 years	1,400	1,300
32 years	2,150	1,900	35 years	1,100	1,150
35 years	4,000	4,000	38 years	1,100	1,450
36 years	2,300	2,050	40 years	1,200	1,450
37 years	2,700	2,800	45 years	1,650	1,350
39 years	3,134	3,400	60 years	1,650	1,600
40 years	3,900	3,750	60 years	1,000	850
41 years	2,900	3,000	60 years	2,050	2,000
42 years	3,450	3,250			
45 years	2,950	2,600	Total	12,650	12,150
49 years	2,250	2,850	Average	1,405	1,350
55 years	2,550	2,250			
			Average of all	2,421	2,410
Total	43,034	43,300			
Average	3,073	3,092			

a Average age, 38 years.

b Average age, 44 years.

TABLE 2*b*.—*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.	Age.	Right temple.	Left temple.
12.8 years	700	650	16.2 years	1,000	1,100
12.9 years	750	600	16.3 years	1,000	1,000
12.10 years	650	800	16.3 years	900	1,100
12.11 years	800	850	16.3 years	650	700
			16.8 years	950	1,100
Total	2,900	2,900	16.9 years	1,100	950
Average	725	725	16.9 years	900	950
			16.9 years	1,000	1,050
13.2 years	1,150	1,200			
13.4 years	600	600	Total	7,500	7,950
13.6 years	750	750	Average	937	993
Total	2,500	2,550	17.1 years	750	850
Average	833	850	17.1 years	1,750	1,550
			17.2 years	700	650
14 years	1,600	1,550	17.2 years	1,500	2,000
14.4 years	950	950	17.4 years	1,200	1,150
14.6 years	700	700	17.7 years	1,300	1,350
14.7 years	1,000	950	17.9 years	1,700	1,600
			17.9 years	1,050	1,000
Total	4,250	4,150	17.10 years	600	650
Average	1,062	1,037			
			Total	10,550	10,800
15.1 years	950	950	Average	1,172	1,200
15.2 years	600	550			
15.2 years	1,700	1,550	18 years	850	950
15.3 years	700	650	18.2 years	600	600
15.4 years	1,450	1,500	18.4 years	2,000	1,600
15.5 years	950	1,050	18.8 years	1,050	950
15.5 years	750	800			
15.6 years	850	900	Total	4,500	4,100
15.6 years	600	650	Average	1,125	1,025
15.6 years	950	950			
15.7 years	1,350	1,400	19.1 years	800	850
15.9 years	750	850	19.2 years	850	900
15.9 years	600	800			
15.9 years	1,650	1,650	Total	1,650	1,750
			Average	825	875
Total	13,850	14,250			
Average	989	1,017			

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.

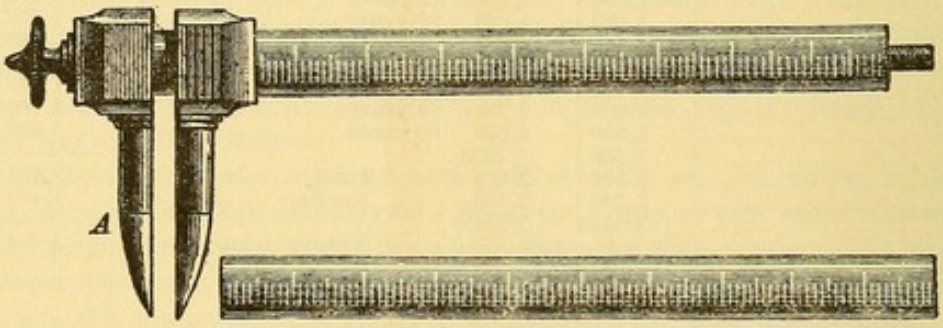

FIG. 26.—Æsthesiometer.

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

THERMSÆTHESIOMETER.

The thermæsthesiometer (fig. 27), designed by Professor Eulenburg, of Berlin, measures the least sensibility to heat. It consists of two thermometers fastened

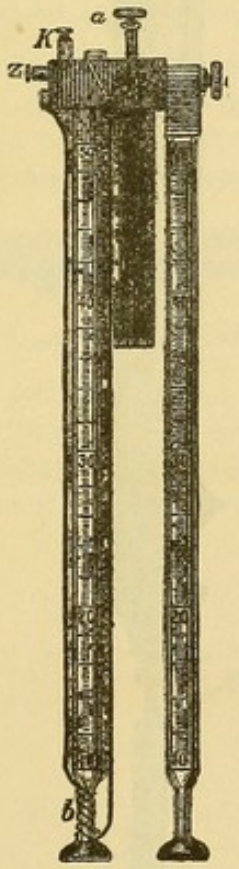

FIG. 27.—Thermæsthesiometer. (Eulenburg.)

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

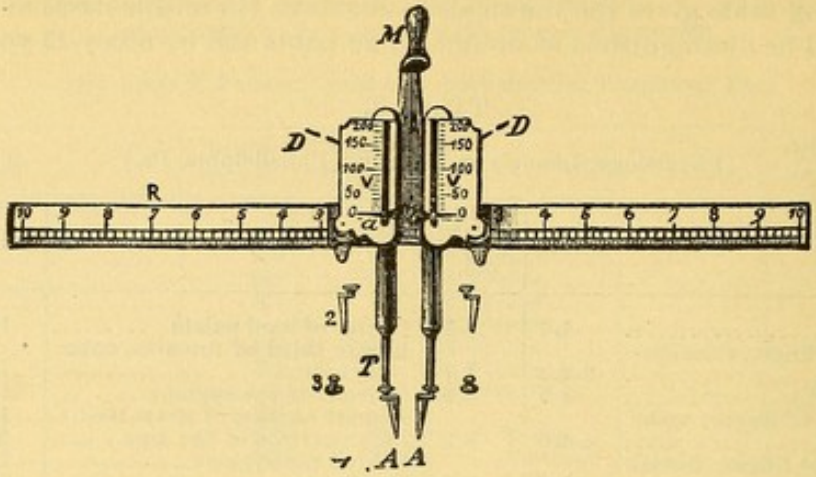

FIG. 28.—Dynamometrical æsthesiometer. (Verdin.)

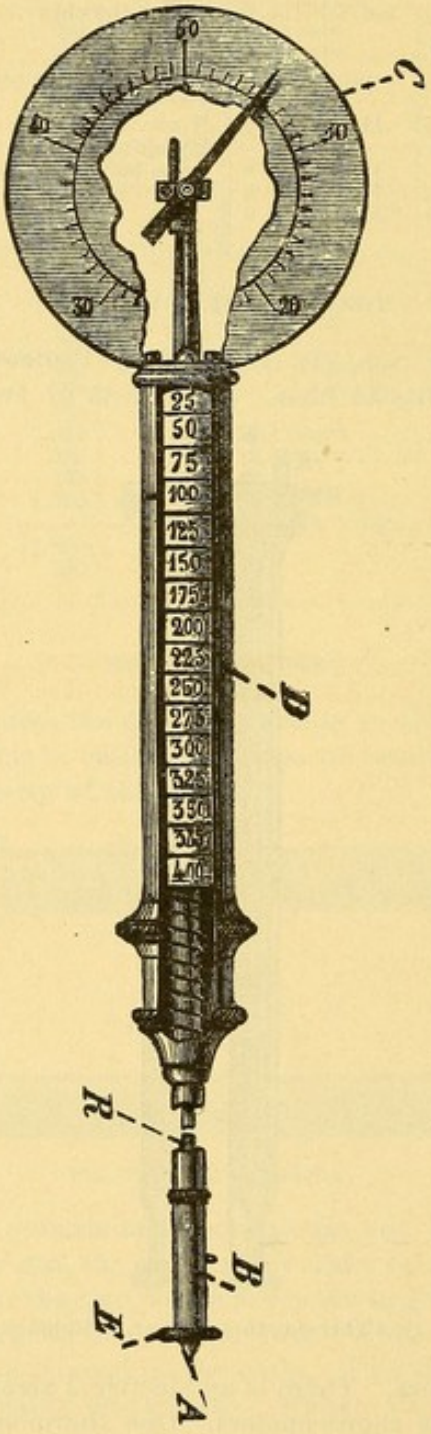

FIG. 29.—Algometer. (Chéron.)

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	4.63	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

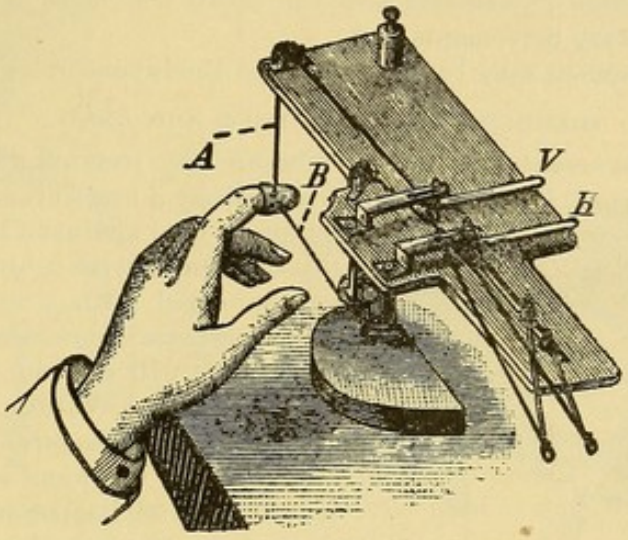

FIG. 31.—Digitalgraph. (Delabarre.)

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

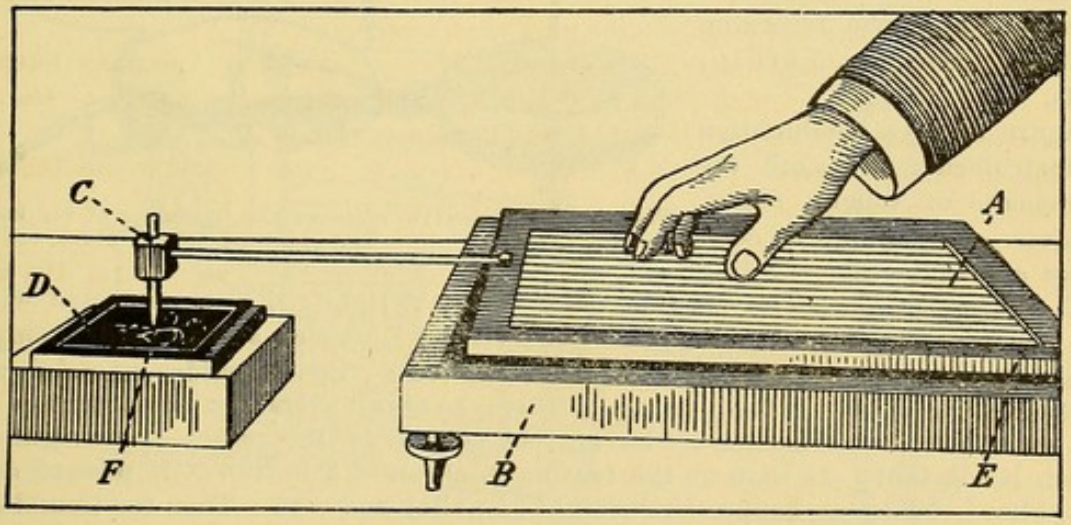

FIG. 32.—Automatograph. (Jastrow.)

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.

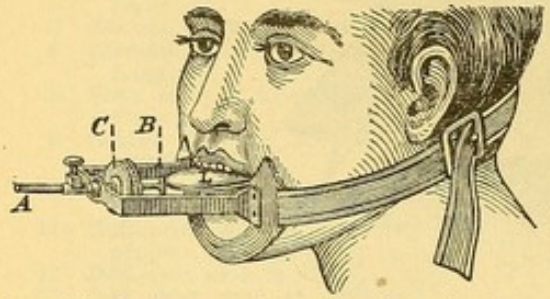

FIG. 33.—Instrument for measuring the trembling of the tongue.

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.

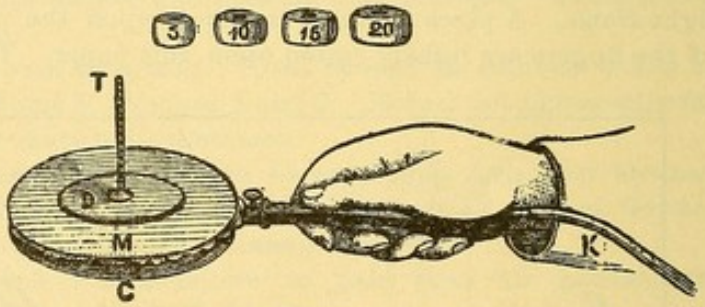

FIG. 34.—Instrument to measure the trembling of the hand and arm.

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.

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[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 con-

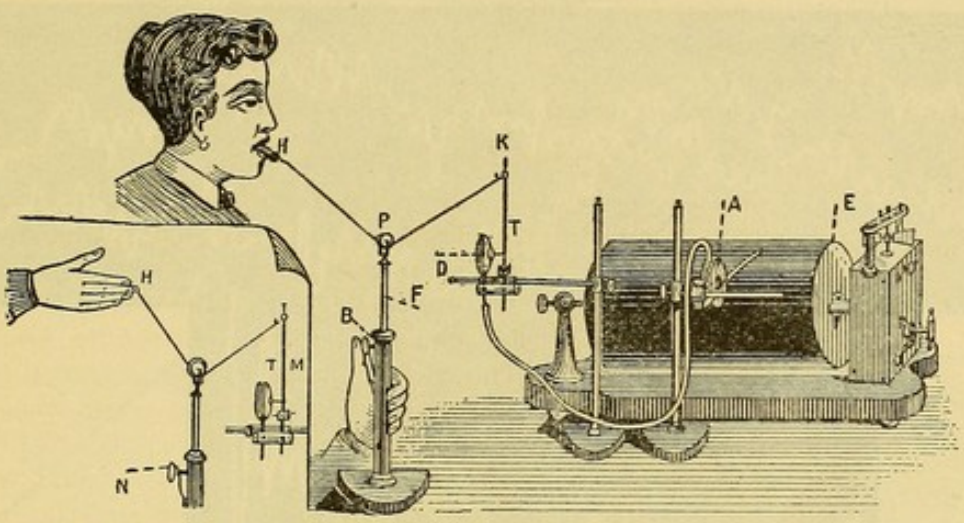


FIG. 35.—Apparatus for measuring the movement of hand, tongue, etc. (Filliatre.)

nect 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

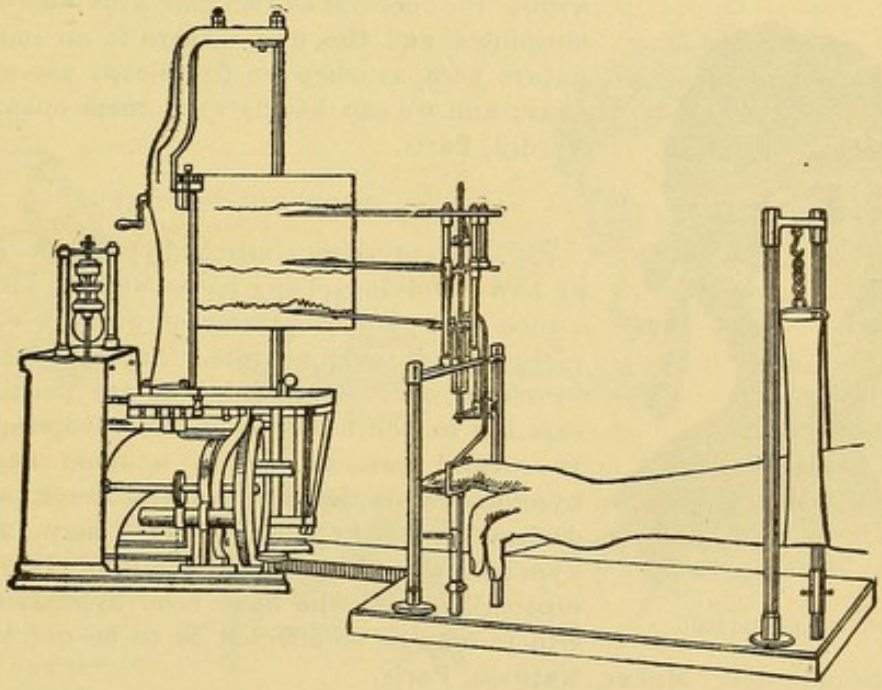


FIG. 36.—Psychograph. (Sommer.)

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.

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

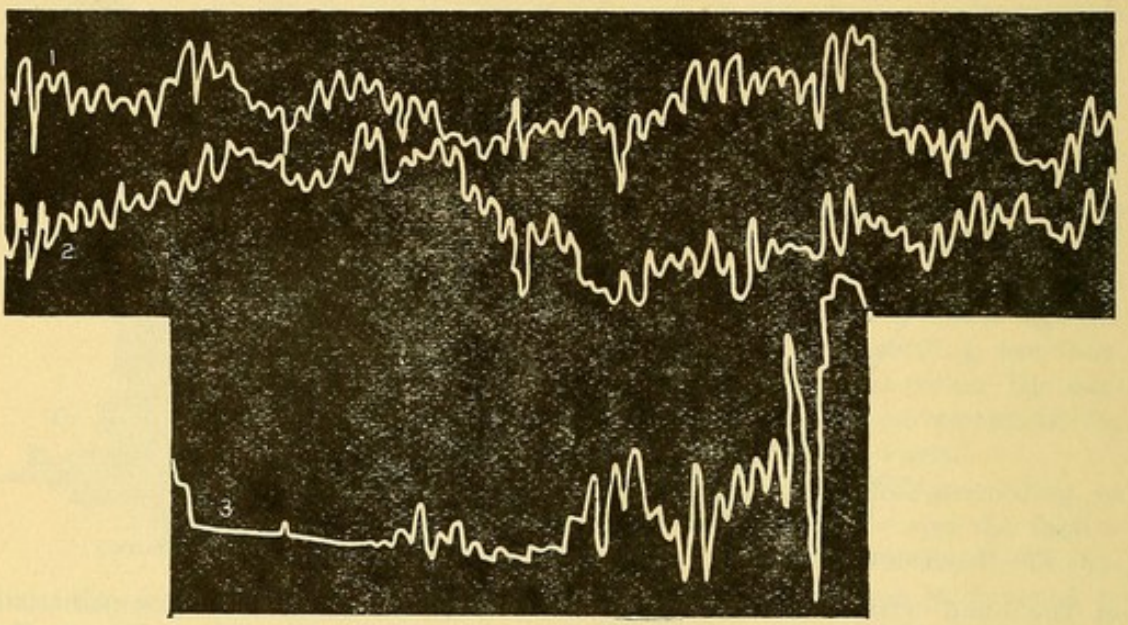


Fig. 37.—Trembling of hand in paralysis.

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

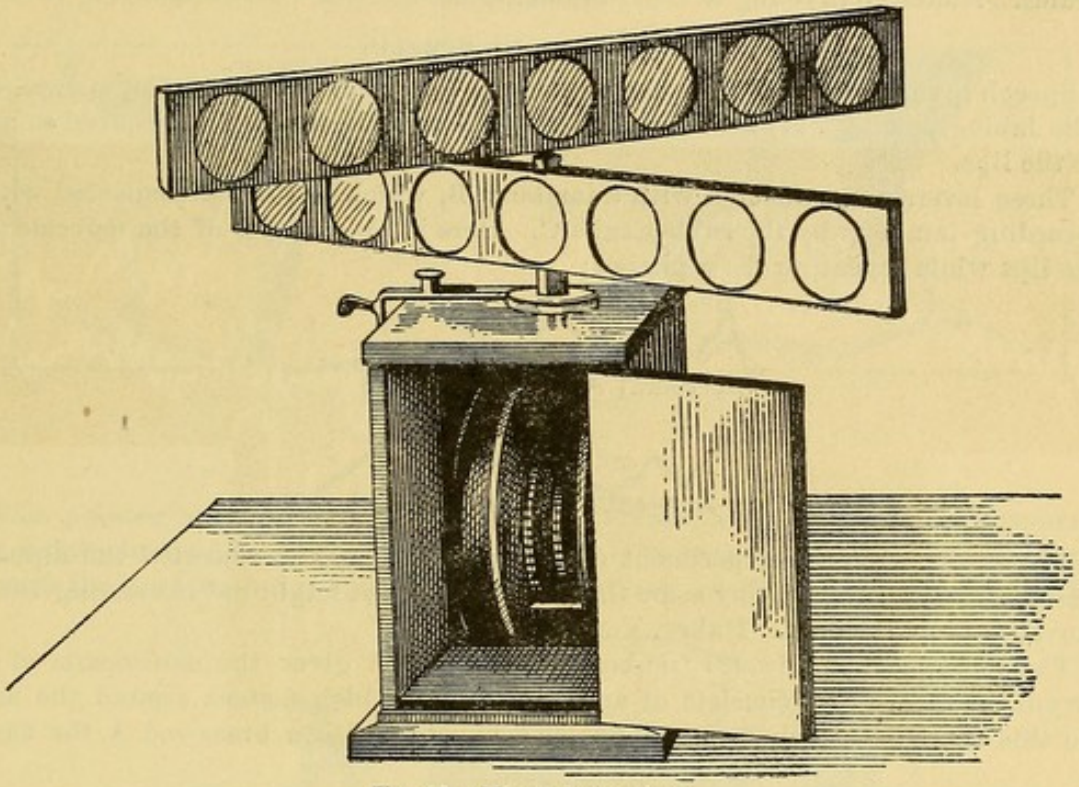


FIG. 39.—Mirror-hypnotizer.

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

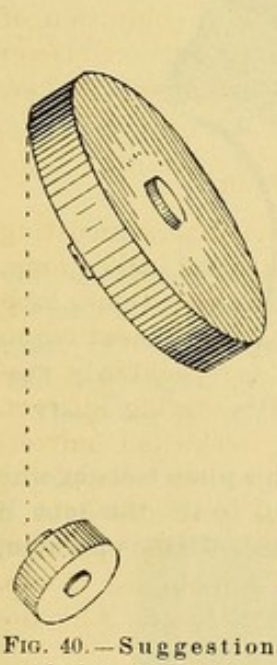


FIG. 40.—Suggestion blocks. (Gilbert.)

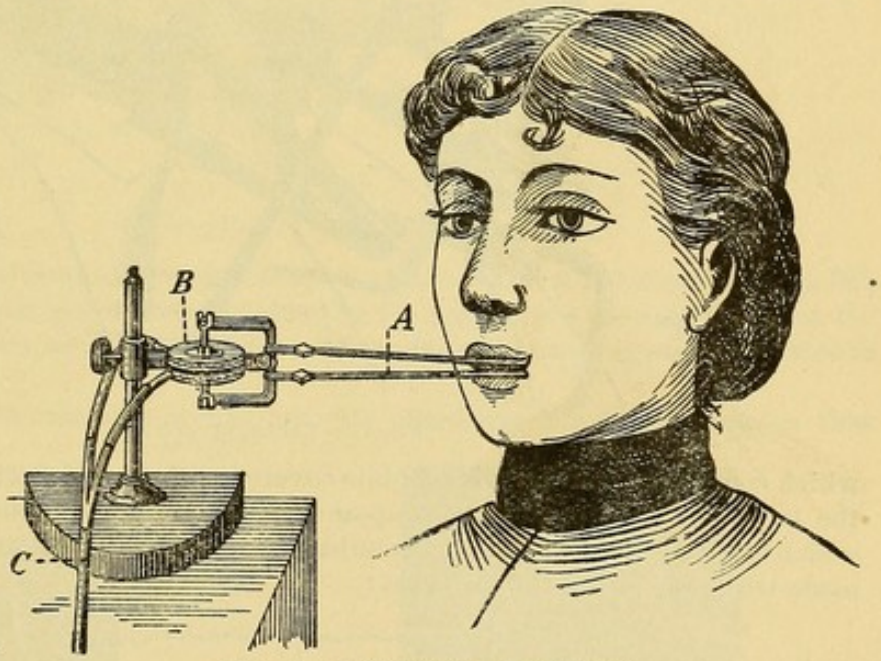


FIG. 41.—Labiograph. (Rousselot.)

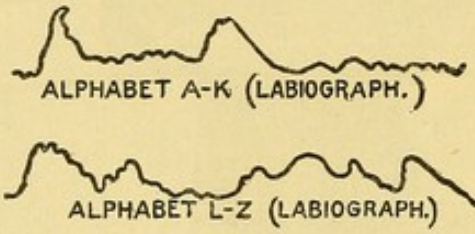
is an illustration of the adage that a pound of lead is heavier than a pound of feathers. As Professor Scripture puts it, it is a "disappointed suggestion of weight." In a series of experiments with different blocks upon New Haven school children, Scripture and Gilbert have shown that suggestibility 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

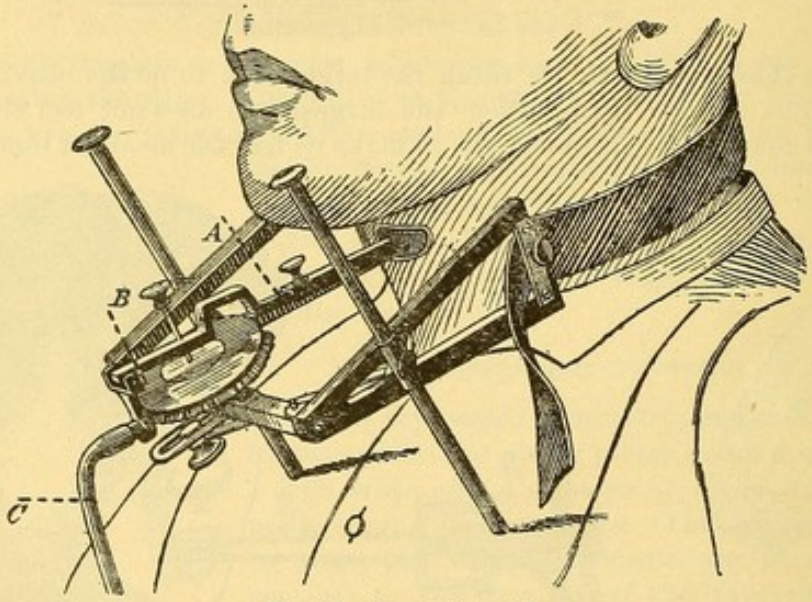
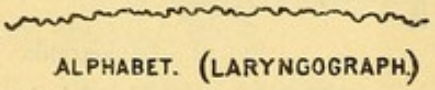


Fig. 42.—Laryngograph.

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.

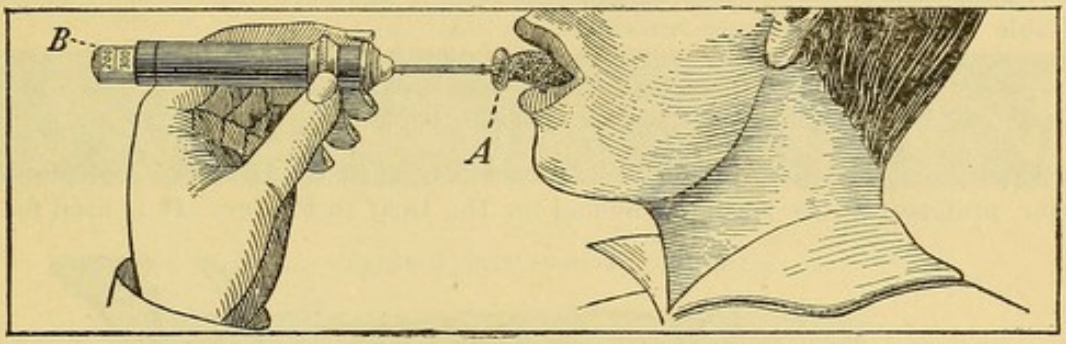


FIG. 43.—Glosso-dynamometer. (Féré.)

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

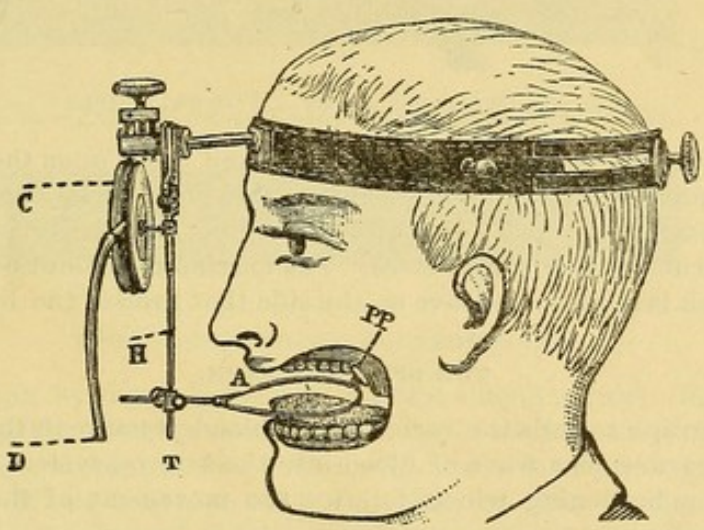


FIG. 44.—Palatograph. (Weeks.)

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

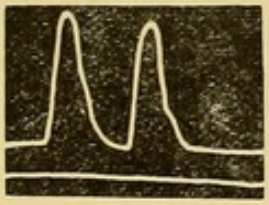


FIG. 45.—No. 1.

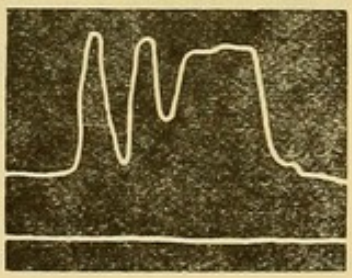


FIG. 45.—No. 2.

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

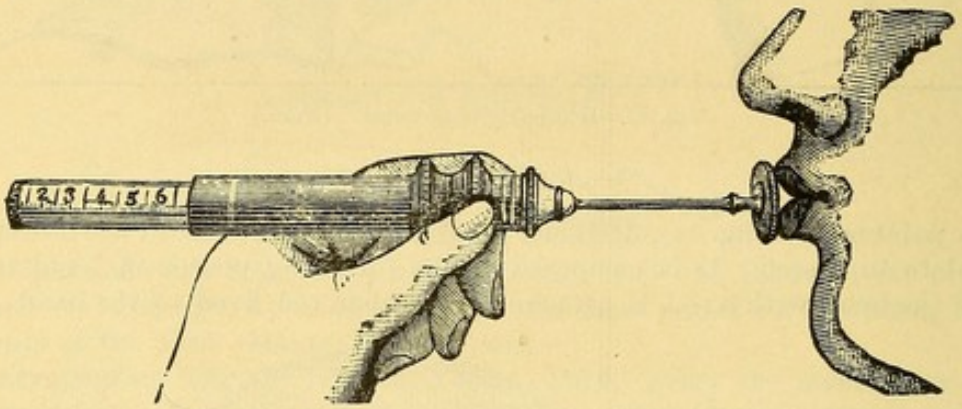


FIG. 50.—Dynamolabiometer. (Féré and Boyer.)

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.

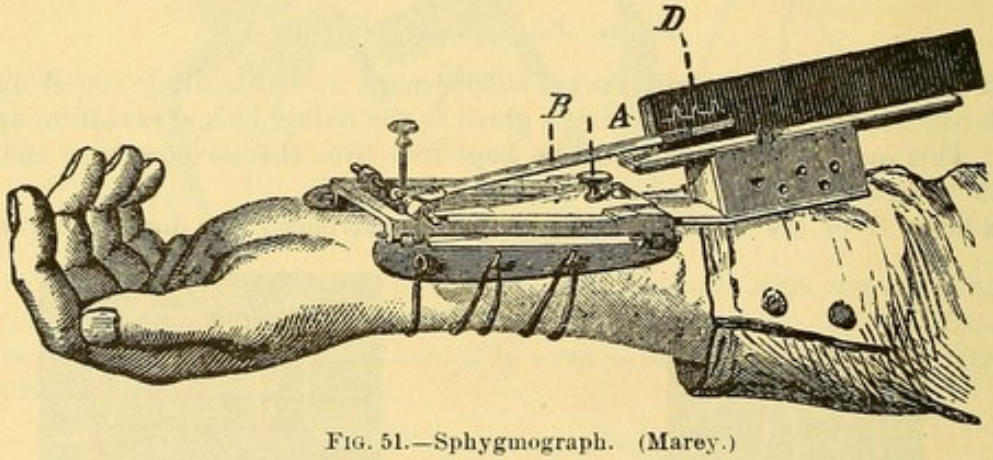
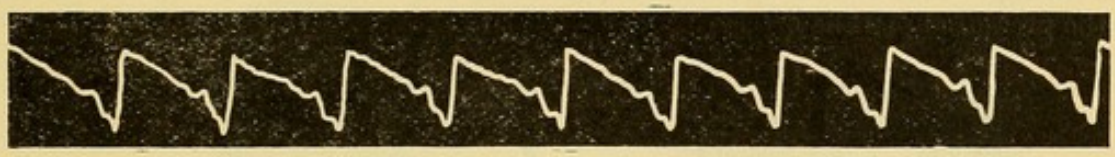


FIG. 51.—Sphygmograph. (Marey.)

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.

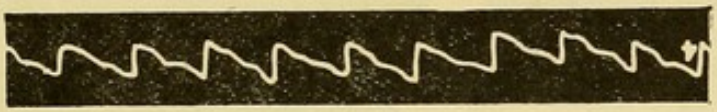
No. 1.—Normal pulse.



No. 2.—Typhoid fever (period of decline).



No. 4.—Rheumatismal pericarditis with fever.



No. 6.—Pulse of an aged man (extreme rarity of beats).



SPHYGMOGRARH 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

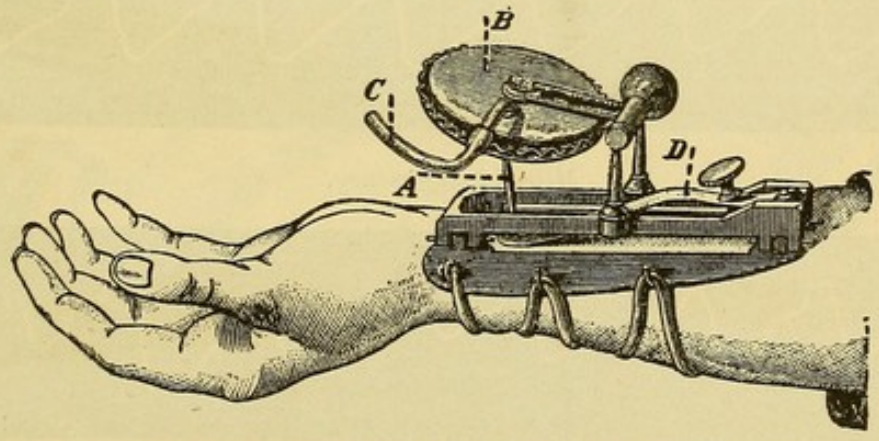


FIG. 52.—Sphygmograph by transmission. (Marey.)

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.

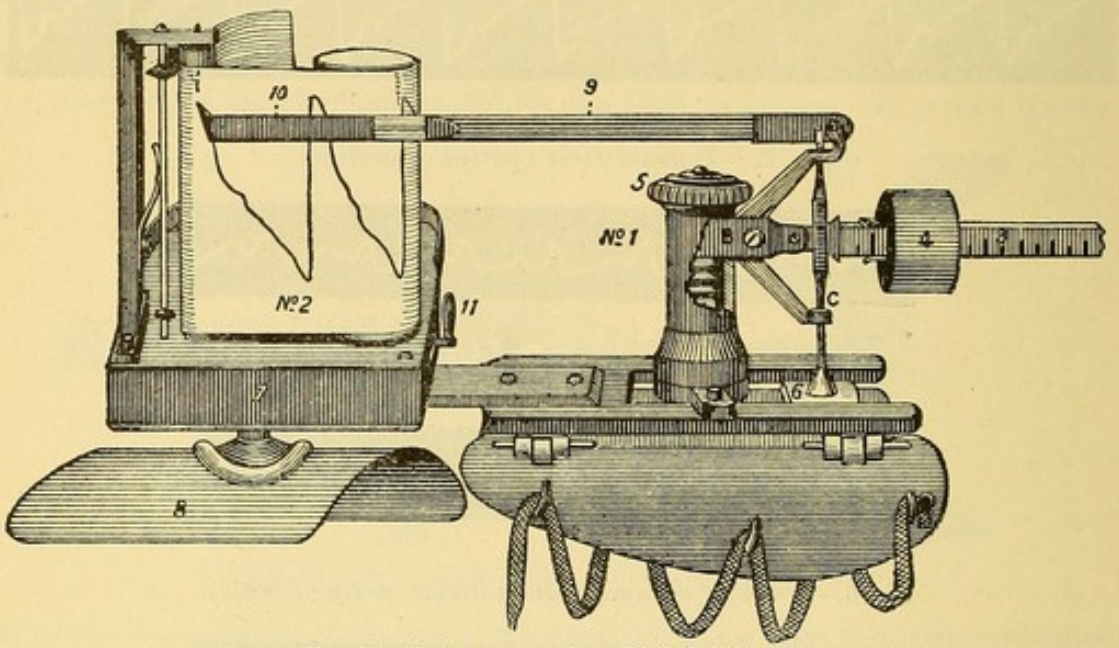
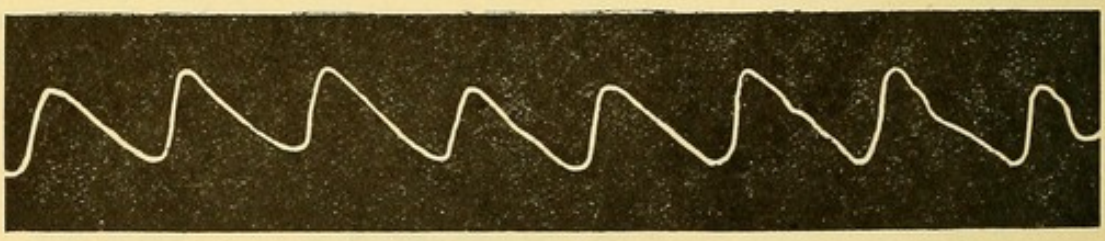


FIG. 53.—Sphygmograph. (Philadelphien.)

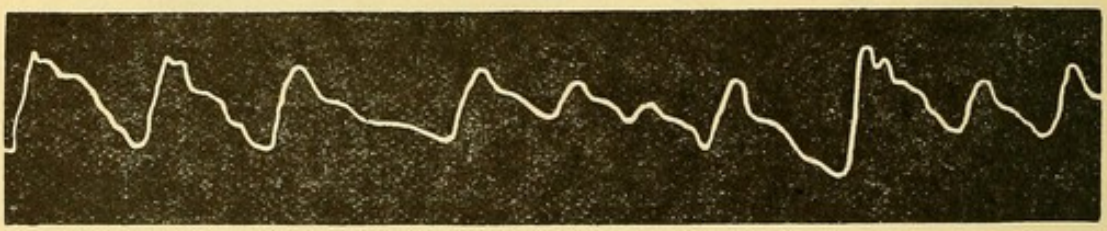
The tracings are made with ink on a band of paper 2, which is a meter long. This instrument permits a number of tracings of variable forms according to the pressure of the ivory plate 6 upon the artery, which is regulated by the weight 4. The screw 5 regulates the plate of ivory 6 in connection with 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.

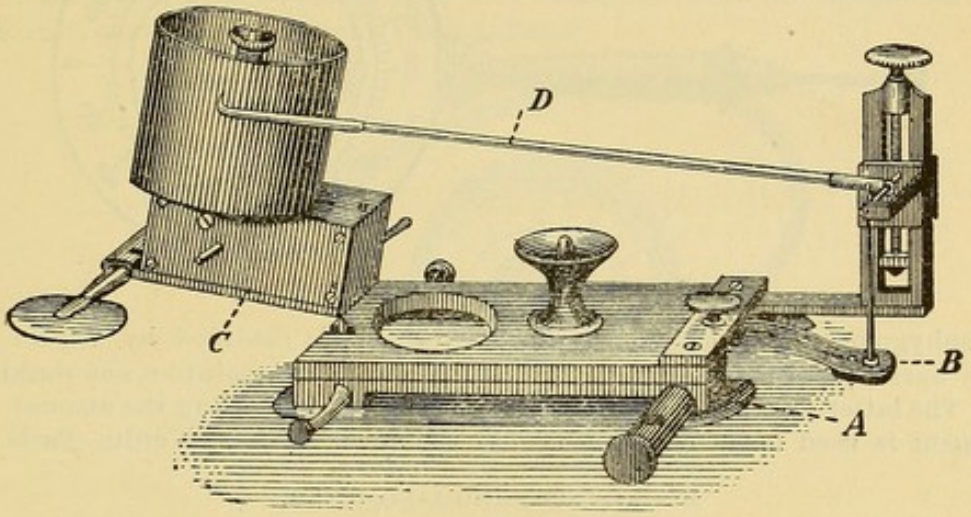


Fig. 54.—Sphygmograph. (Von Frey.)

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

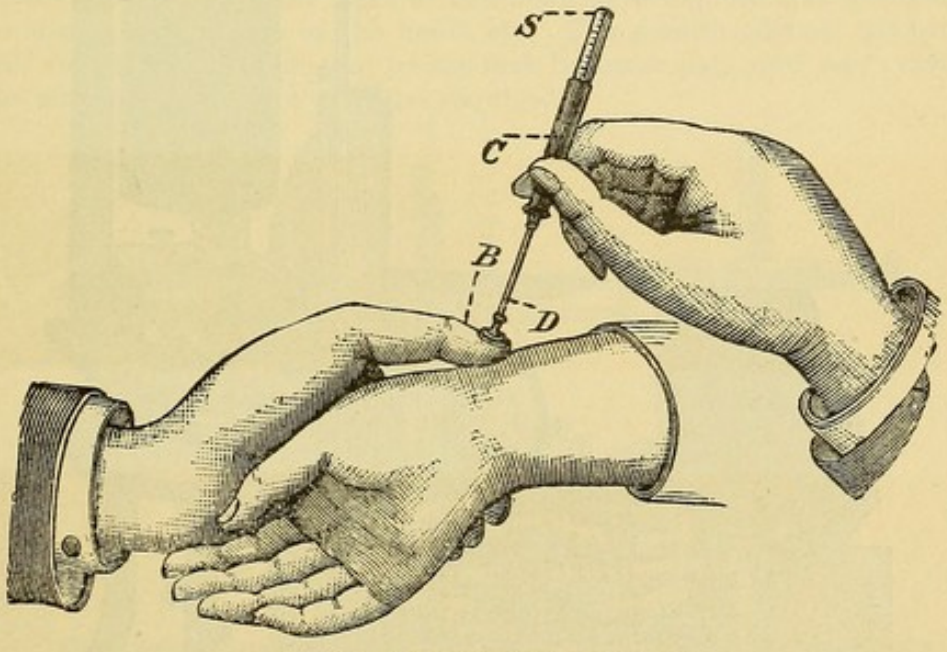


Fig. 55.—Sphygmometer. (Verdin.)

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.

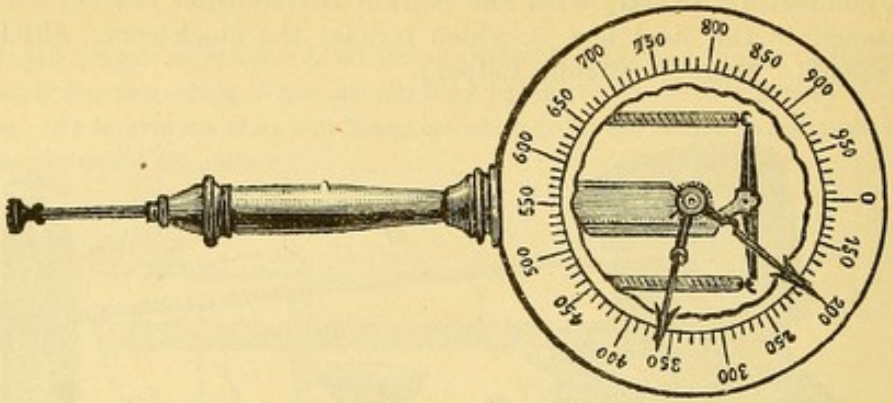


FIG. 56.—Sphygmometer. (Bloch.)

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-

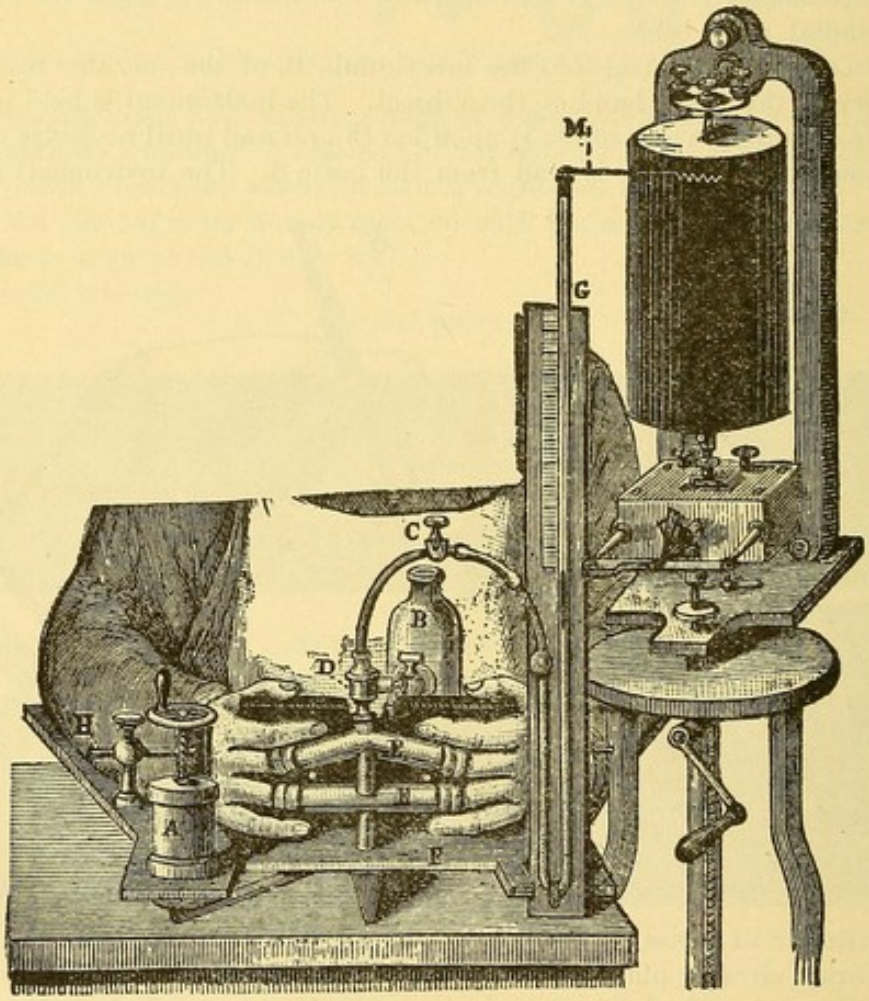


FIG. 57.—Sphygmomanometer. (Mosso.)

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.

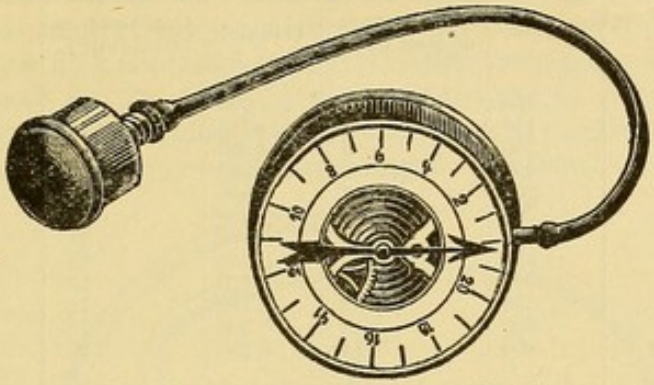


FIG. 58.—Sphygmomanometer. (Basch.)

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.

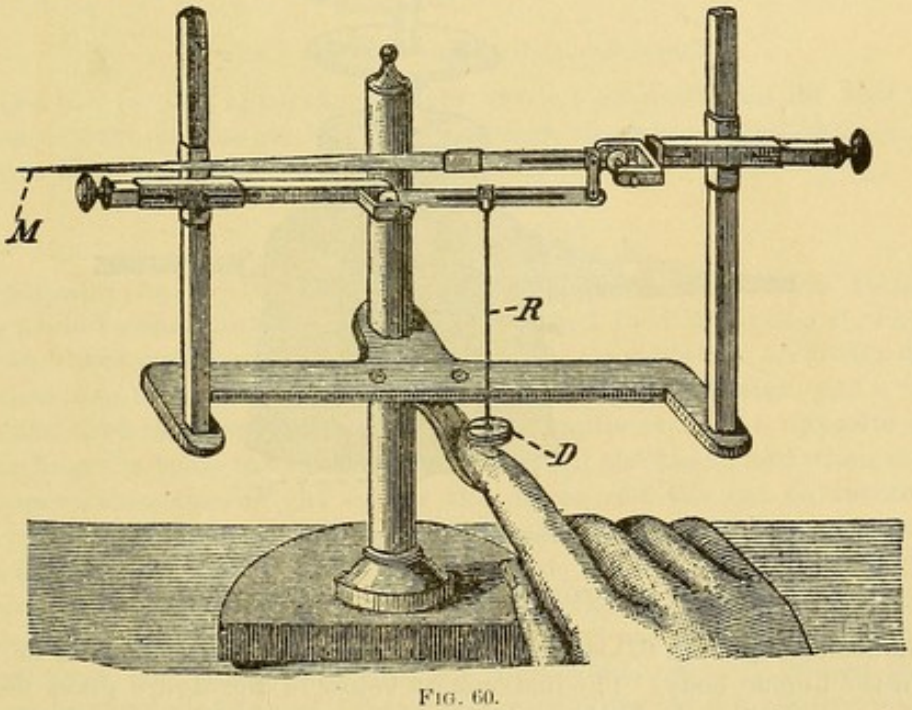


FIG. 60.

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.

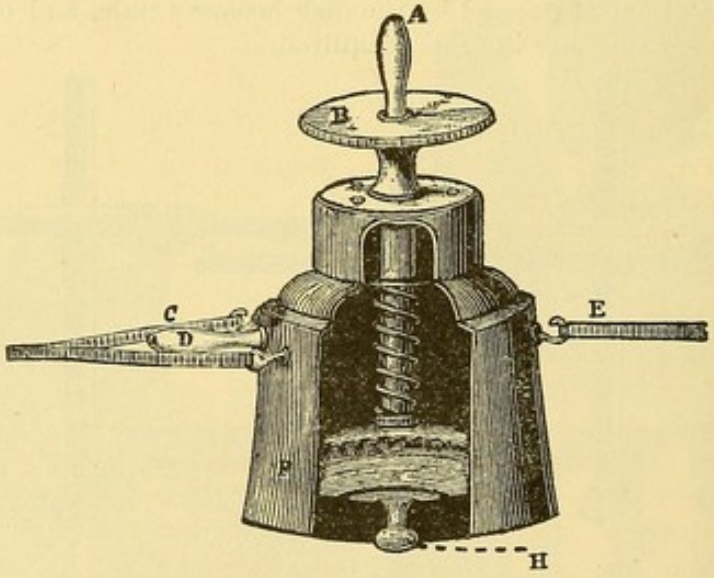


FIG. 61.—Cardiograph stethoscope. (Edgren.)

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.

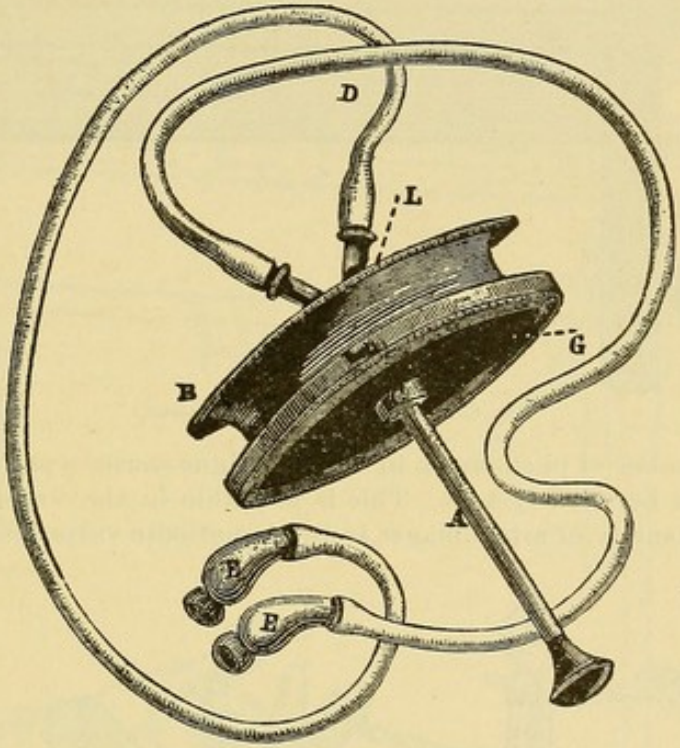


FIG. 62.—Phonendoscope. (Bazzi and Bianchi.)

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.

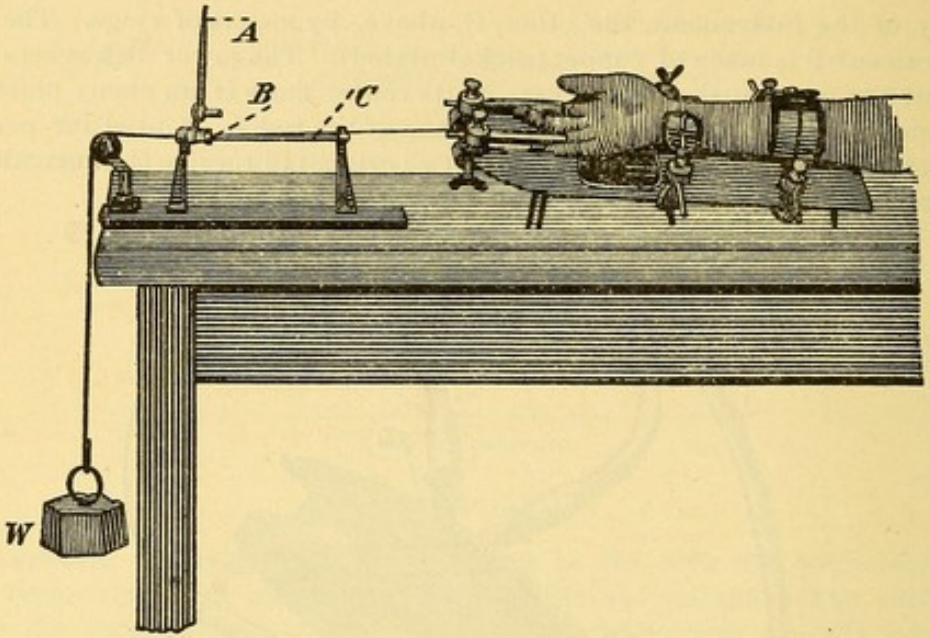


FIG. 63.—The ergograph. (Mosso.)

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.

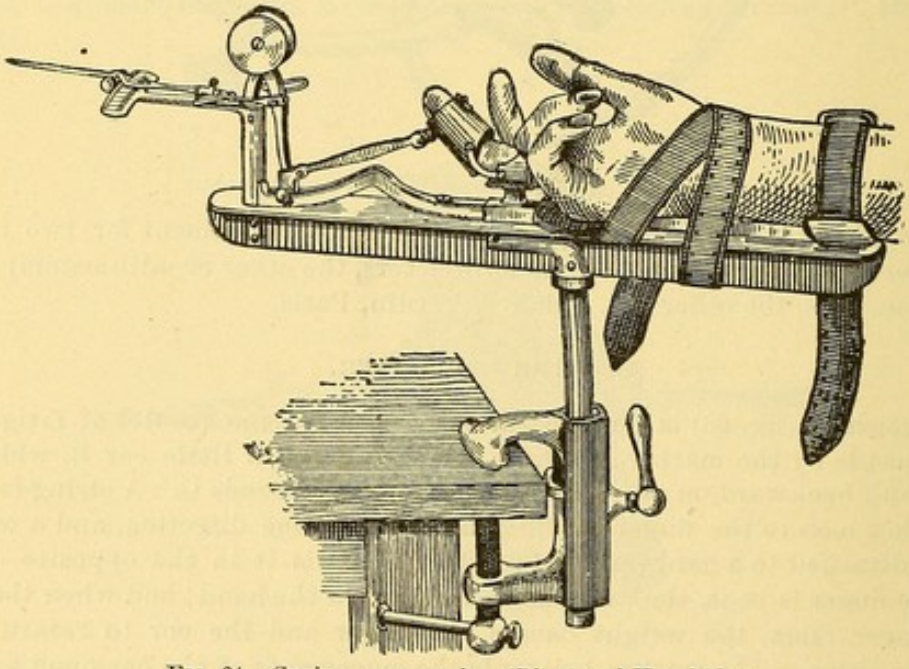


FIG. 64.—Spring ergograph. (Binet and Vaschide.)

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]

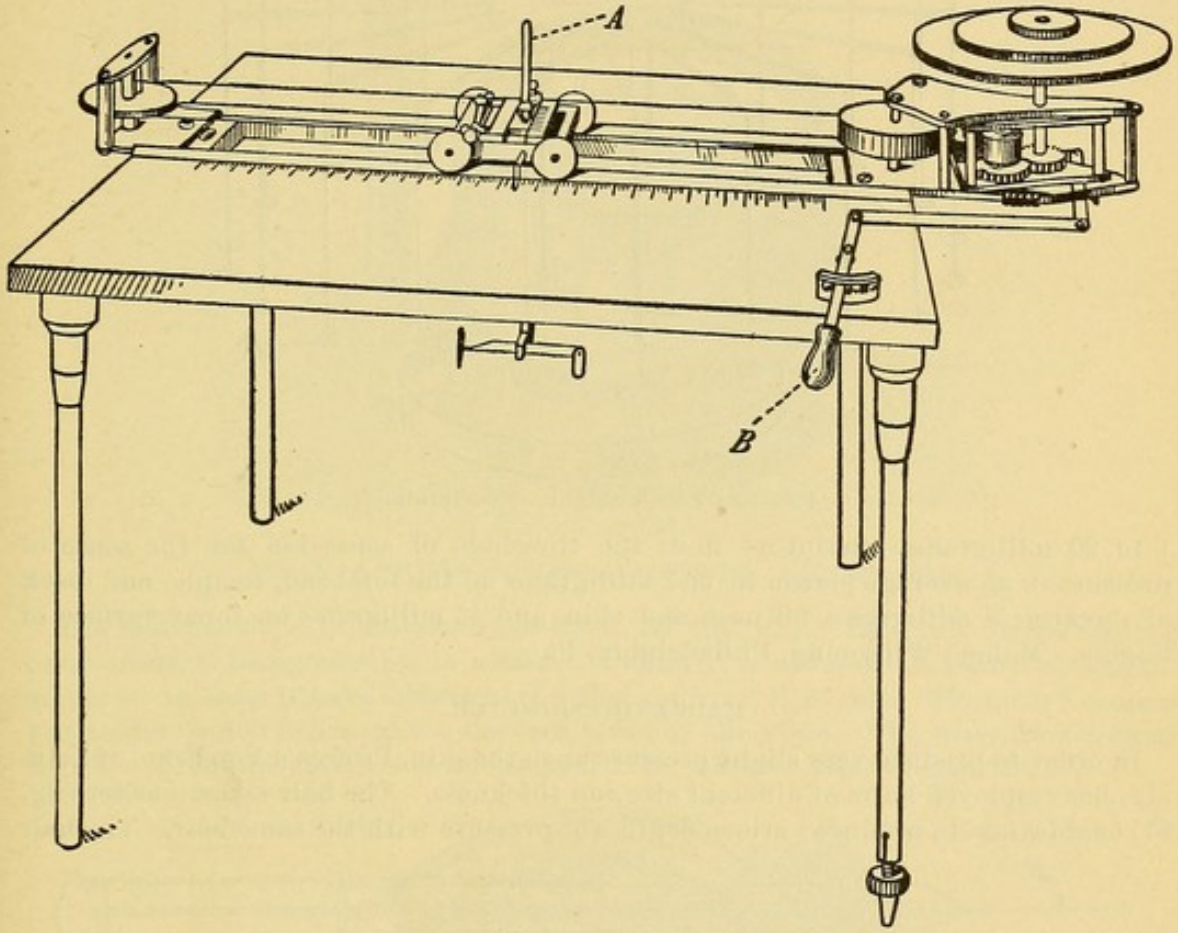


FIG. 65.—Kinesimeter. (Scripture and Titchener.)

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.

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[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

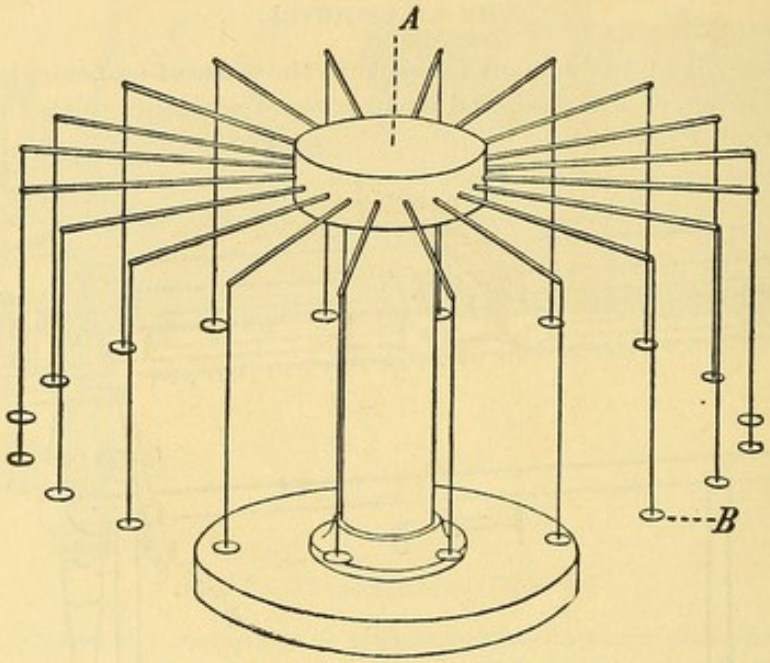

FIG. 66.—Touch-weights. (Scripture.)

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

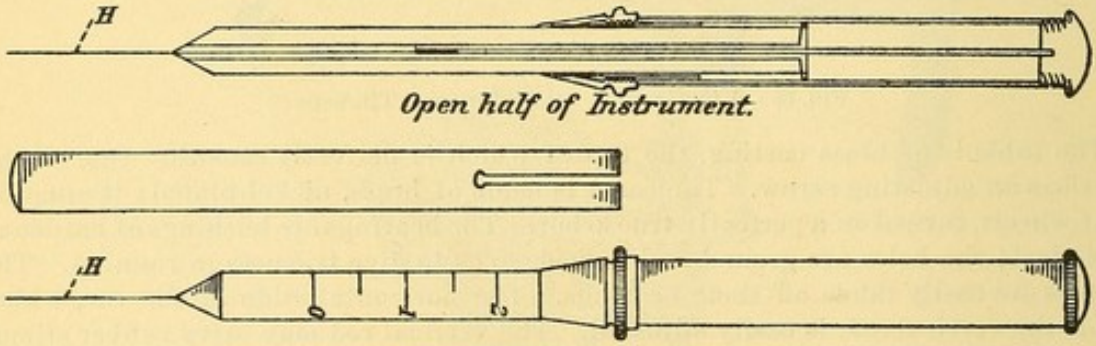

FIG. 67.—Hair-esthesiometer. (Von Frey.)

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.

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[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.

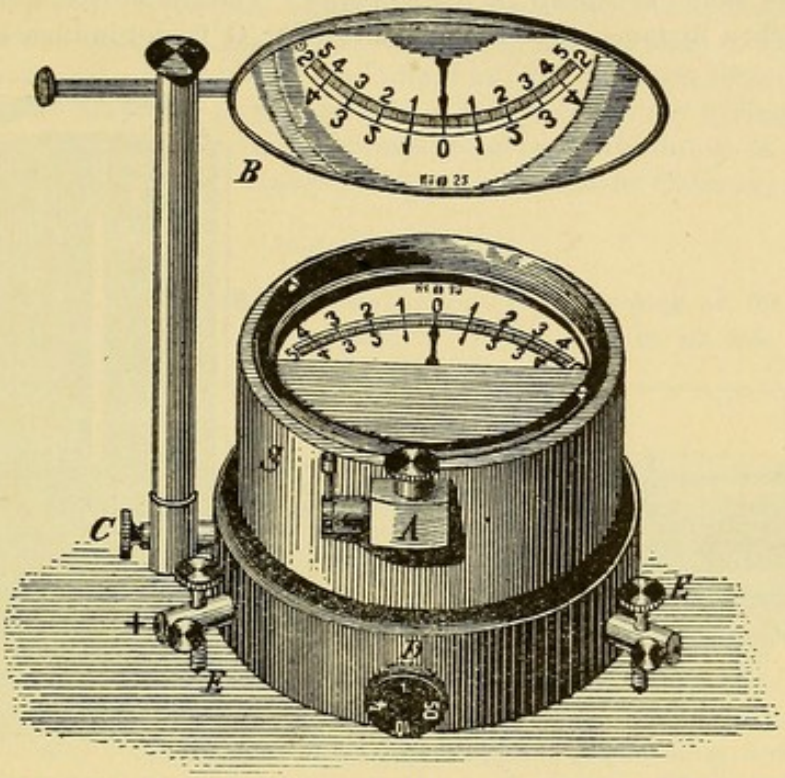

FIG. 68.—A periodic horizontal galvanometer. (Hirschmann.)

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.

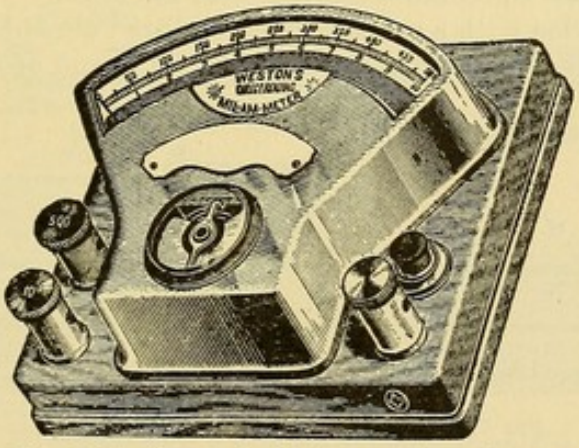

FIG. 69.—Weston's standard direct-reading mil-am-meter.

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

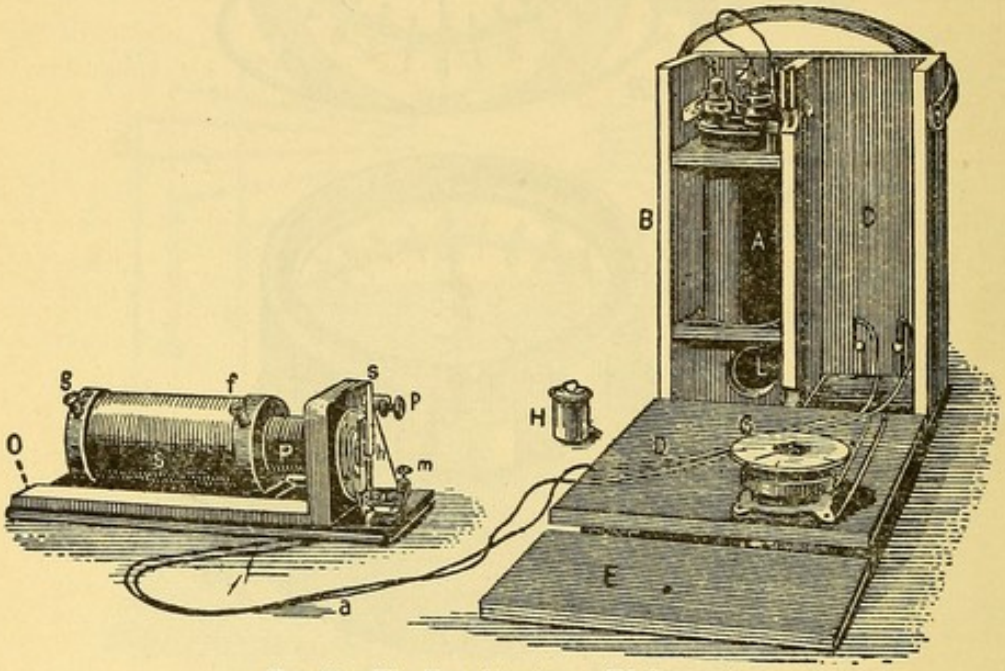

FIG. 70.—The Faradimeter. (Edelmann.)

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

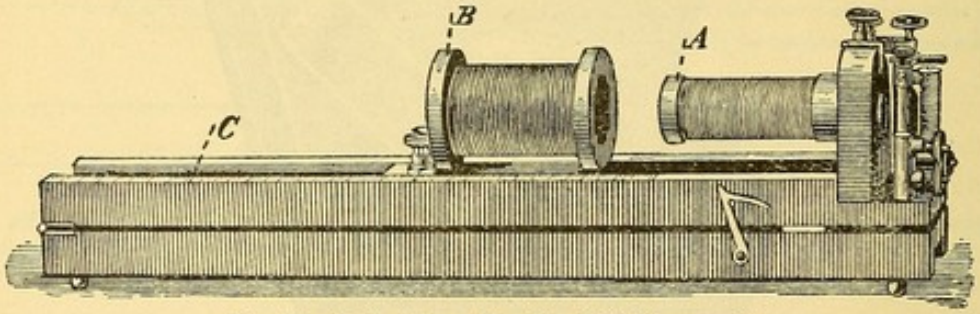

FIG. 71.—Induction coil. (Du Bois-Reymond.)

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

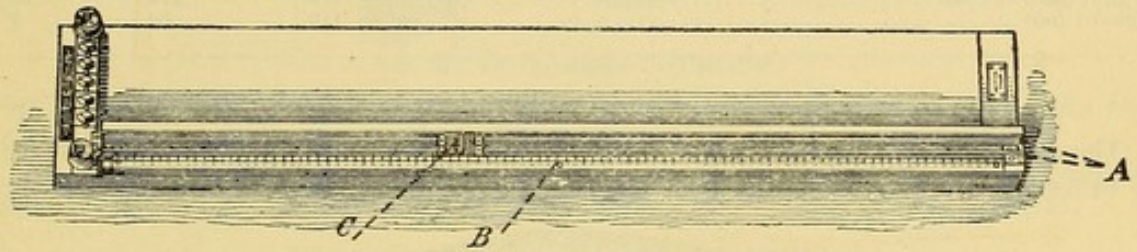

FIG. 72.—Du Bois-Reymond's rheocord.

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

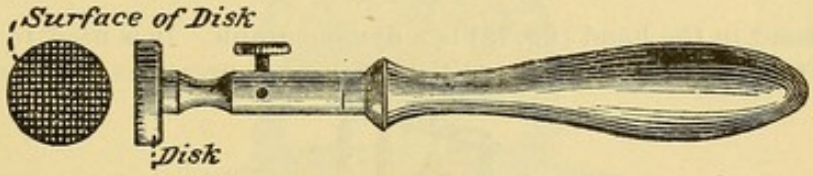

FIG. 73.—Erb's electrode.

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

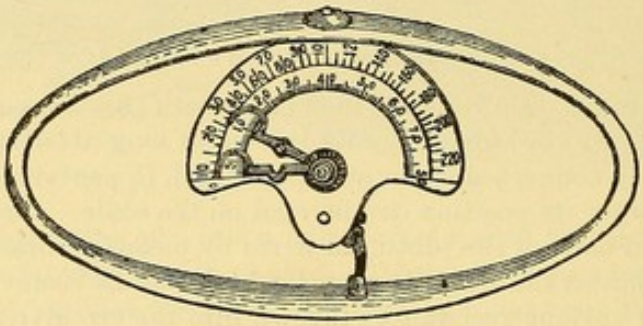

Fig. 74.—Dynamometer. (Collin.)

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 Salpétrière, at Paris, to record the different impressions which certain hys-

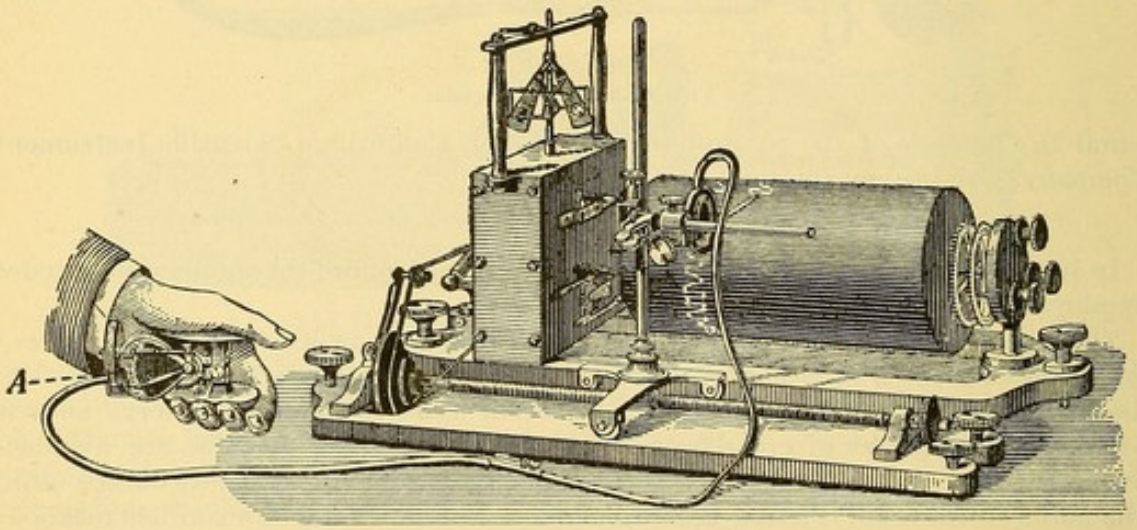

FIG. 75.—Dynamograph. (Duchêne.)

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

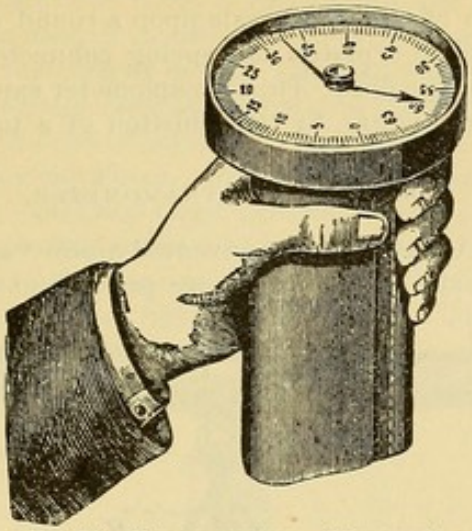

FIG. 76.—Dynamometer. (Ulmann.)

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

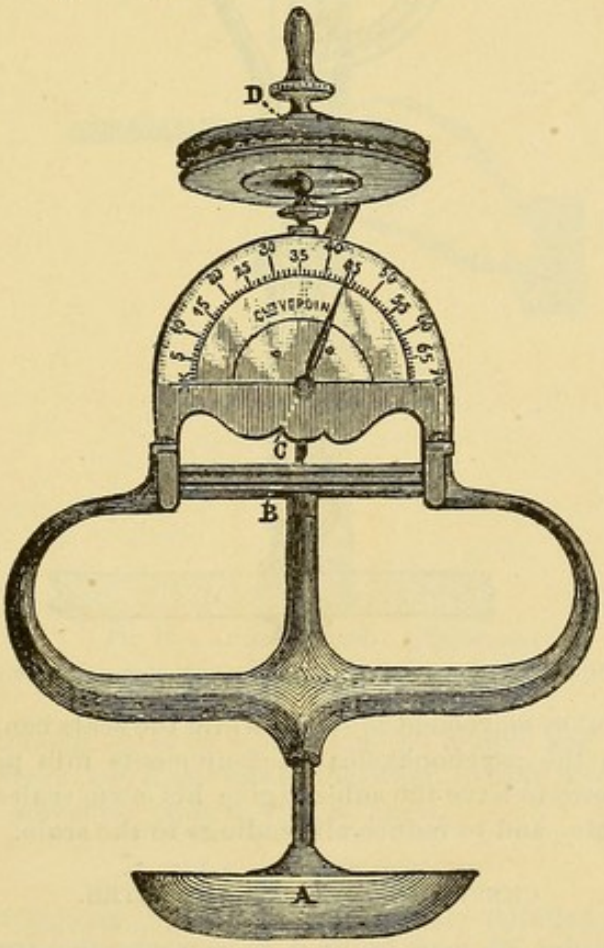

FIG. 77.—Dynamometer of Chéron and Verdin.

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

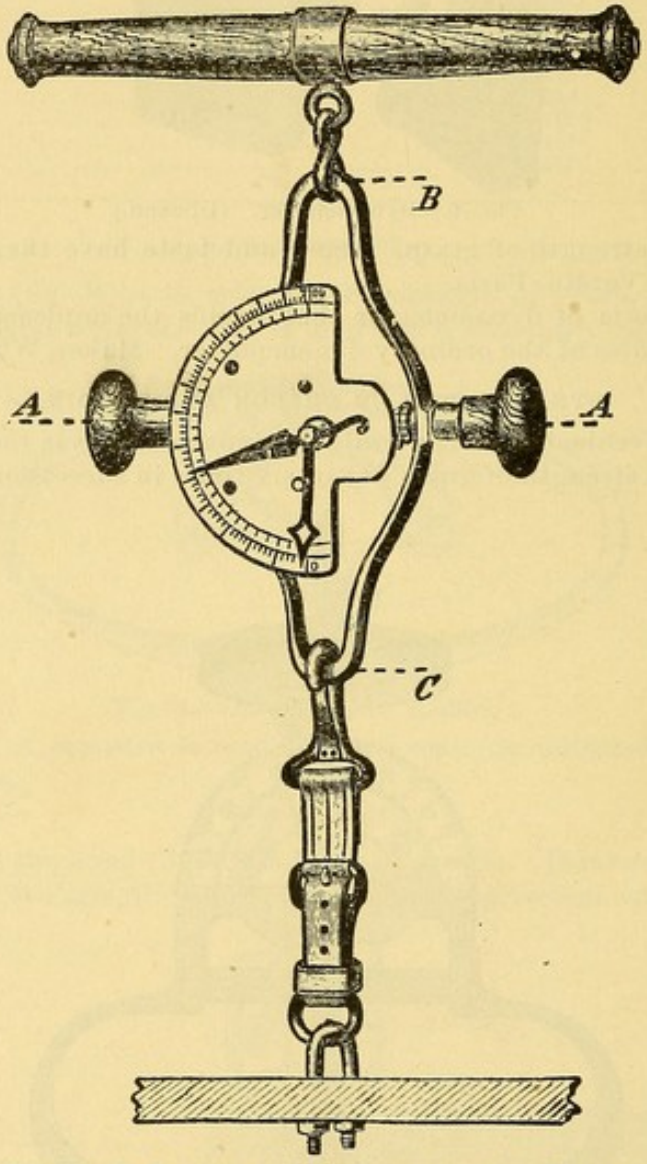

FIG. 78.—Back, chest, and leg dynamometer. (Pfarre.)

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.

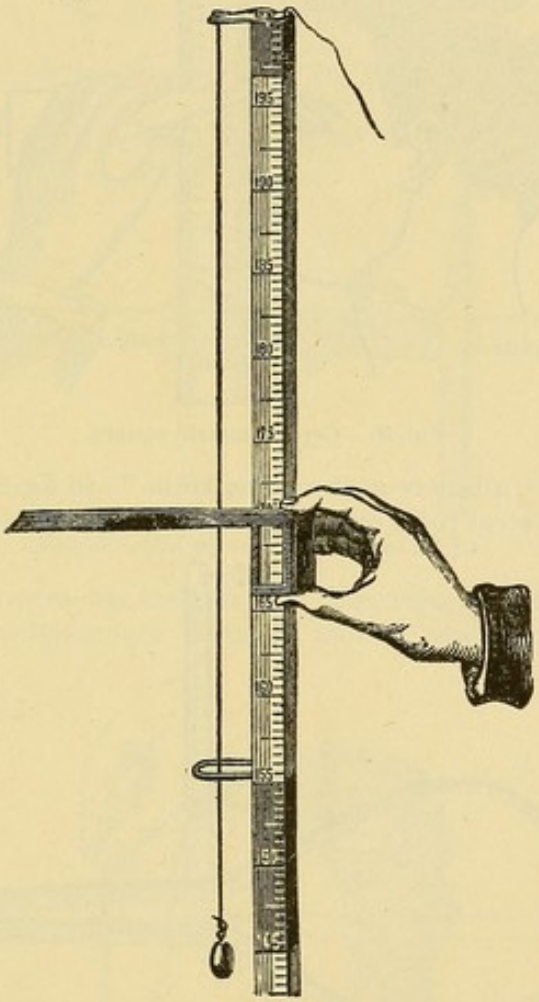

FIG. 79.—Anthropometer. (Topinard.)

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.

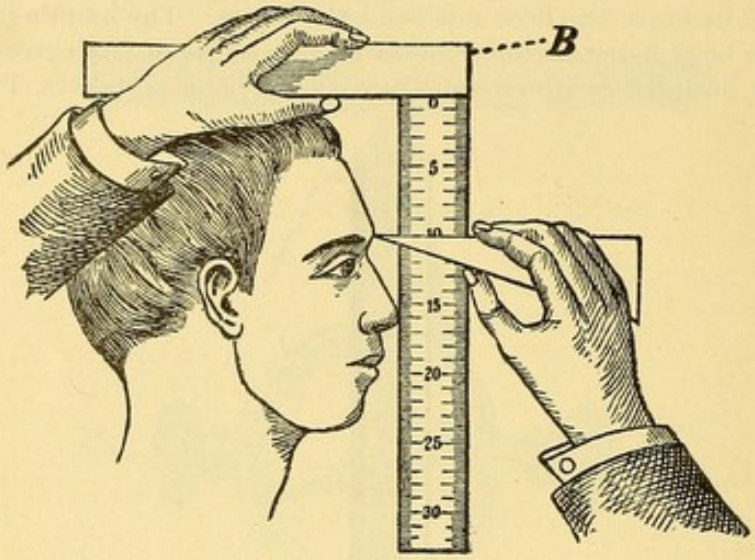

FIG. 80.—Cephalometric square.

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

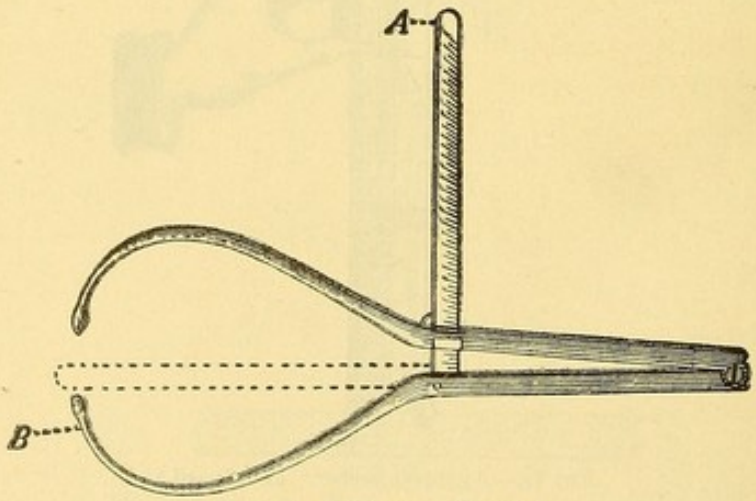

FIG. 81.—Calipers. (Broca.)

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.

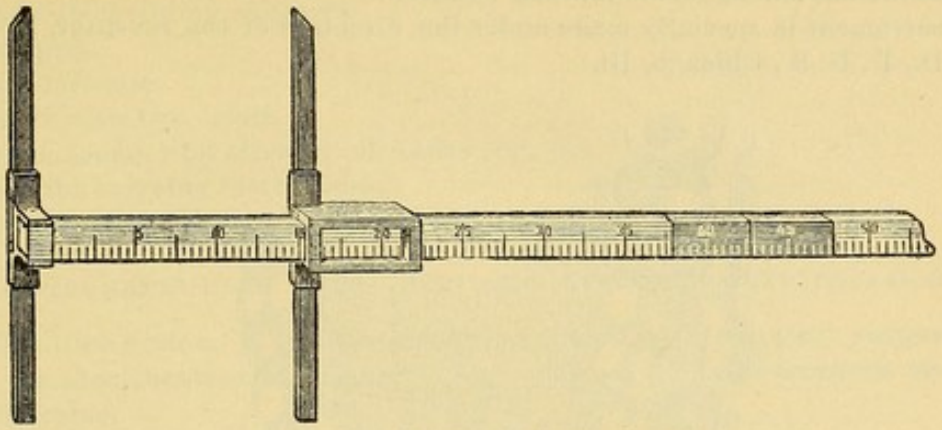

FIG. 82.—Calipers. (Topinard.)[2]

HEIGHT OF VAULT OR PALATE.

In 4,614 measurements Talbot finds the average height of the palate to be 0.58 of

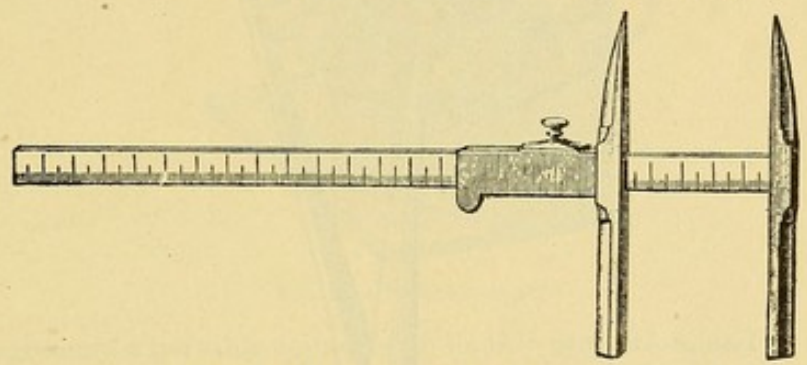

FIG. 83.—Sliding calipers. (Topinard.)

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

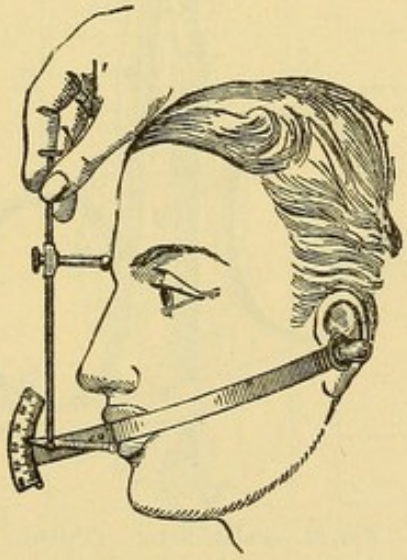

FIG. 84.—Goniometer. (Topinard.)

height of the arch. The cut (fig. 85) shows the position of the instrument when the measurement is made:

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[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.

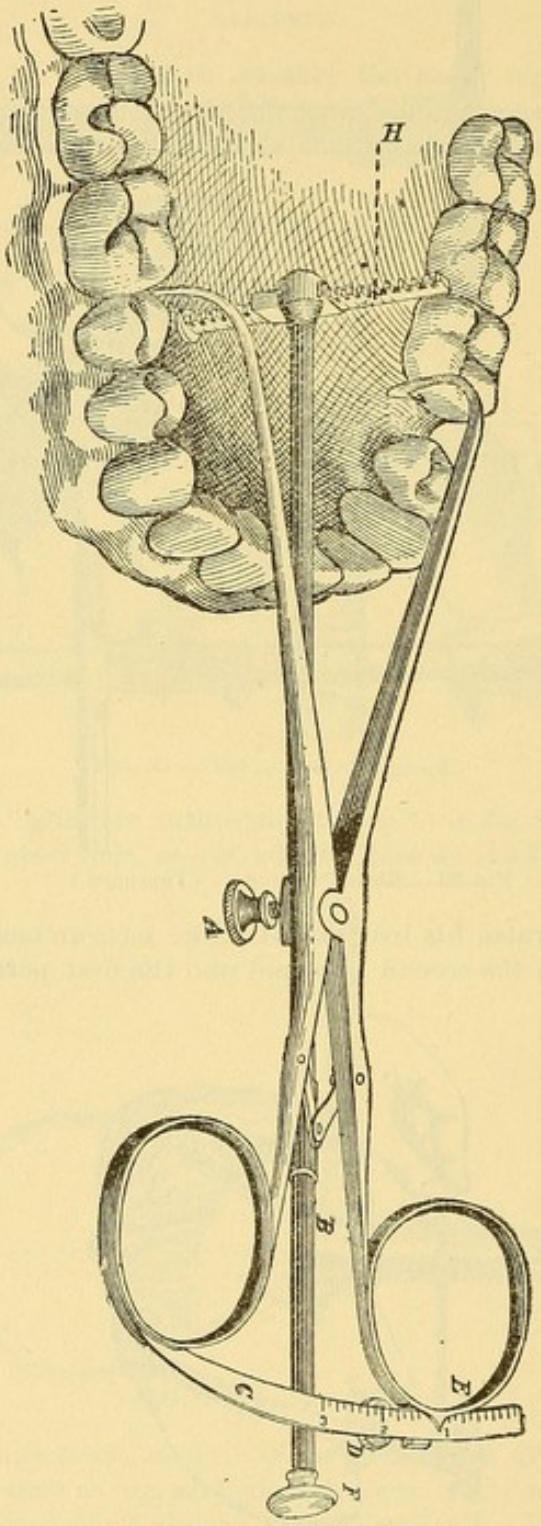

FIG. 85.—Palatometer. (Talbot.)

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.

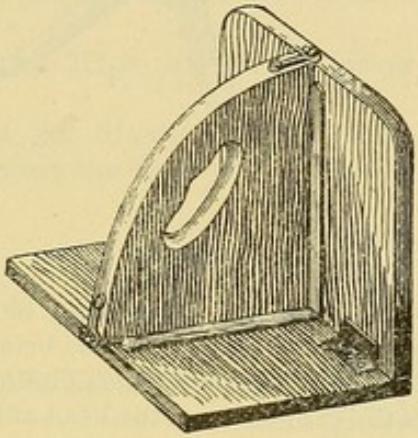

Fig. 86.—Portable square.

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.

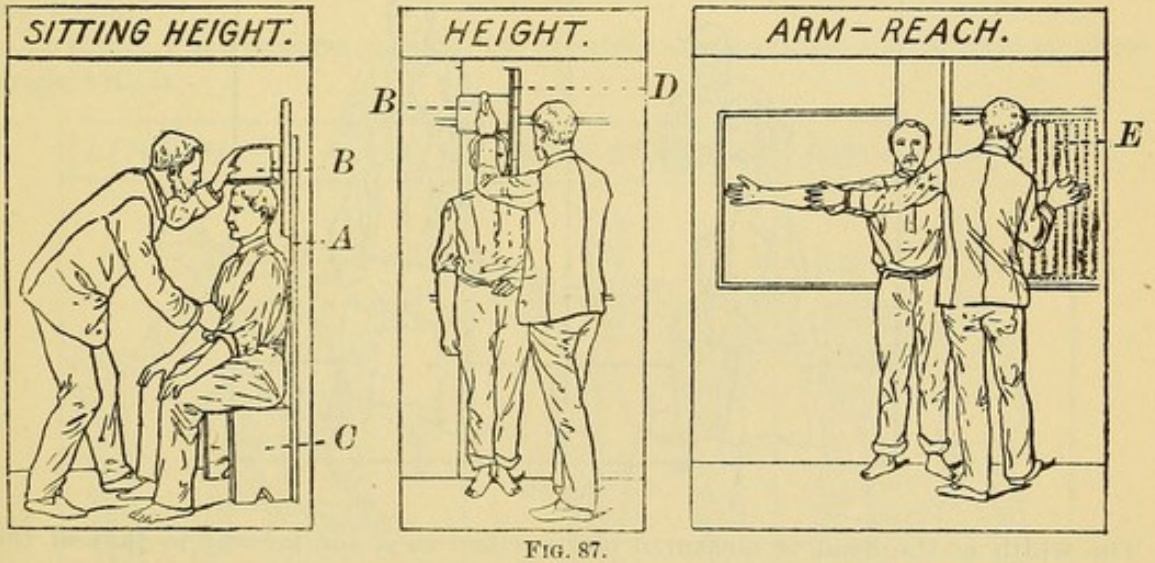

Fig. 87.

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

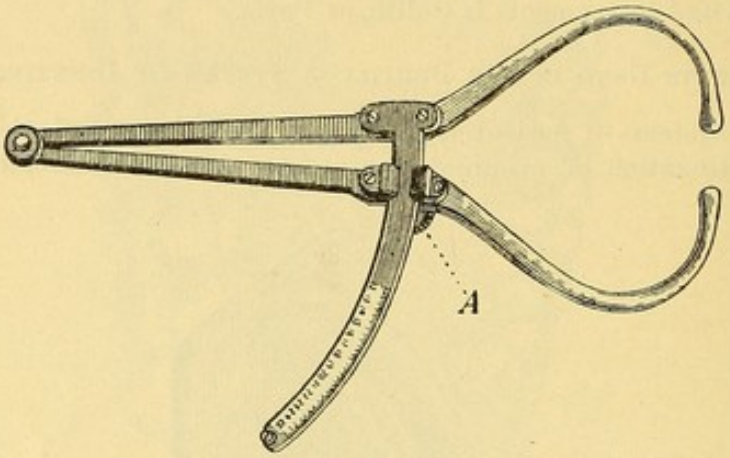

FIG. 88.—Calipers.

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.

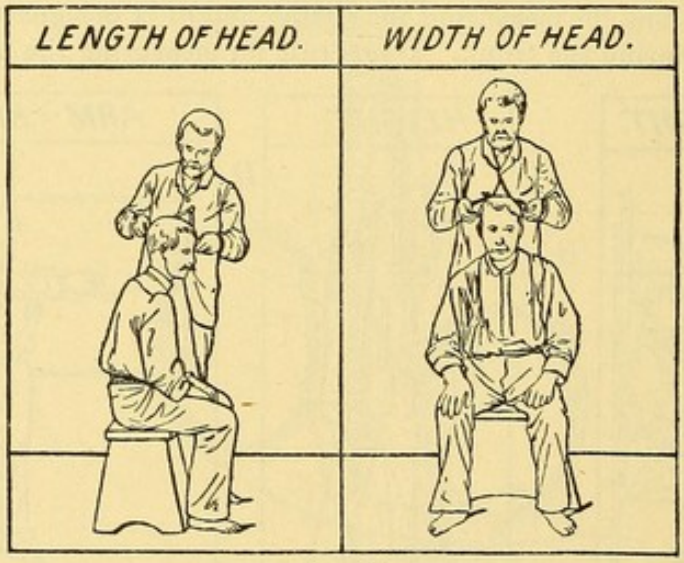

FIG. 89.

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

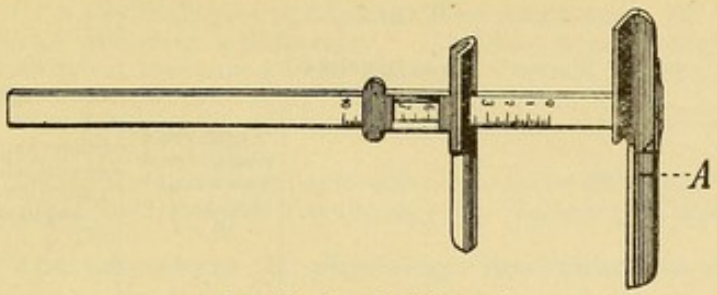

FIG. 90.—Small caliper rule.

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

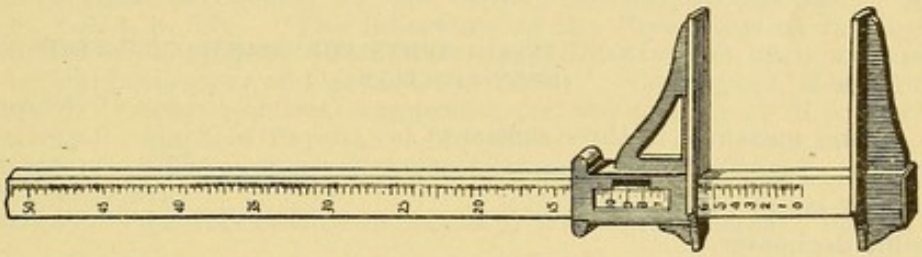

FIG. 91.—Large caliper rule.

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.

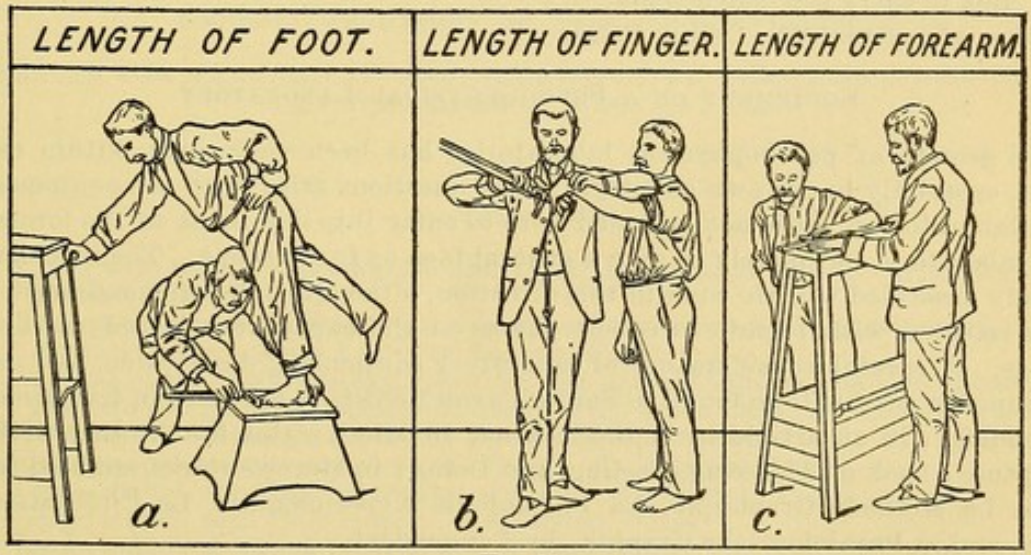

FIG. 92.

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 clastic model, showing the course of the nerve-fibers throughout the encephalic mass. After Luys, by Auzoux, Paris.
3. Natural sized clastic model, showing the nerve-fibers on one hemisphere, and the cerebral ganglion masses on the other. After Luys, by Auzoux, Paris.
4. Natural sized clastic 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 clastic 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_5, 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_3, to be used with the organ bellows. The Ut_2 duplicated. By Koenig, Paris.
54. Eight stopped pipes, giving the scale from Ut_3 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.).

PRELIMINARY TRAINING FOR STUDY IN A PSYCHO-PHYSICAL LABORATORY.

It is difficult to recommend to students, after graduating from college, just what studies to pursue preliminary to taking up psycho-physics, which touches upon so many different departments of knowledge. The writer will venture a few remarks and suggestions.

Physiological psychology, or psycho-physics,[a] is no misnomer for modern psychology, because it is as much if not more physical than psychical. That, consequently, a somewhat extensive knowledge of physiology is a *sine qua non* for the thoroughly trained modern psychologist goes without saying; and this is as true whether there be sympathy or not with the modern view, for in the latter case the psychologist can hardly avoid discussing some of the results of physiology; and such discussions, to be trustworthy and valuable, must be based upon knowledge. And here is not meant mere book knowledge, but experimental knowledge gained in the physiological laboratory; otherwise, when one speaks of sensations, reflex action, afferent and efferent nerves, etc., it is difficult to understand how he can have any adequate insight into the objective reality of these phenomena. It is not intended that any large amount of time be required for purely physiological laboratory work. A term's course—say of six hours a week—might be the minimum. In this case it is assumed that the student has a general knowledge of human and comparative physiology.

If the above requirements are necessary for one who proposes to study psycho-physical questions, it may be inquired further as to anatomical knowledge. That a proper conception of physiology is not possible without anatomy is so obvious as to be commonplace. A general dissection of the body and special dissection of the sense organs and brain, while it would require more time than the physiological course, would be well worth the extra trouble, since it is preliminary foundation work, and is also necessary for the investigation of pathological clinical cases, some of which are of the highest importance for the psycho-physicist. For this and other reasons an elementary course in practical histology is necessary. Thus it is not clear how any student without practical knowledge of coarser and finer anatomy can study and discuss intelligently questions concerning cerebral localization, cranial and spinal nerves, spinal column, medulla oblongata, etc. A study of medicine in the laboratory and clinic sufficient to gain a medical way of looking at things is a desideratum. Such training also is very valuable for students of criminology or other pathosocial subjects.

It may be objected that many of the facts learned in such a course of study would not be of direct utility, but this could be urged against almost any course of study. The value of such negative knowledge consists in serving as a sort of ballast in aiding the student in avoiding mistakes.

It may be said that if practical courses in anatomy and histology are requisites, why not also similar courses in pathology and psychiatry. It is true that these would be valuable; but there must be a limit. Perhaps the student could take up individual pathological cases as they came in the course of his work, provided he has the physiological and anatomical knowledge of normal man before mentioned. It is assumed that the specialist in psycho-physics will read the writings of specialists in physiology, anatomy, and pathology when they treat of topics that bear directly on his own studies. To read such literature, appreciate the points of discussion, and make decisions as to weight of evidence requires at least a practical elementary knowledge of the subjects.

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[a] The writer prefers this term to "physiological psychology," which deals often with that which is not physiological, but pathological.

But it may be objected that, with accurate book learning and good diagrams, one can gain sufficient insight without going to the trouble of taking the practical courses. This objection is perhaps more æsthetical than rational, for many do not care for or are averse to dissection. It is a well-known difficulty, common to medical schools, to obtain faithfulness in dissection. There seems to be a natural disinclination, not only of the nature of dread or disgust that may appear on first entering the dissecting room, but another feeling, that is easier experienced than described. The psycho-physicist who has no medical training is very liable to have a strong disinclination to practical work in anatomy, even if he believes in its utility and necessity. Then there is sometimes the feeling that it is so much easier and saves time to sit quietly in one's own room and study the books and diagrams.

It may be said that many good workers in psycho-physics have never had this preliminary training. This is true; but they have succeeded in spite of this fact. As is well known, many students of philosophy, having become dissatisfied with its methods and results, have turned their attention to experimental psychology, and have neither time nor opportunity to return to preliminary work, which they could have done had they known beforehand the subsequent direction of their studies.

The fact that the majority of leaders in the department of physiological psychology in Europe were previously physicians or students of medicine indicates the direction which the preliminary training in psycho-physics should take.

SPECIAL STUDIES IN EDUCATIONAL INSTITUTIONS.

Susceptibility to Disease and Physical Development in College Women.[a]

It is unnecessary to say that the conclusions drawn from the tables below are only tentative. To confirm or to limit such conclusions, a much larger number of facts would be necessary.

The tables are given in averages.[b]

The measurements of weight, lung capacity, height, and strength were made wholly independent of the medical examination. The number of students in all is 1,486. When the numbers for any age are very small, their averages are omitted in the tables.

CONCLUSIONS.

Comparing those who report no diseases (Table I) with those having had one or more diseases (Table II), we find that those with no diseases are less in weight, but greater in height and lung capacity, and about equal in strength to those having had one or more diseases. As far as these data go, they seem to indicate that strength and weight are not necessarily signs of health, or rather of lack of susceptibility to disease.

The only difference between those having any disease (Table II) and those having constitutional diseases is that the latter are shorter in stature than the former, but in strength, weight, and lung capacity there is no marked difference.

Those having had typhoid fever (Table III) show a superiority in lung capacity and strength, but are inferior in weight and slightly so in height to those having diseases in general (Table II). The typhoid cases compared with all cases of specific infectious diseases are inferior in weight, height, and

[a] Article by the author in The Philadelphia Medical Journal.

[b] The data from which the tables are made were kindly furnished by the professor of physical culture and the resident physician in one of our women's colleges.

strength. This confirms to a certain extent the remark of Hildebrand that delicate slender people are much more subject to typhoid fever than to consumption.

The cases of infectious diseases (Table IV) are distinctly superior in weight, lung capacity, height, and strength to those having diseases in general (Table II).

On the other hand, those having hereditary diseases (Table VII) are inferior in weight and slightly so in height to those having had diseases in general (Table II). If we compare the cases of hereditary diseases directly with those of specific infectious diseases (IV), the contrast is still more marked, showing the hereditary cases to be inferior in weight, lung capacity, height, and strength to the cases of infectious diseases.

Comparing cases of scarlet fever (Table XIII) with those of infectious diseases (Table IV) in general, the only noticeable difference is that the former are inferior in height to the latter.

Those having diseases of the digestive system (Table VI) show less weight and lung capacity, but greater height, than those with diseases in general (Table II).

Those with insufficient respiration (Table XI) have less weight but (contrary to expectation) greater lung capacity and height than those with diseases in general (Table II).

Cases of heart murmurs (Table XII) show greater weight, lung capacity, height, and strength to cases of diseases in general (Table II).

Those with habitual headache (Table IX) are inferior in weight, height, lung capacity, and strength to those with diseases in general (Table II).

Tables of susceptibility to disease and physical development of college women.

ALL.

Number.	Nearest age.	Weight.	Lung capacity.	Height.	Strength of—		
					Arms.	Right hand.	Left hand.
		Pounds.	*Cubic inches.*	*Centimeters.*	*Kilograms.*	*Kilograms.*	*Kilograms.*
1	15	102	175	160	23	26	22
9	16	122	171	162	27	26	24
126	17	118	156	166	27	23	20
462	18	118	164	161	27	23	20
468	19	116	160	161	27	23	21
260	20	117	162	161	27	24	21
90	21	112	159	160	27	23	20
32	22	113	165	160	27	24	21
20	23	112	151	160	26	24	21
12	24	127	167	163	29	26	23
3	25	107	165	166	22	20	20
2	26	107	127	160	34	26	25
1	28	117	160	163	19	31	27

TABLE I.—THOSE REPORTING NO DISEASES.

41	17	118	163	162	27	22	20
178	18	119	166	162	27	24	21
128	19	115	168	161	27	23	20
73	20	117	164	164	28	25	22
10	21	112	165	161	24	21	19
10	23	116	167	159	26	26	23

TABLE II.—ALL HAVING HAD ONE OR MORE DISEASES (DISEASES IN GENERAL).

61	17	119	168	161	27	23	20
226	18	118	162	161	27	23	20
280	19	116	161	160	27	23	20
138	20	118	162	161	27	23	20
51	21	113	157	160	27	22	20
11	22	109	159	160	26	24	22

Tables of susceptibility to disease and physical development of college women—Continued.

TABLE III.—TYPHOID FEVER.

Number.	Nearest age.	Weight.	Lung capacity.	Height.	Strength of—		
					Arms.	Right hand.	Left hand.
		Pounds.	*Cubic inches.*	*Centimeters.*	*Kilograms.*	*Kilograms.*	*Kilograms.*
17	18	117	169	160	28	23	20
26	19	117	164	162	26	23	20
11	20	117	171	160	27	22	21

TABLE IV.—SPECIFIC INFECTIOUS DISEASES.

28	17	119	163	159	27	23	20
59	18	118	167	163	28	22	20
106	19	123	176	161	28	25	21
49	20	120	169	162	30	23	21
28	21	114	169	161	29	24	21

TABLE V.—CONSTITUTIONAL DISEASES.

31	18	119	161	151	26	24	21
22	19	120	164	163	25	24	20
32	20	118	160	161	25	23	20

TABLE VI.—DISEASES OF DIGESTIVE SYSTEM.

1	16	158	220	167	33	28	18
18	17	117	165	162	27	23	20
59	18	120	164	162	27	24	21
77	19	145	151	160	25	23	20
42	20	116	155	161	26	23	20
17	21	112	167	161	26	23	20

TABLE VII.—HEREDITARY DISEASES.

22	17	118	157	160	28	22	20
56	18	116	168	161	25	23	20
60	19	119	163	161	26	23	21
40	20	112	163	159	25	22	20

TABLE VIII.—DISEASES OF NERVOUS SYSTEM.

18	18	120	162	164	28	25	21
59	19	115	160	160	26	24	22
12	20	113	162	162	25	22	20

TABLE IX.—HABITUAL HEADACHE.

29	18	115	162	160	26	23	21
46	19	113	155	160	24	22	20
17	20	113	171	160	26	20	19
11	21	111	147	158	24	23	22

TABLE X.—DISEASES OF RESPIRATORY SYSTEM.

18	17	121	164	162	26	22	20
57	18	120	158	161	26	24	21
84	19	114	159	160	27	23	20
48	20	119	163	161	27	23	22
12	21	111	154	160	26	22	19

Tables of susceptibility to disease and physical development of college women—Continued.

TABLE XI.—INSUFFICIENT RESPIRATION.

Number.	Nearest age.	Weight.	Lung capacity.	Height.	Strength of—		
					Arms.	Right hand.	Left hand.
		Pounds.	*Cubic inches.*	*Centimeters.*	*Kilograms.*	*Kilograms.*	*Kilograms.*
36	17	118	170	163	27	22	21
95	18	116	164	162	27	23	20
119	19	116	162	161	27	22	20
52	10	116	164	160	27	23	20
32	21	112	162	160	27	23	21

TABLE XII.—HAVING HEART MURMURS.

21	17	125	180	164	24	23	20
61	18	117	167	162	28	23	21
62	19	117	166	162	28	24	20
23	20	122	170	168	27	24	22
18	21	112	175	162	26	23	21

TABLE XIII.—SCARLET FEVER.

11	17	122	166	158	30	23	20
19	18	118	166	164	27	22	20
22	19	120	170	161	26	24	21
10	20	120	161	162	50	26	23

The weight is in pounds, the lung capacity in cubic inches, the height in centimeters, and the strength in kilograms.

MEASUREMENTS OF CHATTANOOGA SCHOOL CHILDREN.[a]

We shall add here a few further measurements of school children of Chattanooga, Tenn. We regret the number is not larger.

We have given some conclusions especially as indicating a purely experimental stage of investigation. It might be asked, for instance, what relation could there be between color of eyes and weight and strength, etc. We can not say, but if we had larger numbers, further subdivisions could be made and other factors that might have influence excluded until finally the relation, if real, could be determined.

To neglect every relation that a priori seems improbable is not consistent with the history of investigation, for it has happened that some of the most unsuspected relations have turned out through further inquiry to be of great importance.

Chattanooga school children.—In this study of the Chattanooga children is recorded one of the first, if not the first, measurement of school children of the South.

Measurements were taken of weight, height, strength, and sensibility to pain. The teachers reported also as to whether the pupil was bright, dull, or average in general, and as to the standing of the pupil in particular studies. In order that a fair estimate as to the ability of the pupil might be made, a pupil was marked average whenever there was any doubt.

The date of birth, order of birth, and color of hair and eyes were also noted. The children were divided into blondes, mediums, and brunettes. If such char-

[a] Prof. William E. Ashcroft and Superintendent Dr. A. T. Barrett kindly made the measurements.

acteristics should be related closely to any of the other data, it might in this way be ascertained.

Chattanooga schoolgirls.—Schoolgirls in Chattanooga are slightly taller and heavier for most ages than schoolgirls in Washington. (Tables 1 and 2.)

TABLE 1.—*Washington schoolgirls.*[a]

Number of pupils.	Nearest age.	Average height.	Average weight.	Number of pupils.	Nearest age.	Average height.	Average weight.
		Inches.	*Pounds.*			*Inches.*	*Pounds.*
754	8	47	49	833	14	60	93
883	9	49	54	655	15	62	100
939	10	51	58	450	16	62	105
931	11	53	64	323	17	63	110
876	12	56	73	151	18	63	111
966	13	58	82				

[a] See "Experimental study of children."

The summer born are slightly less in height and strength, and have less sensibility to pain than the winter born for most ages. (Tables 3 and 4.)

Mentally considered (Table 5).—The first born are slightly superior to the second born. Those born in winter are superior to those born in summer.

There is no special difference between blondes and brunettes.

Chattanooga schoolboys.—The Chattanooga boys are superior in weight and height to the boys in Washington. (Tables 6 and 7.) This accords with the general impression that southern men are taller than northern men.

Those born in summer are very slightly inferior in weight, height, and strength to those born in winter. (Tables 8 and 9.) This does not agree (as in the case of girls above, Tables 3 and 4) with Combe's results in Switzerland, who found children born in summer to be taller for their age. As the superiority of winter children in Chattanooga is very slight, it may be due either to the relatively small number measured or to difference of climate, it being severer in Switzerland during the winter than in Chattanooga.

Mentally considered.—The first born boys are slightly superior mentally to both the second born and later born. (Table 10.) Boas found the first born to excel the later born in both stature and weight. This coincides with results of most investigations, showing that superiority of body usually goes with superiority of mind. Thus the children of the nonlaboring (professional and mercantile) classes of Washington not only show a higher percentage of mental ability, but are physically superior to those of the laboring classes.

Chattanooga school children.

TABLE 2.—WHITE GIRLS.

Number of pupils.	Nearest age.	Average height.	Average weight	Strength of—		Sensibility to pain.	
				Right hand.	Left hand.	Right temple.	Left temple.
		Inches.	*Pounds.*	*Kilograms.*	*Kilograms.*	*Grams.*	*Grams.*
10	8	47	.....	11	9	.....	.....
21	9	59	.....	13	11	.....	.....
						(5)	(5)
30	10	52	.....	14	13	2,540	2,830
			(11)			(14)	(14)
30	11	54	70	14	13	2,315	2,415
			(30)			(31)	(31)
49	12	54	77	18	16	2,520	2,590
						(26)	(26)
43	13	58	92	20	18	2,550	2,445
44	14	61	100	21	19	2,687	2,642
35	15	62	101	23	21	2,460	2,463
13	16	62	101	23	20	2,653	2,561

Chattanooga school children—Continued.

TABLE 3.—SUMMER BORN.

Number of pupils.	Nearest age.	Average height.	Average weight.	Strength of—		Sensibility to pain.	
				Right hand.	Left hand.	Right temple.	Left temple.
		Ft. in.	*Pounds.*	*Kilograms.*	*Kilograms.*	*Grams.*	*Grams.*
4	8	3 9		10	8		
8	9	4 5		12	12		
						(1)	(1)
13	10	4 4		14	13	2,400	2,500
			(4)			(4)	(4)
14	11	4 6	71	15	14	2,675	2,537
			(15)			(14)	(14)
27	12	4 9	73	17	15	2,725	2,907
26	13	4 11	91	20	18	2,633	2,561
23	14	5 2	99	21	19	2,755	2,577
16	15	5 2	99	22	21	2,604	2,675
8	16	5 2	100	24	20	2,368	2,275
3	17	5 2	117	20	19	2,532	3,016

TABLE 4.—WINTER BORN.

6	8	4 1		12	10		
13	9	4 2		12	11		
15	10	4 5		14	12	2,775	2,725
			(7)			(9)	(9)
15	11	4 6	69	14	14	2,266	2,366
22	12	4 9	82	19	17	2,351	2,329
			(6)			(8)	(8)
17	13	4 11	82	20	18	2,362	2,193
21	14	5 1	97	21	19	2,611	2,712
18	15	5 3	105	23	21	2,306	2,236
5	16	5 3	103	24	20	3,110	3,020

Chattanooga public schools.

TABLE 5.—GIRLS.

Number.		Bright.	Average.	Dull.	Number.		Bright.	Average.	Dull
		P. ct.	*P. ct.*	*P. ct.*			*P. ct.*	*P. ct.*	*P. ct.*
89	First born	28	65	7	135	Winter born	34	60	6
59	Second born	28	61	11	124	Blonds	27	62	11
127	Later born	34	51	15	81	Medium	34	53	13
139	Summer born	29	55	16	56	Brunettes	30	55	15

Washington boys.

TABLE 6.—WHITE.

Number of pupils.	Nearest age.	Average height.	Average weight.	Number of pupils.	Nearest age.	Average height.	Average weight.
		Inches.	*Pounds.*			*Inches.*	*Pounds.*
787	8	48	51	926	13	57	79
878	9	50	56	784	14	59	88
930	10	52	61	528	15	62	101
862	11	53	66	345	16	64	114
986	12	55	73				

Chattanooga school children.

TABLE 7.—WHITE BOYS.

Number of pupils.	Nearest age.	Average height.	Average weight.	Number of pupils.	Nearest age.	Average height.	Average weight.
		Inches.	*Pounds.*			*Inches.*	*Pounds.*
10	8	49					(11)
17	9	15		47	13	57	89
			(6)	35	14	60	95
28	10	52	69				(12)
39	11	54	77	16	15	63	107
			(8)	12	16	63	115
35	12	57	79				

TABLE 8.—WINTER BORN.

Number of pupils.	Nearest age.	Average height.	Average weight.	Strength of—		Sensibility to pain.	
				Right hand.	Left hand.	Right temple.	Left temple.
		Ft. in.	*Pounds.*	*Kilograms.*	*Kilograms.*	*Grams.*	*Grams.*
5	8	4 1		14	11		
4	9	4 2		14	12		
			(5)			(5)	(5)
15	10	4 5	71	16	13	3,090	3,080
			(7)			(10)	(10)
25	11	4 6	77	23	19	2,783	3,072
			(10)				
22	12	4 8	78	21	20	2,581	2,509
23	13	4 10	92	24	20	2,659	2,746
18	14	5 1	98	27	25	2,443	2,511
8	15	5 4	106	28	27	2,868	3,162
4	16	5 4	105	33	28	2,575	2,612

TABLE 9.—SUMMER BORN.

5	8	4 1		14	13		
						(1)	(1)
12	9	4 3		14	13	2,850	2,700
						(1)	(1)
13	10	4 4	16	15		3,350	2,900
13	11	4 6		19	17	2,733	2,333
			(6)				
12	12		80	19	17	2,566	2,894
21	13	4 10	87	21	21	3,064	3,097
17	14	4 11	92	24	23	2,890	2,950
			(5)				
8	15	5 2	103	30	28	3,016	3,091
8	16	5 3	108	34	33	2,512	2,415

TABLE 10.—BOYS.

Number.		Bright.	Average.	Dull.	Number.		Bright.	Average.	Dull.
		P. ct.	*P. ct.*	*P. ct.*			*P. ct.*	*P. ct.*	*P. ct.*
65	First born	33	50	17	124	Winter born	37	44	19
59	Second born	35	54	11	93	Blondes	38	53	9
105	Later born	32	56	12	91	Medium	30	54	16
108	Summer born	29	56	15	50	Brunettes	30	52	8

Those born in winter are slightly superior mentally to those born in summer. (Table 10.)

Puberty and sensibility to pain.—Both boys and girls (Table 11) are slightly less sensitive to pain after puberty than before. It was found in the study of the Washington children [a] that they were more sensitive to locality and heat on the skin before puberty than after. Thus it seems probable that our senses

[a] Page 29.

in general are more acute before than after puberty. This accords with the general conclusion that sensibility to pain decreases with age.[a]

TABLE 11.—*Puberty and sensibility to pain, Chattanooga children.*

Puberty.	Number of persons.	Sensibility to pain.	
		Right temporal muscle pressure.	Left temporal muscle pressure.
		Grams.	*Grams.*
Boys:			
Before puberty	26	2,820	2,837
After puberty	105	2,852	2,881
Girls:			
Before puberty	50	2,480	2,584
After puberty	117	2,589	2,543

TABLE 12.—COLORED BOYS.

Number.		Bright.	Average.	Dull.	Number.		Bright.	Average.	Dull.
		P. ct.	*P. ct.*	*P. ct.*			*P. ct.*	*P. ct.*	*P. ct.*
131	First born	41	40	19	27	Black skin	33	48	19
69	Second born	37	38	25	56	Brown skin	33	48	19
123	Later born	37	56	7	156	Light-brown skin	36	44	20
66	Summer born	42	31	27	174	Yellow skin	33	46	21
193	Winter born	34	45	21					

TABLE 13.—COLORED GIRLS.

127	First born	33	51	16	45	Black skin	40	44	16
88	Second born	39	44	14	87	Brown skin	41	45	14
199	Later born	33	50	17	207	Dark-brown skin	33	46	21
62	Summer born	30	45	25	220	Yellow skin	35	54	11
239	Winter born	31	53	16					

Colored boys.—The first born are slightly superior mentally to both the second and later born. (Table 12.) There appears to be no relation between different degrees of color of skin and mental ability among the boys.

Colored girls.—The second-born colored girls show a slightly greater mental ability than both the first born and later born. (Table 13.)

The summer born show a slight superiority mentally to the winter born. (Table 13.)

Those with light skin (light brown and yellow) show the lowest percentage of mental ability. (Table 13.) This is not what we would expect from general impressions. But general impressions are sometimes based on conspicuous exceptions.

MEASUREMENTS OF GIRLS IN PRIVATE SCHOOLS AND OF UNIVERSITY STUDENTS.[b]

It is comparatively recent that scientific method has been applied to the mental side of man. That mind and feeling could be measured quantitively was once generally doubted or ridiculed; but such opposition has ceased almost entirely. Opinion and speculation are often entitled to as much respect as facts, but when they go so far as to oppose or ignore facts they create a suspicion of their own weakness. The value of opinion varies according to first-hand knowledge.

[a] Page 135.

[b] Article by the author in the Boston Medical and Surgical Journal, Vol. cxlv, No. 5, pp. 127–129, August 1, 1901.

There is a somewhat prevalent idea that investigation of mind tends to weaken the basis of morality, but there is very little evidence of this. Morality is more a matter of habit and early training. Some of the worst criminals are theoretically sound in their doctrines, but they have not formed good habits, and so are in contradiction with themselves.

We give herewith some recent measurements of young women in private schools and of university students. The numbers of individuals are not as large as one could desire, but we trust that others will take up the work, increasing the number, so that finally the results of such studies may come to possess a high degree of certainty.

TABLE I.—*Washington schoolgirls.*

Number of pupils.	Nearest age.	Average height.	Average weight.
		Inches.	*Pounds.*
754	8	47	49
883	9	49	54
939	10	51	58
931	11	53	64
876	12	56	73
966	13	58	82
833	14	60	93
655	15	62	100
450	16	62	105
323	17	63	110
151	18	63	111

MEASUREMENTS OF GIRLS IN PRIVATE SCHOOLS.

Comparing girls in private schools with Washington and Chattanooga schoolgirls, we find them heavier, taller, much stronger, and much more sensitive to pain than girls in public schools. (Tables I, II, and III.) It would appear that the comforts, refinements, and perhaps luxuries of modern civilization, while beneficial to physical development, tend to increase sensitiveness to pain. This accords with our previous measurements of Washington school children, where it was shown that children of the nonlaboring classes (mercantile and professional) were superior in circumference of head, in height, sitting height, and weight, but more sensitive to heat and locality on the skin than children of the laboring classes; that is, a superior physical development usually seems to be accompanied with greater acuteness of the sensibilities.

TABLE II.—*Chattanooga schoolgirls.*

Number of pupils.	Nearest Age.	Average height.	Average weight.	Strength of—		Sensibility to pain.	
				Right hand.	Left hand.	Right temporal muscle.	Left temporal muscle.
		Inches.	*Pounds.*	*Kilos.*	*Kilos.*	*Grams.*	*Grams.*
10	8	47	----------	11	9	----------	----------
21	9	50	----------	13	11	----------	----------
						(5)	(5)
30	10	52	----------	14	13	2,540	2,830
			[a](11)			(14)	(14)
30	11	54	70	14	13	2,315	2,415
			(30)			(31)	(31)
49	12	54	77	18	16	2,520	2,590
			(23)			(26)	(26)
43	13	58	92	20	18	2,550	2,445
44	14	61	100	21	19	2,687	2,642
35	15	62	101	23	21	2,460	2,463
13	16	62	101	23	20	2,653	2,561

[a] Figures in parentheses designate number from which average is made.

TABLE III.—*Girls in private schools.*[a]

Number of pupils.	Nearest age.	Average weight.	Average height.	Strength of—		Cephalic index.			Sensibility to pain.	
				Right hand.	Left hand.	Dolicho.	Messo.	Brachy.	Right temporal.	Left temporal.
		Pounds.	*Inches.*	*Kilos.*	*Kilos.*				*Grams.*	*Grams.*
3	10	61	.....	14	12	1	2	.....	625	565
6	11	71	.....	17	16	.....	5	1	708	578
4	12	77	57	23	21	.....	.....	4	525	487
11	13	94	62	31	27	1	9	1	730	716
6	14	106	63	37	34	1	1	4	868	933
19	15	115	64	38	34	5	7	7	773	753
23	16	117	64	45	41	2	12	8	934	1,004
14	17	114	65	45	43	3	8	3	1,317	1,353
9	18	113	65	54	46	1	2	6	1,250	1,905
3	19	121	64	61	58	.....	2	1	900	900

[a] These measurements were kindly made for the writer by Misses A. B. Jones and A. E. Palmer, teachers in the schools.

Girls in private schools are less sensitive to locality on the skin, but more sensitive to pain before puberty than after puberty. (Table IV.) It is difficult to say why this sense of locality is less before puberty, as the difference is well marked. There seems to be a distinct difference here between the pain sensibility and the locality sensibility.

Compared with girls in Washington schools, girls in private schools are, contrary to expectation, much less sensitive, both before and after puberty, to locality on the skin. (Table IV.)

TABLE IV.—*Sensibilities of girls in private and public schools.*

	Number of pupils.	Sensibility to locality.		Sensibility to pain.	
		Right wrist.	Left wrist.	Right temporal.	Left temporal.
Girls (private schools):		*mm.*	*mm.*	*Grams.*	*Grams.*
Before puberty	14	18.7	19.2	664	593
After puberty	80	17.0	16.6	971	994
Girls (Washington):					
Before puberty	186	14.5	13.8	.....	.....
After puberty	362	15.0	13.8	.....	.....
All ages	548	14.9	13.9	.....	.....
Girls (Chattanooga):					
Before puberty	50	.....	.....	2,480	2,584
After puberty	117	.....	.....	2,589	2,543

UNIVERSITY WOMEN, EASTERN STATES (TABLE V).

Those with poor nutrition, when compared with others, are inferior in weight, sitting height, strength; in distance between orbits, corners of eyes, and from crown to chin, and in distance between zygomatic arches; in short, they are physically inferior in general.

Comparing the blondes with the brunettes, the blondes are inferior in all measurements except in the distance of crown to chin and distance between zygomatic arches. The blondes are less sensitive to pain. This is in accord with the investigation of this particular point by Miss Carman, in her study of the schools in Saginaw, Mich.[a] In general, the blondes are inferior physically to the brunettes.

[a] Page 136.

TABLE V.—*University women.*[a]

	Number of students.	Average age.	Average weight.	Average lung capacity.	Average height.	Sitting height.	Strength of— Right hand.	Strength of— Left hand.	Distance between— External edges of orbits.	Distance between— Corners of eyes.	Crown to chin.
Nutrition:											
Good	19	21	125	143	161	89	77	64	99	39	234
Fair	10	21	126	158	164	89	79	64	100	38	235
Poor	5	33	114	157	163	88	66	57	97	33	230
Complexion:											
Blonde	8	20	116	153	158	88	76	65	95	39	230
Medium	18	22	128	145	162	89	75	62	101	39	236
Brunette	8	21	129	156	163	89	79	64	99	37	233

	Length of— Right ear.	Length of— Left ear.	Length of— Right thumb.	Length of— Left thumb.	Width of mouth.	Thickness of lips.	Least sensibility to pain. Right temporal muscle.	Least sensibility to pain. Left temporal muscle.	Distance between zygomatic arches.
Nutrition:									
Good	57	57	92	62	49	14	2,289	2,242	129
Fair	56	56	64	63	47	16	1,945	1,867	128
Poor	56	56	63	63	47	14	2,670	2,315	125
Complexion:									
Blonde	56	56	62	62	47	14	2,884	2,315	126
Medium	57	57	63	63	48	14	2,276	2,109	129
Brunette	57	57	63	63	48	15	1,931	1,918	126

[a] Measurements made by Frances A. Kellor, of Chicago University, and Emily Dunning, M. D., of New York.

These comparisons from Table V have been given somewhat in detail; but of course the number of persons examined is too small to give weight to the conclusions.

INTERPRETATION OF PHYSICAL CHARACTERISTICS.

We hear a great deal at present about the supposed significance of physical characteristics, anomalies, and the like, in the face, head, mouth, and hands, and not a few earnest people seem to attach much importance to many such signs; but the world of science has as yet shown little confidence in these interpretations of the signs. One, however, should hold himself open to all possible truth. But it is evident that if any of those physical signs are to be proved significant, it must be done by patient observations on a large number of people, faithfully recorded. People must not be selected for such purpose, and all exceptions must be carefully noted and studied. Until this is done few serious investigators can be expected to place much weight on conclusions as to personality drawn from physical characteristics.

UNIVERSITY STUDENTS, WESTERN STATE. (TABLE VI.)

As a great majority of students have reached adult age, we will compare the students in general as to sensibility to pain.

The first born (men and women) are more sensitive to pain than the second born. This accords with the investigation by Miss Carman, who found that, in general, sensitiveness to pain decreases in order of birth.

The second born (men and women) are less sensitive to pain than the later born. This is not in accord with the results of the investigation just men-

tioned. But in new lines of inquiry with small numbers, tentative contradictions are what might be expected. It only shows the necessity of investigation of large numbers if more than preliminary results are to be obtained. Yet, even with small numbers, the probable truth has often been indicated.

The dolichocephalic (women and men) are less sensitive to pain than the brachycephalic. University women are much more sensitive to pain than university men; this accords with our previous studies,[a] in which women were found to be more sensitive to pain than men. In the investigation of the Washington school children, girls were found to be more sensitive to locality on the skin than boys.[b] It would seem, then, probable that in the female sex there is greater acuteness in sensibilities than in the male sex; but this must not be confounded with the power of endurance in women.

TABLE VI.—*University (Western State).*[c]

MEN.

Number of students.		Sensibility to pain.	
		Right temporal.	Left temporal.
		Grams.	*Grams.*
13	Blonde	1,317	1,366
23	Brunette	1,397	1,211
22	Medium	1,160	1,150
19	First born	1,311	1,246
13	Second born	1,427	1,471
21	Later born	1,201	1,083
14	Dolichocephalic	1,512	1,489
34	Mesocephalic	1,183	1,190
10	Brachycephalic	1,340	1,262
58	All	1,289	1,258

WOMEN.

8	Blonde	926	823
8	Brunette	885	848
22	Medium	786	851
8	First born	825	734
12	Second born	863	991
16	Later born	800	766
7	Dolichocephalic	820	948
15	Mesocephalic	926	894
16	Brachycephalic	817	804
38	All	836	845

[a] Psychological Review, March, 1899.
[b] Experimental Study of Children, p. 1005.
[c] These measurements were kindly furnished the writer by Prof. B. J. Hawthorne.

CHILD STUDY IN THE UNITED STATES.

INTRODUCTION.

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

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.

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[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	16	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	314	360	588	565	585	645	674	669	731	657	702	623
Girls	384	514	425	607	497	577	588	325	672	699	588	558
Falling over dog:												
Boys	101	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.			Defective hearing.	
					Whisper.	Politzer's acoumeter.	Watch.	Number.	Per cent.
					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.

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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.

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[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.		Eyes closed.	
		Anterior-posterior.	Lateral direction.	Anterior-posterior.	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.		Eyes closed.	
		Perpendicular movement.	Lateral movement.	Perpendicular movement.	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.		Eyes closed.	
		Vertical movement.	Lateral movement.	Vertical movement.	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	.693	.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. 185.

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 11.

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	1887	1 9.8	8	2-5	34-38½	Grammar school, Latin school, Harvard.
31	1806–1873	Mill	Philosopher	Holmes Autobiography	1885 1873	Ex. 1 9.7 Ex. 11		3-8 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	Tolstoï	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.

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[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	
								1,267
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	86	80	100	90
but 37 cents,	35	78	93	89	89	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	89	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	37	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	94	80	87	70
to wrap around it.	40	62	81	83	79	77	60	75	93	70
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	437	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.

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[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	59⅔	59⅓	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, 54; 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.

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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.

Children	26
Stories told	24
Servants	18
School	4
Games	3
Parents	2

2. Solitary, 33.

Stories read	22
Pictures	9
Imagination	2

IV.—*Educational influences exerted, 43.*

1. Disbelief taught, 41.

Parents	21
Miscellaneous	18
Teacher	2

2. Belief taught, 2.

Parents	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.

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[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 delinquents	6	5
Unknown	2	1	Poor educational advantages	18	22
Occupation:			Bad associates	26	25
Laborers	16	12			
Peddlers	2	.....	HABITS, ETC.		
Clerk	1	1			
Merchant	.....	1	No occupation (idle)	23	20
None	3	6	Drink intoxicants of various kinds	4	3
Unknown	4	6	Use tobacco, especially cigarettes	23	.....
Religion:			Frequent houses of prostitution	.....	4
Catholic	19	9	Night walkers	.....	9
Protestant	4	9	Been under arrest before present confinement	17	6
Hebrew	1	1			
None	.....	3			
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.*

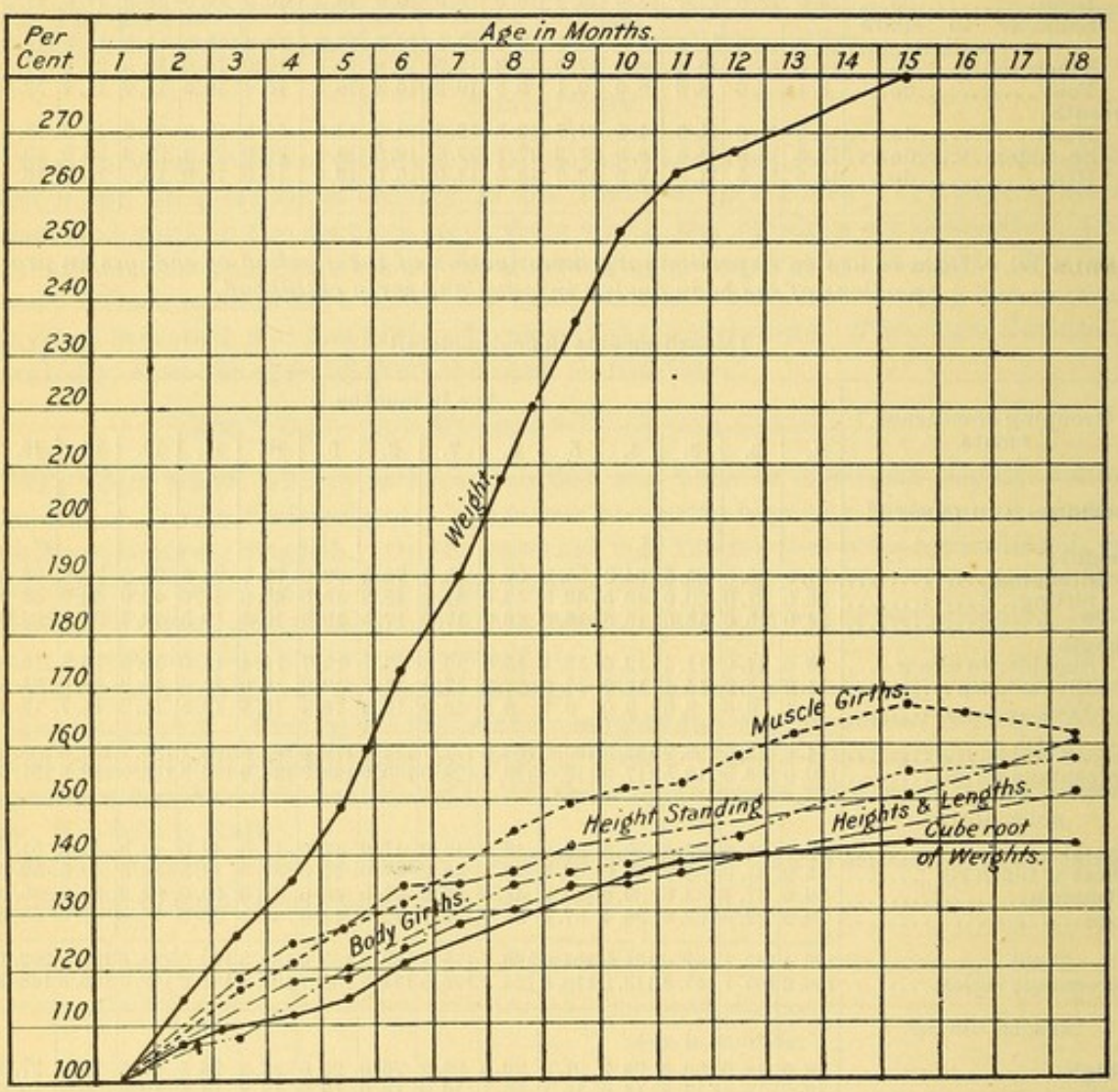
[Measurements in centimeters.]

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	24	.....	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 langnage of the mother. The vowel sounds were introduced in the following order: ĭ, o͞o, ă, ī, ē, ŏ, o͞o, ā, ō, ā, á, ĕ, oi, ow, ŭ. 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, ī, ă, ŏ, ŭ, ĭ, o͞o, ā, á, ă, ĕ, ŏ, a, o͞o, oi, ŭ.

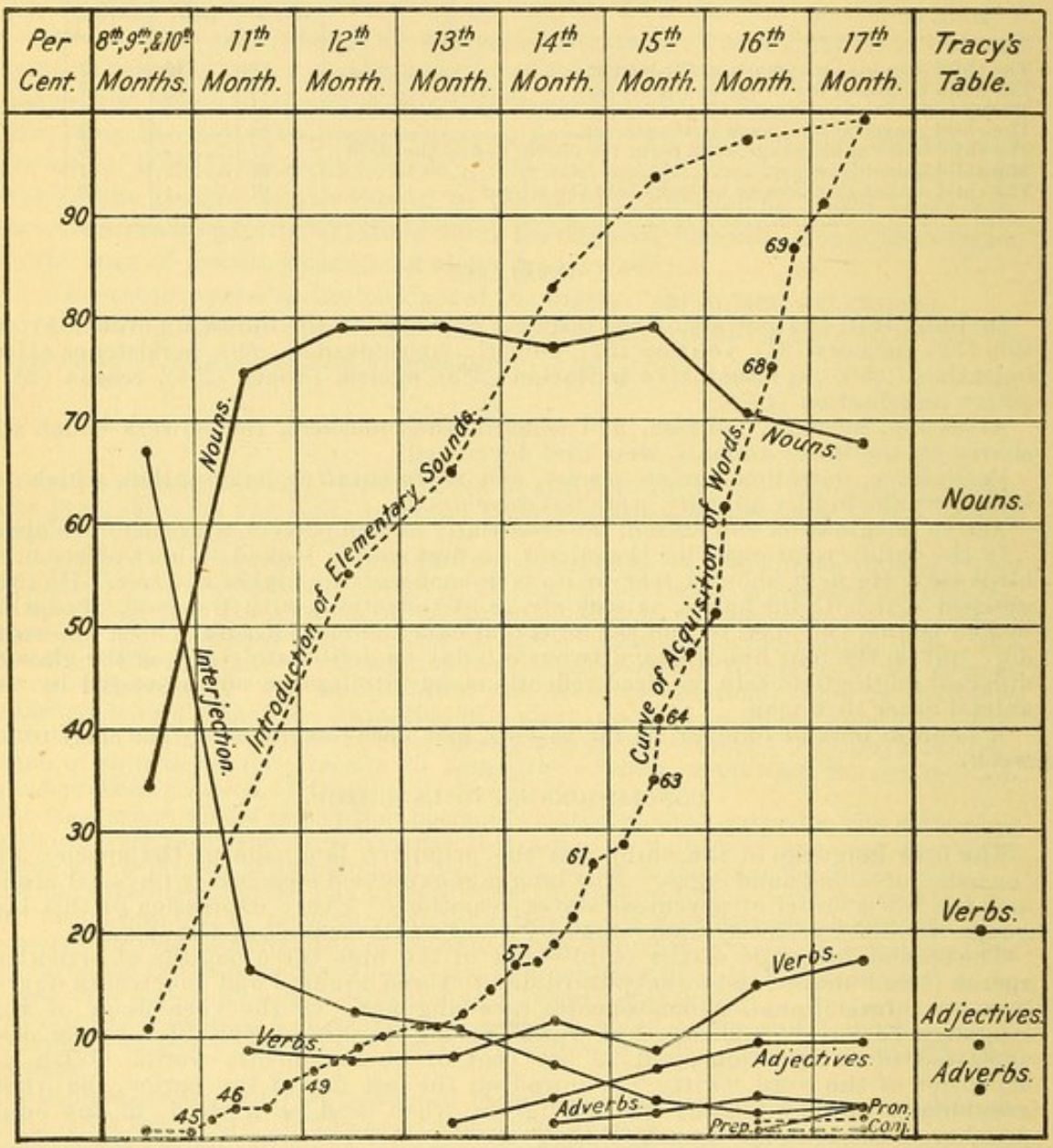
As to frequency of use in new syllables the consonants take the following order: b, n, t, k, p, m, w, d, v, f, s, sh, h, g ng, z, r, l, ch, j.

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, ĭ, 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 ($6\frac{9}{10}$) 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.*

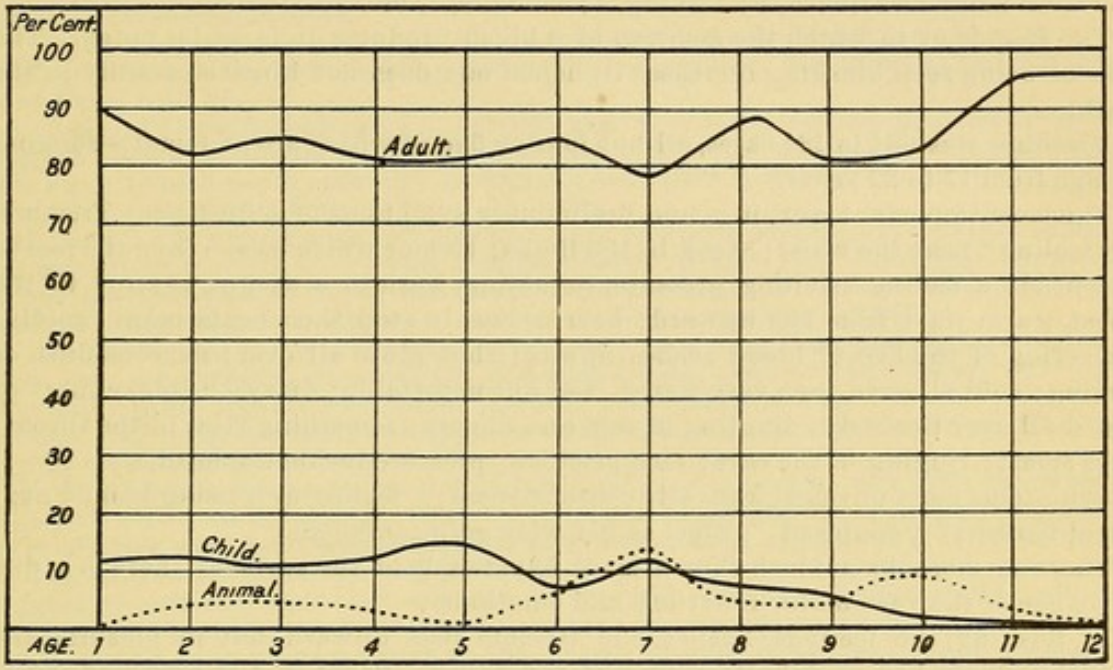
[Numbers indicate per cent; blanks indicate no per cent.]

	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.

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[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		
Northern lights	25	Animals:	
Comets	18	Reptiles	483
Fog	16	Domestic animals	268
Storms	14	Wild animals	206
Eclipses	14	Insects	203
Extreme hot weather	10	Rats and mice	196
Extreme cold weather	8	Cats and dogs	79
		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."

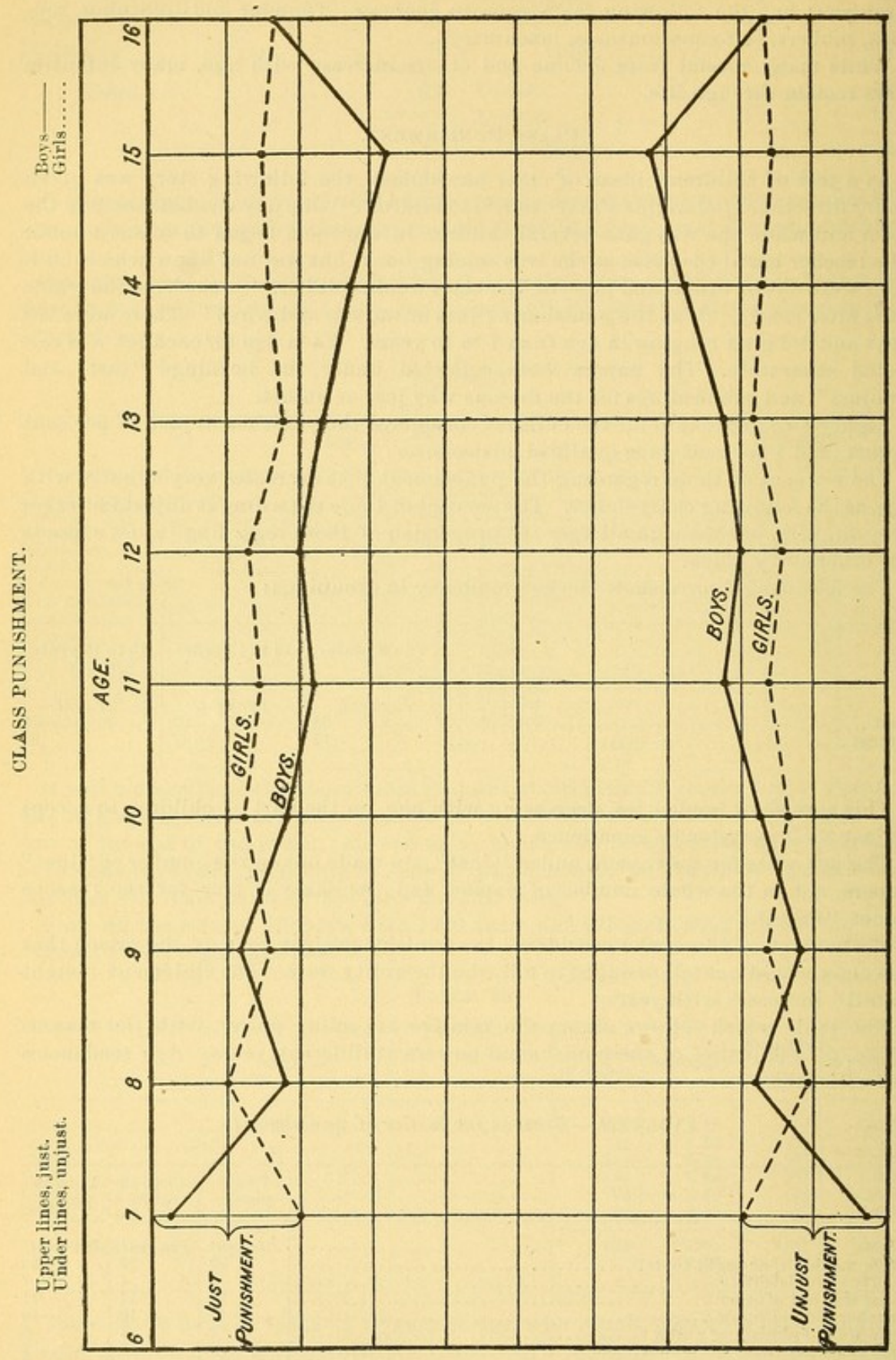
Forty-seven of those who considered the punishment just gave as the reason that the class would not tell or ought to tell who the guilty were. The statement "ought to tell" increases with years.

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	50
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.
Boys——
Girls.....
Upper lines, just.
Under lines, unjust.
AGE.
6
7
8
9
10
11
12
13
14
15
16
GIRLS.
BOYS.
JUST PUNISHMENT.
BOYS.
GIRLS.
UNJUST PUNISHMENT.

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.

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[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, ten pins, 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, ; 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, enliveas 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	14	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$\frac{9}{12}$ years, of 86 boys it is 11$\frac{8}{12}$ 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 proportion 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.

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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.

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HYPNOTISM.[a]

In a new line of inquiry, although the phenomena may be as old as mankind, there inevitably arises a confusion of ideas. Each investigator starts out from some special point. At first the facts are isolated and often seem to be contradictory. But as investigation progresses, increasing greatly the number of data, points that had little meaning come to assume in the light of other facts a definite significance. Then classification begins, and we see the foundation of a science gradually forming. Such in brief has been the course of hypnotism.

When in France some ten years ago many cures by hypnotic suggestion were reported, the Germans, who had little confidence in the French, were naturally incredulous, and, with the exception of a few men, regarded these cures as mythical. Here, as in other instances, the French have shown themselves to be the innovators. But the Germans, though cautious at first, never fail, when once they have entered a field, to carry investigations on with their well-known thoroughness.

One of the men who were instrumental in introducing the study of hypnotism into Germany was Professor Forel, of Zurich. At this time the writer had the privilege of attending his clinics. Many experiments were made. Forel, in the presence of the class, hypnotized a trained nurse and extracted a tooth without her feeling it in the least. In another experiment he told her, while in the hypnotic state, that at the next meeting of the class she must take his hat down from its place when he began to lecture and place it on his manuscript. This was done in the presence of the class. In a week from this time, when the next lecture took place, as Forel began to speak, the nurse arose, then hesitated somewhat, and finally took his hat down from the nail upon which it was hanging and placed it upon his manuscript. She was of course in her normal state, not knowing she had been told to do this a week before when in the hypnotic condition. Her hesitation was due to her normal disinclination to the impropriety of interrupting the professor in this way. But her normal hesitant feeling was not strong enough to overcome the command which was impressed upon her very forcibly the week before, while she was in a hypnotic condition. There were, so to speak, two selves in conflict, her normal self and her hypnotic self, and the stronger self prevailed. Forel admitted in both experiments that he could not be certain that the hypnotic command would be obeyed. He repeated the command to her several times with much emphasis, saying, "You must take my hat down; you can not help it; it is absurd not to do it." "Your tooth will not hurt; you can not feel it; you will not know it is out."

[a] Article by the author in The Chautauquan.

It is unnecessary to remark that this uncertainty of causing the hypnotic self to control the normal self would seem to make the application of hypnotism in most surgical operations impracticable. The reader may ask, Could a criminal command be so enforced upon one in a hypnotic state as to result in an overt act in the waking state; that is, is a post-hypnotic crime possible? An answer to this question would take us too far at present, but it may be said, in a general way, that it depends upon the strength of the normal moral self whether the criminal hypnotic self can overpower it. It is obvious that it would be easier to hypnotize a person to commit a crime who had already done such things. Thus, moral habits, well formed, are a safeguard under all conditions, for even in the hypnotic self they rise up unknown to the normal self and resist the operator's criminal suggestion.

In this study we wish to deal with the curative side of hypnotism, and more especially with recent experiments and views of French specialists.

If waking is the true expression of the active and free mind, sleep, on the contrary, is the expression to a variable degree of its non-activity. The complete isolation in which sleep places the sleeper in removing him from all cause of distraction and the auto-suggestion to put his mind and organism in repose produce a reparative and beneficial effect, which gradually, by the distribution of the nervous forces, restore the equilibrium disturbed by work while waking. Hypnotic sleep is produced by the same concentration of mind as ordinary sleep, but instead of being due, as in the latter case, to self-suggestion it is effected by suggestion from without.

Subjects plunged artificially into the most profound sleep in place of a general and absolute isolation of the senses, may retain a slight connection of thought and sensation with the hypnotist alone. This is because they fall asleep thinking of him, and their active thought continues automatically from them to him. The proof of this is that the subject only performs acts suggested by the hypnotist. If prolonged natural sleep, effected by an habitual and unconscious suggestion, restores poise and nervous energy, all the more has artificial sleep, properly directed, like results, especially if prolonged for some time. Simple affirmations to the waking subject sometimes have the power to produce curative effects, and these affirmations may become much more efficacious if they are made during artificial sleep. In this case the subject, isolated from the world and retaining but a greatly diminished sensibility, can not be distracted by impressions previously felt. At the same time his will has lost its initiative; he accepts and submits to what is imposed on his mind.

Incitation, which is called suggestion, addressed to the mind of the sleeper, whose inert nervous force is centered in the idea of sleep, must without resistance direct this force by turns to any part of the organism; from this results an action on the organs in proportion to the amount of attention fixed on the idea of sleep. When a suggestion is made to cure the sleeping patient, deprived of initiative power, it causes either a depression or an excitation of an organ or a part of the nervous system; or the brain diminishes its active influence on the tissues according as the nervous force is accumulated in it; or, on the contrary, it augments this influence in the same proportion. The more

emphasis there is centered on the idea of sleep the greater become the curative effects obtained by suggestion; that is, the nearer we bring the subject to a state of profound somnambulism the more susceptible we render him to a quick and complete cure.

Whatever method may be employed to obtain the cure of the sick submitted to suggestion, whether simple affirmations of suggestive force are made to them when awake or whether favorable emotions are produced, we induce in the diseased organs effects either sedative or exciting acording to the curative idea which we express. These actions could not be produced if the mental and physical faculties were not transformable, if the mind was not closely allied to the matter. Suggestions can not cure all morbid affections, but it has at least, and especially in sleep, a beneficial influence over them, even those which are incurable.

With the aid of Professors Bernheim, Beaunis, and Liégeois, Liébault was enable to produce on a hysterical somnambulist the apparitions of reddening spots on the skin, blisters, and stigmata by the single action of the idea they had suggested. On other subjects they obtained separately like results. If emotion is added to the power of suggestion to reenforce it, the results are still more decided. In two somnambulists they were able by simple suggestion to produce the slightest modifications in the skin. As a result of strong emotion added to suggestion they caused a redness in the form of a double cross to appear on the hand of one, and blisters of the epidermis on the hand of the other, which took several days to entirely pass away.

The suggestion during natural sleep must be made without the consent of the patient and not at his instigation. Suppose the consciousness of the sleeping subject to have been previously freed from all imaginative representation and a receptivity created similar to that of the ordinary hypnotic subject and conformable to the laws of the diminution of consciousness. The intervention itself must convey suggestions, distinctly articulated, in such manner that there is synchronism between the emissions of the voice of the therapeutical psychologist and the respiratory movements of the subject. It would be well to suspend the intervention whenever the patient gave evidence of waking up or his respiration quickened. The suggestion should never be brusque or sudden, and the beginning and end should be thus: The one gradually increased, the other progressively diminished, but both enunciated in a purposely drawling and monotonous voice. When the suggestion is finished the subject must continue to sleep, to dream of the things suggested, and not to waken until the hour determined upon.

Suggestion during natural sleep has right to a prominent place in the treatment of mental diseases. It also finds place in the diverse branches of the psycho-therapeutic domain. In this way we may learn more as to the psychology of sleep.

Mesmerism, hypnotism, and suggestion are perhaps effects of the same cause, but these effects are certainly produced under different conditions and according to different laws. Boirac agrees with Durand de Gros that suggestion and mesmerism are two distinct agents, equally real and independent one from the other, which can counterfeit each other as they can also combine for the production of common effects. Thus there may be suggestion without mesmerism

and mesmerism without suggestion. There may be a pseudo-mesmerism which is but suggestion, and a pseudo-suggestion which is only mesmerism; finally there may be inseparable mesmerism and suggestion, suggestive mesmerism or mesmeric suggestion. That suggestion exists without mesmerism is continually proved. "When," says Boirac, "without looking at or touching a subject, I say, 'Close your eyes; now you can not open them,' and he vainly tries to do so; when I add, 'They will open of themselves when I have counted seven,' and the effect announced is produced, it is evident that mesmerism has nothing to do with the phenomena and they must be explained by suggestion alone."

But suggestion is not only independent of mesmerism, it can in many cases take its place, or rather simulate all its effects. Here, for example, is an experiment often tried with certain subjects: I place my open hand above the hand of the subject. After several seconds he declares that he feels a very strong impression of heat; presently this heat becomes intolerable and he begs me to take my hand away. I reply that I do not hinder him from withdrawing his, but after unsuccessful effort he declares it impossible, and, in fact, the hand seems to be paralyzed. Nevertheless it moves, rises or falls as soon as I make these movements, as if an invisible thread attached them. Would one not believe oneself to be in the presence of a veritable magnetic phenomenon? Yet there is nothing but the counterfeit of magnetism by suggestion. To convince oneself it is only necessary to change one condition of the experiment, that which permits operator and subject to suggest unknown to each other. Example: I say to the subject, "Close your eyes; now you can not open them," and the subject makes vain efforts to unseal the lids. If then I begin by holding my hand above his to make it rise or fall, as he is not apprised by sight he feels nothing and does not move. My hand, a moment before so efficacious, no longer exercises any influence. But there are cases where, suggestion being eliminated, the magnetic effects remain just as distinct and complete, the subject being truly magnetic and pseudo-magnetic or purely suggestible.

It is evident that suggestible subjects with whom we can obtain the counterfeit of magnetism are more common than the true magnetic subjects, therefore Bernheim and all pure suggestionists are of good faith when they claim to have victoriously refuted mesmerism.

Boirac cites two out of five cases of persons who possessed this remarkable element. The one, G. P., a young electrician; the other, L. V., a student of law and philosophy. In experimenting with them precaution was always taken to bandage the eyes; then they were told to tell as soon as they felt anything. Under these conditions the most varied and precise effects were obtained in all parts of the body, corresponding to positions and movements of the operator.

In the case of G. P., Boirac once placed mesmerism and suggestion in opposition. He says, "I told him I wished to experiment on the time necessary to produce the magnetic effect and asked him to tell me the instant he began to feel it. I said I would act exclusively by attraction in his right hand and asked him to concentrate all his attention on that side. After this preparatory suggestion I said, 'I begin,' making a movement with my right hand, but without placing it opposite that of my subject. At the end of two or three minutes the sub-

ject, who was very attentive, murmured: 'It is strange, but I feel absolutely nothing,' then suddenly, 'Oh! I do feel something, only it is in the left hand and is not an attraction, but a tingling or pricking.'" Boirac had, in fact, silently placed his left hand (which always produced tingling, while the right produced attraction) close to the left knee of G. P.

This proves, in this case at least, that suggestion is powerless to simulate the effect of magnetism. When the subject is eminently suggestible, he may be advised to fix all his attention on one of his hands, being told that he will feel attracted by an irresistible force. As soon as the operator says, "I begin," the subject's hand rises, although the operator has made no movement. In this instance suggestion simulates magnetic action perfectly, but if at the same time, without saying anything, the operator places his right hand vis-a-vis to his other one it will be attracted, the two effects being simultaneous. Identical in appearance, they are in reality produced by two distinct causes—the one by magnetism, the other by suggestion.

Again, the subject being still in the charmed or credulous condition, it is suggested that, in order to act exclusively on one side of his body, the operator will render the other inert, and he ascertains that there is, in fact, paralysis and anesthesia of that side. Here, again, the operator has obtained by suggestion a phenomenon of attraction in the members where sensibility and motility remained intact, but if he place his right hand near the knee or foot paralyzed by suggestion, he finds that in spite of the suggestion there are movements of attraction.

Thus not only can mesmerism produce its effects independent of suggestion, but it can in certain cases annul the effects of suggestion. There is consequently, besides pseudo-suggestive mesmerism, a pseudo-mesmeric suggestion. If it is scientifically proven that magnetism exists, it becomes necessary to have regard to its possible intervention in the ensemble of phenomena attributed to hypnotism and especially to suggestion.

The Nancy school said with justice that the old magnetizers did not cease to make suggestions unwittingly and suggestionists should expect to have it said that they have unwittingly employed magnetism. It is possible that the gaze, the contact, the passes, and the personality of the operator do not act on certain subjects except through purely suggestive influences, but it is also possible that with certain other subjects a magnetic influence is added to or takes the place of suggestion. As long as these two agents, each as real as the other, are always liable to enter into play and combine their actions, neither has a right a priori to the effects produced by one to the exclusion of the other.

It is then permissible to suppose that if certain operators, such as Liébault and Bernheim, succeed so easily in suggesting so large a number of persons, it is not alone because of their great skill, their long experience, and consummate knowledge of suggestive technic, but that they unwittingly possess an exceptional magnetic power. This, too, would explain the great inequality in the operations of different suggestionists.

One of the phenomena which most attracted the attention of the ancient mesmerists was that known as the "charm of a look." In certain subjects there has been found a peculiar disposition to fall

under the fascination of a gaze by an action analogous to that which takes place in certain animals. Such was the case with a young lady artist treated by Bérillon. When enjoined to look the operator in the eyes, this person's eyes would open wide, the pupils dilate, and a singular fixed look come into them. One would say that there was in the mind of this subject but one fixed idea, not to lose sight of the eyes of the operator. In fact, if the latter rose the subject also rose; if he turned his head, she leaned forward and endeavored not to lose sight of his eyes.

The spontaneous apparition of this somewhat rare phenomenon was observed from the beginning of the hypnotic treatment. The patient had suffered for several years from an involuntary habit of putting her paint brushes between her lips in order to better point them. The result was a saturnine intoxication. No advice, no effort of her will, could break the habit. At the first treatment the therapeutic aim was reached. The operator said, "You can no longer put your brushes in your mouth, and if you try to do so your arm will become paralyzed."

The patient, on returning to the clinic, complained of a persistent numbness in the arm, which, while it prevented her from carrying the brushes to her mouth, also hindered her from painting. A suggestion was made that would enable her to work but at the same time prevent her from putting the brushes in her mouth. It was then only necessary to develop in her the faculties of visual memory and the manual ability necessary in the practice of her art. This was an easy task, as she distinctly belongs to the visual type and was gifted in the highest degree with visual memory.

Those subjects susceptible to fascination owe it to the facility with which they concentrate their spontaneous and voluntary attention in the visual function.

The fixity of gaze that one experiences on realizing the charm is but the experimental exaggeration of one form of attention. It is probable that identical phenomena could be produced in those subjects who belong to the auditive type by calling their attention to agreeable and captivating sounds.

We should discriminate between the prognostic and treatment of obscessions which result from a series of incidental causes (moral shock, fear, etc.) and those united to a constitutionally hereditary condition. In the first case the prognostic is more favorable and treatment by hypnotic suggestion is indicated.

In such cases the treatment, which is necessarily long, must be methodical and progressive. The first treatments are confined to having the patient remain seated in an attitude of sleep with the eyes closed. In this way the mental education of the subject begins; he becomes more and more docile, more and more ready to be hypnotized. From the moment the first light sleep appears the arterial tension is lessened and this lessening of the tension is perceptible to the sphygmomanometre.[a] Soon the sleep is augmented and the patient can perform automatic acts. By these gymnastics one succeeds in modifying the normal condition of the subject and awakens in him diverse aptitudes of his cerebral activity.

It was by this procedure that Dr. Bérillon undertook the treatment

[a] An instrument to measure blood pressure in the arteries.

of the following case: The patient on returning home one evening was informed that a neighbor in an access of frenzy had attempted to strangle her child. The woman was very much distresed and passed a bad night. In the morning as she went to embrace her child she felt a strong impulse to squeeze his neck. Seized with alarm, she rushed to her physician, who tried to reassure her. From that time she was obsessed by the idea of homicide. The least contact with her child or even the thought of him was sufficient to arouse this obsession and throw her into a paroxysm. She was submitted to mental treatment and recovered entirely.

One of the interesting studies is that of the artifices by which suggestion is reinforced. In the following case the artifice consisted of a psycho-mechanical action. Mr. T., 56 years of age, had from his infancy the habit of biting his finger nails. In spite of all efforts in that direction he had been unable to break himself of the habit. In the face of such an automatic habit one might well believe that the mental condition of one so disordered must present other manifestations, but there was nothing of the kind. Mr. T. was neither vicious nor impulsive; he felt himself capable of resisting many temptations, but the habit of biting his nails escaped the sovereignty of his will.

When asked to explain the mechanism of his habit, he said: "I know the habit is very annoying, and I attribute to it a series of gastro-intestinal troubles. I also believe that it has aggravated pulmonary affections. I have a most ardent desire to be cured. I have followed the advice of the most celebrated manicures, but the habit persists in spite of my efforts and vigilance. I can not look at my nails without feeling ill at ease and humiliated." It was at once agreed that the patient undergo psycho-therapeutic treatment; but as he showed disquietude at the idea of being hypnotized, it was proposed to treat him by suggestion in a waking state, which proposition he accepted. In order that the mental impression might not be inefficient, the suggestion was reenforced by a mechanical process, the efficacy of which had many times been verified with children. The patient being seated in an armchair with his arms resting on those of the chair, the operator took hold of his wrists and said: "Try to put your hand to your mouth; you can not; the pressure which I exercise on your hand is an obstacle which you can not overcome. Now, whenever the habitual impulse returns you will feel this same pressure on your hand. The resistance, however, will not be caused by my hand, but by your own mind, in which I have created a brake. The force expended to throw off the brake will give you time to recover yourself, to become conscious of what you were about to do, and interpose your own will."

This exercise was repeated several times for each hand, and the seance was ended. Three days later Mr. T. again called on the doctor. He had not once put his fingers to his mouth. He said that every time his hand rose automatically he had distinctly felt a heavy sensation in the forearm, which prevented the movement. This sensation of pressure was such that his arm felt really numb, and it would have cost him considerable effort to overcome it. He desired to have the resistence reenforced, as it seemed to diminish on the third day. A second seance of suggestion was given, and it was not necessary to renew the treatment.

Six weeks later Mr. T.'s nails had grown long and he was convinced that he was definitely cured of the habit.

We have given these cases of cure through suggestion to illustrate their naturalness. While there is a tendency to make them either "wonderful" or mythical, they are in reality no more complex a phenomenon than sleep itself. The desire to make them of a miraculous origin was due to a failure to comprehend their real nature. There may be those who are skeptical as to hypnotic phenomena, but a skepticism that remains such in the presence of facts refutes itself.

Traumatic Hypnotism.[a]

Hypnosis is a psychical state in which an individual is more than usually susceptible to suggestions. As is well known, the degrees of suggestibility are many. Making the distinction between physiological and pathological hypnotism, the traumatic hypnotism would, of course, fall under the latter head. We have been led to employ the term "traumatic" from an investigation of the following case. The case is all the more interesting since the patient is a physician. She gave the account herself to the writer.

Patient says:

I was in a village cart coming up the street; the horse was spirited; a man tried to stop him from running away. The last thing I remember is calling to him to get out of the way. The following, of which I was unconscious, has been told me by others: The cart struck another wagon and threw me into the air, and I came down in a heap, as if one were going to dive into the water, striking on my back and side, having the lines wound around my hands. I was pulled forward and up by the horse starting and dragged about 20 feet, when the lines slipped off of my hands. I did not say anything at this moment. They picked me up for dead and carried me into a drug store. I then began to talk with them, looking deathly pale. They asked me if I was hurt. I answered, "No; not at all; I am all right." I would moan every now and then during the conversation. Quite a number of my friends came in, and I called one by name. Then I took off my bonnet and walked back where I could wash my face and hands. I moaned all the time I was doing this. They all thought I knew what I was doing. I walked out toward the hack, but told them I preferred to wait till the crowd got out of the way. On the way home my daughter got into the hack, and I told her not to worry; that I was all right. I walked from the hack into the house. The doctor asked me to sit down, but I said I did not dare to, for I should lose control of myself. I asked to have a pin taken out of my dress. They gave me some whisky. Then I suggested if it would not be a good idea to take a hot bath. My daughter asked me where the arnica was, and I told her in the office on the second shelf, which was correct.

Then they gave me the hot bath, and while the servant was pouring some water on my head I came to myself for the first time since calling to the man to get out of the way, but only for a few seconds, hearing only voices and feeling something strike my head, giving pain. I was then taken out of the bath and put into bed; I told them how to unfold the bed; then the doctor put a saturated cloth on the wounded part of my head; I told them to get towels and put them on the pillow to prevent soiling it. Then I began to be very delirious [patient now passes from hypnotic into a delirious state] and talked incessantly about a railroad accident; my husband is constantly on the road, and I have worried sometimes about it. I repeated the same things over, saying the railroad switch was wrong, etc. This delirium lasted about an hour. The surgeon arrived, and on putting his finger between the scalp and skull I felt a flash of lightning and saw it. I said, "I can not stand this pain," and then I became conscious for the first time of the injury on the back of my head. I was in agony; I could feel distinctly a grating when his finger was put under the scalp, and on pressure in one spot there was a bubbling sensation that seemed to shoot right

[a] Article by the author in Science, vol. xix, No. 466.

over the brain. During this time I was conscious, but did not see anything. It is three weeks since the accident occurred, and I have had headache continually, being a reecho of the old pain. When I try to read, the right eye sees double; my head feels double; the wounded side feels thick; I have had very unpleasant dreams since.

According to the description of the surgeon, the wound was on the right parietal protuberance over the third descending convolution; it was a contusion.

Inquiries of those who saw the accident and subsequent events confirm the statement of the patient. When picked up her eyes were closed; then water was poured on her head, and she opened her eyes; she could not quite remember her husband's name; then she said she felt better and went and washed her face, etc., as already described.

It is interesting to note the states of consciousness: First, unconsciousness at time of accident; then, water being poured on her head, patient passes into the hypnotic state; this lasts nearly an hour, during which she so conducts herself that her friends do not suspect but that she is herself. During this hypnotic state suggestibility may be said to have been normal, since she responded to everyone naturally. Her normal self seemed to control her hypnotic self fully; this latter self was the only one during the hour which was conscious.

Surgical Operations During Hypnotic Sleep.[a]

I desire to give somewhat in detail two cases of surgical operations during hypnotic sleep by Dr. Schmeltz, of Nice.

The writer may be allowed to say that, while attending clinics, he has witnessed the extraction of a large, painful tooth (by Forel, of Zürich) during hypnosis, where the patient, who was an intelligent trained nurse, had not the least consciousness of the operation.

While there can be no doubt that in certain cases hypnotism may be as serviceable in surgery as the usual anæsthetics, we, however, do not believe that it is generally practicable. But it is interesting to note special cases under special conditions in which it has been useful.

Case I. *Amputation of the breast.*—Miss M., 20 years of age, born in Italy, consulted Dr. Schmeltz for a swelling in the right breast. During the examination of her malady, which was a very large sarcoma, he observed that the young woman could very easily be plunged into a hypnotic state. By a steady gaze and a few downward passes he in a few seconds put her to sleep, catalepsy and anæsthesia being apparently complete. As treatment, the doctor proposed a complete ablation of the diseased glands. The neighboring glands were in no way hardened. Her general condition was good, and there was no inherited cancer in the family.

The young woman, with the consent of her parents, readily agreed to be operated upon under hypnotic anæsthesia.

Desiring to be absolutely sure of the success of the operation, Dr. Schmeltz hypnotized his patient at intervals of two and three days, and was successful, especially as to the anæsthesia—in fact, disinfected pins were stuck deep into different parts of her body without producing a shadow of pain.

On the day set for the operation, in spite of the suggestion made

[a] Article by the author in the New York Medical Journal.

the day before for the young woman to be at the doctor's office at 7.30 a. m., she did not arrive until 9, and then entered reluctantly. Her parents had indiscreetly told her of the time set for the operation, and it was impossible to obtain complete anæsthesia. It was not until after the departure of the other physician, whom Dr. Schmeltz had invited to be present, that she regained confidence. The anæsthesia was then produced, and, owing to a suggestion which led her to believe that the operation would be postponed a week, all fear disappeared. She declared during the sleep that she had been terrified by the thought of the operation, and therefore could not sleep as desired. She gave assurance that the operation could take place next day, because on waking she was convinced that she had eight days before her.

The next day she arrived at the hour fixed during the sleep. Anæsthesia was complete from the first, and the patient seemed admirably disposed.

Two other physicians assisted Dr. Schmeltz. After a minute examination of the hands and diseased part, Dr. Schmeltz made the classic oval incision for the amputation of the breast, which permitted him to take out that much-diseased organ with the aponeurosis of the large pectoral. A thorough examination of the axilla showed that the ganglia were not diseased. After five tubes were inserted the wound was closed by means of 32 metallic sutures. During the entire operation, which lasted about an hour, the part was continually washed with a sublimate solution. Ten arteries were involved and were twisted by the forceps. After a fresh wash of sublimate had been applied the region was covered with iodoform, making an antiseptic and compressive dressing.

At the beginning of the operation the assistants were somewhat excited, and begged the operator to have chloroform and ether in reserve; but they were quickly reassured when they saw the patient absolutely insensible in an anæsthesia such as is obtained by large doses of chloroform.

Dr. Schmeltz operated slowly and at his ease. The patient appeared to feel very gay, and from time to time laughed loudly, as though to testify that she felt no pain. To aid the operation she took the most favorable attitudes, extending her right arm, and thus avoiding the necessity of having it held.

The results of the operation were satisfactory in every respect; her temperature did not rise above 37.3° C. (99.1° F.). The tubes were withdrawn the third day. Until a complete cure was effected, which was on the fifteenth day, but one dressing was made, consisting of iodoform and absorbent cotton. The sutures were removed as soon as the reunion was complete.

Throughout the operation the patient's face was very pallid, but the pupils of her eyes did not dilate, and her pulse was not feeble.

A number of physicians saw Miss M. at this time; they also saw the tumor, which weighed about 4 pounds.

Case II. *Ectropion of the lower left eyelid.*—Miss V., 18 years of age, was attacked by ectropion when 10 months old, as a result of an abscess in the suborbital region, which had been lanced by a physician.

She had undergone two operations and the lid fell lower. When she consulted the doctor she told him that she had suffered so much

from the inhalations of chloroform that she would never again undergo an anæsthesia produced in that way.

A seance of ten minutes sufficed to convince the doctor that the operation could take place during a state of complete magnetic insensibility. Dr. Macario and Dr. Huillett were invited to be present at the operation.

All the usual antiseptic measures were taken, and, after putting the patient in a profound sleep, her eye was washed with a sublimate solution of 6 to 1,000. The patient, in a state of somnambulism, at once said, "That is a very strong remedy that you use." When asked if the irrigation burned, she said, "Not at all; I do not feel the slightest pain."

A V-shaped incision was made in the lid and the fragment removed. Three pins were then placed parallel through the ends of the wound and a metallic thread united them. A wash of sublimate with vaseline and iodoform was spread on the seam; a dry antiseptic dressing held the eye immovable. The pins and wire were removed on the fifth day; the wound was thoroughly united, and healed without the shadow of a complication and without a drop of pus.

The operation was performed slowly, and the eye, without any aid whatever, remained wide open, in spite of the contact with the instruments.

Owing to the pallor of the face and quasi absence of respiration, it was for a moment believed that the patient had fainted, but the large, soft pulse showed that this pseudo-syncope was but the effect of hypnosis. The patient did not feel the slightest pain, and when she awoke she would not believe that she had been operated upon.

The Power of Suggestion.[a]

The term "suggestion" is often preferred to that of "hypnotism," because it is the fundamental factor in hypnotism. Suggestions may be made by signs which are visual, auditive, olfactory, or tactile. Hypnotism may be defined as an artificially induced sleep in which there is suggestibility and hallucinability with insensibility to most impressions, and upon waking remembrance of little or nothing that has taken place.

Durand de Gros, while hypnotizing an individual whom he had previously directed to gaze steadfastly at a small brilliant object for the space of fifteen minutes, said to him in a positive tone, "you will run on a gallop and you can not stop without my permission."

That which he declared took place. The attainment of such a result involves as a first condition the participation of the consciousness and intelligence of the subject. This is proven by the fact that the affirmation has no effect until comprehended. If spoken to in a language he does not understand, the subject makes no reference to the suggestion. For the success of the method in suggestion experiment it is necessary that the subject have a certain moral aid, a certain faith, that he believe, to a certain extent, the incredible assurances that are made him. The affirmation is not generally effective unless articulated in a peremptory manner and by a person whose

[a] Article by the author in the Philadelphia Medical Journal.

voice, face, and entire bearing suggest conviction and persuasion. It is a universal fact that personal magnetism is a powerful aid to the hypnotist. To an old practitioner there is no doubt that the disposition to submit to suggestion lies in individual credibility and authority. Thus, in order that the suggestion may operate effectually it is indispensable that its expression be comprehended by the subject and that it obtain a certain adhesion on his part. To induce hypnosis through suggestion the attention of the subject must be fixed on one idea, exactly as one puts oneself into the autohypnotic state necessary to success in a spiritualistic seance. The attention must be concentrated and one must think only of the phenomena to be produced.

This may be one reason why the subjects the most sensitive to hypnotism are also those who best realize spiritualistic experiences. All methods to induce hypnotic sleep aim to fix the attention of the subject and to play on his imagination.

In the neurotic the attention frequently can not be concentrated for any length of time. Contradictory ideas pervade the mind, and the imagination wanders continually. Thus, neurotics, though very suggestible when awake, are difficult to hypnotize.

EMOTION AND SUGGESTION.

Emotion as a physiologic state was studied by Professors James and Lange, who claimed that it is but the consciousness of the neurovascular variations which are produced in the organisms. Among the emotions there are two which have a particularly paralyzing action on the will—sadness and fear. Besides these two fundamental types there are several secondary ones. Thus, with melancholia there is depression, discouragement—a feeling of weakness and powerlessness. With fear there is inquietude, apprehension, timidity, anguish, and terror. All of these emotions may have an inhibitory action on the will. Sadness, according to Lange, is an abnormal constriction of the small blood vessels producing a general anemic condition, which shows itself in the pallor of the tissues, in coldness, a diminution of secretions, dyspnea, certain digestive troubles, and a diminution of voluntary energy. Fear may also be due to spasmodic contraction of the small blood vessels.

ABOULIA AND EMOTION.

Aboulia is a condition in which volition is impaired or lost. It may be divided into general and special aboulia. By general aboulia is meant that state in which depressive emotion is so developed that it plays a preponderant rôle in physical life and constantly interferes in the exercise of voluntary activity. The native instability of the vasomotor system disturbs the vascular equilibrium from the slightest cause, so that there is always a quantity of loose emotion which is ready to attach itself to the idea which commands the act and to influence it in its realization. This original tendency to emotion may exist in various degrees. When very prominent it corresponds to what may be described as "nervous anguish." When emotion is thus brought into play, apropos of a voluntary determination, it immediately opposes its inhibitory action to the dynamic power of the will, and a struggle results at times extremely painful and accompanied

by characteristic symptoms—pallor, cold perspiration, oppression, and palpitation.

The timid, who almost always have aboulia emotion, know this uneasiness. They know that the most deliberately planned act may be suddenly prevented, at the moment of execution, by a stupid emotion which seizes the throat, crushes the breast, presses the heart, covers them with cold perspiration, and deprives them of all power. Sometimes by energetic force they succeed in overcoming this inhibition; frequently, however, they are incapable of overcoming it and are constrained to renounce their plans. All reasoning is vain; they are obliged to yield to this force, which is stronger than they. Emotion does not always attain to such intensity, and manifests itself under other circumstances by a resistance which interposes like a brake between the idea and the act. Thus the timid seldom realize what they desire. In them nervous energy, instead of spending itself in acts, is transformed into vasomotoric phenomena. In special aboulia, emotion is not generalized, but localized in a constant manner in this or that territory of the voluntary activity. It is not a permanent infirmity, but in intermittent and elective incapacity to act.

The following cases may serve to illustrate the power of suggestion:

Case 1.—Durand de Gros, taking the vegetative life as the objective of a disturbing suggestion, said to a subject (making him swallow a glass of water and a bread pill): "You have taken a powerful purgative, which will act very quickly," and the event did not fail to follow the announcement.

CASES OF CURE OF OBSESSION BY SUGGESTION.

We give below some cases of persons, healthy up to a certain epoch, being more or less under the domination of ideas of which they could not disabuse themselves, and which forced them to commit acts contrary to their wills. These cases were treated by Doctor Bramwell:

Case 2.—M. A., aged 24 years, suffered from disordered glands in the neck and face. Cured of these, he went to the seashore, where he fell and was wounded in the perineum. This formed an abcess, which opened and let the pus enter the urethra. The doctor found a very bad-looking wound by which the urine escaped. He told him to use a catheter regularly and the wound would heal. Sometimes before he could introduce the catheter the urine escaped by the wound. This became more frequent, and at last he allowed the urine to escape, no matter where he was. This was often the case at night. He was hypnotized at the first seance. While sleeping, it was suggested to him to think no more of this thing, to retain the urine for eight hours, and to pass it by the catheter. After this seance the patient was absolutely free from his obsession, and the wound healed completely in a year without any operation.

Case 3.—M. B., a young man of athletic habits, who loved all kinds of sport, as bicycle, football, etc., lost his mother by cancer of the breast. Fear seized him that he would contract the same disease, and he came to believe that he had a cancer in the left breast. He seldom left his room, and when he went out he wore an overcoat for fear that cold might aggravate the supposed disease. One day he thought he felt pains in his arm, and thenceforth carried it in a sling. Upon examination, no trace of cancer was found, but the muscles of the arm were atrophied from lack of exercise. Being easy to hypnotize, he was quickly put to sleep and cured.

Case 4.—M. D., aged 42 years, suffered from infancy from an obsession which made life intolerable. He fancied that everybody watched him and criticised him. If anyone looked at him, even a child, he blushed. The idea that some one might look at him also made him blush. This obsession forced him to give up his business, and he was haunted by thoughts of suicide. This man was

cured after long-continued treatment; for, being refractory to sleep, he was only brought under its influence at the fifteenth seance. He had no return of the trouble.

A somewhat analogous case is that of a merchant who fancied that he committed errors to his disadvantage in the affairs which he undertook. After he had accomplished what he undertook he felt embarrassed, and believed that everyone noticed it. This last idea possessed him equally when he went about in the world. He was entirely cured in six months.

Most of the experiments were successful. Those whom Bramwell did not cure were refractory to hypnotism. In these cases he did not succeed in provoking sleep, the mind of the sick man being so occupied by his obsessions that he could not hear what was said.

Many persons are prejudiced against hypnotism and decide to use it only when all else fails. Almost all patients have had some violent emotion. With one, it was the death of a member of his family, which produced the obsession that his wife would die also. With another, it was an emotion caused by the sight of a drunkard on a railroad, which produced the idea of never being able to travel on a train again.

Bérillon insists that these obsessions are generally associated with the daily occupations of the sick person, and show a pronounced professional character.

The greater number of authorities say that an obsession is different from a mental disease in that the patient considers his obsession as independent of his being. But this law has exceptions. One of Dr. Bramwell's patients became superstitious. Little by little he came to attribute his bad times to bad days. There are many superstitions which do not show other symptoms of disease or degeneracy. The unassimilation of an idea of obsession sometimes constitutes a morbid element, and this, it appears, depends rather upon the individual and peculiar circumstances than upon the obsession itself.

Obsessions may consist in a hypertrophy of the attention; the idea itself is normal, but its quantity, intensity, and degree are not so. Everybody can not have obsessions; for example, idiots, who possess little voluntary attention. Many very intelligent patients are not prevented by their obsessions from doing valuable work. The greater number are emotional, but it does not follow that the emotional brain is a degenerate brain and that the accidents to which it is exposed are the consequences of a finer constitution than that of the ordinary brain.

AUTO-HYPNOTISM NOT ALWAYS ADVISABLE.

Case 5.—Dr. Bonjour often suggested to a patient that no one else could hypnotize him. One day the young man received a visit from a relative, who was pleased to hear of his cure. He told him how he had been treated: "I had only to count 20 to be in catalepsy," said he; "stop, I will show you—" and calling a servant—"Emily! go set the electric alarm at 2 o'clock. I am going to hypnotize myself, and that will wake me in a quarter of an hour." In twenty minutes he closed his eyes and his body was relaxed. At the end of several minutes the maid, instead of executing the order received, went into his mother's room and rang the electric bell several times. The room communicated with the chamber of the hypnotized man. He rose immediately, ran into his mother's chamber crying: "The robbers! where are they?" Seeing no one, he dragged the furniture about and reached everywhere, went into another room, looked under the beds, went to the cellar, then, seeing his brother, threw himself upon him forcibly to injure him. When Dr. Bonjour arrived the attack had lasted three or four hours. The doctor could not awake him. At last he awoke and said that upon hearing the bell, which his mother never used, he believed her to be in danger from robbers; hence his attack.

He could not recall what he had done during the attack. After having calmed him and promised that he was cured, Dr. Bonjour advised him never to undergo this experience again, and suggested to him the uselessness of his efforts to hypnotize himself. The patient tried several times to count, as he was accustomed to do, without succeeding in putting himself to sleep.

As Bonjour could not be often with his patients who lived far away, he suggested to them the case of self-hypnotism by counting, for example, 20 or 30 or more, in order that if they awoke they could put themselves to sleep again immediately. It is necessary to suggest to patients that no one else can hypnotize them; but in some cases it may be wise to suggest in addition that they can not hypnotize themselves.

HYPNOTISM AND MORAL EDUCATION.

Suggestion may be a moral agent and educator, or a curative agent of physical ills. As an illustration of this we give the following case of Bourdon:

Case 6.—B., aged 13 years, had always been anæmic and nervous; from the age of 2 years she slept badly and was very restless at night. She was the daughter of an arthritic mother, who also suffered from gravel, and of a father addicted to drink. At the age of 7 years she had articular and visceral rheumatism, which seemed to have affected the left side of her heart. A little later she had a severe fright; her father, in a state of intoxication, had struck his father-in-law with a gun. Later he had dizziness, syncope, then great nervous crises, convulsions, palpitations of the heart at any sound or movement, constant fear, and loss of consciousness when playing or at rest. Her character changed; she became peevish and choleric, especially at the approach of the crises. She ate very little and did not go to the closet. Her nose frequently bled, increasing her anæmia and sense of oppression. At the age of 12 she had long periods of sleeping; she cried in her sleep, had violent nervous attacks, always announced by greater impatience and fretfulness. In a word, she had hysteric somnambulism. She was rude and unamiable, disobedient, idle, dirty, although a little coquette, combing her hair every instant; she bit her nails; she ran after boys. It was not known whether she practiced onanism. She had, besides, profuse hemorrhages from the nose and difficult menstruation; her monthly periods she had once at the age of 13; they had never returned. Hypnotism was difficult, sleep was not at all profound, but it increased a little at each new seance. The operator looked at her, and told her to sleep; also used his hand. He said to her, insisting upon it often, that she must not sleep during the day, but only at night, as other people did; that she should not be any more afraid in the evening or at night than during the day. He suggested to her amiability, goodness, gentleness, thoughtfulness, affection for her relations, thankfulness to them for their kindness, obedience, docility, cleanliness without coquetting, the care of her hair only in the morning, love of work, and the desire to do good, horror of evil, distaste for biting her nails, indifference toward boys; then, that she should have no more hemorrhages from the nose; that the blood should take its natural course; that her appetite should return and increase; that she should digest her food properly and go morning and evening to attend to the calls of nature; that she should have no more palpitations of the heart—in a word, everything that might redeem the situation as much from a moral as from a physical point of view. These suggestions were repeated several times, softly, but in a manner to impress them upon her mind, and this prolonged her sleep several hours each day. These seances were repeated daily for ten days, then weekly, then semi-monthly, then at intervals more or less distant. Each time some ground was gained. The crises were less and less frequent and less and less strong. At last perseverance was rewarded by good results, and as the young patient seemed to acquire a taste for sleeping, fearing that it might grow into a habit, it was suggested to her that, as she was growing better and better, she did not need to sleep so often. This treatment was accompanied by a tonic and massage of the body. At the beginning a blister was applied near the heart, with the hope of destroying or diminishing the valvular exudations left by the rheumatism. Several times by the aid of suggestion the wound (dried up by the

blister) was made to flow and cease to flow as often as it seemed necessary. The heart grew better and better, and whether the action of these two means be illusion or not, there was scarcely any palpitation. The hypnotic sleep was each time easier and better, though never deep.

The young girl was completely cured; she was transformed physically and morally. There were about forty-two seances in all. Thus hypnotic suggestion can be a salutary aid in moral education. Experiments have already shown to what extent the passions, instincts, tastes, and psychic faculties can be definitely modified by hypnotic suggestion, and one can not help smiling at the protestations, as eloquent as they are incompetent, against "the outrage upon the rights of humanity by the practice of hypnotism."

Study of the Hypnotized State.[a]

Hypnologists have frequently expressed regret at not being able to procure personal and exact observations made during hypnosis. The difficulty is that profound hypnotic sleep generally renders personal observations impossible because of amnesia which accompanies it. Even when the hypnosis is light and does not exclude all memory it is difficult to procure information from sincere persons accustomed to psychological observations. The majority of subjects are sick people, more or less nervous, who see nothing in the experiments but a pretext to be theatrical, and consequently their testimony must be taken with caution. As a result it is very difficult to analyze the suggestion, the manner in which it is perceived by the subject, and the mechanism by which it is executed.

A possible way to escape these difficulties may be, first, in not taking sick people as subjects, but persons accustomed to psychological studies and exact analysis; second, in simplifying the suggestion as much as possible, so that the accessory phenomena do not take a preponderant part and thus mask the principal phenomenon; and, finally, in placing the subject in a condition which, if not normal waking, is not a state of profound hypnosis, and in which he retains absolute liberty of mind and his faculties of attention and analysis, the memory being neither abolished nor weakened.

To this end we give a number of experiments by Dr. Joire on his pupils. At the first seance there were present 16 students, the majority belonging to the faculty of medicine, the others to law and letters.

Mr. C., a medical student, offered to serve as a subject. His eyes were covered by a band made expressly for the purpose—a double black cloth mask with an opening for the nose, and on each side a large pad of cloth which filled up the hollow between the cheek bone and the nose—and the subject placed in the middle of the room. Longitudinal passes were then made before his face and the whole length of his body; then his hands were held a few minutes regarding him fixedly.

The doctor moved away and stood three or four yards in front of him, at the same time mentally suggesting that he raise the left arm. In a few seconds this arm, which hung by his side, began to show successive movements—one would say contractions such as a feeble current of electricity would produce passing in the flexor muscles of

[a] Article by the author in the Medical Summary, Philadelphia.

the hand and forearm. After these movements the arm moved out from the body and rose without bending to a horizontal position as though moved by an invisible spring. While the left arm was thus raised it was suggested that the subject raise the right arm, and shortly it went through the same movements with remarkable precision. Then a like suggestion was made which caused the arms to fall in their former position. They fell slowly with the same automatic movement, not as they would if inert and fatigued by their own weight.

This all took place in full light and absolute silence.

This subject gave an account of his sensations. When the passes were made he felt a sort of general numbness or dizziness; then the left arm obeyed the influence of a strange impetus and was pulled forward and upward by force. The force then ceased to be felt and the movement of the arm was arrested. The same force was felt in the right arm, and after a few seconds it was felt in both arms in an inverse sense, which determined the lowering and returning of the arms to their normal position.

The second experiment was made on Mr. B., a medical student. The same preparations were made as in the first case. The subject was placed in the middle of the room well in the light. The doctor then stood three yards in front of him, leaning with his hands on the back of a chair behind him, and suggested that he should raise the right leg, the doctor himself accompanying the suggestion by the movement. In from fifteen to twenty seconds the subject rested all the weight of his body on the left leg, bent the right knee till only the toe touched, and finally lifted it entirely. The bandage was taken off and the doctor breathed on his eyes, and he then related his sensations. He did not emphasize the numbness, which, however, he declares he felt before the suggestion, but he distinctly felt an unexpected and involuntary contraction of the muscles in the thigh, which caused the raising and bending of the knee.

At the second seance M. X., a medical student, who had been present at the first, said he was not convinced of the reality of the impulse which the subjects claimed to feel. He did not doubt their good faith, but thought there must be auto-suggestion and that the spontaneous movement only chanced to be the one desired, etc. Dr. Joire proposed to repeat the experiments on him. He being skeptical and prejudiced against auto-suggestion, a successful experiment would have all the more value. M. X. was blindfolded (he declared that he was convinced that to try an experiment on him was useless) and passes made on the head and body, he at the same time being told not to imitate from memory and not to resist any distinct impulse. The operator then stood about two yards from him and began a mental suggestion to move the left arm out, but parallel with the body, and then to bend the forearm up onto the arm. In a very few moments the automatic movements began, slowly, but without hesitation.

When asked why he made the movement M. X. confessed, with some surprise, that he had felt a force drawing his arm in the direction followed, that he at first resisted, but the impulse continuing to act and became very strong, when he no longer resisted.

One of the subjects who had served before was then led from the room, while those remaining made a chalk line with numerous curves on the floor. When all was ready the blindfolded subject was led into

the room and placed at one extremity of the line. The operator, without touching the subject, fixed his attention on the line which he was to follow. This line began at the door, described a circle to the left, turned to the right, and again a large circle to the left. The subject followed the line step by step, very exactly, stopping and seeming to hesitate at the curves.

The same experiments were repeated several times with different subjects, which permitted the operator to gather the impressions of each under exactly the same conditions. Each of the subjects experienced the same sensations and analyzed them in the same way.

It is of great interest, then, to find in what condition the subjects are at the time of receiving the suggestion. In appearance they are awake, and, in fact, if questioned after the experiment, would unanimously reply that they had not slept. In reality they were not in a sound sleep, but neither were they in a normal waking condition. The proof is found in the fact that when the passes were made they all experienced a change; as they said, something seemed to isolate them, and there was a vague numbness and tingling all over the body.

The subjects were in a state which has been described as medianic or passive—the attention to whatever came from the person suggesting was exalted to a point which it could not attain in a normal condition. It is probably this modification of the subject which admits of the establishment of communication between himself and the operator by which he can be impressed by an influence purely psychic. This psychic correspondence between several individuals does not appear to be abnormal, or even peculiar to the hypnotic state, but in the "medianic" state there is an orientation peculiar to this nervous influx, and at the same time a concentration of force toward some one individual.

It has been ascertained that the presence of another person, and who makes an effort contrary to the suggestion, considerably hinders the experiment and can even prevent a complete success.

Mental suggestion requires a considerable effort of will on the part of the operator, an effort which must be sustained without interruption throughout the time required for the suggestion.

This constant effort of will, this fixity of the attention, concentrated on a single object, is not as easy as may be imagined and requires a certain education or training.

PEDAGOGIC HYPNOTISM.[a]

One of the chief workers in hypnotism as applied to pedagogics is Dr. Bérillon, of Paris. We desire in the main to present his ideas, but before doing so, the writer will describe briefly a visit to his clinic.

On arriving at his clinic we found most of the patients already there. The doctor remarked we could visit a while in his private office, as most of the patients would hypnotize themselves. When we entered the clinic there were nine or ten persons of different ages and sexes who had been looking intensely at hypnotic mirrors or similar contrivances, and most of them were already asleep. The fact that the doctor had hypnotized them in this room many times

[a]Article by the author in the Medical Progress, Louisville, Ky.

and with the aid of these instruments, the fact that he had arrived, and their confidence that he could hypnotize them as soon as he came, all of these conditions enabled most of them to put themselves to sleep. The doctor then proceeded to deepen the sleep of his patients, making various suggestions adopted to their special troubles.

HYPNOTISM USEFUL FOR ABNORMAL CHILDREN.

By repeated suggestions during hypnotic sleep, in which condition suggestions have more weight and a deeper and more lasting effect, it is possible to develop the faculty of attention and to correct evil instincts in vicious, unruly, and obstinate children, incapable of the least attention and of the least application. There are as many reasons against the use of hypnotism in the education of normal, healthy children as there are reasons for its employment in the cases of bad, vicious, or sulky subjects. It is expressly and emphatically stated that this means of educating a child must not be resorted to till all other methods have failed, and must always be applied under the direction of a competent and experienced physician. Dr. Berillon has accomplished by means of suggestions the cure of cases of kleptomania, lying, biting of the finger nails, cowardice, fear of the dark, etc. It is possible through the hypnotic state to modify the ideas of children, change their characters, correct acquired habits, and form new ones; increase the power of attention and of memory, awaken and develop natural aptitudes, and vary the intensity and modality of perception. There are, therefore, in hypnotism the elements of a true experimental pedagogy.

The object of the use of suggestion in pedagogy is to correct impulses and automatic habits in children, and to bring out their natural aptitudes arrested in their development. This result may be brought about in two ways—first, by the creation of psychical inhibitory centers and the cultivation of the power of self-control, and, second, by the exercise and the automatic stimulation of psychic energy and the excito-motory functions.

REQUISITES OF PEDAGOGIC HYPNOTISM.

Certain fundamental requisites are necessary to the obtaining of these results. To begin with, it is necessary to study the natural suggestibility of subjects. In order thus to diagnose their susceptibility to suggestion, it is necessary to suggest to them, in the waking state, to perform in spite of themselves a series of simple acts. The result of this suggestion gives the measure of their suggestibility. In certain children a suggestibility will be revealed much greater than their appearance would lead one to expect. The importance of this experiment will be understood when the fact which we give as an actual psychological law is stated. The suggestibility of a subject is directly related to his intellectual development.

The second requisite is to induce in the child a hypnotic condition or at the very least a passive state—that is to say, a physiological condition characterized by the suppression or diminution of the different activities of his mind—and by the increase of automatism. The third requisite, the subject being in a passive state, is to associate with the

verbal suggestion a psycho-mechanical action. In cases where it is desired to correct a more or less irresistible impulse or an automatic habit the psycho-mechanical action will have for its object the creation of an "inhibitory center." This will result either in making it mechanically impossible for the subject to perform the act indicated, or in causing in him by suggestion a psychic paralysis. These maneuvers should be repeated till the image of the check is fixed in the brain of the subject. In cases where it is desired to overcome a condition of mental activity the desired result will be arrived at by use of the image or thought of action and an automatic impulsion repeated as often as necessary to awaken mental activity. The fourth requisite is to formulate all suggestions with precision and clearness. It is necessary that the visual, auditory, or motory images presented to the brain should be definitely outlined.

After the subject has automatically and unconsciously performed the suggested acts he must be awakened to consciousness by degrees, and the same acts must be performed with his conscious participation.

Finally, the subject being completely conscious, there remains nothing more to do but to assure him that he can inhibit his impulses by the simple action of his own will power.

If this procedure be carefully followed, pedagogic hypnotism, which seems at first glance an enslaving of the consciousness, will show itself to be instead a development of individual consciousness and of personality.

As an illustration of the utility of hypnotic or suggestive method, we give in detail the case of a schoolboy affected with nervous trembling.

NERVOUS TREMBLING CURED BY HYPNOTIC SUGGESTION.

The following observation treats of a youth of 15 years of age, pupil in a public school in Paris: Fernand F. was very intelligent, usually gave satisfaction by his work, and regularly occupied one of the first places in the various classes. Toward the month of December he was astonished to see his writing uncertain and his hand shaky. He paid little attention to it at first, but soon it became aggravated and troubled him very much; for example, in tracing a letter he was obliged to go over it several times, to proceed by starts and jerks, and to make additions—sometimes angular, sometimes round. He was thus rendered incapable of taking notes or writing from dictation. He also frequently had geometrical designs to make, but he found it impossible to do this sort of work, as he could not make use of the drawing pen.

The school programme included manual work in carpentry, etc., in which F. had achieved a certain skill, but as a consequence of this manipulating the wood and iron after an extraordinarily intense effort, which fatigued him very much, and then the results obtained were but trembling he became maladroit and uncertain and only succeeded in mediocre. In every respect F.'s studies were seriously compromised, the more so as the trembling increased from day to day.

To add to this, F. was many times a day subject to auditive hallucinations, generally when he fixed his attention firmly on one object. These hallucinations were in keeping with the subject which occupied him at the moment, and arose more particularly when he was work-

ing at his geometry. At times it seemed to him that one of his masters stood behind him and spoke imperiously to him, but more often the hallucination was not external. What he heard was an internal voice, grave and severe, which engrossed all his attention, which subjugated and possessed him. During this time his features were immobile and his gaze fixed; he seemed stultified or plunged into a sort of intellectual torpor. After several minutes he would realize that he was the toy of an illusion and would pull himself together, rise, pace up and down, and thus come back to ordinary life. Once free from the hallucinations, he did not recall the words he had heard; even their sense escaped him. He was distinctly conscious that the voice was rough and imperious, but he dared not affirm that the words were distinct. He was aware that the voice was more often internal and that is was of purely subjective origin.

F. realized that his case was abnormal, even pathological, and attributed it to the derangement of his nervous system. In the beginning of February he determined to procure treatment, and to this end went to the clinic for nervous diseases.

It was there that Dr. Farez was enabled to study him and to treat him in concert with Berillon.

ANTECEDENTS OF F.

This youth was very sparing in details concerning his hereditary antecedents. The majority of the members of his family lived in the provinces, and he scarcely knew them. He had never heard of any of his relatives or antecedents having had mental trouble or neuropathic defects. He had neither brother nor sister; his parents, aged, respectively, 40 and 50 years, were very well. His mother was very nervous and exhibited an exaggerated emotivity; the slightest thing caused her to weep; yet she was neither hasty nor choleric, but, on the contrary, possessed a rare equality of temper, and, moreover, was credulous and trusting in the extreme.

F. resembled his mother both mentally and physically. As a child he had been very healthy. Although but 15 years old, he seemed at least 17 or 18. He was tall, and, judging from his large frame, one would have thought him solid and vigorous; nevertheless he experienced a sensation of feebleness and lassitude, especially in his limbs.

ANATOMICAL PECULIARITIES OF F.

The cerebral cranium was abnormal and asymmetric, more developed than ordinarily, and the temples very prominent, the right one more than the left, and there was a deep depression in the top of the head above the temples in the region which corresponds to the coronal suture and to the anterior portion of the sagittal suture, which indicated an untimely synostosis. The right temple showed the trace of an old contusion, and on top of the head immediately back of the left temple, quite near the median line, antero-posterior, was a comparatively new scar. In fact, some months previous to the appearance of the above-named symptoms F. had been struck on that spot by a stone and had been unconscious for several hours.

DISPOSITION OF F.

F. was of a tranquil and gentle disposition, rather timid. Ordinarily he appeared grave and serious as would a mature man; he was neither expansive nor yet too reticent; he laughed immoderately, though seldom; he had a horror of fights, and if spoken to roughly he refrained from responding, though he suffered cruelly and even cried in secret. He was neither capricious nor fantastic. He exhibited a great deal of patience and perseverance, and his studies seemed to be his only occupation. He was very impressionable, and in class was a constant prey to anxiety; he blushed, and profuse perspiration covered his entire body; he expected every minute to be questioned, and feared lest the questions find him unprepared. He thus underwent a veritable moral torture, which was ended and followed by a glow of satisfaction as soon as the recitation was over. This experience is too common in recitation, where the object seems to be to find out who knows the lesson (not very important knowledge), the teacher being a sort of mental detective. He experienced the same anguish when the compositions were read for places, fearing he would not be among the first.

Finally his memory failed and he could not work for any length of time without becoming fatigued, but, being very courageous, he overcame the fatigue and applied himself to his studies not only during the day, but far into the night. When he went to his meals, in order not to lose any time from his studies he ate very fast and in a gluttonish manner, and immediately after the repast he began work. His digestion was defective, which caused abnormal fermentation.

SYMPTOMS.

The trembling consisted of slight oscillations, regular and rhythmical, little apparent when in repose; it became exaggerated when F. made voluntary movements, and especially in writing. In the transverse sense his writing showed hesitations, breaks, and retouchings, while the downward strokes in the curves and long loops were full of small and almost irregular undulations. F. trembled more when he tried to write slowly and also toward evening, but more especially after fatigue or any emotion. This tremulousness was not confined to the arms, but also in the legs, and at intervals even appeared in the lips and eyelids. It was more noticeable in the hand because of the great inconvenience it caused him. The tremulousness came on very gradually; it existed before the blow on the head, but was extremely slight.

TREATMENT OF F.

In his first visit to the clinic he was made to look fixedly at an armchair; then it was energetically asserted that he was about to submit to a species of fascinations toward the chair; that he would feel himself drawn toward it; that he would, by virtue of an irresistible force, go and sit in it and fall into a profound sleep, all of which was realized in a few moments, proving that he was very suggestible. In fact, at each seance he fell asleep with the greatest ease.

While he was in the hypnotic sleep, suggestions were made him in accordance with his case. He was persuaded that he had been lack-

ing in self-control; that he trembled when writing because he had not sufficient energy to fix his attention firmly on his work or to control the trembling. He was assured that by means of hypnotism he would be given the moral energy which he lacked; that in future he would be absolute master of his movements, that he would direct them in perfect consciousness, and would be able to prevent his hands from trembling; he would also have the power to concentrate his mind on any single object; that he would never be distracted or possessed by any hallucinations; that the lassitude would disappear and the muscles recover their normal vigor. At the same time a simulation of a general massage of the limbs was made. Then, to reenforce the suggestion, he was told that by special passes his body would be filled with magnetic fluid, which would secure the realization of all that had been told him.

Intervention during hypnosis was not confined to psychic suggestions; this was accompanied by mechanical treatment. While F. continued to sleep, his hand was held firmly and directed in such manner as to make him accomplish, without trembling, movements corresponding to the form of certain letters. Then he was told to trace in the air words indicated, which he soon did with great assurance. While still in the hypnotic sleep, with eyes tight shut, he was told to write with a pen on paper. The letters were remarkably distinct and correct.

This double treatment was applied once a week during three months, and at the end of each seance a remarkable amelioration was observed. At the end of this time F. was pronounced cured, and he once more became an excellent pupil. His memory was better and more prompt, light work no longer fatigued him, and he was able to apply himself successfully to his school duties. His writing was firm and flowing, his geometrical designs exact, he had recovered his old skill at manual work, and his hallucinations had completely disappeared.

At the beginning of the treatment the amelioration obtained by each hypnotic sleep did not become definite all at once; the progress was regularly maintained during three, four, or even five days, but diminished on the day before that set for the next treatment. To be more clear we will make a comparison: Take, for instance, a storage battery which has been charged with sufficient electricity for considerable work, but all work is impossible when the potential energy previously stored has been exhausted. Thus every Thursday our youth went, so to speak, for a fresh supply of moral energy, which was spent little by little during the week. One Thursday F. was unable to attend the clinic, and a fortnight elapsed without his receiving treatment, or, to adhere to our metaphor, without being recharged, so at the end of this time he was in the same condition of a fortnight before, consequently the amelioration was not present, as nothing had hindered its retrocession.

Thus the cure was necessarily slow and gradual, but was finally obtained through patience, perseverance, and tenacity. It was not sufficient to gain ground each time; it was also necessary to maintain it. F. was afterwards obliged to take an examination, and there was reason to apprehend bad effects from overstudy and emotive anguish, so care was taken to again subject him to hypnotic and psycho-

mechanical treatment as a prophylactic to relapse. Thanks to this intervention, the cure was made permanent in spite of the unfavorable circumstances surrounding the subject.

In cases of this kind, as in many others, hypnotism not only aids, cures, and renders the cure permanent, but is an operation which enables one to forestall a repetition and to fight successfully against conditions favorable to a return of the disease.

What is the rôle of the mechanical treatment which accompanies suggestion?

All motory habits can be revived by what is called an association of synergetic movements. These movements in a measure form part of one mechanism; they concur to the same end; they enter into play together and have no signification aside from the definite purpose for which they are associated. But it may happen that these movements lose their clearness, their precision, their fixity, that they become dissociated and cease to be synergetic; or it might be that these supplementary movements subjoined superpose those which are indispensable. From this, the motor habit may be perverted or deviated, and it is expedient to set it right, to render it fixed and regular; in a word, to reeducate it. This is quickly and surely accomplished by the mechanical treatment during hypnotic sleep, which subjects the various movements to a beneficial discipline and creates anew the association. As a consequence we possess a treatment of the diverse motor habits, and besides, one may have recourse to this intervention, not only to rectify, but also to conserve and even create motor habits.

We have learned, says Farez, that psychotherapeutists are the natural and frequently the indispensable assistants of educators.

The case in question is a fresh example of the fecundity of the suggestive method. Thus hypnotism is an instrument of mental and moral orthopedy; it is capable of assuring not only the education of the intelligence of the will and of the disposition, but also of precision, of address, and dexterity in the motor domain.

SOME RECENT RESULTS FROM THE STUDY OF MAN.

It may be interesting to give some of the results of recent investigations of modern man. The statement of these results will indicate how incomplete and unsatisfactory our knowledge of living man is. As there can be no more important study than man himself, the need of bringing this study up to the degree of accuracy equal to that of the sciences is evident. But this can be done only by patient investigation with instruments of precision applied to many persons of all classes. To these psycho-physical results must be added a sociological study of all the outward conditions in which the individuals have existed from childhood up. This combination of psycho-physics and sociology will make both more useful to the community.

The conclusions below, although based upon a considerable number of cases or experiments, can be held only as tentative—that is, while true for the individuals experimented upon, they have only a general probability when applied to all persons. To be generally true most of the conclusions would have to be based upon a very large number of experiments.

Some of the conclusions may seem so obvious as not to need an experimental basis, but commonly accepted ideas may prove to be more false than true when submitted to rigid tests, for general impressions are sometimes based on conspicuous exceptions.

It is not intended here to note results from all those who have done research work. In giving the conclusions we have followed the work of the investigators as much as brevity would allow, giving the general idea in as few words as possible. As will be seen, much research has been done by Americans.

RESULTS.[a]

GROWTH.

Large children make their most rapid growth at an earlier age than small ones (Bowditch).

Maximum growth in height and weight occurs in boys two years later than in girls (Bowditch).

First-born children excel later born in stature and weight (Boas).

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 (Lancaster).

Chest girth increases constantly with height and is generally half the length of the body (Landsberger).

Chest girth and circumference of head increase in parallel lines (Daffner).

The relatively large size of head as compared with body in children may be due to the fact that from birth on the child needs its brain and senses as much as when it is grown (Weissenberg).

Boys grow more regularly than girls, but the growth of girls during school years is greater than that of boys (Schmidt).

In boys in school the muscles of the upper extremities increase with age as compared with those of the lower extremities because of their sitting more than standing (Kotelmann).

Breadth of face increases much more rapidly in proportion to the growth of head in breadth and length (West).

Tall boys (naval cadets) are much more likely to have completed their growth at an earlier age than those short in stature (Beyer).

Children born in summer are taller than those born in winter (Combe).

Boys of small frames often have large heads and are deficient in repose of character, and when the chest is contracted and mental action slow, this mental condition is due probably to lack of supply of purified blood (Liharzik).

Delicate, slender people are much more subject to typhoid fever than to consumption (Hilderbrand).

Women students who have had infectious diseases are superior in weight, height, strength, and lung capacity to those having had hereditary diseases (MacDonald).[b]

Some defective children are over-normal—that is, they are taller and heavier than other children (Hasse).

Growth degenerates as we go lower in the social scale (British Association for Advancement of Science).

Dull children are lighter and precocious children heavier than the average child (Porter).

Urban life decreases stature from five years of age on (Peckham).

Truant boys are inferior in weight, height, and chest girth to boys in general (Kline).

Righthandedness is natural, and the superiority of the right over the left hand increases with growth (Smedley, F. W.).

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[a] For a full understanding of some of the results one of course must consult the original articles.

[b] Philadelphia Medical Journal, April 20, 1901.

SIGHT.

Visual perceptions are not copies of a physical world, but mainly the result of experience and utility (Cattell).

In the association of images frequency is the most constant condition of suggestibility (Calkins, Mary W.).

If the eye is the expressing sense, all lengths are greatly underestimated, the error decreasing as the length increases (Jastrow).

The recognition of an ordinary picture requires one-fifth of a second or less, the time decreasing as the familiarity increases (Colgrove, F. W.).

An object is recognized more readily when inverted than in either of the two intermediate portions of quarter-reversal, and more readily than in the erect mirror position or the position inverted (Dearborn, G. V.).

Visualization decays as age advances and abstract thought increases (Armstrong and Judd).

Localization seems to depend much more on fusion than upon motor tension of the eyes (Hyslop).

The effects of fatigue are more lasting toward the side portion of the retina than near the center (Washburn, Margaret F.).

From the commencement of a momentary illumination until the appearance of an after-image 0.344 second elapses (v. Vnitschgau and Lustig).

The eye when in the primary position can be rotated from this position 42° outward, 45° inward, 34° upward, and 57° downward (Schuurmann).

The sense of sight is much more accurate in estimating length than the sense of touch aided by the muscular sense (Swift, E. J.).

When colored objects are very small and illumined only for a short time, the normal eye first fails to perceive red (Aubert).

When retinal fields (colored squares or figures) are presented in succession, the new field dominates in consciousness (Pace, E. A.).

There is good evidence for believing that we can get an after-image from a mental image (Downey, June E).

Red and yellow are visible at greater distances than green and blue (Misses Tanner and Anderson).

The pleasantness of colors generally increases with their saturation (Cohn, J.).

The optic nerves, especially the left optic, in Laura Bridgman, are very small, when compared with those in normal brains (Donaldson).

Children can not see colors as far in indirect vision as adults. Difference in sex makes no perceptible difference in the extent of color range (Luckey, G. W. A.).

In comparison of a fixed object with one which is moved toward or from the eye the moved object is generally underestimated (McCrea and Pritchard).

SOUND.

In the audibility of shrill notes there is a remarkable falling off of the power as age advances (Galton).

Beats are more precisely perceived by the ear than by other sense-organs (Höring Mach).

We distinguish more easily the direction from which noises mixed with musical tones come than that of tones (Rayleigh).

The fixedness of auditory localization can indeed influence the optical impression (Münsterberg and Pierce).

The conception of a rythm demands a perfectly regular sequence of impressions within the limits of about 1 second and 0.1 second (Bolton, T. E.).

The auditory element in reading is a much more persistent factor than articulation (Secor, B. S.).

Tones of liminal intensity, attentively followed by practiced observers, evince the fluctuations ordinarily described as "fluctuations of attentions" (Cook, H. O.).

There is no good evidence for supposing that cutaneous sensations play any part in the localization of sound (Angell and Fite).

MEMORY.

In young children a memory image is smaller than its object, while in adults it may exceed the object in size (Wolfe, H. K.).

The memory which acts quicker acts better (Bingham, J.).

The memory image tends to grow larger as the time interval increases (Warren and Shaw).

The memory image is more readily producible after five minutes than after one minute (Bentley, I. M.)

Matter memorized orally appears to be retained slightly better than that memorized visually (Whitehead, L. G.).

It is absurd to assume that the memorizing of any subject gives valuable memory training (Kirkpatrick, E. A.).

Sentences are remembered inversely in proportion to their length and number of nonessentials contained (Shaw, J. C.).

Great men, though often absent-minded, have strong memories in the lines of their interests (Yoder).

The accuracy of memory is enhanced if, during the interval, the attention is deflected from the thing to be remembered to something else (von Zwetan Radoslawow-Hadji-Denkow).

SKIN.

The skin over the joints is more sensitive than elsewhere; touches on the back are more distinctly felt than touches on the front of the body; touches on the left side are not so well localized as on the right side (Krohn and Bolton).

The greater the mobility of the part, the greater the sense of locality on the skin (Vierordt).

A weight held by one limb seems to become lighter as soon as we contract other muscles of the limb, which, however, are not required to act in supporting the weight (Charpentier).

The sensibility to cold is generally greater than to heat, that of the left hand greater than the right (Goldscheider).

Limbs which are asleep feel heat and not cold (Herzen).

The greater the sensibility of the skin the more rapidly can stimuli succeed each other and still be perceived as single impressions (Bloch).

Two points touching the skin feel wider apart than when moving along the skin (Fechner).

The pain threshold increases with the area of stimulation, but, like the tactile threshold, much more slowly than in direct proportion. The most sensitive parts of the body are those where the skin is not separated from the bone by muscular and other tissues (Griffing, H.).

In cutaneous perception of form, the tip of the tongue ranks first, then come the finger tips and lips (Major, D. R.).

TASTE AND SMELL.

Taste sensations, so far as their discriminative or intellectual value is concerned, are the composite result of the mingling of sensations of smell, touch, temperature, sight, and taste (Patrick, G. W. T.).

Sweet is tasted best on the tip of the tongue, sour on the edge, and bitter at the base, acid equally on the tip and edges, but less at the base (Kiesow, F.).

Saline substances are tasted most rapidly (after 0.17 second); then come sweet, acid, and bitter (v. Vintschgau).

Odorous bodies diminish the number of respirations (Gourewitsch).

Weber's law applies to smell (Gamble, Eleanor).

MOVEMENT.

The thought of a movement already begins it, facilitates it, quickens it; yet attention to a practiced movement in many instances embarrasses it, hinders it, lengthens it (Baldwin).

Accuracy in judging space by movements of the arm increases with age (Gilbert).

Automatic movements of the speech organs do take place and are far from uncommon (Curtis, H. S.).

There is a gradual increase of motor ability with age; the increase in mental ability is not so well marked. Boys slightly surpass girls in motor ability, while the reverse obtains in mental ability (Bagby, W. C.).

In involuntary motor reaction there is a strong tendency to expansion under agreeable stimuli, and to contraction under disagreeable stimuli (Münsterberg).

Contraction of the extensor muscles is more pleasant in itself than contraction of the flexors (Dearborn, G. V. N.).

The individual who is fairly accurate and very quick is generally more accurate when he takes more time (Fitz, G. W.).

The average knee jerk varies in amount at different times of day, being as a rule greatest in the morning and very much less at night, and in general large after each meal (Lombard).

ATTENTION.

The constant of attention for any activity increases with (1) the effort of the accommodation of the special sense organs; (2) the effort in coordination of the muscles; (3) the effort of the memory, and (4) the number of simultaneous activities (Welch, Janette C.).

The time question in attention is not a case of a "sensory" versus a "motor" reaction, but of a sensori-motor less habitual versus a sensori-motor more habitual (Angell and Moore).

In perceptual attention there is a general increase in the rapidity of respiration. This is also characteristic of heightened mental activity (MacDougal, R.).

VOLITION.

The power of volition of the ego seems to induce changes in the cerebral centers and connected organs of sense apparently without any use of the muscular system to control the nature of those changes (Ladd).

Mental images themselves constitute the motives, the springs of action, for all we do (Lay, W.).

Positive feeling seems to indicate that the function exercised is supported by a good amount of nervous energy, and negative feeling the opposite condition (Hylan, J. P.).

If the volitional temperament is unfavorable, practice will have no effect in determining the two types of reaction time (Titchener, Hill, and Watanabe).

STIMULATION AND SENSATION.

Intensity of sensation is exactly proportional to the duration of stimulation, the time being less than necessary to produce a maximum effect (Lough, J. E.).

The threshold of sensation for the sense of pressure in an average person is 2 milligrams on the forehead, temple, and back of forearm, 5 milligrams on nose and chin, and 15 milligrams on under surface of fingers (Scripture).

Equal increments of sensation are produced by increments of stimulus in geometrical progression (Morgan, C. L.).

The minimal time of stimulation which will yield an after sensation is about 5 seconds with a pressure of 150 grams (Spindler, F. H.).

In judgments of comparison with a mental standard, there is an absence of any correspondence with Weber's law (Woodworth and Thorndike).

MORAL SENSE.

Young children think of the results of action; older children consider more the motive that leads to action (Schallenberger, Margaret).

The humane instinct in children is much stronger than the destructive instinct (Barnes).

As age increases, children have more sense of their own value, submit to punishment less, but feel more responsibility (Frear, Caroline).

Moral action in child life is more a matter of imitation than intellect (Street, J. R.).

Girls show less interest in material things than boys, and admire the æsthetic more (Chandler, Katherine).

READING AND WRITING.

Many acts called intelligent, such as reading and writing, can go on quite automatically in ordinary people (Solomons, Leon M., and Stein, Gertrude).

In reading the size of type is the all-important condition of visual fatigue No type less than 1.5 mm. in height (eleven-point) should be used, the fatigue increasing rapidly even before the size becomes as small as this (Griffing and Franz).

In learning to interpret the telegraphic language it is intense effort which educates; each new step in advance seems to cost more than the former (Bryan and Harter).

In writing men respond to an increased difficulty by intensifying the volitional impulse; women, by a reduction in the size of the characters written (Diehl, A.).

Rapid readers do their work better, as well as in less time, and retain more of the substance of what is read (Quantz, J. O.).

As to legibility of small letters, w, m, q, p, v, y, j, and f are good; h, r, d, g, k, b, x, l, n, and u are fair, and a, t, i, z, o, c, s, and e are poor (Sanford).

Eye movements in reading are not materially different from those made in response to peripheral stimuli as the eye looks back and forth between two fixation points (Dodge and Cline).

In adding the effect of alcohol seems to be a slight quickening; in reading and writing, alcohol produces a period of quickening followed by a period of retardation (Partridge, G. E.).

ILLUSIONS AND DREAMS.

In perception of visual form each observer has certain habits of illusion, or certain typical modes of associative completion, which persist with modification throughout his records (Hempstead, L.).

Illusions are mainly due to autosuggestion (Tawney, G. A.).

Men are less prone than women to illusions of weight (Wolfe, H. K.).

Dreams are the product of light sleep, representing the reinstatement of consciousness after the early and profound sleep (Patrick and Gilbert).

The delusions of the waking hours seldom or never come to harass the sleep of the monomaniac (Pilcz, A.).

Illusions are easily built up when suggested along the lines of firmly fixed associations, and consequently the brightest children are more suggestible under these conditions than the dullest ones (Dresslar, F. B.).

BLUSHING AND FEAR.

Blushing comes from shyness and fear, is unnatural and morbid, increases at puberty, and is greater in women than men (Partridge, G. E.).

In boys, fear increases from ages 7 to 15, and then declines; in girls, from 4 to 18. Girls fear more than boys (Hall).

POWER OF ESTIMATION.

Younger children underestimate weight and size (proportion) and overestimate time (Franz and Houston).

Weights are discriminated a little better through the hand than through the foot (Kinnaman, A. J.).

In the estimation of measurement men are more accurate than women (Bolton, T. E.).

Time perception can alone be accounted for as a process. Nearly all persons under nearly all conditions find a particular length of time interval more easily and accurately to be judged than any other (Nichols, H.).

MISCELLANEOUS.

Students entering college have heads on the average 19.3 cm. long; 15 per cent have defective hearing; their average reaction time is 0.174 sec.; they can remember seven numerals heard once (Cattell and Farrand).

In reaction time the ear-lip coordination is the fastest (Angell and Moore).

Lower races seem to have shorter reaction times than higher races; they are more automatic (Bache, R. M.).

The mental processes of the highest animals are not radically different from those of men, but man has capabilities of feeling and intellection which animals can not attain (Mills, W.).

Mental exercise causes less inflow of arterial blood into the arm, and so does sleep (Mosso).

Vascular tonicity increases dicrotism (double-beating pulse) and high pressure diminishes it (Binet).

In general, sensitiveness to pain decreases in order of birth (Carman, Ada).

Those who have endured the most hardihood in life are usually the least sensitive to pain (MacDonald).

City children are more vivacious, but have less power of endurance than country children (Liharzik).

Among United States naval cadets there is a great preponderance of blondes (Beyer).

The insane show an excess of 5 per cent of light eyes, with dark hair, and criminals of 10 per cent of dark eyes, with dark hair, over the general population (Roberts).

In Germany 40 per cent of the children of the well-to-do classes are blondes and less than 10 per cent brunettes (Virchow).

The endurance (ergographic work) of boys is greater than that of girls at all ages (Christopher, W. S.).

The desire to make the objective conditions correspond with the subjective ones requires unity in our forms, and is the one essential condition for the emergence of the æsthetic consciousness (Pierce, E.).

In religion conversion is not a unique experience, but has its correspondence in the common phenomena of religious growth (Starbuck, E. D.).

Continuous intellectual work during several hours produces a decrease in the heart beats (Vaschide).

Weather conditions which are physically energizing and exhilarating are accompanied by an unusual number of excesses in deportment and the minimum of deaths and mental inexactness, while the opposite meteorological conditions show the reverse effects (Dexter, E. G.).

In literature red indicates man; blue and green, nature; and white, yellow, and black, imagination (Ellis, Havelock).

High percentile rank in height, weight, and chest circumference in growing children is nearly always found associated with a superior grade of mental work, as that is determined in our schools (Beyer).

WASHINGTON CHILDREN.

There is a very general representation from all States among the residents of Washington. Conclusions concerning the children, therefore, may be more applicable to our country as a whole. We give some results from our study of 20,000 children in the public schools.

As circumference of head increases mental ability increases.

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

Boys have greater circumference of head than girls, yet girls are superior to boys in their studies, but girls show higher percentages of average ability, and so less variability, indicating less power of adaptation. This is interpreted by some to be a defect from an evolutionary point of view.

In white children brightness decreases with age in most studies. In colored children the reverse is the case.

Dull children are the most unruly, and unruly children are the dullest.

Mixture of nationalities does not seem to be favorable to the development of mental ability in the offspring.

The pubertal period of superiority of girls over boys in height, sitting height, and weight is nearly a year longer in the laboring classes than in the nonlaboring (professional and mercantile) classes.

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

Abnormalities are most frequent at dentition and puberty.

INSANITY AND GENIUS.

Human beings may be classified, in a general way, into normal and abnormal. By "abnormal" is meant departure from the normal. While the term "abnormal" often suggests ethical or æsthetical characteristics, it is here employed with no such reference. Thus a great reformer and a great criminal are both abnormal in the sense of diverging much from the average or normal man. The principal and extreme forms of human abnormality are insanity, genius, and crime.[a] The third form, "crime," includes all excessive degrees of wrong.

Assuming the natural history point of view, man should be studied as we study all species below him. In an investigation, therefore, of insanity and genius we must, as far as possible, eliminate all those ethical and æsthetical ideas (however important) that we have been accustomed to associate with these terms, for an empirical study is concerned with facts rather than with sentiments, emotions, or ideals connected with such facts.

INSANITY.

Krafft-Ebing[b] defines insanity, from the anatomical point of view, as a diffuse disease of the brain, accompanied with nutritive, inflammatory, and degenerative changes. The division between mental and brain diseases is purely a practical one and not strictly scientific. Mental diseases are a special class of cerebral diseases, and from a clinical standpoint are distinguished by psycho-functional disturbances. Insanity is not only a disease of the brain, but also a diseased alteration of the personality. One difficulty in distinguishing between sanity and insanity is due to the fact that the manifestations of one can correspond exactly to those of the other. The first symptoms are not generally intellectual, but emotional; there is abnormal irritability.

The fluctuating line between sanity and insanity, as frequently seen in public and private life, can, says Krafft-Ebing, oscillate between the extremes of genius and mental disease. Such men show peculiarities in thought, feeling, and action; they are called strange or foolish because the great majority of men feel or act otherwise. So their combinations of ideas are uncommon, new, striking, and often interesting; yet they are not capable of making use of these new thoughts. Such individuals are not yet insane, but still they are not

[a] The author treats of deeper forms of abnormality and crime in "Criminology," New York, 1893, and considers degenerative sexuality in another work, entitled "Formes Graves de la Criminalité," Paris et Lyon, 1893.

[b] Psychiatrie, 1890.

quite right; they form the passage over to insanity; they are on the threshold. They are so eccentric as to be said to have a strain of madness in them. Maudsley[a] calls this an "insane temperament;" it is characterized by a defective or unstable condition of moral element, a tendency to sudden caprices, to act independently of the social organism, a personal gratification that seems to others a sign of great vanity. But they are so engrossed in their own impulses as not to be conscious of how it affects others. In Maudsley's opinion this predisposition to insanity lies close to genius in some cases. Some persons having this insane temperament may be called mattoids, to use Lombroso's expression; they are strikingly peculiar, eccentric, and original, but generally in useless ways; they show disproportionate development; they are closely allied by heredity to mental disease and may gradually develop into this state; thus one member of a family may show genius and another be insane or epileptic. This may indicate an extreme sensibility in the family which under different conditions of life and body has taken different forms. This extreme nervous sensibility may endow a person with genius, but not the highest genius, for it lacks the power of the critical sense and the vast intelligence of the genius which permits him to correct his wild imagination. The insane temperament shows originality, but lacks a critical spirit; the ordinary normal mind has some critical spirit, but lacks originality; the genius possesses both originality and critical power.

Clouston says that there are a number of examples of insane temperaments ranging from inspired idiots to inspired geniuses; that De Quincy, Cowper, Turner, Shelley, Tasso, Lamb, and Goldsmith may be reckoned as having had in some degree the insane temperament. Some are original, but in the highest degree impracticable and unwise in the conventional sense of the term. Another form of this temperament is sometimes illustrated in spiritualism, thought reading, clairvoyancy, and hypnotism. The pseudo genius or mattoid is then one who has the insane temperament with originality and particular talents in certain lines, and often displays a mixture of insanity and genius. In the words of Maudsley, he desires to set the world "violently right." Under mental strain he is impulsive and may be attacked with derangement. A weaker and much less important class of mattoids are the egotistic variety, with no capacity to look at self from an outside standpoint. This self-feeling may widen into the family, but develops no further. This class consider their oddities higher than the virtues of others. Another phase is illustrated by those who have little sympathy for their own kind; they often have extreme affection for some dog or cat, and suppose that they are exceedingly humanitarian because they love animals more than human beings.

Hammond[b] says that "the discrimination of the very highest flights of genius from insanity is a difficult and at times an impossible undertaking, for they may exist in one and the same person." Hammond also is of opinion that more people of great genius exhibit manifestations of insanity than do persons of ordinary mental faculties.

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[a] Pathology of Mind. [b] Treatise on Insanity, New York, 1883.

He mentions as showing symptoms of insanity or at the close of life passing into fatuity, Tasso, Burns, Swift, Mozart, Hayden, Walter Scott, Blake, and Poe. Shüle[a] defines insanity as a disease of the person, resting upon and caused by a brain affection. Here it is to be understood, psychologically speaking, that a pathological symptom does not constitute the essence of a mental disturbance, be the thought ever so broken or the disposition or action ever so anomalous. Hallucination under certain conditions can appear temporarily, or superstition can come within the range of specific mental disease, and yet there is no insanity. In true mental disease the whole person must be included, so that in his thoughts, feelings, and actions he is no more determined by motives accessible to reflection and conclusion, but by irremovable feelings and ideas upon the Ego, which, if called up exercise an incontestible superior power. It is the mental compulsion that constitutes the essence of mental derangement. The patient often stainds under its power as a whole personality. At another time he is theoretical or reflective as to this force over him, but the distinctive point is, that he can not clear it away or overcome it through logic nor stop it by his will. This compulsion is grounded in a fundamental organic brain disease.

According to Arndt[b] our manner of knowing, feeling, and willing is differently developed, and shows itself in feeble or strong constitutions as nervousness, weakness, or insanity; or as gift, talent, or genius. Every mental disease is a reaction of the nervous system impaired in its nutrition, especially the nutrition of the brain. Arndt's idea is that when a nervous condition appears occasionally in parents and grandparents it sooner or later passes over into mental disease, as seen in children of aged parents born late, or in children of parents with talent or genius. In the first case (in children born late) this nervous condition develops with the decrease of vital energy; in the second case it comes from the nature of the higher endowment or genius. This endowment or genius is an expression of a highly organized nervous system, more particularly that of the brain. Thus it is that all higher gifts, including genius, are very frequently subject to all kinds of diseased conditions, peculiarities, idiosyncrasies, and perversities. Arndt mentions, as examples among poets, Tasso, Lenau, Heinrich, von Kleist, Hölderin, Gutzkow; among artists, Robert Schumann, Carl Blechen; among scientists, Pascal, Frederic Sauvages, John Müller, Robert von Meyer; among statesmen and generals, Tiberius and the Duke of Marlborough. A large number of geniuses were the last of their kind, as Democritus, Socrates, Plato, Aristotle, Cæsar, Augustus, Galenus, Paracelsus, Newton, Shakespeare, Leibnitz, Kant, Voltaire, Gustave Adolphus, Frederick the Great, Napoleon, Linné, Cuvier, Byron, Alexander von Humboldt. The family of Schiller have died out in their male members. This dying out of genius can only be explained, according to Arndt, by the weakness of their organizations and the resulting hyperæsthesia. This also is an explanation of the fact that the brothers and sisters of geniuses are often mediocre, and sometimes weak-minded.

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[a] Klinische Psychiatrie. [b] Lehrbuch der Psychiatrie.

GENIUS.

Moreau of Tours[a] holds that genius is the highest expression, the ne plus ultra of intellectual activity, which is due to overexcitation of the nervous system, and in this sense is neurotic; that disease of the nervous centers is a hereditary condition, favoring the development of the intellectual faculties. He maintains, on the basis of biographical facts, that among distinguished men one finds the largest number of insane; that the children of geniuses are inferior to those of average men, owing to convulsions and cerebral diseases in infancy. Genius is always isolated; it is a summum of nature's energy, after which her procreative forces are exhausted. Mental dynamism can not be exhalated to genius, unless the organ of thought is in a condition analogue to that of an abnormal irritability, which is also favorable to the development of hereditary insanity. When the mind reaches its highest limit it is in danger of falling into dementia. The cerebral troubles of great men, from simple nervousness to normal perturbation, are the natural if not necessary efforts of their organization. Lélut[b] also considers genius a nervous affection, a semimorbid state of the brain. Nisbet[c] holds that genius and insanity "are but different phases of a morbid susceptibility of or a want of balance in the cerebro-spinal system." "Whenever a man's life is at once sufficiently illustrious and recorded with sufficient fullness he inevitably falls into the morbid category." Huxley says: "Genius, to my mind, means innate capacity of any kind above the average mental level." From a biological point of view I should say that a "genius" among men stands in the same position as a "sport" among animals and plants, and is a product of that variability which is the postulate of selection. I should think it probable that a large proportion of "genius sports" are likely to come to grief, physically and socially, and that the intensity of feeling, which is one of the conditions of what is commonly called genius, is especially liable to run into the fixed ideas which are at the bottom of so much insanity.[d] Lombroso says[e] that from an anatomical and biological study of men of genius, who are semi-insane, from an investigation of the pathological causes of their apparition, marks of which are almost always left in their descendants, there arises the conception of the morbid degenerative nature of genius.

While, then, some alienists hold that genius is a pathological condition of the nervous system, a hyperæsthesia, a nervous, or mental disease, others do not go so far; yet all seem to be agreed that the relation between insanity and genius is very close.

As an introduction to the biographical study of genius it will be interesting to give the opinions of geniuses themselves.

Aristotle says that under the influence of a congestion of the head there are persons who become poets, prophets, and sybils. Plato[f] affirms that delirium is not an evil but a great benefaction when it emanates from the divinity.

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[a] Psychologie morbide.
[b] Démon de Socrate.
[c] The Insanity of Genius, London, 1891.
[d] Nisbet, the Insanity of Genius, London, 1891.
[e] L'Homme de Gérie.
[f] Phædo.

Democritus [a] makes insanity an essential condition of poetry. Diderot [b] says: "Ah, how close the insane and the genius touch; they are imprisoned and enchained; or, statues are raised to them." Voltaire says: "Heaven in forming us mixed our life with reason and insanity; the elements of our imperfect being; they compose every man, they form his essence." Pascal says: "Extreme mind is close to extreme insanity." Mirabeau affirms that common sense is the absence of too vivid passion; it marches by beaten paths, but genius never. Only men with great passions can be great. Cato [c] said before committing suicide: "Since when have I shown signs of insanity?" Tasso said: "I am compelled to believe that my insanity is caused by drunkenness and by love; for I know well that I drink too much." Cicero speaks of the furor poeticus; Horace of the amabilis insania; Lamartine of the mental disease called genius. Newton in a letter to Locke says that he passed some months without having a "consistency of mind." Chateaubriand says that his chief fault is weariness, disgust of everything, and perpetual doubt. Dryden says: "Great wit to madness is nearly allied." Lord Beaconsfield says: "I have sometimes half believed, although the suspicion is mortifying, that there is only a step between his state who deeply indulges in imaginative meditation and insanity. I was not always sure of my identity or even existence, for I have found it necessary to shout aloud to be sure that I lived." [d] Schopenhauer confessed that when he composed his great work he carried himself strangely, and was taken for insane. He said that men of genius are often like the insane, given to continual agitation. Tolstoi acknowledges that philosophical scepticism had led him to a condition bordering on insanity. George Sands says of herself, that at about 17, she became deeply melancholic, that later she was tempted to suicide; that this temptation was so vivid, sudden, and bizarre that she considered it a species of insanity. Heine [e] said that his disease may have given a morbid character to his later compositions.

[e] Correspondence Inédite, Paris, 1877.

However paradoxical such sayings may seem, a serious investigation will show striking resemblances between the highest mental activity and diseased mind. As a proof of this, we will give a number of facts, to which many more might be added.

BIOGRAPHICAL FACTS SHOWING ECCENTRICITIES, NERVOUS DISEASES, AND SYMPTOMS OF INSANITY.

The difficulty of obtaining facts of an abnormal or pathological nature, and of other unfavorable data, is obvious. Authors have not only concealed such data, but have not deemed them important enough to record. It is due to the medical men, whose life brings them closest to abnormal reality, that such facts have been gathered. If it be said that the abnormal or exceptional must be taken with some caution, because it is natural for the mind to exaggerate striking characteristics, it must be remembered that such facts, when unfavor-

[a] Horace, ars Poetica.
[b] Dictionaire Encyclopédique.
[c] Plutarch.
[d] Contarinia Fleming.

able to reputation, are concealed. In the study of any exceptional or abnormal individual, as the insane or genius, one finds more concealed than is known.

Socrates had hallucinations from his familiar genius or demon. Pausanias, the Lacedemonian, after killing a young slave, was tormented until his death by a spirit which pursued him in all places and which resembled his victim. Lucretius was attacked with intermittent mania. Bayle says this mania left him lucid intervals, during which he composed six books, "De rerum natura." He was 44 years of age when he put an end to his life. Charles V had epileptic attacks during his youth; he stammered. He retreated to a monastery, where he had the singular phantasy of celebrating his own funeral rites in his own presence. His mother (Jane of Castile) was insane and deformed. His grandfather (Ferdinand of Arragon) died at the age of 62 in a state of profound melancholia. Peter the Great, during infancy, was subject to nervous attacks which degenerated into epilepsy. One of his sons had hallucinations; another convulsions. Cæsar was epileptic, of feeble constitution, with pallid skin, and subject to headaches. Linné, a precocious genius, had a cranium hydrocephalic in form. He suffered from a stroke of paralysis. At the end of one attack he had forgotten his name. He died in a state of senile dementia. Raphael experienced temptations to suicide.

Pascal,[a] from birth till death, suffered from nervous trouble. At 1 year of age he fell into a languor, during which he could not see water without manifesting great outbursts of passion; and, still more peculiar, he could not bear to see his father and mother near one another. In 1627 he had paralysis from his waist down, so that he could not walk without crutches; this condition continued three months. During his last hours he was taken with terrible convulsions, in which he died. The autopsy showed peculiarities. His cranium appeared to have no suture, unless perhaps the lambdoid or sagittal. A large quantity of the brain substance was very much condensed. Opposite the ventricles there were two impressions as or a finger in wax. These cavities were full of clotted and decayed blood, and there was, it is said, a gangrenous condition of the dura mater. Walter Scott, during his infancy, had precarious health, and before the age of 2 was paralyzed in his right limb. He had a stroke of apoplexy. He had this vision on hearing of the death of Byron: Coming into the dining room he saw before him the image of his dead friend; on advancing toward it he recognized that the vision was due to drapery extended over the screen.[b]

Some men of genius who have observed themselves describe their inspiration as a gentle fever, during which their thoughts become rapid and involuntary. Dante says:

* * * I'mi son un che, quando
Armore spira, noto ed in quel modo
Che detta dentro vo significando.

(I am so made that when love inspires me, I attend; and according as it speaks in me, I speak.)

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[a] L'Amulette de Pascal, 1846.
[b] Edinburgh Medical and Surgical Journal, January, 1843.

Voltaire, like Cicero, Demosthenes, Newton, and Walter Scott, was born under the saddest and most alarming conditions of health. His feebleness was such that he could not be taken to church to be christened. During his first years he manifested an extraordinary mind. In his old age he was like a bent shadow.[a] He had an attack of apoplexy at the age of 83. His autopsy showed a slight thickness of the bony walls of the cranium. In spite of his advanced age there was an enormous development of the encephalon.[b]

Michael Angelo,[c] while painting "The Last Judgment," fell from his scaffold and received a painful injury in the leg. He shut himself up and would not see anyone. Bacio Rontini, a celebrated physician, came by accident to see him. He found all the doors closed. No one responding, he went into the cellar and came upstairs. He found Michael Angelo in his room, resolved to die. His friend the physician would not leave him. He brought him out of the peculiar frame of mind into which he had fallen. The elder brother of Richelieu, the cardinal, was a singular man; he committed suicide because of a rebuke from his parents. The sister of Richelieu was insane. Richelieu himself had attacks of insanity; he would figure himself as a horse, but afterwards would have no recollection of it. Descartes, after a long retirement, was followed by an invisible person, who urged him to pursue his investigations after the truth. Goethe was sure of having perceived the image of himself coming to meet him. Goethe's mother died of an apoplectic attack. Cromwell, when at school, had a hallucination in his room; suddenly the curtains opened and a woman of gigantic stature appeared to him, announcing his future greatness. In the days of his power he liked to recount this vision. Cromwell had violent attacks of melancholic humor; he spoke of his hypochondria. His entire moral life was molded by a sickly and neuropathical constitution, which he had at birth. Rousseau was a type of the melancholic temperament, assuming sometimes the symtoms of a veritable pathetic insanity. He sought to realize his phantoms in the least susceptible circumstances; he saw everywhere enemies and conspirators (frequent in the first stages of insanity). Once coming to his sailing vessel in England he interpreted the unfavorable winds as a conspiracy against him, then mounted an elevation and began to harangue the people, although they did not understand a word he said. In addition to his fixed ideas and deliriant convictions, Rousseau suffered from attacks of acute delirium,a sort of maniacal excitation. He died from an apoplectic attack. Jeanne d'Arc was a genius by her intrepid will; she had faith in her visions; her faith rested upon the immovable foundation of numerous hallucinations having the force of moral and intellectual impulsion, making her superior to those around her. Science can pronounce as to her inspirations, but its judgment does not diminish in the least the merit of her heroism. Jeanne was of the peasant class and uneducated. According to her statement she first heard supernatural voices when she was 13 years old. Mohammed was epileptic. He persistently claimed to be a messenger from God, receiving his first revelation at the age of 42. He lost his father in infancy and

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[a] Ségur; "Mem.," t. I.
[b] R. Parise, Philosophie et Hygiène.
[c] R. Parise. Histoire de la Pinture en Italie.

his mother in childhood; was a traveling merchant, and married a wealthy widow fifteen years older than himself. His revelations began with visions in sleep. He used to live alone in a cave. He had interviews with the Angel Gabriel. Henry Heine died of a chronic disease of the spinal column. Lotze was often melancholic. Moliére suffered from convulsions; delay or derangement could throw him into a convulsion.

Mozart's musical talent was revealed at 3 years of age; between 4 and 6 he composed pieces with expertness. Mozart died at 36 of cerebral hydropsy. He had a presentiment of his approaching end. He was subject to fainting fits before and during the composition of his famous "Requiem." Mozart always thought that the unknown person which presented itself to him was not an ordinary being, but surely had relations with another world, and that he was sent to him to announce his end. Cuvier died of an affection of the nervous centers; the autopsy showed a voluminous brain. He lost all his children by a fever called "cerebral." Condillac had frequent attacks of somnambulism; he sometimes found his work finished in the morning. Bossuet suffered from a disease from which he once lost speech, knowledge, and even the faculty of understanding. Dumas says: "Victor Hugo was dominated by the fixed idea to become a great poet and the greatest man of all countries and times. For a certain time the glory of Napoleon haunted him." Chopin ordered by will that he be buried in a gala costume, white cravat, small shoes, and short trousers. He abandoned his wife, whom he loved, because she offered another person a seat before she offered it to him. Giordano Bruno considered himself enlightened by a superior light sent from God, who knows the essence of things. Compte considered himself the "Great Priest" of humanity. Madame de Staël died in a state of delirium, which had lasted several days; according to some authors, several months. The autopsy showed a large quantity of cerebral matter, and very thin cranium. Moreau of Tours says she had a nervous habit of rolling continually between her fingers small strips of paper, an ample provision of which was kept on her mantelpiece. She used opium immoderately. She had a singular idea during her whole life; she was afraid of being cold in the tomb; she desired that she be enveloped in fur before burial.

English men of letters who have become insane, or have had hallucinations and peculiarities symptomatic of insanity, are Swift, Johnson, Cowper, Southey, Shelley, Byron, Goldsmith, Lamb, and Poe. Swift was also cruel in conduct, but he was hardly responsible, as his insanity was congenital. His paternal uncle lost speech and memory and died insane. Swift was somewhat erratic and wild as a university student. He suffered at times from giddiness, impaired eyesight, deafness, muscular twitchings, and paralysis of the muscle on the right side of the mouth. He had a bad temper, was called "mad person," actually feared insanity, saying once, on seeing a tree that had been struck by lightning, "I shall be like that tree; I shall die at the top." Later in life he became a violent maniac. The post-mortem examination showed a cerebral serous effusion and softening of the cortex. There were a number of cranial anomalies. Shelley, when young, was strange and fond of musing alone, and was called "Mad Shelley;" he suffered from somnambulism and bad dreams, and was excitable and impetuous; these symptoms increased with age;

at twenty he constantly took laudanum for his nervous condition; he had hallucinations; he saw a child rise from the sea and clap his hands, a vision which it was difficult to reason away. Much eccentricity existed in the immediate antecedents of Shelley. Charles Lamb was confined in an insane asylum. Johnson was hypochondriacal and apprehended insanity, fancying himself seized with it; he had convulsions, cramps, and a paralytic seizure depriving him of speech; he had hallucinations of hearing. Carlyle considered Southey the most excitable man of his acquaintance. Southey's mind failed, and he became an imbecile and died; a year before his death he was in a dreamy state, little conscious of his surroundings. Southey wrote verses before he was 8 years of age. His maternal uncle was an idiot and died of apoplexy. The mother of Southey had paralysis. Cowper was attacked with melancholia at 20, which continued a year; at another time it returned with greater force. He himself tells of his attempts at suicide; he bought laudanum, keeping it in his pocket, when later a feeling pressed him to carry it into execution; but soon another idea came to him, to go to France and enter a monastery; then the suicidal impulse came again, to throw himself into the river—an inhibitory feeling from taking the laudanum—but he would have succeeded in hanging himself had not the thong to which the rope was fastened broken. After suicidal ideas left him he relapsed into religious melancholia, thinking he had committed the unpardonable sin. He was confined in an asylum eighteen months. Keats was an extremely emotional child, passing from laughter to tears; he was extremely passionate, using laudanum to calm himself; sometimes he fell into despondency. He prophesied truly that he would never have any rest until he reached the grave. The attacks of critics agitated him almost to insanity. His nervousness was very susceptible, so that even "the glitter of the sun" or "the sight of a flower" made his nature tremble.

Coleridge was a precocious child, self-absorbed, weakly, and morbid in imagination; this morbidity was the cause of his running away from home when a child and from college when a student; he enlisted as a soldier, and again went to Malta for no reason, permitting his family to depend upon charity. When 30 years of age his physical suffering led him to use opium. Subsequently he had a lateral curvature of the spine (De Quincey). There were many morbid symptoms in the family. Burns says: "My constitution and frame were ab origine blasted with a deep, incurable taint of melancholia which poisons my existence." Dickens died from effusion of blood upon the brain; he was a sickly child, suffering from violent spasms; when a young man he had a slight nervousness which increased with age, and finally was attacked with incipient paralysis.[a] George Eliot suffered from melancholic moods, and from her thirtieth year had severe attacks of headache. As a child she was poor in health and extremely sensitive to terror in the night. She remained a "quivering fear" throughout her whole life.[b] De Quincey, the opium eater, took opium as a relief from neuralgia and general nervous irritation. He was in bad health for a long time, dying at the age of 39. Alfred de Musset had attacks of syncope; he died at 47. George Sand described him in the Forest of Fontainebleau in his neurotic terror, in his joy

[a] Foster. Life of Charles Dickens. [b] J. W. Cross. Life of George Eliot.

and despair, as manifesting a nervous condition approaching delirium. He had a morbid cerebral sensibility, showing itself in hallucinations; he had a suicidal inclination. He was a dissipated gambler, passing from gaiety to depression. His keen disappointment in love in Italy was accompanied by brain fever. For some time after this he could not speak of his chagrin without falling into syncope. He had an hallucination, and to distinguish it from real things he had to ask his brother. Wellington was subject to fainting fits; he had epilepsy and died from an attack of the disease. Warren Hastings was sickly during his whole life; in his latter years he suffered from paralysis, giddiness, and hallucinations of hearing. During the time of his paralysis he developed a taste for writing poetry.[a] Carlyle,[b] the dyspeptic martyr, showed extreme irritability. He says in his diary: "Nerves all inflamed and torn up, body and mind in a hag-ridden condition." He suffered from a paralysis in his right hand. Carlyle's antecedents were conspicuously of a nervous kind. Bach[c] died from a stroke of apoplexy; one of his numerous children was an idiot. His family suffered from nervous diseases. Handel[d] was very irritable; at the age of 50 he was stricken with paralysis, which so affected his mind that he lived in retirement for a year.

Nisbet[e] says: "Pathologically speaking, music is as fatal a gift to its possessor as the faculty for poetry or letters, the biographies of all the greatest musicians being a miserable chronicle of the ravages of nerve disorder extending, like the Mosaic curse, to the third and fourth generations." Newton, in the last years of his life, fell into a melancholia which deprived him of his power of thought. Newton himself in a letter to Locke says that he passed some months without having "a consistency of mind." He was also subject to vertigo. From the manner of manifestation and the results following from this disease Moreau[f] goes so far as to say that it permits a certain degree of diagnosis and may be called acute dementia.

The insanity of Tasso is probable from the fact that, like Socrates, he believed he had a familiar genius which was pleased to talk with him and from whom he learned things never before heard of. Swift died insane. Chateaubriand during his youth had ideas of suicide and attempted to kill himself. His father died of apoplexy; his brother had an eccentricity bordering on insanity; was given to all vices, and died of paralysis. "My chief fault," says Chateaubriand, "is weariness, disgust of everything, and perpetual doubt." Tacitus had a son who was an idiot. Beethoven was naturally bizarre and exceedingly irritable. He became deaf and fell into a profound melancholia, in which he died. Alexander the Great had a neurosis of the muscles of the neck, attacking him from birth, and causing his head to incline constantly upon his shoulders. He died at the age of 32, having all the symptoms of acute delirium tremens.[g] His brother Arrchide was an idiot. His mother was a dissolute woman; his father was both dissolute and violent. De Balzac (Honoré)

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[a] Gleig. Memoirs of the life of Warren Hastings.
[b] Reminiscenses.
[c] Spitta. Life of John Sebastian Bach.
[d] Rockstro. Life of Handel.
[e] The Insanity of Genius.
[f] Psychologic morbide.
[g] Plutarch.

died of hypertrophy of the heart, a disease that can predispose one to cerebral congestion. The eccentricity of his ideas is well known. Lamartine says he had peculiar notions about everything; was in contradiction with the common sense of "this low world." His father was as peculiar. Lord Chatham was from a family of original mental disproportions, of peculiarities almost approaching alienation. Lord Chatham did not do things as others; he was mysterious and violent, indolent and active, imperious and charming. Pope was rickety. He had this hallucination: One day he seemed to see an arm come out from the wall, and he inquired of his physician what this arm could be. Lord Byron was scrofulous and rachitic, and clubfooted. Sometimes he imagined that he was visited by a ghost; this he attributed to the overexcitability of his brain. He was born in convulsions. Lord Dudley had the conviction that Byron was insane. The Duke of Wellington died of an apoplectic attack. Napoleon I had a bent back; an involuntary movement of the right shoulder, and at the same time another movement of the mouth from left to right. When in anger, according to his own expression, he looked like a hurricane, and felt a vibration in the calf of his left leg. Having a very delicate head, he did not like new hats. He feared apoplexy. To a general in his room he said, "See up there." The general did not respond. "What," said Napoleon, "do you not discover it? It is before you, brilliant, becoming animated by degrees; it cried out, 'that it would never abandon me;' I see it on all great occasions; it says to me to advance, and it is for me a constant sign of fortune."

GENERAL CONSIDERATIONS.

Many great men have believed in the existence of a star, of a genius protector. It is probable that many of these hallucinations have aided men in the execution of their plans. Additional biographical data concerning the different types of genius might be added, and many will occur to anyone who has read the lives of great men. In certain instances the authority for some of the facts might be questioned, but the great majority will stand.

Lombroso thinks geniuses differ as much from father and mother, which is characteristic of degeneracy, and thus the physical resemblances between geniuses of different epochs and races are noticed, as in Julius Cæsar and Napoleon. They sometimes lose their national type, and it occurs in the most noble traits, as elevation of forehead, remarkable development of nose and head, and vivacity of the eyes. A parallel example is found in Cretins and insane. Humboldt, Virchow, Bismarck, and Hemholtz do not have, according to Lombroso, the German physiognomy. Byron did not have the physiognomy or the character of the English.

Stammering troubled Æsop, Virgil, Demosthenes, Alcibiades, Erasmus, Cato of Utica, and Charles V. Sterility is not uncommon in great men, as Dryden, Addison, Pope, Swift, Johnson, and Goldsmith. Precocity is a symptom of genius and insanity. Dante composed verses at 9, Tasso and Mirabeau at 10. Comte and Voltaire and Pascal were great thinkers at 13; Niebuhr at 7; Jonathan Edwards and Bossuet and Pope at 12; Goethe before 10; Victor Hugo and Fénélon at 15; Handel and Beethoven composed at 13; Mozart

gave concerts at 6; Raphael was renowned at 14. Yet some great men were regarded as poor pupils, as, for example, Pestalozzi, Wellington, Balzac, Humboldt, Boccacio, Linné, Newton, and Walter Scott.

Originality is very common, both to men of genius and the insane; but in the latter case it is generally without purpose. Lombroso goes so far as to make unconsciousness and spontaneity in genius resemble epileptic attacks. Hagen makes irresistible impulse one of the characteristics of genius, as Schüle (see above) does in insanity.[a] Mozart avowed that his musical inventions came involuntary, like dreams, showing an unconsciousness and spontaneity, which are also frequent in insanity. Socrates says that poets create, not by reflection, but by natural instinct. Voltaire said, in a letter to Diderot, that all manifestations of genius are effects of instinct, and that all the philosophers of the world together could not have given "Les animaux malades de la peste," which La Fontaine composed without knowing even what he did. According to Goethe a certain cerebral irritation is necessary to poets. Klopstock declared that in dreams he had found many inspirations for his poem.

Thus, as the great thoughts of genius often come spontaneously, so it is with the ideas of the insane.

Geniuses are inclined to misinterpret the acts of others and consider themselves persecuted. These are well-known tendencies of the insane. Boileau and Chateaubriand could not hear a person praised, even their shoemaker, without feeling a certain opposition. Schopenhaur became furious, refused to pay a bill, in which his name was written with a double "p." Unhealthy vanity is also common in the ambitions of monomaniacs.

SOME PHYSICAL ANOMALIES IN MEN OF GENIUS AND IN THE INSANE.

Not a few men of genius are rachitic and some have cranial and cerebral lesions. Vico, Clement VI, and Malbranche had their skulls fractured. Pericles, Bichat, Kant, and Dante had cranial asymmetry. Dante had an abnormal development of the left parietal bone and two osteomata in the frontal bone. Kant was ultrabrachycephalic; the disproportion between the upper part of the occipital bone and the lower part is noticeable; the same is true as to the minimum smallness of the frontal arc as compared with the parietal. The "soudures" of the sutures in the crania of Byron, Pascal, and Humboldt are to be noted. Descartes was submicrocephalic. Milton Linnæus, Cuvier, and Gibbon were hydrocephalic. Dante and Gambetta had small cranial capacity. Rousseau had hydropsical ventricles, Gauss[b] and Bichat had a more developed left hemisphere than right.

Bischoff and Rüdinger, in a study of eighteen brains of German savants, have found congenital anomalies of the cerebral convolutions.

Alienists hold in general that a large proportion of mental diseases are the result of degeneracy—that is to say, they are the offspring of drunken, insane, syphilitic, and consumptive parents. The most frequent characteristics of mental diseases are: Apathy, weakness or loss of normal sense, impulsiveness, propensity to doubt, verbosity

[a] Klinische Psychiatrie. [b] Wagner, Das Hirngewicht der Menschen, 1870.

or exaggerated acuteness, extreme vanity or eccentricity, excessive preoccupation with one's own personality, mystical interpretations of simple facts, hallucinations, abuse of symbols or special terms, sometimes suppressing every other form of expression, and a general physical disproportion through an excessive development of certain faculties or by absence of others. The reader is particularly requested to note these physical symptoms of insanity, for almost all of them, as we have seen, are found in men of genius. If X were substituted for insanity and Y for genius, so as to dispel preconceived notions, an impartial observer would be very liable to say that the characteristics of X and Y bring them under the same general category. Also some other physical characteristics of the insane are almost as frequent in geniuses; they are: A symmetry of face and head, irregularity in teeth, rachitism, face and head very small or very large. In the insane are frequently found abnormally large or small ears or mouth, harelips, hypertrophy of the under lip, gums wide or one sided, bent nose, hands unequal in size, abnormal growth of hair over body, growth of beard on women, and defective eyebrows, etc. Cerebral anæmia is frequent and hyperæmia very frequent in the insane. Wildermuth from an investigation of 127 idiots found 69 normal craniums. Meynert[a] says that 114 out of 142 idiots show signs of degeneration. In order that some of the results may be seen more in detail, we give some tables.[b]

TABLE I.—*Cranial capacity in cubic centimeters.*

Men:	
Average of 30 normal craniums	1,450
Average of 10 epileptic craniums	1,523
Women:	
Average of 30 normal craniums	1,300
Average of 14 epileptic craniums	1,346

Here in Table I (as in the case of men of talent and genius in the following Table II) we see that the abnormal exceed the normal in brain development—that is to say, in these cases the insane and genius both exceed the normal man in cranial capacity or weight of brain.

TABLE II.

Men of talent and genius.	Age.	Weight of brain in grams.	Medium weight of average brain at same age.	Cranial capacity in cubic centimeters.	Horizontal circumference in millimeters.
Webster (statesman)	70	1,520	1,303	.....	.....
Thackeray (humorist)	52	1,660	1,368	.....	.....
Cuvier (scientist)	62	1,829	1,340	.....	.....
Gaust (mathematician)	78	1,492	1,246	.....	.....
Broca (anthropologist)	65	1,485	1,331	.....	.....
Kant (philosopher)	.....	.....	.....	1,740	.....
Napoleon I (general)	.....	.....	.....	.....	564
Darwin (scientist)	.....	.....	.....	.....	563
Wagner (musician)	.....	.....	.....	.....	600
Dante	.....	.....	.....	1,493	.....
Schumann, Robert	.....	.....	.....	1,510	.....
Schwann (scientist)	.....	.....	.....	.....	565
Napoleon III	.....	1,500	.....	.....	.....
Müller (scientist)	.....	.....	.....	.....	614
Liebig (chemist)	70	1,352	1,303	1,550	.....
Whewell (philosopher)	72	1,390	.....	.....	.....
Average of 35 men of talent	65	1,474	1,319	.....	.....

[a] Meynert, Klinische, Vorlesungen über Psychiatrie, 1890.
[b] Welcker., Schiller's Schädel, etc.

Taking now 551 millimeters as an average horizontal circumference of the head it will be seen that Napoleon, Darwin, Wagner, Schwann, and Müller exceed the normal. The averages of brain weight for the different ages, given by Welcker, are not absolute, but sufficiently near the truth for comparison:

TABLE III.

	Weight of brain.	No. of brains.
Melancholia	1,490.33	9
Mania	1,438.46	15
Old cases	1,454.00	23
Transition forms	1,447.05	15
Total		62

If 1,350 grams is taken as an average weight for a brain, Table III gives 62 insane much above the normal, but this is 62 out of 579 brains weighed. If we take the totals of the 579 as given in Table IV, all are below the average except the maniacs among men. The extreme divergence from the average may be regarded as abnormal and in the light of anomalies. To show more clearly the anomalous nature of the brains of the insane Table V is given.

TABLE IV.

	Sex.	Weight.
		Grams.
Total meloncholia	Men	1,295.18
	Women	1,210.37
Total mania	Men	1,376.41
	Women	1,221.09
Total old cases	Men	1,319.22
	Women	1,175.74
Total paralytics	Men	1,214.82
	Women	1,068.24
Total transition forms	Men	1,336.03
	Women	1,190.03

We see, therefore, from these tables that particular individuals among both the insane and genius show extremely large cerebral capacity, but that in general the insane are much below the normal while the genius is above in brain capacity and brain weight.

TABLE V.

	Sex.	No.	Weight.
			Grams.
Melancholia	Men	33	1,052.00
	Women	51	1,035.65
Mania	Men	39	.....
	Women	53	1,035.00
Old cases	Men	86	.....
	Women	31	1,057.40
Paralytics	Men	145	1,032.81
	Women	29	1,048.88
Transition forms	Men	43	.....
	Women	49	1,055.06

Bischoff found some of the heaviest brains (weighing 1,650, 1,778, 1,770, and 1,925 grams) among common and unknown laborers, but such cases are very rare, so much so that the average is not affected. De Quatrefages says that the largest brain has been found in a lunatic, and the next largest in a genius. The main fact brought out by the tables is the large number of anomalies and deviations from the normal in both insanity and genius.

CONCLUSION.

The facts cited thus far would seem to indicate that genius is not only abnormal, but often passes into a pathological form. But it may be asked more particularly as to what is meant by pathological and abnormal.

The modern and fundamental conception of disease is an access of normality. This statement can be supported by the highest medical authorities. Virchow [a] says that substratum upon which pathological manifestations play is a repetition or reproduction of the normal morphological stratum; its pathological character consists in this, that the stratum arises in an unfit way or at the wrong place or time, or it may depend upon an abnormal increase of the tissue elements, resulting in deviation, which becomes degeneration. Thus in pathological relations there is a preservation of specific normal characteristics; nothing new arises functionally. Pathology is in potentia in physiology. According to Perl, pathological phenomena are distinguished from the normal by their unequal and little constancy. Cohnheim affirms that physiological laws hold their validity in diseased organisms; that abnormal means a considerable deviation from the type. Zeigler [b] says that disease is nothing else than a life whose manifestations deviate in part from the normal.

In saying that genius manifests the symptoms of a neurosis or psychosis, we mean an excessive nervous or cerebral action. Many forms of insanity are also manifestations of similar excessive action. Such action in one individual can give rise to most wonderful, original, and brilliant ideas, and we call it genius; in another individual it produces also wonderful and original but highly absurd thoughts, and we call it insanity. But it appears that the fundamental cause in both genius and insanity is the same; it is the excessive psychical or nervous energy.

Some of the flights of genius are most brilliant and fascinating, yet they are none the less abnormal; and when this abnormality reaches a certain degree it can become pathological. Thus Don Quixote has wonderful ideas; he is an ardent soul with brilliant thoughts superior to the opinions of his contemporaries. Yet he renders no account of real things; he is in the air; he takes his imaginations for realities, sees everything in his dream; he is without critical spirit and has little balance. Edgar Poe is full of phantasy, invention, original creations, extreme notions, regardless of critical spirit. Poe was somewhat dipsomaniac. While his writings are remarkable, yet they have elements similar to the wanderings of the insane.

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[a] Cellular-Pathologie. [b] Allgemeine path. Anatomie.

Some characteristics of genius are originality, egotism, vanity, indiscretion, and lack of common sense; precocity, sterility, irritability, impetuosity, melancholy, and susceptibility to visions and dreams. These characteristics belong also to the insane. If it be said that it is cruel to compare much that we consider highest in the world with insanity, the reply is that we might as well object to classing man among the bipeds because vultures are bipeds. Any analysis of genius that may show the closest relation to insanity can not change genius itself. Faust and Hamlet remain Faust and Hamlet. Genius and great talent may be considered those forms of abnormality most beneficial to society.

CRIMINOLOGY.

Criminology is a branch of sociology, and treats of those actions, thoughts, and feelings which are especially dangerous either to the individual or society. Drill says that crime is a sensible measure of the degree of health, strength, and prosperity of a given society in a given moment of its existence. The social organism suffers from disease just as the individual. Thus there is a social pathology, which considers the morbid states of society and the anomalies opposed to nature, and shows their coexistence and the derivation of one from the other.

Criminology proper may be divided into general, special, and practical. General criminology consists in a summary and synthesis of all the facts known. Special criminology concerns the investigation of individual cases, physically, psychically, and historically considered. Here, perhaps, is the most promising field for the advancement of criminology as a science. The practical side, which includes all methods and institutions for the prevention or repression of crime, is the most familiar to the public.

SCIENTIFIC METHOD.

The study of criminology, like the study of medicine, should be carried on by scientific methods—that is to say, all the conditions, occasions, and causes of crime must be investigated first, if the treatment is to be a rational one. "Sound pathology, sound medicine," is as true as it is familiar.

A practical advantage in the study of criminals is that, they being in prison, questions can be asked and investigations permitted that would be very difficult outside of prison. The exact conditions, such as diet, regularity in manner of living, etc., being known, make it more favorable for scientific inquiry. And since the criminal is living on the bounty of the State, there is no valid reason why he can not be utilized (provided always that it is in a humane way); for the very object of such an investigation is ultimately to benefit the State by lessening crime. The method is, by a thorough diagnosis, to trace out the underlying and constant causes of crime, and thus be enabled to

apply direct means toward its prevention and repression. The study of the criminal can also be the study of a normal man; for most criminals are so by occasion or accident, and differ in no essential respect from other men. Thus an individual, becoming excited in discussion, or under the influence of liquor, or on account of an insult, may, on the spur of the moment, strike the offender with the nearest object in his reach. If it is a hammer, he becomes a criminal; if it is a book, he is not a criminal.

But even where the individual is criminal by nature, it is generally his moral and not his intellectual side that is abnormal; so that methods found to be successful in mental education will be applicable outside of prison; and vice versa, any experiment that fails in prison may save the community from making a similar mistake. Thus the prison or reformatory may also serve as a laboratory for experiments on humanity for the good of humanity itself. The pressing need of the present is a system of education that will prepare the average young person for actual life. Such a system will not be found by arguments or theories, but must come from experiments. Any prison method that might be found successful for the moral, intellectual, and industrial training of the weak in life would *a fortiori* be applicable to society at large.

PRISON DISCIPLINE.

It is almost a truism of prison discipline that the conditions inside should approach those outside as near as possible, so that on the prisoner's release the change may not be so sudden as to precipitate his early fall. He probably became an evil doer gradually, and if he becomes a good citizen the change must be as gradual. The importance of the application of the individual method in prison discipline is evident here. It seems rational that one in charge of a penal or reformatory institution should know at least the important details as to the character and life of every individual under his charge. The practical value (not to mention the scientific value) is obvious. This applies as well to all the underofficers, who are much more in contact with the men. We say it seems rational, if the men are to have intelligent and proper treatment. But, as a matter of fact, in almost all our institutions, if not all, ignorance of such details is the rule among those in charge, and this ignorance seems to be the most intense among those who are in closest relation with the inmates, the very ones whom such knowledge might assist the most.

The real trouble, as in other institutions, is the want of thoroughly trained men. It is as true of a prison as of a university that buildings do not make it, but men. The public, however, are unwilling to pay for trained men. Even the wardenship of a prison is not regarded as a very high political office, nor are intellectual qualifications a conspicuous requisition. The regular duties of a warden (not to mention his political ones) leave him little time and less energy to make an individual study of his prisoners, and too many of the underofficers are incapable from lack of education or intelligence, or both. Many of the criminals are more intelligent than those over them. The psychological effect is apparent. Given ten of the most disorderly

men in a prison, and one of the lowest paid officers (as is too often the case) to take charge of them, the result is likewise evident.

Having considered the point of view from within the prison, we may briefly take up the point of view of the citizen outside, who is of much more value than the criminal. The value of the criminal is very small in comparison, but it is infinitesimally so when the whole community are considered. In a sense the criminal is important, simply because the community make him so. Just as a flaw in one little part of a mechanism can throw the whole into disorder, so the criminal is important, since by his crime he can throw the whole community into excitement. Why, then, should he have so comfortable quarters and many privileges at the expense of the community? Simply because it is more economical for the community (not to mention higher moral and religious reasons) to treat him well than otherwise. History records the results of the vengeance theory, and shows at least its uselessness.

APPLICATION OF SCIENTIFIC METHOD.

By the application of the scientific method is meant that all facts, especially psychological (sociological, historical, etc.), physiological, and pathological, must form the basis of investigation. Psychological facts that can be scientifically determined, as affecting humanity, beneficially or not, are comparatively few in number. Physiologically, more facts can be determined as to their effect on humanity, but it is preeminently in the field of pathology that definite scientific results can be acquired. As to the difficulty of investigating psycho-ethical effects, it may be said physiological psychology and psycho-physics have not as yet furnished a sufficient number of scientific facts.

By the scientific application of chemistry, clinical and experimental medicine, with vivisection, to physiology, many truths of ethical importance to humanity are made known, but there is much here to be desired; for example, what is said about questions of diet and ways of living in general is scientifically far from satisfactory. The development of pathology in medicine has been without precedent. Its direct ethical value to humanity is already very great; but the outlook into the future is still greater. It is only necessary to mention the discovery of the cholera and tuberculosis germs (a *conditio sine qua non* of their prevention). Immunity in the case of the latter would be one of the greatest benefactions yet known to the race. Medicine can be said to be the study of the future, especially in the scientific and prophylactic sense. It is to experimental medicine that scientific ethics will look for many of its basal facts.

In emphasizing the scientific method as the most important it is not intended to exclude others. The *a priori* method has been of inestimable value to philosophy, ethics, and theology, and to science itself in the forming of hypotheses and theories, which are often necessary anticipations of truth, to be verified afterwards. The *a priori* method is related to the *a posteriori* method as the sails to the ballast of the boat: the more philosophy the better, provided there are a sufficient number of facts; otherwise there is danger of upsetting the craft.

The present office of ethics is, as far as the facts will allow, to sug-

gest methods of conduct to follow and ideals to hold that will bring humanity into a more moral, physiological, and normal state, enabling each individual to live more in harmony with nature's laws. Such an applied ethics must study especially the phenomena manifested in the different forms of pathological humanity and draw its conclusions from the facts thus gathered.

But there are many scientists who look with suspicion upon the introduction of philosophical thought and methods into their field. We may call them pure scientists—that is to say, those who believe that the term scientific truth should be applied only to that form of truth which can be directly verified by facts accessible to all. Yet from this point of view the arrangement, classification, formation of hypotheses and theories, or philosophical conclusions are not necessarily illegitimate, provided those processes are clearly distinguished from each other and rigidly separated from the facts. Perhaps the study which, more than all others, will contribute toward a scientific ethics is criminology, the subject-matter of which touches the popular mind very closely, owing, in a great measure, to the influence of the press; and though this has its dangers, yet it is the duty of this, as of every science, to make its principles and conclusions as clear as possible to the public, since in the end such questions vitally concern them.

Crime can be said, in a certain sense, to be nature's experiment on humanity. If a nerve of a normal organism is cut, the organs in which irregularities are produced are those which the nerve controls. In this way the office of a nerve in the normal state may be discovered. The criminal is, so to speak, the severed nerve of society, and the study of him is a practical way, though indirect, of studying normal men. And since the criminal is seven-eighths like other men, such a study is, in addition, a direct inquiry into normal humanity.

The relation also of criminology to society and to sociological questions is already intimate, and may in the future become closer. Just what crime is at present depends more upon time, location, race, country, nationality, and even the state in which one resides. But notwithstanding the extreme relativity of the idea of crime, there are some things in our present social life that are questionable. A young girl of independence, but near poverty, tries to earn her own living at $3 a week, and if, having natural desires for a few comforts and some taste for her personal appearance, she finally, through pressure, oversteps the bound, society, which permits this condition of things, immediately ostracizes her. It borders on criminality that a widow works fifteen hours a day in a room in which she lives, making trousers at 10 cents a pair, out of which she and her family must live, until they gradually run down toward death from want of sufficient nutrition, fresh air, and any comfort. It is criminally questionable to leave stoves in cars, so that if the passenger is not seriously injured, but only wedged in, he will have the additional chances of burning to death. It has been a general truth, and in some cases is still, that so many persons must perish by fire before private individuals will furnish fire escapes to protect their own patrons. It seems criminal to grant licenses to hotels, where a sudden fire in the night would almost certainly cause the death of human beings. It is a fact

that over 5,000 people are killed yearly in the United States at railroad grade crossings, most of whose lives could have been spared had either the road or the railroad passed either one over the other. But it is said that such improvements would involve an enormous expense; that is, practically, to admit that the extra money required is of more consequence than the 5,000 human lives. And yet, strange as it may seem, if a brutal murderer is to lose his life, and there is the least doubt as to his premeditation, a large part of the community is often aroused into moral excitement, if not indignation, while the innocently murdered railroad passenger excites little more than a murmur.

There is, perhaps, no subject upon which the public conscience is more tender than the treatment of the criminal.

Psychologically, the explanation is simple, for the public have been educated gradually to feel the misfortune and sufferings of the criminal; it is also easier to realize, since the thought is confined generally to one personality at a time. But if the public could all be eye-witnesses to a few of our most brutal railroad accidents, the consciousness gained might be developed into conscientiousness in the division of their sympathies. But this feeling, however paradoxical, is a sincere, though sometimes morbid, expression of unselfish humanitarianism; for the underlying impulses are of the most ethical order, and overcultivation is a safer error than undercultivation. The moral climax of this feeling was reached when the Founder of Christianity was placed between two thieves.

INSTRUCTION IN CRIMINOLOGY.

In a report prepared by Lombroso for the International Penological Congress is the question whether it will be advisable to organize instruction in penal science. That is, by what means could there be added the positive study of the facts and questions of application, without interfering with the performance of duties and without prejudice to the administration.

In our own country and Europe science and the university have manifested little interest in criminological subjects. They have taken the position of the public that crime is a necessary and incurable evil, and so there is little use in troubling about it. Yet penitentiary and carcerial sciences are the most complicated and most susceptible to instruction of all other sciences. To construct the most healthy, most economical, and best-adapted prison cell or workshop is a desideratum. The same is true as to the construction of women's prisons, houses of arrest for accused persons, innocent or guilty, and places for witnesses.

At present our jurists study law books much more than they do criminals; and yet perhaps one-half of the time of our courts is confined to criminals. Criminals are considered by many jurists prison employees, and the public as normal men, who are unlucky and unfortunate. The individual study of the criminal and crime is a necessity if we are to be protected from ex-convicts, the most costly and the most dangerous class we have. But the criminal can not be studied without

being seen and examined. For the love of science and humanity we permit the examination of the sick, of pregnant women by young men, manipulation in surgical clinics of fractured members; the visiting, examination, and individual study of the insane, although these are sometimes injurious to the insane. But the criminal may not receive visits, may not submit to a scientific examination. Why should criminals be so privileged a class? An accused innocent person may have his name and life, with photograph, published in the newspapers; and yet objections are raised to the study of habitual criminals for scientific purposes.

Benedikt, a specialist in craniology at the University of Vienna, says that to correct the criminal and protect society the criminal must be studied scientifically. For this purpose the universities, higher courts of justice, and prisons should have places for instruction and investigation.

CRIMINALS NOT SO ABNORMAL.

Should a philosopher desire to study normal human nature experimentally, he could do this best in prison, for probably nine-tenths of prisoners are criminals by occasion—that is, their crime is due mainly to bad social conditions; their personality differs little or none at all from that of the average man, so that any results gained here relate to normal man. But there is an additional advantage, questions can be asked and investigations permitted that would be difficult with normal man outside of prison. The prisoner has much less to lose and will often make confessions that few outside of prison would care to make, giving the deepest insight into human nature. Another advantage is that the exact conditions, such as regularity in habits of life, diet, etc., are known, and thus a more favorable condition of scientific inquiry is afforded. This is especially true in reformatories, industrial schools, houses of refuge, etc.; most of the inmates are entirely normal; it is abnormal surroundings, such as poverty or drunkenness at home, that brought them here, and not abnormal natures in the children themselves. But it may be added, that if children remain long enough in such conditions they will be liable to develop whatever criminal tendencies are in them. It is generally admitted that about 10 per cent of inmates are incorrigible; that is, they are criminals by nature. As their incorrigibility is shown by repeated acts, it is not so difficult to select these cases. This is not saying that such and such a case can not be cured, but intelligent prison officials of long experience doubt the probability of reformation.

CRIME NOT A DISEASE.

This fact of incorrigibility may be a reason why crime has been considered a disease. Reports from the principal penitentiaries of this country recently gathered by the Bureau of Education show 82 per cent in good health, 11 per cent in fair health. If crime is a disease, it would seem that it has little to do with what is ordinarily designated under this term. Some have sought by the study of criminals' brains to show anatomical anomalies indicating disease; but there is little agreement in these investigations. But if there were agreement,

it would only indicate probabilities, not certainties, for comparatively few brains of criminals have been studied. Even in the case of the insane it is not demonstrated that mental disease necessarily involves brain disease; yet most investigators believe that it does, and with good reason. But there have been cases of insanity in which cerebral anomalies have been sought for in vain. To say that the cause was functional and so did not leave any traces is a hypothesis, but not knowledge in the scientific sense. Now, in the case of the criminal, the too common statement that crime is disease, is speculation, not fact.

FREEDOM OF CRIMINAL'S WILL.

A general sociological and ethical maxim is that the idea of wrong depends upon the moral, intellectual, and physical danger or injury which a thought, feeling, volition, or action brings to humanity.

This principle should be applied to degrees of exaggerated wrong or crime. But it may be asked if the degree of freedom or of personal guilt should not be the basis of punishment. The force of this objection is evident; the idea of freedom has been the basis of criminal law; it has also been sanctioned by the experience of the race; and, although no claim is made of carrying it into practice without serious difficulties in the way of strict justice (difficulties inevitable to any system), yet it has been not only of invaluable service, but a necessity to humanity. This is not only true on criminal lines, but this idea has been the conscious basis of our highest ideals.

But at the same time the exaggeration of the idea of freedom has been one of the main causes of vengeance, which has left its traces in blood, fire, and martyrdom; and though at present vengeance seldom seeks such extreme forms, yet it is far from extinct. On moral and on biblical grounds, as far as man is concerned, vengeance can find little support. With few exceptions, a revengeful tone or manner toward a prisoner (the same is true outside of prison) always does harm, for it stirs up similar feelings in the prisoner, which are often the cause of his bad behavior and crime. Kindness, with firmness, is the desirable combination.

If we were obliged to withhold action in the case of any criminal for the reason that we did not know whether or in what degree he was innocent or guilty, from the standpoint of freedom of will, the community would be wholly unprotected. If a tiger were loose in the streets, the first question would not be whether he was guilty or not. We should imprison the criminal, first of all, because he is dangerous to the community.

THE STUDY OF CRIMINALS.[a]

At present our jurists study law books, not criminals, and yet nearly one-half the time of our courts is given to criminals. The individual study of the criminal and crime is a necessity, if we are to

[a] "Education and Patho-social studies" (by author), published by the United States Bureau of Education; also "Le Criminel-Type" (by author), published in France.

be protected from ex-convicts—the most costly and most injurious citizens we have.

A complete study of a criminal includes his history, genealogy, and all particulars concerning himself and his surroundings previous to and during his criminal act; also a study of him in the psycho-physical sense—that is, experiments upon his mind and body with instruments of precision—measuring, for example, his thought-time, sense of sight, hearing, touch, taste, smell, pressure, heat, and cold; also an examination of his organs after death, especially of his brain. It is evident that no one person could make an adequate study of a criminal. The microscopical anatomy of the brain alone, with its physiology, is more than the life work of many men could accomplish. Criminology, therefore, depends for its advancement upon the results of numerous departments of investigation.

CRIMINOLOGY NOT YET A SCIENCE.

In a rigid sense criminology is no more a science than sociology. Like many other branches of study, they are called sciences by courtesy. But the empirical study of human beings, with whatever class it begins, is an important step toward a scientific sociology. Criminology is an initiatory step in the direct study of individuals themselves and their exact relations to their surroundings. The practical and scientific value of such study consists in showing more clearly what normal society is or ought to be, just as the study of insanity gives by contrast an insight into mental health.

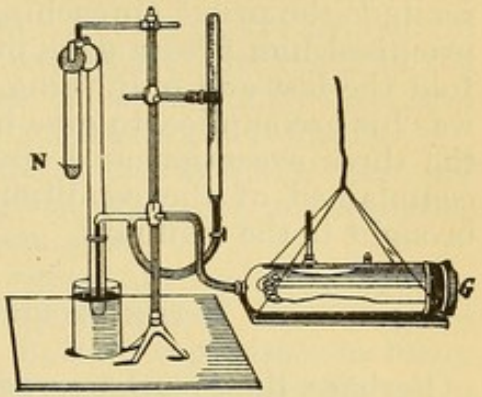
PHYSIOLOGY OF THE CRIMINAL'S BRAIN.

As already indicated, knowledge of the criminal's brain, as well as of the brain in general, is very inadequate, so that any definite conclusions are unwarranted. It may be said that the fact of a criminal having mental anomalies and at the same time cerebral or cranial ones, does not show that either one is the cause of the other, although it may justify a presumption that they are in some way related; for such conclusions are based upon the anatomy rather than the physiology of the brain. As to the latter, little is known. It is easy to conceive that brain circulation, qualitative and quantitative, has as much to do in its effect on the mind as anatomical conditions. It is, however, reasonable to assume that in the last analysis every physiological irregularity is based upon an anatomical one; yet the reverse may be assumed also. The probability would seem to be that the physiological and anatomical mutually act and react, one upon the other; and to decide which is primary is wholly beyond our present knowledge.

MEASUREMENTS OF EMOTION.

Measurements of sensibility by instruments of precision have not been carried very far. As an illustration of the probable importance

of this method of study, we give a diagram of the plethysmograph of Mosso. The purpose of this instrument is to show the effect of the emotions upon the circulation of the arterial blood.



The Plethysmograph.

This instrument is one among others belonging to the Bureau of Education, constituting the nucleus of a physio-educational laboratory. It consists of a cylindrical vessel, G, suited for the limb (the arm); the opening through which the limb is introduced is closed with caoutchouc and the vessel is filled with water. The arrangement is such that any increase or decrease in the volume of water in the vessel G causes the weight N to rise or fall. On this weight is attached a small bar which can be made to register its upward or downward movement on a revolving cylinder. As the arm enlarges from an increased supply of blood the curve registered on the cylinder is upward. Since the flow of venous blood is regarded as uniform in the passive limb, an increase of the volume of the arm shows a greater velocity in the flow of arterial blood in the limb. By having the criminal insert his arm into the cylinder, some of the effects of ideas on his emotional nature through the circulation of the blood will be registered, giving involuntary testimony as to his nervous and physical nature. Thus, in the case of one when the sentence of a judge was read, a decrease in flow of blood was observed by the lowering of the curve, but the sight of a cigar or a glass of wine raised the curve, which is equivalent to an increase in flow of arterial blood in the arm. In the case of a brutal murderer, the flow was little affected by the sight of a pistol, whereas in normal man there is a decided effect. The value of such an instrument for investigations on normal people will also be evident when we consider that both mental depression and sleep may cause the curve to lower; during straining and coughing the curve rises, but falls in sighing.

Although little has been done with the plethysmograph as yet, it is easy to see the important bearing it may have on educational and psycho-physical questions. Thus a pupil with his arm in the vessel can be set to performing mathematical calculations or composing sentences, or varied ideas may be presented to his mind, and the effects of these mental states or studies on the circulatory system can be seen. As it is very probable that an increase of circulation in the arm, psychically caused, means a decrease of circulation in the brain, we are able to study directly the influence of different mental conditions on circulation in the brain.

MORAL OBTUSENESS.

The extreme moral insensibility of habitual criminals can not be better shown than by their words and acts, often naïvely expressed. A criminal whose brother was being executed stole a purse and watch

and said, "What a misfortune my brother is not here to have his share." Some speak so coldly and unconcernedly of their crimes in court that they would be taken for witnesses rather than authors of their deeds. Pity for the suffering of others is very feeble. One reminds the priest (preaching to him repentance) of the wine he had promised him fifteen days previously; and when mounting the scaffold the last and only thing which he said was to ask his wife, who was his accomplice, to give him credit for 37 francs. Another, from the three executioners desired to choose his "professor." Another complained of the condition of the streets through which he was brought to the scaffold.

THE DECEITFULNESS OF CRIMINALS.

Perhaps the greatest power of deceit of which man is capable has been shown on the scaffold. There are too many people who believe that no one would tell a falsehood when facing death. The fact that many hold this idea encourages criminals to insist on their innocence to the very last. Especially is this true of the more intelligent criminals; for they see they have little to lose but some things to gain as far as their reputation is concerned; for if they do not confess, many, perhaps, may believe them to be innocent or even consider them martyrs. Then, too, they may deny their guilt for the sake of their family.

Criminals probably fear death more than other men, but their intense vanity helps them to conceal it, just as their lack of foresight and impetuosity makes them appear courageous. Not a few have been known to confess their faults to Him who grants divine pardon and then proclaim with a loud voice their innocence and die in contradiction with themselves.

PREVENTION OF CRIME.

When the cause of a particular crime is found, this indicates the most active cause, but not the only one. There may be specific remedies for specific cases, but they can only be determined by special study of the individuals. While some cases can not be reached, the great majority can be made susceptible to reformation, or at least improvement. Often the truest and best advice a physician can give to his patient is to keep up the general health and nature will be his best servant in resisting all attacks of disease. The same principle applies in aiding one to overcome temptations to evil or crime. Such a remedy consists in moral and intellectual habits being implanted in children, which will give a constant resistance to all temptation, and be even an unconscious force when self-control is lost. Little can be expected from palliative remedies as long as this educational remedy is not thoroughly carried out.

CRIMINAL ARISTOCRACY, OR THE MAFFIA.

The aristocratic sentiment is found among the lower forms of life, where it does not seem to have degenerated, as in man. It is easily traced through the savage world up to man, where, if it does not take the form of a government, it seems to exist in classes or individuals as

much as ever. While this is manifest enough in the higher circles, it is just as evident among the unfortunate and lower. The poor on the second floor of the tenement house consider themselves superior to those on the top floor. In the almshouse and insane asylum the same feeling is the cause of many petty quarrels. Among criminals, both in and out of prison, the aristocratic sentiment often shows itself in the form of associations. The highway robber detests the petty thief, and the most brutal murderers hate liars and consider them cowards.

Association strengthens criminals by discipline, develops their old savage tendencies and causes them through vanity to commit atrocities that would be repugnant were each of them alone.

The purpose of criminal associations is almost always to appropriate the property of others. They are mostly composed of unmarried young men, who are without education. In their organizations many have an armed chief with dictatorial power, and his authority, as in savage tribes, comes from personal qualities. There is sometimes a division of labor—there is an executioner, a schoolmaster, secretary, priest, physician, and sometimes a surgeon, charged to disarticulate the fingers, so that expertness at stealing can be acquired. Some associations are not allowed to steal in the locality where they live, so that they may have safe domicile. If anyone is put in prison for a small offense, they take the precaution to hide nails and files in the cracks in the walls. When they walk with their booty, the women go ahead, holding the packages as if nursing a child. In some societies each has a manual for action and dictionary for slang; some imitate epileptics by falling down in a crowded street, simulating a fit, and consorts pick the pockets of those pressing up to see the supposed victim; others play the part of the insane or deaf-mute.

One of the well-known criminal organizations is the Maffia, an association of malefactors, whose home is in Sicily. As a rule, it has no secret sects, statutes, regular meetings, or organization. Its power, however, is very great; it is incarnated in the Sicilians. It is divided into two clans, the Maffia of the city and the Maffia of the country. They operate together, sustain one another, and divide the booty. The members of the city Maffia steal, assassinate, seek to get possession of the large proceeds, and to hold the association in their grasp. The rustic members are bands of from ten to twenty brigands, who infest the country, causing terror everywhere. The Maffia are professional criminals, and desire to become rich by this method. They have their own code of justice, which is not social justice; their verdicts are unchangeable and prompt. A witness condemned by the Maffia is killed within twenty-four hours. They work by terror. A judge will avoid condemning a criminal through fear of being stabbed. A witness against the criminal shares the same danger. The prefect of Palermo defines the Maffia as a latent and pernicious power in a country where corruption and reaction against authority is a heritage of the past. By the aid of this society people of every class yield to a reciprocal assistance in view of defense, plunder, gain, power, vengeance in using all the means that law, morality, and civilization detest and condemn. The rich practice it to protect their person and property.

There are classes of Maffiosi—the Maffioso of action, that is, brigand, the thief, or the assassin; the secret Maffioso, who gathers and distributes the news and is a silent aid for the perpetration of crimes; the

Maffioso manuten golo, through fear or interest, is the purveyor and receiver of stolen goods for the Maffiosi of action.

The Bassa Maffia is a lower grade of the society. Here any scamp who thinks he has courage can become a Maffioso; he threatens to kill some one and is honored by all. The Alta Maffia seeks to make a show of good manners, and at the same time to be in accord with the brave of the Maffiosi of low extraction.

The Bravi, or supreme chiefs, are sometimes elegantly clothed and wear yellow gloves. Then there are the stabbers and the thieves. They seek financial aid in enterprises of vengeance, in clandestine lotteries, in illicit profit from public works, and sometimes in blackmailing.

They all follow faithfully their unwritten code. Here are some of the principles: To keep absolute silence concerning the crimes which they witness, and to be ready to give false testimony in order to cover up traces; to give protection to the rich for money considerations; to defy public force at all times and everywhere, and always to be armed; to fight a duel for the most frivolous motives, and not to hesitate to stab treacherously; to avenge at any price injuries received, even if one is intimately related to the offender. Whoever is found wanting in any of these respects is declared infamous, which means that he should be killed without delay, even if in prison; if weapons are wanting, to suffocate him in his pail. He receives also an order to give himself up to death. Knowing the condemnation to be irrevocable, he strictly obeys. Before killing a comrade, one notifies him by drawing a cross on his door or by shooting a pistol at his house. Lombroso has seen many escape death by seeking mercy in being shut up alone in a prison cell.

Like ordinary rascals, they have their slang. They say "sleep" instead of death, "cats" for war, "ruby" for eye, "product of extortion" for linen, "tic-tac" for revolver. Their principal home is in prison. They are firm in their hatred. Lombroso tells of one, who, feeling himself the weaker one, kept his vengeance for fifteen years, until at last his adversary was condemned to death. Then he petitioned the Naples court and obtained the favor of filling the office of executioner.

The most complete organization of criminal aristocracy is the Cammorra at Naples. The Maffia is a variety of the Cammorra. A further study of the Maffia can be pursued perhaps in no better way than by describing the Cammorra.

This organization consists of a number of prisoners, or ex-convicts, formed into small independent groups, but under one hierarchy. The aspiring candidate must prove that he is courageous and that he can keep a secret. He should kill or wound anyone who would name to him the sect; if victims were wanting, he must fight with one of his future colleagues with a knife. Formerly the test was a more difficult one, where the candidate was obliged to raise a piece of money while the Cammorrists pierced it with their daggers. He must submit to an apprenticeship of two, three, and sometimes eight years; he is in service of another, who gives him most fatiguing and perilous things to do, allowing him a few cents once in a while, for charity's sake. After he has gained the esteem of his master by zeal and submission, a meeting is called and his reception as a Cammorrist is deliberated upon. If received, he must fight again in the presence of the assembly; he takes the oath over two daggers forming a cross, that he will be faithful to his associates, show himself in everything an enemy of authority; have no relation at all with the police; never denounce thieves, but to have

a particular affection toward them, as toward those who expose their line continually. After this a banquet finishes the celebration.

One of the most important matters is the distribution of "la cammorra," a little vessel which contains the extortions in gambling rooms, brothels, from those who sell watermelons and newspapers, from hackmen and beggars, and from prisoners. These last furnish the best revenue. On entering prison the "unfortunate" must give a tenth of his possession, and pay for drinks, food, gambling, and for sleeping on an easier bed.

A Cammorrist can not kill a comrade without permission from the chief, but in revenge he can make away with anyone else. If there are doubts as to the fidelity of a colleague, before condemning him they send him a plate of macaroni; if he refuses to eat it (for fear of poison, perhaps) they feel certain of his guilt, and his condemnation is pronounced, and lots are drawn to indicate the apprentice who must execute it. This is done punctually, as shown by this fact: A prisoner tells the governor of a castle that a Cammorra had been established for some time, and that it was his misfortune to be one of the chiefs. One of the laws is to compel all the convicts to pay 2 cents a day. A certain convict, Razo, would not submit to this. The chiefs of the Cammorra voted unanimously to put him to death. But the lot fell to him (the chief) to strike the blow; he accepted and was to commit the crime that morning. But on reflection at the sad consequences of such a forfeit, the cause of which was only 2 cents, he restrained his arm and went out of the castle. He then begged the governor of the castle to isolate him, for, after this treachery, his comrade chiefs would kill him without pity.

Yet the Cammorra is not wholly without heart, as shown in the case of the young girl whose lover had been condemned to death for refusing to pay his contribution. She asked that her lover might be pardoned, and it was accorded to her with Olympian majesty.

CRIMINAL SUGGESTION.

It is a common experience that when one of a party yawns another is liable to do the same. There is an instinctive suggestion to look when the crowd are gazing on the street. This elementary power of suggestion becomes morbid in the case of the habitual thief. Any desirable object he sees suggests taking it; there is a spontaneous feeling too tempting to resist. If questioned closely why he takes it the man's last and repeated answer is simply that he likes to.

It was the custom in Denmark during the last century to have a procession of priests, repeating psalms, accompany the criminals from prison to the place of execution, after which a sermon was preached. The contagious suggestion from this display made condemned criminals ambitious to die amid such pomp. The result seemed to be a large increase of murder in the country. At one time martyrdom became so contagious in the church that it was forbidden. Religious history contains many examples of excessive enthusiasm arising from nervous contagion. In massacres, after a few men have been killed the sight of blood intoxicates the crowd, who rush upon the prisoners with fury and reckless murder.

Aubry[a] defines the will of a crowd as the resultant of all the actions and reactions of the individual wills in contact. This collective will can be led by suggestion to act contrary to the principles of many of the individuals who compose it. What an excited crowd will do no one can predict; the most timid man has been transformed into a beast. In the French Revolution certain men blamed the assassins severely; but later these same men, finding themselves, from curiosity or by accident, in the presence of a massacre, were overcome by the excitement and participated in the slaughter. In a crowd some people are taken with dizziness; others, not knowing what is going on, are influenced by the noise, or mystified, and give way to the least impulsion, imitating those around them, not knowing why; they may take arms without suspecting results. It is thus that riots sometimes arise.

War springs often from a patriotic suggestion, and frequently over some insignificant question; it is encouraged by the younger element in the nation rather than by the more experienced. The nation strives to annihilate its neighbors; there is thought of little else than the need to kill the enemy; this continuous suggestion becomes contagious and causes each citizen, however egotistic and selfish, to be willing to give up his personal interests and business and fight for his country. Aubry says that war is a neurosis, a homicidal insanity.

In Europe, where dislike or hatred exists between nations, the immense standing armies are a constant suggestion of future utilization; they are a menace to the temporary equilibrium of the forces of hatred. The frequent outbursts of anarchistic or socialistic radicalism in the destruction of life or property are symptomatic of the neurotic temper of the times, and are a sign of a deeper social disease arising from the unfortunate condition of many in poverty or on the verge of poverty. Such discontented persons are particularly susceptible to dangerous suggestions, which can be fanned into a flame by the daily reading of detailed accounts of crime against government, property, or life. Every daring robbery, every throwing of dynamite or other riotous act, is almost certain to be followed by similar crimes.

A woman who throws vitriol upon her lover is seldom convicted. She is described in the newspapers; the color of her hair and her other charms are dwelt upon; her letters and her photograph are published. Women with more imagination than intelligence are fully prepared to imitate the heroine when any peculiar grievance or temptation affords occasion. The force of such suggestion has been known to result in epidemics of vitriol throwing.

With those illustrations of the influence of criminal suggestion upon society as a whole, we may pass to the consideration of cases[b] of an experimental nature, and other special cases.

The difference between criminal suggestion, criminal hypnotism, and somnambulism in its deeper stages is one of degree, and thus individual cases may be found in these several stages.

It is possible during somnambulism to compel certain persons, contrary to their will, to commit immoral or criminal acts; and, according to the Nancy school, this can be accomplished after the subject has returned to his normal state and at an exact time which has been previously suggested to the subject during the hypnotic state. The writer

[a] La Contagion du Meurte, Paris, 1888.

[b] We are indebted for some of these to Dr. Emile Laurent, formerly "interne" in the prisons of Paris.

has heard Professor Forel tell a woman in the hypnotic state that when she awoke she would see all the students headless. On awaking she looked puzzled, and, on being asked why, said that the students were without heads. The school of Salpétrière does not admit that post-hypnotic suggestions are irresistible. It maintains also that a person while in a state of somnambulism is always a person who can manifest volition in resisting suggestions repugnant to a profound sentiment. Brouardel holds that the somnambulist realizes only agreeable and indifferent suggestions. Delboef[a] says that the hypnotized person knows that he is playing a comedy. Laurent[b] avows that he has seen some somnambulists successfully resist all post-hypnotic suggestions, and others who were unable to resist doing acts repugnant to themselves.

Thus Liégeois[c] shows that a hypnotized person can be made to sign a false note; and that if it is suggested to him that he owes the money in question, he will, on awaking, hold the note in memory and consider it genuine. Liégeois said to a very suggestable lady, "You know that I lent you 500 francs; kindly sign a note that will give me security." "But, sir," the lady replied, "I do not owe you anything; you never lent me any money." "Your memory fails you, madame. I will recall the circumstances. You had asked me for this sum, and I consented to lend it to you. I gave it to you here yesterday in five-franc pieces." By the force of his look and by his affirmation Liégeois gave an impression of sincerity. Madame hesitated; her thought was troubled; she tried to remember; obedient to the suggestion, she at length recalled the loan. This suggestion assumed in her mind a real character, and she signed the note.

While it is undeniable that one can in this manner be made to sign a false note or will, it is doubtful whether the experiment would succeed in ordinary life, outside of the laboratory. It would be necessary that the note should be made payable very soon, for the suggestion might not remain very long; also the patient would reason about it; subsequently the truth would be found out, and the hypnotizer would be in danger.

One may put his subject under hypnotic influence and say to him or her: "You will steal [such and such a sum at such a time]; you will bring it to me;" or "you will kill [such and such a person], whom I detest. After you have done this you will awake; but you must not remember that I have made you do this; you will believe that you acted of your own accord." Experimental suggestions of this nature have succeeded; but if they should be tried in reality the perpetrator would be more liable to be detected than if he committed the deed himself; for in the former case the person hypnotized would afterwards show by his words and actions that something was wrong; suspicion would be aroused, and it would be discovered that he was hypnotizable, and he himself as well as friends would attribute it to the hypnotizer.

It is possible to violate the conscience of a person in the somnambulistic state and to make him to divulge the deepest secrets. Liébaut hypnotized a lady, and affirmed that he was a priest and that she had

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[a] L'Hypnotisme et la Liberté des Representations Publiques.

[b] Les Suggestions Criminelles.

[c] De la Suggestion et du Somnambulisme dans leurs rapports avec la jurisprudence et la "médicine" légale, Paris, 1889.

come to confession. She played her part seriously. Another physician had questioned his hypnotized patient with too much curiosity. The patient, after some hesitation, much blushing and embarrassment, said: "Mon Dieu! J'ai aimé Monsieur." The physician awoke her immediately. A similar case was that of a lady who, during the hypnosis, answered questions with a confidence so serious and dangerous to herself that the physicians hastened to awaken her.

Bernheim mentions that certain subjects who have been frequently hypnotized show a disposition when awake to obey suggestions. For example, children, who are very impressionable, have hallucinations and give false testimony. Laurent cites a mysterious case of a 14-year-old girl, belonging to the Reformed confession, who disappeared. Nineteen Jewish families resided in the town where she lived. The report soon spread that, in order to obtain her blood to mix with the unleavened bread, the Jews had killed her. She had disappeared just before Easter. A cadaver was discovered in the river and recognized by certain persons to be the body of the girl. The mother of the girl, however, was incredulous, and would not recognize her daughter. Thirteen Jews were arrested on account of the statement of the son of the sexton, a boy 13 years of age. After being questioned at length by the commissioner, the boy made confessions: He heard a cry; he went out and looked through the keyhole of the lock of the temple; he saw Esther stretched upon the ground; three men held her while the butcher bled her by the throat and collected the blood into two bowls. In court the boy persisted in those confessions. The presence of his father, with twelve other Jews who were threatened, and the ardent supplications that he should tell the truth were of no avail. He repeated the statements.

Bernheim's explanation is that the commissioner by questioning the boy suggested the matter to him. His imagination was struck with terror; the scene was called up before him; a retroactive hallucination took possession of him, and he fancied all the incidents in the scene which the commissioner had mentioned. It was just as one can do experimentally in profound sleep; the hallucination is created; the remembrance of the fictitious vision is so vivid that the subject can not escape from it.

Liégeois reports a case of a woman who being accused of infanticide at first denied it, but on being further questioned by the police commissioner, and asked whether she had not placed the child where the pigs were kept, after much hesitation admitted it. The sage-femme had already asked her the same question and she had confessed. She renewed her confession before the judge and the court: "I took my child; I opened the door of the place where the pigs were; I threw it in; I don't believe that it cried; I did not see it move." When this woman was taken to prison it became known that she was in an advanced stage of pregnancy. This showed conclusively that the crime of which she was accused and convicted was impossible. On being questioned further, she said that her parents and the sage-femme had pressed her to make the confession; that they frightened her with the prospect of a severer condemnation if she did not confess. Laurent, while admitting that the woman was vividly impressed, does not believe that it was a matter of suggestion. He thinks it was a matter of persuasion by force, if she knew that she had not committed the crime. It is not impossible, however, that suggestion and persuasion cooperated.

An example of a hysterical hereditary case[a] is that of a man who allowed another person, whom he knew but slightly, to confide to him stolen property, which he was persuaded to carry to the pawn shop. Whether he was dupe or accomplice, the initiative of his crime was not in him. A few days later the same man was imprisoned for three months on account of being deceived. Again at liberty, he became acquainted with a woman who made him sell for her a gold watch and chain that she had stolen. The man was gentle, well-disposed, and generous, but he was easily influenced. His will had been paralyzed, and in each crime his accomplice had the control of him.

Then, there is the phenomenon of autosuggestion, which can take the form of vengeance. Some men, when enraged, treasure up thoughts of revenge against which neither reason nor sentiment is of avail. After the criminal act is accomplished, the fixed idea disappears, and the subject becomes himself again. He is surprised at his act, and realizes that he was out of himself.

Aided by her son a woman murdered and mutilated her infirm husband on the highway. They left his body, without reflecting that it would be necessary to give explanations next morning. Dr. Laurent's notion is that the woman and her son had lived for months with the fixed idea of ridding themselves of this man, who had kept them in poverty; that they were haunted by the suggestion of murder; and that, having only a rudimentary conscience, they did not attempt to struggle against the temptation. To add to the autosuggestion, another man, who was enamored of this woman, had promised to marry her; this further obscured their conscience, and rendered the murderous suggestion all-powerful. Thus they lost prudence, and committed a crime certain to bring them to the gallows.

Tropmann is another case, best explained by auto-suggestion. Here is a young man, without bad antecedents, who commits an unheard-of montrosity, with premeditation and great skill. He assassinates an entire family of seven or eight persons. He enticed the father into a forest of Alsace, poisoned him with prussic acid, and buried him. He dug a ditch in a field, enticed the elder son there, brutally murdered him, and buried him. He dug another trench for the mother and children, and, after enticing them there, killed them with a pickax and buried them. Tropmann desired to go to America to pass himself off for the father, and by some unknown means realize the modest fortune of this exterminated family. He was a man insignificant in appearance; his physique and moral character would not indicate that he was capable of such an infernal act. Bernheim is of the opinion that, in whatever way this idea may have entered his mind, it finally became an irresistible auto-suggestion, just as a fixed idea of suicide may culminate fatally.

It may be said that there is no specific method of procedure in order to prevent such crimes. In social as in bodily diseases there are certain conditions that no remedy can reach. While symptomatic and palliative treatment is possible, the state of social therapeutics, like that of medical, is unscientific and far from satisfactory. Often the truest and best advice a physician can give to his patient is to keep up the general health; nature will be his best servant in resisting all

[a] Laurent, "Les Suggestions Criminelles."

attacks of disease. The same principle is applicable to a diseased condition of the social organism. Since there is no "specific," the remedy must be general, gradual, and constant. It consists in religious, moral, industrial, and intellectual education of the children and youth, especially of the poor unfortunate and weakling classes. The most certain preventive is the early incarnation of good habits in children, which, becoming part and parcel of their nervous organization, are an unconscious power when passion or perplexity or temptation causes them to lose self-control. Without this inhibitory anchor many are certain to go astray. This power is generally proof against all criminal hypnotic suggestion. The methods by which such an education is to be best accomplished are as yet problematic.

EDUCATION AND CRIME.

It is an undisputed fact that the moral side of education is as difficult as it is important. This becomes most apparent in the education of the dependent, weak, and criminal classes. Any educational system that can succeed here can with slight modifications succeed in the community at large, for all men have tendencies, however slight, toward these defects; but, by force of character or surroundings, the great majority have been able to resist to such a degree as not to fall.

But it may be asked to what extent methods of education for normal individuals may be adapted to those who are abnormal. An individual may be said to be abnormal when his mental or emotional characteristics are so divergent from those of the ordinary person as to produce a pronounced moral or intellectual deviation or defect. To distinguish such abnormality from disease is difficult, if not impossible; but in general an abnormality is called disease as soon as it reaches a certain degree; but it may also be an excessive degree of the normal, just as in the physical man in a single diseased cell the normal or physiological processes are not changed in kind, but only in degree, or simply act at an inappropriate time. In general it may be said that, while all diseases are abnormal, not all abnormalities are diseases. The fact that the same functions are involved in both normal and abnormal processes (psychical and physical) is one explanation why the same methods of education are found applicable to both.

CLASSES OF SOCIETY.

If, then, the average man in the community is taken as a normal type and individuals are classified according to their degree of likeness or unlikeness to him, there will result in general the following divisions:

(1) The normal class of individuals, who greatly exceed all other classes in number; these in every community constitute the conservative and trustworthy element and may be said to be the backbone of the race.

(2) The dependent class, as represented in almshouses, hospitals, asylums for orphans and the homeless, and similar charitable institutions. According to the census of 1880, in the United States the whole number of such individuals, for example, amounted to 123,626.

(3) The delinquent class, as found in all penal and reformatory institutions, which, according to the same census, amounted to 70,077.

(4) The defective class. Here belong the insane, feeble-minded, idiotic, and imbecile, amounting in all to 168,854; and also the deaf, dumb, and blind, numbering 82,806 in all.

(5) Men of genius or great talent.

The total number of these first four classes in the United States for 1880 was 445,363. This, of course, is far below the reality, since many are not sent to the institutions from which the census is taken. It will, however, give an idea of the comparatively small number of distinctively abnormal individuals—that is, less than half a millon out of fifty million inhabitants. It is surprising that so small a part of the community can cause so much trouble, danger, and expense. But it is in a social mechanism as in a mechanical, where one little part may throw the whole into disorder. Yet the importance of this part does not lie in itself, but in its relations to the others. Thus one crank or one criminal can throw the whole community into excitement often causing great injury.

The delinquent classes approximate nearest to the normal type, for the majority deviate principally in one respect, that is, in a weakness of moral sense which gives away to temptation; this is the most harmful deviation, both for the individual and society, and the community justly regard these classes as their greatest enemy.

While the dependent classes owe their condition directly or indirectly to either alcoholism or improvidence or general mental or physical incapacity, their abnormality may be regarded as more distinctly social than in the case of the other classes.

The insane and feeble-minded are the largest in number and vary the most from the normal type. The one is an exaggeration of mental faculties due to cerebral irritation; the other is a diminution of mental powers; or both exaggeration and defect may coexist. Feeble-mindedness, idiocy, and imbecility may be due to an immature or arrested development.

There is a natural objection to calling the deaf and dumb and blind "defectives," since the public are liable to suppose that this term applies to the mental capacity, which in many cases is not true. Yet the popular prejudice is not wholly unfounded, for anyone deprived of such important senses is so far hindered in opportunities for knowledge. It must be borne in mind also that a considerable number of the feeble-minded are deaf and dumb or partially so.

The division of the abnormal classes into dependent, delinquent, and defective, while by no means exact, is as convenient as any perhaps. Any exact division is manifestly impossible for the defective and delinquent are generally dependent and the delinquent are often defective, and *vice versa*.

The difficulty of obtaining the number of all those who belong to the special classes is unavoidable. Thus the delinquent class are the most desirous to conceal themselves. As to the insane, there are many such in the community who are not referred to as such, because they are harmless. Many families seek to conceal insanity and idiocy. On the other hand, there may be exaggeration in the number of the poor, for some claim to be in poverty in order to receive help. There is also a tendency to exaggerate evil or misfortune in order to bring out a more liberal sympathy, or there is unfortunately a morbid desire to picture the world in its darkest colors.

TEACHING OF PRACTICAL MORALITY.

From the point of view of society, the importance of these classes is not according to their number, for the delinquent are the most injurious and costly. This is evident when one considers the time they require from the police, detectives, and courts. There is much to indicate that the sociological problem involved in the delinquent and dependent classes is at its foundation an educational one. Teaching of practical morality in such a way as to form good habits in the young is doubtless the surest preventive from a criminal career. A general criticism of educational systems is that they are little developed on their moral side as compared with the intellectual. Perez says that the business of education should be much more concerned with the habits that children acquire, and with their wills, rather than with the moral conscience. The latter is the blossom that will be followed by fruit, but the former are the roots and branches. While the moral and intellectual sides of education necessarily exist together, yet society is most solicitous about the former, for an individual may be a good citizen with little instruction, if he has sound morality; but the reverse is not true.

There is a special difficulty in teaching even a minimum system of morality, for the desideratum consists not only in inculcating general principles, but by indicating courses of conduct in detail. Generalities elevate the moral tone, but details incarnate the principles. A definite course of conduct is needed, yet broad enough to apply to the average individual. In the province of personal hygiene there is much to be done, but nothing should be taught unless sanctioned by the most competent medical authorities. One cleanly habit established suggests others; a beginning, with a few details, is much more impressive than generalities.

Society teaches many of these things by occasion, when the poor are brought into hospitals and made conscious of what cleanliness signifies, or when the board of health forces this idea upon the community. Many children are taught, for the first time, lessons of cleanliness upon entering institutions for the weakling classes, where the good effects are seen; so that it is as true as it is paradoxical that some of the enemies of the State are receiving a most practical education from the State. This, however, has its justification, since the weak need more aid than the stronger, but this weakness may have been due to the neglect of such education at the outset.

The inmates of institutions for the delinquent and dependent differ little or none at all from individuals outside. The excellencies and defects of an educational system can be carefully studied in these institutions, for all are under the same conditions and can be controlled in all details of their life. In addition to the practical value of the experience of these institutions there is a deeper one. One of the main objects of education is to eradicate or modify undesirable tendencies and to develop the favorable ones. Here is an opportunity for the rational method of treatment, which is, first, to study the unfavorable characteristics, and, second, to investigate their causes as far as possible. Knowledge thus gained will be the most reliable in correcting evil tendencies or preventing their development. By such a method no sudden results should be expected; gradual progress is all that can be hoped for. A thorough study of this nature in penal and reformatory institutions is possible; the effects of the method of education can

be closely observed physically, intellectually, and morally. Thus, when, for instance, an inmate ceases to reverse his drinking cup after using it, which is required for purposes of cleanliness and order, this, though a very slight thing in itself, indicates that he is becoming careless and losing his will power to reform. By a sort of radiation other negligences are liable to follow, confirming the direction in which he is tending. A good report from his keeper, on the other hand, can signify a new resolution of the will. Thus a series of records indicate, so to speak, the moral and intellectual pulse of the inmate. What might seem a very slight offense outside of a reformatory institution is not so within, where there is a minimum of temptation to do wrong and a maximum of continuous restraint to do right, so that there may be a gradual education in the formation of good habits which are the surest safeguard to the inmate after his release.

It is important that institutions for the criminal and weakling classes strive to gain as much knowledge as possible of the life of the inmate previous to entering the institution, to keep a minute record of his conduct while under their care, and especially to follow his career afterwards, thus imparting useful knowledge to society at large. For if there is to be any advancement in the treatment of the weakling classes by educational methods, it will lie in the direction of the study of the inmates themselves. The institutions should afford facilities for such study, the very object of which is to furnish a trustworthy foundation for the prevention and repression of delinquency and dependency. If the cure is possible only to a certain degree, the approximate determination of this degree would be of great practical importance.

But if it be objected that, after all, much that is definite and trustworthy may not be gained, the cause will be due mainly to the need of more exact methods of investigation. By keeping an exact record of conduct in school, workshop, military service, and cell in connection with intellectual standing, and giving special attention to those individuals whose hereditary tendencies and early surroundings are best known, a thorough investigation of physical, mental, moral, and industrial education can be made. A minute study of one single individual in the social organism, be he delinquent, dependent, or not, may suggest a method for the beginning, at least, of a scientific sociological education. Such experience might be especially helpful in pointing out the best methods for the education of the young. In general, the main object of education is to train the young to become intelligent, moral, and self-supporting citizens. A system of education that can accomplish this is a practical need in society as a whole.

But education in the sense of the intellectual only is not sufficient; for, though the children of the weakling classes remain six hours in school, the rest of their time is spent in abodes of crime, squalid homes, or vicious idleness. While the reform schools are doing much, they do not reach, however, the very young at a time when influences for evil can leave indelible impressions. If these unfortunate children are to be educated morally and intellectually, it is evident that this can not be done unless they are removed from their pernicious surroundings. Early prevention is the most effective of all reforms. Philanthropic efforts are being directed to this end, but they have not proved sufficient for their support is not always assured, and not infrequently they are of a sporadic nature. It would seem, if anything permanent

and effective is to be accomplished, the State must assist. While the American Government is not a paternal one, yet there is a limit to all forms of rules here; extremes can produce evil. Major McClaughry, chief of the Chicago police, and an expert of long experience, considers first among the causes of crime in this country "criminal parentage, association, and neglect of children by their parents." It is to be presumed that parents will properly care for their children, treating them kindly, and allowing them an opportunity for at least an elementary education. When this presumption is found to be untrue, the State provides for the appointment of a suitable person to act as guardian. But, as Mr. Martindale[a] says, there are two defects in this method: "First, there is no officer or person or body charged specially with the duty of investigating and prosecuting the cases. Secondly, as such children have no estates out of which they may be maintained and educated, the court can find no guardian who will undertake the task at his own charge. Experience in such cases shows that it is difficult to induce neighbors to prosecute. The fear of revenge, reluctance to attend court, a common belief that a child belongs to a parent, who has a right to do as he pleases with it, and sympathy for a mother deprived of her child, however depraved she may be, are all prevailing motives which hinder the prosecution of such cases."

Prof. Francis Wayland,[b] of the Yale law school, says that "it may require a little time to convince the community that a father has no inalienable right to brutalize his children, and to conduct under his roof a normal school for crime; that a mother has no inalienable right to turn her apartments into a brothel. A haunt of vice and crime is not a home; and we do not advocate institutional life save as, and always as, a temporary resting place under humane conditions, as to care and comfort, until a permanent home can be provided."

According to the most thorough study yet made[c] of the conditions of the weakling classes, 20 per cent of the school fees can not be collected; 10 per cent of the children attending are in want of food; some come without breakfast because the parents do not get it for them; as a little boy said, "his mother got drunk and could not get up to get it." Such children are very irregular in attendance, which is a great annoyance to a teacher, not to say a waste of public money. Such children live in the poorest neighborhood; they have no regular meals; fully a third live in one room with their parents; their waking hours are divided between school and the street; saloons are sometimes as numerous as one to every hundred adults; those on the verge of pauperism patronize them. Yet there is good order in these schools; the street urchins are trained to respond to right rule, affording ground for hope as to their future. At home they have no training; they need encouragement; they should be lifted up from their surroundings and gain a taste for better things. The difficulty is caused more frequently by poverty and shiftlessness at home than by neglect and vice; yet the latter have great influence. Compulsion in its ordinary form is practically useless in making such children regular in attendance at school. The parents are characterized by improvidence, want of purpose, and no regard for the future of their children; as soon as their boy is through with school he is put on work which prepares him for nothing,

[a] "Child Saving Legislation," North American Review, September, 1891.
[b] "Child Saving Legislation," reprint from National Baptist, December 3, 1891.
[c] Charles Booth, Labor and Life of the People, London.

and thus he drifts into casual employment, trusts to chance for a living, and gradually sinks. The poverty, misery, and vice of the next generation will to a large extent come from the slum children. Their need is education in habits of decency, cleanliness, self-respect, the rudiments of civilization and domestic life; their instruction should not be too abstract, nor technical in the sense of fitting them for competitive examinations, clerkships, or college, but rather for the workshop, factory, trades, or the home.

RELATION OF EDUCATION TO CRIME.

It is a common suspicion of a number of writers that education has little influence in decreasing crime. That the meaning of this may be clearly understood it will be necessary to cite a few opinions.

Monsieur Tarde[a] speaks of the action of education upon insanity and suicide, which increase pari passu, but he refers only to primary education. He remarks that the restrictive action of education over crime is not seen, for where there is the most illiteracy there is not always the most crime. In Spain the proportion of illiteracy to the population of the whole country is two-thirds, but only half of the crime comes from this number. In 1883, 64 of condemned assassins knew how to read or write, 67 did not; there is one condemned for theft out of every 6,453 with common education and 8,283 with no education.[b] In the country, where there is less education than in the city, there are 8 prisoners a year for 100,000 inhabitants, but 16 prisoners for 100,000 inhabitants in the cities. Education modifies crime. Thus within forty or fifty years the stealing of grain has diminished, while that of jewels has increased; also the proportion of crime against chastity has been very large, a probable effect of the emancipation and refinement of mind. Therefore, according to Monsieur Tarde, "the quantity of crime en bloc is not at all attacked by the diffusion of primary education. The remedy should be to proclaim the necessity of sacrifice, the insufficiency of the motive of personal interest, and the opportunity to elevate by æsthetical education of the highest sort and to spread professional education as far as possible." From Tarde's point of view, however, primary education is necessary, as it is a condition of the higher and professional, even if we should admit that per se it is without effect.

According to Proal,[c] instruction is not sufficient to repress crime; morality is not an attribute of thought but of will; spiritual beliefs and respect of God are necessary. Instruction does not do away with egotism. Literary and philosophical studies have much more moral influence than those that are scientific.

Victor Hugo liked to say that he who opens a school closes a prison. But Proal says many schools have been opened, but no prisons closed; criminality has not diminished while education has increased. Nicolay[d] insists that if defective instruction is the cause of every evil, then (1) there should be less morality in the country where instruction is less cared for than in the city; (2) the sense of duty should be more feeble in woman than in man; but the contrary is the truth; the city population, which is only three-tenths of the whole, furnishes almost half

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[a] La Criminalité comparée, Paris, 1890.
[b] Jimeno Agius, la Criminalitad en España. Revista de España, 1885.
[c] Le Crime et la peine, Paris, 1892.
[d] Les enfants mal éleves, Paris, 1891.

the number of accused; and woman commits four times as few offenses and six times as few crimes as man.

Lombroso,[a] by comparing 500 criminals with normal men, finds the following:

	Delinquents.	Normals.
	Per cent.	*Per cent.*
1. Analphabets	12	6
2. Elementary instruction	95	67
3. Superior instruction	12	27

The delinquents are inferior to the normal in the two extremes, but not so in elementary instruction. But there is great variation, according to the category of criminals; 25 per cent of violators and assassins are analphabets, but only 9 per cent of criminals against property, and less than 1 per cent of swindlers. In Austria the class committing the least crime for fourteen years consisted of those engaged in scientific work,[b] but such men are engaged in tedious and long investigations; they are critical, and their emotional nature is little developed, so that they see more clearly the folly of crime, and that its reaction generally returns with great severity upon the offender. But with poets and artists crime is more common, since the emotional nature is more prominent. The artists are tempted by professional jealousy. While sculptors and architects manifest little tendency to crime, painters produce their quota, owing perhaps to their abuse of alcohol. But crime is more frequent in the liberal professions. In Italy and France 6 per cent had received a superior culture; in Bavaria 4 per cent, and in Austria 3.6 per cent. Lombroso adds that these numbers are relatively greater than in the other classes of society. In Italy there is 1 criminal for every 345 professional men ("professionistes"), 1 for every 278 proprietors, 1 for every 419 farmers, and 1 for every 428 employees.[c] For those who exercise a profession science is not an end in itself but a means, thus giving less force to conquer the passions. The physician can easily give poison, the lawyer commit perjury, and the teacher sin against chastity.

But there are other authorities who take a somewhat different view. Büchner (Force et matière) says that defect of intelligence, want of education, and poverty are the three great factors in crime. Beccaria asserts that the evils that flow from knowledge are in inverse ratio to its diffusion and the benefits directly proportional; to prevent crime, enlightenment should accompany liberty. A bold impostor, who is never a commonplace man, is adored by the ignorant and despised by the enlightened. The surest, yet most difficult, means of preventing crime is to improve education; inclining the youth to virtue by the path of feeling, and deterring from evil by the force of necessity and disadvantage, and not by mere command, which is uncertain. D'Olivecrona[1] says that three-fourths of those who enter prison have been conducted to crime through neglected education; the method of treatment therefore should be the development of the moral and intellectual faculties, and self-reformation should be taught as the first duty.

[a] L'Homme Criminel. Paris, 1887.
[b] Messedaglia, Statistiche criminali dell' Impero Austriaco.
[c] Oettingen, Die Moral-Statistik.

In America the opinion of those of large experience on the practical side of reformation decidedly favors the influence of education. Z. R. Brockway, superintendent of the Elmira Reformatory (an institution generally acknowledged to be the most successful in the world), considers the factors for the reformation of criminals: (1) physical renovation; (2) mental development and education; (3) the creation of improved habitudes, including moral habitudes. Gardiner Tuffs, of the Massachusetts Reformatory, says that criminals are more weak than wicked; deficient in goodness rather than excessive in wickedness; that a reformatory is an educational institution; inmates are trained physically, taught letters and trades, and equipped with manual skill and industrial knowledge. Rev. Fred. H. Wines makes labor, instruction, and religion all forms of education.

SOME CONCLUSIONS AS TO CRIMINAL MAN.[a]

The following statements as to the criminal are not based upon experimental research so much as upon the experience of those who have studied criminals directly or who have had practical control of large numbers in prisons or reformatories:

1. The prison should be a reformatory, and the reformatory a school. The principal object of both should be to teach good mental, moral, and physical habits. Both should be distinctly educational.

2. It is detrimental financially, as well as socially and morally, to release prisoners when there is probability of their returning to crime, for in this case the convict is much less expensive than the ex-convict.

3. The determinate sentence permits many prisoners to be released who are morally certain to return to crime. The indeterminate sentence is the best method of affording the prisoner an opportunity to reform without exposing society to unnecessary dangers.

4. The ground for the imprisonment of the criminal is, first of all, because he is dangerous to society. This principle avoids the uncertainty that may rest upon the decision as to the degree of freedom of will, for upon this last principle some of the most brutal crimes would receive a light punishment. If a tiger is in the street, the main question is not the degree of his freedom of will or guilt. Every man who is dangerous to property or life, whether insane, criminal, or feeble-minded, should be confined, but not necessarily punished.

5. The publication in the newspapers of criminal details and photographs is a positive evil to society, on account of the law of imitation, and in addition it makes the criminal proud of his record and develops the morbid curiosity of the people, and it is especially the mentally and morally weak who are affected.

6. It is admitted by some of the most intelligent criminals, and by prison officers in general, that the criminal is a fool, for he is opposing himself to the best, the largest, and the strongest portion of society, and is almost sure to fail.

ALCOHOLISM.

Alcoholism may be considered briefly, first, in its general bearings, and, second, as a form of insanity. The relation between alcoholism, crime, pauperism, and charity is most intimate. For example, a certain

[a] From "Criminology."

young criminal, who tried to kill an aged woman without provocation, said that when he was 6 years of age his father used to return home drunk, striking his mother and throwing sticks of wood at him. He stood it for a while, but afterwards left home, and though not a thief was compelled to steal for a living; was sent to a juvenile asylum, and, after leaving, went among farmers to live under their care, being kindly treated by a very few, whipped, and otherwise roughly treated by many. Remaining a month or so with different farmers, he finally developed into a tramp, and leaving all farmers wandered two years, stealing, eating, and sleeping wherever he could. Thus alcohol gave the initiatory to thieving. Charity endeavored to counteract these effects (result of six years of unfavorable surroundings) in two years, but the evil forces acquired by early treatment had gained too strong a foothold, and the following stages were tramping, pauperism, and crime. Such cases are typical, and almost wholly the result of evil surroundings, for which society is culpable and for which she suffers dearly, both morally and financially. The alcoholic may be a good workman when sober, but from irregularity he loses his position and gradually becomes a pauper. A sad fact in connection with alcoholism is that often the kindest and most genial natures are for this very reason ruined through the unintentional influence of friends, for they are unable to resist the so-called feeling of good fellowship when drinking together. From the ethical point of view it is questionable whether one has the right to take the chances of causing another to fall. It is better to forego the physical, intellectual, or social pleasure of indulging in any luxury or nonnecessity than to aid in the physical, moral, or social ruin of a fellow-being.

The relation of ethics to all these forms of abnormal humanity is as direct as it is diversified. It is ethically questionable whether it is right to give to beggars, for by so doing we encourage them by virtually paying them to beg, and if not already paupers they can be made so by a mistaken philanthropy. It is a common saying and practice of Americans traveling in Europe to give every beggar "a cent to get rid of him." This, of course, has just the opposite effect.

All these abnormal forms of humanity are different degrees of evil or wrong, the highest of which is crime. They are all links of one chain. This chain is that which we denote by the words evil, bad, unjust, wrong, etc.

These forms, to wit, criminality, alcoholism, pauperism, etc., may all be considered under the head of "charitological." Thus the different institutions, such as prisons, insane asylums, inebriate and orphan asylums; institutions for the blind, deaf, and dumb, and defectives; hospitals, dispensaries, relief for the poor in any form; church missions, and different forms of philanthropical work are, of course, charitable in their purpose. The difference between these institutions is one of degree, as an examination of the inmates would soon show. The pauper may be or may have been a criminal, or insane, or alcoholic, or the criminal may be or may have been a pauper, or insane, or alcoholic, and so on.

The close relation of alcoholism to insanity is shown by the statement of a specialist (Krafft-Ebing) that all forms of insanity, from melancholia to imbecility, are found in alcoholism. It is artificial; it begins with a slight maniacal excitation; thoughts flow lucidly; the quiet become loquacious, the modest bold; there is need of muscular

action; the emotions are manifest in laughing, singing, and dancing. Now, the æsthetical ideas and moral impulses are lost control of; the weak side of the individual is manifested, his secrets revealed; he is dogmatic, cruel, cynical, dangerous; he insists that he is not drunk, just as the insane insists on his sanity. Then his mind becomes weak, his consciousness dim, illusions arise; he stammers, staggers, and, like a paralytic, his movements are uncertain.

The principal character of these mental disturbances consists in a moral and intellectual weakness; ideas become lax as to honor and decorum. There is a disregard of the duties of family and citizenship. Irritability is a concomitant; the slightest thing causes suspicion and anger which is uncontrollable. There is a weakness of will to carry out good resolutions, and a consciousness of this leads some to request to be placed in an asylum, for they are morally certain in advance that they can not resist temptation. Thus one has been known to have his daughter carry his wages home, as he could not pass a saloon on the way without going in if he had any money with him. Now it is a weakness of memory, a difficulty in the chain of thought and a weak perception until imbecility is reached.

There may be disturbances in brain circulation, causing restless sleep, anxious dreams, confusion, dizziness, headache. Such circulatory disturbances in the sense organs can give rise to hallucinations. There is a trembling in hands, face, lips, and tongue. In short, there is a gradual mental and bodily degeneration.

From the medical point of view, a cure is generally doubtful, for in private life total abstinence is impossible. The patient must be placed in a hospital for inebriates, where total abstinence can be enforced. Patients with delirium tremens especially need the most careful hospital treatment. The principal directions are conservation of strength and cerebral quiet, strong uni ritating diet, and mild laxatives, etc. Such in general is considered to be the best medical treatment. A certain French specialist (Magnan) says that a dipsomaniac is insane to drink; but the drunkard is insane after he has drunk.

TOTAL ABSTINENCE.

To insist on total abstinence from wine in France and beer in Germany is like objecting to the use of coffee and tea in England or America. The question of total abstinence is manifestly a local one; it is relative to the country, or even state, city, or town. To insist that drinking is either right or wrong in the absolute sense is an attempt to make the relative absolute, which is a contradiction. There are two distinct questions, the purely ethical and the purely scientific; and while they are separated for convenience, they are in reality together, for in the end the facts decide the "ought." The practical ethical question seems to turn on this point: To what extent the use of a thing should be prohibited when it is abused. Many ethical difficulties are not between good and evil, but between two evils, as to which is the lesser. Yet it must be admitted that total abstinence is the safest course.

In the past, wine was used almost wholly by the well-to-do classes, and beer was of such a nature that harm was out of the question. Excessive use of alcohol first began with the art of distillation, and with the obtaining of strong concentrated whisky from corn, potatoes,

and the like. With the universalizing of the use of whisky a series of phenomena have appeared which are designated by the word "alcoholism."[a]

The climate is an important factor. Drunkenness is more frequent in cold than in warm countries, and is more brutal and injurious in its effects as we go north. Yet this is not always true, for within the last ten years alcoholism has greatly decreased in Sweden and increased in southern France and northern Italy. In tropical regions it is at present spreading fast, and with great injury, especially in newly settled districts.

SOCIAL PATHOLOGY AND EDUCATION.

The term pathology includes the doctrine of disease, its nature and results. Social pathology is intended to be used as a general term and refers to any abnormal or to any diseased social conditions. It includes pauperism, crime, insanity, feeble-mindedness, alcoholism, and in general refers to all classes of individuals who, by mental, moral, or physical defects, come to be dependent upon or injurious to society as a whole. Such individuals may or may not be responsible for their condition, for it may be due to the individual himself, or to his surroundings, inherited tendencies, or physical diseases over which he has had no control.

The purpose of studying social pathology is not so much ethical as scientific—that is, it does not undertake to pronounce whether the individual or society is to blame for delinquency, dependency, or defectiveness, but it seeks to analyze the causes of these abnormal or diseased social conditions, and in this respect it is a necessary preliminary to the prevention or amelioration of patho-social conditions. As education concerns the moral, mental, and physical development of individuals and society, it bears a most intimate relation to those pathological elements that tend to social degeneration. Education here is social therapeutics—that is, a method of amelioration or prevention. The large number of weaklings in will, intellect, and body are cases included under this educative treatment. As there is no known "specific" for any of the social diseases, the general remedy is to implant and develop in individuals (the earlier the better) such mental, moral, and physical habits as will serve to prevent or lessen tendencies to delinquency, dependency, or defectiveness. Social therapeutics is therefore distinctively educational.

Crime and its Punishment.

IDEAS ON THE REPRESSION OF CRIME, BY GAROFALO, OF THE NEW ITALIAN SCHOOL OF CRIMINOLOGY.

The problem of individual moral responsibility is perhaps insoluble. From the point of view of penal science one can not employ the principle of free will; a different and more solid basis is needed. The generally accepted theory is in contradiction with the results of scientific researches. There should be no discord between judicial logic and social interest. From the moral point of view, individual responsibility is much lessened by bad example from infancy, traditions of family or race, bad habits that have been formed, violence of passion, tempera-

[a] Die Trunksucht und ihre Abwehr, von Dr. A. Baer. Wien und Leipzig, 1890.

ment, etc. As responsibility lessens, so the penalty lessens, until it is reduced to a minimum, if you can prove extreme force and impulsion to crime. Now, there is scarcely a guilty man, who has not attenuating circumstances. There is not a crime where we can not discover such circumstances—that is, the only criminals who should be inexcusable, are those for whom one has not sought out the extenuating circumstances. But the reply is, that it concerns only bad tendencies and the free will of man can triumph over them. But how can one measure the part that comes from bad tendencies, and that which comes from free will? The progress of anthropology shows that the most culpable have almost all an abnormal psycho-physical organization. If penalty depends upon the principle of moral responsibility we should acquit some of the most ferocious assassins, as soon as their extreme natural brutality and all-powerful criminal impulsions are shown. In any case the punishment should be lessened in the measure in which the causes of the bad tendencies become evident. The more perverse and incorrigible the criminal the less should be the punishment. The public have protested against the verdicts of acquittal by juries, against the indulgence of magistrates, but such acquittals are the triumph of logic; only the triumph is at the expense of security and social morality. There is no way to avoid this unless we make the penal criterion depend upon social necessity and not on moral responsibility of the individual. Society does not concern itself sufficiently with crime, neither as regards the victim, nor its prevention. The fact that in the midst of our civilization thousands of persons are slaughtered each year, where one does not directly desire money or life, is significant, and it is all the more hideous as life becomes more pacific and less uncertain. In all Europe the average number of murders each year from 1881 to 1887 was 15,000. In the United States the proportion to population is much larger.

But what does society do to prevent these evils? Little or nothing. Crimes have been tabulated, because a scale of penalties has been asked for, where for each délit a measure of suffering is designated in the form of detention in a building, where the prisoner, for a certain time, is lodged, fed, and clothed at the expense of the State. After this time has passed, the prisoner becomes a free citizen and is said to have expiated his crimes, or to have paid that which he owes society. All this is nothing but rhetoric. The truth is, the criminal has paid nothing; it is the State, on the contrary, which has paid his expenses, which is really an addition to the damages of his crime. Nor has the criminal improved morally; there are no miracles in prison; the convict is not terrified; our penitentiary system is not severe; on the other hand, physical pains are easily forgotten. He leaves prison and enters into the same surroundings in which he was before his condemnation, where he finds the same temptations. In the eyes of the people, the codes and the judicial power have the appearance of protecting the criminal against society, rather than society against the criminal.

It is objected that fatalism is the outcome of these ideas. This is a false interpretation. Experience demonstrates that the individual always acts in the same manner when under the same intellectual and moral conditions and the same exterior circumstances. It is foolish to pretend to better the criminal by imprisonment or by any other mode of punishment, if, after release, he is allowed to return to his former surroundings. But it is not impossible to aid the criminal if

he is put into new conditions, where he sees the necessity of honest work, and where stealing will be profitless to him. Those, are, rather fatalists who say that crime has always existed and will exist, and, therefore, consider it as one of the evils which must always afflict society. But, it is said, instead of punishing we should modify the conditions in suppressing the causes of crime. But this is out of the question, for the legislator can not do that, which is solely the work of time. Why should this strange antinomy exist in contemporary society: That the majority, who have the sovereignty, should make one exception, and that, too, where it is against the smallest, the most harmful, and most abject minority, that of the criminals? Why should the large part of humanity be put to inconvenience in changing the conditions of social existence in the exclusive interest of a mere handful of worthless individuals? Why, on the contrary, should not these few who are unadapted to civilization be eliminated?

The criminal anomaly diminishes in proportion as the provocation increases. Crime is a legitimate reaction in principle, but it is excessive, and the abnormality consists in this excess. The most rational means of repression should consist in the removal of the delinquent from the locality where the victim or his family lives, and in prohibiting his return before a certain time, and in every case not before he has paid the indemnity due to the victim or his family, A more difficult problem is the treatment of a murderer, whose motive was vengeance for a grievous wrong, or insult to his family. An affront is real, which is considered so according to the ideas of our surroundings. It is of little importance whether this environment be the whole world or only the part in which we live.

There is a class of delinquents who stand between criminals and normal men, because their offenses are less serious violations of the feelings of pity and are more of the nature of roughness, or indicate want of education and reserve. Such are blows in a fight, where there is no intention of murder; here there is little development of the alternative sentiment; here belong injuries and threats having no particular gravity. Imprisonment here is advantageous. The offender should also pay a fine to the State, and also another for the benefit of the injured party.

Another large class of criminals are those who are totally or partially deprived of the sentiment of probity. Aside from the kleptomaniacs, pyromaniacs, the epileptic thieves and incendiaries, who should be placed in asylums for insane criminals, there are the thieves, incendiaries, swindlers, and forgers who are not insane, but who have a criminal instinct (according to Benedikt it may be a moral neurasthenia). These and the habitual delinquents of this species, whether their improbity be congenital or, having commenced from bad education. example, or company, has become instinctive and incorrigible, should be transported into some distant land, where the population is small and where assiduous work is the absolute condition of existence. But if the neurasthenia is insurmountable, a further elimination into a savage country is necessary.

But it is objected that deportation is at an end, because civilization is invading the whole world. France has New Caledonia, where colonization has scarely commenced, and where it sends its (recidivists) habitual criminals in spite of the opposition of the Australian Government, which is more concerned as to a future commercial competition

than the puerile fear of criminals fleeing New Caledonia and infesting Australia. Russia possesses immense Siberian regions, where the population is excessively sparse. The Government of English India continues to send criminals to the islands of Andamans.

But, it is said, space will be wanting in the future, the mines will be exhausted, etc. Is it necessary to cease to care for the present world on account of a vague probability? After the large islands of Polynesia, Australia, and Malaisia there will remain the innumerable Madreporic groups in the Pacific Ocean, which for the most part are deserted. When there is no more room here there will always be the Sahara and the center of Africa. For a few centuries, at least, there will not be wanting space where civilized nations can pour out their most impure elements.

But there is without doubt the economical side to solve. There are the expenses of transportation, the supervision, etc. We must consider, however, the expenses of our prisons at present, and that habitual criminality, which represents about half of the total of crimes, will be suppressed; also the criminal will be obliged to gain his living by agricultural work which will not fail. In prisons it is very difficult to employ convicts at useful labor.

In this second subclass of criminals whose improbity is congenital, or has become instinctive by habit, and who at the same time are, by the gravity or number of their crimes, a pressing danger to society, it is necessary to follow another plan, that of those whose depravity is not complete and who have not yet become recidivists nor extremely dangerous. This is a very numerous class. The individual whose sentiment of probity is not very profound becomes guilty on account of bad example through imitation; often a first fault involves another. For there are very humble social positions where a good reputation is a necessity; a domestic or workman who has been found stealing will not easily find another place; a new career then opens to him, that of a malefactor. He will enter it without flinching, for his greatest safeguard is now broken; he has nothing more to fear since his improbity has been discovered.

The only possible remedy here would be a change of country, habits, kind of work, a new existence to commence. Now, in order that the punishment inflicted by the State may aid matters rather than make them worse, as at present, it is necessary to distinguish different cases according to the causes which have determined the crime.

France, since 1850, has had agricultural colonies for young men acquitted on account of lack of discernment, and for minors condemned to more than six months or less than two years of imprisonment. The length of time varies from three to six years; agricultural work predominates. Public money has never been spent more usefully, for the state returns 93 out of every 100 who are adaptable to society. Otherwise the larger part of these would inhabit the prisons for the rest of their lives at the expense of the nation. When the time arrives the director of the colony places the young man with some farmer or has him enter the navy or army. The individual thus finds himself away from his former environment. Colonies of this kind can be established in civilized countries without any danger, for the supervision of the young men is not difficult. Whatever difficulties there are, they are not to be compared to agricultural colonies where the men are condemned to hard labor, as has been attempted in Italy, and is a grave error.

Among many passing beyond adolescence there is a large number of novices at theft who have been brought to crime by idleness, ignorance of a trade, abandonment, or spirit of vagabondage. Such cases should be enrolled in a company of workers for the State, with a nominal salary, not inferior to the ordinary, but which will be retained for the payment of a fine to the State and for the damage to the injured party. Here there will be the choice between working and starving. The workman should not be released after he has fulfilled his obligations until he has found employment; then he should furnish security, which will be confiscated in case of another similar crime, and will not be rendered to him until after a number of years of good conduct. In case of the récidive perpetual relegations should be made directly; all other means are inutile, because there is a proof of a persistent individual cause—aversion to work. The same treatment is adapted to swindlers and forgers.

But sometimes the delinquent is not an idler or vagabond; he has a trade by which he lives, he may be quite well to do, yet by a strange aberration he commits a theft, or by pure cupidity he takes money placed in his care, or he becomes suddenly a swindler or forger or bankrupt. But there is no proof of improbity on this account; as there exists no constant motive to determine a new crime, it is possible that the delinquent will not fall again, if his cupidity has been completely disappointed, so that he sees that honest conduct is much better for his own interests. For this there is nothing better than forced payment of the fine and damage to the injured party. This would produce other advantages for society. An unfaithful cashier or fraudulent bankrupt would know that if once discovered he could not enjoy the smallest part of the money stolen, but would have to return all, every penny; or otherwise he would have to work an indefinite time for him whom he had robbed. This is a forcible way of causing the sudden reappearance of the sum that might be thought to be in the hands of consorts. This is much more useful than imprisonment for a fixed time, which is no profit to anyone, and only adds to the damage from the crime the expense of supporting the prisoner. If the money has really been spent, the offender must work without respite for repayment of the injured party. If he will not do it voluntarily, he will be obliged to do it in a company of works for the State, where there is no bread without labor. If, in spite of his efforts, he is unable to gain a sufficient sum, after a certain number of years, according to his age or his good will, this constraint can be fixed to ten or fifteen years; but this term should be lengthened as soon as a want of assiduity is noticed. If the delinquent fulfills all his obligations, he is to be released, and deprived only of his political rights with interdiction of any public function, or of exercising commerce, if it is a case of a bankrupt.

It will be noticed that temporary detention for a fixed time in advance (the typical penalty of our present legislation) has entirely disappeared in the system that has just been outlined. This new system is an attempt to give to penalties a social utility, and this is done in the most logical manner, by the principle of rational reaction against crime. This consists sometimes in absolute elimination by the death penalty, or relative elimination by seclusion in an asylum, or deportation with abandonment, or perpetual relegation, or indefinite relegation, or simple damages with payment of a fine, or by public labor.

There are but few kinds of crime in which it is necessary to hinder

the delinquent physically as the sole means of avoiding its repetition. Such is, for example, the counterfeiting of money. Here imprisonment is necessary until it is reasonable to suppose that they have no longer associates. Imprisonment in advance applies to these cases, not in the code of criminality, in which there is a special immorality, incompatible with those attributive sentiments which are the basis of present morality. The immorality of these actions consists principally in a revolt against authority, or in disobedience of the law. If this political element is predominant, the penalty should be of the nature capable of assuring support of the law. This does not pertain to real malefactors, but to revolts. Here is the limit where the reason of the State replaces the natural laws of social organization, and where considerations as to crime cease.

To fight against an enemy with success, it is necessary to know him beforehand. Now this enemy, the criminal, the jurists do not know. In order to know him, one must have observed him for a long time in prison. It is to those who have thus studied that the future will reserve the mission of transforming penal science into harmony with social necessities.

PURE MURDER.

A classical case of pure murder is where a fellow-prisoner killed his comrade while snoring too loud. The case of least provocation that we have seen was that of a man who pierced the abdomen of an intimate friend with a very small, slender, knife blade. His friend, raising up his vest, said: "Why, you stabbed me, John; there is blood there." With that John made three or four more punctures, from the effects of which the man died. As they had no quarrel at all, it would seem that the murderer merely had a curiosity to stick the knife into something.

Another case is that of a life prisoner, who had been in a dungeon for years. He had killed several men, and would not hesitate to take the life of prison officers, all of whom were afraid of him. He had only one friend in the world, and that was the "doctor." It was perfectly safe to go into his cell when the doctor introduced one as his friend. At the time of the visit he happened to see a certain prison officer, and a volume of epithets followed. Then he pointed out the five or six bullet wounds that he had received in a row with the officers. "Rascals and cowards," he growled, grinding his teeth. He said: "I came from Ireland, where I had also killed some men, but in America punishment is a great deal harder. I was going to a ball with 'me' girl one evening, and a policeman tried to arrest me; he insulted 'me' girl and I knocked him 'inside out' (killed him), but I did not run away, I went to the ball." During his trial, being very easily angered, he nearly cleared the court-house, and was almost bled to death by wounds from handcuffs, etc., used to subdue him. In the course of conversation he said: "Doctor, I would have killed a man in the hospital had he not been under your charge."

This man was honest in character, and was chaste toward women. He would give his life up for the "doctor." Anyone he liked he would do anything for; anyone he hated he would kill without the

least repulsion. There was something heroic in him notwithstanding his ferocity.

Man in the savage state was forced to look upon the stranger as an enemy, which generally proved to be true. But the little child also seems to show traces of this murderous tendency. For it would hesitate none the less to bite its nurse or strike its mother did these acts cause their death. Fortunately this propensity is generally corrected, but should it persist, and surroundings be favorable for its growth, such a child could develop into a murderer.

As an illustration we shall study the case of "A," who was 12 or 13 years old when he committed the act that made him known.

That "A" may speak for himself, we give verbatim his autobiography.

AUTOBIOGRAPHY OF "A."

According to my life I will write from about when I was 7 or 8. My parents treated me right till I was 11 years old. I went to school right along for about two months, and then I ran away from school. So then my parents sent me to the ——— Asylum. There my course was not very well. I had a great many black marks against me there. I stayed for two years two weeks and two months. Then I was sent back home, and behaved myself for one month. Then again I did not go to school as usual; so my parents sent me back to the institution. There I stayed a long time. Then I was called up by the superintendent of the place and asked if I would like to live in the country. I said I would, so he said he would let me go.

My first wrong deed I done was to steal an apple from an Italian's stand. I went home with the apple, and my mother asked me where I got it. I said I bought it for 1 cent. She asked me where I got my money; I said from my saving's bank. She asked how I got the money from the bank.

I hung my head and did not want to tell then. She asked me what was the matter; I said nothing. She said why do you hang your head so; I said for nothing.

Then I went from home and was lost. When they found me they took me back home. When I got inside the house my father asked me where I was; I would not tell him, so he said to me if I did not tell he would thrash me, and still I would not tell, so he went and got the bootjack and said, "Are you going to tell?" But I would not; and so that night I got a good sound thrashing.

I will now describe my parents in regard to their doings. Just before I left home my mother, brothers, and sisters were good to me, and I will mention them more than my father. He used to drink a great deal. Every night when he came home drunk we had to get out of his way, or something would go sailing through the room. But one night I did not get out of his way; I was not a-going to, either, for I just was a-going to see what he was a-going to do. He came in the door and I was sitting by the window. He just walked right over to where I was and jerked a hole right through my ear. I commenced to cry. He asked me what was the matter. As soon as he saw my bloody ear he got a piece of black "sucking" plaster and put it on the back of my ear. My father was the cause of my mother's death. He came home drunk one night, and my mother was sitting in the parlor sewing at some one of the boys' pants; he picked up a flatiron and hurled it at my mother; it did not strike her; she looked about and could not tell where it came from. She then saw my father pick up a stove poker. He walked up to my mother and hit her with it; left a severe wound, and she was in bed about one month before she died. My father would drink continuously, but there was no more trouble in the house.

I was then sent from home to the ——— Asylum. From there I went to ———, and received a good education in schooling. I went to school in summer and stayed at the farm in winter. I am going to try to be a better boy hereafter.

When I was in ——— I did a great many things that were wrong. The man I was with used to send me to the field to work, and I used to lay down in the field and go to sleep. I used to sleep by the hour, and sometimes half a day, if he did not come to see if I was working. If I was not, he would pick up a cornstalk and whip me about the field. He would set me at pulling weeds at an early hour. I would pull for two or three hours steady and then lie down. If I did not get enough I would lie down all day, if he would let me.

I was with ——, of ——— County, ———, and stayed for one month. I used to go and tease the sheep he had; then I would chase the hogs about the pen and the chickens about the barnyard. I used to steal eggs of all kinds. When he told me

to go up to the "old home" out in the field and feed the cows, I would not go; I would lie down and go to sleep. I left that place because the man did not like me nor I him.

The next place I went to was ——— County, ———. The man's name was ———. He had a very nice farm, indeed. I liked him very much. He treated me as he would one of his own boys, and I treated him as any ordinary white person should. There was one fault between us, and that was I would not do the work decent; and that was the reason I left him although he was a very nice man. I liked him and he did me.

The next place was in ———. I stayed with Mr. ——— for two months. I liked it first rate. I used to run the windmill at his place every day, pumping a big tank full of water. The worst of it was I did not like to watch it. I had to herd from 15 to 20 head of cows and drive them; had to fetch them from the pasture every morning and night. I had to tend 12 horses, feed and water them every morning, noon, and night.

The next place I went was in ——— County. There I stayed with Mr. ——— for three months steady. I did a great deal of work there. I had to plow, sow, reap, harrow, drag, had to help gather the harvest in, going about a quarter of a mile before we reached the field. There was where I did so many things in killing his animals. As I told you what I killed I need not mention it here. I will try to behave myself hereafter. Then I went to ———, where I took a place with ———, staying for three good solid months. I did not like his treatment. In the winter time he would not let me have mittens on my hands; he would set me to clean the horse and cow stables when it was bitter cold, without anything on my hands to keep them warm or on my feet. Sometimes he would come into the barn and see me standing still, not working; he would ask me what I was doing; I would say, "Trying to warm my hands;" then he would say, "You clean out these stables or I'll thrash you."

Then he would come again and catch me not working; then he would get the tugs or driving-rein and thrash me, and besides he would make me "jerk" a wagon "bed" of corn without anything on my hands. I would have to unload it and pick another load before I got anything to eat; sometimes three loads before and after dinner. If I did not do my share of work he would say, "You can't have anything to eat." He was a hard man with me when I hit his wife with my fist for plaguing me. If she had not been teasing me, I would not have struck her. I said to his wife, "Now, just stop your fooling or else there will be trouble," but she would not; so I struck her a good blow in the face, and she did stop; but she told her husband and that night I got a good thrashing.

The next place I went to was at ———, where I stayed with ——— five months, and liked it first rate. I used to do all the chores about the barn, and help in the housework along with the other work. I don't remember doing anything wrong there. His wife was a good lady and I liked her very much indeed; she never gave me much trouble at all.

The next place I went was ———. There I hired out to a man that kept a livery stable. I did first-rate work and got my board and clothes. When I was there a week I got a new suit of clothes and had a splendid time of it.

The next place I went was———. There I stayed for a few days and caught a "blind baggage" and rode on it till I reached a station about 10 miles south of ———. Then I got on a freight train and held it right through to Chicago. I stayed there about a week. I used to help to load steamships for pretty near six days. Finally I stole a ride on a boat going from Chicago to Milwaukee. There I came nearly getting arrested for stealing a ride on the boat. Then the mate said, "Get off this boat." I said, "No, I won't; not for such a thing as you or anyone like you;" so he went and got a policeman. The policeman said, "I will give you till 1 o'clock to get out of town." But I was rowing in one of the boats on the side of the shore of Lake Michigan for at least two hours after the policeman told me to get out of town. I swore at the mate and told him I would break his face for him if I caught him on land. He dare not set foot off the boat for fear of getting hurt. I went back to Chicago and there stayed for three days more. Then I got on another boat and went to Buffalo about three days; then took a freight train, and slept on a load of sheep for one night; when I got out of the car I was about 50 miles from Buffalo on one of the roads running through Pennsylvania. I had to work my way part of the time, and the conductor gave me a ride in his caboose for over 100 miles, I had to keep out of sight for fear; if I was caught I might be arrested, and the conductor might have been discharged. I walked for three days, stopping only for resting and eating; then I caught a freight train, going very slow, about a half a mile from Scranton, and riding from there to Jersey City, I walked to Hoboken, taking a boat across the river, I walked down to Grand street, and started to find my folks, but after inquiring for them I stayed in New York City two hours; then taking a boat I went across the river to Brooklyn. There I began my search with a

gang of Brooklyn boys to help me hunt up my parents. We went to a large drug store and asked to take the Directory to find a man's name and place where he lived. We found a good many with the same name as my father. We went to these places, but did not find the right one; but still we looked, but no traces could be found; but I remember of one in East Brooklyn, but I did not have time to go over there, because I was taken by a minister to the ——— Home. I stayed there one month. I did not work in the house. The work I did was cutting wood and helping in the engine room. I got my dinner at 1 p. m. sharp, sometimes not till 1.30 p. m. I liked it first rate there; it was a very good place. Then I went to ———, where Mr. ——— came after me. I went to his place on Christmas noon, where I got a good meal. The next morning, when I got up, I went out to the barn and did all the chores the best I knew how; then went to the house and did what was needed there; then I went into the yard and fed the chickens and turkeys. Then came noon; I went out and fed and watered the horses and cattle; then rumaged around a little, and doing something once in a while. When I was not doing anything I would think of something to do. If I could not think of something I would go in the house and read. I stayed at the house in summer and went to school in winter. We used to have fine times; we had lots of fine coasting and sliding down a hill half a mile long. I would ride down on a sled. But one day was a sad one for one of the boys in the schoolhouse. I stole his sled and ran off to town with it; I had a lot of fun with it, then gave it away, and had some fun with the boy I gave the sled to; then went down to the ——— railroad depot. I had a talk with Mr. ———, conductor of the road, and then with the man in the station or the telegraph operator; then went out of the station and stole another sled for to pay the boy for the sled I stole of him. I then went back with the sled I stole to town, and gave it to him. The boy's father came up to the barn where I was doing chores; he said to me, "Where is the sled you stole from my boy." I told him I left it in town; then he said, "You get the sled or you will pay for it;" I said all right. Then he asked me when I was going to get it; I said this afternoon, if I could not get the sled, I would get a new one. So I started for town right after dinner, and got in town by 2 o'clock; there I stayed pretty late; as I was going up the hill with the sled in my arms I went down the back way through the back road. I thought I would not be heard or seen, but I was mistaken. As I approached the barnyard I saw the father of the boy I stole the sled from and his hired hands. Then I went up to the house and went to bed in the hack under the wagon shed. The next morning old ——— came in the shed, and gave me a poke with a stick he [the man he worked for] always carried when he went to milk the cows. When I woke up I made a groan and then turned out. I did the chores, then went into the house and got some breakfast, I went by the stove and got warm a little, then went upstairs and dressed myself in my best suit of clothes, then went downstairs and bid them good-bye. Then I started on my journey for New York. I walked from ——— to ———, a distance of 25 miles.

As I was going along the road I met two teams coming along the road. After we passed the teams I started snowballing a lady of about 65 or 70 years old; then she said she would get me arrested. That got me mad; I did not like it, because she said she would have me arrested. I saw a few stones ahead of me on the ground. I picked up three or four stones; then she caught up with me. I then started and ran ahead about 6 rods, then fired one of the stones at her. I then kept it up until I had bruised her very badly, then I ran on to ——— and caught a train going to ———. I did not want to go on the train, but the station keeper put me on. Then, when the conductor came for my ticket I said that I was a poor boy without any home, and wanted to go to New York City, but he gave me a ride to ———. When I got in ——— I slept in the second precinct station house. I told the police that I was a poor boy and had no home; had been away from home for four years and had been all around, and they made a collection for me and I got $1.50. Then I went down to the State board of charities and asked the head man of the house for a pass to New York City.

He sent a man with me to the ——— depot and gave me the pass. I took the pass and got on the train and was going for New York City. When I reached New York I was asked by a detective what my name was. I told him what it was. He said that father and mother were looking for me. Then he said I will take you there; I said all right. Good-bye.

FROM THE RECORDS OF THE INSTITUTION.

HISTORY OF "A."

Received May, 1889; assault, first degree, court oyer and terminer ———; plead guilty. Father, Catholic; intemperate; mother, dead; stepmother, Catholic; habits,

unknown. No insanity or epilepsy in family; don't know about her father; one brother imprisoned on Blackwell's Island. Stepparent, mother, has heard nothing of his parents since they surrendered him six years ago; grandfather, German; reads and writes; langshoreman; grandmother, American; education unknown, family very poor; don't know why father was arrested.

Facts as to "A."

He has known no residence; home wretched; Protestant; no previous arrest; home life till six years ago; ——— Asylum and country were places he was at; very little moral sense. He was placed in ——— Asylum six years ago by his parents. Two years later he was sent to Illinois and placed with ———; then placed successively with four different farmers; remained with the last one the longest (about a year); was in Illinois about four years altogether; came away from last place and started for New York, stealing rides; looked in vain for his people, and was after a few days taken up by the ——— society of ——— and sent to ———. He remained a month or more and then ran away, and on the same day he struck a woman with a stone, stealing up behind her. They had ridden together in a farmer's sleigh; she was an old woman; the assault was unprovoked. They had chanced to fall together on a country road. Age, January, 1889, 15 years. Health good; blue eyes; quality medium; fair, light brown, clothing good; complexion fair. On admission: Weight, 44.90 kilos.; height, 1,494 mm.; chest, 711–762 mm. February, 1890: Weight, 48.07 kilos.; height, 1,549 mm.; chest, 685–762 mm. May, 1890: weight, 48.97 kilos.; height, 1,574 mm.; chest, 736–812 mm.

Previous education, Third Reader, long division; assigned to third grade, second division; previous occupation, farm boy; assigned to tailor shop. First badge earned October 5, 1889; time, twenty-one weeks; six complaints. Second badge, March 22, 1889; time, 24 weeks; 5 complaints; total, 11 complaints.

Complaints against "A," 1889.

June 28, by watchman: Out of his dormitory continually to make a disturbance; crawling along the upper tier to other dormitories (three weeks).[a]

July 20, by tailor: Not doing his work; when other boys come and get their clothes fixed, plays with them (two weeks).

August 5, by watchman: Lying down on the floor outside of his dormitory; talking to other boys; also, Saturday night, throwing down different articles he brought from the tailor shop (three weeks).

September 1, by hallman: Stole a book ("St. Nicholas") from the school-room and gave it to ———.

September 8, by watchman: Standing or lying partly out of his door; talking in a loud tone to boy ———. I have repeatedly had to speak to this boy in regard to talking; have had him on the floor; he will not obey the rules; talked Friday and Saturday night (punished with a strap).

September 24, by watchman: Report this boy for throwing a short, heavy stick (called a "nib") from his dormitory door at me. I saw the stick coming, and the direction from his door; he denies it; boy ——— sleeps next to him; other side is ———; one of these boys surely threw it; witnesses (one week).

November 16, by hallman: For disorder in the hall; throws rags (at boys ——— and ———).

December 4, by watchman: Found in another boy's dormitory under the bed; hiding soon after the first count was taken (three weeks).[a]

December 12, by superintendent: Refusing to do as told; striking at me with a broken knife when I attempted to punish him (punished with a strap).

December 20, by military instructor: Running around sleeping hall and striking boy ——— in face, without provocation (punished with a strap).

March 8, 1890: Disorderly conduct.

May 5, 1890, by hallman: For not scrubbing clean, and not taking care of his ———, and stealing a book from Mr. ——— (two weeks).

September 4: Caused trouble in his company by interfering with the other boys.

October 15: Throwing a dipper on the storeroom floor.

March 3, 1891: Released. Home and employment were found for him with some farmers, where "A" remained till March 11, when he ran away from them, taking some of their property. Since this time he has not been heard from.

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[a] Three weeks added to his time of confinement in institution.

TESTIMONY.

The tailor says: "Disagreeable to other boys."

Yard keeper says: "Makes unreasonable requests; becomes angry, strikes a boy; yet came with a reading paper, which had been given to him, and wanted me to read it first; has heard that he put a string around his finger to make it black in order to get out of work."

Physician: "Only in hospital once" (nothing serious).

Hallman: "Raises his temper easy; does not care how he does his work; boys and some of the officers say he is a 'little off;' I don't report the boy, as it will do no good; has not improved on his scrubbing work for nine months. I said he would have to go to superintendent. He answered: 'I don't care; I will go down and tell him I did my work good enough.'"

Mr. ——— ———, teacher: "Tried to hang himself; too familiar with me; saw my watch chain and said: 'I will have that watch and chain.' This he did three or four times; but after a reprimand he ceased to be familiar."

Professor of drawing says: "He is a little below the average in his work, and a good boy."

Mr. ———, school principal: "Nervous, impulsive; he will look at you with glaring eyes when reproved; dreamy way about him."

Mrs. ———, teacher: "Good scholar; industrious; best in arithmetic (three months in this department). I never had any trouble with him; never had to speak to him, to correct him; half of the boys I never speak to at all, that is to say: 'Turn around and study,' etc.; he was a little behind, but caught up; he told of killing the woman as though he would not like to have us tell about it; but with no air of vanity, no animation in his face; he said he would never do it again."

Miss ———, teacher: "Very good boy in school; did fairly in all studies, but better in arithmetic; perceives quickly; never got angry; great boy to read papers ('Golden Days,' etc.); was six months under me."

Carpenter: "No mechanical ability; no natural affection or feeling for any injury he inflicts; he struck a boy in the yard; the boy did not retort, but 'A' simply grinned; if he is disorderly and spoken to about it, he acts indifferent; he has not shown the least sign of anger or viciousness, as gritting his teeth; when disorderly he acts as if he was not bright, just indifferent; never reported him because he did not seem vicious. When he struck the boy, he said, 'I was only fooling;' he said to me he had no reason at all for stoning the old woman; he felt like it and stoned her; he did not feel bad about it at all, and had no remorse; this he said when he first came here; never saw him playing much with the boys; ever since here he has not varied from being indifferent and doing things thoughtlessly; never caught him in a lie; if asked what he did wrong for, he will say, 'Well, I don't know.' No hilarity in the boy; he grins a little; does not talk loud; seems uneasy; difficult for him to remain still. He tied a handkerchief so tight around his neck that he was purple; he said he wanted to choke himself to death, as the fellows said, he told them so. I think he was trying to show the boys what he could do to 'scare' them. When I call him up for disorder there are 'spells;' he has a staring look, and if I ask him a question he does not seem to notice it, then in an instant he seems to come to himself (he has a vacant look when in the 'spells'), and understands what was said to him; this spell endured about a quarter of a minute; frequently those spells come on (glare, hesitating, and looking), but not always when spoken to. When reprimanded sharply sometimes, he did not have these spells, he first looks down, then into my eye (glaring) bends his head simply; a short reprimand produced no fear or scowl, but in every case a sameness, that is he looks up and down slowly as if he was planning something; but he confesses everything; most peculiar boy in this institution in his actions—that is, a sameness in his actions, manner, motions, etc. My opinion is that the boy would not hesitate a moment to take his life; no idea of what is beyond the act."

The steward: "His make-up is not first-rate; at times, when I would correct him, he would stand and look down and turn his eyes, acting as a boy going to be insubordinate: he would show fullness of the face, that he was angry, a peculiar form of anger, having the air of sullenness and rank temper, different from the other boys; he does not talk much when angry. This spell would last as long as you talked to him; once I corrected him, he showed a good disposition, but could not be called an obedient boy; toward the latter part of the time he was with me he told me his crime; said it was without provocation, on a highway; that he broke her wrist; he did not appear sorry for it; told me her name and age; he is not a bright boy; not with the other boys much; a boy somewhat a little silly was with him some; the boys 'pumped' him and after that dropped him, as they usually do, and so the half-

silly fellows were with him a little; after a while he used to play ball a little. I think he would do injury; he is not a good boy in any sense. He had spells, so I did not trouble him; he was reported three or four times to me for striking boys; he denied it; he would come up good and cheery when called; once he was surly, and the more I talked to him the worse he became; he was not impudent, nor did he talk up quick; he muttered something at that time."

Watchman: "He was with me about four months; at times he became excited and hardly knew what he did; he looked wild out of his eyes; he often wet his bed; I called him three times a night; he got better; at times he was cranky; hard boy to wake up, had to shake him; he would stare at me when I called him; he would act as if he were mad, and after an hour he would say, 'I will try and be a good boy hereafter;' he has asked me to forgive him; he was not bad intentionally; I think he has lied to me; he said he would be a good boy, but did not want to be reported; he ran upstairs, I reprimanded him, and he threw a stick (nib) at me."

Watchman (second division): "He has been under me about a year; he is a little 'off;' he has thrown things around the hall quite often, but not so much now; have to call him three times every night, at 10, 12.15, and 2 to go to the water-closet; he wakes up with difficulty; have caught him running around fooling with other boys; when reprimanded he promises he won't do it any more, but if he has a 'pout' (ill-tempered) he will not say he is sorry; he is no coward; sometimes talks back; he would deny things he had done, and sometimes long afterwards he would admit it, but did not want to get reported; his chum is ———, who is surely 'off;' the other boys call him a fool."

Chaplain: "His people are not attendants at church; while in home of ——— was not at Sunday school; this is about all the religious instruction he has had; here he has taken interest in the temperance work, signing the pledge; he came to me several times about this; has attended our prayer meetings regularly; is a very close listener; he says, 'I don't want to be a drunkard; I want to sign now.'"

Military instructor: "He has been a good soldier, is an intelligent one; has made no mistake that I know of."

Superintendent: "When being reprimanded in my room, thinking he would be whipped, he started to run into the sleeping hall; then he stopped and drew a knife out of his pocket; I said, '———,' calling his name; and he said, 'Lock me up, lock me up; I will give knife up, if you will lock me up;' I got him into a dormitory and got the knife away from him; he ran, breaking away from me, into the yard and up into the other sleeping hall, and, getting a club, he chased the boys out; the military officer went to get the club away from him, but he struck at him; when, however, taken hold of, he ceased resisting; his eyes shone like a wild beast's; I whipped him for that and he cried a little; has not been very disobedient since; this occurred after he had been here some time, when he ceased to be a quiet boy."

The superintendent of another institution, in which "A" was formerly, says: "He was a heedless, disobedient boy while here; he showed no very serious misconduct, but simply little petty meannesses; he was disagreeable to his teacher and others; no special traits distinguished him from a hundred other boys here. We always have quite a large number of boys whose foolish conduct and wanton acts indicate a lack of good sense and a streak of meanness."

Another superintendent says: "There was nothing special to attract attention during his ('A's') short stay."

The district attorney of the county in which "A" was tried says: "He is as bright as he is bad; he is bad only in one way, and that is in his desire to hurt somebody; he was indicted for assault in the first degree; he met an old, fat lady in the street, knocked her down with stones, then jumped on her and pounded her head with stones; broke her wrist, etc.; he is a fair-looking boy as you ever saw; but seems to have spells. Every man in jail was afraid of him, for he would throw things at them in unconquerable fits, and he was so small that they would not touch him; and, except in those spasms, was a general favorite. I write you, because if that boy can be cured, he will make a very bright man."

In a letter "A" wrote to another boy formerly in the institution he says: "Dear Sir—I now take the pleasure of writing you a few lines. I am in good health; I hope you are the same. The weather is very delightful up here; I believe that Mr. ——— is going to leave us, but I hope he don't go, for if he would I would not like it. I am still in the 'scrubbing gang' (lowest grade); they could not hire me to go out of it for anything. When you write to me, tell me what you have done. The first thing when you got home, did you start for the woods? I would like to know. From your friend ——, No. ——."

The farmer with whom "A" lived last (before his crime) says: "As to the assault on the old lady: They were riding on a sleigh and they both got off at ———; and she went one way and he the other. Then he ran ahead of her and got a stone and threw it and knocked her down; then pounded her and broke one of her arms.

Some one, I do not know who it was, came to her assistance; he ran and took the cars for ———, where he was arrested. She was under the doctor's care for a long time. I do not know whether she is alive or not. The boy is a bad boy; he was with me about four months, and I was glad when he left. Before he went he had been going to school, and he acted so with the scholars that it was unendurable. He stole one of their sleds and sold it, and he took a knife to my wife, but it was before anything else had happened; he was not angry; so we did not do anything about it. I am sorry he is such a boy, for he is a bright boy."

The physician says he was called to see the old lady; he treated her "for a broken arm and a bruised back, which was about as bad as her arm; her face was somewhat cut and scratched."

EXAMINATION OF "A."

I began school when I was four years old, and went about six years. One of my brothers used to hit me with his fist; I would not touch him, for I was afraid he would tell my mother. I hit him out of spite once. Another of my brothers treated me all right; another pretty well; did not like my stepmother; she used to whip me too much. My father quarreled with my real mother, would pound her with his fist; was always drunk then. He would not do it again, if I was home; did not hit her the three months I was there; if he had, there would have been a stick of wood flying at him. I do not want to go home; would not step inside of the door, because I am afraid I would get my head knocked off. I would not have left home had my father not got drunk; would run away and then be afraid to return, so, in order to eat, some other boys and I would steal old iron and zinc, and sleep near the foundries inside of some of the things where it was warm; I would miss school, and was sent to one or two institutions, and then out West; I wanted to run around and see the country. I left Mr. ———, because he did not like me; tramped around for nearly two years, I guess; while at Chicago, broke into cars and got something to eat; I always carried a knife with me to keep larger tramps from pitching on to me. I killed the horse of one farmer with a club; also at another time a cow and a sheep, I wanted to get even with the farmer for whipping me; I would have killed the farmer, but he was too big; I don't like to see a cow killed, because it should live as well as we. I went through Pennsylvania, because I wanted to see the country; was interested in the coal mines. I went to New York and stayed about a month, and was sent out into the country again. I did not like the place; the man whipped me with a rattan, but not very hard; a boy teased me at school by calling me names, so I stole his sled and brought another back in its place. The man I was with I did not like, so I left him. Going along the road I met an old woman, and walked with her a half an hour; then we got into an empty sleigh and rode about fifteen minutes; the man with the sleigh turned off on another road, so we got off. I saw some large icicles in the trees and began to knock them down with snowballs. Then I thought it would be fun to throw at the old lady. I threw them pretty swift; she called me names; said she would have me arrested before night; I threw two more snowballs. Two teams came along and I stopped throwing snowballs, because they would catch me. The snowballs did not hurt her, for they only hit her shawl. I was getting angry; I threw three small stones; only the third one hit her on the arm; she said she would have me arrested. I saw a bare place where there were some stones. I ran ahead to it, crossing a road; she ran down this road to get away from me. I ran across lots after her; she slipped down on the ice. I threw larger stones at her; threw them underhand, as I could do it swifter; two of the stones were large; about 5 inches long and 2 inches thick. I kicked at her, but hit the bundle of clothes; the stones made gashes on her head; the big stone broke her wrist. I saw some one running up from the station, so I stopped and ran away."

On closer questioning the following was brought out:

Q. Why didn't you throw all the stones at her?

A. Because I did not want to waste them on her so quick; she screamed each time, and I kept on just to hear her scream for the fun of it, to get even with her.

Q. Why didn't you jump on her with your feet instead of your knees?

A. Because I did not want to go too fast.

Q. Why did you not get right over her and throw the big stones right down on her harder?

A. I could throw them underhand easier, jerk them.

Q. How did you feel all this time?

A. I felt dizzy all the time after I threw the first snowball; I kept a-going to keep myself from falling down and hitting someone or something else. When I ran away I had the same dizziness about ten minutes, and then fell down tired out; then in three minutes I was all right again. I commenced having dizziness in the head right after I got angry; I can not control myself; can stand some fun from the boys, but soon I get angry and mean to kill them. I threatened the superintendent with a

knife because I thought he was going to punish me; I meant to kill him. I had no dizziness while killing horse, cow, and sheep to get even with the farmers; sometimes I get angry without feeling dizzy. Saying she would have me arrested made me angry. These spells last about an hour. When I drew the knife on the superintendent, and struck the club at the military officer, I did not have any dizziness, but got mad. When I become dizzy I try to kill; sometimes, I say, it is just for the fun of it, but I really want to kill. I just as leave die as not and go and see my mother. If I killed anyone they would hang me, so I would die. I wanted to kill the old woman, but was not thinking of being killed myself at that time. I did not want to get caught, or I would have killed her by throwing the stones at her head. I wouldn't have cared if they had killed me at this time. I don't hardly feel I am to blame. I know I am to blame for killing the old woman. I began to feel I was to blame after I came to this institution. I never read books about murder; I could not say how I got the idea, it simply comes to me.

Q. Did you try to kill yourself once?

A. I went into the rag room where there was a closet in which I knew there was a window cord; but the closet was locked. My mother was dead, I did not want to live; I had no friends. I took a black linen thread and tried to hang myself; it only cut my neck. I took a yarn and tied it around my finger till it was black in order to get out of work. I did not like the work.

Q. What did you do after your trial?

A. I was in jail six months.

Q. What did you do in jail?

A. I used to sing to them to amuse them.

Q. What did they do?

A. They used to play cards.

Q. Did you play cards?

A. No; it is wrong to play cards; for I do not want to become a gambler.

Q. Where did you learn that?

A. At one of the places I was at.

A physiological examination (by the physician of institution): Vegetative functions, normal; circulation, normal; respiration, 20; digestion, good; anomalies, none; pulse, 80; girth of thorax, 724–787 mm.; girth of waist, 660 mm.; girth of thigh, 444 mm.; girth of calf of leg, 317 mm.; weight, 109 lbs. (49.44 kilos.); physical anomalies, none.

——— ———, *M. D.*

Craniological measurements are: Width of head, 128 mm.; length from glabella to occipital protuberance, 190 mm.; maximum length of head, 190 mm.; width above tragus, 134 mm.; width between zygomatic arches, 127 mm.; width between external edges of orbits, 96 mm.; distance between outer corners of eyes, 90 mm.; distance between inner corners of eyes, 32 mm.; width between prot. malaria, 119 mm.; width between gonia, 96 mm.; distance from chin to hair, 158 mm.; distance from chin to root of nose, 108 mm.; distance from chin to base of nose, 66 mm.; distance from chin to mouth, 50 mm.; distance from chin to tragus, 95 mm.; distance from tragus to root of nose, 97 mm.; length of ear, 61 mm.; length of nose, 47 mm.; elevation of nose, 49 mm.; width of nose, 31 mm.; width of mouth, 42 mm.; thickness of lips, 15 mm.; horizontal circumference of head, 540 mm.; vertical circumference of head, 349 mm.: sagittal circumference of head, 368 mm.; angle of profile, 60 mm. Color of eye, gray; color of hair, light. There was an observed flatness to the eyelids.

CONCLUSION.

"A" is a case of pure murder. His anomaly or abnormality consists in a lack of repulsion to taking life. He is no coward, nor wanting in will power. His intelligence is above the average, yet he is at times stubborn and lazy and mean, although he may be partly unconscious of this latter element. He acts oddly at times. His idea of justice seemed to be "getting even" with every one. He is unaware of how his want of repulsion to killing appears to others. Many boys neglect their work and are whipped, but they do not kill cows and horses to "get even." The dizziness of "A" might suggest epilepsy, but the fact that he is never unconscious and remembers everything is against such a theory. Spells of anger where self-control is lost are not uncommon, and one will strike with the hand or throw something, but seldom go further unless there is a radical defect somewhere. Given

a boy who becomes angry easily, losing self-control, who at the same time lacks repulsion to taking life, and whose surroundings have been favorable to bring this element out, and the case of "A" is a clear one. That such a boy is dangerous is self-evident. Considering his early and evil surroundings it is questionable how far he is to blame for his murderous acts. It is doubtful if he should be allowed to be free in the community, even under the most favorable conditions, for his training has been such that he is angered very easily. To speak to him cross or to punish him is probably the worst thing that can be done. He may outgrow this murderous tendency by experience in the community, but can the community afford or has it the right to make such experiments as expose its members to danger?

"A" was at large when last heard of.

MAN FROM SCIENTIFIC POINT OF VIEW.

Looking at man from a scientific point of view, he exceeds all others in criminality; he kills not only his own species, which the animals rarely do, but beings of all other species with impunity; those which it is not an advantage to kill he subjects to slavery. The egotism of the human species surpasses that of all others. The basis of this egotism is a combination of psychic and physical force, not moral force.

At present the bloody idea of war still remains in the whole human race. Modern Europe, where the highest civilization exists, has at least 12,000,000 men trained for war, while Rome, with her vast empire, had only 300,000 legionaries; and this is the state of the world which, at present, is in its commercial glory, and yet, in the face of this, it is claimed that commerce and war are antagonists; but it is said that war has the advantage of purging the race. To accomplish this, however, cholera is much more effective, for the lower strata are preeminently the sufferers, while in war much of the best blood of a nation is sacrificed. The savage instinct of murder is still deeply rooted. War from the natural history point of view is universal murder, an extension and development of universal homicide. In primitive times it was terrible in character, exceeding the ferocity of the wildest beasts; in the next stage of development one did not eat his enemy, but mutilated and tortured him; and modern civilized war is the same in essence, though different in form, for inventive genius is at present exerting itself to its utmost to discover how to kill and mutilate the enemy at great distances, and, to the disgrace of the nineteenth century humanity, it seems to have succeeded. And, while we look with horror upon the cannibal, the words of Montaigne are not inapplicable when he says that "It is more barbarous to kill a live man than to roast and eat a dead one."

STATISTICS OF CRIME, SUICIDE, INSANITY, AND OTHER FORMS OF ABNORMALITY.

INTRODUCTION.

It may be said, with a few exceptions, that within the last thirty or forty years there has been an increase (relative to population) in crime, suicide, insanity, and other forms of abnormality. This is the general verdict of the official statistics of the leading countries of the world.

The objection is frequently made that this relative increase in crime, etc., is due to more stringent methods of gathering the data. While doubtless this has weight, yet how much it has had to do with the increase is a matter of opinion. In the judgment of those who have spent their lives in dealing first hand with these forms of abnormality better methods of inquiry will not account for the increase. It would seem that this increase is due more to the rapid development of the world in general, rather than to any specific cause. Thus there has not only been a relative increase in social abnormalities, but in many other things, such as education, intelligence, wealth, and in comforts of living for the poor.

If we take in our own country the groups of States that show the greatest education and intelligence, as the North Atlantic, North Central, and Western (Table 1), we find that they also exceed in pathosocial evils, as insanity, suicide, nervous diseases, juvenile criminals, and almshouse paupers. But to assume, for instance, as is sometimes done, that education and intelligence tend to increase social evils is the too common mistake of confounding concomitants with causes.

TABLE 1.[a]

States (1890).	Education and intelligence.				Pathosocial conditions.				
	Average number of years schooling per capita (Table 4), 1890.	Per cent of illiterates (Table 5), 1890.	Number of people per library (Table 8), 1891.	Number of people to each college student, 1897–98.	Insane per million population (Table 19), 1890.	Deaths from suicides per million population (Table 18), 1890.	Deaths per million population from nervous diseases (Table 18), 1890.	Juvenile criminals per million population (Table 20), 1890.	Almshouse paupers per million population, 1890, United States census.
North Atlantic	6.05	5.9	9,837	714	2,385	77.9	2,181	425	1,790
South Atlantic	2.73	14.5	29,138	1,030	1,322	18.0	1,168	146	914
North Central	5.36	5.1	21,924	716	1,647	72.6	1,203	244	1,145
South Central	2.42	15.3	47,917	1,237	959	35.0	1,059	33	460
Western	4.57	6.2	16,727	552	1,878	121.0	1,031	117	1,036

[a] Based upon the census of 1890 and reports of the Bureau of Education.

If we examine Table 2, we find that within the last forty years or more there has been a great increase in the condensation of population, as illustrated in the increase of urban over rural population.

TABLE 2.

[Twelfth Census of the United States.]

Census year.	Total population.	Urban population.[a]	Number of places.	Percentage of urban of total population.
1790	3,929,214	131,472	6	3.4
1800	5,308,483	210,873	6	4.0
1810	7,239,881	356,920	11	4.9
1820	9,638,453	475,135	13	4.9
1830	12,866,020	864,509	26	6.7
1840	17,069,453	1,453,994	44	8.5
1850	23,191,876	2,897,586	85	12.5
1860	31,443,321	5,072,256	141	16.1
1870	38,558,371	8,071,875	226	20.9
1880	50,155,783	11,318,547	286	22.6
1890	62,622,250	18,272,503	447	29.2
1900	75,468,039	24,992,199	545	33.1

[a] Population of places of 8,000 inhabitants or more at each census.

Table 3 shows that while wages have increased, prices have decreased, indicating better opportunities of living, more general comfort, hygienic improvements, etc. While the consumption per capita of wheat, coffee, and other grains has increased, the consumption of malt liquors and sugar has increased much more. This might be interpreted as a tendency toward less solid, less staple, or more artificial food; since, also, the consumption of meat and potatoes has decreased. While potatoes are not specially nutricious, yet with meat, a concentrated food, they are regarded by physiologists as a very desirable combination.

TABLE 3[a].

Year.	Wages and prices.		Consumption of food and drink.						Patho-social conditions.						
	Wages per person yearly.	Price level (Mulhall).	Consumption of malt liquors per capita.	Consumption of coffee per capita.	Consumption of meat per inhabitant.	Consumption of potatoes per inhabitant.	Consumption of wheat and other grain per inhabitant.	Consumption of sugar per inhabitant.	Failures, annual average.	Divorces per 1,000 marriages in Connecticut, South Carolina, Massachusetts, Rhode Island, and Vermont.	Divorces per 100,000 population (in United States).	Inmates per 1,000,000 population in juvenile reformatories.	Deaths per 100,000 deaths from suicide.	Persons in prison per 1,000,000 population.	Prisoners charged with homicide per 1,000,000 population.
			Galls.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*							
1850..	$255	.....	.....	.....	224	205	1,730	20	.....	.....	.....	.....	.....	292	....
1855..	.....	.....	.....	(67) 5.01	.....	.....	.....	.....	(57–60) 3,262	.....	.....	.....	.....	.....	....
1860..	300	.....	.....	(68) 6.52	202	200	1,800	34	(61–65) 1,830	.....	.....	.....	.....	610	....
1865..	.....	.....	.....	(69) 6.45	.....	.....	.....	.....	(66–69) 2,425	.....	.....	.....	(66) 218	.....	....
1870..	315	.....	5.31	6	140	202	1,864	41	(70–75) 4,882	(67–71) 41	(67–71) 30	.....	232	875	....
1875..	.....	(74–83) 1,000	6.71	7.08	.....	.....	.....	.....	(76–80) 7,970	(72–76) 48	(72–76) 32	.....	.....	.....	....
1880..	360	.....	8.26	8.79	157	190	2,190	40	.....	(77–81) 53	(77–81) 35	229	287	1,169	92
1885..	.....	(84–93) 796	10.62	9.60	(87) 155	(87) 170	(87) 1,860	(87) 53	(81–86) 8,823	(82–86) 55	(82–86) 42	.....	.....	.....	....
1890..	505	.....	13.67	7.83	.....	.....	.....	.....	(89) 11,719	.....	.....	237	349	1,315	117
1895..	.....	.....	(94) 15.18	(94) 8.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
1896..	.....	638	15.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....

[a] Based upon United States Census and Dictionary of Statistics (Mulhall).

If we were to argue from mere concomitants, we might say that since the consumption of sugar and the number of divorces, suicides, and juvenile crimes have also increased (see Table 3), therefore this increased consumption of sugar is a cause of these evils. This mode of reasoning is so frequently employed that we beg the indulgence of the reader for referring to it.

Doubtless all these factors may be related in some way, but sociology has not yet reached that scientific stage in which such relations can be determined.

The rapid development of society, as we have suggested, is possibly one of the main causes of the increase of crime and abnormality; it includes a great number of new inventions, increased opportunities for travel, and the enterprise of the press enabling us to read all the news of the world at breakfast. It was quite otherwise fifty years ago.

This haste of civilization, involving many transition periods, puts an abnormal strain upon the nervous system as compared with the muscular system. Thus the electric car, automobile,[a] and the telephone tend to make people exercise less and think more. A reaction has set in already through the development of systems of physical culture. The less cost of living and the increase of wealth, with the luxuries of the table, have tended to over-eating, which, in connection with lack of exercise, has had its evil effects, and doubtless produced an additional reaction on the nervous system. When the nerves are unstrung by overpressure the will may become weak, depression and pessimism set in, and loss of self-control follow with its consequent abnormal actions leading on to crime and other social evils.

In the statistics of crime some special points may be noted. The youth as compared with adults (p. 28, Table 7) have committed more crimes as society has developed. Suicide among children has greatly increased; this might be regarded as a symptom of diseased precociousness.

The recent rapid development of women by entering more and more into the work of men, a transition involving great strain, seems to have some unwelcome accompaniments. In Vienna, for instance, general paralysis, a man's disease, is increasing among women. In Belgium (p. 44, Table 4) insanity and suicide have been growing relatively faster in women than in men. In Austria it has been found (p. 50, Table 7) that the criminal influx into cities is relatively greater in women than in men and the effects of heredity are greater upon women than upon men (p. 49, Table 6).

If we shake the tree the bad apples fall first. So in periods of rush and strain the weaknesses of human nature become more apparent. But this increase in evil may be only a temporary one, due to the necessary pressure of adaptability to modern civilization. The increase in crime, for instance, is not necessarily a proof that the world is growing worse. Periods of decline in history show that the world does not grow better in a straight line upward.

In giving the statistics of crime and other abnormalities in different countries we have depended as far as possible on official publications. As few countries make the same classification of their data and some carry the investigation much further than others, it is difficult to make comparisons between their statistical results. Some countries also change their classification from year to year, so that gaps and other inadequacies are evident.

We have endeavored in some countries to give the concomitant mental and sociological development.

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[a] These conveniencies of travel are rather symptoms (not causes), chips on the water showing direction of current.

UNITED STATES.

INCREASE OF EDUCATION AND INTELLIGENCE.[a]

Table 4 shows the amount of schooling the inhabitant of the United States receives on an average. There has been a gradual increase up to 1898, with a decrease in 1899, and slight increase in 1900 and 1901.

TABLE 4.—*Average number of years of schooling (of 200 days each) that each individual of the population received at the different dates specified in the table, taking into account all public and private schooling of whatever grade.*

Divisions.	1870.	1880.	1890.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.[a]	1901.[a]
North Atlantic Division ..	5.06	5.69	6.05	6.13	6.41	6.52	6.67	6.84	6.95	6.90	6.98	6.94
South Atlantic Division...	1.23	2.22	2.73	2.84	3.02	3.01	3.01	3.07	3.32	3.11	3.17	3.35
South Central Division ...	1.12	1.86	2.42	2.70	3.00	2.81	2.87	3.03	3.04	3.09	3.11	2.97
North Central Division ...	4.01	4.65	5.36	5.43	5.72	5.81	6.00	6.01	6.15	6.01	6.09	6.05
Western Division	3.56	4.17	4.57	5.17	5.29	5.62	5.66	5.90	5.85	5.42	5.53	5.61
The United States ..	3.36	3.96	4.46	4.58	4.85	4.87	4.99	5.09	5.20	5.09	5.13	5.14

[a] Subject to correction.

DECREASE IN ILLITERACY.

From Table 5 we find that the amount of illiteracy has decreased about 2 per cent each decade from 1870 to 1890, and 1½ per cent from 1890 to 1900.

TABLE 5.—*White population 10 years of age and over, and number and per cent who could not read and write.*

States and Territories.	1870.			1880.		
	Total.	Illiterates.		Total.	Illiterates.	
		Number.	Per cent.		Number.	Per cent.
North Atlantic Division	9,285,812	672,077	7.2	11,086,104	654,817	5.9
South Atlantic Division.....	2,655,333	623,386	23.5	3,312,920	647,085	19.5
South Central Division	3,014,773	705,630	23.4	4,068,790	877,344	21.6
North Central Division	9,088,051	750,633	8.3	12,466,565	731,804	5.9
Western Division	673,901	100,185	14.9	1,226,021	108,030	8.8
United States	24,717,870	2,851,911	11.5	32,160,400	3,019,080	9.4

States and Territories.	1890.			1900.		
	Total.	Illiterates.		Total.	Illiterates.	
		Number.	Per cent.		Number.	Per cent.
North Atlantic Division	13,658,519	810,091	5.9	16,350,192	926,476	5.7
South Atlantic Division.....	4,109,269	595,952	14.5	4,953,831	567,967	11.5
South Central Division	5,347,099	817,031	15.3	7,066,708	833,306	11.8
North Central Division	16,560,840	849,843	5.1	19,831,594	747,648	3.8
Western Division	2,255,347	139,657	6.2	3,048,593	125,349	4.1
United States	41,931,074	3,212,574	7.7	51,250,918	3,200,746	6.2

SECONDARY EDUCATION.

Table 6 gives the number and per cent of secondary students in public and private high schools, showing a general relative increase in education.

[a] The statistics on education are from the reports of the Commissioner of Education.

TABLE 6.—*Number of secondary students in public and private high schools.*

Year.	Secondary students.					
	In public high schools.	Per cent of population.	In private high schools.	Per cent of population.	In both classes of schools.	Per cent of population.
1871	.....	.....	38,280	0.097	.....	.....
1872	.....	.....	48,660	.120	.....	.....
1873	.....	.....	56,640	.137	.....	.....
1874	.....	.....	61,860	.145	.....	.....
1875	.....	.....	68,580	.157	.....	.....
1876	22,982	0.051	73,740	.164	96,722	0.215
1877	24,925	.054	73,560	.160	98,485	.214
1878	28,124	.059	73,620	.155	101,744	.214
1879	27,163	.056	74,160	.152	101,323	.208
1880	26,609	.053	75,840	.151	102,449	.204
1881	36,594	.071	80,160	.156	116,754	.227
1882–83	39,581	.074	88,920	.166	128,501	.240
1883–84	34,672	.063	95,280	.174	129,952	.237
1884–85	35,307	.063	97,020	.173	132,327	.236
1885–86	70,241	.122	86,400	.150	156,641	.272
1886–87	80,004	.136	83,160	.142	163,164	.278
1887–88	116,009	.194	69,600	.116	185,609	.310
1888–89	125,542	.205	79,440	.130	204,982	.335
1889–90	202,963	.324	94,931	.152	297,894	.476
1890–91	211,596	.331	98,400	.154	309,996	.485
1891–92	239,556	.369	100,739	.155	340,295	.524
1892–93	254,023	.383	102,375	.154	356,398	.537
1893–94	289,274	.425	118,645	.174	407,919	.599
1894–95	350,099	.509	118,347	.172	468,446	.681
1895–96	380,493	.539	106,654	.151	487,147	.690
1896–97	409,433	.573	107,633	.151	517,066	.724
1897–98	449,600	.618	105,225	.144	554,825	.762

HIGHER EDUCATION.

The increase in higher education as compared with population is shown in Table 7. The most noticeable increase is that of graduate students, or university students proper, since a number of the theological, more of the law, and still more of the medical students are not college graduates.

TABLE 7.—*Number of students in higher education to each 1,000,000 persons from 1872 to 1897–98 (based on the number of students in the colleges of the United States).*

Year.	Undergraduate collegiate and technical students.	Graduate students.	Law students.	Medical students.	Theological students.	Total.
1872	573	5	49	142	83	852
1873	739	5	52	176	93	1,065
1874	749	7	61	182	102	1,101
1875	736	8	61	196	120	1,121
1876	706	9	59	194	95	1,063
1877	701	8	61	209	86	1,065
1878	781	9	64	210	91	1,155
1879	775	10	62	231	97	1,175
1880	770	8	62	238	105	1,183
1881	755	9	63	242	93	1,162
1882–83	731	10	57	237	92	1,127
1883–84	741	14	49	230	96	1,130
1884–85	742	15	49	197	103	1,106
1885–86	687	16	53	221	110	1,087
1886–87	690	21	54	208	107	1,080
1887–88	688	22	61	231	109	1,111
1888–89	729	22	64	245	114	1,174
1889–90	850	27	72	266	112	1,327
1890–91	901	33	82	284	115	1,415
1891–92	980	39	94	284	115	1,512
1892–93	1,037	43	105	298	118	1,601
1893–94	1,087	51	107	320	113	1,678
1894–95	1,128	58	130	331	116	1,763
1895–96	1,158	62	139	346	114	1,819
1896–97	1,142	69	146	342	115	1,814
1897–98	1,193	74	163	328	117	1,875

INCREASE OF LIBRARIES.

It is objected sometimes that educational tests are not necessarily tests for intelligence and culture. While there may be cases of much more education than intelligence or culture, yet we believe these are exceptional. But, waiving this point, we may try another way of gaining a knowledge as to the intelligence of a community. It is reasonable to believe that in those sections in which the proportion of libraries and books is large there is a greater amount of knowledge and intelligence.

From Tables 8 and 9 it will be seen that in 1891 there was an average population of 17,877 to a library, and in 1896, 17,376; that in 1891 there were 41 books to each 100 of population, and in 1896, 47 books. The increase in population from 1890 to 1895 is estimated at nearly 12 per cent, but there has been an increase in the number of libraries of about 15 per cent and in the number of books of more than 27 per cent.

TABLE 8.—*Summary of statistics of public, society, and school libraries of 1,000 volumes and over in 1891.*

DISTRIBUTION OF LIBRARIES AND OF VOLUMES.[a]

States and Territories.	Libraries.	Volumes.	Population, census 1890.	Number of people per library.	Books per 100 of population.
North Atlantic Division	1,769	13,754,092	17,401,545	9,837	79
South Atlantic Division	304	3,400,818	8,857,920	29,138	38
South Central Division	229	1,122,366	16,972,893	47,917	10
North Central Division	1,020	6,259,810	22,362,279	21,924	28
Western Division	181	1,440,557	3,027,613	16,727	48
United States	3,503	25,977,643	62,622,250	17,877	41

[a] Report of the Commissioner of Education.

TABLE 9.—*Summary of statistics of public, society, and school libraries of 1,000 volumes and over in 1896.*

DISTRIBUTION OF LIBRARIES AND OF VOLUMES.[a]

States and Territories.	Libraries.	Volumes.	Estimated population in 1895.	Number of people per library.	Books per 100 of population.
North Atlantic Division	2,000	17,647,723	19,318,000	9,659	91
South Atlantic Division	322	4,015,087	9,436,000	29,305	43
South Central Division	255	1,360,451	12,091,000	47,416	11
North Central Division	1,195	8,016,780	25,934,000	21,116	32
Western Division	254	2,011,831	3,875,000	15,256	52
United States	4,026	33,051,872	69,954,000	17,376	47

[a] Report of the Commissioner of Education.

The educational data and the library data are in general accord in indicating the knowledge and intelligence of a community.

NEWSPAPERS AND PERIODICALS.

A still further indication of the amount of reading and intelligence in a community may be shown in a general way by Table 10, which

gives the number of persons to each copy per issue of newspapers and periodicals in our country. In this table the sections of our country take the following order: 1, North Atlantic States; 2, North Central; 3, Western; 4, South Central; 5, South Atlantic.

TABLE 10.

[United States Census, 1890.]

States and Territories.	Number of persons to each copy per issue.	States and Territories.	Number of persons to each copy per issue.
North Atlantic:		Western—Continued.	
Maine	0.27	Arizona	2.67
New Hampshire	1.44	Utah	3.06
Vermont	1.60	Nevada	3.15
Massachusetts	.48	Idaho	3.97
Rhode Island	2.32	Washington	1.71
Connecticut	1.50	Oregon	1.50
New York	.33	California	1.05
New Jersey	.97	South Central:	
Pennsylvania	.56	Kentucky	2.55
North Central:		Tennessee	1.22
Ohio	.65	Alabama	6.13
Indiana	1.69	Mississippi	11.93
Illinois	.48	Louisiana	3.12
Michigan	1.38	Texas	3.40
Wisconsin	1.60	Oklahoma	4.22
Minnesota	1.27	Arkansas	5.85
Iowa	1.76	South Atlantic:	
Missouri	11.93	Delaware	3.03
North Dakota	2.11	Maryland	2.66
South Dakota	2.31	District of Columbia	.72
Nebraska	1.67	Virginia	4.79
Kansas	1.89	West Virginia	5.85
Western:		North Carolina	9.09
Montana	1.92	South Carolina	9.46
Wyoming	2.49	Georgia	2.51
Colorado	1.79	Florida	3.65
New Mexico	6.83		

Table 11 shows an increase of number of publications as compared with population from 1880 to 1900:

TABLE 11.

[Twelfth United States Census.]

Year.	Number of inhabitants to each publication.	Per cent of increase in preceding decade.	
		In urban population.	In number of daily newspapers.
1880	4,433	.....	.....
1890	4,224	61.4	65.8
1900	4,170	36.8	38.3

INCREASE OF PATHO-SOCIAL PHENOMENA.

The number of failures from 1857 to 1889 has increased almost fourfold (Table 12), that is, much faster than the population. But the amount per failure has decreased in about the same ratio; that is, the increase has been with the smaller dealers.

TABLE 12.[a]—*Failures in the United States.*

Years.	Annual average number of failures.	Amount per failure.
1857–60	3,262	$7,100
1861–65	1,830	5,800
1866–69	2,425	6,200
1870–75	4,882	6,100
1876–80	7,970	4,100
1881–86	8,823	3,200
1889	11,719	2,400

[a] Mulhall: Dictionary of Statistics.

SOME EVIL EFFECTS OF CITY LIFE.

We may see some of the evil effects of condensation of population of life in large cities by taking a few representative States and their chief cities for comparison. Table 13 shows the enormous relative increase of deaths from alcoholism and suicide in the cities as compared with the States:

TABLE 13.

[Compiled from United States Census, 1890.]

States and cities.	Deaths per 1,000,000 population by alcoholism.	Deaths per 1,000,000 by suicide.
New York State	80	95
New York City	219	149
Illinois	48	93
Chicago	87	169
Pennsylvania	38	55
Philadelphia	92	90
Massachusetts	72	83
Boston	180	120
Missouri	35	76
St. Louis	90	177
California	143	190
San Francisco	177	297

Table 14 shows this to be true of the United States as a whole. It also shows that death from nervous diseases is more frequent in the city than in the country. While it is generally true that mortality in general is higher in the city than the country, yet the difference is small compared with that in the table.

TABLE 14.—*Deaths per 100,000 population, 1890.*

[Compiled from United States Census, 1890.]

States and cities.	Alcoholism.	Nervous diseases.	Suicide.
States	8.05	240.28	8.78
Cities	10.97	260.09	9.29
Rural districts	3.59	210.03	8.00
Cities, nonregistration States	8.10	258.19	12.65
United States	8.07	247.37	10.31

From 1860 to 1890 we see (Table 15) how much faster cities of more than 50,000 inhabitants have increased than towns and rural districts.

TABLE 15.—*Population United States.*[a]

Cities and towns.	1860.	1890.	Increase.
			Per cent.
Cities of over 50,000	3,100,000	11,700,000	280
Towns and rural districts	28,300,000	50,900,000	80
Total population	31,400,000	62,600,000	99

[a] Mulhall: Dictionary of Statistics.

The Twelfth Census shows a decrease in deaths (from 1890 to 1900) from alcoholism and nervous diseases, but an increase in suicides.

DEFECTIVE CLASSES.

From 1860 to 1880 there has been an increase in insanity and in the number of the defective, as Table 16 shows; but this increase reached its highest point in 1880. From 1880 to 1890 there has been a slight decrease except in juvenile criminality. For data from 1890 to 1899 we must consult Table 17.

TABLE 16.

[United States Census.]

Special classes.	Number per 1,000,000 of population.			
	1860.	1870.	1880.	1890.
Insane	765	971	1,833	1,697
Feeble minded	602	636	1,533	1,526
Deaf and dumb	408	420	675	659
Blind	403	527	976	805
Criminals in prison	.....	.....	1,169	1,315
Juvenile criminals	.....	.....	229	237
Paupers in almshouses	.....	.....	1,320	1,166

The statistics in Table 17 show a relative increase in the number of inmates in institutions for the feeble-minded and deaf from 1890 to 1899. The number in reform schools and institutions for the blind indicates no general increase.

TABLE 17.

[Based upon reports of the Bureau of Education.]

Year.	In reform schools.		Feeble-minded.		Blind.		Deaf.	
	Number.	Per 1,000,000 population.	Number.	Per 1,000,000 population.	Number.	Per 1,000,000 population.	Number.	Per 1,000,000 population.
1890–91	16,853	264	5,746	90	3,237	50	7,511	118
1891–92	22,378	346	5,923	93	3,437	53	7,846	121
1892–93	23,011	347	6,336	96	3,498	53	8,275	125
1893–94	20,201	295	6,937	102	3,775	55	8,048	118
1894–95	21,898	317	7,010	101	3,741	54	8,543	109
1895–96	21,078	297	7,652	108	3,630	51	9,037	128
1896–97	21,243	297	8,177	112	3,630	51	9,391	126
1897–98	25,308	347	8,866	122	3,744	53	9,832	121
1898–99	24,925	336	9,158	123	3,665	49	9,890	133

COMPARISON BETWEEN GROUPS OF STATES.

The relative mortality from nervous diseases is greatest (Table 18) in the North Atlantic States and least in the Western States; the North Central States stand second in rate of mortality; then come the South Atlantic and South Central. In mortality from alcoholism and suicide the divisions of the States follow the same order as in nervous diseases. Except in the Western States there is an abnormally high per cent of mortality from alcoholism and suicide.

TABLE 18.

[Based on United States Census, 1890.]

Divisions.	Deaths per 1,000,000 population from—		
	Nervous diseases.	Alcoholism.	Suicide.
North Atlantic	2,181	65.3	77.9
South Atlantic	1,168	29.0	18.0
North Central	1,203	29.0	72.6
South Central	1,059	25.0	35.0
Western	1,031	99.0	121.0

INSANE.

The total number of the insane per 1,000,000 population for 1860 was 765; for 1870, 971, and for 1880, 1,833. (Table 19.) The editor of the census remarks that the decrease from 1880 to 1890 may be an actual decrease, or the returns were not as full as in the census for 1880.

Table 19 shows that in 1880 and 1890 the North Atlantic States are first in the number of the insane, the Western second, North Central third, South Atlantic fourth, and South Central last.

TABLE 19.

[United States Census, 1890.]

Divisions.	Per 1,000,000 population.	
	1880.	1890.
North Atlantic	2,475	2,385
South Atlantic	1,511	1,322
North Central	1,717	1,647
South Central	1,257	959
Western	2,008	1,878
United States	1,833	1,697

FEEBLE-MINDED.

Carrying this comparison between groups of States still further, we find from Table 20 that in feeble-mindedness the Western States have the fewest in number; then follow the North Atlantic, the North Central, the South Central, and the South Atlantic, respectively, for 1880. In 1890 the order is as follows: Western, North Atlantic, South

Central, North Central, and South Atlantic. The reader can trace out under each head the order the several divisions of States take in deafness, blindness, and criminality:

TABLE 20.

[Per 1,000,000 population.]

States.	Feeble minded.		Deaf and dumb.		Blind.		Criminals in prison.		Juvenile criminals.	
	1880.	1890.	1880.	1890.	1880.	1890.	1880.	1890.	1880.	1890.
North Atlantic	1,348	1,472	686	670	970	777	1,425	1,624	469	425
South Atlantic	1,762	1,653	655	634	1,105	888	1,043	1,288	122	146
North Central	1,570	1,634	729	731	877	783	862	888	183	244
South Central	1,744	1,532	613	581	1,099	895	1,250	1,466	43	33
Western	651	648	467	430	814	561	2,199	2,221	93	117
United States	1,533	1,526	675	659	976	805	1,169	1,315	229	237

ENGLAND.

It is the opinion among official experts in England[a] that the total number of indictable offenses is the best general criterion of the amount of crime.

INDICTABLE OFFENSES.

Table 1 gives the number of persons tried for indictable offenses in England from 1874 to 1893, showing a decrease in crime. Violent crimes against the person have also decreased.

The decrease in crime against property with violence is not so marked as that in crime against person.

TABLE 1.—*Number of persons tried for indictable offenses in England and Wales, 1874–1893.*

Year.	Annual average for each period of five years.	Proportion per 100,000 inhabitants.
1874–1878	53,044	217
1879–1883	60,080	230
1884–1888	57,384	208
1889–1893	56,472	194
CRIMES AGAINST PERSON.		
1874–1878	1,829	7.5
1879–1883	1,581	6.0
1884–1888	1,581	5.7
1889–1893	1,440	4.9
CRIMES AGAINST PROPERTY.		
1874–1878	1,420	5.82
1879–1883	1,834	7.04
1884–1888	1,887	6.86
1889–1893	1,883	6.47

[a] Judicial statistics, England and Wales, London, 1895 (printed for Her Majesty's Stationery Office).

In a late report of the commissioner of prisons the number of prisoners received per 100,000 of the population was:

	1900.	1901.
Scotland	1,402	1,489
Ireland	744	720
England and Wales	571	621

This seems to indicate an increase in crime.

Table 2 shows that malicious injury to property increases up to 1888. This offense is not of great importance; its variations in number depend upon the number of drunken persons disposed to break windows.

The decrease in forgery and counterfeiting is mostly due to a great decrease in counterfeiting, the number of forgeries remaining fairly constant. During the 20 years from 1874 to 1893 the number of crimes of violence against the person has diminished greatly, though crimes against morality have increased apparently. On the whole, the decrease in crime is substantial.

TABLE 2.—*Showing a general increase of crime from 1874 to 1883 and then a decrease to 1893.*

England and Wales.	Annual average for each period of five years.				Proportion per 100,000 inhabitants.			
	Offenses against property without violence.	Malicious injury to property.	Forgery and counterfeiting.	Miscellaneous offenses.	Against property with violence.	Malicious injury of property.	Forgery and counterfeiting.	Miscellaneous offenses.
1874–1878	47,900	202	400	602	196	0.83	1.64	2.4
1879–1883	54,425	254	523	712	208	.98	2.01	2.7
1884 1888	51,267	277	510	711	186	1.01	1.85	2.5
1889–1893	50,820	270	346	568	174	.93	1.19	1.9

MITIGATION OF SENTENCES.

TABLE 3.—*Comparison of the sentences passed for indictable offenses on a summary conviction in England and Wales 1882–83 and 1893.*

Indictable offenses, England and Wales.	Proportion per 1,000 convictions.	
	1882–83.	1893.
1 year and above 6 months	0.34	0.12
6 months and above 3 months	25.77	15.53
3 months and above 1 month	252.18	152.36
1 month and under	336.04	292.82
Total imprisonment	614.33	460.83
Detention:		
Reformatory	30.32	29.18
Industrial school	26.09	16.71
Fine	226.80	270.89
Whipping	86.90	82.48
Recognizances	15.56	139.91
Total	1,000.00	1,000.00

There is a noticeable decrease in the whole scale of imprisonment, very marked in the lower sentences. The increase occurs almost entirely in fines and recognizances. The number of cases in which the prisoner has been put under recognizances has increased nearly tenfold, due mostly to the "Probation of first offenders act," in 1887, which itself is a striking instance of more leniency in treatment of criminals.

CRIMINALS PREVIOUSLY CONVICTED.

From Table 4 it will be seen that offenses against property and forgery are the highest. This is to be expected, as those are the offenses upon which the professional criminal depends for a livelihood.

TABLE 4.—*Classes of crime.*

Offenses.	Proportion previously convicted (1893).
	Per cent.
Offenses against the person	30
Against property with violence	66
Against property without violence	64
Malicious injury to property	42
Forgery and counterfeiting	37
Other offenses	25

SEX IN CRIME.

Taking the indictable offenses, Table 5 shows the proportion of different crimes committed by women. Taking all the crimes, it will be found that 82 per cent of the persons convicted are men and 18 per cent women. But the proportion varies according to the crime, as shown in the table.

In nonindictable offenses, the official report shows that the proportion of women convicted of drunkenness is considerably higher than of women convicted of crime—it amounts to 29 per cent of the total convictions of drunkenness. It must be remembered, in comparing the sexes, that women are treated more leniently than men, which may lower the percentage of female criminality.

TABLE 5.

Classes of crime.	Proportion of women (1893).
	Per cent.
Violence against person	11
Crimes against morals	4
Abortion procuring	91
Child stealing and cruelty to children	70
Burglary	3
Robbery and extortion	10
Against property, without violence	19
Malicious injury to property	15
Forgery	9
Coining, counterfeiting	18
Miscellaneous offenses	16

MINOR OFFENSES.

Table 6 shows a tendency to diminution in minor offenses, especially assaults, malicious damage, and drunkenness. There is an increase in education acts offenses. There is an increase in vagrancy acts up to 1879–83, then a decrease follows.

TABLE 6.

Minor offenses.	Number tried per 100,000 population.			
	1874–1878.	1879–1883.	1884–1888.	1889–1893.
Assaults	402	320	289	268
Stealing animals, fruit, etc	19	22	20	18
Malicious damage	97	80	76	65
Vagrancy acts	121	157	153	144
Game laws	52	41	40	30
Drunkenness	812	698	636	615
Education acts	103	272	278	285

AGE IN CRIME.

While the proportion of crime committed by women is small, the proportion committed by children is very great (Table 7). Of 43,835 persons convicted, 17,902, or 41 per cent, were under 21 years of age. Of 30,902 convicted of larceny, 14,064, or 45 per cent, were also under 21 years of age.

The proportion of crime from 16 to 21 is much higher than at any age. This proportion then declines steadily as life advances (Table 7). But in the case of women this is not true. A comparatively larger number of women are criminals in the later periods of life. This may indicate that women are less under the influence of punishment than men.

TABLE 7.

Ages.	Total number of persons convicted of indictable offenses in 1893.		Proportion per 100,000 population of same age (both sexes).	Percentage of women.
	Women.	Both sexes.		
Under 12	145	2,009	24	7.32
12 to 16	803	6,595	261	12.18
16 to 21	1,346	9,298	321	14.48
21 to 30	1,948	10,862	245	17.93
30 to 40	1,701	7,824	204	21.74
40 to 50	1,107	4,190	143	26.42
50 to 60	501	1,879	92	26.66
Above 60	236	1,178	56	20.03

YOUNG CRIMINALS.

Table 8 shows that nearly one-fourth of the persons convicted of larceny are children under 16, and that more than one-third of the convicted burglars are youths between 16 and 21.

TABLE 8.—*Young criminals, 1893.*

Nature of crime.	Per cent under 16.	Per cent from 16 to 21.
Crimes of violence	2.20	14.73
Crimes against morals	4.87	20.58
Burglary, housebreaking, etc	5.07	36.22
Robbery and extortion	2.42	24.19
Larceny from the person	6.42	22.92
Larceny by a servant	13.38	27.69
Simple larceny	24.56	20.92
False pretenses	2.15	11.98
Malicious injury of property	27.69	12.82
Forgery, etc	1.93	12.08
Coining, etc	.61	23.78
Miscellaneous offenses	.....	9.49
Total	19.55	21.21

CRIME IN CITIES.

Table 9 gives the proportion of offenses in 1893 per 100,000 population in geographical divisions. This table, with other official tables, would seem to support the theory that a race which is most free from crime in an agricultural state can become most criminal when concentrated in cities. The seaport towns show the highest per cent of crime.

TABLE 9.[a]

Geographical divisions.	Crimes committed per 100,000 population.				Offenses tried summarily per 100,000 population.						
	All indictable offenses.	Against property.	Against the person.		Stealing and receiving animals.	Assaults.	Malicious damage.	Drunkenness.	Vagrancy acts.	Game laws.	Education acts.
			Crimes of violence.	Crimes against morals.							
Metropolis	413	384	10	7	16	423	48	601	132	4	291
Mining counties	232	211	8	8	20	281	196	963	216	55	213
Manufacturing towns	358	340	7	4	12	276	47	457	203	1	325
Seaports	663	624	20	7	76	457	83	1,328	307	.....	379
Pleasure resorts	308	294	6	3	9	170	36	254	93	3	191
Agricultural:											
Eastern counties	138	126	4	6	14	140	48	116	63	108	113
Southwestern counties	194	172	5	11	34	159	61	220	138	87	151
Home counties	204	187	5	7	38	140	68	244	.....	101	152
Total England and Wales	299	277	7	6	24	293	68	582	.....	35	217

[a] Decimals are omitted in giving this table.

MONTHLY FLUCTUATIONS OF CRIME.

From Diagram A it will be seen that crime is at a minimum in June, there being 6,490 indictable offenses. It is at the maximum in October (8,014), and decreases but little in November, December, and January.

DIAGRAM A.—Crimes committed (all indictable offenses).

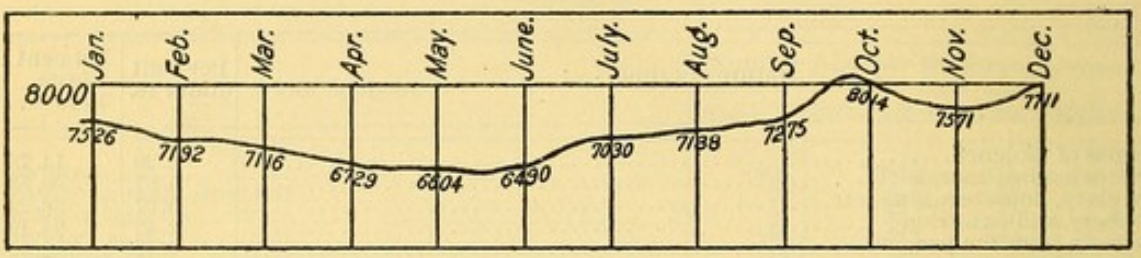


DIAGRAM B.—Crimes of violence against the person.

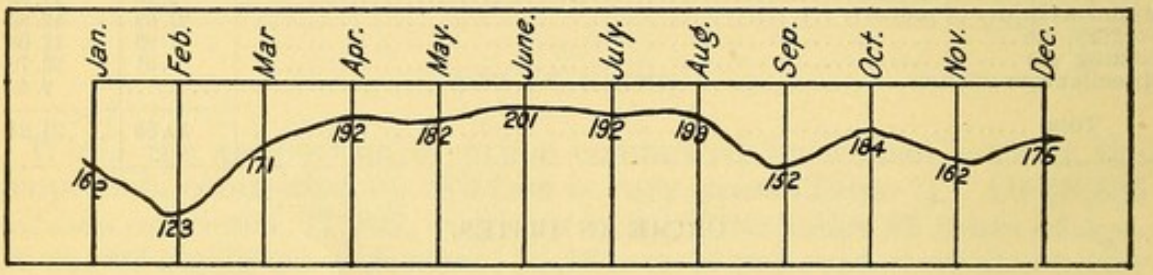


DIAGRAM C.—Crimes against property with violence.

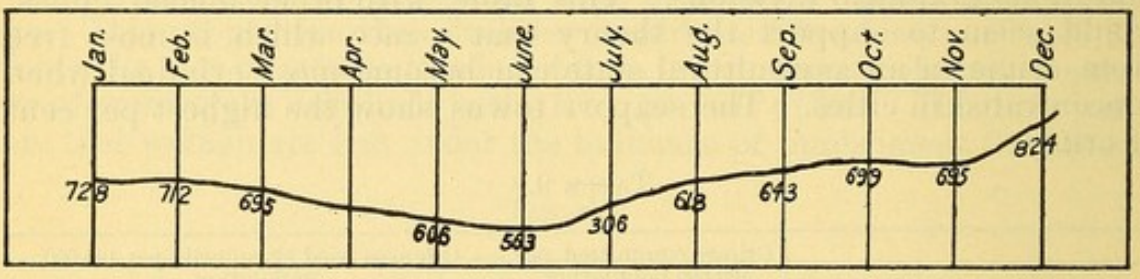
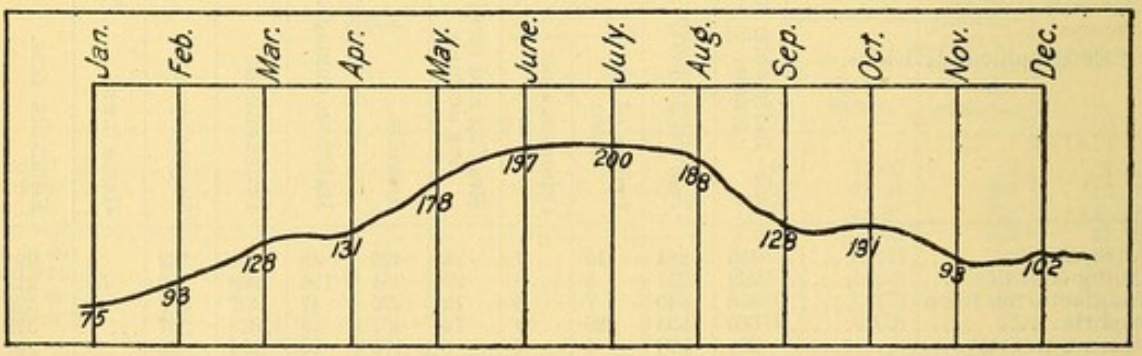


DIAGRAM D.—Attempts at suicide.



While the fluctuations of crimes against property determine those of crime generally, crimes against the person follow an opposite course, as Diagram B shows; that is, crimes against the person are highest in spring and summer and lowest in the winter months.

In crimes against property with violence, Diagram C, the maximum is in December and the minimum is in June, varying inversely with the length of day. Such crimes are naturally more frequently committed when it is dark.

The attempts at suicide are most frequent in the warm weather (Diagram D).

INSANITY.

Table 10 shows a large increase in insane paupers in the United Kingdom. In Table 11 we find a steady increase in insanity in relation to population from 1862 to 1896.

But it is claimed that the increase of insanity is due to kinder treatment, which diminishes the mortality. Thus the death rate has decreased yearly, as shown in Table 12.

TABLE 10.[a]

Years.	Paupers insane per 1,000,000 population.	
	England and Wales.	Scotland.
1861–65	2,080	2,050
1871–75	2,581	2,290
1880	2,792	2,580

TABLE 11.[a]

Year.	United Kingdom.	
	Number of insane.	Number per 100,000 population.
1862	55,525	181
1872	77,013	241
1882	98,871	294
1896	128,896	328

TABLE 12.[a]

Years.	Yearly death rate per 1,000 in England.
1871–75	133
1876–80	83
1881–85	77
1886–88	74

[a] Mulhall.

Report of the Inspector of Lunatics in Ireland.

In Ireland the number of lunatics per 100,000 was 251 in 1881, 345 in 1891, and 475 in 1901.

PAUPERISM.

The amount spent annually on poor relief in England and Wales from 1702 to 1888 is given in Table 13. There is a large increase up to 1835, then a decrease, with variations.

TABLE 13.—*Poor relief in England and Wales, 1702–1888.*

Years.	Pence per inhabitant.	Years.	Pence per inhabitant.
1702–14	41	1841–50	74
1760–75	58	1851–60	69
1783–93	66	1861–70	77
1801–5	78	1871–80	75
1815–20	152	1884–88	73
1830–35	114	1894	78

The number of paupers per 1,000 population is given in Table 14, showing an increase in Ireland, but a slight decrease in the United Kingdom as a whole.

TABLE 14.—*Number of paupers per 1,000 population.*

	1877.	1897.
England	30	27
Scotland	27	24
Ireland	15	22
United Kingdom	27	26

NERVOUS DISEASES.

In Scotland deaths from nervous diseases and violent deaths decrease as the density of population decreases; thus the (Table 15) rural districts show the smallest number of deaths per 100,000 population. This is generally true of all diseases except typhoid fever and of deaths from old age, where the towns and rural districts lead.

TABLE 15.—*Deaths in Scotland from nervous diseases and violence, 1886.*

Scotland.	Deaths per 100,000 population from—	
	Nervous diseases.	Violence.
Cities:		
Men	284	100
Women	244	39
Towns:		
Men	246	92
Women	214	32
Rural:		
Men	193	87
Women	185	30
All Scotland:		
Men	248	93
Women	220	34

In England and Wales diseases of the nervous system gradually increased from 1861 to 1886. The deaths yearly per 1,000,000 inhabitants are given in Table 16.

TABLE 16.[a]

	Number.
1861–1870	1,575
1871–1880	1,760
1881–1885	1,800
1886	1,835

SUICIDE.

From Table 17 it will be seen that suicides are most frequent at ages 55 to 65, both in men and women; that in general men commit suicide almost three times as much as women.

It would be hazardous to give any general causes of suicide due to profession or trade. If we compare the three learned professions, the lawyer and physician are near the maximum in number of suicides, while the clergyman is nearest the minimum. The soldier commits more than twice as many suicides as any other profession, and is five times above the general average.

[a] Mulhall.

TABLE 17.—*Suicides in the United Kingdom.*

BY AGES.

Ages.	Suicides per 1,000,000 population.		
	Male.	Female.	Total.
10–15	4	3	4
15–20	26	30	28
20–25	62	34	47
25–35	99	42	69
35–45	175	62	116
45–55	271	103	184
55–65	396	119	251
65–75	894	113	243
75–85	306	85	183
Over 85	226	46	116
All ages	104	41	72

BY PROFESSION OR TRADE.

Profession or trade.	Suicides of men, 25–65, per 1,000,000.	Profession or trade.	Suicides of men, 25–65, per 1,000,000.
Miner	74	Printer	262
Clergyman	139	Farmer	270
Fisherman	157	Schoolmaster	290
Gardener	160	Cabman	303
Mason	175	Watchmaker	315
Laborer	177	Baker	328
Policeman	201	Clerk	329
Carpenter	213	Broker	346
Carter	214	Milkman	353
Grocer	218	Hairdresser	364
Smith	222	Butcher	407
Painter	224	Lawyer	408
Weaver	229	Physician	472
Miller	239	Beer seller	474
Tanner	249	Soldier	1,149
Shoemaker	252		
Tailor	256	General average	222

METHOD OF SUICIDE.

Hanging is the method of suicide most preferred, except in the case of women, who employ drowning the most (Table 18). Also, women, as compared with men, use poison almost twice as frequently, and jump from heights much more often than men.

Suicide by gunshot is extremely rare (only 2 in 1,000) among women. Under "otherwise" the number of women is five times as great as in the case of men, indicating that women employ more varied methods than men.

TABLE 18.[a]—*Methods of suicide in United Kingdom.*

	Men.	Women.	Total.
Hanging	417	240	365
Drowning	152	264	185
Cut and stab	207	129	184
Poison	79	145	99
Gunshot	67	2	48
Jump from heights	21	36	25
Railway train	24	8	19
Otherwise	33	176	75
All methods	1,000	1,000	1,000

[a] Mulhall.

In almost all cities suicide has been increasing, but London shows a gradual decrease from 1841 to 1880 (Table 19).

According to Mulhall, Scotland is the only country in the world where the rate of suicide in urban population is less than among the rural districts.

TABLE 19.[a]—*London suicides.*

Year.	Annual average per 1,000,000 population.
1841–1850	107
1851–1860	100
1861–1870	88
1871–1880	85

[a] Mulhall.

CONSUMPTION OF LIQUOR.

Table 20 shows a general decrease in the consumption of beer and cider and an increase in the use of spirits from 1700 to 1896; that is, the increase has been in rum, whisky, and brandy.

TABLE 20.[a]—*Consumption of liquor in the United Kingdom.*

Year.	Consumption per inhabitant of—			
	Wine.	Beer and cider.	Spirits.	Equivalent in alcohol.
	Gallon.	*Gallons.*	*Gallons.*	*Gallons.*
1700–1720	0.3	43	0.3	2.32
1720–1750	.3	53	.6	3.00
1760–1780	.3	51	.3	2.76
1790–1800	.4	27	.4	1.63
1810–1820	.3	26	.5	1.61
1830–1850	.2	26	.9	1.79
1850–1870	.3	27	1.0	1.91
1871–1880	.5	30	1.0	2.10
1886–1888	.4	27	.9	1.88
1896	.4	.....	1.0	1.90

[a] Mulhall.

TOBACCO.

Table 21 shows an increase in the consumption of tobacco per capita from 1801 to 1896.

TABLE 21.—*Consumption of tobacco in the United Kingdom.*

Year.	Amount consumed per inhabitant.	Year.	Amount consumed per inhabitant.
	Ounces.		*Ounces.*
1801	16	1861	19
1811	18	1872	22
1821	12	1881	23
1831	13	1888	23
1841	13	1896	28
1851	18		

DIVORCES.

Tables 22 and 23 show a relative increase of divorces in the United Kingdom. This increase is greatest in Scotland. Divorces for twenty years (1867–1886) were most frequent in Scotland, less frequent in England, and very much less frequent in Ireland.

TABLE 22.

Year.	Annual average per 1,000,000 population.
1858–1867	6
1868–1877	7
1878–1887	13
30 years	9

TABLE 23.

Year.	Divorces per 1,000 marriages.	Divorces per 1,000 marriages in—		
		England and Wales.	Scotland.	Ireland.
1867–1871	0.8	0.8	1.5	0.03
1872–1876	1.0	1.0	1.7	.10
1877–1881	1.7	1.8	2.7	.18
1882–1886	1.8	1.9	3.1	.16
20 years	1.3	1.4	2.2	.11
1890–1895	1.6	.....	.....	.....

GERMANY.

INCREASE OF CRIME.

TABLE 1.

Table 1 shows an increase of crime relative to population in Germany from 1882 to 1896, but a slight gradual decrease thereafter.

Year.	Crimes.	Persons convicted.	Convictions for every 100,000 of population of punishable age.
1882	389,658	329,968	1,040
1883	400,064	330,128	1,034
1884	426,490	345,977	1,080
1885	441,245	343,087	1,062
1886	450,636	353,000	1,080
1887	454,700	356,357	1,081
1888	453,359	350,665	1,048
1889	475,710	369,644	1,087
1890	498,390	381,450	1,105
1891	498,751	391,064	1,124
1892	534,025	422,327	1,202
1893	535,000	430,403	1,212
1894	546,494	446,110	1,244
1895	550,793	454,211	1,249
1896	550,622	456,999	1,244
1897	559,007	463,585	[a] 1,240
1898	572,381	477,807	[a] 1,257
1899	574,339	478,139	[a] 1,236
1900	563,819	469,819	[a] 1,195

[a] Based upon estimated population.

INCREASE OF CONVICTIONS.

In Table 2 is given the number of persons convicted in the German courts (except consular courts), with per cent of increase or decrease. It is evident from examination of the table that there has been a general increase in the number of convictions from 1882 to 1896.

TABLE 2.

Year.	Convicted persons.	Per cent of increase or decrease—	
		Since previous year.	Since 1882.
1882	329,961	.....	.....
1883	330,113	+0.05	+ 0.05
1884	345,968	+4.8	+ 4.9
1885	343,083	− .8	+ 4
1886	352,993	+2.9	+ 7
1887	356,346	+ .9	+ 8
1888	350,653	−1.6	+ 6.3
1889	369,625	+5.4	+12
1890	381,425	+3.2	+15.6
1891	391,051	+2.5	+18.5
1892	422,311	+8	+28
1893	430,387	+1.9	+30.4
1894	446,101	+3.7	+35.2
1895	454,192	+1.8	+37.7
1896	456,980	+ .6	+38.5

In Germany there has been a greater increase since 1882 of convictions (Table 3) of crimes against the person as compared with crimes against property.

TABLE 3.

	Per cent of increase of persons convicted since 1882.	Number convicted per 100,000 inhabitants.									
		Against the state.	Against public order.	Counterfeiting.	Against morality.	Rape.	Murder, manslaughter.	Injury to person.	Theft, embezzlement.	Injury to property.	All crimes.
1882	.....	4	9	0.3	16	12	1	63	370	31	568
1883	0.05	5	7	.3	13	10	1	65	353	27	549
1884	4.9	5	10	.4	15	11	1	78	358	31	578
1885	4	5	10	.3	15	11	1	81	335	33	560
1886	7	4	11	.3	15	11	1	84	337	30	565
1887	8	6	10	.3	16	12	1	86	337	34	576
1888	6.3	4	11	.4	15	11	1	82	334	32	563
1889	12.	5	11	.2	16	12	1	88	369	34	614
1890	15.6	5	15	.3	17	12	1	99	391	40	663
1891	18.5	5	15	.5	18	13	1	101	392	38	672
1892	28	5	15	.4	19	14	1	108	430	40	729
1893	30.4	6	17	.2	19	14	1	118	376	41	686
1894	35.2	7	20	.5	22	16	1	121	393	45	716
1895	37.7	7	20	.5	21	15	1	126	380	41	702
1896	38.5	8	20	.3	21	15	1	130	373	46	702

THE PREVIOUSLY CONVICTED.

Table 4 shows the relation of the number of first and previous convictions to convictions in general for the years 1892 to 1896, and also a similar comparison of young criminals. It will be seen how the yearly increase of convictions is due mainly to those previously convicted. The increase of this tendency and that of habitual crime is evident from this table.

TABLE 4.

Year.	Number per 1,000 convicted persons previously punished.											
	All ages.						From 12 to 18 years of age.					
	Not yet.	Already.	Once.	Twice.	3 to 5 times.	6 or more times.	Not yet.	Already.	Once.	Twice.	3 to 5 times.	6 or more times.
1882	751	249	110	55	62	22	.....	.....	.....	.....	.....	.....
1883	741	259	116	57	66	20	.....	.....	.....	.....	.....	.....
1884	736	264	117	59	67	21	.....	.....	.....	.....	.....	.....
1885	726	274	119	60	70	25	.....	.....	.....	.....	.....	.....
1886	719	281	120	60	73	28	.....	.....	.....	.....	.....	.....
1887	711	289	121	61	76	31	.....	.....	.....	.....	.....	.....
1888	707	293	121	62	76	34	.....	.....	.....	.....	.....	.....
1889	687	313	130	65	80	38	848	152	95	33	22	2
1890	672	328	136	69	84	39	838	162	100	37	23	2
1891	660	340	140	70	88	42	832	168	104	39	23	2
1892	653	347	141	72	89	45	828	172	105	39	26	2
1893	648	352	141	72	92	47	826	174	105	39	27	3
1894	631	369	145	75	97	52	814	186	111	40	31	4
1895	621	379	147	77	99	56	814	186	111	41	31	3
1896	611	389	147	78	104	60	812	188	110	40	34	4

YOUTH AND ADULTS.

Table 5 shows a general increase in number of convictions in proportion to the population both in youths and adults. The percentages in the last four columns of the table are computed in the total number convicted less those convicted for offenses against military service. This less number is very small.

TABLE 5.

Year.	Persons convicted.		Convictions per 100,000 population.		Per cent of increase or decrease of convictions.			
					From 12 to 18 years of age.		19 years of age and more.	
	From 12 to 18 years of age.	19 years of age and more.	From 12 to 18 years of age.	19 years of age and more.	Since previous year.	Since 1882.	Since previous year.	Since 1882.
1882	30,719	299,242	568	1,137	.....	.....	.....	.....
1883	29,965	300,148	549	1,134	− 2.4	− 2.4	−0.2	− 0.2
1884	31,342	314,626	578	1,182	+ 4.6	− 2	+4.7	+ 4.5
1885	30,704	312,379	560	1,164	− 2.1	− .1	−1	+ 3.4
1886	31,513	321,480	565	1,186	+ 2.6	+ 2.5	+2.3	+ 5.8
1887	33,113	323,233	576	1,188	+ 5.1	+ 7.7	+ .3	+ 6.1
1888	33,067	317,586	563	1,151	+ .3	+ 7.4	−2.4	+ 3.5
1889	36,790	332,835	614	1,188	+11.4	+19.7	+5.5	+ 9.2
1890	41,002	340,423	663	1,201	+11.4	+33.3	+2.7	+12.2
1891	42,312	348,739	672	1,224	+3 .1	+37.5	+3.1	+15.7
1892	46,496	375,815	729	1,307	+10	+51.2	+7.5	+24.3
1893	43,776	386,611	686	1,328	− 6.1	+42	+1.8	+26.6
1894	45,552	400,549	716	1,358	+ 3.8	+47.4	+3.8	+31.3
1895	44,384	409,808	702	1,364	− 2.5	+43.7	+1.8	+33.7
1896	44,275	412,705	702	1,356	− .3	+43.2	+ .3	+34.1
1897	45,329	.....	.....	.....	.....	.....	.....	.....
1898	47,986	.....	.....	.....	.....	.....	.....	.....
1899	47,512	.....	.....	.....	.....	.....	.....	.....
1900	48,657	.....	.....	.....	.....	.....	.....	.....

The youth from 12 to 18 years of age furnish almost one-tenth of the convictions. The per cent of convictions from year to year varies more in the case of the youth than of the adults; also it has increased much faster, in some years almost twice as fast as in the case of the adults.

CHILDREN UNDER 15 YEARS OF AGE.

The number of convictions of children between 12 and 14 years of age has decreased from 1894 to 1896, but convictions for forms of unchastity, serious theft, and receiving of stolen goods have increased. Crimes causing personal injury have decreased.

TABLE 6.—*Convictions of persons between 12 and 14 years of age.*

Nature of offense.	1894.	1895.	1896.
All crimes in general	8,215	7,601	7,686
Disturbing domestic peace	57	65	51
Disturbing Sunday rest	31	26	25
Unchastity and rape, etc	56	69	86
Insults, affronts, etc	71	60	47
Simple injury to body	103	100	87
Dangerous injury to body	428	485	428
Careless injury to body	42	29	32
Simple theft	4,829	4,403	4,338
Simple theft repeated	39	38	36
Larger theft	862	758	949
Embezzlement	239	219	222
Receiving of stolen goods	290	296	315
Cheating, fraud, etc	197	182	140
Offenses against game laws	57	68	58

Table 7 shows, as to theft alone, a general decrease in convictions of youth until 1890, when there is a sudden increase, which continues except in the years 1893 and 1896. In the case of the adults the decrease in per cent of convictions is constant throughout.

If we consider all convictions except for theft, there is a general increase for both youth and adults; the increase, however, is much greater with the youth. The youth also show not only an increase but a much higher per cent of increase of convictions for injury to the body than the adults.

TABLE 7.—*Per cent of increase or decrease since 1882.*

Year.	Theft.		All crimes except theft.		Severe injury to body.	
	Youth.	Adults.	Youth.	Adults.	Youth.	Adults.
1883	− 4.9	− 3.7	− 0.9	+ 0.7	+ 2.1	+ 5.9
1884	− 3.5	− 8.1	+ 9.4	+ 8.2	+ 25	+23.5
1885	− 9.9	−15	+11.2	+ 8.4	+ 31.2	+31.6
1886	− 9.9	−17.8	+13.4	+11.6	+ 39.6	+36
1887	− 9.6	−22.7	+17.9	+13.5	+ 41.7	+40.4
1888	−10.2	−25.2	+12.5	+ 9.1	+ 37.5	+36.8
1889	− .9	−19	+21.4	+11.9	+ 45.8	+39
1890	+ 4.9	−22.4	+34.4	+15.5	+ 60.4	+45.6
1891	+ 5.2	−17.8	+37.5	+17.7	+ 62.5	+47
1892	+15.4	− 9.3	+47.3	+24	+ 75	+54.4
1893	− .3	−21.2	+51.8	+29.9	+ 91.7	+69.1
1894	+ 4.7	−23.4	+56.7	+34.7	+ 97.9	+77.9
1895	+ .6	−26.2	+57.1	+35.7	+104.2	+80.9
1896	− 1.2	−28.7	+59.4	+35.2	+112.5	+89.7

SUICIDE.

From Table 8 it will be seen that suicides have increased but little from 1893 to 1896. Men commit suicide almost four times as often as women.

TABLE 8.—*Number of suicides per 100,000 inhabitants.*

1893–1896:	
Men	33.8
Women	8.5
All	21
1893	20.6
1894	20.2
1895	21.7
1896	21.2

BEER AND TOBACCO.

Table 9 shows a large increase per capita in the production and consumption of beer. This increase in beer drinking may mean less drinking of stronger liquors. There has also been a gradual increase in the consumption of tobacco.

TABLE 9.

Year.	Production of beer per capita.	Consumption of beer per capita.	Consumption of tobacco per capita.
	Liters.	*Liters.*	*Kilograms.*
1877–78	62	88.7	2.2
1880–81	62	84.6	1.3
1885–86	68	88.8	1.4
1887–88	76	97.7	1.5
1888–89	77	97.5	1.4
1889–90	85	105.8	1.5
1890–91	84	105.8	1.6
1891–92	84	105.5	1.5
1892–93	84	107.8	1.4
1893–94	86	108.5	1.5
1894–95	84	106.9	1.6
1895–96	92	115.7	1.8
1896–97	92	115.8	1.8

PRUSSIA.[a]

The number of inmates of all penal institutions of Prussia on March 31, 1899, was 44,960, divided as follows:

1. In the penitentiaries	16,060
2. In the large prisons	8,588
3. In the small prisons	331
4. In houses for compulsory education	11,341
5. In houses of correction	8,640
Total	44,960

SINGLE CELLS.

In the penitentiaries there were 4,652 single cells. In the prisons there were 3,908 single cells.

TABLE 10.

	Of those released there were in solitary confinement—				
	In all.	Under 18 years of age.	From 18 to 25 years of age.	25 years and older.	
				Not several times previously punished.	Several times previously punished.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Penitentiaries	34.6	.....	86.3	35.5	22.6
Prisons	51.8	89.8	90.4	47.8	21.1

[a] Taken from and based upon Statistick der . . . . Straftanstalten und Gefänguisse. Berlin, 1899.

DECREASE IN PRISON POPULATION.

In Germany only those 18 years of age or more can be confined in a house of correction.

Table 11 shows that serious crimes lessened from 1869 to 1871, then were on a somewhat constant increase to 1881–82, then a similar decrease, so that in 1897–98 prison population was 35 per cent less than in 1869 and 48 per cent less than in 1881–82.

TABLE 11.

Year.	Number of prisoners per 10,000 population.	Year.	Number of prisoners per 10,000 population.	Year.	Number of prisoners per 10,000 population.
1869	4.73	1879–80	4.99	1889–90	4.13
1870	3.85	1880–81	5.82	1890–91	4.09
1871	3.64	1881–82	6.01	1891–92	4.14
1872	4.19	1882–83	5.41	1892–93	4.25
1873	4.35	1883–84	5.02	1893–94	4.06
1874	4.81	1884–85	4.94	1894–95	3.98
1875	4.47	1885–86	4.61	1895–96	3.77
1876	4.98	1886–87	4.50	1896–97	3.69
1877–78	5.20	1887–88	4.35	1897–98	3.08
1878–79	5.47	1888–89	4.06	1898–99	3.22

INCREASE OF PREVIOUS CONVICTIONS.

While there has been a decrease in prison population, there has been an increase in the number of those previously convicted relative to the prison population (Table 12). More than three-fourths of both men and women prisoners were previously convicted. From 6 to 10 per cent more of the men were previously convicted than the women; but 2 to 7 per cent more of the men were convicted more than three times than in the case of the women.

TABLE 12.

Year.	Number of prison inmates.		Number of prisoners previously punished.		Per cent of prisoners previously punished.		Per cent of prisoners punished more than 3 times.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
1889–90	5,812	1,284	4,868	976	83.76	76.01	63.92	61.37
1890–91	5,865	1,247	4,976	980	84.89	78.59	64.49	62.31
1891–92	6,025	1,242	5,126	969	85.08	78.02	66.59	63.52
1892–93	6,246	1,288	5,320	1,005	85.17	78.03	67.15	60.33
1893–94	6,060	1,215	5,199	935	85.79	76.95	67	61.40
1894–95	6,148	1,057	5,264	808	85.62	76.44	67.52	60.74
1895–96	5,745	1,072	4,925	812	85.73	75.75	68 01	59.79
1896–97	5,490	978	4,720	739	85.97	75.56	68.96	60.94
1897–98	4,694	924	4,080	716	86.92	77.49	70.66	64.50
1898–99	4,954	872	4,320	676	87.20	77.52	70.04	63.53

AGE OF PRISONERS.

Table 13 shows an increase in young prisoners (age 18 to 21) from 1894 to 1897, then a sudden decrease follows. More than a third of the prisoners are under the age of 30; that is, a large number are young men.

TABLE 13.—*Number of prisoners of certain ages per 10,000 of population.*

Ages of prisoners.	1894–95.	1895–96.	1896–97.	1897–98.	1898–99.
18 to 21 years	2.63	2.63	2.72	1.98	2.21
21 to 25 years	4.47	4.28	3.89	3.66	3.44
25 to 30 years	5.88	5.29	5.07	4.09	4.09
30 to 40 years	5.26	4.53	4.33	3.89	3.86
40 to 50 years	4.55	4.26	4.15	3.63	3.58
50 to 60 years	3.22	3.28	2.72	2.40	2.35
60 to 70 years	1.57	1.39	1.47	1.28	1.26
70 years and more	.58	.42	.51	.46	.50

In Table 14 the number of those previously punished as well as those punished more than three times will be found. There is a slight increase in the number of recidivists during the last eight years.

TABLE 14.

Year.	In prison before.		In prison more than 3 times.	
	Men.	Women.	Men.	Women.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
1889–90	84	76	64	61
1890–91	85	78	65	62
1891–92	85	78	66	63
1892–93	85	78	67	60
1893–94	86	77	67	61
1894–95	86	76	67	60
1895–96	86	76	68	60
1896–97	86	75	69	61
1897–98	87	77	71	64

BAVARIA.[a]

In Bavaria there has been a general increase of crime during the ten years from 1884 to 1894, as will be seen from Table 15, which gives the number of inhabitants to every convicted person.

TABLE 15.—*Number of inhabitants to every convicted person.*

1884	100	1890	97
1885	98	1891	98
1886	95	1892	91
1887	98	1893	90
1888	96	1894	82
1889	99		

Table 16 gives the relative increase or decrease of crimes of different nature. Crimes against domestic peace, of injury to body, against personal freedom, and of fraud have increased. Crimes of insult and injury, of stealing and embezzlement have decreased:

TABLE 16.—*Per cent of those convicted for various crimes.*

Crimes.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Against State	2.5	2.4	2.5	2.4	2.3	2.2	2.3	2.2	2.1	2.2	2.3
Against domestic peace	2.6	2.6	2.7	2.9	2.7	2.6	2.9	3	2.9	3	3.2
Against military duty	2.7	2.8	2.2	3.7	2.3	3.4	2.5	2.7	2.9	2.3	2.7
Against morality	1.9	2	1.9	1.9	1.9	1.7	1.8	1.9	1.8	1.9	1.9
Insult, injury	14.4	13.9	14.9	13.2	13.9	12.3	11.9	11.6	11.1	11.7	11.2
Injury to body	21.7	22	23	22.4	23.2	22.8	22.5	23.5	23.9	25.4	25.5
Against personal freedom	3	3.1	3.4	3.5	3.5	3.3	3.5	3.7	3.9	4.1	4.3
Stealing	24.2	23	22	21.8	22.3	23.6	23.5	23.5	22.5	20.3	19.7
Embezzlement	5.8	5.7	5.7	5.8	6.1	6.2	6.1	5.8	5.8	5.7	5.5
Receiving stolen goods	1.7	1.8	1.7	1.6	1.5	1.5	1.6	1.6	1.5	1.4	1.2
Fraudulent	7.7	8	8.4	9.3	9.7	9.7	10.9	9.9	11.3	11.3	11
Perjury	1.2	1.3	1.3	1.5	1.5	1.4	1.3	1.1	1.1	1.2	1
Breaking game laws	1.8	1.8	1.5	1.6	1.3	1.1	1.1	1.2	.98	.89	.89
Injuring property	3.4	3.5	3.6	3.4	3.5	3.2	3.2	3.5	3.4	3.5	3.8

[a] Ergebnisse der Civil- und Strafrechtspflege * * * des Königreichs Bayern. München, 1897.

FRANCE.

From 1831 to 1885 there is a large increase of number of criminals condemned relative to population, as will be seen from Table 1.

TABLE 1.[a]

Year.	Condemned.	
	Total.	Per 1,000 population.
1831	426,000	13.3
1840	549,000	16.1
1850	736,000	21.0
1860	894,000	24.2
1870	549,000	14.4
1880	995,000	26.5
1885	1,111,000	29.4

[a] Mulhall.

From 1880 to 1894 there has been an increase in crime in general (Table 2). Since 1892 there has been a decrease in theft and swindling. Crimes of violence present an increase.

TABLE 2.[a]

[Correctional tribunals.]

	1880.	1890.	1891.	1892.	1893.	1894.
Persons accused of—						
Crimes of all kinds	199,637	229,143	233,704	248,537	247,888	249,166
Theft	46,013	49,801	50,874	53,175	49,214	47,709
Swindling	4,027	4,571	4,073	4,020	3,905	3,749
Abuse of confidence	3,979	4,229	4,109	4,252	4,394	4,704
Assaults (strokes and wounds)	23,378	28,769	29,386	32,698	35,635	35,395
Crimes against public decency	2,899	3,025	3,092	3,240	3,522	3,325
Vagabondage	11,985	19,971	17,887	19,356	18,628	19,723
Number of convictions in police courts	.....	447,273	447,203	4,360,601	.....	448,474

[a] This and the following tables, not otherwise designated, are taken from or based upon the "Compte Général de l'Administration de la Justice Criminelle en France, etc. Paris, Imprimerie Nationale 1896 and 1901."

Table 3 gives the number of persons convicted before the various courts. There is an increase in convictions from 1895 to 1897.

TABLE 3.

[From Statesman's Yearbook for 1902.]

Year.	Assize courts.	Correctional tribunals.	Police courts.
1895	2,372	221,234	298,723
1897	2,378	225,213	436,734
1898	2,226	219,346	.....

MINORS.

Table 4 shows a general increase of the number of those accused of crime among minors. There is a slight decrease of the accused among girls less than 16 years of age.

TABLE 4.—*Minors accused of crime against common law.*

Ages.	1880.	1890.	1891.	1892.	1893.	1894.
Males:						
Less than 16	5,634	6,284	5,914	6,118	5,917	5,967
From 16 to 21	22,267	25,416	26,181	27,744	28,350	28,701
Females:						
Less than 16	975	1,097	1,013	1,030	981	934
From 16 to 21	3,168	3,039	3,228	3,479	3,532	3,616
Total	32,044	35,836	36,336	38,371	38,780	39,218

CRIMINAL RECIDIVISTS.

Table 5 indicates a general increase in the number of recidivists. The increase is greater relatively among the women than men.

TABLE 5.—*Number of recidivists.*

Year.	Men.	Women.	Total.
1884	1,551	57	1,608
1890	1,604	79	1,683
1891	1,586	84	1,670
1892	1,638	92	1,730
1893	1,641	100	1,741
1894	1,507	83	1,590

Table 6 shows also an increase of old offenders from 1826 to 1880.

TABLE 6.[a]—*Proportion of increase of old offenders.*

	Per cent.
1826	10
1850	28
1870	41
1880	48

CRIME AGAINST PROPERTY AND PERSON.

The number of men convicted of crime against property has always been greater than that of men convicted of crimes against person, but with women the reverse is true, as seen in Table 7.

TABLE 7.

[Assize courts.]

Year.	Men convicted of—		Women convicted of—	
	Crimes against person.	Crimes against property.	Crimes against person.	Crimes against property.
1874	1,576	2,792	396	464
1884	1,520	2,164	330	263
1890	1,251	2,196	323	308
1891	1,298	2,206	398	305
1892	1,372	2,076	356	292
1893	1,519	2,154	319	277
1894	1,327	2,007	317	264

[a] Mulhall.

COURT OF ASSIZES.

Table 8 shows that in the court of assizes, while convictions for crimes against person have increased, convictions for crimes against property have decreased. The four forms of homicide—murder, assassination, parricide, and poisoning—have increased from 1889 to 1894. From 1895 to 1897, inclusive, there is a decrease, but in 1898 a large increase. This seems to contradict the idea that modern civilization tends to diminish the violent forms of crime. As an explanation, Darlin, minister of justice of France, says that correctionalism in crime is spreading, but it works with more facility against thefts and other crimes than against homicide.

TABLE 8.—*Convictions for crimes against person and against property and for homicide.*

Nature of crimes.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
Crimes against person	.....	1,386	1,402	1,461	1,549	1,451	1,302	1,360	1,213	1,170
Crimes against property	.....	1,596	1,537	1,488	1,486	1,402	1,224	1,228	1,279	1,183
Homicides	372	420	.....	.....	429	441	384	385	371	461

CORRECTIONAL RECIDIVISTS.

Correctional recidivists are those which come before the correctional tribunals. These recidivists have increased in number (Table 9) to a much greater extent than recidivists in general; but the increasing indulgence of the correctional tribunals (Darlin) will be seen from the fact that recidivists condemned from one to five years have decreased considerably in number. From 1894 to 1898 the number of recidivists has gradually decreased.

TABLE 9.

Year.	Correctional recidivists.	Condemned from 1 to 5 years.	Year.	Correctional recidivists.	Condemned from 1 to 5 years.
1880	74,009	4,316	1894	104,644	2,476
1890	99,098	2,658	1895	99,434	.....
1891	98,253	2,557	1896	97,271	.....
1892	105,380	2,786	1897	93,909	.....
1893	104,528	2,498	1898	93,475	.....

DIVORCES.

In Table 10 we find an almost continuous increase in number of divorces in proportion to population. Urban life, especially that in the department of the Seine, shows a strikingly large number of divorced persons as compared with the rural population.

TABLE 10.[a]—*Proportion of divorced persons for every 10,000 inhabitants.*

Year.	Department of the Seine.	Population.		France, entire.
		Urban.	Rural.	
1885	9.4	3.8	0.70	2.20
1886	4.4	2.8	.64	1.54
1887	7.6	2.8	.80	1.90
1888	9.2	3.8	1.04	2.40
1889	8.8	3.8	1.06	2.48
1890	10.4	4.2	1.26	2.84
1891	10.4	4.4	1.30	3.00
1892	9.2	4.6	1.44	3.00
1893	.....	.....	.....	3.21
1894	9.8	4.8	1.68	3.34
1895	10.8	5.0	1.72	3.50
1896	12.0	5.0	1.82	3.66
1897	11.6	5.2	2.00	3.86
1898	10.6	5.2	1.96	3.74
1899	10.2	5.2	2.00	3.70
1900	9.3	5.3	2.02	3.68

[a] Statistique Générale de la France. Imprimérié Nationale, Paris, 1901.

PAUPERISM.

In Table 11, by Levasseur, pauperism from 1813 to 1887 is shown to be on the decline.

TABLE 11.[a]—*Paupers per 1,000 population.*

1813	165	1861	53
1829	79	1872	54
1847	79	1887	51

INSANITY.

Table 12 shows an increase in insanity, both in relation to the population and in the number of inmates in asylums. The cases attributed to drink increase rapidly from 1856 to 1866.

TABLE 12.[a]

Year.	Insane per 100,000 population.	Caused by drink.	Number of insane in asylums.	Number insane in Infirmary of Paris.
		Per cent.		
1851	129	8	.....	.....
1856	166	9	.....	.....
1866	238	14	.....	.....
1869	247	15	.....	.....
1871	.....	.....	37,720	.....
1872	.....	.....	.....	3,084
1879	252	15	.....	.....
1880	.....	.....	45,060	3,484
1886	.....	.....	52,870	.....
1888	.....	.....	.....	4,449

[a] Based on Mulhall.

Alcoholic insanity in 1890 was twice as frequent as it was fifteen years previous (Mulhall). The number of persons put under restraint on account of it increased 25 per cent from 1887 to 1890. Lunier (1856) found the number of persons who become insane yearly in a million of each class, as follows:

TABLE 13.

Peasants	52	Learned professions	525
Tradesmen	180	Soldiers	590
Capitalists	275	Officers	1,300

The large number of officers is striking.

SUICIDE.

From Table 14 it will be seen what a great increase there has been in the number of suicides.

TABLE 14.[a]

Year.	Number of suicides.	Number per million population.	Year.	Number of suicides.	Number per million population.
1830	1,756	51	1870	4,957	133
1840	2,752	82	1880	6,638	178
1850	3,596	103	1885	7,902	205
1860	4,050	112			

[a] Mulhall.

TABLE 15.[a]—*Suicides with and without children per million (Legoyt).*

	With children.	Without children.
Husband	205	470
Widower	526	1,004
Wife	45	158
Widow	104	238

[a] Mulhall.

Table 15, of Legoyt, would seem to indicate a striking effect of children in decreasing the number of suicides in families. Legoyt shows the favorable influence of marriage in its influence upon the tendency to suicide, as follows:

	Per million.
Married	272
Unmarried	422
Widowed	737

In five years ending 1880 no fewer than 238 children under 15 years of age committed suicide.

STERILITY.

Tables 16 and 17 show a general increase in sterility, which is one of the signs of degeneration.

TABLE 16.[a]—*Birth rate for Paris and for the whole of France for certain periods.*

Period.	France.	Paris.	Period.	France.	Paris.
1801–1810	33	.....	1841–1850	27.3	31.4
1811–1820	31.8	.....	1851–1860	26.1	31.5
1821–1830	30.6	35.9	1861–1870	26	30.1
1831–1840	28.8	35.1	1871–1880	25.6	27.4

[a] Mulhall.

TABLE 17.[a]—*Stillbirths per 1,000 births.*

Period.	Male.	Female.	Total.	Lawful.	Illegitimate.	Total.
1841–1850	39	29	34	32	66	34
1853–1862	49	35	42	40	71	42
1863–1870	51	38	45	41	81	45

[a] Mulhall.

ALGERIA.

Table 18 gives the number of those convicted in the courts of assizes for crimes against property and against person. The number of crimes against person is double that against property:

TABLE 18.—*Convictions in courts of assizes for crimes against person and against property in Algeria.*

	1884.	1890.	1891.	1892.	1893.	1894.
Crimes against person	483	459	591	630	650	642
Crimes against property	246	240	233	214	244	233

In the correctional tribunals there were—

	Cases.
In 1884	8,663
In 1890	11,060
In 1893	15,154
In 1894	14,491

Showing a considerable increase in crime.

The recidivists have increased in number, as the following statement will show:

	Recidivists.
1884	1,555
1890	1,863
1891	2,211
1892	2,185
1893	2,617
1894	2,475

ITALY.

In Italy from 1880 to 1896 there was a large increase in crime, except in homicides, which decreased. The greatest increases were in frauds in commerce, in crimes against customs, and against special laws. The decrease in the most violent form of crime seems to have been counteracted by a greater increase in the less severe crimes:

TABLE 1.—*Proportion of crimes per 100,000 inhabitants in Italy.*[a]

Years.	Frauds in commerce and industry.	Against good custom and family.	Homicides.	Thefts, robberies.	Total of all crimes.	Violent resistance to authority.	Breaking of special laws.	Mendicity.	Drunkenness.
1880	3.65	10.78	19.26	.....	.....	.....	.....	.....	.....
1881	3.79	13.43	17.17	.....	.....	.....	.....	.....	.....
1882	3.95	13.30	16.32	.....	.....	.....	.....	.....	.....
1883	4.13	13.26	15.64	.....	.....	.....	.....	.....	.....
1884	4.70	13.40	15.37	.....	.....	.....	.....	.....	.....
1885	5.72	13.55	14.77	.....	.....	.....	.....	.....	.....
1886	5.65	13.80	14.43	.....	.....	.....	.....	.....	.....
1887	7.70	14.82	13.49	305.32	1,789.94	42.02	574.32	.....	.....
1888	8.87	15.14	14.54	355.48	1,868.73	40.30	609.48	.....	.....
1889	8.57	15.96	13.43	352.47	1,918.78	37.09	657.92	.....	.....
1890	13.58	16.24	12.10	352.00	2,034.99	38.16	756.67	.....	.....
1891	14.62	17.77	13.08	363.11	2,157.77	46.27	793.03	.....	.....
1892	13.58	19.04	14.53	352.44	2,179.72	50.09	814.65	.....	.....
1893	14.33	19.23	14.20	346.52	2,164.37	50.20	790.83	.....	.....
1894	15.10	20.16	12.80	360.54	2,294.64	49.39	856.46	[b] 31.10	[b] 54.27
1895	15.07	20.35	12.49	377.77	2,348.61	46.63	866.41	[c] 38.09	[c] 43.04
1896	.....	20.74	12.44	395.80	2,466.50	47.45	936.75	47.50	39.99
1897	.....	23.93	12.79	414.39	2,572.67	48.11	.....	39.56	40.73
1898	.....	23.92	11.91	438.23	2,666.86	54.96	.....	51.08	40.91
1899	.....	23.77	11.32	400.05	2,608.93	50.26	.....	38.23	46.65

[a] Based on Annuario Statistico Italiano, Roma, 1898, and Statistica Giudiziaria Penale per l' anno 1899, Roma, 1902. [b] 1890–1892. [c] 1893–1895.

EDUCATION.

Table 2 shows a gradual decrease in illiteracy and a gradual increase in number of pupils in public schools. The number of university students has almost doubled from 1871 to 1896.

TABLE 2.[a]

Year.	Analphabets per 100 population.	Pupils in public elementary schools per 100 population.	Number of university students.
1871	67.23	5.77	11,997
1881	59.07	6.50	12,191
1884	55.81	7	14,229
1888	52.02	7.20	15,874
1889	50.83	7.20	16,496
1890	50.75	7.30	16,922
1891	50.14	7.39	17,518
1892	49.17	7.47	17,792
1893	47.71	7.51	.....
1894	47.29	7.57	19,739
1895	45.88	7.65	21,439
1896	44.76	7.65	21,955
1897	44.55	.....	.....

[a] Based on "Annuario statistico italiano," Roma, 1898 and 1900. Roma, 1900, 1902.

LITERATURE.

Table 3 shows a general decrease in the number of books and pamphlets published from 1872 to 1897. The official tables show, however, an increase in works of fiction, in medical works, and in political and sociological works. These have not been given in Table 3.

There is an increase in the number of readers in government libraries and in the number of journals and periodicals published.

TABLE 3.

Year.	Number of readers in government libraries.	Number of works, pamphlets, reviews published.	Total number of journals and periodicals.	Number of works copyrighted.
1871	.....	.....	765	.....
1872	853,901	.....	.....	1,038
1873	.....	.....	1,127	.....
1875	820,385	.....	.....	615
1880	863,297	.....	1,454	403
1885	792,320	.....	1,459	1,101
1886	758,133	11,034	.....	858
1887	.....	.....	1,606	.....
1889	.....	.....	1,596	.....
1890	848,685	10,339	.....	1,061
1891	943,903	10,311	1,779	840
1892	.....	9,742	.....	1,238
1893	.....	9,489	1,897	897
1894	1,179,638	9,416	.....	859
1895	1,251,367	9,437	1,901	805
1896	1,273,921	9,778	.....	792
1897	1,277,835	9,732	.....	993

NERVOUS DISEASES.[a]

From Table 4 it will be seen that there has been a general decrease in nervous diseases from 1887 to 1896, except in the case of alcoholism and cerebral and spinal meningitis.

TABLE 4.—*Deaths per million inhabitants.*

Disease.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
Cerebral apoplexy	1,095	1,128	1,058	1,019	1,046	1,020	1,000	1,009	1,030	982	927
Epilepsy	62	78	74	71	74	71	68	62	65	60	57
Infintile eclampsia	808	807	778	755	736	694	681	644	650	632	590
Paralytic demencia	12	15	13	10	10	12	12	8	11	12	10
Rachitism	106	93	91	101	101	107	90	81	90	101	100
Alcoholism	15	14	14	16	15	20	21	20	15	18	16
Homicide	52	55	49	44	47	51	54	46	48	47	49
Cerebral and spinal meningitis	479	509	481	464	477	478	536	479	597	532	485
Myelitis and tabes dorsalis	136	142	128	157	170	157	145	148	162	118	101

SUICIDES.

Table 5 gives somewhat in detail the statistics as to suicide. There has been a large increase in the number of suicides, beginning with 890 for the year 1872 and ending with 1,895 for the year 1897. In general, nearly four times as many men commit suicide as women. The number of women suicides is much more variable from year to

[a] Annuario Statistico Italiano, Roma, 1898; Roma, 1900.

year than that of the men. From 1872 to 1880 suicide was a little more frequent in married persons than in the unmarried, but from 1881 to 1896 the reverse is true, only the unmarried show a proportionally larger number of suicides than the married do from 1872 to 1880.

AGE.

As to age, comparatively few suicides are committed before 20 or after 80. From 1872 to 1880 a few more suicides seem to have been committed from ages 40 to 60 than from 20 to 40, but after this the reverse is true, only the excess is greater. There seems to be a parallelism here with the relation between the married and unmarried, as noted above.

SEASON OF YEAR.

Spring and summer furnish the largest number of suicides and winter the fewest. As between spring and summer, the difference in number varies some until 1890, after which time—including 1896—the greater number of suicides occur in summer. In general, then, the order is summer, spring, autumn, and winter.

METHODS EMPLOYED IN SUICIDE.

The most frequent methods of suicide are by drowning and use of firearms; then come, in order of frequency, hanging, throwing oneself from some high place, poisoning, asphyxiation (otherwise than by hanging), sharp instruments, and crushing (as throwing oneself in front of a train).

TABLE 5.—*Suicides in Italy.*

Year.	Total number of suicides.	Sex.		Civil state.				Age.					
		Male.	Female.	Unmarried.	Married.	Widow or widower.	Unknown.	Under 20.	20 to 40.	40 to 60.	60 to 80.	80 and above.	Unknown.
1872	890	704	186	372	386	108	24	44	335	341	148	7	15
1873	975	788	187	375	433	138	29	53	359	355	197	7	4
1874	1,015	762	253	388	472	141	14	53	385	425	143	5	4
1875	922	747	175	409	382	106	25	55	376	342	129	8	12
1876	1,024	854	170	475	398	125	26	67	400	380	160	11	6
1877	1,139	915	224	477	504	136	22	85	427	429	185	8	5
1878	1,158	920	238	487	498	153	20	62	442	449	190	8	7
1879	1,225	1,001	224	529	533	132	31	62	497	433	214	14	5
1880	1,261	1,005	256	496	575	153	37	52	472	480	251	6	.....
1881	1,343	1,068	275	582	564	158	39	89	512	497	228	10	7
1882	1,389	1,147	242	642	536	160	51	82	576	487	231	5	8
1883	1,456	1,167	289	670	557	178	51	100	595	519	214	14	14
1884	1,370	1,115	255	615	540	169	46	86	548	468	252	13	13
1885	1,459	1,182	277	653	577	179	50	91	587	500	263	16	2
1886	1,225	1,007	218	564	466	140	55	88	508	400	219	9	1
1887	1,449	1,182	267	610	604	186	49	99	563	484	273	21	9
1888	1,590	1,280	310	673	632	205	80	93	629	531	317	11	9
1889	1,463	1,144	319	634	598	171	60	92	580	492	284	8	7
1890	1,652	1,356	296	717	672	202	61	119	636	559	310	18	10
1891	1,697	1,381	316	734	671	227	65	113	644	583	329	14	14
1892	1,723	1,392	331	742	721	219	41	99	630	640	325	19	10
1893	1,737	1,432	305	752	736	219	30	131	651	589	327	25	14
1894	1,732	1,381	351	789	645	204	94	148	693	562	298	12	19
1895	1,874	1,507	367	775	802	244	53	117	750	626	367	14	.....
1896	2,000	1,594	406	884	813	238	65	142	792	662	362	26	16
1897	1,895	1,504	390	802	825	220	48	157	732	623	352	22	9

TABLE 5.—*Suicides in Italy*—Continued.

Year.	Season.				Methods of suicide employed.								
	Spring.	Summer.	Autumn.	Winter.	Drowning.	Firearms.	Hanging.	Sharp instruments.	Falling from high places.	Crushing.	Poison.	Asphyxia.	Unknown.
1872	233	267	201	189	300	202	162	45	85	13	54	16	13
1875	292	277	178	175	252	232	160	53	96	24	58	29	18
1880	411	374	252	224	385	309	211	63	143	41	58	45	6
1885	466	440	270	283	354	398	244	82	160	41	101	64	15
1890	468	472	369	343	406	418	262	83	174	62	120	65	62
1891	451	537	382	327	405	422	273	68	181	55	112	95	86
1892	493	540	351	339	442	409	286	68	184	49	145	80	60
1893	460	543	368	336	327	490	320	59	193	70	136	66	76
1894	478	544	372	338	368	492	272	69	169	76	125	84	77
1895	521	560	426	367	411	418	317	98	152	63	125	122	168
1896	572	614	404	410	415	498	326	70	156	79	168	105	183
1897	506	584	441	364	337	478	351	60	176	70	153	90	180

AGE AND CRIME.

The largest per cent of convictions occurs from 30 to 50, but if we combine the second and third columns (Table 6) there will be a still larger number of convictions between 18 and 30. That is, most of the convictions are among young men. The increase or decrease of convictions according to age has been very slight.

TABLE 6.—*Percentages of all convictions of crime for certain ages.*

Year.	Minors under 18 years.	From 18 to 21 years.	From 21 to 30 years.	From 30 to 50 years.	More than 50 years.
1890	11.54	11.42	28.33	35.11	12.89
1891	12.45	11.25	28.34	34.52	12.78
1892	11.61	11.34	29.17	34.80	12.51
1893	11.30	11.16	29.13	35.42	12.87
1894	11.75	11.77	28.40	34.73	12.85
1895	11.61	11.67	28.44	34.93	12.82

CIVIL AND CRIMINAL JUSTICE.

There has been not only an increase of criminal convictions, but also an increase of cases of general litigation, as Table 7 indicates. The number of divorces in proportion to marriages has increased.

TABLE 7.

Year.	All cases before all magistrates per 1,000 inhabitants.	Number of divorces per 10,000 married couples.	Year.	All cases before all magistrates per 1,000 inhabitants.	Number of divorces per 10,000 married couples.
1884	40.55	2.28	1891	48.34	2.47
1885	42.45	2.29	1892	45.77	2.45
1886	44.04	2.25	1893	50.01	2.64
1887	44.22	2.18	1894	52.05	2.83
1888	46.67	2.57	1895	49.30	2.86
1889	47.08	2.18	1896	49.79	2.83
1890	45.92	2.49	1897	50.20	2.94

RECIDIVISTS.

Table 8 shows that about one-fourth of those convicted have been previously convicted. Recidivists convicted once and from two to five times have increased; those convicted more than five times have decreased.

TABLE 8.—*Convictions classified according to previous convictions.*

Year.	All previously convicted.	Once convicted.	From 2 to 5 times.	More than 5 times.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
1890	27.42	45.34	43.65	11.01
1891	25.02	47.32	43.35	9.33
1892	24.31	48.01	44.46	7.53
1893	25.52	48.29	44.27	7.44
1894	24.17	48.55	44.13	7.32
1895	27.13	45.87	45.57	8.56

ALCOHOL AND TOBACCO.

In alcohol there has been an increase in production; in beer, an increase from 1871 to 1886, and thereafter a decrease (Table 9). The amount of tobacco sold has increased gradually from 1878 to 1897.

TABLE 9.

Years.	Average annual amount of alcohol per capita produced.	Average annual amount of beer produced per capita.
	Liters.	*Liters.*
1871–1878	0.473	.....
1879–1882	.929	0.605
1883–1886	1.025	749
1887–1889	.539	[a]812
1890–1897	.623	[b]560

Year.	Average quantity of tobacco sold per capita.	Year.	Average quantity of tobacco sold per capita.	Year.	Average quantity of tobacco sold per capita.
	Kilograms.		*Kilograms.*		*Kilograms.*
1878	6.36	1882	6.38	1894–95	7.13
1879	6.34	1883	6.54	1895–96	7.18
1880	6.33	1884–85	6.66	1896–97	7.29
1881	6.40	1890–91	7.15		

[a] 1887–1890. [b] 1891–1897.

DENSITY OF POPULATION.

Table 10 shows that density of population has gradually increased. The number of marriages and births has decreased, but the number of stillborn has increased.

TABLE 10.

Year.	Average population per quadratic kilometer.	Number of marriages per 1,000 population.	Number of still-born per 1,000 population.	Number of births per 1,000 population.
1872	94.08	7.53	1.10	37.97
1875	95.81	8.42	1.09	37.81
1880	98.70	6.97	1.08	33.96
1885	101.92	8.03	1.35	38.67
1890	105.21	7.38	1.40	36.03
1891	105.87	7.53	1.47	37.42
1892	106.52	7.51	1.47	36.48
1893	107.18	7.45	1.51	36.77
1894	107.84	7.51	1.50	35.79
1895	108.50	7.36	1.48	35.22
1896	109.16	7.14	1.49	35.12
1897	109.82	.....	.....	.....
1898	110.48	.....	.....	.....

BELGIUM.

EDUCATION.

In primary education (Table 1) there was from 1881 to 1890 a very large increase in the number of scholars—almost double the number in 1881.

TABLE 1.—*Percentage of primary scholars to population.*

1881	5.08
1890	10.13
1897	11.63
1898	11.61
1899	11.65

The progress of primary instruction may be seen from Table 2, which gives data as to young men entering the military service. Here, as in Table 1, there has been a large decrease in illiteracy.

TABLE 2.—*Literacy of young men in the military service of Belgium.*

	1870.	1880.	1890.	1895.	1897.	1898.	1899.	1900.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Unable to read and write	29.23	21.66	15.92	13.66	12.76	12.83	12.84	12.01
Able to read and write	70.77	78.34	84.08	86.34	87.24	87.17	87.16	87.99

UNIVERSITY EDUCATION.

The number of university students has not ceased to decrease since 1890, when it had reached its maximum. In 1889–90, there were 6,188 students; in 1894–95, 4,842; in 1895–96, 5,017; in 1897–98, 4,951; in 1898–99, 5,100; in 1899–1900, 5,194. In 1890 there were 102 students to every 100,000 inhabitants. In 1895 this number was 76, and in 1898, 75; in 1899, 76, and in 1900, 77.

LITERATURE.

The number of works published almost doubled from 1860 to 1885. The increase of newspapers and periodicals has been almost as great (Table 2a).

TABLE 2a.

Number of works published.

1860	722	1880	1,134
1865	770	1884	1,697
1870	834	1885	1,389
1875	1,188		

Number of newspapers and periodicals published.

1883	841	1895	1,264
1885	829	1896	1,348
1890	949	1897	1,318
1893	1,101	1898	1,373
1894	1,129	1899	1,409

MARRIAGE AND DIVORCE.

Table 3 gives a small increase in the proportion of marriages to population from 1860 to 1897, and a large increase in the number of divorces from 1840 to 1897.

The average number of divorces from 1885 to 1890 was 319, and from 1891 to 1896 was 476.

TABLE 3.

Year.	Number of marriages for each divorce.	Proportion of marriages per 1,000 population.	Year.	Number of marriages for each divorce.	Proportion of marriages per 1,000 population.
1840	1,175	.....	1890	130	7.32
1860	.....	7.54	1896	96	8.10
1865	739	.....	1897	86	8.22
1870	.....	7.02	1898	74	8.31
1880	182	7.03	1899	100	8.27

INSANITY.

From 1858 to 1897 the number of insane has doubled. The insanity of women has increased faster than that of men.

TABLE 4.

Year.	Number of insane—			Population.
	Men.	Women.	Total.	
1858	3,481	2,994	6,475	[a] 4,337,048
1868	4,287	3,953	8,240	[b] 4,827,833
1878	5,288	4,732	10,020	[c] 5,336,185
1883	4,454	4,309	8,763	[d] 5,520,009
1890	5,453	5,324	10,777	6,069,321
1896	7,037	6,278	13,315	6,495,886
1897	7,167	6,401	13,568	6,586,593
1898	7,473	6,749	14,222	.....
1899	7,620	6,965	14,585	6,744,532

[a] In 1856. [b] In 1866. [c] In 1876. [d] In 1880.

PENAL JUSTICE.

Table 5 shows a large increase in the number of persons accused in criminal courts from 1850 to 1897. In the correctional tribunals this number has more than doubled and in the police tribunals more than trebled. On the other hand, the prison population has decreased in the central prisons, but increased in the secondary prisons.

TABLE 5.

Year	Number of persons accused in—			Average population of prisons.	
	Court of assizes.	Correctional tribunals.	Police tribunals.	Central prisons.	Secondary prisons.
1835	.....	.....	.....	3,639	1,458
1840	.....	.....	.....	4,792	2,189
1850	270	24,482	49,890	4,912	2,089
1860	254	23,556	57,732	3,725	2,217
1870	133	26,507	70,179	2,029	2,672
1880	181	41,653	106,142	824	2,881
1890	140	48,330	149,783	860	3,424
1894	170	53,321	154,464	.....	.....
1895	155	50,627	155,661	715	3,721
1896	138	54,297	170,686	761	3,634
1897	148	52,224	166,884	735	3,833
1898	109	51,106	173,610	.....	.....
1899	.....	.....	.....	738	3,481

CIVIL JUSTICE.

In all the civil courts the number of cases entered has increased greatly from 1849 to 1897. The cases have almost doubled in the court of appeals, have increased fivefold in the tribunals of commerce, and threefold before the justices of peace.

TABLE 6.—*Statistics of civil justice.*

Year.	Number of cases entered in—				
	Court of "cassation."	Court of appeals.	Tribunals of commerce.	Tribunal.	Justice of peace.
1849-50	91	1,370	6,806	10,349	30,306
1859-60	47	1,458	11,414	10,328	32,351
1869-70	75	1,468	18,196	11,281	37,352
1879-80	65	1,964	33,113	15,612	56,236
1884-85	97	1,887	33,944	16,761	64,884
1889-90	82	2,150	35,267	16,983	75,426
1894-95	97	2,519	36,168	16,770	88,816
1895-96	97	2,528	35,215	17,034	100,341
1896-97	104	2,639	36,069	17,803	104,315
1897-98	94	2,508	38,522	17,761	99,736

POPULATION AND YEARS.

1846	4,336,048	1890	6,069,321
1856	4,529,560	1895	6,410,783
1866	4,827,833	1896	6,495,886
1876	5,336,185	1897	6,586,593
1885	5,853,278	1899	6,744,532

AGE OF SUICIDES.

The largest number of suicides are committed from ages 25 to 40. The greatest relative increase has been in persons less than 16 years

old, having doubled from 1886 to 1897. As compared with men, women commit suicide much more from ages 16 to 25 than men do. In general, from four to five men commit suicide to one woman.

TABLE 7.—*Suicides as to age.*

	1886 to 1890, average.			1896.			1897.			1898.	1899.
	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.		
Less than 16 years old	7	4	11	11	2	13	19	6	25	14	12
From 16 to 25 years	71	26	97	89	31	120	79	42	121	134	115
From 25 to 40 years	138	27	165	155	38	193	142	35	177	208	210
From 40 to 50 years	129	20	149	140	30	170	129	24	153	149	148
From 50 to 60 years	128	19	147	139	16	155	120	16	136	159	140
From 60 to 70 years	84	14	98	89	17	106	72	19	91	107	104
70 years and more	35	9	44	42	7	49	40	3	43	50	49
Age unknown	2	.....	2	3	.....	3	5	.....	5	2	3
Total	594	119	713	668	141	809	606	145	751	823	781

SUICIDES.

There has been a general increase in suicides from 1871 to 1897. The largest number are due to strangulation. Drowning or submersion and use of firearms are the next two methods most employed. Suicides among women have increased more than among men. The women employ poison and drowning much more than the men, relatively to their number of suicides.

TABLE 8.

Means of suicide.	Averages from 1871 to 1880.			Averages from 1881 to 1890.			1897.			1899.
	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.	
Firearms	51	1	52	88	3	91	97	4	101	132
Asphyxia by coal gas	1	.....	1	2	1	3	2	5	7	5
Asphyxia by other gases	2	1	3	2	1	3	1	.....	1	5
Asphyxia by suffocation	.....	.....	.....	.....	.....	.....	1	.....	1	7
Burning	.....	.....	.....	2	1	3	.....	1	1	3
Fall from elevation	4	1	5	5	3	8	4	3	7	7
Railroad train	9	1	10	16	1	17	24	3	27	30
Poison	6	6	12	6	10	16	14	13	27	19
Inanition	.....	.....	.....	.....	.....	.....	1	.....	1	.....
Sharp instruments	15	2	17	16	2	18	12	2	14	17
Industrial machines	.....	.....	.....	1	.....	1	1	.....	1	.....
Strangulation	202	27	229	285	38	323	300	41	341	348
Submersion	74	28	102	122	46	168	146	72	218	202
Horse and carriage	1	.....	1	1	.....	1	1	.....	1	1
Unknown	2	1	3	5	1	6	2	1	3	4
Total	367	68	435	551	107	658	606	145	751	781

MULTIPLE AND ILLEGITIMATE BIRTHS.

The number of illegitimate births (Table 9) has, relatively to number of births in general, increased from 1840 to 1897. This increase has been gradual. The number of multiple births has also increased relatively to births in general. The number of twins born has increased greatly from 1841 to 1895.

TABLE 9.—*Multiple and illegitimate births.*

	1840.	Annual averages. 1841 to 1850.	1851 to 1860.	1861 to 1870.	1871 to 1880.	1881 to 1890.	1895.	1897.	1898.	1899.
Number of legitimate births for 100 births	93.67	92.57	92.09	92.87	92.80	91.53	91.36	91.68	92.12	92.32
Number of illegitimate births for 100 births	6.33	7.43	7.91	7.13	7.20	8.47	8.64	8.32	7.88	7.68
Multiple births for 100 births	.....	.97	1.03	1.02	1.02	a 1.06 b 1.09	1.13	.....	.....	.....
Total number of twins born	.....	2,523	2,808	3,149	3,489	a 3,679 b 3,986	4,112	.....	.....	.....

a 1881–1885. b 1890.

CONVULSIONS, ALCOHOLISM, HOMICIDE.

Deaths caused by apoplexy and cerebral inflammation increased from 1851 to 1864, then were variable, decreasing from 1864 to 1869.

TABLE 10.

Year.	Deaths caused by— Convulsions.	Apoplexy, softening of brain.	Encephalitis, cerebral inflammation.	Acute alcoholism.	Homicide.	Suicide.
1851	5,523	3,696	2,686	.....	.....	.....
1852–1854	a 6,109	a 3,909	a 2,494	.....	.....	.....
1855	6,606	4,483	2,396	.....	.....	.....
1856–1860	a 6,948	a 4,207	a 2,349	.....	.....	.....
1864	7,603	4,951	2,687	.....	.....	.....
1865	8,368	4,745	2,699	.....	.....	.....
1866	7,869	4,702	2,588	.....	.....	.....
1867	7,124	3,129	1,602	.....	.....	.....
1868	7,276	3,086	1,490	.....	.....	.....
1869	6,757	3,323	1,637	.....	.....	.....
1870	.....	.....	.....	285	103	338
1871–1880	.....	.....	.....	a 385	a 86	a 435
1881–1890	.....	.....	.....	a 372	a 94	a 658
1895	.....	.....	.....	288	b 103	b 839
1897	.....	.....	.....	261	110	751
1898	.....	.....	.....	250	.....	823
1899	.....	.....	.....	286	108	781

a Average. b 1894.

Deaths caused by acute alcoholism have decreased from 1870 to 1897. Deaths from homicide have increased slightly, and from suicide the increase has been almost double from 1870 to 1897.

DEAF AND BLIND.

The number of inmates in institutions for the deaf and blind has increased greatly (doubled) from 1875 to 1896, and gradually from 1884 to 1896, but the number in orphan asylums has decreased.

TABLE 11.—*Number of persons in institutions under Government control.*

Year.	Deaf and blind.	Orphan asylums.	Year.	Deaf and blind.	Orphan asylums.
1875	710	3,473	1890	1,368	2,584
1878	884	3,262	1893	1,382	2,024
1881	1,111	1,902	1896	1,476	2,468
1884	1,076	1,955	1899	1,546	2,352
1887	1,269	1,703			

CHARITABLE INSTITUTIONS.

Taking the charitable institutions as a whole (Table 12), there has been a large increase from 1835 to 1895, nearly double the number of inmates; but from 1895 there has been a gradual decrease.

The average number of inmates in the poorhouses has doubled from 1835 to 1890–1897, and in the agricultural and charity schools the increase in average population since 1850 has been very great, beginning at 1895. There has been a decrease in the houses of refuge from 1895 to 1897, and in the reformatories from 1850 to 1897.

TABLE 12.—*Average populations of charitable institutions.*

Year.	Average population of—				Total.
	Poor-houses.	Houses of refuge.	Agricultural and charity schools.	Reformatories.	
1835	2,260	.....	.....	.....	.....
1840	2,828	.....	.....	.....	.....
1850	3,478	.....	.....	266	.....
1860	2,448	.....	.....	352	.....
1870	1,925	.....	.....	550	.....
1880	2,857	.....	.....	1,005	.....
1890	4,644	.....	.....	905	.....
1895	4,529	2,766	2,187	258	9,740
1896	4,430	2,314	2,209	249	9,202
1897	4,076	1,876	2,261	222	8,435
1898	4,208	1,983	2,360	240	.....
1899	4,248	1,823	2,382	227	.....

AUSTRIA.[a]

Table 1 gives in absolute numbers the general status of the penal institutions in Austria for the year 1895.

TABLE 1.—*General status of penal institutions in Austria for the year 1895.*

	Men.	Women.	Total.
Number of inmates January 1, 1895	8,995	1,276	10,271
Number entering during the year	4,344	570	4,914
Number leaving during the year	4,790	568	5,358
Number present at end of year	8,549	1,278	9,827
Decrease from previous year	446	.....	.....
Increase from previous year	.....	2	.....
Total decrease	.....	.....	444

DECREASE OF PRISON POPULATION.

From Table 2 we find that from 1878 to 1881 crime has increased over previous years, then decreased from 1882 to 1884, then increased from 1885 to 1886, and since then there has been a general decrease in absolute quantity with the exception of the years 1892 and 1894. In general there has been from 1878 to 1895 a general decrease in prison population in Austria.

[a] All the criminal and other data concerning Austria are taken from or based upon the "Statistische Uebersicht der Verhältnisse der österreichischen Strafanstalten." Wien, 1895 and 1900.

TABLE 2.

Year.	Whole number of days spent in prison for each year.	Per cent in comparison with previous year.		Year.	Whole number of days spent in prison for each year.	Per cent in comparison with previous years.	
		More.	Less.			More.	Less.
1878	3,626,762	1.3	.....	1887	3,528,240	.....	3.1
1879	3,665,784	1	.....	1888	3,466,315	.....	1.7
1880	3,743,699	2	.....	1889	3,359,101	.....	3
1881	3,800,821	1.5	.....	1890	3,339,436	.....	.5
1882	3,727,556	.....	1.9	1891	3,298,630	.....	1.2
1883	3,623,992	.....	2.7	1892	3,309,207	.3	.....
1884	3,600,765	.....	.6	1893	3,272,969	.....	1.9
1885	3,637,744	1	.....	1894	3,276,018	.09	.....
1886	3,641,723	.1	.....	1895	3,136,455	.....	4.2

Table 3 gives a general decrease in number of convictions.

TABLE 3.—*Convictions per 100,000 population in Austria (proper) for years 1886 and 1894.*

	Convictions per 100,000 population.	
	1886.	1894.
Crimes	129	123
Offenses	2,428	2,174
Total	2,557	2,297

INCREASE OF EDUCATION.

Table 4 shows an absolute increase in number of students in gymnasia and real gymnasia.

TABLE 4.[a]—*Gymnasia and real gymnasia—Number of scholars at end of year.*

1888–89	52,685	1892–93	53,589
1889–90	52,644	1893–94	54,411
1890–91	52,719	1894–95	55,713
1891–92	53,109		

Table 5 shows a relatively large increase in primary education from 1871 to 1895.

TABLE 5.[a]—*Number of children attending public schools per 1,000 population.*

1871	84.4	1885	112
1875	96.4	1890	115.9
1880	103.6	1895	130.6

DIFFERENCE BETWEEN MEN AND WOMEN CRIMINALS.

It would seem from Table 6 that the effects of heredity and unfavorable surroundings are greater in their influence upon women than upon men.

TABLE 6.—*Family stand of persons in prison in Austria, 1895.*

	Of legitimate birth.	Illegitimate.	Unmarried.	Widower or widow.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Men	87	13	71.6	28.4
Women	76.4	23.6	66.2	33.8

[a] Statistik der Unterrichts-anstalten für das Jahr 1894–95. Wien, 1898.

INFLUX OF CRIME INTO CITIES.

From Table 7 will be seen the tendency of the influx of the criminal element into cities, which is greater in the case of women than men. Thus 28.6 per cent of the men and 24.5 per cent of the women were born in the city, but 34.7 per cent of the men and 37.5 per cent of the women last lived in the city.

TABLE 7.—*Place of birth of offenders in penal institutions in Austria in 1895 and where they last lived.*

	Per cent having place of birth in—				Per cent last lived in—			
	Cities.	Country.	Foreign.	Unknown.	Cities.	Country.	Foreign.	Unknown.
Men	28.6	67.4	3.9	0.1	34.7	55.2	1	9.1
Women	24.5	71.1	4.4	.....	37.5	48.6	1.4	12.5

AGE OF CRIMINALS.

It will be noted from Table 8 that the majority of criminals are under 30 years of age; that the men are relatively younger than the women—78.7 per cent of the men and 72.9 per cent of the women are under 40 years of age.

TABLE 8.—*Offenders in penal institutions in Austria in 1895, divided according to ages.*

	14 to 16 years.	16 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	60 years and over.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Men	1.2	12.3	41	24.2	12.9	6	2.4
Women	1.6	7.6	41.2	22.5	13.7	10.8	2.6

EDUCATION IN PRISON.

Comparing women with men in Table 9, we find the women nave received less educational advantages both in school and at home; a larger per cent were away from home from ages 14 to 20.

TABLE 9.—*Educational advantages of inmates of penal institutions in Austria, 1894 and 1895, by sex.*

	Men.			Women.		
	1894.	1895.		1894.	1895.	
		Per c't.	*Number.*		*Per c't.*	*Number.*
Without schooling	1,381	27.4	1,263	236	38	216
Able to read	342	8.1	373	58	7.7	44
Able to read and write	3,054	61.2	2,822	267	54	306
Superior education	198	3.3	154	1	.3	2
Instruction before 14 years of age:						
At home	4,145	85.5	3,943	445	79.8	453
Away from home	830	14.5	669	117	20.2	115

In prison, as in the outside community, men have enjoyed more educational privileges than women.

In all teaching of religion, elementary knowledge, and "useful knowledge," or knowledge for the public good (table 11), the women show more than twice as many failures as the men.

TABLE 11.—*Education in prisons in Austria, 1895.*

	Number taught in general.	Results of religious teaching.			Results in elementary teaching.			Results of instruction in "useful knowledge."		
		Good.	Medium.	Bad.	Good.	Medium.	Bad.	Good.	Medium.	Bad.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Men's prisons	20.7	80	17.5	2.5	71.3	23.8	4.9	72.5	23.4	4.1
Women s prisons	22	63.5	30	6.5	54.6	37.3	8.1	54	34.6	11.4

PRISON LABOR.

In Table 12 we find the relative amount of prison labor for the needs of the prison; also, the connection of labor with the community outside is given.

TABLE 12.—*Prison labor in Austria, 1895.*

	Labor for prison needs.	Labor in connection with outside community.	
		Within the prison.	Without the prison.
	Per cent.	*Per cent.*	*Per cent.*
Men's prisons	29.9	61.4	8.7
Women's prisons	32	67.5	.5

PRISON DISCIPLINE.

As in the world in general, women's behavior is better in prison than men's. This will be seen in Tables 13 and 14.

Table 13 gives the conduct of prisoners discharged in the year 1895. The women also excelled in their savings from prison labor.

TABLE 13.—*Conduct of prisoners discharged from Austrian penal institutions in 1895.*

	Not punished in prison.	Conduct in prison.			Average savings from wages per capita.
		Good.	Medium.	Bad.	
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Fl. Kr.*
Men's prisons	56.9	74.9	14.6	10.5	14 79
Women's prisons	77.1	78.6	14.3	7.1	18 91

Women do not excel in good behavior as compared with men when they are recidivists, as Table 14 indicates. This illustrates the idea that woman is extreme in both good and evil.

TABLE 14.—*Prison discipline in Austrian penal institutions in 1895.*

	Per cent of all prisoners punished.	Per cent punished.	
		Recidivists.	Punishment repeated.
Men's prisons	24.2	63.4	42.1
Women's prisons	10.9	76.1	33.3
Cellular prisons	14	41.8	44.5
Reformatories (Prague, Marburg)	21.8	.....	52.6

The difference between men and women prisoners is very marked as to their treatment of each other. In Table 15, 41 per cent of women committed offenses against fellow-prisoners, while only 14.9 per cent of the men were likewise guilty. But the women were much more obedient in regard to their work.

TABLE 15.—*Offenses committed by inmates of penal institutions in Austria in 1895.*

Prison punishment for offenses—	Men prisoners.		Women prisoners.	
	Number.	Per cent.	Number.	Per cent.
Against officers	118	1.8	10	3
Against chaplains	15	.2	5	1.5
Against physicians	65	.9	.....	.....
Against keepers and guards	1,126	17.1	45	13.6
Against fellow-prisoners	981	14.9	135	41
Against third persons	76	1	1	.3
In relation to outside of prison	44	.6	3	.9
In relation to religious service	93	1.4	8	2.4
In relation to school	180	2.7	6	1.8
In relation to work	859	13.1	10	3
In relation to food	59	.9	.....	.....
In relation to other household matters	3,114	47.5	106	32.2

PREVIOUS IMPRISONMENT.

The most noticeable fact in Table 16 is the much higher per cent of female inmates who were never imprisoned before, as compared with male inmates. There is also a much smaller per cent of women than men imprisoned for light offenses.

TABLE 16.—*Statistics as to previous imprisonment of inmates of penal institutions in Austria in 1895.*

	Men.	Women.
	Per cent.	*Per cent.*
Never imprisoned before	18.2	31.2
Imprisoned for misdemeanors	24.5	13.5
Imprisoned for crime	57.2	55.1
Pardoned and recently convicted again	.1	.2

SICKNESS AND MORTALITY.

There are a few cellular prisons (6) in Austria. From Table 17 it appears that there is much less sickness and death in the cellular prisons, although there are more suicides. The mortality in the women's prisons is much higher than that of the men's prisons (Table 18).

TABLE 17.—*Sickness in prisons in Austria in 1895.*

	Men's prisons.	Women's prisons.	Cellular prisons.
All prisoners one or more times sick ..... per cent..	28.5	26.7	13
Average number of days of sickness for each case	28	40	21
Number of sick:			
Healed ..... per cent..	67.5	58.6	69.4
Improved ..... per cent..	18.2	17	20.2
Not benefited ..... per cent..	9.3	10.9	6.6
Died ..... per cent..	5	13.5	3.8
Mortality of whole number ..... per cent..	2.2	5.3	.6

TABLE 18.—*Mortality in prisons in Austria in 1895.*

	Men's prisons.	Women's prisons.	Cellular prisons.
	Per cent.	*Per cent.*	*Per cent.*
Diseases of brain and nervous system	6.7	2	5.2
Diseases of respiratory organs	9.6	9.2	5.2
Diseases of heart, vascular system	4.3	3	.....
Diseases of digestive organs	5	7.2	10.5
Urinary diseases	3.3	5.1	.....
Diseases of bones, muscles, and joints	1.7	.....	5.2
Diseases of general nature	13.6	11.2	10.5
Tuberculosis	52.2	61.3	53
Scrofula	2.3	1	5.2
Suicide	1	.....	5.2

In Table 18 the mortality of the women is much lower in brain and nervous diseases and higher in diseases of the digestive system and in tuberculosis than in the case of the men. In the cellular prisons mortality in diseases of the digestive system is much higher than in the other prisons.

THEFT THE CHIEF CRIME.

From Table 19 we see that theft is the chief crime, and is 20 per cent greater in women than men criminals. The women also lead the men in per cent of political crime, murder, and fraud proportionally to their number.

TABLE 19.—*Nature of last crime committed by prisoners in Austria in 1895.*

	Men's prisons.	Women's prisons.		Men's prisons.	Women's prisons.
	Per cent.	*Per cent.*		*Per cent.*	*Per cent.*
Political crime	1.6	4.8	Theft	63.9	82.8
Public violence	10.5	2.3	Embezzlement	1	.3
Rape and unchastity	4	.7	Robbery	1.7	.....
Murder	.6	1.2	Fraud	6.3	6.4
Manslaughter	7.9	.3	Misuse of official authority, etc	.6	.6
Counterfeiting	.5	.3			
Incendiary	1.4	.3			

RECIDIVISTS.

Table 20 gives the number of recidivists for the years 1894 and 1895, showing a decrease.

TABLE 20.—*Recidivists in Austria in 1894 and 1895.*

	Men.	Women.	Total.
1894	2,757	307	3,064
1895	2,508	313	2,821

With recidivists (Table 21), the women show a higher per cent of first convictions at ages 14 to 16, and from 30 on, and a higher per cent of last convictions at ages 14 to 16, and from 40 on; that is, habitual criminality in women begins earlier and lasts longer than in men, but is less than in men from 16 to 30.

TABLE 21.—*Percentage of convictions at certain ages of recidivists in Austrian penal institutions in 1895.*

AGE AT FIRST CONVICTION.

	14 to 16 years.	16 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	More than 60 years.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Men	7.9	30.8	46.3	11.5	2.9	0.4	0.2
Women	10.9	23.3	38.3	18.2	8	1.3	.....

AGE AT LAST CONVICTION.

Men	0.2	7.5	37.5	30	15.4	7.2	2.2
Women	1.2	5	34.5	22.3	20	14	3

Table 22 gives the per cent of recidivists who, after an interval of two years at most, again committed crime; showing that while the per cent has generally increased for the men's prisons, it has decreased in the women's prisons.

TABLE 22.—*Percentage of inmates of Austrian prisons who again committed crime after an interval of two years at most.*

	1890.	1891.	1892.	1893.	1894.	1895.
Prisons for men	54	56	60	58	61	56
Prisons for women	61	62	60	65	58	55

In Table 23 are given the intervals in which recidivists committed crime after being discharged from prison; thus 18.3 per cent of the men committed crime again within the first six months after discharge; 20 per cent within the second six months after discharge, etc. The majority of recidivists commit crime again before two years have expired after their discharge. The highest per cent of criminality is for men within the second six months after their discharge, and for women in the second year. Almost one-fifth commit crime within the first six months after their discharge.

TABLE 23.—*Intervals in which crime was again committed by recidivists in Austrian prisons in 1895.*

	6 months	1 year.	2 years.	3 years.	4 years.	5 years.	8 years.	10 years.	Longer.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Men's prisons	18.3	20	17.9	10.3	7.5	5.9	8.5	3.8	7.8
Women's prisons	17.2	15.3	22.7	14.4	7.2	5.4	8.3	3.5	6

Table 24 shows that the per cent of men prisoners who have become recidivists during a period of two years, at the most, has increased, while that of women has decreased from 1890 to 1895.

TABLE 24.[a]—*Inmates of Austrian prisons relapsing during interval of two years, at least.*

	1890.	1891.	1892.	1893.	1894.	1895.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Men	54	56	60	58	61	57
Women	61	62	60	65	58	55

[a] 1. Statistiche Übersicht der . . . Osterreichischen Strafanstalten im Jahre 1895. Wien, 1899.

CRIMINOLOGICAL STUDY.

In a subject of such recent development it would be premature to introduce a system or theory of criminology or to enter into the philosophy of crime or any form of criminological polemics. There is therefore no defined theory advocated. Many problems, including that of the criminal "type," are not considered by the author. In a strict sense, criminology is of course not yet a science any more than sociology is; but it may prove to be an important step in the direction of a scientific study of humanity, for investigations of normal humanity with scientific instruments and methods can best begin in prison. At least half of the prisoners are as normal as persons outside, and they are much easier reached and much more likely to confess truths that individuals in free life would conceal.

Description of the individual and his patho-social surroundings has been one of the main objects of criminological study. Whether any such study will solve any problems is more important practically than scientifically. Yet it is a general scientific belief that truth is always practical and that it is the most direct method of solving problems, if such be possible with the inadequate knowledge at present attainable.

A complete study of a criminal would include his history, genealogy, and all the particulars concerning himself, and his surroundings previous to and during his criminal act. Also a study of him in the psycho-physical sense; that is, experiments upon his mind and body with instruments of precision, measuring, for example, his thought time, senses of sight, hearing, touch, taste, smell, pressure, heat, cold, etc. Also an examination of his organs after death, especially of his brain. It is evident that no one person could make an adequate study of a criminal. The histology of the brain alone, with its physiology, is more than the life work of many men could accomplish. Thus criminology must depend for its advancement upon the work of numerous specialists. Scientific research in nervous diseases and in insanity has taken but a few steps. Yet the close relation of crime to these conditions is well known.

Critics who expect definite conclusions in criminology reveal their ignorance of the extent of the subject. It is an initiatory step in the experimental study of individuals themselves and their exact relations to their surroundings. It is the physiological side of social disease, as well as the anatomical. Both a practical and scientific value of criminology may consist in showing more clearly what normal society is or ought to be, just as the study of insanity by contrast gives an insight into mental health.

The growing interest in criminology, and especially in social science, or, more exactly, social pathology, should encourage all serious students to undertake the investigation of the many vital questions that lie directly before them.

Some of the results in this study consist of individual and typical cases personally studied by the author in penal and reformatory insti-

tutions of America. The author was kindly offered every assistance by those in charge of the institutions in which special cases were studied, and he takes great pleasure in acknowledging the same. He was also permitted to be locked up with certain criminals whom it was considered dangerous to allow out of their cells. The endeavor has been made to follow scientific methods, as far as it was possible, but such exactness as physics or other developed science has reached would be unreasonable to expect in a comparatively new line of work, especially in the sociological realm.

EVOLUTION OF CRIME.

MURDER.[a]

It is a familiar fact that cannibalism is sometimes practiced among wolves; field mice when they fall into a trap devour one another; rats do the same; porpoises and rabbits have been known to do likewise even when they have plenty to eat; once in a while a dog will kill another dog. But with cannibalism goes infanticide. The female of the crocodile sometimes eats those of her young who do not know how to swim. As among barbarous peoples, so among civilized, there has been infanticide on account of bodily deformity. There are birds who break their eggs and destroy their nests; monkeys who dash the heads of their young against a tree when they are tired of carrying them. Cats, hares, and dogs furnish the equivalents of infanticide, and the young of foxes practice parricide. There is in animals, as in men, an irresistible impulse for over-excitement of passions. The patient dromedaries when agitated become furious, trample those who trouble them under their feet, but, having satisfied their vengeance, they become quiet again; in such cases the Arabs throw their clothes at the dromedary and let him vent his rage on these. In certain species of ants the warriors, after a combat, are possessed with a sort of fury and fight everything in their way; they even attack the slaves, who strive to calm them by seizing them by the legs and holding them firm until their anger is over. In a quarrel between the bears in a zoological garden at Cologne, the female becoming exhausted, the male held it under water until it was drowned, and then dragged it around to make sure of its death. In northern Scotland troops of cows have been known to put their guilty companions to death. Magnan has seen the most docile dogs, by continued use of alcoholic drinks, become mischievous. Lombroso has observed a parallel case in roosters poisoned with foul meal. Ants narcotized by chloroform become paralyzed, except in the head, by the moving of which they bite everything in reach. It is known that in a sect of assassins in the Orient the homicidal fury is excited by a mixture of hemp and opium.

Meteoric conditions have their influence. Thus animals of the same species, or related ones, are fiercer in the Torrid Zone than in the less warm regions of America (Rousse); the lions in the Atlas Mountains are much less formidable than those in the desert. Cattle have been known during the warm season, and especially at the approach of a storm, to be taken with an attack of fury and rush against persons and trees until the storm bursts and the rain calms them.

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[a] "Murder" is used, of course, only in a figurative sense as applied to animals.

THEFT.

Theft is a common vice among animals. In stealing to satisfy hunger, the passion is generally irresistible. There is a selection of suitable objects; the dog or cat confine themselves to food; there is, as a rule, no hoarding or hiding, but the food is used at once. But in the stealing of useless articles practiced by magpies, rats, and monkeys, the method is often systematic or at long intervals, hoarding or hiding being the rule; this is a sort of kleptomania, pernicousness, or a love of stealing for its own sake.

As the magpie is notorious for stealing glittering objects, so we find the parallel among savages, who have been known to help themselves on shipboard to all the movables, being fascinated by mirrors, cutlery, and jewelry. Sometimes bees, in order to save trouble, attack in crowds well-furnished hives and carry off the provisions; they gradually acquire a taste for this, and form companies and colonies of brigands. If bees are given a mixture of honey and brandy, they can acquire a taste for it, and become irritable under its influence, drink and cease to work, and, like men, fall from one vice into another, giving themselves without scruple to plunder and theft.

DECEIT.

Swindling and deceit are known among animals. In military stables horses are known to have pretended to be lame in order to avoid going to military exercise. A chimpanzee had been fed on cake when sick; after his recovery he often feigned coughing in order to procure dainties. The cuckoo sometimes lays its egg in the sparrow's nest, and to make the deception surer it takes away one of the sparrow's eggs. Animals are conscious of their deceit, as shown by the fact that they try to operate secretly and noiselessly. They show a sense of guilt if detected. They take precautions in advance to avoid discovery. In some cases they manifest regret and repentance. Thus bees which steal hesitate often before and after their exploits, as if they feared punishment. One describes how his monkey committed theft: While he pretended to sleep the animal regarded him with hesitation, and stopped every time his master moved or seemed on the point of awakening. Such, and many more well-known facts, may be due, perhaps, to fear of punishment which naturally follows a misdeed, just as is observed among habitual thieves.

MEANNESS.

Cases of meanness are not so numerons among the animals. A surprising one is the innocent dove, which sometimes hides under her wings food for which she has no need simply to deprive her companions.

SENSE OF PROPERTY.

The sense of property is manifested in the competition for prizes, as in the struggle for the female, or for food, rank, territory, or nests. The dog distinguishes the property of his master, and even discriminates between objects belonging to different members of the same family. Snakes, according to those who observe them closely, have a distinct sense of property.

PUNISHMENT.

It is well known that, by a wise employment of punishment, animals can be trained and improved. There are, however, instincts that it seems impossible to change. The cat, in spite of a long domesticity and repeated punishments, never loses its habit of stealing; and a curious coincidence is that among criminals a thief is the most difficult to reform, and is generally incorrigible. Severity may help feeble animals sometimes, but it renders the more vigorous vindictive. In the case of criminal man the same idea is true; less brutal means of punishment have better results.

MAN.

In passing from animals to man we find, as is natural to expect, the lowest degree of savagery in prehistoric races. Without discussing Tertiary man, we know in general the manner of life of Quaternary man; it was the lowest degree of savagery; stones, roughly split, were used as weapons; hunting was the main occupation; those on the coast ate mollusks, but were not fishermen; they located on certain points of the shore as indicated by the piles of rejected shellfish and débris of kitchen. The bow was for a long time unknown; spears of wood, with flint fastened to them, were their weapons; they knew fire; they lived under rocks, but rarely in caverns, which were too often inhabited by carnivorous animals, with which man would not voluntarily fight. The animals known in this period show how much prudence was necessary to man; how he was as much hunted as he was a hunter; thus his progress was slower than in later days.

Among the savages crime was the rule. There is philological evidence to show that in Sanskrit the word for crime is the word for action; there are ten or more roots which express the idea of killing or wounding; in criminal slang the same is true; one explanation is that synonyms abound for acts that are repeated very often. All languages agree in representing plunder and murder as the first source of property. Even mythology makes crime triumphant in heaven. Ravuvavu was the god of assassins among the Fijis; Laverna was the goddess of thieves among the Romans, and the Peruvians had the goddess of parricide and infanticide. All these were held in adoration.

HOMICIDE.

The large number of homicides in savage life is explained by the fact that excessive increase of population, in comparison with natural means of subsistence, was a constant peril. Such homicides were often ordained by morality and religion, and furnished a title to glory. Abortion, unknown to the animals, is common among savages. Some tribes in central Africa frequently used their children as a bait to catch lions. The sick and aged were murdered, as is sometimes the case among animals. The New Caledonians found such customs natural, and requested death. Their religion taught that they entered the future life in the same state in which they left the earth. On entering a city, seldom a man over 40 was found. Such customs were not confined to savages, but were practiced in Europe before morality and law had reached a sufficient degree of development. Strabo says that the inhabitants of ancient Bactria trained their dogs to devour the aged and sick. In Sweden they preserved the

large clubs with which they killed the old and sick; such cruelty was a solemn act, performed by the relatives themselves. In funeral rites it is a common practice among most diverse races to sacrifice the relatives and slaves of the deceased. In New Zealand the woman who refuses to live after the death of her husband is greatly admired.

In central Africa it is a religious belief that the ghosts of the ancestors drink the blood shed, and so as much blood is offered as possible. The Pauras in India had a caste whose duty it was to carry off men and children as booty for sacrifice. The ancient Greeks calmed the winds by offering children. The Australians did not value the life of a man much more than that of a toad. For a Malay, homicide was a sort of a joke; it was not uncommon to test weapons upon the first comer. In a Kassago tribe, the Cæsarean operation was performed to satisfy curiosity. For a savage a stranger was an enemy, whom to kill was a glory. With the Fijis it was a great ambition to become a celebrated assassin. In Borneo a young man was not able to marry unless he had killed at least one man. For the Australian natural death was a rarity.

CANNIBALISM.

Cannibalism is the highest degree of human savagery. The most common form is caused by necessity, and has gone so far that the Australians have even exhumed bodies. They have an epoch called "the season for eating men." Among many other causes, there is the belief that one assimilates the courage of his enemy by eating his heart, his sagacity by eating his eye, and that his vengeance is prevented by devouring the whole body.

There are some peoples who wage war simply to eat the conquered. Cannibalism is so ingrained in the Fijis that they can not praise food better than by saying "that it is as tender as a dead man." The inhabitants of the seashore were regarded by some as having "an old fishy taste;" the Europeans were "too salty."

In cannibalism there has been a gradual diminution in cruelty and a development of natural sentiments and judicial forms. It was first the whole body, then a part which was eaten, then man was replaced by animals, and at last symbolic figures are employed.

THEFT.

The primitive peoples did not have property, nor the idea of property, and much less of theft. In Egypt the profession of a thief was recognized by the State; he was required to inscribe his name and designate the place where those from whom he had taken things could obtain them by paying a certain sum. The Germans desired their youths to practice stealing on their frontiers to keep them from languishing in idleness. Thucydides says that among the Greeks on the islands piracy was a glory. In Sparta theft was permitted; punishment was administered in case of maladdress. In central Africa thieves are held in general esteem.

IDEA OF CRIME.

Real crimes, from the point of view of the savage, are small in number, and have been distinguished late and in an irregular manner. Crime consists in failures to conform to established usages, and to whatever, through religion, may have been made sacred by continual

custom. The Hindoo must not drink certain beers intended for the Brahmin alone; the young man in Australia must not taste of the flesh of the "emou," which is only permitted to the aged and the chiefs.

While man takes pleasure in a slight innovation, he struggles against radical ones; he likes inertia or repetition of the same movements. So the domestic animals protest at first against great novelties, as gas or steam. Even children are furious when there is a change of house or apartments; they desire to see the same things; they like to hear the same stories over and over again in the same words. Man is naturally conservative, and it is doubtful if he would have progressed had there not been innovations which were necessary to endure in order to escape still greater pains; progress has been forced upon him by extraordinary men with exalted altruism, a superior mental activity, foreseeing events, urging the people on, who in turn have often taken vengeance by killing the reformer.

Savage races, whose minds are less active, react with the greatest force against any innovation, regarding the innovators as criminals. Gradually the guardians of religion, priests, wise men, and physicians, sorcerers, etc., became chiefs of the tribe, country, and section, and were considered as sacred, so that any offense against them was the greatest of crimes.

A Brahmin commits a slight offense when he kills some one, but to kill a Brahmin is an atrocious crime. Ambition of despots, intrigues of priests, joined with the blind fear of the populace and the worship of ancestral customs, have given rise to some most strange laws: In Oceania it is a crime to touch the body of a chief, or for a woman to touch her hand upon the head of her husband, or to enter into a canoe. A Saxon law punished with death whoever burnt a body instead of burying it. In the code of Manou whoever scatters a heap of earth, or cuts a blade of grass with his finger nails, or pares his finger nails is lost, just as much as if he was a slanderer or impure man. Among savages there was little idea of crime; vengeance was a duty. The Arabs did not allow the homicide to be punished by the sovereign; they fought for him and family. The Abyssinians give the murderer over to the nearest relatives of the victim, to be by them disposed of at their pleasure. The Kourraukos punish homicide by death, but the guilty can always free himself by paying damages to parents or friends of the victim; this is regarded wholly as a private affair. The rudimentary idea of justice somewhat general in Africa is that there is no crime, but only damage to some chief or particular person. In Australia each one applied his own penal sanction; later he consulted with the tribe, and vengeance became civil and religious; death or retaliation was the result generally reached. To-day children strike back again, and are often not content until they strike just where they were struck. Murder was of little consequence except in case of a chief, priest, or if committed by a stranger. Among the Ashantis in Africa the murder of an important person was punished by death, the culprit being allowed to kill himself; but the son of a king could not suffer the death penalty.

The Fijis regarded the gravity of a crime according to the social position of the guilty; so in the laws of the Middle Ages a theft by a common man was much worse than by a chief. With the increase of despotism and the force of arms in invasions the chiefs became proprietors instead of the tribe, and theft, as it was against them, became a crime and one of the greatest of crimes; worse than assassination,

which did not involve the property or interests of the chief. The code of Manou defines murder as a secondary offense, but ordains to cut to pieces with a razor a goldsmith who deceives his customer. In Asia, among the Mongolians, theft was considered worse than murder. With the Germans, when theft was announced by a horn, it was not considered a crime.

PUNISHMENT.

Punishment and vengeance finally became confused; the idea was to kill or to wound sufficiently to give compensation to the victim or his friends for the damage incurred or pain endured. Among the Germans and Australians one should kill his adversary, but loyally; he must veil the corpse and indicate to the relatives where it lies. Such punishments were more like scuffles and duels. Thus a tribe warns another tribe beforehand and furnishes it with weapons. At a given signal arrows are shot, and after a number of deaths they shake hands and close with a ball (Tylor). The first legal forms of punishment were duels or combats by several men against an individual presumed guilty. As life and property became more valuable compensation was sought, which the tribe would guarantee; and this varied according to the social position of the offender. The custom of compensation for vengeance and murder being once introduced, the intervention of a third person with authority naturally followed, he should fix the amount. Thus by the increase of wealth and the possession of property it was possible to repair damage more equitably. This increased in turn the power of the chiefs, who were both judges and executive magistrates. This system was extended to all other crimes or offenses which were considered from the point of view of damage to the king. Naturally the chiefs and priests endeavored to maintain laws so advantageous to themselves. Yet it may have been by this means that morality penetrated into society, which otherwise might have been discouraged by a too severe and absolute virtue; and thus punishments which were introduced at first for selfishness became profitable for all humanity, for with no other protection than muscular force it is doubtful if humanity would have been capable of acquiring a veritable organization.

GERMS OF CRIME IN INFANCY.

The germs of crime are met with in a normal manner during the first years of infancy. It is a familiar fact that if many embryonic forms should cease to develop they would become monstrosities. So a child if it retained some of its characteristics would become either a criminal or a person with little moral sense. The frequency of anger in children is notorious.

In the first few months it is manifested by movements of the eyebrows or hands; at the age of 1 year the child strikes other people, breaks objects, and throws things at those who displease it. Obstinacy and impulsiveness predominate, as those who wash and care for children often observe. Certain children can not wait a moment for what they have asked for; to-morrow is as long as eternity. Some become furious when they can not reach a thing. Some bite when they are washed or when angry. When a request is refused in the street, children not infrequently strike their parents.

As in animals, so in man, jealousy is not only excited by love, but especially by the instinct of passion. In children it is sometimes

violent; they break objects rather than see their playmates have them. Like animals, they do not like to see others petted. Lombroso saw a little girl at Turin who would not nurse when it saw its little twin sister at the other breast.

Perez says the first cause of children's lying is the habit which many parents have of deceiving them in order to quiet them. Children lie often to avoid a reproach or to obtain that which has been refused them, or to show themselves strong, or because they wish to deceive themselves as to the humility of their situation, or on account of jealousy, as when a little girl, seeing her mother caress her little brother, imagines that he has struck the parrot. After the age of 3 or 4 years children lie for fear of being punished, or are assisted to it by the way we question them. They feign sickness to escape doing anything, similar to the case of the military horse feigning lameness. Impulsiveness and a shallow sentiment for truth are not infrequent, so that dissimulation is practiced for the slightest motive. A little girl will sometimes say to her mother: "The lady next door said I wasn't dressed very nicely."

A common way to make children falsify is the following: "Willie, did you do that?" "Yes, mama." "Well, the next time you do that I will punish you." After a while Willie does it again. "Did you do that?" "Yes," Willie says. Then his mother punishes him. After a day or so he disobeys the third time. "Did you do that, Willie?" Hesitating and fearing another punishment, he says "No."

Children generally detest injustice, especially if they are the sufferers. The injustice consists in the want of accord between the habitual manner in which they have been treated and that which they experience accidentally.

Affection is rare among babies; they manifest sympathy for pretty faces or for that which gives them pleasure. Too much novelty they do not understand, or are frightened at it. A child's love may often be caused by gifts and the hope for more, and when not realized the love often fades.

Cruelty is common among children; they delight in breaking inanimate objects, tearing things, hitting animals, smashing caterpillars; tramping on anything to kill it. Among the lower classes, boys from 5 to 10 years of age are notoriously cruel.

CRIMINALS PHYSICALLY CONSIDERED.

Comparing 188 young criminals with 437 normal young men of the same age and same manner of life, the stature in the criminals was a little superior at the age of 10 to 13; equal from 13 to 16; superior from 16 to 18, in the proportion of 1.54 to 1.51, and inferior from 19 to 21. As to weight, the criminals were superior in every series, except from 13 to 16, where the two were equal; but cranial circumference in all the young criminals was inferior. The minimum frontal diameter of 12 criminals from 12 to 14 (107–108 mm.) was inferior to that of 12 normal (111 mm.).

ADULTS.

In all regions of Italy the stature of criminals is superior. Highway robbers and homicides are superior in comparison with the violators, forgers, and thieves. As to weight, in general the criminals are superior; the violators and thieves giving the minimum weight. The finger reach of the criminals is superior.

Of 567 homicides, 53 were in delicate health and 3 ill formed; 143 thieves, 19 were in delicate health and 10 ill formed; 21 violators, 4 were in delicate health and 3 ill formed; 34 forgers, 5 were in delicate health and 1 ill formed; 23 incendiaries, 2 were in delicate health and 2 ill formed. The brigands, homicides, and incendiaries are slim and in good health, while the thieves and violators are frail, especially the latter, probably due to solitary pleasure, the traces of which are in the face. The homicides are larger and stronger, but they need their strength and use it more than the thieves.

PHYSIOGNOMY.

The face is the expression of the individual. Whether we will or no on seeing a person for the first time we form an opinion of him, and, though we may be mistaken, still, on the whole, we are much more often right than wrong in our first impressions. A distinctly honest face is much more likely to be what it appears than otherwise. The platitude that appearances are deceptive is only a partial truth. How such a statement can be so easily believed is seen from the fact that we remember much more easily those cases in which we were deceived than those in which we were not, for a jar to our minds, produced by a disappointment, is more tangible for the mind to hold in memory.

Mantegazza has classified the facial expressions into physiological, moral, intellectual, and æsthetical. In the physiological we have the condition of health indicated, assimilation of food, the marks of disease or suffering, the general functioning of the body. The moral characteristics are the most difficult to interpret, for they influence and are influenced in a large measure by the others. There is the open, frank, generous, genial face; although not beautiful, it is attractive. There is the dull, unsympathetic countenance. Then there is the intelligent expression, the intellectual characters being anatomically indicated in the forehead, eye, and mouth. The æsthetical characters are indicated in the symmetry or asymmetry of the features; the color of eye, skin, and shape of nose have, as a resultant, beauty or the opposite. The clergy have generally a distinct physiognomy; so in the case of actors, teachers, and literary men. All those who give their lives to intellectual work of any kind can be distinguished from the modern business man. It is not difficult in a college town to distinguish the students from the town boys, simply by their faces. The veterans of the army have a well-marked physiognomy. If one walks through a prison, he certainly will see something common in most of the faces that is characteristic, however unable he may be to describe it; one has a similar experience in visiting an insane asylum. The criminal, as to æsthetical physiognomy, differs little from the ordinary man, except in the case of women criminals, who are most always homely, if not repulsive; many are masculine, have a large, ill-shaped mouth, small eye, large, pointed nose, distant from the mouth, ears extended and irregularly implanted. The intellectual physiognomy shows an inferiority in criminals, and when in an exceptional way there is a superiority, it is rather of the nature of cunning and shrewdness. The inferiority is marked by vulgarity, by meager cranial dimensions, small forehead, dull eyes. The moral physiognomy is marked in its lowest form with a sort of unresponsiveness; there is little or no remorse; there is sometimes the debauched, haggard visage. In the lesser forms of crime there is difficulty in mak-

ing out much that is special, as the individual is capable of concealing his motives and impulses.

Lombroso, with the aid of Marro, finds as to the hair (comparing 500 criminals with 500 normal men) that the incendiaries and thieves reach the maximum (57 per cent) for black hair; the violators the minimum (23 per cent); the idlers, highway robbers, and thieves attain the maximum for brown hair. The violators and swindlers form the majority of the blondes. Dark hair (black and brown) is predominant among criminals in general, as compared with normal men, in the proportion of 49 per cent to 33 per cent; light hair (blonde and red) in the proportion of 16.5 to 6.85 per cent. Marro among 507 criminals found 10 per cent with little hair, 44 per cent with thick hair, with a maximum of 53 per cent in vagabonds, 47 per cent in assassins. From 4,000 criminals Bertillion finds 33.2 per cent with brown iris; 22.4 per cent with a dark brown; 32.4 per cent yellow or red iris. While it is true that many of these characteristics are often seen in ordinary men, yet the large jaw, the masculine appearance of the women, bad look, projecting ears, strabism, thick hair, and receding forehead are much more frequent in criminals.

Although there are many doubtful points in the case of criminals, yet in the case of the so-called normal men there is much greater uncertainty, for we know little or nothing of their lives; some of them, as among all men, need the aggravating occasion to become criminals. Easy circumstance and agreeable surroundings in life can protect some whom severe adversity might turn into criminals. We may say that most every individual has his limit beyond which he would commit a criminal act. Poverty, misery, and organic debility are not infrequently the causes of crime. The physiognomical criminal type is very rare among normal men, but frequent among criminals. The popular mind, though often unobserving, has not failed to notice many criminal characteristics. A few proverbs (collected by Lombroso) will illustrate this: "There is nothing worse than scarcity of beard and no color." "Pale face is either false or treacherous" (Rome). "A red-haired man and bearded woman, greet them at a distance" (Venice). "Be thou suspicious of the woman with a man's voice." "God preserve me from the man without a beard." "Bearded woman and unbearded man, salute at a distance" (Tuscan). "Man of little beard, of little faith." "Beware of men with small and twinkling eyes" (Tuscan).

There are not a few women, who, although ignorant of the lower side of life, are instinctively suspicious of persons unknown, but criminal in character. There may be a heredity element here, as in the case of our little house-birds, who strike their cage with wing and beak when a bird of prey passes over them, which enemy was only known to their ancestry.

There is little doubt but that physiognomical characteristics can be modified by the criminal sometimes. Lombroso has observed that when a murderous man is made to make a violent effort, his physiognomy, especially his face, takes the ferocious look peculiar to the criminal at the moment of the crime.

Physiognomy stands in close relation with facial and cranial signs of degeneration. It must not be forgotten how great an influence habits have over the mimical facial muscles, how gradual the passage is from harmonious features to prison physiognomy, which is caused in part by passions temporarily changed. Also the unconscious influence of the style of hair, beard, look, demeanor, and clothing is to be

noted; in prison garb, for example, a face makes quite another impression from that in ordinary dress. Von Hölder, from 1,022 portraits of recidivists of both sexes, found it impossible in many cases to pronounce one a criminal from his physiognomy. Physiognomy, though uncertain, may give us hints sometimes.

TATTOOING.

Following is a table of statistics from Lombroso:

	Number.	Tattooed.	Proportion.
			Per cent.
Condemned for murder and violence	80	16	20
Condemned for theft	141	20	14
Condemned for forgery, swindling	54	6	11.1
Condemned for rape	11	1	9
Deserting or rebellious soldiers	4	1	25
Criminals who are not recidivists	99	4	4
Criminals who are recidivists	191	50	20.9

The largest number who tattoo are found among the recidivists; the smallest number, omitting crimes against decency, are the forgers and swindlers. Perhaps their superior intelligence enables them to see the disadvantage of tattooing. As a rule, women tattoo very little. Men who are not criminals tend to give up the custom, while among the criminals the usage reaches large proportions. Almost all tattoo the forearm and the palms of the hands, a smaller number tattoo the shoulders, chest (sailors), and fingers (miners). The symbols of war are naturally most frequent among the soldiers.

As in the case of sailors and savages, criminals tattoo all parts of the body, which indicates among them all a low degree of sensibility to pain. Of 89 adult criminals 66 were tattooed between the ages of 9 and 16. Of 89 criminals 71 were tattooed while in prison. The causes of a custom of so little advantage, and frequently harmful, are found in: (1) Religion; to engrave the image of a saint on one's own flesh was a proof of love; the Phœnicians engraved on the forehead the sign of their divinity; the early Christians engraved the name of Christ upon the hand and arm. Sailors had still another motive, which was that they might be recognized if they perished in the sea. (2) In the desire of imitation. Often a whole company of soldiers have the same symbol tattooed. (3) In the spirit of vengeance, as indicated by the symbols. (4) In laziness, as in the prisons where they amuse themselves for nothing else to do; inaction being more difficult to endure than the pain itself. (5) Vanity has very great influence; thus the savages go naked, having signs upon the chest; others tattoo the parts most exposed; the soldiers do it to show their courage in enduring pain. Among the "Birmans" of New Zealand tattooing indicates social position. (6) Feeling of association and of sect, as among the Camorrists of Naples, was a cause. (7) Noble passions also were influential; thus the image of a friend or the souvenirs of childhood give courage to the soldier. (8) Atavism and erotic passions, as shown by obscene symbols, are, perhaps, the most frequent causes. Tattooing is one of the characteristics of primitive man. In prehistoric caves, and in ancient Egyptian sepulchers, are found the instruments used for this purpose. Tattooing among the insane indicates criminality if they have not been sailors or soldiers.

CRANIOLOGY.

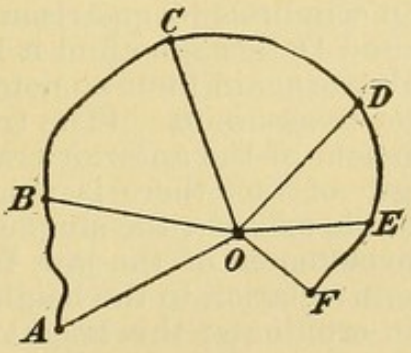
Cranial capacity.—By a comparative study of 121 criminals and 328 normal men, Lombroso finds that craniums of small volume exceed, and those of very large volume are rare, in the case of criminals, although the criminals were larger of statue than the normal men. He also shows from his own statistics and those of others that in general, when a large cranial capacity is not due to hydrocephalus, it is concomitant with a developed intelligence.

Ranke makes the cranial capacity of criminals equal to that of other men, with variations in the minimum and maximum capacities; but, as Lombroso remarks, those results relate only to assassins; in addition, cretinism is somewhat extensive where (Bavaria) Ranke made his researches. Bordier and other observers find in a number of assassins a capacity superior to that in normal men. Manouvrier explains these divergencies by the probable difference in method, and the insufficient number studied.

Weight of cranium.—The average weight of the cranium is superior to that of the ordinary individual, according to Lombroso, who examined 21 Italian assassins. On the other hand, Manouvrier, on examination in France of 44 assassins and 50 normal men, found the weight of cranium inferior. As to the relation of the weight to the capacity, it may be true, as Corre suggests, that the weight of the cranium is less related to the brain development than it is to the osseous system. Thus, the skeleton and the length of its members would be a fact to consider. Corre, Bordier, Lombroso, Ferri, Weisbach, and Lauvergne find the horizontal circumference in criminals inferior to that of ordinary men.

Semihorizontal circumference.—Almost all measurements give a slight predominance to the semiposterior circumference over the semianterior. In such cases, in which the predominance is in the anterior circumference, the muscular mass of the temporal bone, the most powerful moter for the jaw, must be taken into consideration.

Broca's method of measuring the auricular angles, by which, through the use of the stereograph, projections of the cranium are



obtained, is as follows: O is the apex of the auricular angles; A is the alveolar point; B, suborbital; C, bregma; D, lambda; E, inion, and F, ophisthion. The first angle (A O B) represents the facial region; the second (B O C), the frontal cerebral region; the third (C O D), the parietal region; the fourth (D O E), the occipital crebral region, and the fifth (E O F), the region of the cerebellum. The size of these angles does not depend upon the size, but upon the form of the cranium; this gives the angles special value. Corre measured 150 craniums of widely different categories, and confirms the value of these angles.

From this table we see that the frontal angle increases as we rise toward the superior races, but that the criminals stand comparatively low (50.9°).

Cranium.[a]

	Nasal-orbital angle.[b]	Frontal angle.	Parietal angle.	Occipital angle.	Angle of cerebellum.	Total cerebral angle.[c]
	Degrees.	*Degrees.*	*Degrees.*	*Degrees.*	*Degrees.*	*Degrees.*
Gorilla	61	35	58			
Chimpanzee	59.5	35	54	19	43	108
Microcephalics	52.5	41.2	59.3	38.5	35.7	137
Idiots (not microcephalics)	47.5	44	62.5	38.3	32.3	144.8
New Caledonians:						
Men		49	63	36	30	148
Women		52	61	32	27	145
African negroes	43.3	51.4	61.7	36.6	35.1	149.7
French assassins (22 in number)	51.8	50.9	67.1	40.9	29.9	158.9
Modern Parisians:						
Men	50.3	54.6	59.7	40.1	30.6	154.4
Women	48.5	55.4	59.8	37.7	30.1	152.9

[a] Quatrefage and Hamy's table.
[b] The nasal-orbital angle corresponds to facial projections.
[c] The total cerebral angle includes the frontal, parietal, and occipital angles, which correspond to the cerebral cranium.

In the French assassin the frontal angle is smaller than in the African negro. Orchanski and Heger agree in according to the normal man a superior anterior projection of the cranium.

Curves.—Bordier concludes that the parietal region is larger in criminals; Benedikt and Lombroso find no appreciable difference.

Cephalic index.—This expresses the general form of the cranium; it is less in proportion as the length is greater and more as the length is less. With some variations, the brachycephalic cranium is the most common among criminals. Lombroso considers this an indication of a tendency to exaggerate ethnic indices. Corre interprets this more in the sense of arrest of development approaching that of the child.

Vertical index (diameter drawn from the base to bregma).—Lombroso finds no notable difference; d'Ardouin, d'Orchanski, and Bordier make it greater in criminals (comparison in the same race); on the other hand, Heger and Dellemagne find it less.

Frontal index.—Lombroso again finds no notable deviation, Bordier and Corre find it larger in assassins. (The frontal index expresses the transversal development of the anterior cranial region.)

Under the total length of face there is a large predominance in favor of the criminal; this exceeds the simple length, but this is in connection with the development of the jaw, for, according to Ferri, the length of the face, in relation to the height of the vertex to the chin, is much greater in criminals; this height indicates the relation of the face to the development of the cranium. Also the bizygomatic (maximum breadth) breadth of face is larger in criminals.

From the following table, arranged by Dr. Corre, some facial characteristics will be evident (measurements are in millimeters):

Face.

	Normal men.			Criminals.		
	Topinard.			Orchanzi.	Corre.	
	Parisians.	Italians.	Negroes.	Assassins.	Violation.	Murder under sexual influence.
	Mm.	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*
Total length	128 (?)	----	134	----	135.5	131
Simple length	87.7	86	----	89	90	87.6
Bizygomatic breadth	132.2	----	130	133.6	131	133.3
Indices: [a]						
Facial	65.9	----	68.6	65.3	68.6	66.2
Nasal	46.8	----	----	45.6	----	----
Orbital	83.7	----	----	88.4	----	----
Palatal	74.7	----	----	81.5	----	----

	Criminals.					
	Corre.					Lombroso.
	Murder under diverse influences.	Murder and theft.	Murder and suicide.	Murder premeditated.	Average.	Criminals in general.
	Mm.	*Mm.*	*Mm.*	*Mm.*	*Mm.*	*Mm.*
Total length	132.2	138	133	140	----	----
Simple length	90.4	86	92	92.6	89.7	92
Bizygomatic breadth	132.8	135	132	133	132.7	----
Indices: [a]						
Facial	68	63.6	69.6	69.6	67	----
Nasal	----	----	----	----	----	----
Orbital	----	----	----	----	----	----
Palatal	----	----	----	----	----	----

[a] Facial index expresses relation of maximum breadth to simple length of face. Nasal index expresses relation of maximum breadth to maximum length of nose. Orbital index expresses relation of vertical diameter of the base of orbit to its horizontal diameter. Palatal index expresses relation of width to length of palatal vault.

According to Lombroso, the lowest nasal indices are twice as rare and the highest are twice as frequent in the criminals. Lombroso, Ferri, Orchanski, Manouvrier, and others, agree as to the greater development of the lower jaw among criminals; Lombroso finds greater orbital capacity in criminals, explaining it, as in the case of birds of prey, by the coordination of certain organs as the result of more frequent exercise; this capacity is still more developed in thieves and assassins. We are indebted to Dr. Corre and others for the following facts: (1) Frequency of the median (or metopic) frontal suture. This character appears with brachycephalic heads and may be regarded as indicating inferiority; (2) the parietal or parietol-occipital sutures grow together earlier. Thus, the parietal or occipito-parietal sutures are soon effaced, so the parietal-frontal and temporal; (3) the notched sutures are the simplest. This anomaly (as an interparietal bone in Peruvians and Negroes) is considered by Anouchine as a sign of inferiority; it is normal in certain animals and constant in embryonic life; (4) the supernumerary or Wormian bones are frequent in the region of the median posterior fontanelle and of the lateral posterior fontanelles; (5) other characters are the development of the superciliary ridges with the effacement or even frequent depression of the intermediary protuberance; the development of the mastoid apophyses. These characters are correlative with the great development of the temporo-parietal region, which in turn is related to the

development of the jaw; (6) the backward direction of the plain of the occipital depression, as in inferior races, is more frequent in criminals. The under surface of the cranium, where the traces of the convolutions, and of the meningeal vessels are found, has not been sufficiently studied, to give more knowledge concerning encephalic vascularization. For instance, a fossa, situated on a level of the internal occipital crest, corresponding to an abnormal development of the lobe of the cerebellum (occipital fossa) is four times as frequent in criminals as in ordinary men.

As the following table gives the results from over 3,000 cases, studied by independent investigators, it deserves special attention. It shows the proportion of anomalies found by Lombroso in 66 male and 60 female criminals; also Legge's figures from 1,770 normal craniums, those of Lombroso and Amodei from 1,320 solidiers' bodies and 170 insane. One should note the distinctive cranial anomalies as sclerosis epactal bone, receding forehead, frontal sinuses, superciliary ridges, oxycephalic craniums, internal nasal suture, facial asymmetry, fusion of the atlas; anomalies of the occipital depression and the occipital fossa in men. As regards sex, the men furnish many more anomalies than the women; almost double the number; the women exceed in platycephalic craniums, in anomalies of the basiliary depression and of the frontal apophyses of the temporal bone and in fusion of the atlas with the occipital bone.

Lombroso finds in general, on looking at the anomalies as a whole, a distinctive teratological character from the union of many anomalies in the same cranium, the proportion being 43 per cent, while simple isolated anomalies only show 21 per cent. He admits that atavism does not explain the frequent cranial and facial obliquity, fusion and the welding of the atlas with the occipital bone, the plagycephalic cranium, and exaggerated sclerosis.

Table of asymmetry.[a]

	Males.		Females.		Savage.	Insane.
	Normal.	Criminal.	Criminal.	Normal.		
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Plagycephalic heads	20	42	21	17.2	----------	24
Cranial sclerosis	18	31	31	17.2	100	50
Sutures ("soudées")	25	37	26	13.3	8	28
Suture ("metopique")	9	12	5	10	5.1	9
Wormian bones	28	59	46	20	----------	68
Epactal bone	5	9	1.7	6.8	5.4	3.8
Fusion of atlas with occipital bone	0.8	3	3.2	----------	----------	2.7
Middle occipital fossa	4.1	16	3.2	3.4	26	14
Hollow of civini	27	15	8.1	----------	----------	----------
Receding forehead	18	36	6.8	10	----------	----------
Frontal apophyses of the temporal bone	1.5	3.4	6.6	----------	12	2.3
Superciliary ridges and developed sinuses	25	62	29	19	100	67
Anomalies of lower teeth	6	2	3.2	0.5	40	----------
Large jaws	29	37	25	6.5	----------	----------
Very large jaws	4.5	10.6	----------	----------	100	----------
Traces of the intermaxilary suture	52	24	3.3	----------	----------	60
"Oxycephalic"	2	7.5	3.3	----------	----------	----------
Double suborbitary fossa	6	18	----------	----------	----------	----------
"Subscaphocephalic"	6	6	----------	----------	----------	----------
Prognatism	34	34	32	10	100	----------
Projecting zygomaticapophyses	29	30	7.6	6.9	----------	----------
Nasal glabella much depressed	13	31	----------	----------	----------	----------
Platycephalic	15	22	33	0.1	----------	----------
Asymmetry of the face	6	25	----------	----------	----------	----------
Asymmetry of the teeth	6	1	----------	----------	----------	----------
Projection of the temporal bones	27	43	----------	----------	----------	----------
Frontal beak of the coronal suture	2	9	----------	----------	----------	----------

[a] From Criminology.

Table of asymmetry—Continued.

	Males.		Females.		Savage.	Insane.
	Normal.	Criminal.	Criminal.	Normal.		
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Depression of the coronal glands.	29	50	----------	----------	----------	80
Wormian bone of pterion	16	23	3	----------	66	18
Anomalies of the occipital fossa..	2.5	10	11.5	----------	----------	0.5
Feminality	15	6	----------	----------	----------	----------
Virility	----------	----------	9.2	----------	----------	----------
Projection of the orbital angle of the frontal bone	15	46	7	6.9	190	----------

Those anomalies seem to him to result from errors in development of the fœtal cranium or from diseases slowly evolving from the nervous centers. But the frequency of frontal sinuses, receding foreheads, developed superciliary ridges, and sclerosis makes it probable that men with such a number of cranial anomalies have parallel anomalies in intelligence and feelings, for these phenomena are visible alterations in volume and form of the intellectual centers.

While one can find many asymmetrical craniums among normal people, and while certain asymmetries can be due to education or to the alterations of convolutions through functional excess or defect, due to physiological or psychological causes, yet these occasional causes are limited. Although one part of the brain can sometimes do the work of another, yet one lobe can hardly supply the place of another.

Corre's opinion is that cranial asymmetry indicates a certain state of perturbation in cerebral action, and that when education can not remedy these defects there is a large chance for the instincts to degenerate into evil impulses, which overrule or suppress the intellectual nature and develop into criminal acts. Yet every asymmetry is not necessarily a defect of cerebral development. For, as suggested above, under the influence of education defect of function can be corrected, covered up, or eradicated. This can be due to complex psychological operations. But a functional disease would not, strictly speaking, have a functional compensation, for this would be understood, according to Corre, only by substitution between two regions exactly homogeneous. According to Corre and Broca a certain number of cranial deformations have their origin in the brain. Broca says that every affection which, in the fœtus or young child, alters gravely the form of the encephalic mass produces necessarily a deformity of the cranium.

When we consider the early surroundings (unhygienic conditions, alcoholic parents, etc.) of the criminal, where he may begin vice as soon as consciousness awakes, malformations, due to neglect and rough treatment, are not surprising. Yet cranial malformation may be frequently due to osteological conditions. But here still hereditary influence and surrounding conditions in early life exert their power. Many are scrofulous and rachitic, which affections modify the osteological structure. In its turn the cranium forces the brain to a reduction in its development, and in general nutritional perturbations cause irremediable troubles in the brain.

Lascassagne and Clequet say that the head that is symmetrical posteriorly is more developed on the left anterior side, and the head symmetrical anteriorly is more developed on the left posterior side. There is sometimes a tendency to compensation; if the predominance is parietal, it is counterbalanced to a certain point by a frontal promi-

nence or occipital, or both. There is a tendency to correction by the relative development of certain opposite regions.

SKELETON AND MEMBERS.

Homicides show a strong development of the osseous system, while thieves and violators have weak skeletons. The assassins generally have a strong physical organization, but some of them merit the double epithet of strong and with little intelligence. Weight, stature, and thoracic development in connection with small forehead would put a number of malefactors close to pathological beings, as Cretins and idiots; because in both cases there is often the same coexistence of mascular force and intellectual depression. The bandit of the most brutal kind, however, is not so weak mentally, since his muscular force is in service of his cerebral activity, which, although incomplete, is kept awake by his mode of life. The idiot, on the other hand, has little to develop his mental activity. Although a strong physical organization among assassins is the rule, there are some exceptions, as in persons practicing ambush, or where the victim is feeble, or strategy is required. Corre mentions a young flirt at Paris, who had assassinated and robbed several lovers, her favorite instrument being the hammer. She was gentle in manner, polite, and of agreeable physique, but was remarkable for muscular force; she always dressed in gentleman's attire.

The extremities in criminals are often deformed. The hands are large and short in murderers and in those condemned for assault and battery; they are long and narrow in thieves. Lacassagne found 600 out of 800 criminals with large finger reach.

CEREBROLOGY.

Brain weight.—4. Bischoff, after comparing the weight of 137 brains of criminals with 422 of normal men, obtained no striking difference. Lombroso, finding an asymmetrical predominance on the right in 41 per cent and on the left in 20 per cent (38 per cent being equal), thinks this is significant, since in physiological asymmetries the two sides are equal. Giacomini found in 42 homicides 20 with right lobe heavier and 18 with the left lobe heavier; in the four others the two lobes were equal. Topinard says that large brains have less convolutions, and small brains more. In this way there is a compensation, as in the case of Gambetta, whose brain was small, but finely convoluted.

ANOMALIES.

Flesch, out of 50 brains of criminals, did not find one without anomalies. From an examination of 28 brains he found: Alterations of the meninges, to the extent of 50 per cent; adherences of the pia mater and to the gray substance, 4 per cent; adherences of the dura mater to the gray substance, 6 per cent; internal hemorrhagical pachymengitis, 10 per cent; leptomeningitis in young men, 14 per cent; tubercular meningitis of the base, 1 per cent; œdema of the pia mater, 7 per cent; atheroma of the basiliary arteries, 8 per cent; spinal hemorrhagic meningitis, 1 per cent; atrophy of the gray substance, 1 per cent; cerebral hemorrhage, 3 per cent. These anomalies generally were not accompanied with the symptoms that ordinarily follow them.

Lombroso thinks that Saltmann, in his observations on the development and gradual multiplication of the motor centers of the cortical substance, shows how the brain can be deeply affected and at the same time never manifest the symptoms of the disease. In experiments made on new-born dogs and rabbits immediately after birth,

electric excitation of the gray matter is not capable of exciting a movement. But the centers are little by little distinguished, following the groups of muscles. The defect of these centers in the first periods of life often explain at that time how cerebral diseases can rest latent; if, for instance, there is an arrest of development in one region, the multiplication of regulative centers ceases, but as in fœtal life some other centers can perform the functions of all; thus the psychical work, being less divided, is imperfect, and the pathological process rests dormant.

In 92 brains of criminals were found in the central membranes: Opaqueness and adhesions in 10; inflammations in 3; slight ossifications in diverse parts in 1; osteoma in 3; softening in 3; points of hemorrhages in 5; arterial degeneracy in 4; tumors in 3; adherence of the posterior horns in 1; hemorrhages of the lateral ventricles in 2; abcess of cerebellum and cerebrum in 2.

Benedikt, from a study of 19 brains of criminals of different nationalities, finds a typical confluence of fissures; that is to say, if we regard the fissures as rivers, floating bodies can pass into almost all the other fissures, because bridges between the fissures are wanting. This means that important brain substance is wanting. Rüdinger has shown that brachycephalic and dolicocephalic brains have these characteristics in fœtal life. Huschke has shown that negroes' brains belong to this type. Thus the three important fissures of the outer surface—that is, the central fissure, the third frontal fissure, and a portion of the interparietal fissure—have a great tendency to unite with the Sylvian fissure, so that there results not only an anterior and posterior rising branch but also three other branches, namely, the central fissure, third parietal, and a portion of the interparietal fissure. Benedikt says, "That to suppose that an atypically constructed brain can function normally is out of the question. What we do not know is why such a brain functions this way and not that, and why, under certain psychological conditions, it functions just in this way."

But Benedikt's results do not seem to be confirmed by the investigations of others. For instance, Tenchini, after examining 32 brains of criminals from the prison of Parma, does not find these peculiarities, yet he does find a greater frequency of cerebral anomalies than in normal men.

CONCLUSION.

Our knowledge of the criminal's brain as well as of the brain in general is very inadequate, and this in spite of the numerous investigations that have been made. The fact that an individual has psychical anomalies, and at the same time cerebral or cranial or both, does not show that either one is the cause of the other, although it may justify a presumption that they are in some way related, for such conclusions are based upon brain anatomy rather than upon brain physiology, which is a field about which very little is known.

It is easy to conceive that brain circulation, qualitative and quantitative, has as much to do in its effect on the mind as anatomical relations. It is, nevertheless, reasonable to assume that in the last analysis every physiological irregularity is based upon an anatomical one; yet the reverse may be assumed also. The probability would seem to be that the physiological and anatomical mutually act and react one upon the other, and to decide which is primary is wholly beyond our present knowledge.

There is still another difficulty, often overlooked, as to the relation between the cranium and brain. In embryonic life, it is quite prob-

able that the development of the brain has great influence upon that of the cranium, and it is possible, later on at least, that the cranium has equal influence upon the brain.

PATHOLOGY.

In criminals the constitution is rather medium or feeble than strong or vigorous. On account of isolation, regret from want of freedom, a wandering life, and solitary vices (common in prisons), the constitution may be impaired. On the other hand, some adapt themselves to this life, which is calmer, more regular in regimen, and free from temptations to debauch. Yet, on the whole, the depressive action is predominant. Ferrus found in the prisons of Milan and of Clairvaux 1,455 criminals in good health out of 2,153 on their arrival, 471 with fair constitutions, and 227 with feeble; of the whole number, 908 at the end of a certain time were in good health, 379 in fair health, and 579 had notably run down in health.

Lauvergne says feeble health predominates in thieves in the galleys, and that they are the most numerous class there.

In spite of the severity of ancient prisons, quite a number reach an advanced age. Out of 252 incorrigibles, Corre found 69 from 60 to 70 years of age, and 3 over 70. At Brest, Toulon, and Rochefort, in France (for 1843, 1849, 1853), the proportion of deaths was an average of 46.1 per thousaud; for the same period in France the mortality was 25 per thousand. According to Corre, mortality increases with the age of the person at the moment of entrance, and augments especially after the age of 40. This latter fact indicates less power of adaptation to prison life. The proportion of mortality is small in the case of those just beginning adult life, who have scarcely had time to contract permanent habits, or who while in liberty have known only misery. But in the case of those from 21 to 30, where the physical and moral action takes place in the change of existence, the proportion of deaths increases greatly; it increases till it finds its maximum above 40, when the constitution is weakened by a premature senility—the result of an agitated and irregular life.

Those 20 years of age or under show a maximum mortality in the first year of imprisonment; and this maximum is not exceeded in any other period. Between 20 and 30, deaths are more frequent from the second to fifth year of imprisonment; afterwards the mortality is affected in a less degree by the duration of imprisonment. During five to twenty years of imprisonment there is an increase in mortality of persons from 30 to 40 years of age. Among the condemned after 40 years, the deaths are according to conditions of age rather than duration of imprisonment.

In the marine hospital at Brest, from 1844 to 1846, 200 deaths took place. The following table[a] gives the data:

	Crime against property.	Crime against decency.	Attacks on life.	
	Per cent.	*Per cent.*	*Per cent.*	
Pyrexial diseases	15.5	14.8	31.5	
Constitutional diseases	8.4	22.2	10.5	
Diseases of nervous centers	10.3	22.2	5.2	Almost wholly of the brain.
Diseases of heart and large vessels	4.5	----------	----------	Almost wholly of the heart.
Diseases of the respiratory organs	35.7	33.3	31.5	Pulmonary predominance,
Diseases of the digestive organs	14.9	7.4	10.5	Almost wholly intestinal.

[a] Corre, "Les Criminels."

The cases of pyrexia are to a large extent typhoid. In France it has been found that the hygienic conditions are much better in the prisons than in caserns, so that the per cent of mortality is considerably higher among soldiers and sailors than among criminals. The convicts show a very low per cent of mortality in pyrexia, but a high mortality in constitutional affections, owing to alcoholism and a maximum of phthisical diseases. The young criminals give a large percentage of mortality in nervous diseases.

Diseases.	Workmen and guards.	Convicts.	Soldiers (adults).	Sailors (adults and adolescents).
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Pyrexia	11.4	.....	46.2	36
Constitutional	8	12.5	2.1	4.6
Nervous [a]	11.4	12.5	6.4	15.1
Cardiac	4.5	.....	1	1.1
Phthisical	49.7	62.5	14	27.9
Digestive organs [b]	8	6.2	27.8	12.7
Number of deaths	87	16	96	86

[a] Mostly brain diseases. Predominance of menigitis among young criminals.
[b] Almost wholly stomachal and intestinal.

Among the workmen and guards many were advanced in age. Among free persons these diseases are rather hemorrhagic; or there is softening of the brain from age or intemperate habits. The nervous diseases reach a maximum mortality among those condemned for crimes against decency or violation, while for crimes against property their percentage is only 10.3 per cent, and 5.2 per cent for attacks on life. Sexual crime most ordinarily arises from an unhealthy passion; the frequency of cranial asymmetries has already been referred to in this class of criminals.

Among women criminals of all categories the percentage of mortality is high, especially where hard labor is required; so that woman shows a less resistence in constitution as far as crime is concerned.

The following table gives the proportion of mortality in the central prisons (Tardiu):

	Men.	Women.
	Per cent.	*Per cent.*
Condemned to hard labor	5.79	7.79
Condemned to seclusion	5.16	7.36
Condemned for correction	5.34	5.55
Condemned to chains	2.28	.....

Out of 1,319 deaths in the central prisons, 345 were from acute maladies—247 men and 78 women; 974 were from chronic maladies—769 men and 205 women. It is found that farmers, soldiers, sailors, vagabonds, and beggars give a much larger death rate when in the prisons for life than those engaged in other occupations; those in the liberal professions show a lower rate of mortality; then follow those in diverse sedentary callings, inhabitants of the city for the most part.

Dr. Castello calls attention to the fact that prostitutes, who furnish a large number of criminals, are cardiopathic and have affections connected with the cerebro-spinal regions. As to the resistance and morbidity of criminals of all races, transported far from home, there

are two conditions: (1) Where they are placed as free among a population not much better than themselves, an agglomeration by selection or by intermingling of races is formed, where characteristics tend to mingle; (2) the condition where the criminals are gradually allowed to mingle with the noncriminal. Orgéas gives this table:

	Died from malaria.	Died of yellow fever.
	Per cent.	*Per cent.*
Free Europeans	18.1	46.6
Transported Europeans	38.1	4.5
Negroes and mulattoes	14.3	0.5
Transported negroes	29.7	2.4
Transported Hindoos and immigrants	16.5	3.3
Chinese and Anamites	13.5	5.4

According to the annual statistics of France for 1887, out of 24,170 introduced into Guiana from 1852 to 1883 (thirty-one years), 12,148 died and 3,140 disappeared or escaped.

The figures are encouraging as far as acclimatization is concerned; reform by colonization in healthy climates as in New Caledonia is favorable. For the period from 1865–1875 the mortality of those transported was 3.7 per cent. From 1879 to 1882, in spite of the enormous increase of number, the mortality fell to 2.5 per cent.

Criminality and prostitution often go pari-passu. The frequency of anomalies and morbid states among prostitutes is found among certain categories of criminals. In prostitutes and in many criminals the voice is hoarse and masculine. This is, however, a result of complex habits, of which alcoholism is the main cause perhaps. There exist also the relations between the development of the vocal and genital organs, perhaps a reciprocal relation, as has been shown in certain cases. Among singers and declaimers the genital organs are much developed and also Lesbian tastes are frequently present.

PATHOLOGICAL ANATOMY.

In 50 autopsies Flesch found 20 per cent which showed affections of the heart so grave as to be the cause of death; on calculating the accidental affections of the pericardium and endocardium, the mortality was 50 per cent. In these affections criminals resemble the insane.

Comparing the lesions in normal and insane people as given by Hagen, we have the following table:

	Normal.	Insane.	Criminal.
	Per cent.	*Per cent.*	*Per cent.*
Hypertrophy of the heart	16	10	11
Atrophy of the heart	1.2	3.1	11
Fatty degeneration of the heart	3.6	5.2	9
Valvular insufficiency of the heart	3.1	3.6	17
Pericardiac adherence	2.1	2.9	2
Affection of the heart in general	25	26	50

From this table a valvular insufficiency in the criminals is quite marked (17 per cent); atrophy (11 per cent) and a close analogy to the insane in hypertrophy as compared with the normal should be noted. Mendel (Die Manii, 1881) shows that the cardiac affections in

maniacs is from 3.4 to 14 per cent, and 5.5 per cent in dementia. Witkowski has found in cardio-pathological cases that pride, egoism, uneasiness, a tendency to impetuous acts, and violent manifestations against self or others, especially in the case of those attacked with ventricular hypertrophy, are of great influence.

D'Astros, from a study of 39 cases of cardiac troubles, concludes that in general they manifest a character inclined to mental alterations. The aortic lesion causes subsiding (more or less pronounced) of the psychical powers and a neuro-pathological state that may develop into hysteria; mitral lesions predispose to melancholia and to attacks of violence. In cardiac insanity, depression, melancholia, delirium with hallucinations, with short oscillations, especially in attacks of asystolia in impulsive forms, are frequent. The close connection between psychical acts and the circulation of the blood is shown by the sphygmograph. Rindfleisch says that pathological anatomy indicates that the anatomical basis of the mental affections is essentially an anomaly in the distribution of the blood and consequences that follow.

LIVER.

Out of 50 autopsies Flesch found the liver normal in 6 cases only. Fifteen had infiltration and fatty degeneracy (29.4 per cent); 5 had atrophy, and 6 suffered from "brunes" (9.8 per cent); 5 had hyperæmia with bilious stagnation (9.8 per cent); 5 tuberculous, 2 with fatty infiltration (9.8 per cent); 5 cirrhosis (9.8 per cent); 1 hypertrophy (1.9 per cent); 4 nutmeg livers (7.8 per cent). Hepatic affections predominate in criminals; alcoholism explains it in part.

Criminality is more frequent among the liberal professions. In Italy 6.1 per cent of criminals have superior education; in France, 6 per cent; in Austria, from 3.6 to 3.11 per cent; in Bavaria, 4 per cent. The proportion is here relatively greater than in the other classes of society; it is easy for the physician to give poison, the lawyer to cause perjury to be committed, and the teacher rape. Illiteracy is extremely common among prostitutes.

As compared with the insane, criminals are much more lazy; but what they do has more purpose. Education tends to diminish monomania, religious and epidemical insanity, insanity of murder, and it gives to crime a less violent and less base appearance.

Sallust, Seneca, and Demme were not free from the taint of crime, and Lombroso says that Comte, Swammerdam, Pascal, Tasso, and Rousseau were more or less troubled with melancholia and monomania.

SLANG.

The recidivists, who are collected together in the large cities, have a language of their own, and while preserving the grammatical type, general assonances, and the idiomatical syntax in use among the people, they change the vocabulary. The greatest and most curious alteration approaches that of the slang of primitive languages; it consists in indicating the objects by one of their attributes; thus the "kid" is called "the jumper;" death, "the meager," "the lean," "the cruel," "the certain." We can, by a study of their slang, obtain insight into their criminal turn of mind. The soul is called "the false;" shame "the red or the bloody;" the hour "the rapid;" the moon, "the informer or spy;" the street lamps, "the inconvenient;"

the lawyer, "the whitener or washer;" the purse, "the sacred;" blood, "grape-jam;" the prison, "the little saint;" the pawn, "the saint or sacred;" alms or charity, "the pig iron or sow;" preaching, "the tiresome;" the nun, "the blessed one;" the knee, "the devout one;" the canon, "the brutal one;" the painter, "the creator;" the soup of the prison in Lombardy is called "the bad;" "blond," means a bottle of white wine; "paid dull color" stands for money; "a dead bottle" is an empty bottle; "curley head" is a Jew; "the sounder" is justice; "father sounder" is the judge; wisdom designates "the salt."

Another method is to follow the metaphor of a phonetic disguise, thus prophet is "pocket or cellar," alluding to its depth; poverty is called "philosophy." "To strangle a parrot" is to drink a glass of absinth; the color of both is green. "The white nuns" are the teeth. The cravat is "the arch in heaven;" "the bridle" is the chain of the prisoner; "the judge of peace" is the executioner; the college is "the prison." In Lombardy the legs are called "the little branches;" "ducat" is used for pleasure; "vice" for hunger; "teeth" for the fork. Sometimes the metaphor is worthy to rest in ordinary language. "Juileettiser" to dethrone is in French for drinker, in Spanish for vagabond; a Grecian is one who deceives in the game. Here are some locations with homophonic allusions to certain persons or places: To go to Niort is to deny (French nier); to go to Rouen is to be ruined (ruiné).

Others, as among savages, are made by onomatopy; "a stroke" is to walk; "tuff" is a pistol; "tic" is a watch. Synonyms are found also; "papa" is the chief of justice; the ninth hour is the "sentinel." There is also a turning of words: Orfèvre (goldsmith) is "ophelin;" philanthrope for filou (thief); "Andare a Legnano" is to receive strokes of a club. There is sometimes a double play, phonetic and etymological, as "Martin Rounant, gendarme;" Rouen is officer of the police, and the "roue" instrument of execution (wheel or rack); "Erdman" is man-earth, for earthen pot.

Other transformations consist only in changing the terminations, in making metatheses, to suppress or add syllables which obscure the sense of the word, perhaps due to the idea of anything merely new, a characteristic of lazy minds, as in French, friod for froid; "zerver" or "server" or "verser;" in Italian camaro for camorade. Foreign words are a rich source for slang. The Germans borrow from the Hebrew, the Italians from the Germans and French, and the English from Italian and Sanscrit. "Furfante" (Italian) means rogue; it refers to a servant whose business it is to strike the convicts; it was borrowed from the Italians by the French; also "Fuoroba," which is the cry of the galley sergeant to give the signal of a capture; it means without robe.

Ancient terms, which have disappeared from the modern lexicons, furnish curious examples: Arton, the bread; lenza, the water; cuba, the house. The French say "to be warm" (être chaud); for to suspect (se méfier). The Spanish say "milanes" for pistol, by allusion to the ancient fabrics at Milan.

There is a richness of synonyms for things especially interesting to criminals; 17 different words have been found that indicate the guards, 7 for pocket, 9 for sodomy. The French criminals have 44 synonyms to express drunkenness, 20 for the act of drinking, 8 for wine; that is, 72 in all for drink, 19 for water, and 36 for money. Criminals have need of good eyes; they call them "the ardents," "clairs" (clear), "mirettes" (a species of bell flower), "quinquets"

(lamps). Criminals tend to animalize things; the skin is for them "the hide;" the arm is a "pinion;" the visage is a "muzzle," a "snout;" the mouth is a "beak." They employ negatives voluntarily; to be "vicious" is to be clever; they will not say, "Je suis bien fait," but "Je ne suis pas déjeté" (crooked, warped, perverted). In conversation, "Ne pas être méchant," is equivalent to "Être un imbécile." They make everything worse; thus, to put anything into the form of a corpse is to eat it. In spite of large possible resources the slang is poor, owing to the few ideas of criminals. Some expressions remain constant by reason of their sonorousness and bizarre nature.

The Germans and Italians call a watch "tick." The analogy of situations account for the numerous similitudes of ideas. Phonetical resemblances are much more rare; they are favored by the inconstance of criminals, who desire either to escape justice or to strike their victim unbeknown, or to obey the vagabond instinct. This causes them to change their residence and carry their expressions from one country into another. The principal cause of slang among criminals is the necessity for the malefactors to escape the vigilance of the police. But just as language is changed according to location, climate, custom, and new conditions, so slang follows the same laws. To a certain extent every profession has its slang. This tendency to form slang among members of the same trade is strong, especially when the trade is suspicious.

LITERATURE OF CRIMINALS.

The ancients have as models of criminal literature the obscene books of Ovid, Petronius, and Aretino, but, aside from their contents, they are bad models, being devoid of rhetoric and of a low literary style as in the popular almanacs.

In Italy there is the famous Trattato dei Bianti (Treatise of Vagabonds). It describes 38 species of swindlers and vagabonds of Central Italy, the most curious of which are the "testators," who feign dying in order to leave their property to others; the "affarfanti," who pretended to have expiated great crimes by cruel penitences; the "formigoti," who are false soldiers returning from false expeditions to Palestine; the "Sbrisci" (sliders), who go naked, pretending to have been captured and maltreated by the Turks; the "ruffiti," false incendiaries, who pretend to have left their homes in ruins.

Out of 92 little stories (bought at public places), Lombroso found 20 which related to crime and thefts. Fourteen were in verse and 6 in prose.

But aside from this literature there is that coming direct from prisoners, the product of long leisure moments and of badly restrained passions. The poems of this kind are very numerous in Spain, and still more so in Russia, where people sing them outside of the prisons. The following is an example:

I will pillage the merchant in his store,
I will kill the noble in his castle,
I will carry off the brandy and beautiful daughter, and the world will know me as a king.

One writing of the prison says:

There alone you will find the brothers, there the friends, treasures, good repasts, a sweet existence. Outside you will be always in the midst of your enemies; if you can not work you will die of hunger.

Such writings indicate how an excessive humanitarianism turns the prisons into comfortable hotels.

The following shows some æsthetical feeling in criminal nature: "In the midst of the place of Vicaria, with her tiny hands she makes for me signs. I saw that it was my little mother, and that her eyes flowed like two fountains. Mother, you alone who think of me, I am surrounded by evil Christians. We are in hell, condemned. And you, dear mother, breathe in vain your prayers." Those are in error who deny such feelings to criminals.

Les Parias (men who are of the lowest caste of Indians—objects of contempt) represents a caste devoted to prostitution. If they are not thieves they are strolling actors, tattooers, soothsayers, all quite doubtful professions.

Notwithstanding their deep degradation, they have composed fine poetry, but as far as its content goes, except the song of "Tiravallura," it is very immoral. Here are some of the morals of their poems: "What you can not obtain by force, get by strategy. If you know how to put to profit the deceits of others, you will not suffer from hunger. Ally thyself only with the strong; place thy house near the temple in order to steal by night the offerings. The imbeciles permit themselves to be deceived by appearances; endeavor to profit from them." A jackal, having stolen some chickens, thanked God for favoring him; some one was attracted by his voice, and killed him. Moral: "Take care about confiding in God; the most fervent prayer will not save you from the stroke of the club."

Some of the songs show how, in an uncivilized country, crime is considered right, or at least only a trivial sin, which is easy to expiate.

The songs of Corsica are almost all works of bandits. They breathe vengeance for the murder of a friend; hatred of enemies, to kill them, and admiration for the murderer. "I have hope for him; God will permit that I avenge myself; my account is all made. I will be conqueror, killed or bound."

The writer of this, after killing his victim, sprinkled him with pepper, so as to mark him with his seal.

A large part of prison literature is in verse, perhaps because it is more adapted to criminal passions. Lacenaire wrote the following:

TO MY LOVE:

I dream of thee in my happy moments, when o'er my brow shine the most vivid colors; now the dream has vanished and my lot must follow the fatal destiny, which would cast me into the field of cruel death. Wait for me in heaven, thou beautiful, immortal one. Curse me, I laughed at your meanness; I laughed at the gods, for you alone invented. Curse me, my soul without feebleness was firm and frank in its atrocities. However, this soul was far from being black. I was sometimes kind to the unfortunate for virtue's sake. If my heart had been able to believe, doubt it not, I would have been virtuous.

Lacenaire, in his autobiography, tells some truths about the moral life in prison:

If a young man on first entering prison does not learn the slang and immediately put himself down to their level, he will be declared unworthy to sit by the side of friends; even the keepers will frown upon him. He blushes and regrets that he has not been as bad as his comrades; he dreads their jeers and their contempt, for in prison one learns what esteem and contempt mean. This explains why certain men are always happier in prison, because out of prison they receive nothing but disdain. Thus the young man, following his models, in two or three days learns the slang; now he is no longer a green simpleton; now friends will shake his hands without fear of compromising themselves. The young man blushes if considered a novice; and although he is not yet entirely perverted, the first step has been taken, and he will never stop halfway.

When you paint the portrait of a prisoner, it will represent some member of society. Although the prisoner abandons his body to everything, though not always opaque, some among them are transparent. The vulgar sand which you trample under foot furnishes a brilliant crystal after it has passed through a burning crucible. Is a mountain known if one has not visited the caverns? The underground, though distant from the light, is it less important than the outer crust? We have deformities and diseases to make us shudder; but since when does horror exclude study, or disease put the physician at a distance?

In a letter he wrote speaking of himself:

What a torment inaction is for one always accustomed to study? It holds me in a disgraceful laziness, to petrify in the bosom of misery. I have fear of losing what little intelligence remains to me. All creation is based on motion and work, all nature has horror of inertia, and should the prisoner be an exception to this universal law? Some cry bread, bread; but from the bottom of my solitary cell, I cry work, work.

Another endeavors to embellish some of his bad actions, to excuse others, and to invoke the fatality of the stars for some. Instead of being repugnant to the accusation of sodomy, he maintained it was a mark of good taste, and that, in general, crime was permitted to some men, for they were free from the law. Some of the letters and poems of Ceresa, Byron, and Foscolo show traces of the remorse and violence with which they tried to rid themselves of bad passions. Ceresa was a sodomite priest, who paints in vivid colors his struggle against evil. So Byron and Foscolo picture crime and adultery, but are irritated if taken too literally.

Lately it is due to Balzac, Victor Hugo, Dumas, Sue, Gaboriau, and Zola, that this miasma has endeavored to penetrate into literature. But this isolated phenomenon may not always endure; the vain pleasure, the new and better taste which provoke parallel odors should have an antidote in the contempt which is aroused in the mind of the reader. True art loves to hover in purity and serenity; and this all the more when it sees the great contrast around it.

The literary productions of the insane resemble those of the criminal in autobiographical tendencies, in vivacity of complaint and its little details. But the productions of criminals excel by their burning and passionate eloquence. The criminals show less lightness and more originality of form, except when they lose themselves in the play of words or rhymes or homophonies, which the insane always seek.

SPECIAL CRIMINALS.

In the investigation of special criminals we must ask the reader's indulgence for going into many details, but any attempt at scientific method requires this.

The author visited the leading prisons and reformatories, and selected, with the aid of the superintendent, typical cases which were regarded more or less incorrigible. He frequently lived in the prison and learned all he could from the records and officers of the institution about the inmate to be studied. This was always done before he examined the inmate himself. The inmate was not aware of this, so if he falsified, he would be much easier detected.

The method of study employed is quite imperfect, and is only given as a suggestion of the direction in which such studies should go. For, after all, the knowledge of the criminal himself should be the foundation upon which reform should be based, and criminal law and its administration should rest.

CASE "B." HISTORY FROM RECORDS OF INSTITUTION.

Received July 25, 1887; offense, petit larceny; age, 11; eyes, brown; clothing, fair; resides with parents; never in the almshouse; at police court of ——— on complaint of ——; weight, 34 kilos; height, 1,371 mm.; hair, brown; education, second reader; previous arrests, two or three for stealing and staying out; never in orphan asylum, but in reform school; three months ago was in Catholic protectory and assigned to knitting department, first division. Parents: Father, intemperate, dock laborer; he does not know whether any of them were arrested; no stepfather or stepmother; father, Irish Catholic; family consisting of two boys and two girls.

June 20, 1889: Height, 1,428 mm.; in chest, 723 mm. April 2, 1890, he was intrusted to the care of his mother,

June 21, 1890, recommitted by police court for petit larceny. Weight, 41 kilos; height, 1,485 mm.; clothes, good.

COMPLAINTS.

1888, May 14: Leaving the line while returning from chapel last Sunday morning; not going on the yard. (Pleads guilty, case held open.)

May 21: Running around the yard with two others, shouting and making all the noise they could; would not come when called; refused to go on parade; kept running until I caught and locked them up. (Sunday, pleads guilty.)

May 22, by watchman: Disorderly in the yard, kicking stones up against the shop windows while on parade. (Punished with a strap, 5 blows, 1 week, pleads guilty.)

May 23: In company with other boys entered knitting shop; machines tampered with; a few articles were missing. (Five to 10 strokes with a strap, 8 weeks.) [a]

May 31: Throwing his window frame out of the door; spoken to many times about being disorderly. (Five blows with a strap, 1 week, pleads guilty.)

July 15: Loud and disorderly after whistle was blown for parade; crowding where there was no room for him, and when asked to go to another place did not do it until I insisted on it, then he was very insolent; also fought with another boy. (Pleads guilty.)

July 16: Disorderly in wash room and training room almost every day. (Five blows with strap.)

July 21: Leaving dormitory and going to others; also generally disorderly; impossible to keep him in his dormitory. (Pleads guilty.)

August 28: Taking the plate of hash, and refusing the rest of the boys to have any; would not stand up. (One week.)

September 6: Disorderly on parade; scuffling on the bench in the yard.

September 17: Burglarizing with another boy while on parade.

September 18: Kicking another boy. (Excused, with reprimand.)

September 19: Throwing a hat about the sleeping hall and lying about it. (Reprimanded.) Other complaints on September 21, October 4, October 10, October 15, October 31, November 13, November 22.

November 25: Rank impudence and insubordination; demanded a ticket to hospital in impudent manner; he was told to wait and see Mr. K.; was very impudent. (Punished with strap; 1 week.) Other complaints December 15, December 18, December 20.

December 29: Going to bed with his clothes and stockings on, which I had forbidden. Admits it (1 week). (In an interview he said he was cold and so kept dressed.)

1889, January 9: Talking on parade in lavatory. Admits it (2 weeks).

January 15: Stealing a pair of second badge pants from boy "S." Other complaints January 16, January 22, January 23, January 29, February 1, February 11, February 16, March 30, April 12, April 16, April 22.

April 28–29. Having four keys in his pocket and tobacco; one key fitting drawer in an officer's room, which has been opened several times and articles taken out. (Punished with strap.) Other complaints May 2, May 22.

May 31: Disorderly in ranks when boys were marching to dormitory, getting out of his place, and insolent when spoken to about it. (Held open.) Other complaints June 17, June 25, June 26.

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[a] Added to time of stay in institution.

June 27: Going into boys' dormitory for plunder; got under the bed; I told him to come out and he would not do so. Admits, except plunder (3 weeks). Other complaints October 5, October 22, October 24.

1890, January 23: Going into "B.'s" dormitory. Admits (held open).

January 30: Going to bed with his trousers on; I put him on the floor and he was very impudent and abusive and positively refused to do what I told him. Admits it (under lock and key for 1 week). Other complaints February 28, August 29, September 2.

September 26: Refused to go to the superintendent when requested; throwing a chair at the officer and calling him a g——— d——— liar.

September 27: Detected in taking putty off of some freshly glazed windows.

1891, January 12: Impudent to an officer, telling him to shut up and get out.

He escaped by scaling the wall and was recaptured. He gave his guard the slip at the depot but was captured again. He was placed in confinement but succeeded in getting out; search high and low was made for him until he was found by one of the other inmates in the top of a tree late in the evening. After attempting to escape day after day he was finally transferred to the penitentiary.

TESTIMONY OF OFFICERS.

Yardman: "'B' is a good boy; gets along with me very well. I let him wear a tie of mine one Sunday for being a good boy. I have to trust the boys a great deal; 'B' has not stolen but a few things; he does not feel like taking from me."

Hallman: "He gets into a room and steals without anyone seeing him; I seldom see him steal. He is a good boy to work; when bad he wants to go here and there; he won't stay at his work, roves around; he has been under me six or eight months; he disobeyed at first, but afterwards with a little pressure he would mind better; he likes to fight; I never saw him cry; he learns quickly; I saw him stealing beans and caught him."

A teacher: "I had him one or two weeks. He was very lazy; tried to get out of his work the best he could; talked to the boys in school a great deal; did not talk back very much. He got into my desk and took some lead pencils."

Another teacher: "He is a little villain; does not bother me much more than the other boys at table; a vicious kind of a boy; he turned upon me one time; he would not stop his talking; he kept muttering; I took him by the collar, and he kicked me when I took him out; I had hold of him with one hand."

Another officer: "He was under me, but never gave me any trouble; never stole anything from me."

A teacher: "He wrote a note to another boy about his teacher, and signed a boy's name whom the teacher liked very much. He tries to steal something almost every day; I always find something in his pockets that he has stolen."

A teacher: "He has tried my patience very much; he is bright and peculiar, very stubborn and self-willed, and inclined to take anything in his reach; he never broke into my desk; he would take things from the boys and lie about it; he is disagreeable; he lies, is sulky, no matter how you treat him; he is a fighter; he is perfectly lawless, one of the worst boys I had; he never struck any boy; he is quiet at times; never saw him cry. I have seen him very angry; his face becomes red; he is a good scholar. Since his return his conduct is better the three days he has been under me; he has been absent three or four weeks; he won't talk much; he is a bright appearing boy, but he is stubborn and is a daring fellow."

Watchman: "His behavior is generally bad most of the time, running out of his dormitory and throwing things around the yard and hallooing; he is impudent and saucy; I do not suspect he has bad habits; he uses vulgarity with the other boys; he steals from the other boys; he has admitted it. I have seen him punished and then he cried; never saw him cry except this time; he has the wildest look when he does cry. I have seen him hit other boys with his hand; most of the boys do not hit one another; he is not a coward; some boys are afraid of him, but he is not afraid of a boy, no matter how big he is. He was under me about a year and a half; he got into bed with his clothes on, because sometimes they have to wait a half an hour before they go to water-closet; he had more bedclothes than the other boys, or he would have stolen from the other boys' beds. He appears to have some control over the other boys; the boys do not hate him; he gets angry, and they like to see him angry, but he fights them. He got into one of the officers' rooms, cut open a satchel, and took out some things, but not everything."

Teacher in painting and graining: "I never saw him take anything. He has admitted everything I have accused him of. At first he would say nothing; afterwards he would admit it. His actions were offhanded. He did not want to say anything then. Everything that had been taken was attributed to him. He hates to have anyone question him. When I talked to him he cried, probably because he did not want to leave the shop. He has been under me about eight months. He will make a good workman. Is very accurate in mixing colors; has good taste. Decided in his answers after he knows a thing. He doesn't talk much. He thinks he knows all about badness and malignity. He has improved in his work. If he is going to deny a thing, he would do it at once. He never stole a thing from me, although it was easy for him. He never tried to escape."

Military instructor: "'B' is a good soldier by nature, and a bad soldier, because indifferent. Has no enthusiasm for anything. I have punished him two or three times. He has more nerve and pluck than any other boy I ever saw. Thought of punishment has no effect on him; he takes it indifferently; but the last time I gave him seven blows, and he said: 'Oh, Mr. ———, let me go, and I won't do it again.' He denied it up and down the first and second stroke; the fifth or sixth time he admitted his guilt. After this I made him promise me not to steal for a straight month, and he accomplished it, and was taken out of the scrubbing gang. He has an indomitable will and enthusiasm if you can get at him in the right way. I have never had any other particular trouble with him. He has not been impudent to me. I have known him to take a whipping in order to shield another boy. He never tells on other boys. He is a boy who would sacrifice to do you a favor."

Chaplain: "He is not religious by nature; his moral sense seems to be dead. He is well-behaved in chapel. He gives his name regularly for confession, which is voluntary. He was in the class preparing himself for his first communion, depriving himself of spare time for two days in the week for three or four months. In the meantime he prepared his catechism lessons. While with me he was very correct, but would steal when away. He is not very talkative, even when locked up. He began to cry when I said 'My little fellow.' He cried the time I separated the candidates. He tried his best. He studied his catechism earnestly; got a boy to help him, as he could not read

well. It was a great disappointment to him not to succeed. There is no question about his sincerity in this."

Superintendent: "I have whipped him four or five times. He generally denies the charge at first. I never punish a boy until he admits the charge. I give him a few days to think it over. He has asked me to whip him instead of locking him up. After thinking it over a day or two he generally admits the charge. During whipping he acts very sour. He will always cry, which is from anger, I think, because afterwards he would act sorry or surly.

"I have given up punishing him with a strap; it is no use. After he broke into the officer's room, he denied it for six days, and cried and was fighting mad; when mad he shakes his head in a threatening sort of way. I caught him running around, and called him up to the office and searched him, and found on him some bronze that Mr. D. had; Mr. D. was called to see it, and 'B' said 'I hope you don't think I took this bronze;' and he stood and cried as if accused falsely; one night he stayed out, he gave no reason for it (when a man is missing it may keep the officers up all night); he stole something this night; he said he did not want to escape, which is probably true."

INTERVIEW WITH "B."

"B" is not talkative. He was gradually drawn into a conversation. He says:

I am 15 years of age. When about 5 I went to The Sisters School; I had stole some liquorice, and five weeks after was arrested by the detectives. I once caught a ride to Cleveland simply to take a ride, and stole a ride back; went to ——— to ride on the water for that day; paid 15 cents for passage. I went to the public schools. They used to whip me at the Catholic school for talking. My father whipped me for staying out late. Father does not drink, my mother did not treat me badly. As complained of by watchmen here, I did look around, but I do not know why I like to look around. I like school and paint shop here. *I steal because when I see a thing I want I like to get it.* I am more apt to get $10 in here than outside. I went to bed with my clothes on because it was cold. I chew tobacco, I like it (cried and sobbed); they whip me here, I deserve it, but it did not do me any good, because he (superintendent) did not whip me hard enough; my father whips me harder and hurts me more, he whips me with a strap. They can not make me do a thing unless I want to do a thing by whipping me, and so whipping me harder does me no good. I am going to do as well as I can here (cried again). I have a brother older than I; he never was arrested, he is better than I because he did not want to do bad things. I went into officer's room to get some tobacco—I got a cigar; not for to get into the room, but for to chew. After I get out of here I would like to go to work. I have a good memory. At home I used to come in at 9 or 10 o'clock at night, I would go out at 6 or 7 in the morning. I would stay out in our shed; I did not go in the house because I was afraid of being whipped. Three times (doubtful) were all I ever stayed out for fear of being whipped. I never stole anything but candy (doubtful). It is about the same to get along here as outside. When in Cleveland I slept in a car during the summer. No man ever hit me very hard. I often feel good, certainly I do.

Physical examination.—Vegetative functions, normal; circulation, good; respiration, 16; digestion, perfect; anomalies, same; girth of thorax, 27½ to 30 inches; girth of waist, 25½ inches; girth of thigh, 16½ inches; girth of calf of leg, 11½ inches; weight, 89 pounds.

Craniological examination.—Width of head, 152 mm.; length from glabella to occipital protuberance, 173 mm.; maximum length of head, 173 mm.; width above tragus, 142 mm.; width between zygomatic arches, 128 mm.; width between external edges of orbits, 110 mm.; distance between outer corners of eyes, 91 mm., distance between inner corners of eyes, 34 mm.; width of protaria malar, 98 mm.; width of gonia, 95 mm.; distance from chin to hair, 145 mm.; distance from chin to root of nose, 99 mm.; distance from chin to base of nose, 61 mm.; distance from chin to mouth, 43 mm.; distance from chin to tragus, 113 mm.; distance from tragus to root of nose, 101 mm.; length of ear, 64 mm.; length of nose, 46 mm.;

height of nose, 38 mm.; elevation of nose, 13 mm.; width of nose, 29 mm.; width of mouth, 42 mm.; thickness of lips, 17 mm.; horizontal circumference of head, 533 mm.; vertical circumference of head, 330 mm.; sagittal circumference of the head, 304 mm.; nationality, Irish; nationality of father, Irish; nationality of mother, Irish; occupation, worked in can factory; color of eye, brown; color of hair, dark.

Remarks: Ears projected very much; head is not symmetrical; right side of head in parietal region is considerably larger than left side; the boys had noticed this; he had trouble with fitting hats; he is slender in form.

CONCLUSION.

"B" generally admits everything after he is whipped or talked to and pleads guilty. He is dirty and indecent at times. Although not talkative, when aroused he is given to swearing and impudence, and has manifested pride in his knowledge of evil. He is sincere in his desire to be religious, but his passion for stealing is still stronger. He feels the desire for things he can not have, and so steals them, and especially from persons he does not like. He has ability, power, and tenacity, but his passion for stealing determines their direction. Hereditary influences seem to be at the basis of this stealing, yet his early surroundings are adequate to account for much of it. The fact that lately he has been moved to the penitentiary for insubordination would indicate that there is little hope of his reformation. He seems to be a case of what might be called approximately pure theft. He should never be let out upon the community until there is reasonable certainty that he will not steal, for as he grows stronger his bravery and tenacity can make him a very dangerous thief or burglar. There is a possibility of his outgrowing his stealing impulse, but little probability.

Physically he seems to be equal to if not superior to the average boy, and the anomaly is the lack of symmetry in the posterior part of his cranium.

CASE "C."—FROM RECORDS OF INSTITUTION.

September 5, 1885, "C" was received into a reformatory institution at the age of 20. His crime was grand larceny in the second degree.

Antecedents.—No insanity, epilepsy, nor dissipation; he had a good common-school education, and had been in the high school. His family were very well to do. His father was a real-estate broker worth some $80,000.

There were no papers found on "C." June 16, 1886, it was found that "C" had previously served a term in another institution. "C" denied it, but the superintendent of the other institution recognized his photograph, although there he was under another name. Owing to this "C" admitted he had falsified, but still denied being under an assumed name. "C" said he always lived at home till the date of his marriage a year ago. He claimed to know only through fractions when in school. He said, as to his work, that he was a Hall typewriter, copying at $12 a week with ——— & Co. (This statement was found to be untrue.) As to religion, he had been under ordinary influences, had joined the church with a cousin and wife as a member.

Physical condition was excellent, as was also his mental capability. He seemed to have no moral susceptibility, but is not incorrigible; sensitiveness, 1; claimed innocence, and denies that he confessed in court. He expects to inherit property, and has no idea of business; he was a stenographer.

CONDUCT REPORT.

1885, October 10: Disturbing library books, and when told of it using insulting language.

October 10: Destroying the report made against him by the librarian; taking it from Mr. N.'s desk.

October 10: Neglecting three different times to be at count. Other complaints, October 11, October 12, October 13, October 13, October 13, October 14, October 19, October 29, October 29, November 19, December 3, December 13.

December 14: Throwing paper on gallery from room.

December 16: Dilatory in sending in examination paper.

December 17: Dusty walls.

1886, January 2: Talking in brush shop without permission. Other complaints, January 4, January 11, January 13, January 20, February 11.

February 17: Carelessly stenciling cases.

March 3: Sweeping dirt on door stone.

March 11: Not at door for count; other complaints April 21, June 7, June 10, June 21, July 29, August 4, August 4, August 6, August 12, September 1, September 13.

September 15: Continually laughing and fooling in line.

October 6: Leaving cell door unlocked with man in it; other complaints, October 14, October 15, October 21.

November 7: Neglect of duty, as he went into his room to write a letter and stayed twenty-five minutes.

November 26: Bucket contained bread. (Canceled.)

December 2: Towel not on cupboard. (When "C" was on parole, he called on the family of one of the inmates and told a false story as to boys contributing $1 to getting a play in reformatory, and "C" obtained a dollar in this way.)

1887, January 3: Talking on way from hall; other complaints, February 2, March 4, March 24, March 26.

March 29: Trying to hinder the marker and floor man in doing their work by not trimming the kind of screw bodies when asked to do so by the marker; other complaints, April 4, April 13, April 27.

April 29: Lying to superintendent about report of June 27, 1887.

August 24: Talking to foreman without permission.

September 2: Leaving a good brush in waste stock to go down fire hole; other complaints, September 26, October 9, November 26.

1888, January 21: Corresponding with a discharged prisoner, who signed himself as brother.

January 22: Borrowing a magazine.

January 22: Erasing the name ——— from magazine and writing his own name thereon, intending to deceive.

February 29: Good record.

March 31: Good record.

April 6: Negligence in reporting absentees; other complaints, April 18, May 16, May 26, May 28, June 26, July 17, July 20, July 21, August 1, August 20.

December 29: Neglect of duty; signaling band to cease playing before the companies were in hall, and marching his men ahead, causing the other captains to halt.

1889—January 9: Brooms not in cupboard.

January 12: Disturbing hall by loud talking in room.

January 16: Talking loud in room at unreasonable times; disturbing hall; other complaints, January 20, May 24, June 11, July 7, August 7, August 15, September, October 10, October 12.

November 4: Taking from shop when not at work a newly tapped pair of first-grade shoes, wearing the same without permission. Other complaints November, 18, December 31; 1890—January, February 8, February 19, February 26, February 28, March 31, April 9, April 15, May 30.

June 4: Inattention in drill; slow in manual. Superintendent did not whip "C," *because it would be punishment, and not reformation.*

July 31: No reports.

August 31: No reports.

September 1: Promoted to upper first grade.

September 24: Discharged at expiration of maximum term.

1891, June 29: Nothing new in "C's" case. His record was perfect from July to the date of his release, September 24, 1890. He has been heard from indirectly since his release as having the appearance of one about the streets of a city, getting his living by his wits.

School record.	Literature.	Physiology.	Physical geography.	Language.	Arithmetic.	History.	Physics.	Civil government.	Stenography.	Science.	Psychology.	Ethics.
1886–87	81	----	----	86	74	94	97	90	62	----	----	----
1887–88	85	----	----	----	100	97	88	94	83	100	----	----
1888–89	----	----	----	----	----	96	----	86	86	97	83	84
1889–90	87	73	97	----	75	90	----	82	----	85	----	98
Total average	84	73	97	86	83	94	92	88	77	94	83	91

FROM LETTERS.

September 16, 1885: Grand larceny in second degree.

August 31, 1885: Stealing two coats, one vest, and one pair of trousers; value, $45.

September 16, 1885: Sentenced.

September 25, 1885: Admitted to the reformatory.

July 11, 1886: "C" wrote a letter to an old friend advising him to beware of bad company (women), drinking, and doing anything to make his parents ashamed of him; had not written before because he was almost discouraged.

April 24, 1887: Father wants "C" back in his business.

July 23, 1887: Stepfather talks about giving "C" a position.

August 2, 1887: "C" writes a letter to his mother, blaming the authorities because he was not released before; giving up hope of getting out till September 16, 1890 (maximum term), when he will be 25, having then served nearly seven years penal servitude; he tells his mother he nevertheless intends to make his mark in the world. He hopes his mother will not worry. He has seen 500 men leave the reformatory as reformed who were no more reformed than he. He signs himself with his *false name*, and promises never to leave the path of duty here or elsewhere.

January 1, 1888: Claiming to be unfortunate and misunderstood and accused wrongfully of writing criminal letters.

January —, 1888: Letter from superintendent of another reformatory in which he was confined. "C" was received here September 18, 1882, from a court of oyer and terminer held in ———, for placing obstructions on the railroad track. Age 15, April 23, 1883. His history on the book says he was a telegraph boy. Father dead; stepfather living. "C" was released from here February 9, 1884, to the care of his mother. I recognize him in the photograph. This is the boy who was said to be so cruelly treated by Mr. "X" during my absence, and for which he (Mr. "X") was compelled to resign. He was in same kind of boys' home in ——— before he came here.

January 21, 1888: "C" acknowledges his crookedness, promising to redeem himself if allowed to remain in his grade one month longer. He says he has a brother, Will. (A lie.)

February 13, 1889: Letter asking to be paroled two days so as to find a position.

February 15, 1889: "C" writes a letter seeking employment, claiming to be a good laster of ladies' and men's shoes, knowing the trade thoroughly, and learned it previously to coming to reformatory; standing good.

March 22, 1889: Paroled.

May 9, 1889: Mr. ———, officer of reformatory, given order for arrest of paroled prisoner.

May 12, 1889: Telegram from "C": "I have been retaken by the State authorities for leaving Mr. ———. Please telegraph the superintendent the circumstances before it is too late. We don't arrive till 1.30 a. m. to-morrow." ———. (Signed his true name.)

May 15, 1889: "C" has never claimed he was employed in ———; did give conditional consent. (This is from a letter of a kindly disposed gentleman who took an interest in him.)

May 20, 1889: "C" writes: "Gone to be employed by ——— as reporter. In my former employment I was kept idle three-fourths of the time for want of work; he did not advance me as he said he would when I entered his employ. He promised to keep me on lasting machines. Instead of that he put me on all sorts of jobs. I told the foreman I could not well work for the wages I was getting—$8 per week. He answered that I was probably getting as much as I would receive for a long time, until I got into better standing."

May 20, 1889: Letter from an interested gentleman: "C" left Mr. ——— in a mean way, then forged a check for $5.87; I found a piece of paper in his drawer, where he had practiced the name. I also accused him of knowing where a missing watch was.

May, 1889: Foreman says he left his employment shamefully, leaving a letter saying he was going to work on some paper.

June 4, 1889: Letter. The following is a copy of a check, signature, and indorsement forged by "C" while he was on parole. He forged the check and gave it to a restaurant keeper; this gentleman presented it at the bank and it was returned as worthless.

Check.

No. 129. ———, May 11, 1889.

COMMERCIAL BANK,

——— street.

Pay to C. H. F———, bearer, 5\frac{87}{100}$, Five Dollars and Eighty-seven Cents.

5\frac{87}{100}$. Signed (another false name).

March 2, 1890: Letter to superintendent—"As you have put me in a higher grade, it would seemingly go to show that you haven't even yet given up all hope of accomplishing my reformation, though you have declared me incorrigible. If this is true, wouldn't it have been better to have left me in the third grade?" "C" has now been in the reformatory nearly five years.

CRANIOLOGY.

April 23, 1890: "C" was 23 years of age. Width of head, 152 mm.; length from glabella to occ. prot. 191 mm.; maximum length of head, 191 mm.; width of tragus, 139 mm.; width between zyg. arches, 130 mm.; width between external edges of orbits, 115 mm.; distance between outer corners of eyes, 91 mm.; distance between inner corners of eyes, 30 mm.; width of gonia, 96 mm.; distance from chin to hair, 179 mm.; distance from chin to root of nose, 108 mm.; distance from chin to base of nose, 61 mm.; distance from chin to mouth, 42 mm.; distance from chin to tragus, 141 mm.; distance from tragus to root of nose, 117 mm.; length of ear, 60 mm.; length of nose, 55 mm.; height of nose, 47 mm.; elevation of nose, 26 mm.; width of nose 32 mm.; width of mouth, 52 mm.; thickness of lips, 17 mm.; horizontal circumference of head, 570 mm.; vertical circumference of head, 360 mm.; sagittal circumference of head, 360 mm.; nationality, American; father and mother, American.

PHYSICAL EXAMINATION (BY PHYSICIAN OF INSTITUTION).

Occupation, typewriter; born April 23, 1867; father and mother, American; father's occupation, merchant; father died of cerebral apoplexy; mother living; "C" most resembles father; his general health good; has had jaundice and skin eruptions; age, 23 years; weight, 55.5 kilos; height standing, 1,692 mm.; height sitting, 918 mm.; height knee, 425 mm.; height pubes, 812 mm.; height navel, 993 mm.; height sternum, 1,365 mm.; girth neck, 830 mm.; girth chest, 830 mm.; girth chest, full, 878 mm.; girth knee, right, 348 mm.; girth knee, left, 348 mm.; girth calf, right, 331 mm; girth calf, left, 328 mm.; girth, ankle, right, 210 mm.; girth ankle, left, 210; girth instep, right, 238 mm.; girth instep, left, 238 mm.; girth upper arm, right, 280 mm.; girth upper arm, left, 281 mm.; girth, elbow, right, 252 mm.; girth elbow, left, 253 mm.; girth ninth rib, 775 mm.; girth ninth rib, full, 834 mm.; girth waist, 720 mm.; girth hips, 872 mm.; girth thigh, right, 472 mm.; girth thigh, left, 472 mm.; breadth head, 153 mm.; breadth neck, 113 mm.; breadth, shoulders, 393 mm.; breadth waist, 247 mm.; breadth hips, 321 mm.; breadth nipples, 195 mm.; shoulder-elbow, right, 360 mm.; shoulder-elbow, left, 354 mm.; elbow-tip, right, 456 mm.; elbow-tip, left, 455 mm.; length of foot, right, 256 mm.; length of foot, left, 257 mm.; length horizontal, 1,706 mm.; stretch of arms, 1,741 mm.; capacity lungs, 3.7; strength lungs, 4.9; strength back, 156; strength legs, 195; strength chest, 34; girth fore-

arm, right, 260 mm.; girth forearm, left, 260 mm; girth wrist, right, 162 mm.; girth wrist, left, 163 mm.; depth chest, 171 mm.; depth abdomen, 188 mm.; b. strength upper arms, 8; r. strength forearm, 25; l. strength forearm, 24.

Total: Development, fair; condition, good; vision, 20; hearing, good; pilosity, medium; color hair, brown; eyes, blue.

The physician says that there is little illness of any description; besides the affections marked, there is gonorrhœa.

There is absence of evidence of disease in circulatory and respiratory systems. The pulse is 68, and respiration 18. There is nothing to point to troubles in the abdominal viscera; no renal disease; no disease of the genito-urinary apparatus. "C" is somewhat anæmic, but no more so than would naturally appear in the case of an individual who has been indoors for a length of time. With the exception of a few acne spots on the body, the cutaneous system is in good condition.

In brief, the physical examination yielded negative results, as far as discovery of pathological conditions. Organic (vegetative) and volitional functions are well performed. "C" would pass as a healthy individual, and if presented for life insurance would be considered a good risk.

TESTIMONY OF THOSE HAVING CHARGE OF "C."

An officer says: "'C' took a pair of shoes out of the shop about seven months ago. I saw them on his feet a few minutes after he took them; he was out in the yard at the time; he did the finishing of shoes; I asked him in regard to the shoes; I followed him to his room to make sure. He was going to be a drum major, and said Mr. ———, the hall man, always gave the drum major this kind of shoes. He was previous in his action here. This is all I have ever seen him do; his work is pretty good; he has been under me about a year; after he was returned from parole, he was absent three months, being put in third grade; he has no chums, as far as I know. He is previous, and a little officious; this is a characteristic of a prisoner. I heard that he did a little bit of forgery while out on parole. I didn't know what he was brought here for. That is one thing I pay no attention to."

An officer says: "I heard him mumbling; I called him over; his lips were livid; he said it was not necessary (to call him); he never paid any more attention all the evening. He is below the average; he will do anything some day. I would not trust him as to killing a man, from the way he acted. I was keeping order; that night it seemed difficult for him to control his temper."

An officer says: "I don't know as I have seen him do anything out of the way. He is a pretty 'slick' fellow. I have seen him provoked, but no exhibition of temper. I was over him about four months in brush shop. He did his work first class."

An officer says: "He worked under me about four years ago; he was one of the best men I had, yet he had a sheepish way. One night in school he showed temper; he was all right in the band; he was a determined man; has considerable brains. Two convicts said he was sent to ——— prison for a year; he has never attracted much attention here, because his conduct was very good. I think he is a habitual criminal; he is not a coward. Toughest men are always in the foundry, because it is the hardest work; it develops a man physically. I have no confidence in "C" at all; he would run away if he could.

Superintendent says: "'C' was in N.; he was punished, but was cute enough to cause an investigation and have, as a result, one of the keepers ousted. The newspapers were full of it. He denied being in N, but finally admitted it after a letter arrived here addressed to his real name. He said he lied because it might help him; he was given a good position on parole, and ingratiated himself into the confidence of his employer."

INTERVIEW WITH "C."

Q. How long have you been here?
A. Four years and ten months.
Q. Do you like it here?
A. (Laughs.)
Q. What did they send you here for?
A. Grand larceny.
Q. What was the special charge brought against you?
A. Taking clothing.
Q. How soon after it was taken was the theft discovered?
A. Soon after; they caught me with the property on my person.
Q. Have you been to the reformatory at Y?
A. Yes, sir.
Q. Why were you sent there?
A. Putting an obstruction on railroad track.
Q. What made you do that?
A. Because the devil was in me.
Q. There must have been some other reason?
A. Well, I had a spite against the railroad company.
Q. Did they discharge you?
A. No; I was not in their employ. They put me off the cars up in the Adirondack region.
Q. Why?
A. Oh, I lost my ticket and the conductor put me off up there.
Q. Were you in the employ of the railroad company?
A. No; I was a passenger and lost my ticket.
Q. And the conductor would not believe it?
A. He would not or did not want to. He had punched my ticket twice previously, and I told him so, but he would not have it, and put me off 12 miles from any habitation.
Q. That was the reason you did that?
A. Yes, sir.
Q. What can you give as a reason for having taken those clothes? You were not poor, were you?
A. No; I was "tight" at the time.
Q. Would not your father or mother give you money?
A. I was not living at home.
Q. Why not?
A. Because they would not have me live the way I was living and live at home.
Q. How were you living—with a woman?
A. Yes, sir.
Q. You were not married?
A. No; was simply living with her.
Q. Did your family want you to live with them?
A. Oh, yes! They wanted me to live with them; but wanted me to give up the woman.
Q. Had you, before going to Y, ever taken anything?
A. Well, yes; I had stolen apples, etc. I had never been convicted of any crime, though.
Q. Well, you might not have been convicted, but did you ever steal anything? I want to see why you do this. A man doesn't learn to steal at one time—instantly—it is a gradual process; it comes on gradually. Did you ever steal anything from your mother?
A. Oh, yes; out of the pantry, etc.
Q. Well, that is the beginning. Some people stop there, and others don't, but go on. Did your mother tell you not to take things out of the pantry?
A. Yes, sir.
Q. Did your father ever whip you?
A. Not much.
Q. When he did, how did he do it?
A. Not so hard as my mother did.
Q. Did he whip you with a stick? Have you any complaint as to how you were treated by your parents?
A. Oh, no.
Q. How do you account for the other boys (your brothers) not going wrong?
A. Well, they always lived at home, and I haven't.
Q. Why did you not live at home?

A. Well, I had a roving disposition.

Q. How many brothers?—A. One.

Q. What is he doing now?—A. He is in the Navy.

Q. Would you not like to go into the Navy?—A. I was in it, but got tired.

Q. Do you get tired of things quickly?—A. I do when they don't agree with me. I liked the Navy well enough, but for one thing. The rations they served were worse than prison rations.

Q. Prison rations are pretty good though?—A. I don't think so.

Q. Well, you have been accustomed to better food than most men that come here, have you not?—A. Yes, I guess I have.

Q. Consequently you notice the difference more than they do. Do you think they reform boys here, or don't you? I only want your opinion; nobody touches a man for his opinion.—A. Well, I don't know. I——

Q. What would you suggest about reforming a boy? If you were going to have an institution, how would you run it? If you had a fellow like yourself, and was trying to make him "straight" so he would not "run off the track," how would you do it?—A. I should have the men that are put over the inmates different from what the prison keepers are generally.

Q. What is the matter with keepers generally?—A. All the keepers I have ever seen can not be looked up to by the men under them as their superiors—they do not feel that they are superior to them. Most of the keepers here whom we associate with, ten chances to one we feel to be beneath us, or, at least, not above us. I think prisoners ought to come in contact with better men than the prison keepers we have here. I think the majority of keepers are hired more for political reasons than because of fitness or anything else.

Q. If you were going to give a reason for your "running off the track" once in a while, you would say it was your associations? But you need to be pressed, don't you? If you had not been pressed for money, would you have taken this clothing?—A. No, sir.

Q. When you first took these clothes what were your feelings?—A. Well, I took them when I was drunk.

Q. How much had you been drinking? Could you walk straight?—A. Oh, yes; I was never so drunk I couldn't walk straight.

Q. Were you drunk when you put obstructions on the track?—A. No. It was done in a moment of revenge. I was sorry I did it after I got away from the spot, but I knew it was too late to get back and remove them before the train came on.

Q. Did you ever do anything else beside this? Did you ever get into tight circumstances and be pretty strongly tempted, and for some reason or another did not do it? Do you remember any of those circumstances when you were pressed by temptation to do something, whether you did it or not?

A. I think there have been times in my life when I would have done "little" things.

Q. When you get pressed you occasionally fail to tell things just straight, don't you, that always goes with the other?

A. Well, a person don't like to talk about some things too freely.

Q. Yes; but I would not say anything about it; I just want to find the reason for it all. You get angry occasionally, do you not?

A. Yes, sir.

Q. What makes you angry? Does it make you angry if a man calls you a name?

A. No; not in here it wouldn't. A fellow gets used to it in here and sees that it is only a sort of byword.

Q. Suppose a man called you names outside, what would you do?

A. If it was a bad one I would make him take it back, but I would not go so far as killing him.

Q. When you get angry do you turn red or white?

A. Red.

Q. Your face feels warm, doesn't it?

A. Yes, sir.

Q. Are you sure you turn red?

A. Well, I feel the blood rush to my face. But when I was guilty of any wrong act and was caught at it I turned white.

Q. When you are caught at anything do you feel mad?

A. Well, no; I think I do afterwards, though.

Q. Do you ever remember any time in your life when your mother told you she would whip you if you did a certain act, and you did it and told a lie about it to get out of the whipping?

A. I don't think I was whipped enough. I was often told I would be whipped

if I did a certain thing, and after doing it was not whipped. So if I did a thing I would not have any reason for denying it as I was pretty sure not to be whipped.

Q. What do you think is the cause of your telling things crookedly once in a while?

A. I think it commenced at school. I used to be with a lot of other school boys and we might do something one day and when questioned about it by the teacher would lie because afraid to tell the truth, and after a while would not tell the truth, not because afraid, but didn't want to.

Q. You are going to get out of here soon, are you not?

A. Yes; sixty-four more days.

Q. Do you think you are going to stay out?

A. I hope so.

Q. Well, when you went out on parole you thought you were going to stay out, didn't you?

A. I think I would have done so if I——

Q. What was the trouble?

A. Well, I left my employment and had permission to do so from the gentleman who has charge of the paroled men in Z., and the superintendent heard about it and I had not written to him about it and he issued a warrant and brought me back. But that has not held me here. It was, however, what made me lose my parole.

Q. There is a complaint recorded here against you about tearing up a report. What made you do that?

A. Well, a short time after I came here the superintendent put me to work in the office. The office men were allowed to come up as soon as they got through eating their dinner and could take a book from the library and read it. I was a new man, and we had a librarian who was a "fresh" sort of a fellow. I saw the other fellows go up and take a book, and I did the same. He then came over and said: "You want to leave them books alone." I said: "I don't want to do anything of the kind; all the other fellows take them and I will." He said he would give me a report, and I said for him to do so and be ——. I got mad as well as he did. The other clerks tried to fix it up, and finally he said he would let it all go if I would apologize. My temper was up and I would not apologize. He then went over, and made out a report for using insulting language. I went over and tore it up.

Q. You do not do anything out of the way unless you are pressed?

A. No; I am not a thief by heart or anything like that.

Q. Well, how do you account for it that when another fellow is pressed he don't steal, and when you are pressed, you do.

A. Well, he may be a little more conscientious than I.

Q. How does it come about that he has more conscience?

A. I don't know; I never saw two men situated the same way and one do different from the other.

Q. There are many fellows who are tempted to steal, but never do. Why are you tempted though?

A. Well, in this last case I saw no way of getting out of it.

Q. It was the woman that brought you here, was it not?

A. Oh, I would probably have come here whether I had been with the woman or not. I did crooked things before—little things.

Q. What were they?

A. At school, for instance, I would play truant and steal apples.

Q. Then your mother would ask you if you were at school, and you would say you had been?

A. Yes, sir.

Q. Where did you go when you left your parents?

A. To ——.

Q. How were you treated there?

A. I was allowed to do as I pleased.

Q. What did you do there besides going to school?

A. When I was about 14 years old I got acquainted with two other boys about my own age, and the relatives I lived with would not let me out at night, and as the places those fellows and myself wished to go to couldn't be visited in the daytime, I would get out of the window after the family were asleep and go down to the city with them till about 12 o'clock.

Q. How would you get in?

A. I had a back way that was not used. I could go down in the cellar and up through that way.

Q. Where did you go with these fellows?

A. To the theater or to saloons.
Q. What did you do in saloons?
A. Play pool and billiards.
Q. What was the value of the ticket you had when you were put off the train?
A. Two dollars and fifty cents.
Q. Were you going home?
A. Yes.
Q. Did you put the obstruction on right after you were put off?
A. Yes; right after.
Q. Did it obstruct anything?
A. I did not intend to wreck the train. The thought came into my head to put it on the straight run and not on a curve. I wanted to catch the conductor. I only wanted to delay the train and put them to trouble.
Q. What did you put on the track?
A. I put on two ties, wedge shape, and a lot of cobblestones and sand.
Q. What was your object in filling it up that way?
A. So it would take a lot of time to clear away, thus causing a delay.
Q. How long have you been in the habit of drinking?
A. Ever since I went to live at ——.
Q. What did you drink?
A. Beer.
Q. What else?
A. Whisky.
Q. How often have you been drunk?
A. Only when I went out in the evening with these people.
Q. You like to rove about, don't you?
A. Yes; but I don't mean that I like to change my employment.
Q. Have you wanted to change your employment here?
A. Yes; to something that would benefit me. They claim to teach you trades here, but they don't. I remember one instance: A man I was working for took a man from here who had learned the machinist's trade. When he got there he told him to make out a list of tools he would require and he would get them for him. The fellow couldn't do it, but sent up to the foreman here for a list, which they never sent him.
Q. Well, you would say the cause of your being here is the circumstances you were placed in?
A. Yes, sir.
Q. What do you intend to do after you get out?
A. I intend to go out of the United States.
Q. You haven't any money?
A. I can get some money easy enough. I want to go where there are no prisons.
Q. You can't find such a place.
A. Well, you know if a fellow goes to work in a shop and his fellow-workmen find he has been in a prison they won't let him work.
Q. Do you blame them?
A. No; it is a natural feeling, but I want to get where I am not known.
Q. You don't expect to get back in prison again?
A. No; I think not.

CONCLUSION.

"C" is capable of behaving himself in prison, and most of his disorder is voluntary. He seems to have no physical anomaly of any kind. He is an interesting case, and somewhat exceptional in that he has good parents, in good circumstances. As he confesses in the interview, he is not so "conscientious" as others, his anomaly is psychological; he has an innate tendency to crooked things, or, we may say, he has less power of resistance to temptation than the average boy. As is evident, he is much above the average intelligence. He is probably incorrigible. The last report about him, that he is trying to live by his wits in a city, is very unfavorable in its outlook.

HISTORY OF CASE "D."

TESTIMONY AS TO "D."

Officer says: "When in a reformatory 'D' escaped several times; one time he walked out with a dinner pail as a child of a citizen; being

returned for larceny, he behaved well and was discharged. Later he was sent to the penitentiary for three years for stealing from freight cars; he escaped from here in the guise of a workman; he was returned to reformatory for burglary, but under another name; being recognized, he was obliged to serve out his penitentiary sentence; after this he broke into a store, was caught, but escaped from the jail, was retaken, and almost escaped again; he set the jail on fire and tried to escape, but was held by the jailer's wife; afterwards, however, he escaped; was sent to the penitentiary for stealing a horse; he stabbed the night watchman, and was sent to State prison for five years; but he escaped on the way there.

"At the time he was indicted for the burglary of a horse he was 31 years of age and with no occupation. 'D' declares that he will kill Detective 'E' should he live out his sentence; he was very demonstrative in hack on way to public station. He lived once with Mrs. H., who left a good husband and three or four children in order to live with him; another time he entered a store and stole neckties, charms, lockets, etc. 'D' is a Frenchman."

The physician says: "'D' is a stock liar, an ingenious inventor, and a good writer; he wrote one or two columns in a large newspaper of a supposed interview with me; he had the facts and technical terms correct; he will do anything for me; he is genial and pleasant and well behaved in prison; he has no fear. 'D' told me his wife lived near ———. I believe he really intends to quit his former ways."

A lady says: "'D' stayed with his mother opposite us; his parents were orderly people. He hid under a stoop in the town for a week or so; no one could find him. He got into a stable and stole a horse, loaded a gentleman's furniture in the wagon, and drove away as fast as he could. Everybody was afraid of him in town."

INTERVIEW WITH "D."

"D" says: Whipping may do a young man good, but it is of little utility after he has grown up.

Old criminals free from alcoholism do not set up the young to crime. I have made up my mind to quit, and so have no objection to talk. I have always had a passion for invention, and instead of borrowing money, as I could have, I stole it in order to carry out my inventions. This is the real cause of all my stealing, for which I get the credit of twice the amount I have ever done. After a fellow gets a reputation nobody will believe him when he tells the truth; so it is easy to convict him. I was accused falsely of stealing a dollar from a negro woman in the next cell; she was afraid of being searched, and asked me to keep a dollar for her. Finding a flaw in my indictment, they decided to get up a new one, and so they got the negro woman to swear that I stole the dollar, and on that I went up to the penitentiary for six months.

I never stole very much money. I did not have an idea of earning much money, never looked out for that; was beaten out of a good patent at ———. I am a fool for stealing money, and also for having escaped many times. The feeling outside is very disagreeable, for I was suspicious of everybody, so much so that I would not recognize an old friend whom I had fallen in love with when a boy until, after telling me many things about my early boyhood, she finally showed me her finger that she had broken when we were sliding down hill together. That was the only thing that convinced me. I do not enjoy stealing. Every time I steal I have a repulsion to it, but the idea of getting means to satisfy my inventive idea overcomes me. I could get out of most any place. ["D" here showed the writer the iron bars in his cell window that he had sawed almost through, having filled the space made by the saw with brown bread, being the color of the bars.] I can pick most any lock. I opened the sheriff's safe the other day in twenty minutes after a so-called expert had worked at the combination lock all the afternoon without success.

I always carried a pistol, but never shot a man. I would shoot in the air to scare a man. [The prison officer said he never heard of "D" injuring anyone.]

I would rather be hung than have a life sentence. I should like electricity as a method of punishment. I could have got out of prison any time. [" D " was at time of punishment deprived of knife and fork; a spoon was considered a concession for fear he might use it as a tool to escape. He was obliged to return the spoon after each meal.] I have an invention to keep burglars from getting into stores at night. I think it will be a success. Aften ten years in prison, on being discharged, I was no more than out of the gate when I was presented with a number of old indictments, and so I am in jail now. I hold Wines's idea of reformation as given in reprint; but I do not take much stock in theology, yet I respect a sincere man. I detest thieves and detest myself.

Sometimes it takes me a week to get up courage to steal; I need pressure; I might be called a coward for this reason. I never dared enter a place if anyone was in it, or if I was afraid of meeting anyone there. I have been accused of stealing chickens, but never have fallen quite so low as that. I sometimes would aid the prison officers in making a reputation. I agreed to hide in a hole under a flat stone in the prison yard. I was fed like a king. Every officer said that I had escaped except this one officer, who maintained that I was in the prison. He had kept the men on the wall day and night so long that they had voted him a fool. It would have been his plan to have deceived me and get the glory, by showing that he was right after all in maintaining that I was in the prison, but he did not arrange well enough. This officer was afraid he might lose his position through change of administration; hence his scheme.

If an officer once has the ill will of prisoners, it is very hard for him to gain it back. I do not want to have my head measured, I have no interest in it; I admit it is prejudice, although I would oblige you as much as I can. I have never had a photograph taken. I do not see I am any more a thief than those outside of prison, and I don't see why you have come to me. I have been unlucky, and also a fool not to steal in other ways, by forging paper or many ways like the " kid-glove " thieves outside; and as long as society allows those to parade our streets, I have very little conscience about stealing. I never stole more than a hundred dollars at a time, but those fellows steal their thousands. I do not want my head measured; they measured my height once, and my wife blamed me for that. I can not write my biography just now; I do not want to write till I know I am free. If I am released I will write it for you. I often change my name, giving that of letters in my pocket. A prisoner bet me once that I could not get out that night. At dinner table I took a knife and a few cold potatoes to my cell, when it was late and the guards had come to the conclusion that all was safe, I nicked the knife on the iron slats of my bedstead to make teeth, and then, with the candle behind a screen and by the moisture from the cold potatoes, I gradually tempered the knife sufficiently so I could saw the iron bars of my cell window, and thus I escaped.

Since this interview " D " has been released, has secured employment at good wages, and is doing well. But he has failed to write his biography; he has been written to, but no reply has been received. " D " is being tried on a charge of being a professional burglar.

CONCLUSION.

" D " is a sort of criminal genius, especially in his ability to escape, and also in his faculty for invention. His extreme cautiousness is evident. He is very agreeable and modest in manner, but can be irritated, probably owing to the fact that his manner of life has been a severe strain upon his sensitive nervous system.

He blushed quite frequently during the conversation, and did not seem to like his reputation for being a genius in crime. He has little vanity, when compared with criminals in general. He has a clear insight as to the foolishness of crime; but it must be confessed that this idea has come somewhat late, as as he is about 40 years of age.

While he has a very strong passion for invention, there is an extreme feebleness in resisting the temptation to lying and crookedness. Environment will not account for his criminality.

MEANNESS.

There are very few criminals who do not manifest the quality of meanness occasionally, either as an expression of dislike or retaliation. The term "meanness" is intended to be applied to those individuals who hate almost everyone around them, and who persist in displaying it in the form of meanness. The relation of this condition to that of crime is very close, and the one is generally followed by the other.

CASE E. MISS "E." FROM RECORDS OF INSTITUTION.

Received April 30, 1887, from the court of special sessions in ———, for being a disorderly child. Age, 15 years; weight, 86 pounds; height, 1,066 mm.; blue eyes; light-brown hair; light, sallow complexion; poorly clothed; reads in Second Reader; can not write; has stepmother; own mother was a half-breed Indian; stepmother in penitentiary; "E" lived at ——— house until 12 years old; one of her sisters lived there also; has two half brothers in orphans' home somewhere; Protestant; American parentage; father works in sawmill.

COMPLAINTS.

1888, December 4, by a teacher: Disorderly in her classes and impudent when reproved (locked out of school).

December 14, by dressmaker: Doing poor work; feigning ignorance of all kinds of sewing, which she understands (isolation).

December 28, by night watchman: Quarreling, pulling another girl's hair out by the handful, scratching her face, and calling her vile names (deprived of afternoon recreation).

1889, January 12, by dressmaker: Talking and disorder at table, during past week twice a day (one week).

January 25, by laundress: She and Miss F appropriated to their own use handkerchiefs belonging to first-division girls; also contention in the breakfast room (two weeks).

February 9, by Teacher A: Talking in a vulgar manner for the benefit of her class about the things she saw on her sleigh ride (whipped).

February 21, by laundress: Impudent every day (locked in her room till 23d February).

February 24, by Teacher B: Disorder in chapel; when motioned to, continued to laugh throughout the service; was spoken to, and replied in an insolent manner; said she usually behaved much worse.

Other complaints: March 4, March 11, April 5.

April 12, by laundress: Quarreling hourly; neglecting her work to meddle with that of others; playing pranks during my temporary absence, and exasperating insolence (whipped, April 15).

Other complaints: May 19, July 27, August 8.

August 17, by dressmaker: Diabolical conduct for three days in succession (confined in her room one week).

September 6: Throwing kisses at the boys as they pass through the yard.

September 14: Other complaints, September 19, September 20:

October 5, by dressmaker: Always ready for a fight and exhibition of temper (two weeks; just released from lodge [a] on parole, upon most earnest promises of good behavior, violated every day).

October 6: Other complaints, October 11, October 19, December 5.

1890, January 4, by teacher: Worst possible conduct at school (January 4, expelled from school and put in the lodge).

January 6, by night watch: Vulgar language at play.

January 8, by dressmaker: Exhibiting her temper by breaking her machine needle; slamming her work around and dishes at meals (January 10, caused by penalty of January 4).

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[a] Place of confinement.

January 31: Other complaints, April 11, May 3, May 22, June 11.

June 16, by dressmaker: Furious anger because she could not go to A's funeral; disorderly and insolent in dining room; perfectly reckless of law and order in the department; a "tantrum" lasting several hours; her power of annoying baffles description (four weeks).

June 20, by dressmaker: Open rebellion during five days, breaking every well-known rule, saying she never "feared any one in her life, and she never would" (four weeks).

Since June 20 till October 2, 1890, when Miss "E" was discharged, there were verbal complaints almost daily which, summed up, would be under the head of general insubordination, with abusive and profane language, etc.

After Miss "E" had been home with her father six or eight weeks he wrote that she was beyond his control; that he had obtained seven or eight places for her in families, but no one would keep her. As Miss "E" was of age, no quarterly reports to the institution could be required of her. She wrote but one letter (soon after her discharge) to the institution, the motive of which seemed to be to give information of the festive life she was leading in her own town, and, she would have it thought, under her father's care.

TESTIMONY AS TO MISS "E."

Lady superintendent: "She does not want to sit still; is restless; was seriously sick with diphtheria and very irritable after that; wants to get mad; has 'cheek' in contemptible way; she is always at war with the conditions; very active; speaks clearly, speech flows easily; swears just like boys, and uses obscene words; does not care for boys so much; she is not sneaky, but acts openly and defiantly; she is not a thief; never caught her actually stealing a thing; always pale when she is mad; she wants to be noticed; she has a trick of calling for something else after she has eaten all she wants, it is refused, then she flies into a passion; she does not throw anything; she does not destroy her property; she never attacked any of the officers, but has attacked the girls—she does this when excited by jealousy; she never tries to escape or talks about it; she has grown worse in more frequent attacks, and especially during her sickness, and is better in making some effort to be good. Her medical certificate put down her character as questionable; she has had one miscarriage; she was going to pray to God to help her to confess; she admits having relations with a man, but denies the miscarriage."

Chaplain: "Miss 'E' admitted leading an abandoned life; her mother was a prostitute; she was adopted by Mrs. ———, then by Mrs. L., then by Mrs. S., remaining a year, then by Mrs. H., then by uncle; entire family are morally bad; she ran away from her aunt, and made bad people her companions; she has a fiery disposition bordering on insanity; she became a little interested in the religious meetings; she was very angry because she could not go with the girls to join the church. She cried when I talked with her about her temper; she said she could not control herself, but did not cry when relating her history. She said: 'I can't even wear a badge; I try, but everybody seems to be against me. I liked handiwork, but did not want to sew; I want some nice easy place in a nice family, where I will have little work and an easy time.'"

INTERVIEW WITH MISS "E."

"My mother was a runabout. She brought a man and said he was my father. She went with another man, also. My father treated me well sometimes. My uncle used to whip me. I can't help it, I always tell the truth. The strap never takes anything out of me. I feel my face burn when I get angry. I am disobedient. I have the

most patience at my work. My uncle whipped me six times. My mother hit me with a big iron spoon when I was 2 years old. My grandpa would slap me hard. He threw his boot at me once. He struck me across the back with a box. My Uncle J. used to tie me to the bedpost and whip me with a strap, letting the buckle hit me. This made me spunky. My Uncle J.'s wife would talk vulgar. Charlie A., married man—he was not a good man—all the way I can express it is that he destroyed my character. His wife was a good woman. They were poor. When I get angry I don't know what I am saying. My sister was adopted because mother was not a nice woman to bring up children."

CRANIOLOGICAL EXAMINATION.

Width of head, 146 mm.; length from glabella to occipital protuberance, 173 mm.; maximum length of head, 173 mm.; width above tragus, 127 mm; width between zygomatic arches, 122 mm.; width between external edge of orbits, 90 mm.; distance between outer corners of eyes, 80 mm.; distance between inner corners of eyes, — mm.; width between protaria malar, 97 mm.; width between gonia, 80 mm.; distance from chin to hair, 127 mm.; distance from chin to root of nose, 96 mm.; distance from chin to base of nose, 62 mm.; distance from chin to mouth, 41 mm.; distance from chin to tragus, 104 mm.; distance from tragus to root of nose, 91 mm.; length of ear, 57 mm.; length of nose, 41 mm.; height of nose, 38 mm.; elevation of nose, 15 mm.; width of nose, 28 mm.; width of mouth, 45 mm.; thickness of lips, 10 mm.; horizontal circumference of head, 533 mm.; vertical circumference of head, 329 mm.; sagittal circumference of head, — mm.; angle of profile, 63°; nationality of father, American; nationality of mother, American; occupation, none; color of eye, bluish gray; color of hair, light. Remarks: General symmetrical head; assimilation, fair.

PHYSICAL EXAMINATION (BY PHYSICIAN OF INSTITUTION).

All functions, normal; circulation, good; heart, normal; respiration, 17; pulse, 70; digestion, perfect; no anomalies; girth of thorax, 787 mm.; girth of waist, 609 mm.; girth of calf of leg, 310 mm.; weight, 42.18 kilos; physical anomalies, none.

AUTOBIOGRAPHY.

The first of my life I went to live with my grandmother, and she was not a good woman, and she taught me wrong things when my father was not there; and she had a son that was very bad and would insult me often, and if I would say anything to him my grandmother would whip me, and I would not dare to tell my father for fear of getting another whipping; and I lived like that for about six years, when my grandmother died; and then I lived with my uncle, and he used to scold and whip me when his wife was there, and when she was gone he would insult me.

He would say, "If you dare to tell Martha I will whip you till you can't stand on your feet," and so you see I was small and did not dare to tell my father, and then my Aunt Mary wanted me to live with her and take care of her baby; and I went there, and she did not get me anything to wear nor paid me a cent, and then it made me angry, and then I said if I could not get paid for honest work I can be paid for dishonest work, and so I did; and then I went down to H. and stayed to some houses and went wherever I wanted to; and when I got tired of that I went back to my father's and told him I wanted a place to work, and then I went to C. and lived with Mrs. B., and she was very kind to me; and in a short time Mr. and Mrs. S., from A., came after me to live with them; and after I had been there a short time my mother came after me, and I would not go with her, and when she saw I would not go she tried to get some men to steal me at night when I would

go to some of our neighbors; and then I wrote and told my father, and he came and took me to H., where he boarded, and was there a while; and then I thought I could do as I pleased, and then I came to where I am writing this. That is all I can remember about myself now.

(Signed by Miss "E.")

MR. MAC DONALD: You say you wanted to know what would help me. The only thing that will help me is to have my father and mother live together and me live with them. Now I have told you all I have done and what would make me a good girl. Please excuse my writing, for I have had a little trouble [a] in my department this morning, so this is all.

(Signed by Miss "E.")

CONCLUSION.

It is quite evident that the early surroundings of this girl are sufficient to account for her meanness and criminality. Had she had good bringing up, she no doubt would have been a disagreeable and spunky girl, but not a criminal.

In her interview she was pleasant and is not unprepossessing, and one could hardly suspect that she was what she was. It is not difficult to prophesy her future.

HISTORY OF "F" (FROM RECORDS OF INSTITUTION).

Received February 22, 1890; offense, petit larceny; complainant, grandfather; plea, guilty. Father, American, intemperate; no insanity or epilepsy in family; father was a lumberman; he reads and writes; father was arrested for getting money on a check, and convicted and sent to State prison; mother is a hotel cook; parents are separated; "F" resided with grandparents seven years; attended Sunday school with grandparents; never arrested before; sent here for forging his grandfather's name to a request for money addressed to the boy's aunt; he obtained $4; age, 15 years July 12, 1889; blue eyes; strong and well; a little coarse; brown hair; fair clothing; dark complexion; weight, on admission, 132 pounds; May, 1890, 137 pounds, height, on admission, 5 feet 4½ inches; May, 1890, 5 feet 5 inches; chest on admission, 33–35 inches; May, 1890, 32–36 inches; education Fourth Reader; deficient in arithmetic; previous occupation, canal driver.

COMPLAINTS.

1890, March 24, by teacher: Replying to a request to keep still at table in an impudent and vulgar manner; at first he denied it; but said afterwards he might have misunderstood what he said (admits, reprimanded).

April 4, by patrolman: Scuffling with other boys in the yard; very disorderly to-day; pays no attention to any warnings (admits, held open).

April 7, by patrolman: Scuffling and boxing with the boy "K."; throwing him down and tearing his clothes; had to speak to him Sunday afternoon.

April 27, by gardener: Disobedient, saucy, and unruly to his captain; could not be corrected by him, bad conduct all day (five weeks).

April 30, by teacher: School-room offense with nine others (each one week).

May 2: Striking the boy in front of him in the neck (four weeks).

May 7: Using vile language at the supper table, because the bread was not passed (admits; three weeks).

May 8, by blacksmith: Left the shop this morning to go to first A. drill, but went to the water closet from where he had just come; I gave orders to go to drill.

May 9, by watchman: Going into R——— dormitory this morning.

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[a] The "trouble" was a fight.

May 13, by patrolman: Disorderly on parade; running across the seats in water-closet (admits).

May 19, by carpenter: For disorder in W. C. (admits).

June 5, by watchman: Talking across the hall and fooling with boy "S."; told him to obey; he refused (three weeks).

TESTIMONY AS TO "F."

Chaplain: "F" is not an attendant at church; was in school till 12 years of age, since then he has worked on canal in summer and been idle in winter; he was a periodical attendant at Methodist Church; his home training was very poor; he formerly used tobacco, but has abstained for a year; he uses profane language. He was idle when arrested. His family don't attend church; his grandparents do; "F's" father is a habitual drunkard; not arrested; the boy's record is bad; his grandparents did all they could to bring him up right; but the characters of his father and mother were said to be bad."

INTERVIEW WITH "F."

"F" says: I wanted to get $4 to go down to W. to get work, so I "pulled" my grandfather. My father used to whip me for lots of things. Sometimes he would kick me all over. He would whip me three or four times a year. My grandparents are poor, so they sent me here. I intended to behave myself, but they would not believe it. My grandparents treated me all right. My father and mother separated at the time I was 9 years old. My father never hit my mother and never hit me when she was around. I was about 6 years old when I was sent for the first time from my parents. My father would whip me when I would not give him what money I had. I did not think my forging would turn out like it did. I intended to pay it back. My father was in prison three years. Another boy told me how to forge. He said my parents would not arrest me. I never stole anything in my life. I went to five or six different places and came away of my own accord, and then told my grandparents that they sent me home for a little while. After that I would go to other relatives and visit a while and help them if they wanted me to. I got mad quite often. I don't get mad at the officers, but at the boys. I used to get mad at the boys before I came here. I was always getting mad. I was always liked (?) by the boys. They asked me to go with them. I never got mad first. My mother left my father because he spent the money for drink. I would stay at each place about a month and then leave of my own accord. I would tell my relatives that I did not like it—did not like to work there.

CRANIOLOGICAL EXAMINATION.

Width of head, 142 mm.; length from glabella to occipital protuberance, 194 mm.; maximum length of head, 194 mm.; width above tragus, 127 mm.; width between zygomatic arches, 120 mm.; width between external edge of orbits, 102 mm.; distance between outer corners of eyes, 89 mm.; distance between inner corners of eyes, 32 mm.; width between protaria malar, 140 mm.; width between gonia, 85 mm.; distance from chin to hair, 178 mm.; distance from chin to root of nose, 120 mm.; distance from chin to base of nose, 80 mm.; distance from chin to mouth, 32 mm.; distance from chin to tragus, 125 mm.; distance from tragus to root of nose, 106 mm.; length of ear, 57 mm.; length of nose, 45 mm.; height of nose, 40 mm.; elevation of nose, 15 mm.; width of nose, 29 mm.; width of mouth, 45 mm.; thickness of lips, 16 mm.; horizontal circumference of head, 571 mm.; vertical circumference of head, 365 mm.; sagittal circumference of head, 358 mm.; angle of profile, 648; maximum distance from chin to back of head, 255 mm.; forehead retreats somewhat; large and thick-set body, fairly proportioned; flat nose.

PHYSICAL EXAMINATION (BY PHYSICIAN OF INSTITUTION).

Vegetative functions, normal; circulation, good; respiration, 16; digestion, good; anomalies, none; girth of thorax, 33½ to 36 inches; girth of waist, 29 inches; girth of thigh, 20½ inches; girth of calf of leg, 14 inches; weight, 142 pounds; pulse, 74.

CONCLUSION.

Surroundings evidently made this boy a criminal, and drunkenness gave the initiatory. The boy is rather dull and slow generally, and very unprepossessing in appearance.

GENERAL PRACTICAL CONCLUSIONS.

As to the directly practical side of crime and its prevention, the State has made and is making experiments. But sociological experience of this nature requires much time and numerous tests in order to warrant trustworthy conclusions, and at best they are tentative in nature, for social science is in its formative period.

GENERAL CONCLUSION.

As to the scientific study, cure, and prevention of crime, it may be said, in brief, that the method of the scientific study of criminals is a thorough investigation of the criminal himself, both psychologically and physically, so that the underlying and constant cause of crime can be traced out. There is no other rational road to the prevention and repression of crime. Whatever the remedy, the causes must be studied first. Negative results are as important as positive, to science. If it should be shown that some crime is incurable, that would be valuable to know, especially what degree of reformation can be expected. If, as Lombroso thinks, crime is to return to the primitive and barbarous state of our ancestors, the criminal being a savage born into modern civilization, then for such there is very little reformation. But these are criminals by nature and constitute a very small proportion—less than one-tenth. The French school of criminology has shown that the greater part of crime arises out of social conditions, and hence is amenable to reformation by the changing of these conditions. Major McClaughry, of wide prison experience, and warden of the Federal prison in Kansas, considers criminal parentage and associations, and neglect of children by their parents, as first among the causes of the criminal class.

Now, education, in the narrow sense of mere intellectual instruction, is not sufficient to reform children who spend one-fourth of the day in school, and three-fourths on the street or with criminal, drunken, or idle parents. But are there not reform schools? Yes; but no provision has been made for the little children. Not a few of the inmates of reformatories come there practically incorrigible, and the testimony of prison wardens is that some of the most hopeless prisoners are graduates of the reform schools. The fault is not in the reform schools, but in allowing children to live the first years of their lives in surroundings that almost predestine to crime. Reformatories are expected to erase the indelible criminal impressions made upon children from birth, or before, till the age of six. Instead of deserving criticism, the wonder is that reformatories do as much as they do. In brief, it is useless to expect any great decrease in crime, especially habitual crime, until very young children are properly cared for—that is, until they receive the moral and social education of a home or home-like institution. This is the foundation of all prevention of crime. But much remains to be done after a child has had this good start, for there are still dangers of falling into crime. The method of prevention, from this stage on, consists in moral, mental, and physical training, producing fixed habits.

The criminally inclined are especially weak in moral impulse, and below the average in intellect and physique. The education of the will is the main factor, but the training of the intellect and sentiments are necessary to this end. The remedy, therefore, for crime must be general, gradual, and constant; there is no specific. Every reformatory is a school in which emphasis is laid upon moral and industrial habits, which in the young become, as it were, a part of their nervous organization. This is shown by the fact that moral individuals, when hypnotized, unconsciously resist evil suggestions. When passion, perplexity, or temptation cause the loss of self-control, then it is that good habits implanted in childhood and woven into the constitution overcome evil and criminal impulses.

All prisons should be reformatories. All men, no matter how old in crime, can at least be improved and benefited—that is to say, the best prisons of the future will be reformatory prisons, and the main means of reform will be the inculcation of good mental, moral, physical, and industrial habits.

CASE OF H.

As a study in education and criminology the following case of H. is of interest, for he is an educated man, as the world goes, a doctor of medicine, graduate of a university, and a man above the average criminal in culture, appearance, and general intellectuality. The importance of studying such a man is to note the gradual steps that led him to his fate, which he probably never intended. No man, as a rule, seeks to have his own life taken from him. He gradually gets accustomed to doing things, and forgets the feeling of the community. He then becomes careless and finally is caught. The intellectual education of a man at least fills his mind with subjects calculated to do him good. They do not tend to crime. But, of course, it is the moral side of education that has to do with the study of the criminal. It shows the importance of good habits, which the criminal seldom has. His life is irregular. He is a wanderer, from sociological necessity, and this wandering spirit leads to a feeling of irresponsibility. A man among strangers is liable to regard them as in a manner enemies.

As most criminals, like H , are seeking their own pleasure, if money leads to it, it is a question of degree how far they will go. If the question is asked whether the acts of any criminal, his life, or any special deed are due to himself or to his surroundings, we say that the surroundings caused the crime, and when they are due mostly to him we say he is a criminal by nature. Where a man is admittedly a criminal by nature, he is three-fourths like other men; and what is true in general of the physiology and psychology of criminals is almost as true of all men. So that when we are studying criminals we are really to a large extent studying human beings, only criminals are more convenient to study when they are in prison.

A common characteristic of the criminal is his vanity—the effect his crimes are liable to have on the community—and H. was not an exception to this rule. Some criminals when performing a bloody act get into a sort of spasm, and after they have killed their victim hack him to pieces, and then lay down through exhaustion and sleep right by the side of the body until they are rested.

Criminals are dangerous to the community, and should be shut up and not let out until there is reasonable certainty that they are no longer dangerous, just the same as we treat the insane. It is very difficult

to tell the degree of guilt of any man, simply because we do not know his hereditary tendencies nor the special conditions and surroundings under which he was at the time of committing his deeds, but it is conscience. That is, when he was wronged he felt it (many criminals are very sensitive on this point). But in wronging others he was willfully made obtuse by his overt acts. Criminals are frequently accused of things they don't do, which shows the great disadvantage of having a bad reputation, which most of them earn. He was a deceiver by nature; and this, coupled with his greed for money, gradually led him into serious acts. But how shall we account for this criminal? In one sense such a question involves the whole inquiry into the origin of evil itself. It will not do to say that he is a man born out of his time. It is not plausible in the case of a murderer by nature, for the taking of human life was very common in the early races of men. But H. was effeminate in nature, and when taking human life he used an effeminate method, poisoning. Throughout the history of crime this has been woman's method. We do not know enough about the origin of society to account for the beginning of deception. It is evident from the letters that his greed for money, with little or no aversion to deceive, and his poverty gradually led him on. Poverty is often an occasion but not a cause of a great deal of wrongdoing.

His strong impulse to deception and greed was the hereditary side of his character; the degree to which he developed them into criminality depended upon his environment.

The prisoner did not desire, and therefore the authorities did not permit, that an instrument be put upon him while on the scaffold and after he dropped for the purposes of measuring the effects of the emotions upon the movements of his chest while standing upon the scaffold and the reflex motions of asphyxia. These effects would be transferred to the muscles of the thorax by means of the kymographion; the chest movements after the fall of the drop, the rate of their temporary increase or decrease, and their periodicity could probably have been determined. It was not expected that from one single case any very important results could be obtained, but by observing the different effects of hanging when the neck breaks and when it does not, and also the effects in cases of electrocution, the comparative degree of pain and the length of duration of consciousness might be determined. This would aid in a scientific study of the physiology of death, of which very little is yet known. Physicians are allowed to study persons of the highest respectability both in private practice and in hospitals, and the knowledge thus gained has been utilized for the good of humanity. It is therefore difficult to see serious reasons why the greatest enemies of society should not be used for the benefit of society, provided, of course, no injury is done them.

In reply to the remark that it was temporarily assumed that he (H.) might be guilty of some of the crimes he was accused of, the prisoner made the following statements:

STUDY OF H. IN HIS CELL.

He said: "I did not deny my guilt for several reasons; people would not believe me even if I told the truth. My counsel will tell you the reasons. I am preparing my affairs with a view that I am to be executed. I prefer it to imprisonment for life. If I were not

executed the insurance companies would make an example of me. If I am accused of seventeen murders, and the three insisted upon are shown to be false, how can anyone believe me guilty of the others? I lived in Chicago ten years and had a good reputation."

When told that there was a moral certainty that he was guilty of one or two murders, and there were reasons to suspect that he had committed a number, he laughed. When told that the most intelligent and aristocratic criminals seldom confess on the scaffold, he said he did not desire to confess on account of his relatives.

H. said he was going to cut the interview short, remarking when I was preparing the kymographion that I would use all my half hour with this; that another man was coming to see him whom he desired to see more than me. After I had remained much longer than half an hour he said he guessed he would cut the other man short. He did not care himself, but the prison was granting him many privileges, and so he wanted to cut me short.

When in prison at St. Louis he said he saw a negro hung, while looking through his cell window, and that pieces of the rope were taken as mementoes and fastened on the watch chains of the bystanders. Then he asked if I could believe that after such a terrible experience he would go and do things that would bring him to the gallows. I answered that of about one hundred and fifty men guillotined in Paris all had witnessed a similar execution.

He said in his book he had admitted many crimes, but had never taken life; said "he drew the line at murder." (An innocent man would hardly use such an expression.)

When told that criminals feared death more than other people and preferred imprisonment for life, he said he must be an exception; he was almost tempted to make a false confession in order to hang.

When I inserted an instrument in his mouth to measure the height of his palate, he said, as if afraid, "Don't choke me."

He complained of being troubled with strabismus from childhood; said his mother was an epileptic; that he was not nervous, but at present felt a little nervous.

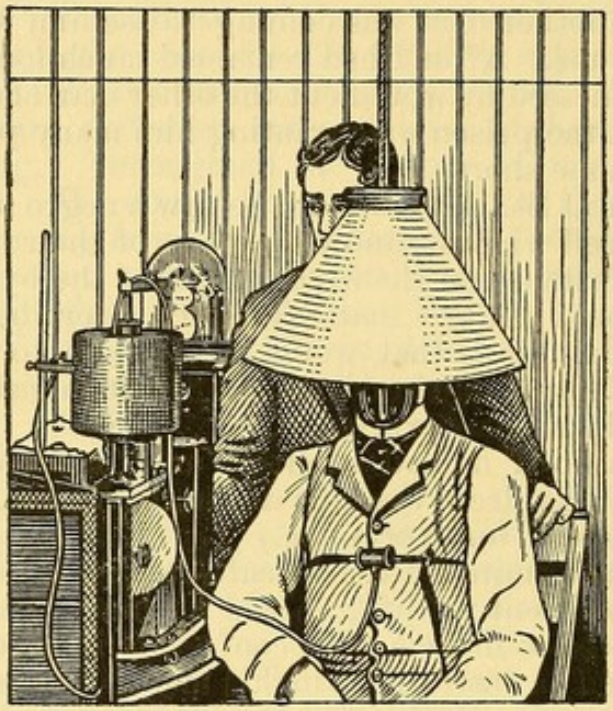
He had lived with a professor, who was his best friend, and who was at that time demonstrator of anatomy. He did not go to college, but graduated from the medical school. He added he was also a graduate in pharmacy. He would send all he had to say to his former professor (he did not do it), to whom I could write. He did not like to tell all on account of his domestic troubles, which had not been entered into. He admitted that he was married more than once.

RESULTS OF EXAMINATION BY KYMOGRAPHION.

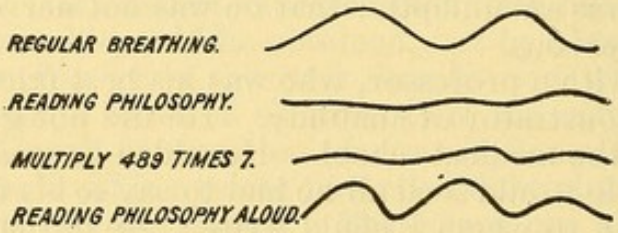
This instrument is for the purpose of measuring the effects of mental and emotional states upon the movements of the chest. Actors locate the seat of the emotion they simulate in the chest. A silk band is drawn closely about the chest, a little air-tight cylinder with a delicate film over both ends, a hook being inserted in each film, was attached to the loops in the end of the silk band; from the air-tight cylinder a couple of yards of slender rubber tubing with the other end inserted in a tambour. The tube went into another air-tight space, the bottom and sides of which were wood and the top a delicate film. On this film

rested a delicate hinge, to which was fastened a fine bamboo splinter, which rose and fell with every breath. When this was placed against the cylinder of the kymographion, lines were scratched on the surface of the smoked paper, which indicated the motion of the little bamboo point. With every inhalation the bamboo splinter was raised and with every expiration it descended, making a wave-like curve on the paper.

It will be noticed that all the mental and emotional states lessened the breathing, since the waves in all the lines are smaller than those in the regular breathing (line 1). In the few experiments made this



THE KYMOGRAPHION RECORD.



The kymographion records the movements of the chest, as affected by mental and emotional states. The higher the waves in the lines the more the subject breathes.

is what generally occurs: Reading of philosophy (line 2), multiplication (line 3), affected the prisoner's breathing most. This is what generally happens, with the exception of the feeling of hatred, which is in most people a wavy line, but in the prisoner it is his most intense line; that is to say, it absorbs his attention most. Concentration of attention seemed to be much easier for him in hating than in the other emotions. As an example of the effects of emotion on H. by another method, the following will illustrate: He was accused by a prominent lawyer of having killed the P. children. They were in a room together. His eyes bulged out; he turned red, and could say nothing.

PHYSICAL MEASUREMENTS.

JANUARY 4, 1896.

Height, 72 centimeters; sitting height, 33 centimeters; strength of right-hand grasp, 34 kilograms; of left-hand grasp, 32 kilograms; maximum length of head, 191 millimeters; maximum width of head, 149 millimeters; cephalic index, 78; distance between external edges of orbits, 110 millimeters; length of nose, 55 millimeters; width of nose, 35 millimeters; nasal index, 63; length of ears, right, 60 millimeters; left, 62 millimeters (he remarked that he had injured his ear); width of mouth, 55 millimeters; thickness of lips, 10 millimeters; height of palate, 20 millimeters.

MEASUREMENTS OF NERVOUS SYSTEM.

Least sensibility to locality: Right wrist, 17 millimeters; left wrist, 17 millimeters. Least sensibility to heart: Right wrist, 4 degrees; left wrist, 5 degrees. Least sensibility to pain by pressure: Right temporal muscle, 700 grams; left temporal muscle, 600 grams; with hand algometer (Catell's), right hand, 5,750 grams, and left hand, 4,750 grams.

H. said he was ambidextrous (common among criminals). He said the example of a friend taught him to be this. Another peculiarity is the fact of one ear being longer than the other. His palate is higher than the normal, which is about 14 millimeters. His sense of locality is more obtuse than the average, which is 15 millimeters. Another peculiarity is the fact that his left hand is less sensitive to heat than his right hand. This seldom is the case with normal people. His sensibility to pain is more acute than the average; that is, on the temporal muscle.

EXAMINATION BY DR. TALBOT.

Nativity, American; age, 35; weight, 150 pounds; occiput, full, right lower than left; bregma, sunken; forehead, left side more full than right, sloping; hair, brown; face, excessive; body, excessive; face, arrested; zygomæ, arrested, hollowed on right side; ears, right lower than left; nose, long, very thin; stenosis of nasal bone; septum deflected to left; nose turned to right; thyroid gland, arrested; eyes, strabismus in left, inherited; left higher than right; jaws, slightly protruding upper, arrest of lower; alveolar process normal; left side of mouth drops lower than the right; third molars not developed; remaining teeth regular; chin turned to right; breast, marked pigeon breast, left side more than right; chest contracted, tendency to tuberculosis; arms, right normal, left 1½ inches short; legs long and thin; feet medium in size, but markedly deformed; depression on left side of skull at bregma, due to fall of brick at the age of 31; sexual organs unusually small.

There are a number of abnormalities noted in Dr. Talbot's examination, but they do not seem to me sufficient in number and degree to class the prisoner as physically abnormal. His height of palate, in my own examination, and his general demeanor would class him among neurotics.

SOCIOLOGICAL.

Antecedents and childhood: One who knew his family well says in a letter: "I was born in P., N. H., in an adjoining town to the birthplace of H., which was G., B. Co., N. H., and inasmuch as H. and his

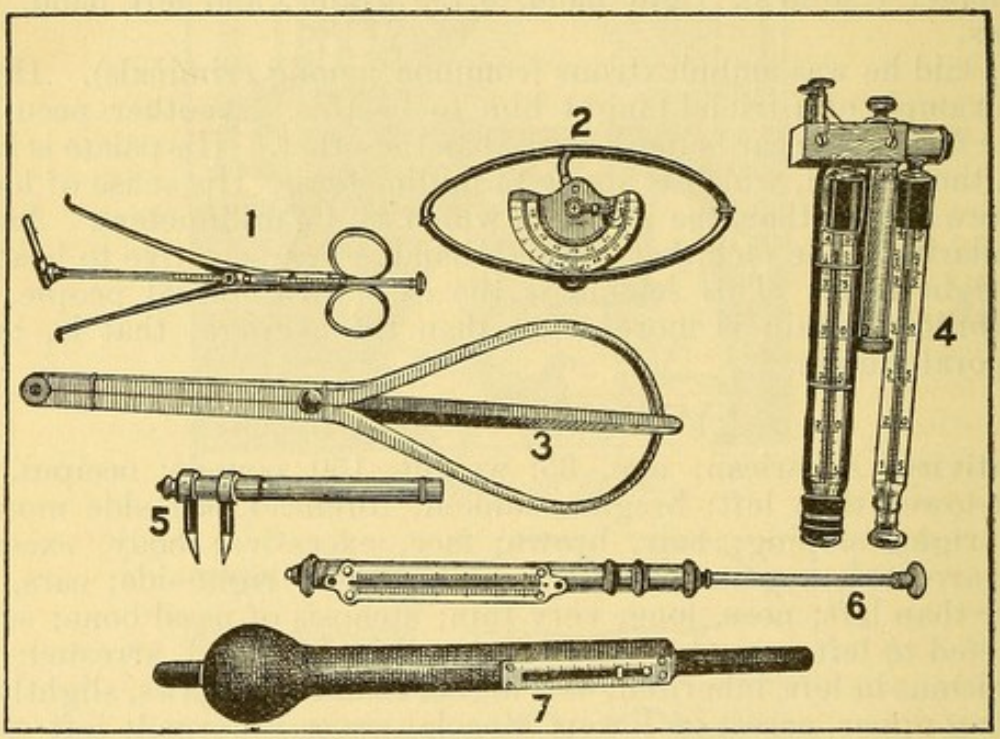
parents were frequently attendants upon my father's preaching, and as he attended the district school taught by my wife's sister, and as his wife, and part of the time himself, were in the employ of an uncle of mine, I have a definite knowledge of his youth.

"His people were very upright, God-fearing citizens, living in a quiet, secluded section of the country. There is no trace or taint of open immorality or vice in the family history for at least three generations of which I have any knowledge. I am intimately acquainted with several of his cousins, and they are all upright men.

"As a boy, H. was a quiet, studious, faithful lad, with refined tastes, not caring to join to any extent in the rude and rough games of his companions at school, and easily standing as the first scholar in his class. He was a general favorite with the mothers in that community.

INSTRUMENTS APPLIED TO H.

1. Palatemeter.
2. Hand-grasp measure.
3. Cranlometer.
4. Thermaesthesiometer.
5. Aesthesiometer.
6. Temple algometer.
7. Palm algometer.



because he was such a well-behaved lad. In his youth he was predisposed to a religious life; was a faithful, painstaking student of the Scriptures, and rather excelled in his Sunday-school class, and later in his Bible class, and my recollection is that he took an active part in the weekly prayer meetings, and was known as a religious youth."

Letter from his first wife.—In regard to his childhood days I can not say much, as I did not know much of him until he was 17 years old. I always felt that he was pleasant in disposition, tender-hearted, much more so than people in general. He was of a very determined mind, at the same time quite considerate of others' comfort and welfare. In 1881 he was at B., Vt., for the year, and in the spring of 1882 he started for the university, and, as far as I knew, was doing very well. I returned to N. H. the spring before he was to graduate, and have known very little of him since, but he has always been called very smart, well educated, and a man of refined ways. Before attend-

ing the medical school he taught school several terms and was very successful—as much so as teachers in general—and when the story came out people who had always known him said: "We can not believe this. H. would not have the heart or courage to do anything so terrible." But of course he has worked himself up to it little by little, and I think, having done some little wrong, he had been driven to a greater one for a cover, and each one growing worse, of course it is easy or more easy to go in the wrong after the first few steps.

UNIVERSITY LIFE.

Letters of inquiry were sent to his teachers and classmates, many of whom are now prominent physicians.

One of the professors in the university says: "It is true that while a student here he was for a year or two under my roof, but not in any such intimate relations with me as to justify him as looking upon me as his best friend; if so, his friends must be few. However, I am very sorry for him, even although he himself may be the direct cause of his present miseries and threatening punishments. He told me a few months ago, when I visited him in prison, that he and another classmate had worked up a scheme to defraud an insurance company a few months after they graduated in 1884 from the medical department here, but that the scheme fell through because of his friend's death, which occurred within a year after he graduated. I do not know whether he graduated in pharmacy or not. He certainly did not take that course here, as I find he was never entered as a pharmacy student. He may have taken the degree elsewhere, but if he did it was after he graduated in medicine, as he made no claim to having had a pharmacy course when he was here.

"There were several things that occurred while he was here as a student that in the light of subsequent events show him to have been even at that time well practiced in criminal habits. Although he was married and had his wife here for a time doing work as a dressmaker and assisting in supporting himself and her, yet he got into trouble by showing some attention to a grass widow, who was engaged in the business of hair dressing. This woman made some complaints to the faculty during the latter part of his senior year, and the stories that she told, had they been confirmed, would have prevented him from graduating. But I had no reason to doubt his word at that time, and his friends lied for him so vigorously that I was wholly deceived and defended him before the faculty, and he was permitted to graduate. On the afternoon of commencement day he came to me of his own accord, with his diploma in his hand, and said: 'Doctor, those things are true that that woman said about me.' This was the first positive evidence that I had received up until that time that the fellow was a scoundrel, and I took occasion to tell him so at that time. I subsequently learned, however, that he had made two attempts to enter my house in the character of a burglar, and also that he had, while occupying a room in a portion of my house, attempted to force a drawer in my library in which I had been in the habit of keeping some valuables. Three months after he had graduated in medicine, and knowing full well what opinion I entertained of him, he wrote me asking for a recommendation to assist him in getting an appointment as a missionary to Africa. This, I am satisfied, he did simply from the spirit of devilishness, and not that he had any serious intention of carrying out

such a purpose. These, and many little incidents that I might relate to you, some of them personal experiences of my own with him, and others that have been told me by members of my family, serve to further illustrate these traits in his character, but they are all of the same nature as those that I have mentioned."

Another professor says: "Personally, I can not recall H.'s features. I only remember that he failed to pass in my work and that I voted against his graduation."

TESTIMONY OF HIS CLASSMATES.

1. "Myself and family lived in the house with H. and his family almost one school year. His family consisted of a wife and one child (a boy about 4 years old). His wife was a very pleasant woman and willing to make any sacrifice that she might help him along in his course. She finally went out to work and gave him her earnings. She was subject to convulsions of some kind, and while at work he gave her such quantities of bromide that her face broke out very badly. Every one thought it too bad for her. He must have been in very straitened circumstances, for he managed different ways of getting along. I remember he built a barn for a widow woman who was studying medicine in the homeopathy department at that time. She told me how H. beat her on the barn. He was very dishonest and tricky any place you found him. He would borrow everything of the students that he could to save himself buying. I have no picture of H. Would never have recognized him by his picture in the papers. At that time he had a rather slender face, wore chin whiskers, not considered good-looking; but I remember he had treacherous-looking eyes. Another piece of his wife's economy was to borrow our sewing machine and completely turn a coat for him. He was not a graduate in pharmacy to my knowledge."

2. "It happened that H. acted as steward of a boarding house (only table boarding). It was his duty to keep the places at table filled with students and collect the money weekly. My recollection of him is quite distinct. None of the boys ever knew much of him (further than that he admitted himself to be married), or had much to do with him. His associations with his fellow-students amounted to but little, because of his way of living. He had no money, at least that is what he always said. For his meals he conducted the club, while he slept at Dr. H.'s house. (Dr. H. was then demonstrator of anatomy in the university.) This brought him to the boarding house only at meal-time. The money was collected by H. regularly every Saturday evening. He was, as I remember, always punctual in performing his duties, and also regular at his meals. Even now I can see him sitting at the lower, dark end of the long table, saying but little and laughing seldom. He was of a remarkably taciturn disposition, apparently very indifferent to his surroundings, coldly methodical, unresponsive to humor, and very brief in his statements. His topics of conversation were mainly concerning Dr. H.'s operations upon his private patients. H., as I have said, slept at Dr. H.'s house. He always accompanied Dr. H. upon his night trips. We students, remarking the thing, always thought that H.'s quietness was due to his rest being broken and irregular, having always to hitch up the horse for the Dr.'s use, perhaps accompany him, and then stable the horse upon the Dr.'s

return. I remember once of asking a medical student how H. answered up in his 'quiz.' The answer I got was that he was not very reliable or exact in his knowledge."

3. Health officer in a well-known city says: "From October, 1883, until June, 1884, I boarded at a boarding club. This club was run by H., who was at that time a member of the senior medical class. He collected the board money and drummed up boarders among the students, receiving his own board free for the services rendered. I sat at the same table with him during most of the year. He assisted Dr. H. in his private dissecting room and in the injection of bodies received for dissection. He kept the cloakroom, receiving small fees from students engaged in dissection for looking after their clothing, renting them drawers for their dissecting instruments, etc., and in many other ways contrived to earn small sums of money. He was at all times, while I knew him, miserably, poor and a subject for pity. As a student he was distinctly what might be termed 'dumb.' He was slow to grasp ideas and not at all ready in reasoning. I distinctly remember that we expected him to fail to graduate and that there was a general impression that his ultimate graduation was due to the pity of the professors overcoming their sense of propriety. Personally, he was not a man to attract friendship, although he was never offensive or repellant. He was rather quiet in manner, very slouchy in gait, and usually held his head low. I think (but am not positive) that he had a slight droop of one eyelid. I heard during the year succeeding H.'s graduation that he had gone to Cape Colony, South Africa, and was much surprised to note the first publication of his name in connection with the murders."

4. A woman medical student says: "I was in the same section for recitation with H. First note, a marked, almost rapt attention to detail in class work, both theoretical and practical; 2d note, very intelligent recitations; 3d note, in spite of the rather attractive physiognomy a personal feeling of repugnance, which I did not understand until his beard was shaved at one time. As I always judge a man by his mouth (as a correcting characteristic feature), I no longer wondered at the instinctive distrust."

5. A classmate who is an alienist, says: "My recollection of him is that he was a quiet, unpretentious individual, not a brilliant student by any means, but rather plodding and perhaps below mediocre, but attentive to lectures and operations. My connection with this institution has been continuous since the day of my graduation, and in the light of the experience I have had in seeing a large number of insane and defective people, I can not now recall anything about H. that would warrant me in saying that he was peculiar, degenerate, defective, or insane, or that he lacked the average mental or moral qualities."

6. "I was quite well acquainted with him. He always stated to me that he was born in England. He seemed always of a sullen disposition, not caring to talk much, a fair student, although not bright, and still he might be stated to be of average intelligence. We attended many lectures together, and occupied seats close to each other. He was not at all popular and seemingly had very few intimate friends, and the talk was that he would not be able to pass his final examinations, as, if I mistake not, he entered on advanced standing. If I mistake not he stated that he was a married man, and complained frequently

of lack of funds to complete his studies. He was often the center of comment on account of his quiet, rather sullen disposition, although he was quite talkative to those with whom he took a fancy. I do not presume that he took any particular fancy to the writer, but he frequently asked me for assistance or passed remarks about our work, and acted as if he had either some great trouble or was of a very retiring disposition."

7. "I was well acquainted with him. He and I dissected together on the same cadaver. In college life he seemed rather a recluse, seldom taking any part in the mirth or amusements of the class, and yet it was not because he was overstudious, for he was but mediocre in attainments. He wore his hair cut square across behind, which gave the appearance of a bulging cerebellum. He did not appear defiant. I do not know that he had a single confidante among his classmates. As I recall him now, he gave no promise of being an adept at good works or crime. Once in the dissecting room I remember that he appropriated the foot of a child cadaver, taking it away for his own use. He did not seem in good health at any time. His eyes were sunken, complexion pasty, and figure lean."

CONDUCT IN DISSECTING ROOM.

8. "I know of nothing in his character during my acquaintance with him which would mark him as exceptional in any way. I remember he was identified with the Young Men's Christian Association of the university, and took sides with that society in a dispute between the society and one of the professors, and he told me at one time that after graduation he intended to go to New Zealand as a medical missionary. On the whole, his conduct was such as to breed a sensation of dislike for him among his fellows. He appeared to be a good deal of a sneak, and I know as a matter of fact that he was a liar. He seemed to be fond of the uncanny things of the dissecting room, and told me at the beginning of one spring vacation that he intended to take home the body of an infant for dissection; that Dr. H. had given him one for that purpose. He seemed to derive a good deal of pleasure from the fact. Nevertheless, he was not an industrious worker in the dissecting room."

9. Classmate, president of a State medical society, says: "I saw him daily. His appearance was very ordinary. He was of a meditative, unassuming disposition, willing to talk if approached, but his manner was retiring. He was apparently most inoffensive; we then thought him stupid. In his difficulty with the dressmaker we, boylike, believed poor H. was being sinned against, and selected a law student, now a member of Congress for Idaho, to intercede for him, with the result that the faculty was lenient and H. was 'vindicated.' His bearing so little resembled that of one who sought the company of women that we regarded the incident as a great joke. Even at that time he was given to devising schemes for money-making; speculating on projects that might be taken up after graduation. We did not regard them as of doubtful integrity, yet none of them were in line with the profession he was about to be graduated into. We looked upon them as visionary. He had no chums or associates, so far as I knew; always alone, of modest demeanor, and never aggressive. It was a serious struggle with him then for bare existence, and we pitied him without thought of his merit, for he was, as we saw him, a negative character."

10. "He was a fellow to slide along without attracting any attention, and would be soon forgotten. There was an episode in which he acquired some notoriety, and if guilty showed much foresight and caution on his part. The facts are as follows: A young widow was running a boarding house, he being one of the boarders. She obtained a letter to him from his wife; she brought her case before the faculty, claiming that he had promised to marry her, and in evidence produced some letters signed in his name. He denied the charge and produced specimens of his handwriting, including notebooks, etc., which were not in the same hand as the letters produced by her. The evidence was not such that the faculty could convict on, so they let him off. The opinion among the students was that he was the one who wrote the letters."

11. "His life was somewhat in the background. He said in conversing with me that he had been in the life insurance business in New York, New Hampshire, and Chicago. He said he had traveled a great amount. He and his wife did not get along very well. Have seen her with blackened eyes as a result of their quarrels. They roomed only a few doors from where I roomed. His life was somewhat suspicious, and he was supposed to be getting bodies for the anatomical rooms in some mysterious way. He gave me a hint of this in a conversation I had with him. He told me he did not intend to practice medicine, but wanted a medical education to help him in his business. He was only a fair student; was absent from his work often, and many of us thought he would not be able to get through. He paid more attention to anatomy, surgery, and materia medica. To me he was a suspicious person, and I so treated him while we were associated together. I would often question him along the lines of business he had been engaged in and he would invariably turn the conversation into other channels. He told me how he evaded paying the extra fees nonresidents of Michigan had to pay. I was not surprised when I saw in one of the papers a short sketch of his past life which tallied with some of the things he told me."

12. "He passed by the nickname of 'Smegma' among the 'boys' of our class, due doubtless to a peculiar odor. As I remember him he appeared as a simple, harmless individual, and it has been a source of astonishment to me in noting his remarkable career of crime. He was in some 'shady' transactions while at the university. As I now look back at the picture he left on memory's wall, he was an uncouth rustic, simple in speech, rude in manner, with not one prodromic symptom that would enable one to even dream that he would one day stand as a monster of crime."

13. "He had a noticeable aversion to familiarity. During the time spent with Dr. H. he took active interest in Sunday-school work of the Presbyterian church, of which Dr. H. was a prominent and active member. I remember him as an odd character in the class on account of his seemingly friendless fate and the manner in which he worked himself into the good graces of Dr. H. About the last thing he told me was he had decided to go as a medical missionary to some foreign country after graduating, and that Dr. H. had acted in his behalf to secure for him all the necessary credentials for the undertaking."

14. "To me he was especially noticeable for his rather delicate and fair facial complexion and rather blue and open eyes. He had a thin

mustache curled up at the ends. His habits were decidedly of a secretive nature, and consequently he was never much discussed."

15. "I was quite intimately acquainted with him and can honestly say that he was the last man that I would suspect of doing the deeds of which he was convicted."

16. "He was sickly looking and troubled quite a little with boils. He was peculiar in that he did not seem to care for anyone but himself and paid but little attention to anyone. I thought he was rather repulsive in looks, but never thought him a criminal."

17. "He was a quiet, hard-working student, although in some respects a little peculiar. He was quite often found occupying older students' seats down nearer the lecturer, and in consequence was sometimes 'passed up,' as the boys used to say. He was of quite a religious turn of mind and was quite a worker in the Presbyterian Sunday school."

18. "He never made very many friends; never was hail-fellow with anybody. Was always influenced by circumstances, and when once decided upon a point would never yield or acknowledge himself mistaken. During 1884 he wore a mustache, dressed plainly, almost shabbily, and was very little with his class outside of absolute necessity."

19. "I boarded in the same club with him, and though sitting next to him at the table made very little progress toward an acquaintance; his disposition was such—sullen, I should call it—that one would be repelled rather than attracted."

20. "He was a man who tried hard to keep his identity to himself. He registered from the State of Michigan, when in private conversation he unthoughtedly admitted that he had never been in the State until he entered the university. His college career was not a bright one, as on many occasions he would try to use secret helps during his examinations. He never could carry on a conversation and at the same time look you in the face. When on the street he usually walked with his eyes on the ground."

21. "I remember having heard him referred to on one or two occasions as a 'smart Alec.' It was not generally, if at all, believed by the students at Ann Arbor that he had the necessary nerve to commit murder. As I remember, he was looked upon as a bigot and a fellow of so little consequence that it was not worth one's while to pay any attention to him so long as he kept to himself."

22. "I considered him a quiet, bright, unsophisticated sort of a young man. I saw nothing abnormal or anything to especially attract attention. He seemed rather gloomy at times and not inclined to be intimate with anyone."

23. "He was easily disconcerted on being questioned and never ranked very high in his class, but this might have been caused by him entering upon advanced standing and not taking the first year in the university."

24. "I boarded at the same boarding house as he. After a few months the landlady found that he was cheating her by various methods; each boarder that left, he would report to the landlady that the boarder had not paid him for his board for several weeks, and pocket that amount of money. Also in ordering groceries he would 'beat' the lady. The other students thereby found out that he was dishonest. He appeared to be a sneaking, quiet, unpopular man, other students not associating with him to any extent. I never knew of him drinking. He did not seem to be a 'fast' boy, but a mean fellow. As

to his scholarship I remember only that Professor V. did not pass him on some branch and H. was very spiteful against Professor V.—wrote him letters calling him vile names and spoke bitterly against him."

25. "He never entered into sports of any kind, seldom laughed, sometimes smiled in a dry, half-hearted way—he seemed secretive and afraid of suspicion."

26. "He was looked upon as one who would attempt to attain favor with the faculty by spying among the students."

27. "I was well acquainted with him. I have read everything about him since he was arrested and I know he tells the truth in some of his confessions."

Letter from one who lived in the "Castle:" "February 2, 1889, I moved into a room in the 'Castle' and remained there till December 3, 1889. He was always quick and active. If you had seen him in drug store in Englewood you would have thought him the busiest man you ever saw. Was considered the best druggist and chemist that ever came here, and his store was always filled with customers. Nearly everyone who knew him here does not believe he killed anyone; think him too big a coward. He was one of the biggest swindlers they ever knew, but when he hired a man to do any work he always paid him what he asked without a word, but if he made a bargain with anyone that could afford to lose without breaking him up he would beat him almost every time. The iron columns in front of his building are an example. He never paid a cent for them and beat them in three courts. His gas business and using the city water for two years and making them believe it was artesian water were other instances. Bringing the city gas through a tank of water, he put stuff in the water to color the flame until the gas inspectors declared that it was not theirs."

Letter from a prison chum: "It is very little information that I can give you regarding H. I met him for the first time in the jail, and was only with him for some three or four weeks while he remained in jail in St. Louis. I suppose that it was owing to the reputation that had been forced upon me that caused him to approach me and seek my acquaintance. I was then expecting to soon recover my liberty, and he stated that he intended soon to make a trip to Germany and wanted me to accompany him. I am now convinced that he would sooner or later have murdered me had I been able to have accompanied him on his intended trip abroad. I know nothing about him but what he told me of some of his former exploits before I met him. Of course you know that he told me all about the scheme to rob the insurance company, and that it was for introducing him to a lawyer who could be trusted to be allowed to know that the scheme to rob the insurance company was a fraud, etc., that I was to have $500 to enable me to fight my case or secure my liberty."

Letter from Mrs. P.'s father: "I beg to be allowed to reply that Mrs. P. is not at all in a condition to give such information even if she had it to give. It would be cruel to ask it of her. She is badly used up by the fearful ordeal she has gone through. The treatment received at the hands of officers and officials under the mistaken idea that she was a bad woman and desperate criminal, added to the horrid work of H. with herself and family, is surely enough to drive almost any woman to death or distraction. Her personal acquaintance with H. was not sufficient to give her a very concise opinion of his peculiar traits or points of character. She saw him but a few times before he

murdered her husband, and only a few times after, while at St. Louis, during the time he and his associates were robbing her of the insurance money. During the time she was being dragged about the country under the promise and delusion that she would see her husband and children, she only saw the wretch occasionally, and only for a short time. He never, to her knowledge, rode on the same train or put up at the same house or hotel where she was stopping. During this time Mrs. P. was under great mental strain. The children were confiding in him because P. had made them to understand and believe that he (H.) would be good to them. He allured P. to his death, and at the same time made him betray his family into his bloody hands. P. loved his family and would have fought for them had he thought anyone was going to impose upon or injure them. H. could show much kindness and be very sympathetic, but always, as it would seem, for the purpose of helping to carry out his murderous schemes. If his instructions to his victims in any matter were not carried out, he was quick to resent it and free to reprimand. He was 'boss' as well as executor."

CONDUCT BEFORE EXECUTION.

H. made a long confession of many brutal murders, which he subsequently admitted to be false. The purpose of this was said to be to pay his debts.

Just before his execution H. desired his counsel to walk to the gallows and remain there with him. No one desired it, but it was done because he threatened to make a scene. His statement upon the scaffold was as follows:

"Gentlemen, I have very few words to say; in fact, I would make no statement at this time except that by not speaking I would appear to acquiesce in my execution. I only want to say that the extent of my wrongdoing in taking human life consisted in the death of two women, they having died at my hand as the result of criminal operations. I wish to also state, however, so that there will be no misunderstanding hereafter, I am not guilty of taking the lives of any of the P. family, the three children or father, B. F. P., of whose death I am now convicted, and for which I am to-day to be hanged. That is all."

H. was self-possessed to the last, even suggesting to the superintendent not to hurry or to make any mistake.

APPENDIX.

BILLS.

Bills or amendments to establish a laboratory to study the criminal, pauper, and defective classes have been introduced in Congress by Senators Hoar, Nelson, Bacon, McComas, Quay, Penrose, Money, and Pettigrew; and by Representatives Ray (New York) and Henry (Connecticut).

The general purpose of these bills is a sociologic and scientific study of the abnormal classes.

The term "laboratory" is employed in the broadest sense, not only including the use of instruments of precision, but the gathering of sociological data, especially as found in institutions for the abnormal classes; also investigations of anarchistic criminals, mob influence, and like phenomena; that especially the causes of social evils shall be sought out, with a view to lessening or preventing them; that these results and those of similar work shall be published from time to time.

At present our State institutions gather more or less data annually, but little use is made of them. It is proposed to combine and summarize these results, to encourage uniformity of method in collecting data, making the work more useful to the country at large.

The laboratory feature of the work is only one phase of it, but being of more popular interest than other features, more importance has been attributed to it by the public than the purpose of the bills warrant.

If any one feature of the work is to be emphasized more than another it is that which concerns the study of criminals in prison and their social conditions and surroundings outside of prison, especially during childhood and youth.

ASSOCIATIONS INDORSING THE PLAN OF WORK.

"*Resolved*, That we are in favor of establishing at Washington a laboratory for the study of the criminal, pauper, and defective classes, it being understood that such investigation is a development of work already begun under the Federal Government; that such study shall include the collection of sociological and pathological data in institutions for the delinquent, dependent, and defective, and in hospitals, schools, and other institutions; that especially the causes of social evils shall be sought out with a view to ameliorating or preventing them."

The above or some similar resolution has been passed by the fol owing societies:

Ve Congrès International d'Anthropologie Criminelle, held at Amsterdam, 1901.

The American Bar Association.

The Pedagogical Society of the University of Moscow.

The Anthropological Society of Bombay, India.

The bar associations of Indiana, Indianapolis, Kansas, Lancaster, Pa., Louisiana, Murfreesboro, Tenn., and New Mexico.

Six national medical societies:

The American Medical Association.
The Association of American Medical Editors.
American Medico-Psychological Association.
The Association for the Study and Cure of Inebriety.
The American Laryngological Society.
The American Electro-Therapeutic Society.

Twenty-two State medical societies—Connecticut, Colorado, Idaho, Indiana, Kansas, Kentucky, Louisiana, Minnesota; Medical Society of the Missouri Valley; Mississippi Valley Medical Association; New England Psychological Society of Alienists; New England Hospital Society; Medical Association of Central New York; North Dakota, New Jersey, Pennsylvania, Texas; Tri-State Medical Society of Alabama, Georgia, and Tennessee; Utah, and Wisconsin.

Three city medical societies—St. Louis, Chicago, and Syracuse.

The medical societies of the District of Columbia, Virginia, and West Virginia.

The Presbyterian synods of California and Missouri.

The Reformed Church Classis of Paramus, N. J.

The Presbyteries of Baltimore, Md.; Butler, Pa.; Carlisle, Pa.; Chester, Pa.; Columbus, Ohio; Denver, Colo.; Dubuque, Iowa; Erie, Pa.; Hudson, N. Y.; La Crosse, Wis., Lehigh, Pa.; Lima, Ohio; Madison, Wis.; Minnewaukon, N. Dak.; Pittsburg, Pa., Redstone, Pa.; Rochester, N. Y.; Springfield, Ill.; San Francisco, Cal ; Stockton, Cal.; Troy, N. Y.; Walla Walla and Olympia, Wash., and Washington, D. C.

The Baptist Charitable Society of Maine.

The Baptist Ministers' Union of Pennsylvania.

The Baptist Young People's Association of Worcester, Mass.

The Conference of Congregational Churches of Rhode Island.

The General Conference of Congregational Churches of Maine.

The Diocese of Michigan.

The Diocese of Central Pennsylvania.

The Diocesean Episcopal Convention of North Carolina.

The Allegheny Conference of the United Brethren Church.

The Massachusetts Universalist Convention.

The Michigan Universalist State Convention.

The New York State Convention of Universalists.

The Old Colony Association of Universalists, Massachusetts.

The Minnesota Unitarian Conference.

The North Middlesex Congregational Conference of Unitarian Churches, Massachusetts.

The Plymouth and Bay Association of Ministers, Massachusetts.

The Georgia State Sociological Society.

The Winona County Medical Society and the Steele County Medical Society of Minnesota.

The Silver Bow County Medical Association, Butte, Mont.

The Missouri Conference of Charities and Corrections.

The Woman's Club of Colorado Springs.

OTHER INDORSEMENTS.

The following gentlemen now in or formerly in Congress have written letters indorsing this line of work:

House of Representatives, United States.—Hon. D. B. Henderson, Hon. Amos J. Cummings, Hon. George W. Ray, Hon. Sereno E. Payne, Hon. Irving P. Wanger, Hon. E. Stevens Henry, Hon. Tazewell Ellett, Hon. R. W. Tayler, Hon. John K. Cowen, Hon. U. S. Hall, Hon. J. H. Southard, Hon. N. M. Curtis, Hon. H. D. Money, Hon. Case Broderick, Hon. Henry C. Brewster, Hon. H. W. Rusk, Hon. Foster V. Brown, Hon. M. Brosius, Hon. William A. Stone, Hon. John L. McLaurin, Hon. H. S. Greenleaf, Hon. John Van Voorhis.

United States Senate.—Hon. George F. Hoar, Hon. Augustus O. Bacon, Hon. T. C. Platt, Hon. John C. Spooner, Hon. David Turpie, Hon. James H. Kyle, Hon. Lee Mantle, Hon. Justin S. Morrill, Hon. J. C. S. Blackburn, Hon. George L. Shoup, Hon. N. C. Blanchard, Hon. R. F. Pettigrew, Hon. M. S. Quay, Hon. Thomas S. Martin, Hon. Charles F. Manderson.

SPECIALISTS WHO HAVE WRITTEN LETTERS IN FAVOR OF SUCH A LABORATORY UNDER THE FEDERAL GOVERNMENT.

One of the main objects of the laboratory is to study statistically and sociologically as well as with instruments of precision the criminal, pauper, defective, and other abnormal classes. It is a laboratory for sociological purposes.

Some of the specialists mentioned below are in different lines of work, but these lines are intimately connected with the work of the laboratory.

AMERICAN SPECIALISTS.

Angell, J. R. (experimental psychology), University of Chicago.
Buchanan, J. L. (psycology and ethics), president University of Arkansas.
Burnham, William H. (pedagogy), Clark University, Wocester, Mass.
Barker, L. F. (anatomy), Chicago University.
Bigham, J. (psychology), University of Michigan.
Brinton, D. G. (anthropology), University of Pennsylvania.
Butler, Nathaniel, president of Colby College, Maine.
Chrisman, O. (paidology), State Normal School, Kansas.
Caldwell, W. (ethics), Northwestern University, Chicago, Ill.
Calkins, Mary W. (psychology), Wellesley College.
Dana, C. L. (nervous system), Cornell University.
Denny, C. (moral philosophy), Vanderbilt University, Tennessee.
Ely, R. T. (political economy), University of Wisconsin.
Forbes, J. F., president of John B. Stetson University, Florida.
Gardiner, H. N. (philosophy), Smith College, Massachusetts.
Henderson, C. R. (sociology), Chicago University.
Hawthorne, B. J. (philosophy), University of Oregon.
Heston, J. W., president of Agricultural College, South Dakota.
Hicks, F. C. (economics), University of Missouri.
Karns, T. C. (philosophy and pedagogy), University of Tennessee.
Krohn, W. O., psychologist in Illinois Eastern Hospital.
Lombard, W. P. (physiology), University of Michigan.
Luckey, G. W. A. (pedagogy), University of Nebraska.
MacDonald, Carlos F. (insanity and legal medicine), New York University.
Mezes, Sydney E. (psychology), University of Texas.
Merz, H. (philosophy and social science), University of Wyoming.
Mills, Wesley (physiology), McGill University, Montreal.
Mills, Charles K. (mental diseases, medical jurisprudence), University of Pennsylvania.
Mall, F. P. (embryology), Johns Hopkins University.
Patrick, G. T. W. (psychology), University of Iowa.
Pearce, F. S. (nervous diseases), Medico-Chirurgical College, Philadelpdia.
Sanford, E. C. (psychology), Clark University, Worcester, Mass.
Scripture, E. W. (psycho-physics), Yale University.
Starr, F. (anthropology), Chicago University.
Stanley, H. M. (psychology), Lake Forest University, Illinois.
Swift, E. J. (psychology), State Normal School, Wisconsin.
Scott, W. H. (philosophy), Ohio State University.
Thwing, C. F., president of Western Reserve University, Cleveland, Ohio.
Wood, H. C. (nervous diseases), University of Pennsylvania.
Wenley, R. M. (philosophy), University of Michigan.
Allison, H. E., superintendent Matteawan State Hospital (for criminal insane), New York State.
Bulkley, L. D., M. D., secretary New York Skin and Cancer Hospital.
Brown, Charles H., editor Journal of Nervous and Mental Diseases, New York.
Barr, M. W., chief physician of Pennsylvania Training School for Feeble-minded Children.
Bruce, C. E., M. D., superintendent New York Juvenile Asylum.
Brockway, Z. R., formerly superintendent Elmira Reformatory.
Crothers, T. D., M. D., editor Journal of Inebriety, Hartford, Conn.
Christopher, W. S., M. D., Board of Education, Chicago, Ill.
Carson, J. C., M. D., superintendent Syracuse State Institute for Feeble-minded Children.
Drahms, A., chaplain of prison, San Quentin, Cal.
Flood, E., M. D., superintendent Massachusetts Hospital for Epileptics.
Pallock, F. K., M. D., Cromwell Hall (nervous diseases), Cromwell, Conn.
McCorn, William A., resident physician River Crest (nervous diseases), New York City.
Shrady, G. F., M. D., editor of Medical Record, New York City.
Warner, Charles Dudley, Hartford, Conn.

EUROPEAN SPECIALISTS.

Dessoir (psycho-physics), University of Berlin.
De Watterville, M. D., editor of Brain, London, England.

Ferri (Senator) (criminal law), University of Rome.
Lasson (philosophy), University of Berlin.
Lombroso (criminology), University of Turin.
Lilenthal (criminal law), University of Heidelberg.
Marro (insanity), University of Turin.
Mosso (physiology; psycho-physics), University of Turin.
Obersteiner (nervous system), University of Vienna.
Ottolenghi (legal medicine), University of Siena.
Ranke (anthropology), University of Munich.
Sergi (anthropology), University of Rome.
Vogt (hypnology), University of Berlin.
Dr. Daniel, physician at School for Special Instruction at Antwerp.
Dr. Havelock Ellis, editor of Contemporaneous Science Series, London; author of The Criminal.
Gibson, G. A., M. D., editor of Edinburgh Medical Journal, Scotland.
Morrison, W. D., D. D., formerly chaplain of Her Majesty's Prisons, London; author of Juvenile Offenders.
Stead, W. T., editor of Reviews of Reviews, London, England.
Tallack, William, secretary of Howard Association, London; author of Penological Principles.
Warner, Francis, F. R. C. P. (abnormal children), London, England.

SUMMARY OF INDORSEMENTS OF WORK DONE IN CRIMINOLOGY, ETC., IN THE BUREAU OF EDUCATION, AT WASHINGTON, AND OF THE PLAN OF ITS DEVELOPMENT.

INDORSEMENTS OF MEDICAL AND SCIENTIFIC ASSOCIATIONS.

The International Congress of Criminal Anthropology of Europe, consisting of the leading university specialists of the world.
Six national medical associations of the United States.
Twenty-two State, four county, and three city medical societies.

LEGAL ASSOCIATIONS INDORSING WORK.

Eight State or city bar associations.

RELIGIOUS AND OTHER ASSOCIATIONS INDORSING WORK.

Twenty-five Presbyteries (in California, Colorado, Illinois, Iowa, New York, Ohio, Pennsylvania, Washington, and Washington City, D. C.).
Three State (Massachusetts, Michigan, and New York) and one district Universalist conventions.
One State (Minnesota) and three district (Massachusetts) Unitarian associations.
One Reformed Church Class, three Baptist and other religious and charitable associations.
Two State conferences of Congregational Churches (Rhode Island and Maine) and three State dioceses (Michigan, Central Pennsylvania, and North Carolina).

AMERICAN AND EUROPEAN SPECIALISTS INDORSING WORK.

Fifty-five American and twenty European specialists have written personal letters to the Government indorsing the work.

CONGRESSIONAL INDORSEMENTS.

Twenty-two members of the United States House of Representatives and seventeen Senators have written personal letters recommending the work. Bills or amendments to bills to develop the work have been introduced in Congress from time to time by Senators Bacon, Hoar, McComas, Money, Nelson, Penrose, Pettigrew, and Quay.
Government documents giving account of work have been introduced by Senators Clapp, Depew, Dubois, Money, Nelson, Platt (New York), and Quarles.
The Judiciary Committee of the United States House of Representatives unanimously reported a bill for a laboratory to develop the work, and the Senate Committee on Judiciary reported the same bill favorably. In brief, this work has received scientific, medical, legal, religious, and legislative indorsements of the highest rank. These indorsements were not formal, but committees were appointed to examine the publications of this work and report to their associations. These publications represent the work done in the Bureau of Education by the author.

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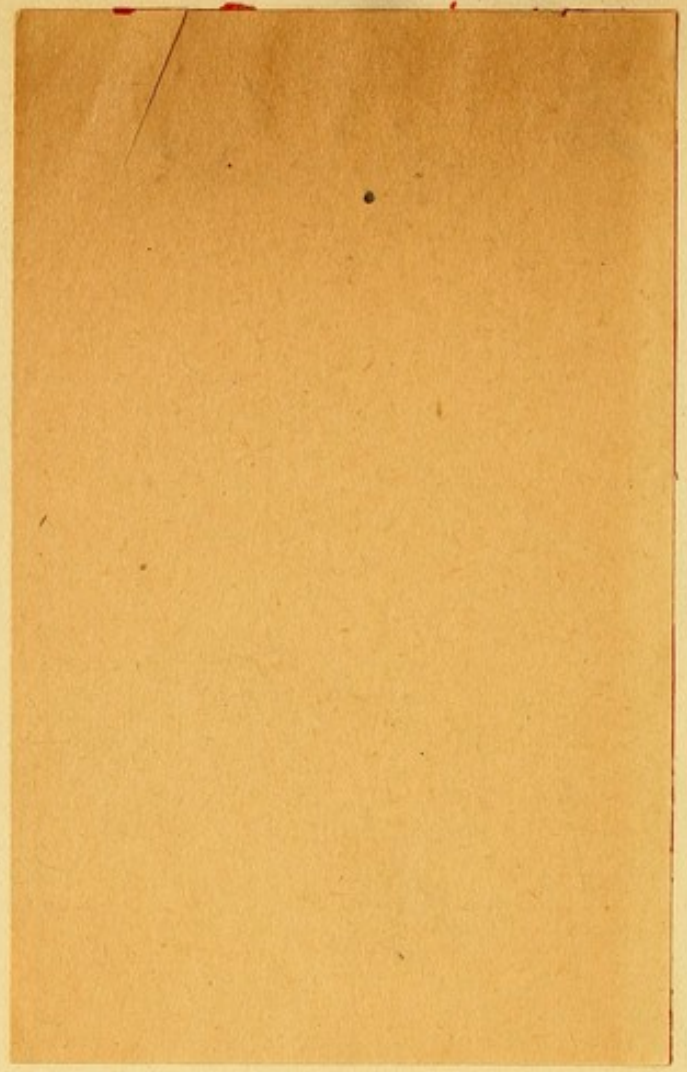

U. HOLZER,
BINDER,
BOSTON, MASS.

